



May 2014

## LAND OWNERS BOREHOLE INFORMATION - VOLUME III

# Groundwater Assessment and Development for the Vaal Gamagara Pipeline Scheme - SD1 Area

**Submitted to:**

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REPORT



**Report Number:** 11613568-12708-4

**Distribution:**

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### Table of Contents

|            |                                        |          |
|------------|----------------------------------------|----------|
| <b>1.0</b> | <b>REPORT VOLUME III CONTENT .....</b> | <b>1</b> |
| <b>2.0</b> | <b>LAND OWNERS .....</b>               | <b>1</b> |
| 2.1        | Adelle Renier .....                    | 2        |
| 2.2        | Allie Syliman .....                    | 3        |
| 2.3        | Arrie Fourie .....                     | 4        |
| 2.4        | Botha Markram .....                    | 5        |
| 2.5        | Christo Steenkamp .....                | 6        |
| 2.6        | Cobus van Niekerk.....                 | 7        |
| 2.7        | Daan van Deventer .....                | 8        |
| 2.8        | Danielskuil Municipality.....          | 9        |
| 2.9        | Dries Scheepers .....                  | 10       |
| 2.10       | G. du Plessis.....                     | 11       |
| 2.11       | G. Faber.....                          | 12       |
| 2.12       | Gerrie Cloete .....                    | 13       |
| 2.13       | Hannes Cornelissen.....                | 14       |
| 2.14       | Hannes Meyer .....                     | 15       |
| 2.15       | Hennie Van Zyl .....                   | 16       |
| 2.16       | Idwala Mine.....                       | 17       |
| 2.17       | I.H. Vermeulen.....                    | 18       |
| 2.18       | Julius Gers.....                       | 19       |
| 2.19       | Jacques Jacobs .....                   | 20       |
| 2.20       | Johan du Plessis.....                  | 21       |
| 2.21       | Johan Faihst .....                     | 22       |
| 2.22       | Keith Williams .....                   | 23       |
| 2.23       | Kokkie York.....                       | 24       |
| 2.24       | Lennox Cloete.....                     | 25       |
| 2.25       | Lucas Burger .....                     | 26       |
| 2.26       | Marika de Jager .....                  | 27       |
| 2.27       | Marthinus Beeslaar .....               | 28       |
| 2.28       | Piet Austin.....                       | 29       |
| 2.29       | Sakkie van Niekerk .....               | 30       |



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## VAAL GAMAGARA PIPELINE GROUNDWATER STUDY

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|      |                           |    |
|------|---------------------------|----|
| 2.30 | Stefaans Prens .....      | 31 |
| 2.31 | Theuns Cloete .....       | 32 |
| 2.32 | Theuns Vermeulen.....     | 33 |
| 2.33 | Thinus van der Spuy ..... | 34 |
| 2.34 | Vaughn Marais.....        | 35 |



### 1.0 REPORT VOLUME III CONTENT

An extensive hydrocensus was conducted within the SD1 investigation area during 2012. During the hydrocensus, 266 boreholes and fountains were surveyed in SD1 area with the co-operation of the land owners.

The hydrocensus survey could not be conducted on some private land areas as some farmers not allowing access. To maintain good relationships with landowners access was not forced as alternative options were available.

The land owners participating with the groundwater study, existing borehole information as captured on the groundwater data base are listed in this volume III of the report, together with the exploration borehole info (If any). DWAF remain the owner of the exploration boreholes.

Borehole information consists out of the following where relevant:

- Locality map and land owner;
- Basic existing borehole information;
- Analytical results of existing boreholes sampled;
- Test pumping results of tested existing boreholes;
- Positions of newly drilled exploration boreholes;
- Borehole logs of newly drilled exploration boreholes;
- Analytical results of newly drilled exploration boreholes;
- Test pumping results of newly drilled exploration boreholes; and
- Management recommendation of well field exploration boreholes.

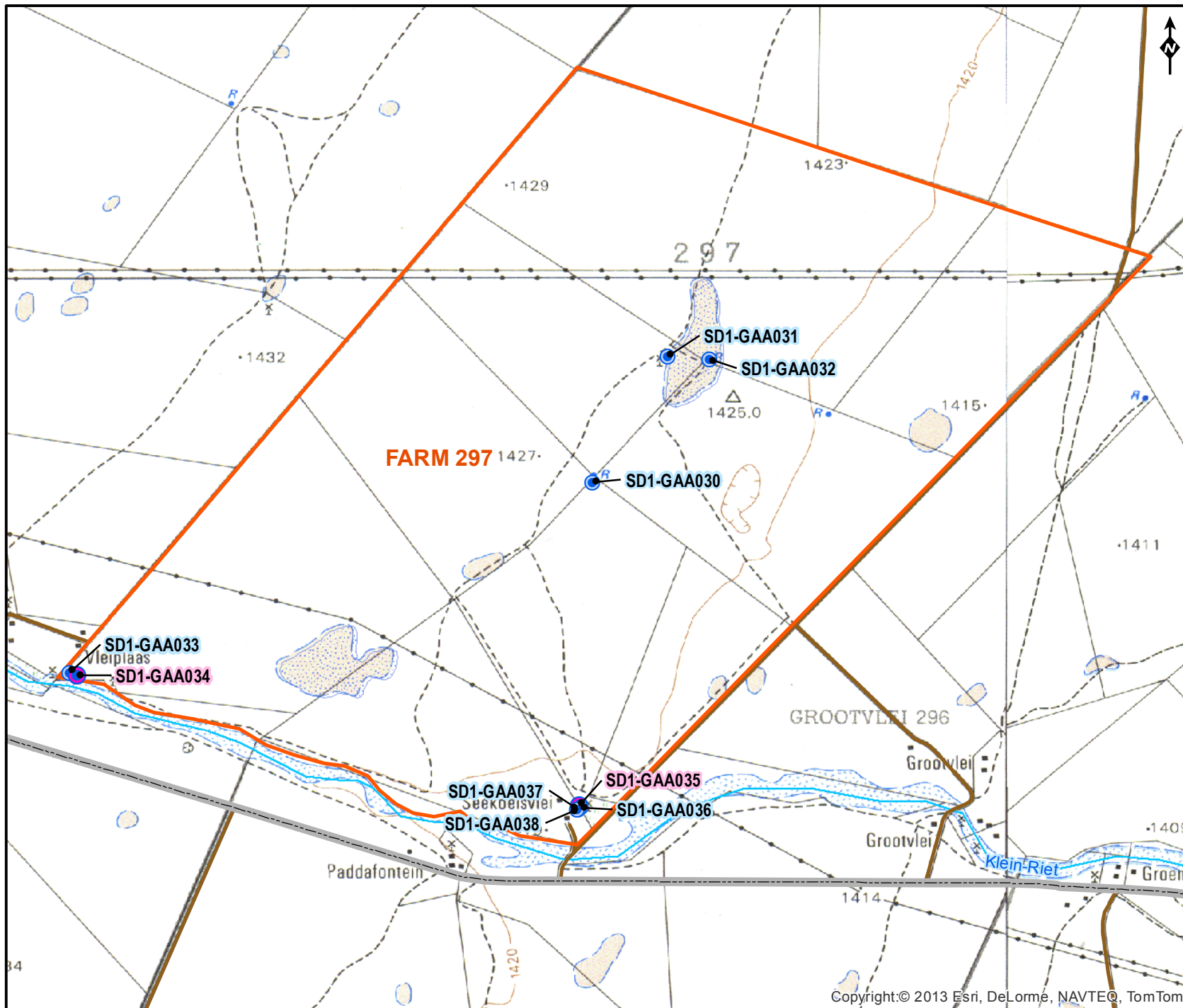
### 2.0 LAND OWNERS

The following landowners/lawful occupiers of land at time of survey who participate with the groundwater study in SD1 area, borehole information is enclosed in this Volume III:



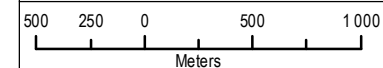


## **2.1 Adelle Renier**



#### LEGEND

- Existing borehole survey
- Existing borehole tested
- Seekoeisvlei Farm
- Secondary road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**FARM 297  
SEEKOEISVLEI  
ADELE RENIER**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:35 000       | A4         |
| GIS MB               | 25/04/2014 |
| CHECK DB             | 25/04/2014 |
| REVIEW FW            | 25/04/2014 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0029 Number: SD1-GAA030 Site type: Borehole

Distr./Farm No.: 297/0 Site Name/Descr.: SEEKOEIVLEI

|                |           |                  |  |               |     |                 |  |
|----------------|-----------|------------------|--|---------------|-----|-----------------|--|
| Latitude [°]:  | 28.360750 | Alt. No. 1:      |  | Diam. [mm]:   | 165 | Water lev. [m]: |  |
| Longitude [°]: | 23.725210 | Alt. No. 2:      |  | Depth [m]:    |     | WL status:      |  |
| Altitude [m]:  | 1423.10   | Rep. inst.: GOLD |  | Col. ht. [m]: |     | Date WL meas.:  |  |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |
|----------------|--|---------------------|
| <b>Pump:</b>   |  |                     |
| Type of Inst.: |  | Pulley Diam. [mm]:  |
| Manufacturer:  |  | Depth to Intk. [m]: |
| <b>Engine:</b> |  |                     |
| Manufacturer:  |  | Power Rating [kW]   |
| Type of Power: |  | Pulley Diam. [mm]:  |

### USE APPLICATION:

Site Status: Unused

Purpose:

Consumer:

Application:

### WATER CHEMISTRY:

|                  |      |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1- | Date sampled: | 20121025 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 0     | Comment:               |        |           |
| Main Parameters: |      |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.89 | Na:           | 27.2     | Cl:                                                                                                                                                                                                                                                                              | 43.3  | Langel.:               | 0.61   | E.Coli:   |
| EC: [mS/m]       | 65.3 | K:            | 4.52     | NO3 as N:                                                                                                                                                                                                                                                                        | 2.5   | Aggr-Ind:              | 12.67  | Faec. co: |
| TDS:             | 488  | Si:           | 16.7     | SO4:                                                                                                                                                                                                                                                                             | 35.5  | Ion-bal:               | 8.64 † | Total Co: |
| T. Alk.:         | 284  | Al:           | 0.05     | F:                                                                                                                                                                                                                                                                               | 0.151 | CaCO3:                 | 400.46 | SPC:      |
| Ca:              | 85.5 | Fe:           | 0.05     | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 45.5 | Mn:           | 0.05     |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

| RECOMMENDATIONS: |              |              |               |  |           |             |               |            |             |
|------------------|--------------|--------------|---------------|--|-----------|-------------|---------------|------------|-------------|
|                  |              | Depth        |               |  | Duty cyc. | Disch. rate |               | Dyn. water | Crit. water |
| Prior.           | Rec. equipm. | to intk. [m] | Type of power |  | [hrs]     | [l/s]       | Water quality | level [m]  | level [m]   |

1

0

0

Note: 1 . Borehole is sealed.



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Project No.: 11613568

## SITE INFORMATION REPORT

**BASIC SITE INFORMATION:** *Site Identifier:* 2823BCX0030 *Number:* SD1-GAA031 *Site type:* Borehole

*Distr./Farm No.:* 297/0

*Site Name/Des.:* SEEKOEIVLEI

*Region Type:* Water supply authority

*Region Descr.:* KGATELOPELE LM

*Latitude [°]:* 28.353370

*Reg./BB.:*

*Topo-set.:* Flat surface, plain

*Depth [m]:*

*Longitude [°]:* 23.729640

*G-Nr.:*

*Site status:* Unused

*Col. ht. [m]:* 0.15

*Altitude [m]:* 1426.90

*Site purp.:*

*Diam. [mm]:* 155

*Coord. acc.:* Accurate to within 10 units

*Use applic.:*

*Drain. reg.:* C92A

*Coord. meth.:* Altimeter

*Equipment:* Windpump

*Rep. inst.:* GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### WATER LEVEL:

| <i>Meth. meas.</i> | <i>Level status</i> | <i>Piez.</i> | <i>Info source</i> | <i>Date meas.</i> | <i>Time meas.</i> | <i>Sec.</i> | <i>Water lev. [m]</i> | <i>Comment</i> |
|--------------------|---------------------|--------------|--------------------|-------------------|-------------------|-------------|-----------------------|----------------|
| Electrical contact | Static              | 0            | Field checked      | 20120125          | 1200              | 0.00        | 5.32                  |                |

## SITE INFORMATION REPORT

**BASIC SITE INFORMATION:** *Site Identifier:* 2823BCX0031 *Number:* SD1-GAA032 *Site type:* Borehole

*Distr./Farm No.:* 297/0

*Site Name/Des.:* SEEKOEIVLEI

*Region Type:* Water supply authority

*Region Descr.:* KGATELOPELE LM

*Latitude [°]:* 28.353550

*Reg./BB.:*

*Topo-set.:* Flat surface, plain

*Depth [m]:*

*Longitude [°]:* 23.732090

*G-Nr.:*

*Site status:*

*Col. ht. [m]:* 0.28

*Altitude [m]:* 1421.70

*Site purp.:*

*Diam. [mm]:* 165

*Coord. acc.:* Accurate to within 10 units

*Use applic.:*

*Drain. reg.:* C92S

*Coord. meth.:* Altimeter

*Equipment:* No equipment

*Rep. inst.:* GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### WATER LEVEL:

| <i>Meth. meas.</i> | <i>Level status</i> | <i>Piez.</i> | <i>Info source</i> | <i>Date meas.</i> | <i>Time meas.</i> | <i>Sec.</i> | <i>Water lev. [m]</i> | <i>Comment</i> |
|--------------------|---------------------|--------------|--------------------|-------------------|-------------------|-------------|-----------------------|----------------|
| Electrical contact | Static              | 0            | Field checked      | 20120125          | 1200              | 0.00        | 2.00                  |                |

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0032 Number: SD1-GAA033 Site type: Borehole

Distr./Farm No.: 297/0 Site Name/Descr.: SEEKOEIVLEI

|                |           |                  |  |               |     |                 |  |
|----------------|-----------|------------------|--|---------------|-----|-----------------|--|
| Latitude [°]:  | 28.371940 | Alt. No. 1:      |  | Diam. [mm]:   | 165 | Water lev. [m]: |  |
| Longitude [°]: | 23.694510 | Alt. No. 2:      |  | Depth [m]:    |     | WL status:      |  |
| Altitude [m]:  | 1420.80   | Rep. inst.: GOLD |  | Col. ht. [m]: |     | Date WL meas.:  |  |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |          |                     |  |
|----------------|----------|---------------------|--|
| <b>Pump:</b>   |          |                     |  |
| Type of Inst.: | Windpump | Pulley Diam. [mm]:  |  |
| Manufacturer:  |          | Depth to Intk. [m]: |  |
| <b>Engine:</b> |          |                     |  |
| Manufacturer:  |          | Power Rating [kW]   |  |
| Type of Power: | Wind     | Pulley Diam. [mm]:  |  |

### USE APPLICATION:

Site Status: Unused

Purpose:

Consumer:

Application:

### WATER CHEMISTRY:

| Sample No.:             | Date sampled: | Depth sampl. [m]:                                                                                                                                                                                                                                                                | Comment:                      |                               |
|-------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------|
| <b>Main Parameters:</b> |               |                                                                                                                                                                                                                                                                                  | <b>Calculated Parameters:</b> | <b>Bacteriol. Parameters:</b> |
| pH:                     | Na:           | Cl:                                                                                                                                                                                                                                                                              | Langel.:                      | E.Coli:                       |
| EC: [mS/m]              | K:            | NO3 as N:                                                                                                                                                                                                                                                                        | Aggr-Ind:                     | Faec. co:                     |
| TDS:                    | Si:           | SO4:                                                                                                                                                                                                                                                                             | Ion-bal:                      | Total Co:                     |
| T. Alk.:                | Al:           | F:                                                                                                                                                                                                                                                                               | CaCO3:                        | SPC:                          |
| Ca:                     | Fe:           | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |                               |                               |
| Mg:                     | Mn:           |                                                                                                                                                                                                                                                                                  |                               |                               |



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0033 Number: SD1-GAA034 Site type: Borehole

Distr./Farm No.: 297/0 Site Name/Descr.: SEEKOEIVLEI

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.372100 | Alt. No. 1:      |  | Diam. [mm]:   | 150   | Water lev. [m]: | 2.69     |
| Longitude [°]: | 23.694900 | Alt. No. 2:      |  | Depth [m]:    | 33.00 | WL status:      | Static   |
| Altitude [m]:  | 1425.37   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.39  | Date WL meas.:  | 20121018 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
 Type of Inst.: Windpump Pulley Diam. [mm]:  
 Manufacturer: RECIPROCAL CYLINDE Depth to Intk. [m]: 13.26

**Engine:**  
 Manufacturer: Power Rating [kW]  
 Type of Power: Wind Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: In use  
 Purpose: Production (water supply)  
 Consumer: Non-urban  
 Application: Agricultural - stock watering only

### WATER CHEMISTRY:

|                  |      |               |          |                                                                                                                                                                                                                                                                                  |       |                        |      |           |   |
|------------------|------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|------|-----------|---|
| Sample No.:      | SD1- | Date sampled: | 20121017 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 30.00 | Comment:               |      |           |   |
| Main Parameters: |      |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |      |           |   |
| pH:              | 0 i  | Na:           | 0        | Cl:                                                                                                                                                                                                                                                                              | 0     | Langel.:               | 0.00 | E.Coli:   | 0 |
| EC: [mS/m]       | 0    | K:            | 0        | NO3 as N:                                                                                                                                                                                                                                                                        | 0     | Aggr-Ind:              | 0.00 | Faec. co: | 0 |
| TDS:             | 0    | Si:           | 0        | SO4:                                                                                                                                                                                                                                                                             | 0     | Ion-bal:               | 0.00 | Total Co: | 0 |
| T. Alk.:         | 0    | Al:           | 0        | F:                                                                                                                                                                                                                                                                               | 0     | CaCO3:                 | 0.00 | SPC:      | 0 |
| Ca:              | 0    | Fe:           | 0        | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ‡ Value exceeds minimum allowable limit |       |                        |      |           |   |
| Mg:              | 0    | Mn:           | 0        |                                                                                                                                                                                                                                                                                  |       |                        |      |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| CONSTANT         | 20120218 | 720          | 30.00              | 1.30             | 5.25       | 0.27           | 95    | 720      |         |         |
| STEP TEST STEP 1 | 20121017 | 60           | 30.00              | 1.17             | 0.51       |                |       |          |         |         |
| STEP TEST STEP 2 | 20121017 | 60           | 30.00              | 1.03             | 2.33       |                |       |          |         |         |
| STEP TEST STEP 3 | 20121017 | 60           | 30.00              | 2.11             | 15.38      |                |       |          |         |         |
| STEP TEST STEP 4 | 20121017 | 10           | 30.00              | 3.03             | 27.16      | 0.16           | 99    | 210      |         |         |
| PUMP INLET       | 20121017 | 5            | 30.00              | 1.73             | 27.44      |                |       |          |         |         |

**RECOMMENDATIONS:** Depth Duty cyc. Disch. rate Dyn. water Crit. water  
 Prior. Rec. equipm. to intk. [m] Type of power [hrs] [l/s] Water quality level [m] level [m]

1

0

0

**Note:** 1. Borehole is sealed with a base plate.



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 Project No.: 11613568



# PUMPING TEST REPORT

Date compiled: 2012/10/29

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0033 Number: SD1-GAA034 Site type: Borehole

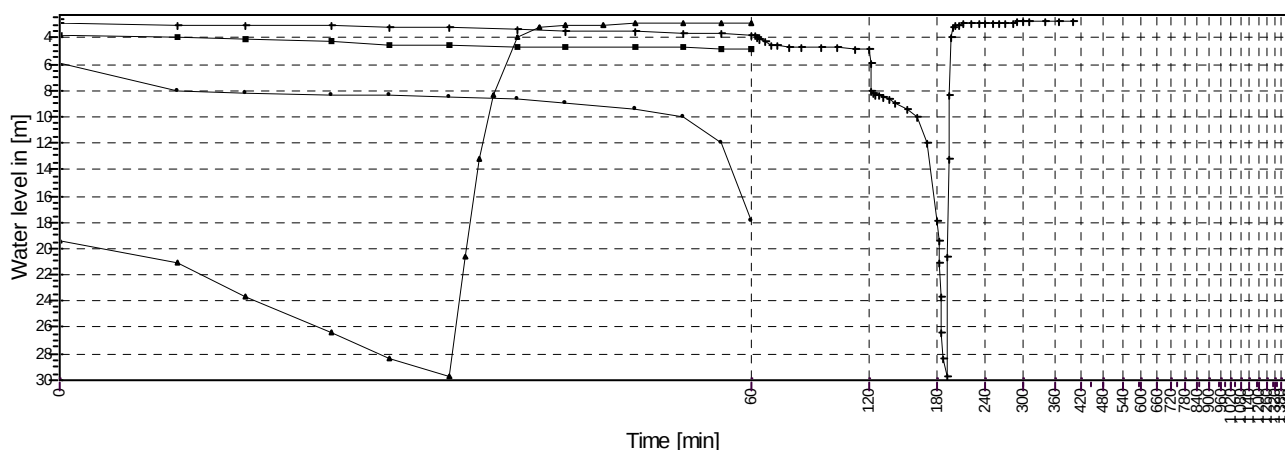
Distr./Farm No.: 297/0

Site Name/Des.: SEEKOEIVLEI

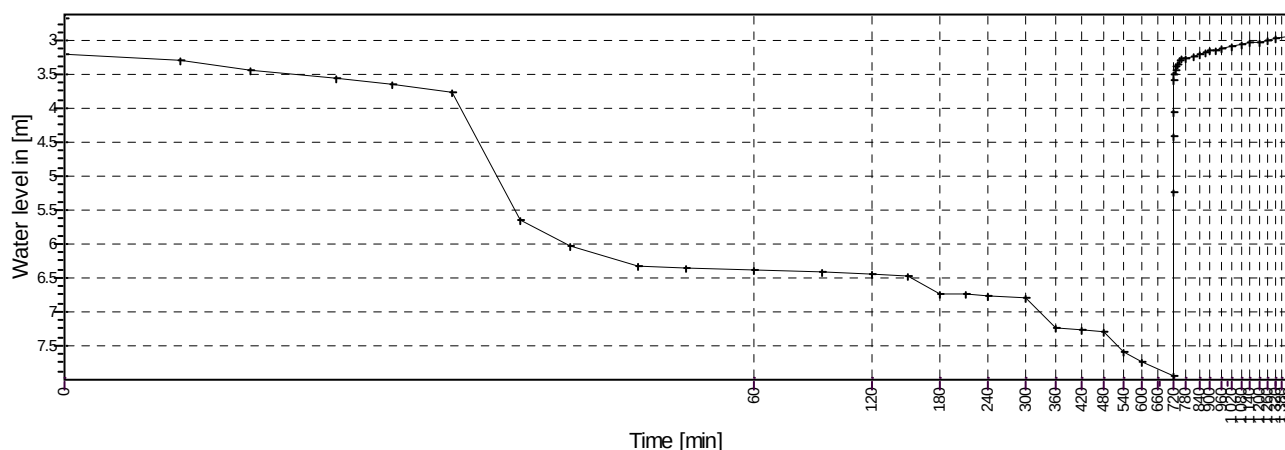
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.372100 | Alt. No. 1:      |  | Diam. [mm]:    | 150   | Water lev. [m]: | 2.69     |
| Longitude [°] | 23.694900 | Alt. No. 2:      |  | Depth [m]:     | 33.00 | Piezometer:     | 0        |
| Altitude [m]: | 1425.37   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.39  | Date WL meas.:  | 20121018 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 30.00               | 20121017      | 1700 | 20121017    | 2340 |                               |           |                 |
| GOLD       | Constant rate test | 30.00               | 20121018      | 0730 | 20121019    | 0730 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1700        | 60           | 30.00              | 1.17             | 0.51       |            |    |                 |                            |             |         | 2.29 |
| STEP TEST STEP 2 | 1800        | 60           | 30.00              | 1.03             | 2.33       |            |    |                 |                            |             |         | 0.44 |
| STEP TEST STEP 3 | 1900        | 60           | 30.00              | 2.11             | 15.38      |            |    |                 |                            |             |         | 0.14 |
| STEP TEST STEP 4 | 2000        | 10           | 30.00              | 3.03             | 27.16      | 0.16       | 99 | 210             |                            |             |         | 0.11 |
| PUMP INLET       | 2340        | 5            | 30.00              | 1.73             | 27.44      |            |    |                 |                            |             |         | 0.06 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0034 Number: SD1-GAA035 Site type: Borehole

Distr./Farm No.: 297/0 Site Name/Descr.: SEEKOEIVLEI

|                |           |                  |  |               |      |                 |          |
|----------------|-----------|------------------|--|---------------|------|-----------------|----------|
| Latitude [°]:  | 28.379800 | Alt. No. 1:      |  | Diam. [mm]:   | 160  | Water lev. [m]: | 2.51     |
| Longitude [°]: | 23.724430 | Alt. No. 2:      |  | Depth [m]:    | 9.83 | WL status:      | Static   |
| Altitude [m]:  | 1418.65   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.35 | Date WL meas.:  | 20121016 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                    |                     |      |
|----------------|--------------------|---------------------|------|
| <b>Pump:</b>   |                    |                     |      |
| Type of Inst.: | Windpump           | Pulley Diam. [mm]:  |      |
| Manufacturer:  | RECIPROCAL CYLINDE | Depth to Intk. [m]: | 6.00 |
| <b>Engine:</b> |                    |                     |      |
| Manufacturer:  |                    | Power Rating [kW]   |      |
| Type of Power: | Wind               | Pulley Diam. [mm]:  |      |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | In use                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                  |       |               |          |                                                                                                                                                                                                                                                                                        |       |                        |        |           |   |
|------------------|-------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|---|
| Sample No.:      | SD1-  | Date sampled: | 20121025 | Depth sampl. [m]:                                                                                                                                                                                                                                                                      | 9.00  | Comment:               |        |           |   |
| Main Parameters: |       |               |          | Calculated Parameters:                                                                                                                                                                                                                                                                 |       | Bacteriol. Parameters: |        |           |   |
| pH:              | 7.78  | Na:           | 20.4     | Cl:                                                                                                                                                                                                                                                                                    | 34.2  | Langel.:               | 0.61   | E.Coli:   | 0 |
| EC: [mS/m]       | 68.4  | K:            | 3.98     | NO3 as N:                                                                                                                                                                                                                                                                              | 2.51  | Aggr-Ind:              | 12.69  | Faec. co: | 0 |
| TDS:             | 502 † | Si:           | 20.4     | SO4:                                                                                                                                                                                                                                                                                   | 28.8  | Ion-bal:               | 6.84 † | Total Co: | 0 |
| T. Alk.:         | 335   | Al:           | <0.05    | F:                                                                                                                                                                                                                                                                                     | 0.182 | CaCO3:                 | 435.24 | SPC:      | 0 |
| Ca:              | 96.8  | Fe:           | <0.05    | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    ‡ Value exceeds minimum allowable limit |       |                        |        |           |   |
| Mg:              | 47.1  | Mn:           | <0.05    |                                                                                                                                                                                                                                                                                        |       |                        |        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121016 | 60           | 9.00               | 0.84             | 0          |                |       |          |         |         |
| STEP TEST STEP 2 | 20121016 | 60           | 9.00               | 2.50             | 0.03       |                |       |          |         |         |
| STEP TEST STEP 3 | 20121016 | 60           | 9.00               | 4.14             | 0.14       |                |       |          |         |         |
| STEP TEST STEP 4 | 20121016 | 60           | 9.00               | 6.24             | 0.29       | 100            | 30    |          |         |         |
| CONSTANT         | 20121016 | 960          | 9.00               | 6.05             | 0.31       | 100            | 120   |          |         |         |

| RECOMMENDATIONS: |              | Depth        | Duty cyc.     | Disch. rate |       | Dyn. water    | Crit. water |           |
|------------------|--------------|--------------|---------------|-------------|-------|---------------|-------------|-----------|
| Prior.           | Rec. equipm. | to intk. [m] | Type of power | [hrs]       | [l/s] | Water quality | level [m]   | level [m] |

1

0

0

**Note:** 1. Borehole sealed with a base plate. Closed.



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 2012/10/29

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0034 Number: SD1-GAA035 Site type: Borehole

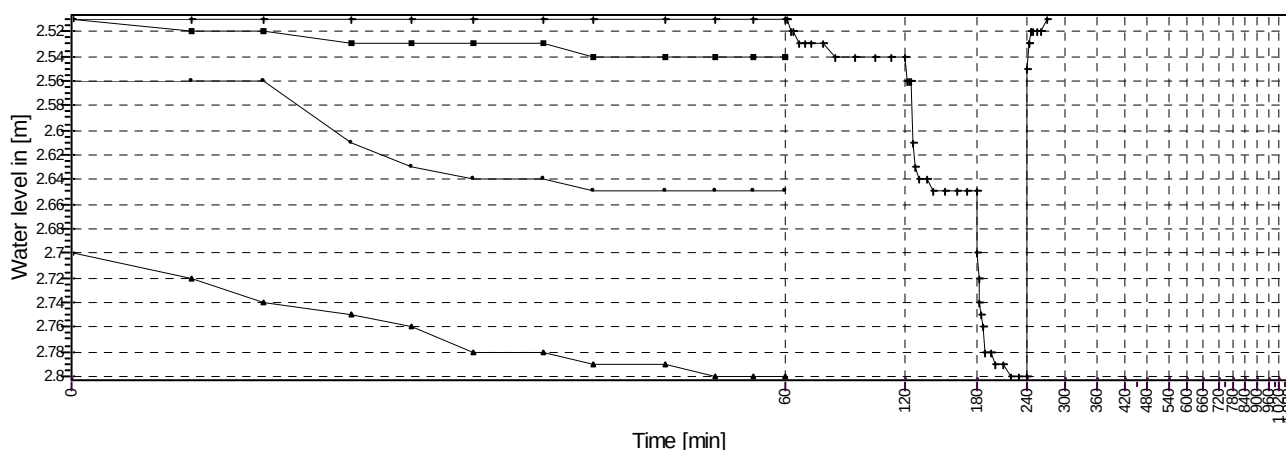
Distr./Farm No.: 297/0

Site Name/Des.: SEEKOEIVLEI

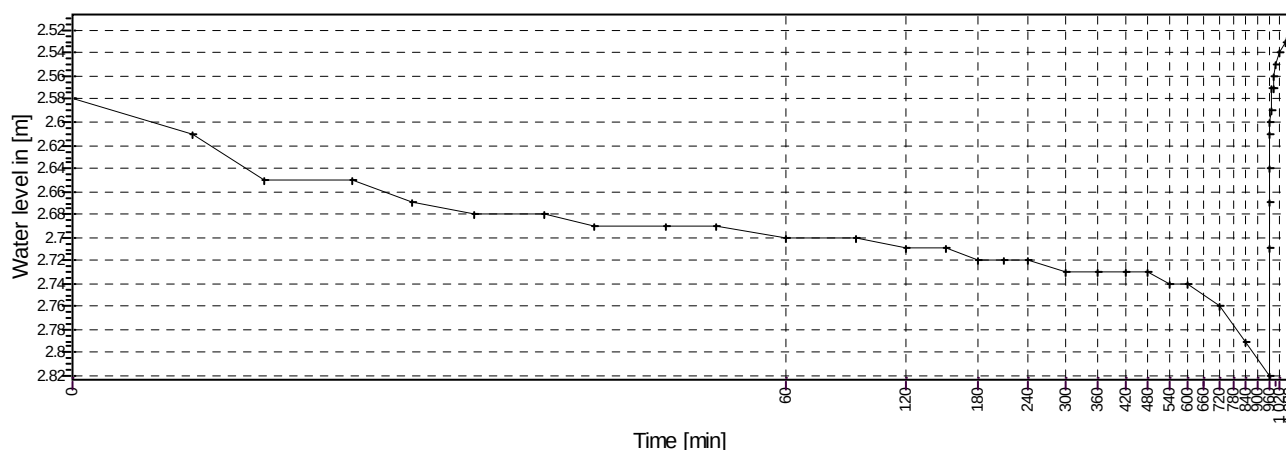
|               |           |                  |  |                |      |                 |          |
|---------------|-----------|------------------|--|----------------|------|-----------------|----------|
| Latitude [°]  | 28.379800 | Alt. No. 1:      |  | Diam. [mm]:    | 160  | Water lev. [m]: | 2.51     |
| Longitude [°] | 23.724430 | Alt. No. 2:      |  | Depth [m]:     | 9.83 | Piezometer:     | 0        |
| Altitude [m]: | 1418.65   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.35 | Date WL meas.:  | 20121016 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 9.00                | 20121016      | 1000 | 20121016    | 1430 |                               |           |                 |
| GOLD       | Constant rate test | 9.00                | 20121016      | 1700 | 20121017    | 1100 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 1000        | 60           | 9.00               | 0.84             | 0          |            |     |                 |                            |             |         | 0.00  |
| STEP TEST STEP 2 | 1100        | 60           | 9.00               | 2.50             | 0.03       |            |     |                 |                            |             |         | 83.33 |
| STEP TEST STEP 3 | 1200        | 60           | 9.00               | 4.14             | 0.14       |            |     |                 |                            |             |         | 29.57 |
| STEP TEST STEP 4 | 1300        | 60           | 9.00               | 6.24             | 0.29       |            | 100 | 30              |                            |             |         | 21.52 |
| CONSTANT         | 1700        | 960          | 9.00               | 6.05             | 0.31       |            | 100 | 120             |                            |             |         | 19.52 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0035 Number: SD1-GAA036 Site type: Borehole

Distr./Farm No.: 297/0 Site Name/Descr.: SEEKOEIVLEI

|                |           |                  |  |               |      |                 |          |
|----------------|-----------|------------------|--|---------------|------|-----------------|----------|
| Latitude [°]:  | 28.379870 | Alt. No. 1:      |  | Diam. [mm]:   | 165  | Water lev. [m]: | 1.64     |
| Longitude [°]: | 23.724520 | Alt. No. 2:      |  | Depth [m]:    |      | WL status:      | Static   |
| Altitude [m]:  | 1418.90   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.33 | Date WL meas.:  | 20120125 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |          |                     |  |
|----------------|----------|---------------------|--|
| <b>Pump:</b>   |          |                     |  |
| Type of Inst.: | Windpump | Pulley Diam. [mm]:  |  |
| Manufacturer:  |          | Depth to Intk. [m]: |  |
| <b>Engine:</b> |          |                     |  |
| Manufacturer:  |          | Power Rating [kW]   |  |
| Type of Power: | Wind     | Pulley Diam. [mm]:  |  |

### USE APPLICATION:

Site Status: In use  
 Purpose: Production (water supply)  
 Consumer: Non-urban  
 Application: Domestic - all purposes

### WATER CHEMISTRY:

| Sample No.:      | Date sampled: | Depth sampl. [m]:                                                                                                                                                                                                                                                                | Comment:               |           |
|------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------|
| Main Parameters: |               | Calculated Parameters:                                                                                                                                                                                                                                                           | Bacteriol. Parameters: |           |
| pH:              | Na:           | Cl:                                                                                                                                                                                                                                                                              | Langel.:               | E.Coli:   |
| EC: [mS/m]       | K:            | NO3 as N:                                                                                                                                                                                                                                                                        | Aggr-Ind:              | Faec. co: |
| TDS:             | Si:           | SO4:                                                                                                                                                                                                                                                                             | Ion-bal:               | Total Co: |
| T. Alk.:         | Al:           | F:                                                                                                                                                                                                                                                                               | CaCO3:                 | SPC:      |
| Ca:              | Fe:           | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |                        |           |
| Mg:              | Mn:           |                                                                                                                                                                                                                                                                                  |                        |           |



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 Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0036 Number: SD1-GAA037 Site type: Borehole

Distr./Farm No.: 297/0 Site Name/Descr.: SEEKOEIVLEI

|                |           |                  |  |               |  |                 |  |
|----------------|-----------|------------------|--|---------------|--|-----------------|--|
| Latitude [°]:  | 28.380000 | Alt. No. 1:      |  | Diam. [mm]:   |  | Water lev. [m]: |  |
| Longitude [°]: | 23.724360 | Alt. No. 2:      |  | Depth [m]:    |  | WL status:      |  |
| Altitude [m]:  | 1418.80   | Rep. inst.: GOLD |  | Col. ht. [m]: |  | Date WL meas.:  |  |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |          |                          |
|----------------|----------|--------------------------|
| <b>Pump:</b>   |          |                          |
| Type of Inst.: | Windpump | Pulley Diam. [mm]:       |
| Manufacturer:  |          | Depth to Intk. [m]: 6.00 |
| <b>Engine:</b> |          |                          |
| Manufacturer:  |          | Power Rating [kW]        |
| Type of Power: | Wind     | Pulley Diam. [mm]:       |

### USE APPLICATION:

Site Status: In use  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

| Sample No.:      | Date sampled: | Depth sampl. [m]:                                                                                                                                                                                                                                                                    | Comment:               |           |
|------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------|
| Main Parameters: |               | Calculated Parameters:                                                                                                                                                                                                                                                               | Bacteriol. Parameters: |           |
| pH:              | Na:           | Cl:                                                                                                                                                                                                                                                                                  | Langel.:               | E.Coli:   |
| EC: [mS/m]       | K:            | NO3 as N:                                                                                                                                                                                                                                                                            | Aggr-Ind:              | Faec. co: |
| TDS:             | Si:           | SO4:                                                                                                                                                                                                                                                                                 | Ion-bal:               | Total Co: |
| T. Alk.:         | Al:           | F:                                                                                                                                                                                                                                                                                   | CaCO3:                 | SPC:      |
| Ca:              | Fe:           | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit   ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit   ¡ Value exceeds minimum allowable limit |                        |           |
| Mg:              | Mn:           |                                                                                                                                                                                                                                                                                      |                        |           |

| RECOMMENDATIONS: |              | Depth        | Duty cyc.     | Disch. rate |       | Dyn. water    | Crit. water |           |
|------------------|--------------|--------------|---------------|-------------|-------|---------------|-------------|-----------|
| Prior.           | Rec. equipm. | to intk. [m] | Type of power | [hrs]       | [l/s] | Water quality | level [m]   | level [m] |

1

0

0

**Note:** 1. Borehole sealed with a base plate.



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0037 Number: SD1-GAA038 Site type: Borehole

Distr./Farm No.: 297/0 Site Name/Descr.: SEEKOEIVLEI

|                |           |                  |  |               |     |                 |          |
|----------------|-----------|------------------|--|---------------|-----|-----------------|----------|
| Latitude [°]:  | 28.380020 | Alt. No. 1:      |  | Diam. [mm]:   | 165 | Water lev. [m]: | 2.27     |
| Longitude [°]: | 23.724340 | Alt. No. 2:      |  | Depth [m]:    |     | WL status:      | Static   |
| Altitude [m]:  | 1418.80   | Rep. inst.: GOLD |  | Col. ht. [m]: |     | Date WL meas.:  | 20120125 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                  |                     |  |
|----------------|------------------|---------------------|--|
| <b>Pump:</b>   |                  |                     |  |
| Type of Inst.: | Submersible pump | Pulley Diam. [mm]:  |  |
| Manufacturer:  |                  | Depth to Intk. [m]: |  |
| <b>Engine:</b> |                  |                     |  |
| Manufacturer:  |                  | Power Rating [kW]   |  |
| Type of Power: | Electric motor   | Pulley Diam. [mm]:  |  |

### USE APPLICATION:

Site Status: In use  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |       |               |                                                                                                                                                                                                                                                                                        |                        |       |                        |        |           |
|------------------|-------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-  | Date sampled: | 20120216                                                                                                                                                                                                                                                                               | Depth sampl. [m]:      | 0     | Comment:               |        |           |
| Main Parameters: |       |               |                                                                                                                                                                                                                                                                                        | Calculated Parameters: |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.68  | Na:           | 17.7                                                                                                                                                                                                                                                                                   | Cl:                    | 31.5  | Langel.:               | 0.48   | E.Coli:   |
| EC: [mS/m]       | 64.8  | K:            | 3.85                                                                                                                                                                                                                                                                                   | NO3 as N:              | 2.01  | Aggr-Ind:              | 12.55  | Faec. co: |
| TDS:             | 500 † | Si:           | 19.7                                                                                                                                                                                                                                                                                   | SO4:                   | 29.3  | Ion-bal:               | 5.60 † | Total Co: |
| T. Alk.:         | 315   | Al:           |                                                                                                                                                                                                                                                                                        | F:                     | 0.202 | CaCO3:                 | 401.38 | SPC:      |
| Ca:              | 95.1  | Fe:           | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    ¡ Value exceeds minimum allowable limit |                        |       |                        |        |           |
| Mg:              | 39.9  | Mn:           |                                                                                                                                                                                                                                                                                        |                        |       |                        |        |           |



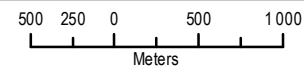
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Project No.: 11613568



## **2.2 Allie Syliman**



-  Existing borehole survey
-  Kais Fontain
-  Kais 245
-  Other road
-  Dam
-  Pan
-  Marsh vlei



Coordinate System: GCS WGS 1984  
Datum: WGS 1984

## GW ASSESSMENT VGG SCHEME

KAIS 245 FARM  
ALLIE SYLIMAN

|                      |    |            |
|----------------------|----|------------|
| PROJECT No. 11613568 |    | REV 0      |
| SCALE 1:45 000       |    | A4         |
| GIS                  | MB | 01/04/2014 |
| CHECK                | DB | 01/04/2014 |
| REVIEW               | FW | 01/04/2014 |





## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BA00155 Number: SD1-GAA255 Site type: Borehole

Distr./Farm No.: 245 Site Name/Descr.: KAIS

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.191930 | Alt. No. 1: |      | Diam. [mm]:   | 165   | Water lev. [m]: | 5.70     |
| Longitude [°]: | 23.725480 | Alt. No. 2: |      | Depth [m]:    | 19.80 | WL status:      | Static   |
| Altitude [m]:  | 1455.40   | Rep. inst.: | GOLD | Col. ht. [m]: |       | Date WL meas.:  | 19940308 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |          |                     |  |
|----------------|----------|---------------------|--|
| <b>Pump:</b>   |          |                     |  |
| Type of Inst.: | Windpump | Pulley Diam. [mm]:  |  |
| Manufacturer:  |          | Depth to Intk. [m]: |  |
| <b>Engine:</b> |          |                     |  |
| Manufacturer:  |          | Power Rating [kW]   |  |
| Type of Power: | Wind     | Pulley Diam. [mm]:  |  |

### USE APPLICATION:

Site Status: In use  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Agricultural - stock watering only

### WATER CHEMISTRY:

|                  |               |                                                                                                                                                                                                                                                                                  |                        |                        |           |
|------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------|-----------|
| Sample No.:      | Date sampled: | 19940308                                                                                                                                                                                                                                                                         | Depth sampl. [m]:      | 0                      | Comment:  |
| Main Parameters: |               |                                                                                                                                                                                                                                                                                  | Calculated Parameters: | Bacteriol. Parameters: |           |
| pH:              | Na:           | Cl:                                                                                                                                                                                                                                                                              | Langel.:               | E.Coli:                |           |
| EC: [mS/m]       | 215 †         | K:                                                                                                                                                                                                                                                                               | NO3 as N:              | Aggr-Ind:              | Faec. co: |
| TDS:             | Si:           | SO4:                                                                                                                                                                                                                                                                             | Ion-bal:               | Total Co:              |           |
| T. Alk.:         | Al:           | F:                                                                                                                                                                                                                                                                               | CaCO3:                 | SPC:                   |           |
| Ca:              | Fe:           | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |                        |                        |           |
| Mg:              | Mn:           |                                                                                                                                                                                                                                                                                  |                        |                        |           |



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BA00154 Number: SD1-GAA266 Site type: Fountain / Spring

Distr./Farm No.: 245 Site Name/Descr.: KAIS FOUNTAIN

|                |           |                  |  |               |       |                 |  |
|----------------|-----------|------------------|--|---------------|-------|-----------------|--|
| Latitude [°]:  | 28.169440 | Alt. No. 1:      |  | Diam. [mm]:   | 0     | Water lev. [m]: |  |
| Longitude [°]: | 23.741680 | Alt. No. 2:      |  | Depth [m]:    | 10000 | WL status:      |  |
| Altitude [m]:  | 0         | Rep. inst.: GOLD |  | Col. ht. [m]: |       | Date WL meas.:  |  |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |
|----------------|--|---------------------|
| <b>Pump:</b>   |  |                     |
| Type of Inst.: |  | Pulley Diam. [mm]:  |
| Manufacturer:  |  | Depth to Intk. [m]: |
| <b>Engine:</b> |  |                     |
| Manufacturer:  |  | Power Rating [kW]   |
| Type of Power: |  | Pulley Diam. [mm]:  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                                                                                   |       |               |          |                                                                                                        |       |                        |        |           |
|-----------------------------------------------------------------------------------|-------|---------------|----------|--------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:                                                                       | SD1-  | Date sampled: | 20140218 | Depth sampl. [m]:                                                                                      | 0     | Comment:               |        |           |
| Main Parameters:                                                                  |       |               |          | Calculated Parameters:                                                                                 |       | Bacteriol. Parameters: |        |           |
| pH:                                                                               | 7.34  | Na:           | 15.1     | Cl:                                                                                                    | 43.2  | Langel.:               | 0.11   | E.Coli:   |
| EC: [mS/m]                                                                        | 78 †  | K:            | 2.18     | NO3 as N:                                                                                              | 0.987 | Aggr-Ind:              | 12.19  | Faec. co: |
| TDS:                                                                              | 568 † | Si:           |          | SO4:                                                                                                   | 29    | Ion-bal:               | 0.62   | Total Co: |
| T. Alk.:                                                                          | 386   | Al:           | < 0.05   | F:                                                                                                     | 0.13  | CaCO3:                 | 451.31 | SPC:      |
| Ca:                                                                               | 73.9  | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption |       |                        |        |           |
| Mg:                                                                               | 64.9  | Mn:           | < 0.05   | † Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit                      |       |                        |        |           |
| ! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |               |          |                                                                                                        |       |                        |        |           |

### RECOMMENDATIONS:

| Prior. | Rec. equipm. | Depth to intk. [m] | Type of power | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|--------------|--------------------|---------------|-----------------|-------------------|---------------|----------------------|-----------------------|
|--------|--------------|--------------------|---------------|-----------------|-------------------|---------------|----------------------|-----------------------|

|   |  |  |  |    |      |  |  |  |
|---|--|--|--|----|------|--|--|--|
| 1 |  |  |  | 24 | 0.50 |  |  |  |
|---|--|--|--|----|------|--|--|--|

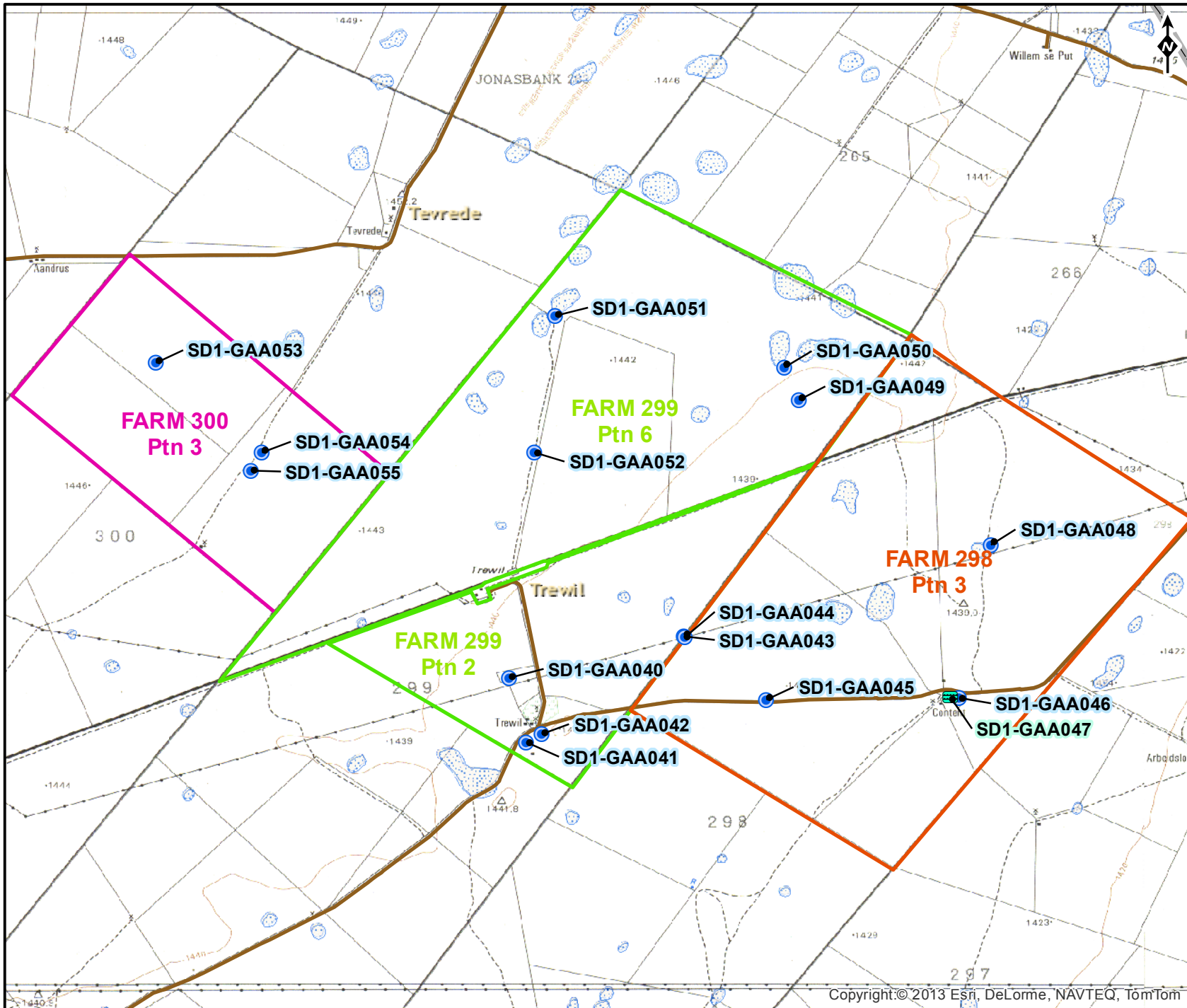
Note:



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Project No.: 11613568

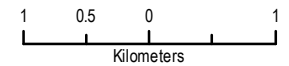


## **2.3 Arrie Fourie**



#### LEGEND

- Existing borehole survey
- Fountain
- Farm 298 Ptn 3
- Farm 299 Ptn 2&6
- Farm 300 Ptn 3
- Secondary road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**FARM 300 - FARM 299**  
**FARM 298**  
**ARRIE FOURIE**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:60 000       | A4         |
| GIS MB               | 01/04/2014 |
| CHECK DB             | 01/04/2014 |
| REVIEW FW            | 01/04/2014 |



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May 14 Report No. 11613568-12708-4

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# **BASIC SITE INFORMATION (SITE LOCATION, GEOHYDROLOGY AND MANAGEMENT REC**

| SITE LOCATION    |            |                                                     |                       |            |              |               |              |              |            | GEOHYDROLOGY |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------|------------|-----------------------------------------------------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|--------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier: | Number:    | District                                            | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]    | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BC00002      | SD1-GAA046 | 298/3                                               | CONTENT               | B          | 28.31943967  | 23.730940001  | 1431.80      | 0.28         | 165        |              | 1.28         |            |                |                       |                |                 |                   |
| 2823BCX0039      | SD1-GAA040 | 299/246                                             | TREWILL               | B          | 28.31744967  | 23.685540001  | 1441.60      | 0.24         | 165        |              | 5.21         |            |                |                       |                |                 |                   |
| 2823BCX0040      | SD1-GAA041 | 299/246                                             | TREWILL               | B          | 28.32388967  | 23.687310001  | 1441.50      | 0.38         | 165        |              | 6.00         |            |                |                       |                |                 |                   |
| 2823BCX0041      | SD1-GAA042 | 299/246                                             | TREWILL               | B          | 28.32311967  | 23.688880001  | 1439.00      |              | 165        |              |              |            |                |                       |                |                 |                   |
| 2823BCX0042      | SD1-GAA043 | 299/246                                             | TREWILL               | B          | 28.31325967  | 23.703150001  | 1441.20      | 0.35         | 165        |              | 2.76         |            |                |                       |                |                 |                   |
| 2823BCX0043      | SD1-GAA044 | 299/246                                             | TREWILL               | B          | 28.31331967  | 23.703260001  | 1440.70      | 0.59         | 165        |              | 2.84         |            |                |                       |                |                 |                   |
| 2823BCX0044      | SD1-GAA045 | 298/3                                               | CONTENT               | B          | 28.31962967  | 23.711480001  | 1437.70      | 0.21         | 165        |              | 2.45         |            |                |                       |                |                 |                   |
| 2823BCX0045      | SD1-GAA047 | 298/3                                               | CONTENT FOUNTAIN      | F          | 28.31932967  | 23.730070001  | 1433.80      |              |            |              | 0.10         |            |                |                       |                |                 |                   |
| 2823BCX0046      | SD1-GAA048 | 298/3                                               | CONTENT               | B          | 28.30398967  | 23.734170001  | 1438.50      |              | 165        |              |              |            |                |                       |                |                 |                   |
| 2823BCX0047      | SD1-GAA049 | 299/246                                             | TREWILL               | B          | 28.28939967  | 23.714820001  | 1441.60      | 0.10         | 165        |              | 3.27         |            |                |                       |                |                 |                   |
| 2823BCX0048      | SD1-GAA050 | 299/246                                             | TREWILL               | B          | 28.28608967  | 23.713310001  | 1439.80      | 0.12         | 165        |              | 8.81         |            |                |                       |                |                 |                   |
| 2823BCX0049      | SD1-GAA051 | 299/246                                             | TREWILL               | B          | 28.28088967  | 23.690200001  | 1442.80      | 0.45         | 165        |              | 2.29         |            |                |                       |                |                 |                   |
| 2823BCX0050      | SD1-GAA052 | 299/246                                             | TREWILL               | B          | 28.29471967  | 23.688150001  | 1444.50      | 0.47         | 165        |              | 3.69         |            |                |                       |                |                 |                   |
| 2823BCX0051      | SD1-GAA053 | 300/3                                               | NIE TE VER            | B          | 28.28566967  | 23.650000001  | 1448.20      |              | 165        |              |              |            |                |                       |                |                 |                   |
| 2823BCX0052      | SD1-GAA054 | 300/3                                               | NIE TE VER            | B          | 28.29466967  | 23.660680001  | 1447.90      |              | 165        | 100.00       |              |            |                |                       |                |                 |                   |
| 2823BCX0053      | SD1-GAA055 | 300/3                                               | NIE TE VER            | B          | 28.29656967  | 23.659550001  | 1447.70      |              | 165        |              |              |            |                |                       |                |                 |                   |
| SUMMARY:         |            | Site Type:<br>B = Borehole<br>F = Fountain / Spring |                       |            |              |               |              | Maximum:     |            | 100.00       | 8.81         |            |                |                       |                |                 |                   |
| Nr. of sites:    |            | 16                                                  |                       |            |              |               |              | Minimum:     |            | 100.00       | 0.10         |            |                |                       |                |                 |                   |
|                  |            |                                                     |                       |            |              |               |              | Sum:         |            |              |              |            |                |                       |                |                 |                   |
|                  |            |                                                     |                       |            |              |               |              | Average:     |            | 100.00       | 3.52         |            |                |                       |                |                 |                   |

Site Type:  
B = Borehole  
F = Fountain / Spring

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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Project No.: 11613568

## ARRIE FOURIE - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BC00002 **Number:** SD1-GAA046 **Site Name:** CONTENT

| Samp. Nr./Type | Date/Time samp. | pH   | EC     | TDS   | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl | SO4  | NO3 as N | F     |
|----------------|-----------------|------|--------|-------|------|------|------|------|------|---------|----|------|----------|-------|
| SD1-GA046      | 20120216 0800   | 7.69 | 80.8 † | 506 † | 99.6 | 57.1 | 17.8 | 2.03 | 22.5 | 384     | 41 | 29.6 | 6.74     | 0.275 |

**Site Identifier:** 2823BCX0045 **Number:** SD1-GAA047 **Site Name:** CONTENT FOUNTAIN

| Samp. Nr./Type | Date/Time samp. | pH  | EC    | TDS    | Ca | Mg    | Na   | K    | Si   | T. Alk. | Cl  | SO4 | NO3 as N | F     |
|----------------|-----------------|-----|-------|--------|----|-------|------|------|------|---------|-----|-----|----------|-------|
| SD1-GA047      | 20120216 0800   | 7.4 | 163 † | 1030 † | 81 | 148 ‡ | 86.2 | 37.6 | 41.6 | 609     | 200 | 83  | < 0.3    | 0.194 |

**Site Identifier:** 2823BCX0053 **Number:** SD1-GAA055 **Site Name:** NIE TE VER

| Samp. Nr./Type | Date/Time samp. | pH   | EC   | TDS   | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|------|-------|------|------|------|------|------|---------|------|------|----------|-------|
| SD1-GA055      | 20120216 0800   | 7.76 | 66.8 | 498 † | 86.3 | 51.4 | 14.2 | 1.57 | 18.8 | 278     | 44.3 | 37.1 | 4.9      | 0.173 |

Chemistry Standard: SABS for human consumption  
 † Value exceeds recommended maximum limit  
 ‡ Value exceeds maximum allowable limit  
 ! Value exceeds recommended minimum limit  
 j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
 EC [mS/m]  
 Nitrate as N

Sample Type Code Explanation:  
 D: Drinking water  
 E: Effluent  
 K: Sewage  
 O: Organic  
 P: Pressed or pellet  
 R: Rock  
 S: Soil  
 X: Other source

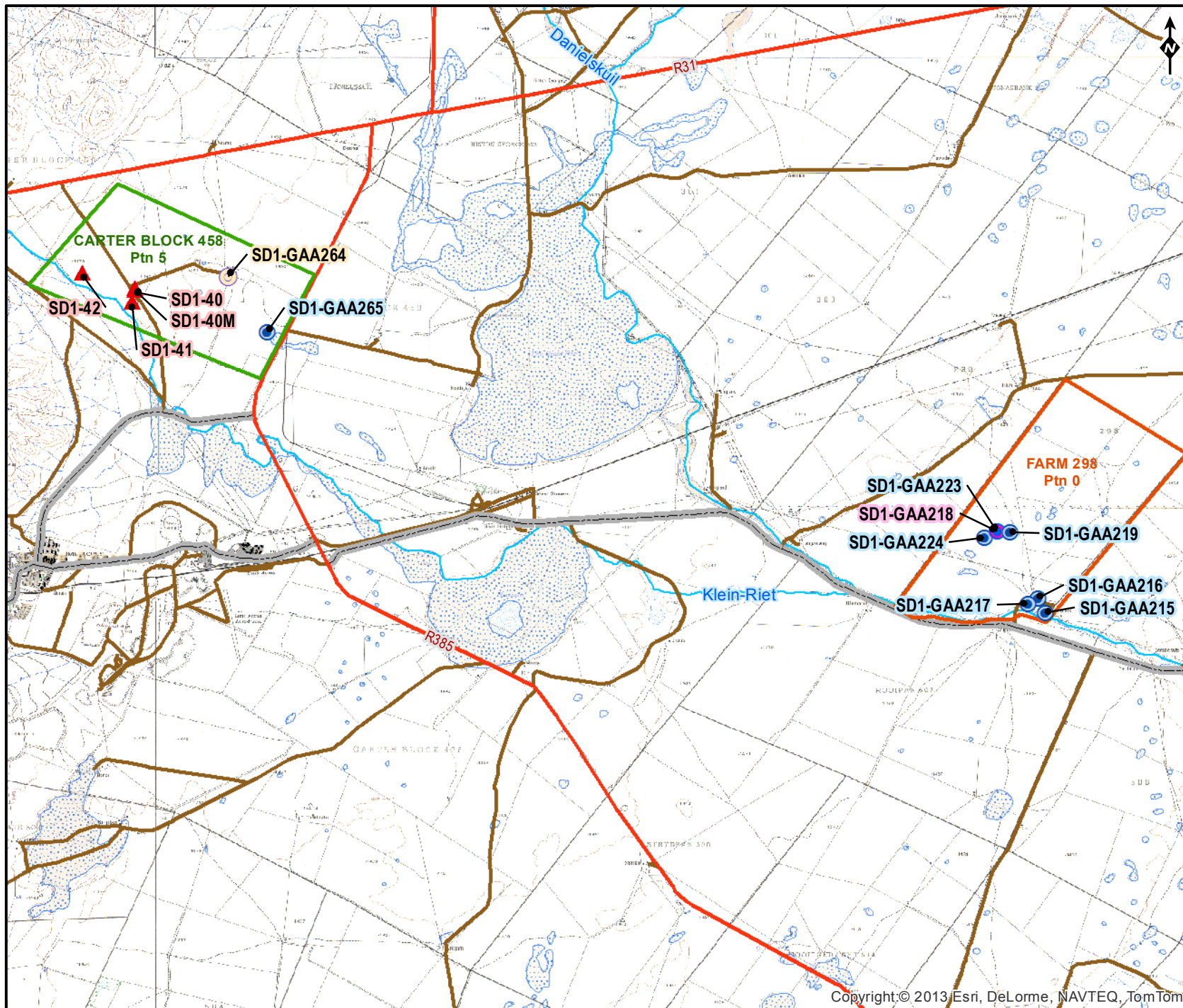


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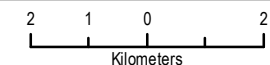
## **2.4 Botha Markram**





#### LEGEND

- ▲ Newly drilled borehole
- Existing borehole survey
- Existing borehole tested
- Dug well
- ▭ Carter Block 458
- ▭ Farm 298
- Main road
- Secondary road
- Other road
- Street
- Rivers
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**CARTER BLOCK 458**  
**FARM 298**  
**BOTHA MARKAM**

|             |            |            |
|-------------|------------|------------|
| PROJECT No. | 1.11613568 | REV 0      |
| SCALE       | 1:130 000  | A4         |
| GIS         | MB         | 01/04/2014 |
| CHECK       | DB         | 01/04/2014 |
| REVIEW      | FW         | 01/04/2014 |



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**BASIC SITE INFORMATION:** Site Identifier: 2823ADX0060 Number: SD1-40 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELELM

Latitude [°]: 28.301570

Reg./BB.:

Topo-set.:

Depth [m]: 97.60

Longitude [°]: 23.494940

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.50

Altitude [m]: 1468.72

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

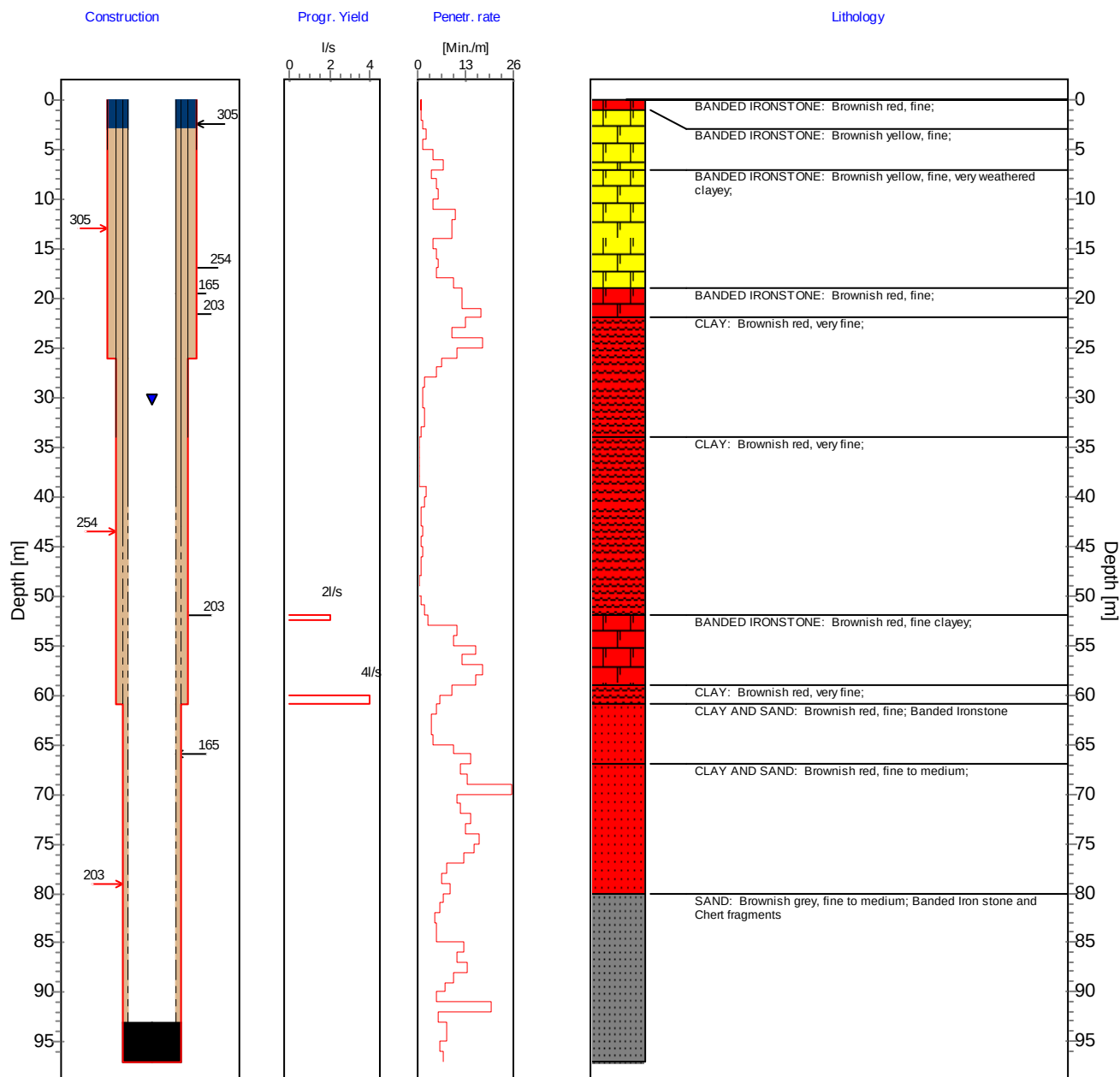
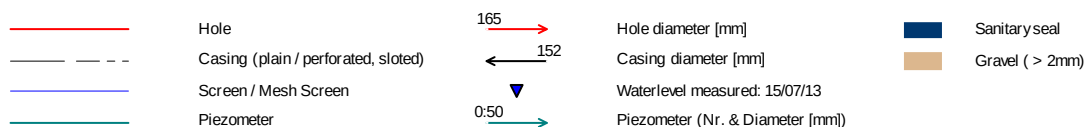
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823ADX0060 Number: SD1-40 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.301570 | Alt. No. 1: |      | Diam. [mm]:   | 165   | Water lev. [m]: | 30.35    |
| Longitude [°]: | 23.494940 | Alt. No. 2: |      | Depth [m]:    | 97.60 | WL status:      | Static   |
| Altitude [m]:  | 1468.72   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.50  | Date WL meas.:  | 20140117 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| <b>Pump:</b>   |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| <b>Engine:</b> |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |                        |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-40 | Date sampled: | 20130714               | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 0     | Comment:               |        |           |
| Main Parameters: |        |               | Calculated Parameters: |                                                                                                                                                                                                                                                                                  |       | Bacteriol. Parameters: |        |           |
| pH:              | 6.72   | Na:           | 10.1                   | Cl:                                                                                                                                                                                                                                                                              | 14.4  | Langel.:               | -0.94  | E.Coli:   |
| EC: [mS/m]       | 34.8   | K:            | 2.36                   | NO3 as N:                                                                                                                                                                                                                                                                        | 2.01  | Aggr-Ind:              | 11.05  | Faec. co: |
| TDS:             | 242    | Si:           | 11.7                   | SO4:                                                                                                                                                                                                                                                                             | 12.8  | Ion-bal:               | 4.09   | Total Co: |
| T. Alk.:         | 155    | Al:           | < 0.05                 | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 187.83 | SPC:      |
| Ca:              | 55.5   | Fe:           | < 0.05                 | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 12     | Mn:           | < 0.05                 |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 52.00            | 52.50             | 2.00       | Notch (V- or U-notch) |              |         |
| 60.00            | 61.00             | 4.00       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 5.00        | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 34.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 43.00       | 203        | Steel    |              | Plain casing          |                                |            |             |
| 43.00            | 61.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |
| 0.00             | 39.00       | 165        | Steel    |              | Plain casing          |                                |            |             |
| 39.00            | 93.00       | 165        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130826 | 60           | 82.80              | 3.54             | 2.03       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130826 | 60           | 82.80              | 7.52             | 7.37       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130826 | 60           | 82.80              | 12.04            | 22.30      |                |       |          |         |         |
| STEP TEST STEP 4 | 20130826 | 60           | 82.80              | 20.04            | 33.41      | 100            | 300   |          |         |         |
| CONSTANT         | 20130827 | 4320         | 82.80              | 10.08            | 14.37      | 100            | 1320  | 79       | 0.0322  |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 54.00              | Electric motor | 24              | 4.00              | CLASS 0       | 5.60                 | 51.00                 |

**Note:** 1. Production borehole.  
2. Install water level monitoring facility in borehole.



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 31/03/2014

## BASIC SITE INFORMATION:

Site Identifier: 2823ADX0060 Number: SD1-40

Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Latitude [°] 28.301570  
Longitude [°] 23.494940  
Altitude [m]: 1468.72

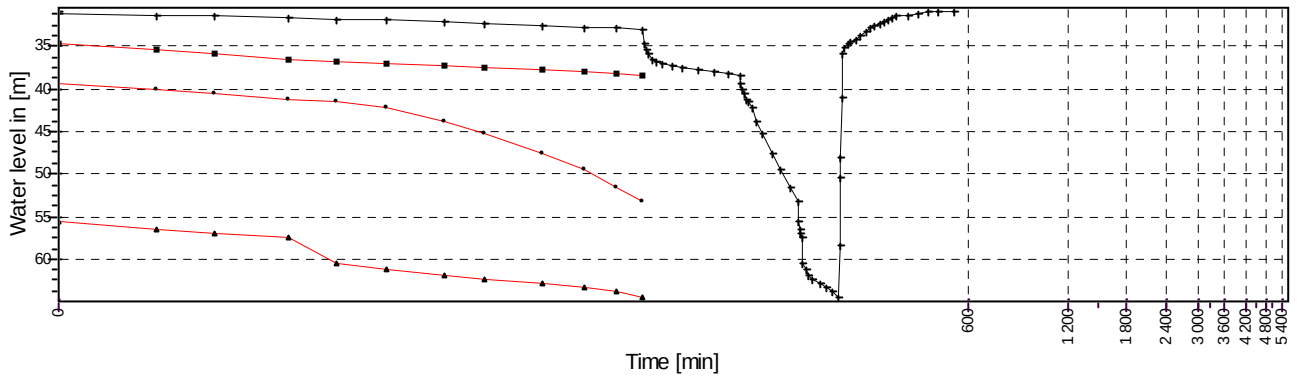
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 165  
Depth [m]: 97.60  
Col. ht. [mm]: 0.50

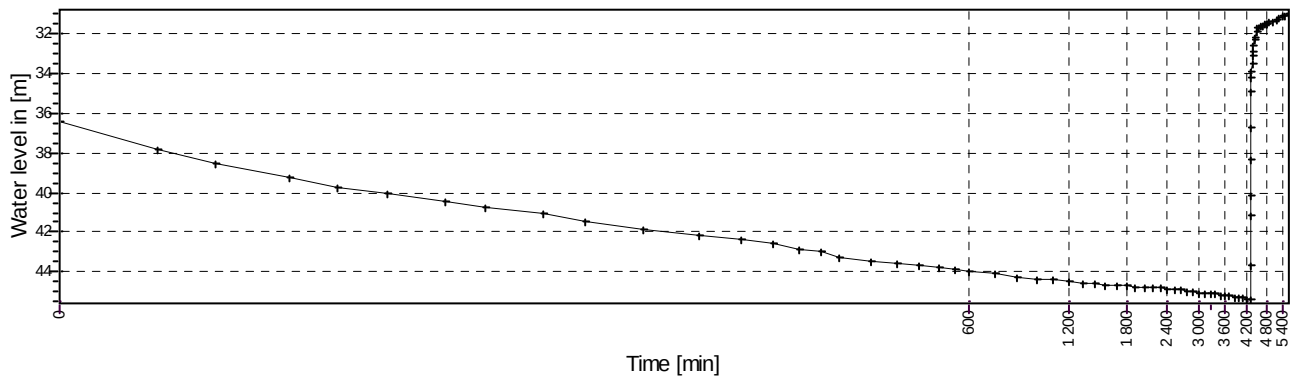
Water lev. [m]: 30.35  
Piezometer: 0  
Date WL meas.: 20140117

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 82.80               | 20130826      | 1400 | 20130826    | 2300 |                               |           |                 |
| GOLD       | Constant rate test | 82.80               | 20130827      | 1130 | 20130831    | 0930 | 79                            | 0.0322    | 3.33            |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | % | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|---|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1400        | 60           | 82.80              | 3.54             | 2.03       |            |   |                 |                            |             |         | 1.74 |
| STEP TEST STEP 2 | 1500        | 60           | 82.80              | 7.52             | 7.37       |            |   |                 |                            |             |         | 1.02 |
| STEP TEST STEP 3 | 1600        | 60           | 82.80              | 12.04            | 22.30      |            |   |                 |                            |             |         | 0.54 |
| STEP TEST STEP 4 | 1700        | 60           | 82.80              | 20.04            | 33.41      | 100        |   | 300             |                            |             |         | 0.60 |
| CONSTANT         | 1130        | 4320         | 82.80              | 10.08            | 14.37      | 100        |   | 1320            | 79                         |             | 0.0322  | 0.70 |



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Project No.: 11613568

# Borehole Construction and Geological Log

Date compiled: 03/03/2014

**BASIC SITE INFORMATION:** Site Identifier: 2823ADX0064 Number: SD1-40M Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

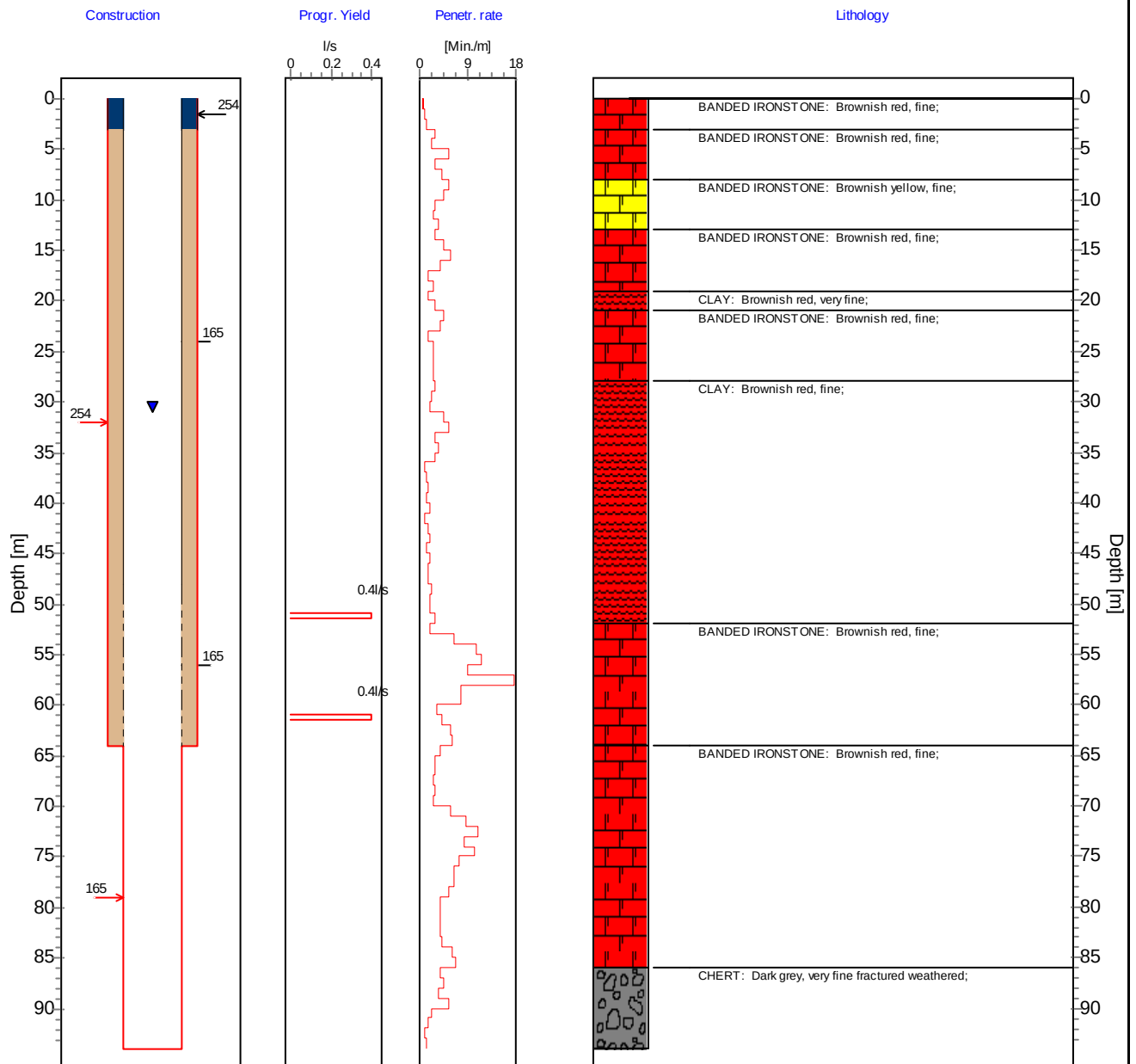
Region Descr.: KGATELOPELE LM

|                                          |           |                                       |                    |
|------------------------------------------|-----------|---------------------------------------|--------------------|
| Latitude [°]: 28.301252                  | Reg./BB.: | Topo-set.:                            | Depth [m]: 64.44   |
| Longitude [°]: 23.494999                 | G-Nr.:    | Site status: Unused                   | Col. ht. [m]: 0.43 |
| Altitude [m]: 1467.00                    |           | Site purp.: Production (water supply) | Diam. [mm]: 165    |
| Coord. acc.: Accurate to within 10 units |           | Use applic.: Domestic - all purposes  | Drain. reg.: C92A  |
| Coord. meth.: Altimeter                  |           | Equipment: No equipment               | Rep. inst.: GOLD   |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend

|  |                                      |        |                                  |  |                |
|--|--------------------------------------|--------|----------------------------------|--|----------------|
|  | Hole                                 | 165 →  | Hole diameter [mm]               |  | Sanitary seal  |
|  | Casing (plain / perforated, slotted) | ← 152  | Casing diameter [mm]             |  | Gravel (> 2mm) |
|  | Screen / Mesh Screen                 | ▼      | Waterlevel measured: 04/08/13    |  |                |
|  | Piezometer                           | 0:50 → | Piezometer (Nr. & Diameter [mm]) |  |                |



COMMENT:



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Fax: 012 - 364 4001  
Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823ADX0064 Number: SD1-40M Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.301252 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 31.28    |
| Longitude [°]: | 23.494999 | Alt. No. 2:      |  | Depth [m]:    | 64.44 | WL status:      | Static   |
| Altitude [m]:  | 1467.00   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.43  | Date WL meas.:  | 20130825 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| <b>Pump:</b>   |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| <b>Engine:</b> |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |         |               |          |                                                                                                                                                                                                                                                                                      |       |                        |        |           |
|------------------|---------|---------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-40M | Date sampled: | 20130825 | Depth sampl. [m]:                                                                                                                                                                                                                                                                    | 58.80 | Comment:               |        |           |
| Main Parameters: |         |               |          | Calculated Parameters:                                                                                                                                                                                                                                                               |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.71    | Na:           | 11.5     | Cl:                                                                                                                                                                                                                                                                                  | 19.2  | Langel.:               | 0.12   | E.Coli:   |
| EC: [mS/m]       | 38.7    | K:            | 2.89     | NO3 as N:                                                                                                                                                                                                                                                                            | 1.53  | Aggr-Ind:              | 12.12  | Faec. co: |
| TDS:             | 284     | Si:           | 9.3      | SO4:                                                                                                                                                                                                                                                                                 | 18.2  | Ion-bal:               | 1.39   | Total Co: |
| T. Alk.:         | 174     | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                                   | < 0.1 | CaCO3:                 | 203.40 | SPC:      |
| Ca:              | 59.6    | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit   ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit   ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 13.3    | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                      |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 51.00            | 51.50             | 0.40       | Notch (V- or U-notch) |              |         |
| 61.00            | 61.50             | 0.40       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 3.00        | 254        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 48.00       | 165        | Steel    |              | Plain casing          |                                |            |             |
| 48.00            | 64.00       | 165        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %   | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|-----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130825 | 60           | 58.80              | 1.20             | 3.89       |              |     |       |          |         |         |
| STEP TEST STEP 2 | 20130825 | 60           | 58.80              | 2.51             | 18.54      |              |     |       |          |         |         |
| STEP TEST STEP 3 | 20130825 | 5            | 58.80              | 3.52             | 27.30      |              | 100 | 100   |          |         |         |
| PUMP INLET       | 20130825 | 10           | 58.80              | 2.28             | 27.52      |              |     |       |          |         |         |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 03/03/2014

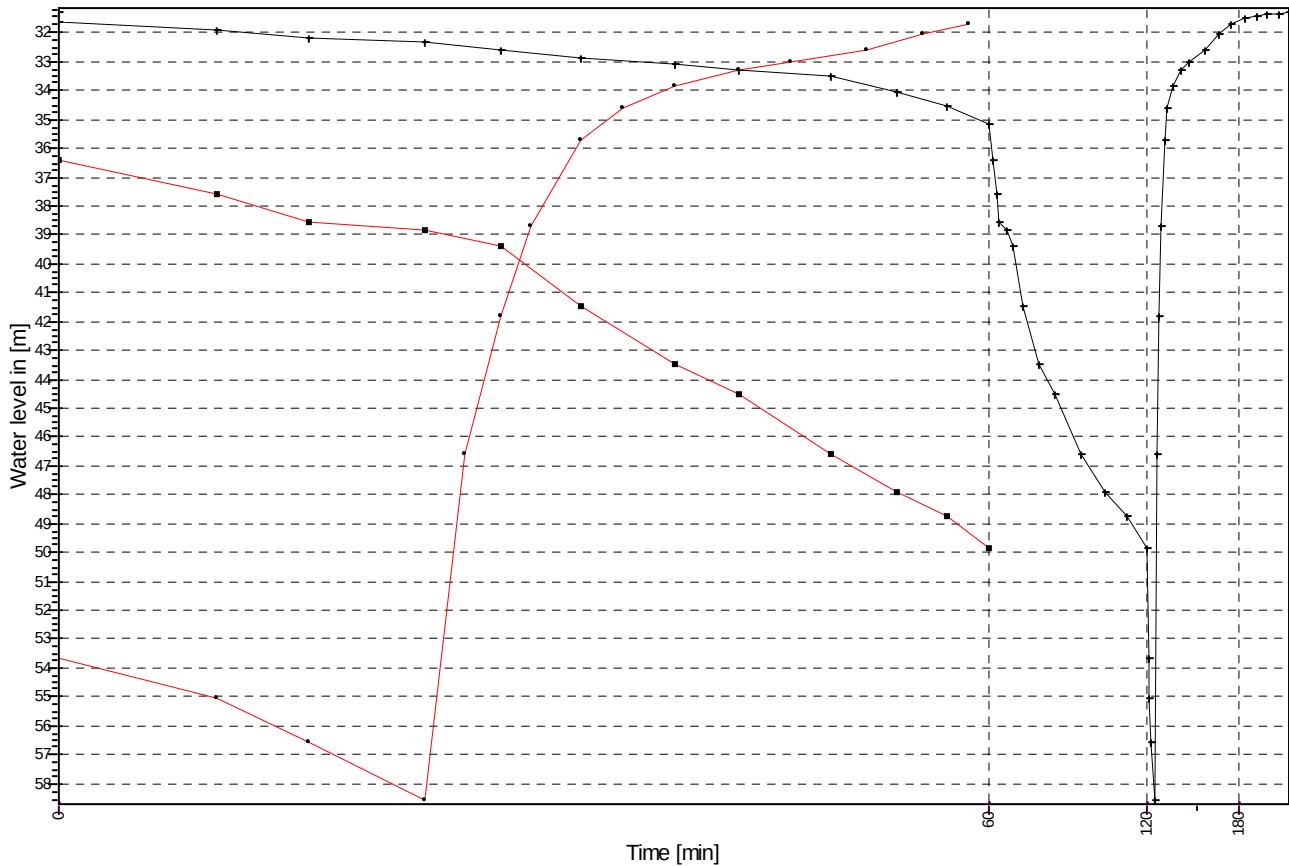
**BASIC SITE INFORMATION:** Site Identifier: 2823ADX0064 Number: SD1-40M Site type: Borehole

Distr./Farm No.: 458 Site Name/Des.: CARTER BLOCK

|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.301252 | Alt. No. 1:      |  | Diam. [mm]:    | 165   | Water lev. [m]: | 30.76    |
| Longitude [°] | 23.494999 | Alt. No. 2:      |  | Depth [m]:     | 64.44 | Piezometer:     | 0        |
| Altitude [m]: | 1467.00   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.43  | Date WL meas.:  | 20140117 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test    | 58.80               | 20130825      | 1400 | 20130825    | 1745 |                               |           |                 |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1400        | 60           | 58.80              | 1.20             | 3.89       |            |     |                 |                            |             |         | 0.31 |
| STEP TEST STEP 2 | 1500        | 60           | 58.80              | 2.51             | 18.54      |            |     |                 |                            |             |         | 0.14 |
| STEP TEST STEP 3 | 1600        | 5            | 58.80              | 3.52             | 27.30      |            | 100 | 100             |                            |             |         | 0.13 |
| PUMP INLET       | 1745        | 10           | 58.80              | 2.28             | 27.52      |            |     |                 |                            |             |         | 0.08 |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823ADX0062 Number: SD1-41 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.304270

Reg./BB.:

Topo-set.:

Depth [m]: 93.00

Longitude [°]: 23.494280

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.55

Altitude [m]: 1467.44

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92C

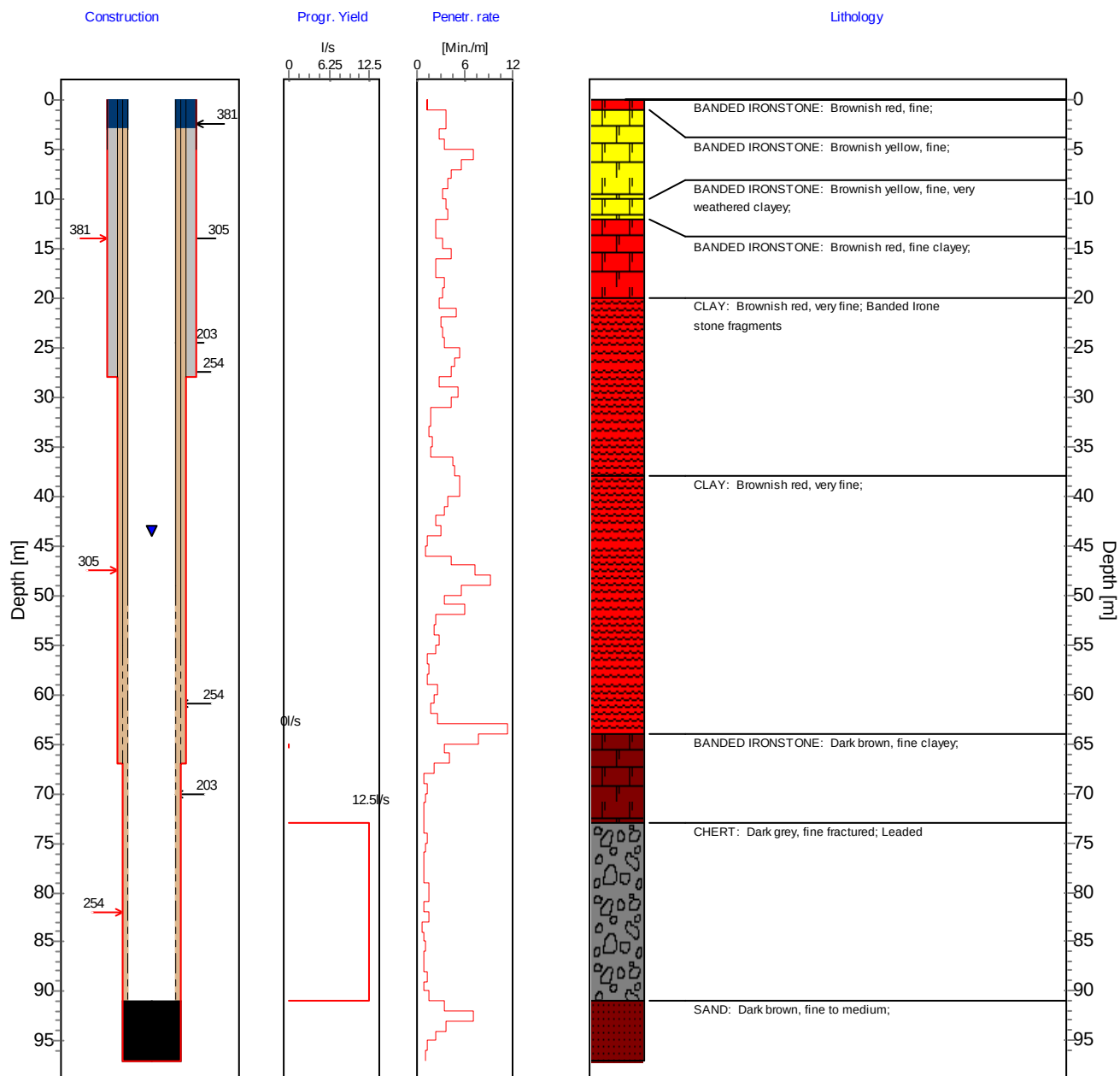
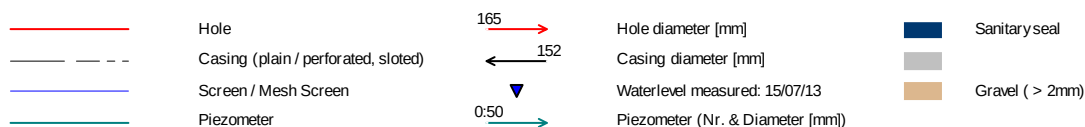
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



Golder Associates Africa, Pretoria  
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Tel: 012 - 364 4000  
Fax: 012 - 364 4001  
Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823ADX0062 Number: SD1-41 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.304270 | Alt. No. 1:      |  | Diam. [mm]:   | 203   | Water lev. [m]: | 43.71    |
| Longitude [°]: | 23.494280 | Alt. No. 2:      |  | Depth [m]:    | 93.00 | WL status:      | Static   |
| Altitude [m]:  | 1467.44   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.55  | Date WL meas.:  | 20140117 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                       |  |                            |  |
|-----------------------|--|----------------------------|--|
| <b>Pump:</b>          |  | <b>Pulley Diam. [mm]:</b>  |  |
| <b>Type of Inst.:</b> |  | <b>Depth to Intk. [m]:</b> |  |
| <b>Manufacturer:</b>  |  |                            |  |
| <b>Engine:</b>        |  | <b>Power Rating [kW]</b>   |  |
| <b>Manufacturer:</b>  |  | <b>Pulley Diam. [mm]:</b>  |  |
| <b>Type of Power:</b> |  |                            |  |

### USE APPLICATION:

**Site Status:** Unused  
**Purpose:** Production (water supply)  
**Consumer:** Non-urban  
**Application:** Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-41 | Date sampled: | 20130823 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 82.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.54   | Na:           | 9.33     | Cl:                                                                                                                                                                                                                                                                              | 15.6  | Langel.:               | -0.10  | E.Coli:   |
| EC: [mS/m]       | 35.5   | K:            | 2.4      | NO3 as N:                                                                                                                                                                                                                                                                        | 1.66  | Aggr-Ind:              | 11.89  | Faec. co: |
| TDS:             | 224    | Si:           | 9.67     | SO4:                                                                                                                                                                                                                                                                             | 13.2  | Ion-bal:               | 1.73   | Total Co: |
| T. Alk.:         | 162    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | 0.123 | CaCO3:                 | 187.81 | SPC:      |
| Ca:              | 55     | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 12.3   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 65.00            | 65.50             | 0.00       | Notch (V- or U-notch) |              | SEEPAGE |
| 73.00            | 91.00             | 12.50      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 5.00        | 381        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 28.00       | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 55.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 55.00            | 67.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |
| 0.00             | 49.00       | 203        | Steel    |              | Plain casing          |                                |            |             |
| 49.00            | 91.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130819 | 60           | 82.80              | 5.06             | 2.84       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130819 | 60           | 82.80              | 10.04            | 7.58       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130819 | 60           | 82.80              | 15.10            | 12.96      |                |       |          |         |         |
| STEP TEST STEP 4 | 20130819 | 15           | 82.80              | 20.06            | 38.10      | 100            | 90    |          |         |         |
| PUMP INLET       | 20130819 | 25           | 82.80              | 18.10            | 38.23      |                |       |          |         |         |
| CONSTANT(1)      | 20130820 | 1200         | 82.80              | 12.04            | 10.30      | 100            | 210   |          |         |         |
| CONSTANT(2)      | 20130821 | 4320         | 82.80              | 12.04            | 14.21      | 100            | 600   | 83       |         |         |

### RECOMMENDATIONS:

| Prior.                                                                                          | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|-------------------------------------------------------------------------------------------------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1                                                                                               | Mono-type pump | 72.00              | Electric motor | 20              | 5.00              | CLASS 0       | 1.90                 | 72.00                 |
| <b>Note:</b> 1. Production borehole.<br>2. Install water level monitoring facility in borehole. |                |                    |                |                 |                   |               |                      |                       |



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 Project No.: 11613568



# PUMPING TEST REPORT

Date compiled: 31/03/2014

## BASIC SITE INFORMATION:

Site Identifier: 2823ADX0062 Number: SD1-41

Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Latitude [°] 28.304270  
Longitude [°] 23.494280  
Altitude [m]: 1467.44

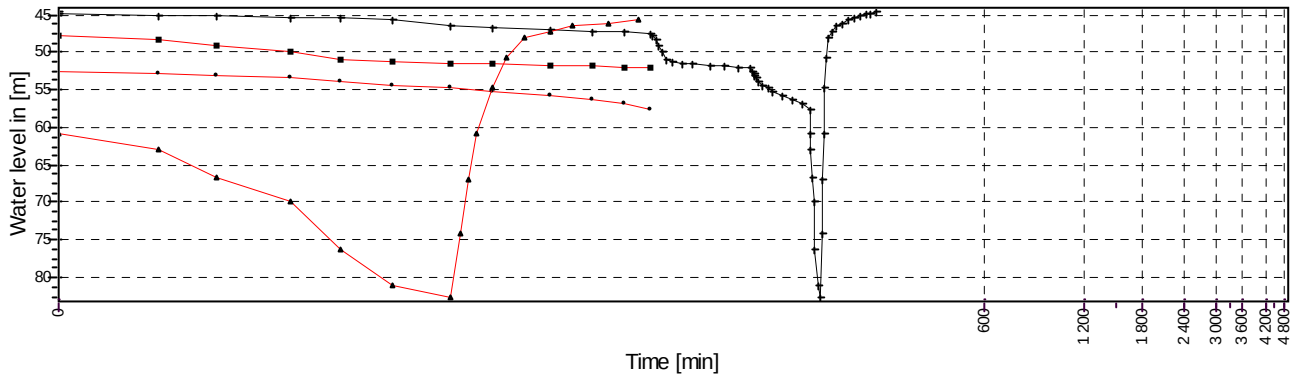
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 203  
Depth [m]: 93.00  
Col. ht. [mm]: 0.55

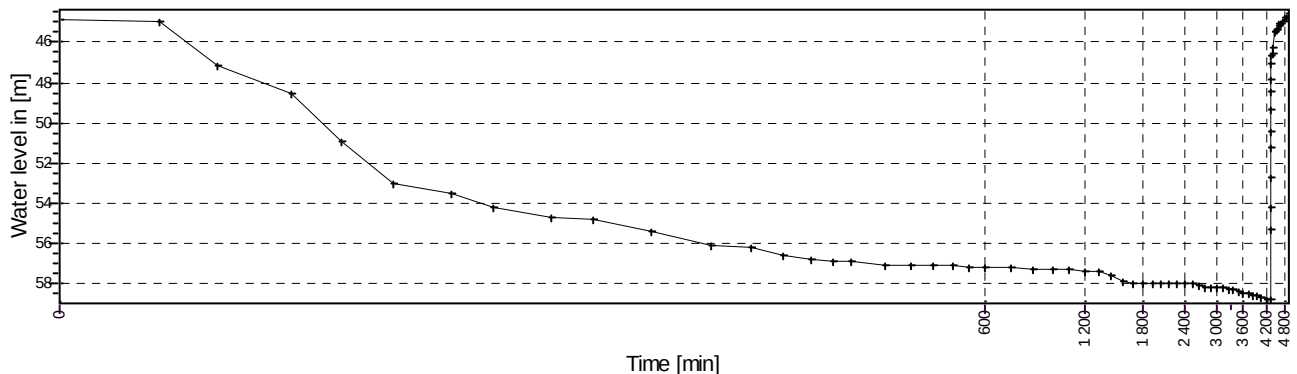
Water lev. [m]: 43.71  
Piezometer: 0  
Date WL meas.: 20140117

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 82.80               | 20130819      | 1200 | 20130819    | 1645 |                               |           |                 |
| GOLD       | Constant rate test | 82.80               | 20130820      | 0730 | 20130821    | 0710 |                               |           |                 |
| GOLD       | Constant rate test | 82.80               | 20130821      | 1100 | 20130824    | 2100 | 83                            |           | 4.17            |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | % | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|---|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1200        | 60           | 82.80              | 5.06             | 2.84       |            |   |                 |                            |             |         | 1.78 |
| STEP TEST STEP 2 | 1300        | 60           | 82.80              | 10.04            | 7.58       |            |   |                 |                            |             |         | 1.32 |
| STEP TEST STEP 3 | 1400        | 60           | 82.80              | 15.10            | 12.96      |            |   |                 |                            |             |         | 1.17 |
| STEP TEST STEP 4 | 1500        | 15           | 82.80              | 20.06            | 38.10      | 100        |   | 90              |                            |             |         | 0.53 |
| PUMP INLET       | 1645        | 25           | 82.80              | 18.10            | 38.23      |            |   |                 |                            |             |         | 0.47 |
| CONSTANT(1)      | 0730        | 1200         | 82.80              | 12.04            | 10.30      | 100        |   | 210             |                            |             |         | 1.17 |
| CONSTANT(2)      | 1100        | 4320         | 82.80              | 12.04            | 14.21      | 100        |   | 600             | 83                         |             |         | 0.85 |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 28/08/2013

## BASIC SITE INFORMATION:

Site Identifier: 2823ADX0062 Number: SD1-41

Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Latitude [°] 28.304270

Alt. No. 1:

Diam. [mm]: 203

Water lev. [m]: 44.57

Longitude [°] 23.494280

Alt. No. 2:

Depth [m]: 93.00

Piezometer: 0

Altitude [m]: 1467.44

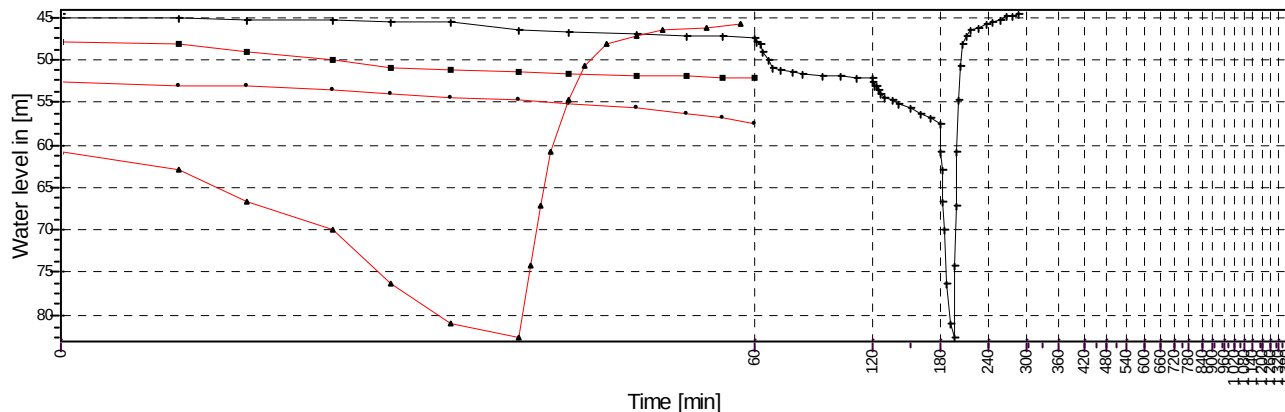
Rep. inst.: GOLD

Col. ht. [mm]: 0.55

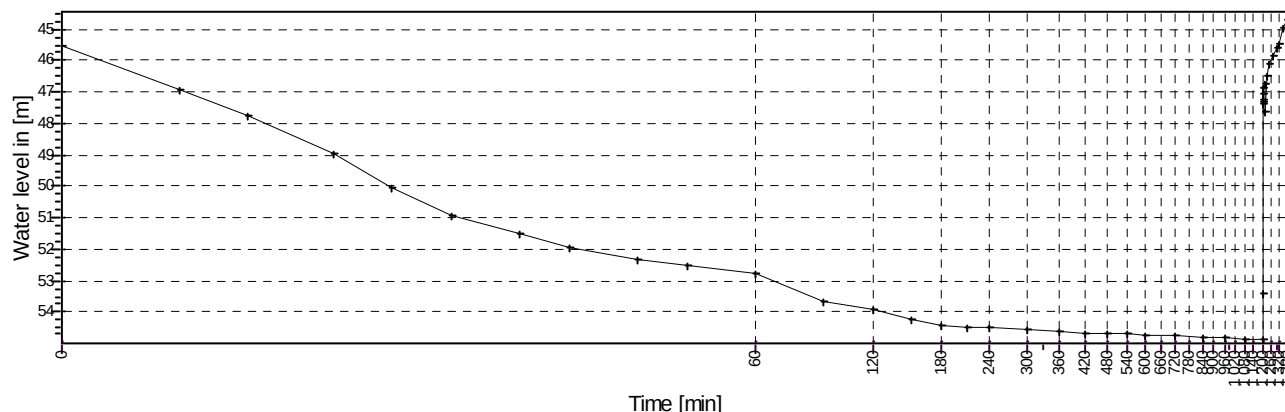
Date WL meas.: 20130819

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartbeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 82.80               | 20130819      | 1200 | 20130819    | 1645 |                               |           |                 |
| GOLD       | Constant rate test | 82.80               | 20130820      | 0730 | 20130821    | 0710 |                               |           |                 |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate [l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|-------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1200        | 60           | 82.80              | 5.06              | 2.84       |            |     |                 |                            |             |         | 1.78 |
| STEP TEST STEP 2 | 1300        | 60           | 82.80              | 10.04             | 7.58       |            |     |                 |                            |             |         | 1.32 |
| STEP TEST STEP 3 | 1400        | 60           | 82.80              | 15.10             | 12.96      |            |     |                 |                            |             |         | 1.17 |
| STEP TEST STEP 4 | 1500        | 15           | 82.80              | 20.06             | 38.10      |            | 100 | 90              |                            |             |         | 0.53 |
| PUMP INLET       | 1645        | 25           | 82.80              | 18.10             | 38.23      |            |     |                 |                            |             |         | 0.47 |
| CONSTANT         | 0730        | 1200         | 82.80              | 12.04             | 10.30      |            | 100 | 210             |                            |             |         | 1.17 |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823ADX0063 Number: SD1-42 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.297860

Reg./BB.:

Topo-set.:

Depth [m]: 112.00

Longitude [°]: 23.483360

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.52

Altitude [m]: 1477.23

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

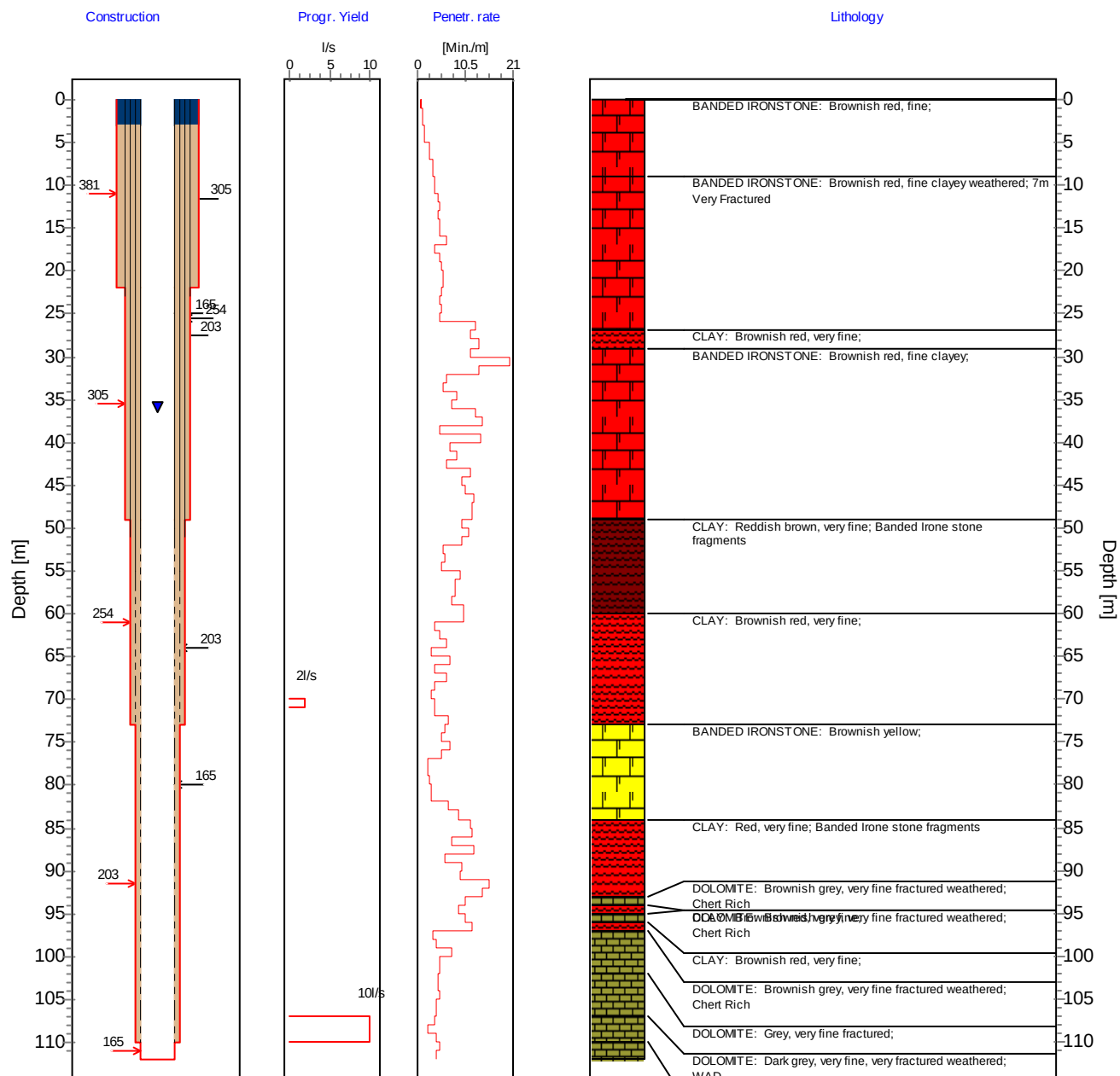
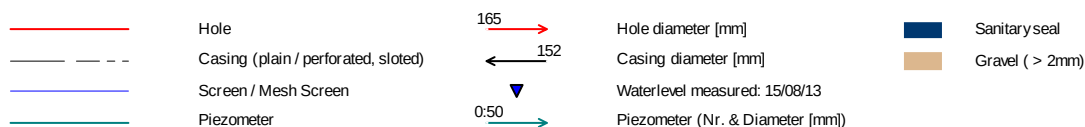
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



Golder Associates Africa, Pretoria  
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 Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823ADX0063 Number: SD1-42 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |             |      |               |        |                 |          |
|----------------|-----------|-------------|------|---------------|--------|-----------------|----------|
| Latitude [°]:  | 28.297860 | Alt. No. 1: |      | Diam. [mm]:   | 165    | Water lev. [m]: | 53.32    |
| Longitude [°]: | 23.483360 | Alt. No. 2: |      | Depth [m]:    | 112.00 | WL status:      | Static   |
| Altitude [m]:  | 1477.23   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.52   | Date WL meas.:  | 20140117 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |  |
|----------------|--|---------------------|--|
| Pump:          |  | Pulley Diam. [mm]:  |  |
| Type of Inst.: |  | Depth to Intk. [m]: |  |
| Manufacturer:  |  |                     |  |
| Engine:        |  | Power Rating [kW]   |  |
| Manufacturer:  |  | Pulley Diam. [mm]:  |  |
| Type of Power: |  |                     |  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                    |      |                        |        |                                                                                                                                                                                                                                                                                  |         |                        |        |           |
|--------------------|------|------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------------|--------|-----------|
| Sample No.: SD1-42 |      | Date sampled: 20130814 |        | Depth sampl. [m]: 0                                                                                                                                                                                                                                                              |         | Comment:               |        |           |
| Main Parameters:   |      |                        |        | Calculated Parameters:                                                                                                                                                                                                                                                           |         | Bacteriol. Parameters: |        |           |
| pH:                | 7.73 | Na:                    | 9.01   | Cl:                                                                                                                                                                                                                                                                              | 16.5    | Langel.:               | 0.20   | E.Coli:   |
| EC: [mS/m]         | 44.5 | K:                     | 2.94   | NO3 as N:                                                                                                                                                                                                                                                                        | 3.26    | Aggr-Ind:              | 12.22  | Faec. co: |
| TDS:               | 274  | Si:                    | 11.8   | SO4:                                                                                                                                                                                                                                                                             | 27      | Ion-bal:               | 2.23   | Total Co: |
| T. Alk.:           | 192  | Al:                    | < 0.05 | F:                                                                                                                                                                                                                                                                               | < 0.155 | CaCO3:                 | 243.75 | SPC:      |
| Ca:                | 63.9 | Fe:                    | < 0.05 | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |         |                        |        |           |
| Mg:                | 20.5 | Mn:                    | 0.05   |                                                                                                                                                                                                                                                                                  |         |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 70.00            | 71.00             | 2.00       | Notch (V- or U-notch) |              |         |
| 107.00           | 110.00            | 10.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 23.00       | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 51.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 55.00       | 203        | Steel    |              | Plain casing          |                                |            |             |
| 55.00            | 73.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |
| 0.00             | 50.00       | 165        | Steel    |              | Plain casing          |                                |            |             |
| 50.00            | 110.00      | 165        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130815 | 60           | 76.80              | 4.04             | 2.03       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130815 | 60           | 76.80              | 8.12             | 9.04       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130815 | 60           | 76.80              | 12.10            | 12.11      |                |       |          |         |         |
| STEP TEST STEP 4 | 20130815 | 15           | 76.80              | 16.30            | 40.61      | 100            | 120   |          |         |         |
| PUMP INLET       | 20130815 | 25           | 76.80              | 14.48            | 40.90      |                |       |          |         |         |
| CONSTANT         | 20130816 | 2880         | 76.80              | 10.14            | 10.38      | 100            | 360   | 52       |         |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 72.00              | Electric motor | 20              | 5.00              | CLASS 0       | 13.50                | 69.00                 |

**Note:** 1. Production borehole.  
2. Install water level monitoring facility in borehole.



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 31/03/2014

## BASIC SITE INFORMATION:

Site Identifier: 2823ADX0063 Number: SD1-42

Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Latitude [°] 28.297860  
Longitude [°] 23.483360  
Altitude [m]: 1477.23

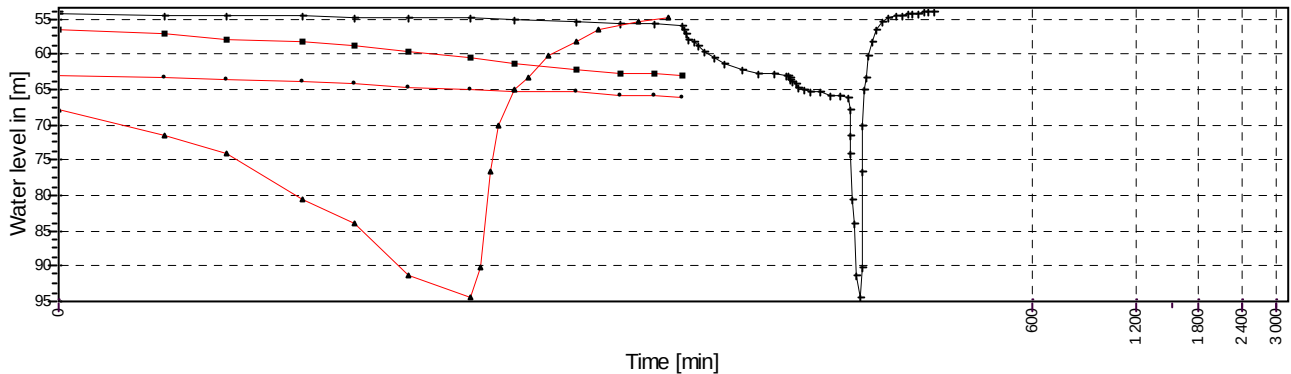
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 165  
Depth [m]: 112.00  
Col. ht. [mm]: 0.52

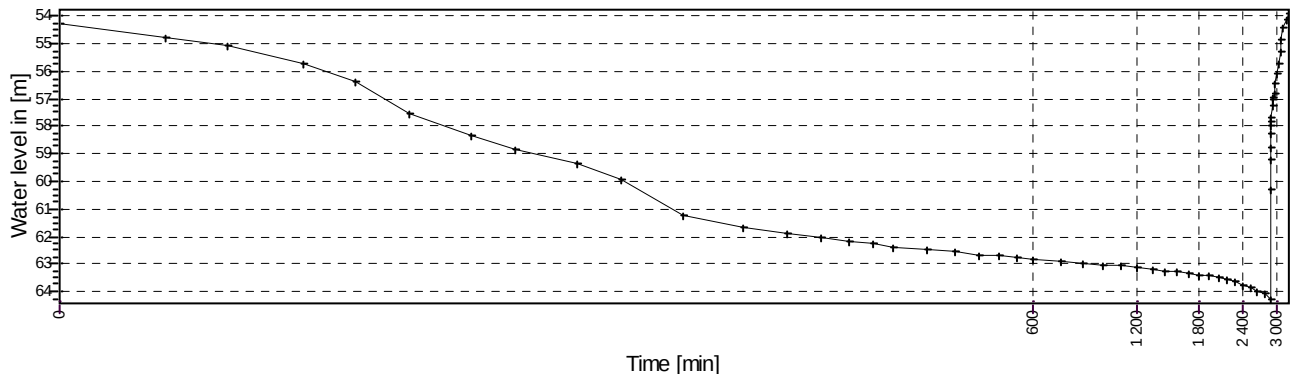
Water lev. [m]: 53.32  
Piezometer: 0  
Date WL meas.: 20140117

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 76.80               | 20130815      | 1400 | 20130815    | 1915 |                               |           |                 |
| GOLD       | Constant rate test | 76.80               | 20130816      | 0900 | 20130818    | 1500 | 52                            |           | 4.17            |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1400        | 60           | 76.80              | 4.04             | 2.03       |            |     |                 |                            |             |         | 1.99 |
| STEP TEST STEP 2 | 1500        | 60           | 76.80              | 8.12             | 9.04       |            |     |                 |                            |             |         | 0.90 |
| STEP TEST STEP 3 | 1600        | 60           | 76.80              | 12.10            | 12.11      |            |     |                 |                            |             |         | 1.00 |
| STEP TEST STEP 4 | 1700        | 15           | 76.80              | 16.30            | 40.61      |            | 100 | 120             |                            |             |         | 0.40 |
| PUMP INLET       | 1915        | 25           | 76.80              | 14.48            | 40.90      |            |     |                 |                            |             |         | 0.35 |
| CONSTANT         | 0900        | 2880         | 76.80              | 10.14            | 10.38      |            | 100 | 360             | 52                         |             |         | 0.98 |



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0155 Number: SD1-GAA218 Site type: Borehole

Distr./Farm No.: 298/1/0 Site Name/Descr.: VLEIPLAAS

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.353830 | Alt. No. 1:      |  | Diam. [mm]:   | 170   | Water lev. [m]: | 6.09     |
| Longitude [°]: | 23.683060 | Alt. No. 2:      |  | Depth [m]:    | 51.18 | WL status:      | Static   |
| Altitude [m]:  | 1433.28   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.12  | Date WL meas.:  | 20121011 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
Type of Inst.: No information  
Manufacturer:  
Pulley Diam. [mm]:  
Depth to Intk. [m]:

**Engine:**  
Manufacturer:  
Type of Power: No information  
Power Rating [kW]:  
Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                        |       |                        |        |           |   |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|---|
| Sample No.:      | SD1-   | Date sampled: | 20121023 | Depth sampl. [m]:                                                                                                                                                                                                                                                                      | 48.00 | Comment:               |        |           |   |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                                 |       | Bacteriol. Parameters: |        |           |   |
| pH:              | 7.3    | Na:           | 16.9     | Cl:                                                                                                                                                                                                                                                                                    | 43.7  | Langel.:               | 0.17   | E.Coli:   | 0 |
| EC: [mS/m]       | 81.7 † | K:            | 2.12     | NO3 as N:                                                                                                                                                                                                                                                                              | 6.73  | Aggr-Ind:              | 12.27  | Faec. co: | 0 |
| TDS:             | 620 †  | Si:           | 28.3     | SO4:                                                                                                                                                                                                                                                                                   | 25.1  | Ion-bal:               | 1.60   | Total Co: | 0 |
| T. Alk.:         | 386    | Al:           |          | F:                                                                                                                                                                                                                                                                                     | 0.164 | CaCO3:                 | 474.96 | SPC:      | 0 |
| Ca:              | 96.4   | Fe:           |          | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    ¶ Value exceeds minimum allowable limit |       |                        |        |           |   |
| Mg:              | 57     | Mn:           |          |                                                                                                                                                                                                                                                                                        |       |                        |        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %  | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121011 | 60           | 48.00              | 0.75             | 6.09       |              |    |       |          |         |         |
| STEP TEST STEP 2 | 20121011 | 60           | 48.00              | 2.11             | 6.96       |              |    |       |          |         |         |
| STEP TEST STEP 3 | 20121011 | 60           | 48.00              | 4.02             | 14.73      |              |    |       |          |         |         |
| STEP TEST STEP 4 | 20121011 | 60           | 48.00              | 6.02             | 20.91      | 0.19         | 99 | 240   |          |         |         |
| CONSTANT         | 20121012 | 480          | 48.00              | 5.03             | 41.87      | 0.68         | 98 | 480   |          |         |         |
| PUMP INLET       | 20121013 | 240          | 48.00              | 3.29             | 41.87      |              |    |       |          |         |         |



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# PUMPING TEST REPORT

Date compiled: 2012/10/16

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0155 Number: SD1-GAA218 Site type: Borehole

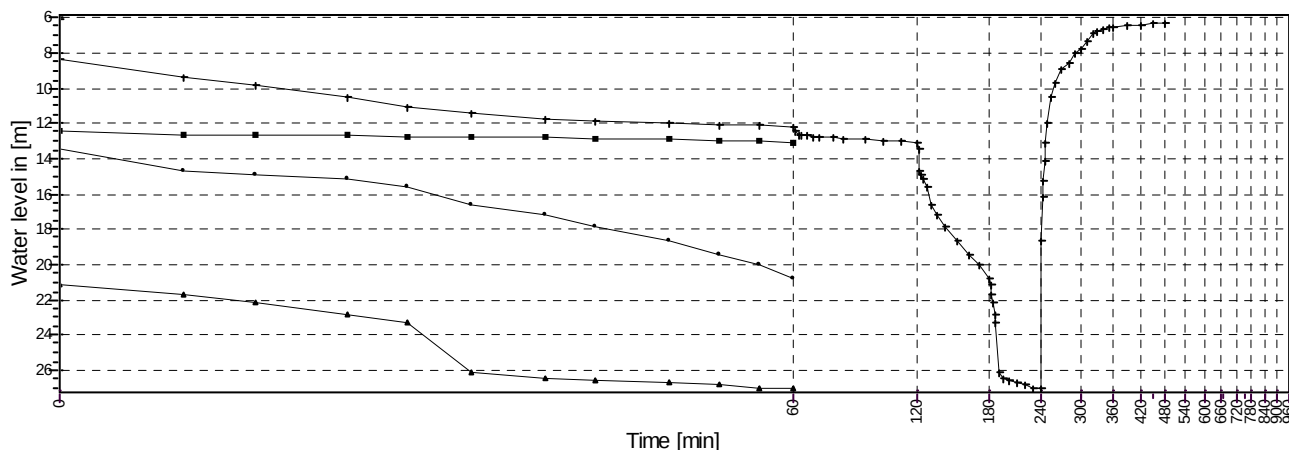
Distr./Farm No.: 298/1/0

Site Name/Des.: VLEIPLAAS

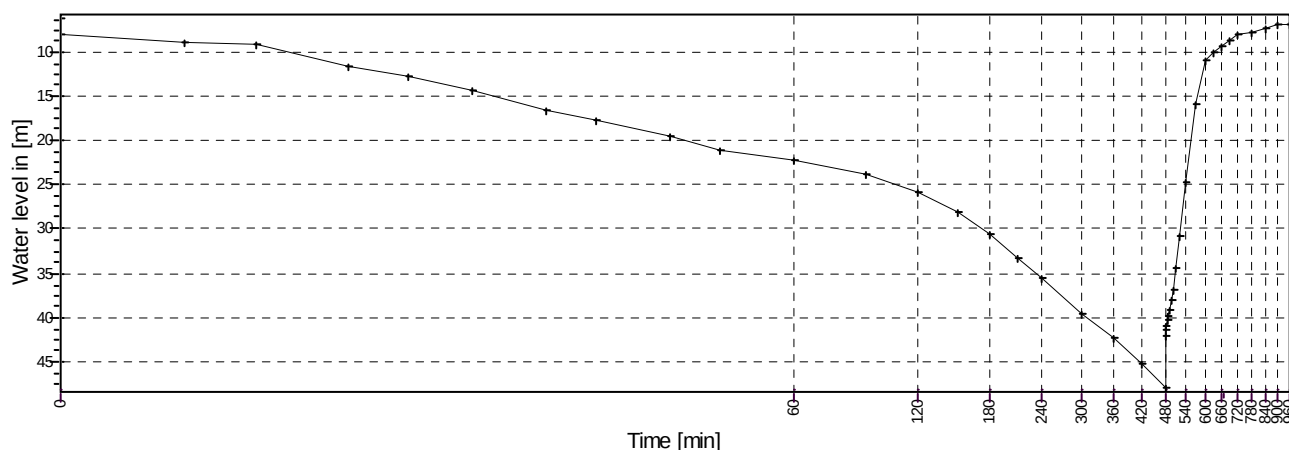
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.353830 | Alt. No. 1:      |  | Diam. [mm]:    | 170   | Water lev. [m]: | 6.09     |
| Longitude [°] | 23.683060 | Alt. No. 2:      |  | Depth [m]:     | 51.18 | Piezometer:     | 0        |
| Altitude [m]: | 1433.28   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.12  | Date WL meas.:  | 20121011 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 48.00               | 20121011      | 1700 | 20121012    | 0100 |                               |           |                 |
| GOLD       | Constant rate test | 48.00               | 20121012      | 0830 | 20121013    | 0030 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1700        | 60           | 48.00              | 0.75             | 6.09       |            |    |                 |                            |             |         | 0.12 |
| STEP TEST STEP 2 | 1800        | 60           | 48.00              | 2.11             | 6.96       |            |    |                 |                            |             |         | 0.30 |
| STEP TEST STEP 3 | 1900        | 60           | 48.00              | 4.02             | 14.73      |            |    |                 |                            |             |         | 0.27 |
| STEP TEST STEP 4 | 2000        | 60           | 48.00              | 6.02             | 20.91      | 0.19       | 99 | 240             |                            |             |         | 0.29 |
| CONSTANT         | 0830        | 480          | 48.00              | 5.03             | 41.87      | 0.68       | 98 | 480             |                            |             |         | 0.12 |
| PUMP INLET       | 0030        | 240          | 48.00              | 3.29             | 41.87      |            |    |                 |                            |             |         | 0.08 |



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# **BASIC SITE INFORMATION (SITE LOCATION, GEOHYDROLOGY AND MANAGEMENT REC**

| SITE LOCATION          |            |          |                         |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------------|------------|----------|-------------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:       | Number:    | District | Site name/Description   | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0152            | SD1-GAA215 | 298/1/0  | VLEIPLAAS               | B          | 28.37168967  | 23.693570001  | 1423.30      |              | 165        | 48.00           |              |            |                |                       |                |                 |                   |
| 2823BCX0153            | SD1-GAA216 | 298/1/0  | VLEIPLAAS               | B          | 28.36851967  | 23.691890001  | 1430.40      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0154            | SD1-GAA217 | 298/1/0  | VLEIPLAAS               | B          | 28.36970967  | 23.689750001  | 1428.20      | 0.33         | 165        |                 | 2.84         |            |                |                       |                |                 |                   |
| 2823BCX0156            | SD1-GAA219 | 298/1/0  | VLEIPLAAS               | B          | 28.35411967  | 23.685820001  | 1432.50      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0169            | SD1-GAA223 | 298/1/0  | VLEIPLAAS               | B          | 28.35384967  | 23.683140001  | 1435.50      |              | 165        | 90.70           |              |            |                |                       |                |                 |                   |
| 2823BCX0170            | SD1-GAA224 | 298/1/0  | VLEIPLAAS               | B          | 28.35530967  | 23.680300001  | 1434.00      | 0.11         | 165        | 7.00            | 5.40         |            |                |                       |                |                 |                   |
| 2823BCX0223            | SD1-GAA265 | 458      | CARTER BLOCK            | B          | 28.31039967  | 23.523840001  | 1453.45      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0224            | SD1-GAA264 | 458      | CARTER BLOCK PTN. KOLBE | D          | 28.29820967  | 23.515390001  | 1463.68      | 0.05         |            |                 | 7.34         |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>        |            |          |                         |            |              |               |              |              |            | <b>Maximum:</b> | 90.70        | 7.34       |                |                       |                |                 |                   |
|                        |            |          |                         |            |              |               |              |              |            | <b>Minimum:</b> | 7.00         | 2.84       |                |                       |                |                 |                   |
|                        |            |          |                         |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
| <b>Nr. of sites:</b> 8 |            |          |                         |            |              |               |              |              |            | <b>Average:</b> | 48.57        | 5.19       |                |                       |                |                 |                   |

Site Type:  
B = Borehole  
D = Dug well

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)

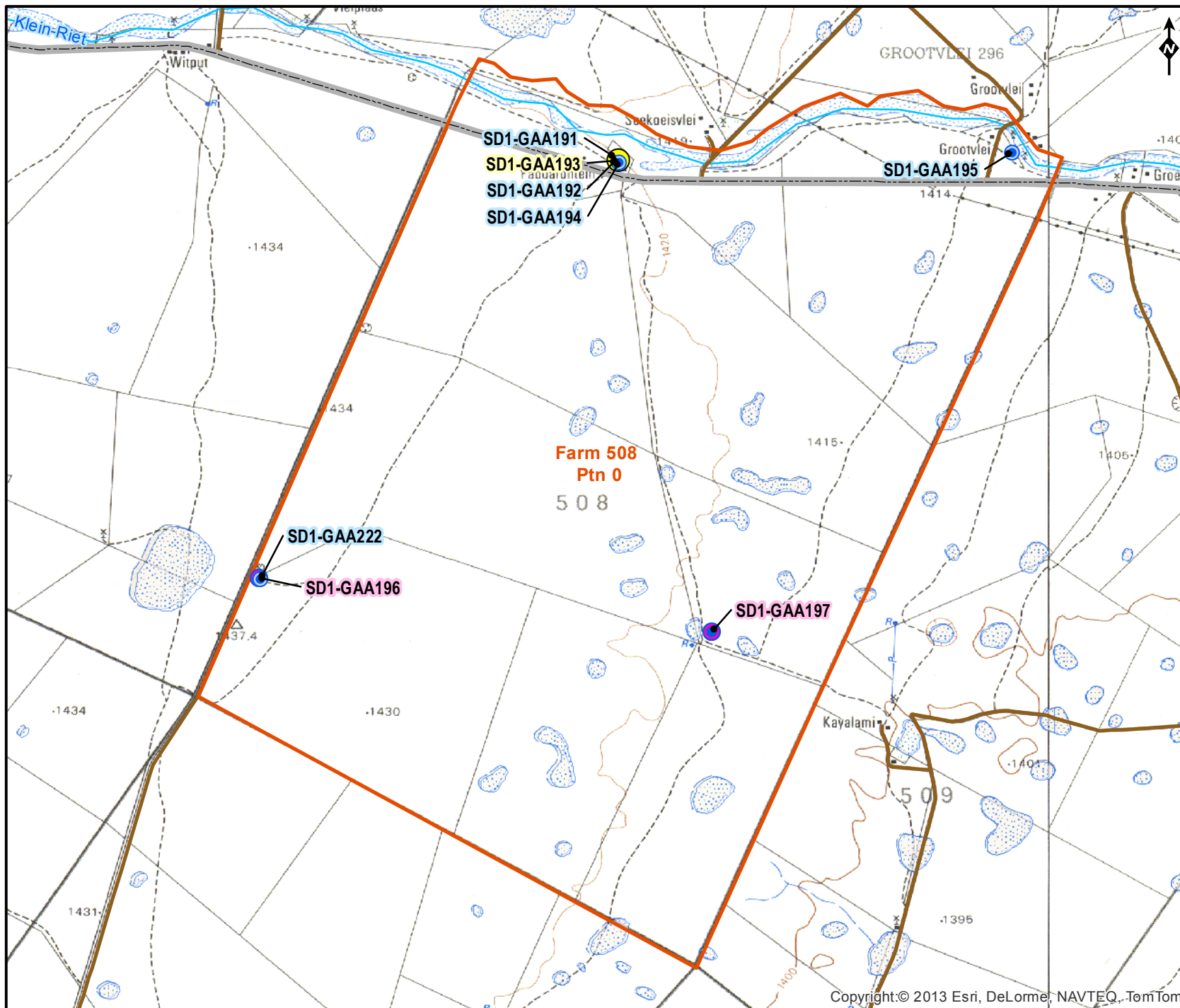


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Project No.: 11613568

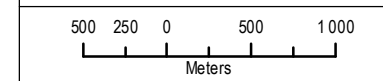




## **2.5 Christo Steenkamp**



- LEGEND**
- Existing borehole survey
  - Existing borehole tested
  - Well point
  - Farm 508
  - Secondary road
  - Other road
  - Rivers
  - Dam
  - Pan
  - Marsh vlei



**RESOURCES/NOTES**  
Coordinate System: GCS WGS 1984  
Datum: WGS 1984

**PROJECT**  
GW ASSESSMENT VGG SCHEME

**TITLE**  
**FARM 508 - PADDAFONTEIN**  
**CHRISTO STEENKAMP**

|             |          |            |
|-------------|----------|------------|
| PROJECT No. | 11613568 | REV 0      |
| SCALE       | 1:45 000 | A4         |
| GIS         | MB       | 01/04/2014 |
| CHECK       | DB       | 01/04/2014 |
| REVIEW      | FW       | 01/04/2014 |



## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0147 Number: SD1-GAA196 Site type: Borehole

Distr./Farm No.: 508/0 Site Name/Descr.: PADDAFONTEIN

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.414220 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 6.78     |
| Longitude [°]: | 23.689840 | Alt. No. 2:      |  | Depth [m]:    | 78.60 | WL status:      | Static   |
| Altitude [m]:  | 1433.56   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.26  | Date WL meas.:  | 20121011 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                  |                     |       |
|----------------|------------------|---------------------|-------|
| <b>Pump:</b>   |                  |                     |       |
| Type of Inst.: | Submersible pump | Pulley Diam. [mm]:  |       |
| Manufacturer:  | FRANKLIN         | Depth to Intk. [m]: | 36.74 |
| <b>Engine:</b> |                  |                     |       |
| Manufacturer:  |                  | Power Rating [kW]   |       |
| Type of Power: | Electric motor   | Pulley Diam. [mm]:  |       |

### USE APPLICATION:

|              |                                    |
|--------------|------------------------------------|
| Site Status: | In use                             |
| Purpose:     | Production (water supply)          |
| Consumer:    | Non-urban                          |
| Application: | Agricultural - stock watering only |

### WATER CHEMISTRY:

|                  |      |               |          |                                                                                                        |       |           |                        |           |   |
|------------------|------|---------------|----------|--------------------------------------------------------------------------------------------------------|-------|-----------|------------------------|-----------|---|
| Sample No.:      | SD1- | Date sampled: | 20121023 | Depth sampl. [m]:                                                                                      | 65.50 | Comment:  |                        |           |   |
| Main Parameters: |      |               |          | Calculated Parameters:                                                                                 |       |           | Bacteriol. Parameters: |           |   |
| pH:              | 7.61 | Na:           | 21.6     | Cl:                                                                                                    | 50.1  | Langel.:  | 0.47                   | E.Coli:   | 0 |
| EC: [mS/m]       | 69.7 | K:            | 3.39     | NO3 as N:                                                                                              | 3.25  | Aggr-Ind: | 12.56                  | Faec. co: | 0 |
| TDS:             | 464  | Si:           | 8.7      | SO4:                                                                                                   | 27.7  | Ion-bal:  | -9.25                  | Total Co: | 0 |
| T. Alk.:         | 420  | Al:           |          | F:                                                                                                     | 0.204 | CaCO3:    | 390.26                 | SPC:      | 0 |
| Ca:              | 85.2 | Fe:           |          | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption |       |           |                        |           |   |
| Mg:              | 43.2 | Mn:           |          | † Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit                      |       |           |                        |           |   |
|                  |      |               |          | ! Value exceeds recommended minimum limit ‡ Value exceeds minimum allowable limit                      |       |           |                        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121011 | 60           | 65.50              | 0.55             | 7.90       |                |       |          |         |         |
| STEP TEST STEP 2 | 20121011 | 60           | 65.50              | 1.02             | 23.25      |                |       |          |         |         |
| STEP TEST STEP 3 | 20121011 | 30           | 65.50              | 2.02             | 58.40      | 100            | 60    |          |         |         |
| PUMP INLET       | 20121011 | 30           | 65.50              | 1.04             | 58.72      |                |       |          |         |         |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 2012/10/16

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0147 Number: SD1-GAA196 Site type: Borehole

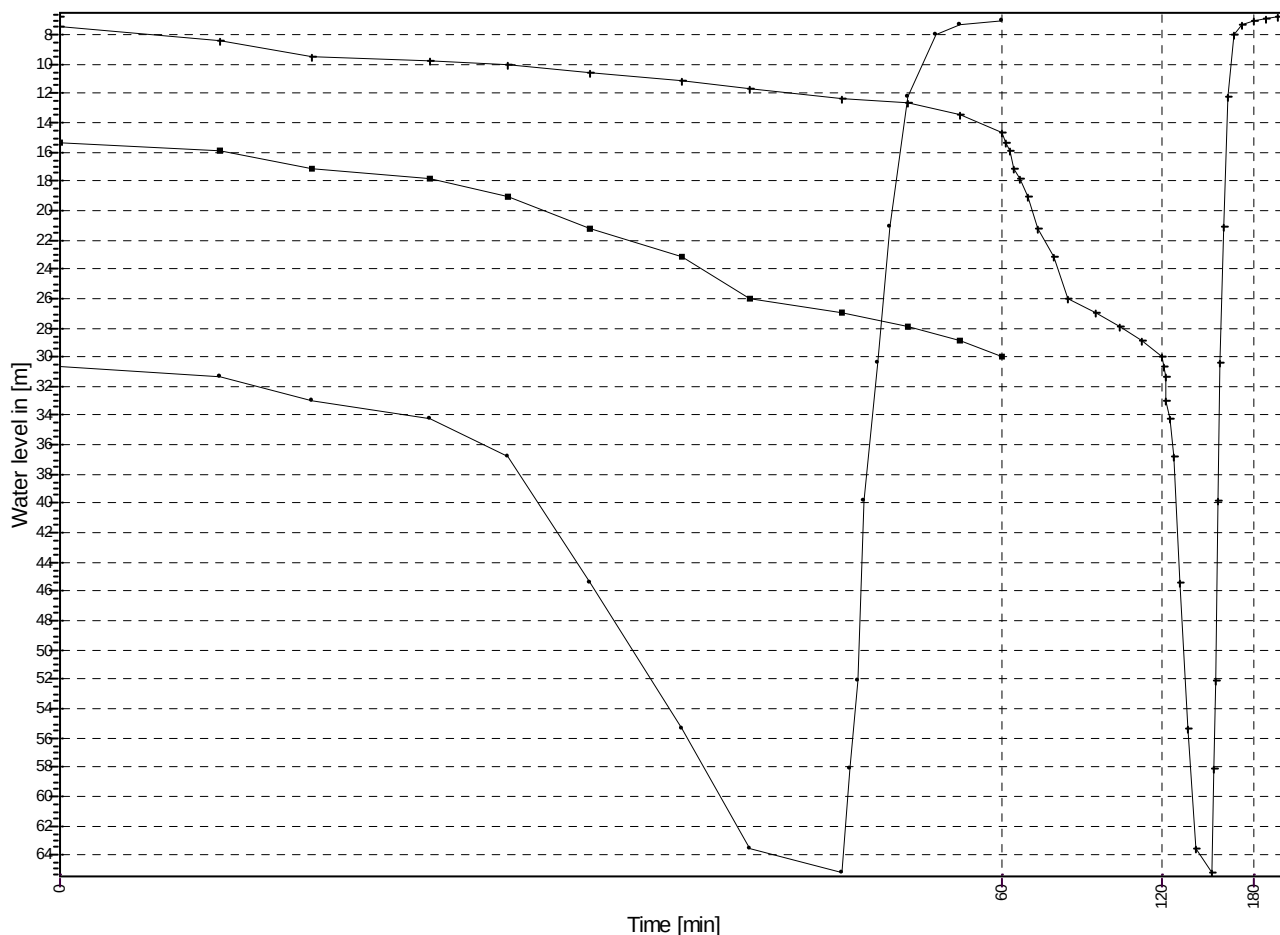
Distr./Farm No.: 508/0

Site Name/Des.: PADDAFONTEIN

|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.414220 | Alt. No. 1:      |  | Diam. [mm]:    | 165   | Water lev. [m]: | 6.78     |
| Longitude [°] | 23.689840 | Alt. No. 2:      |  | Depth [m]:     | 78.60 | Piezometer:     | 0        |
| Altitude [m]: | 1433.56   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.26  | Date WL meas.:  | 20121011 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m²/d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|------------------|-----------|-----------------|
| GOLD       | Step test    | 65.50               | 20121011      | 0700 | 20121011    | 1030 |                  |           |                 |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m²/d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|---------------|-------------|---------|------|
| STEP TEST STEP 1 | 0700        | 60           | 65.50              | 0.55             | 7.90       |            |     |                 |               |             |         | 0.07 |
| STEP TEST STEP 2 | 0800        | 60           | 65.50              | 1.02             | 23.25      |            |     |                 |               |             |         | 0.04 |
| STEP TEST STEP 3 | 0900        | 30           | 65.50              | 2.02             | 58.40      |            | 100 | 60              |               |             |         | 0.03 |
| PUMP INLET       | 1030        | 30           | 65.50              | 1.04             | 58.72      |            |     |                 |               |             |         | 0.02 |



**Golder Associates**

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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0148 Number: SD1-GAA197 Site type: Borehole

Distr./Farm No.: 508/0 Site Name/Descr.: PADDAFONTEIN

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.418310 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 16.10    |
| Longitude [°]: | 23.724100 | Alt. No. 2:      |  | Depth [m]:    | 47.18 | WL status:      | Static   |
| Altitude [m]:  | 1416.68   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.20  | Date WL meas.:  | 20121009 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                  |                     |       |
|----------------|------------------|---------------------|-------|
| <b>Pump:</b>   |                  |                     |       |
| Type of Inst.: | Submersible pump | Pulley Diam. [mm]:  |       |
| Manufacturer:  | ZP/ZH4508        | Depth to Intk. [m]: | 24.00 |
| <b>Engine:</b> |                  |                     |       |
| Manufacturer:  |                  | Power Rating [kW]   | 0.37  |
| Type of Power: | Electric motor   | Pulley Diam. [mm]:  |       |

### USE APPLICATION:

|              |                                    |
|--------------|------------------------------------|
| Site Status: | In use                             |
| Purpose:     | Production (water supply)          |
| Consumer:    | Non-urban                          |
| Application: | Agricultural - stock watering only |

### WATER CHEMISTRY:

|                                                                                   |        |                        |                                                                                                        |                         |       |                        |         |           |   |
|-----------------------------------------------------------------------------------|--------|------------------------|--------------------------------------------------------------------------------------------------------|-------------------------|-------|------------------------|---------|-----------|---|
| Sample No.: SD1-                                                                  |        | Date sampled: 20121023 |                                                                                                        | Depth sampl. [m]: 44.50 |       | Comment:               |         |           |   |
| Main Parameters:                                                                  |        |                        |                                                                                                        | Calculated Parameters:  |       | Bacteriol. Parameters: |         |           |   |
| pH:                                                                               | 7.51   | Na:                    | 1907 ‡                                                                                                 | Cl:                     | 41.6  | Langel.:               | 0.31    | E.Coli:   | 0 |
| EC: [mS/m]                                                                        | 75.8 † | K:                     | 3.35                                                                                                   | NO3 as N:               | 1.23  | Aggr-Ind:              | 12.55   | Faec. co: | 0 |
| TDS:                                                                              | 528 †  | Si:                    | 20.3                                                                                                   | SO4:                    | 25.8  | Ion-bal:               | 81.60 ‡ | Total Co: | 0 |
| T. Alk.:                                                                          | 376    | Al:                    |                                                                                                        | F:                      | 0.136 | CaCO3:                 | 449.06  | SPC:      | 0 |
| Ca:                                                                               | 118    | Fe:                    | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption |                         |       |                        |         |           |   |
| Mg:                                                                               | 37.6   | Mn:                    | † Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit                      |                         |       |                        |         |           |   |
| ! Value exceeds recommended minimum limit ‡ Value exceeds minimum allowable limit |        |                        |                                                                                                        |                         |       |                        |         |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %   | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|-----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121009 | 60           | 44.50              | 0.52             | 2.24       |              |     |       |          |         |         |
| STEP TEST STEP 2 | 20121009 | 60           | 44.50              | 1.06             | 4.74       |              |     |       |          |         |         |
| STEP TEST STEP 3 | 20121009 | 40           | 44.50              | 2.04             | 28.09      | 0.04         | 100 | 40    |          |         |         |
| PUMP INLET       | 20121009 | 30           | 44.50              | 1.74             | 28.40      |              |     |       |          |         |         |
| CONSTANT         | 20121009 | 480          | 44.50              | 1.23             | 8.19       | 0.03         | 100 | 120   |          |         |         |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 2012/10/16

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0148 Number: SD1-GAA197 Site type: Borehole

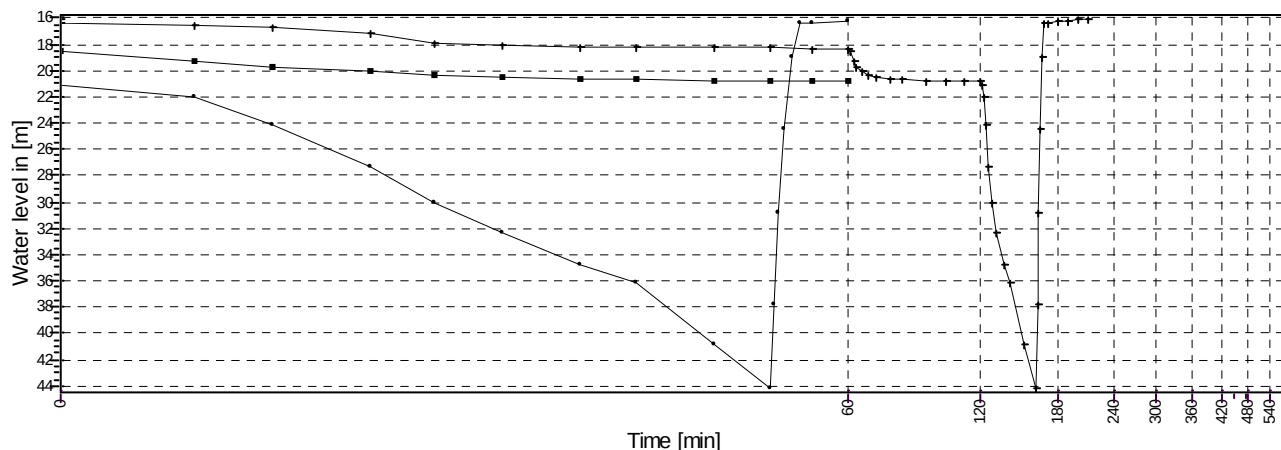
Distr./Farm No.: 508/0

Site Name/Des.: PADDAFONTEIN

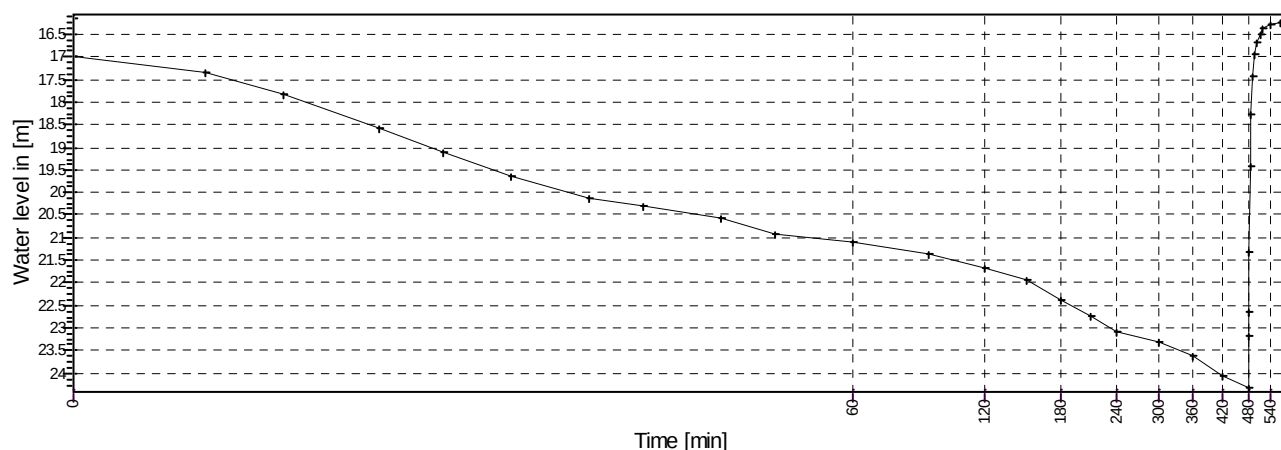
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.418310 | Alt. No. 1:      |  | Diam. [mm]:    | 165   | Water lev. [m]: | 18.34    |
| Longitude [°] | 23.724100 | Alt. No. 2:      |  | Depth [m]:     | 47.18 | Piezometer:     | 0        |
| Altitude [m]: | 1416.68   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.20  | Date WL meas.:  | 20121009 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 44.50               | 20121009      | 1410 | 20121009    | 1740 |                               |           |                 |
| GOLD       | Constant rate test | 44.50               | 20121009      | 1830 | 20121010    | 0430 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1410        | 60           | 44.50              | 0.52             | 2.24       |            |     |                 |                            |             |         | 0.23 |
| STEP TEST STEP 2 | 1510        | 60           | 44.50              | 1.06             | 4.74       |            |     |                 |                            |             |         | 0.22 |
| STEP TEST STEP 3 | 1610        | 40           | 44.50              | 2.04             | 28.09      | 0.04       | 100 | 40              |                            |             |         | 0.07 |
| PUMP INLET       | 1740        | 30           | 44.50              | 1.74             | 28.40      |            |     |                 |                            |             |         | 0.06 |
| CONSTANT         | 1830        | 480          | 44.50              | 1.23             | 8.19       | 0.03       | 100 | 120             |                            |             |         | 0.15 |



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## CHRISTO STEENKAMP - BASIC SITE INFORMATION

| SITE LOCATION          |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:       | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BC00027            | SD1-GAA191 | 508/0    | PADDAFONTEIN          | B          | 28.38245967  | 23.716800001  | 1423.10      |              | 165        | 30.48           |              |            |                |                       | 0              | 0               |                   |
| 2823BCX0143            | SD1-GAA192 | 508/0    | PADDAFONTEIN          | B          | 28.38255967  | 23.716890001  | 1423.70      | 0.43         |            |                 | 2.01         |            |                |                       |                |                 |                   |
| 2823BCX0144            | SD1-GAA193 | 508/0    | PADDAFONTEIN          | W          | 28.38268967  | 23.717040001  | 1424.50      | 0.16         |            |                 | 2.41         |            |                |                       |                |                 |                   |
| 2823BCX0145            | SD1-GAA194 | 508/0    | PADDAFONTEIN          | B          | 28.38276967  | 23.717130001  | 1425.00      |              |            |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0146            | SD1-GAA195 | 508/0    | PADDAFONTEIN          | B          | 28.38201967  | 23.746810001  | 1409.92      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0168            | SD1-GAA222 | 508/0    | PADDAFONTEIN          | B          | 28.41430967  | 23.689970001  | 1433.80      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>        |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> | 30.48        | 2.41       |                |                       |                |                 |                   |
| <b>Nr. of sites:</b> 6 |            |          |                       |            |              |               |              |              |            | <b>Minimum:</b> | 30.48        | 2.01       |                |                       |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Average:</b> | 30.48        | 2.21       |                |                       |                |                 |                   |

Site Type:  
B = Borehole  
W = Well point

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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## CHRISTO STEENKAMP - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BC00027    **Number:** SD1-GAA191    **Site Name:** PADDAFONTEIN

| Samp. Nr./Type | Date/Time samp. | pH   | EC   | TDS   | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|------|-------|------|------|------|------|------|---------|------|------|----------|-------|
| SD1-GA191      | 20120323 1540   | 7.78 | 67.6 | 508 † | 84.9 | 38.5 | 25.5 | 4.83 | 18.3 | 294     | 45.6 | 36.1 | 1.95     | 0.196 |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source

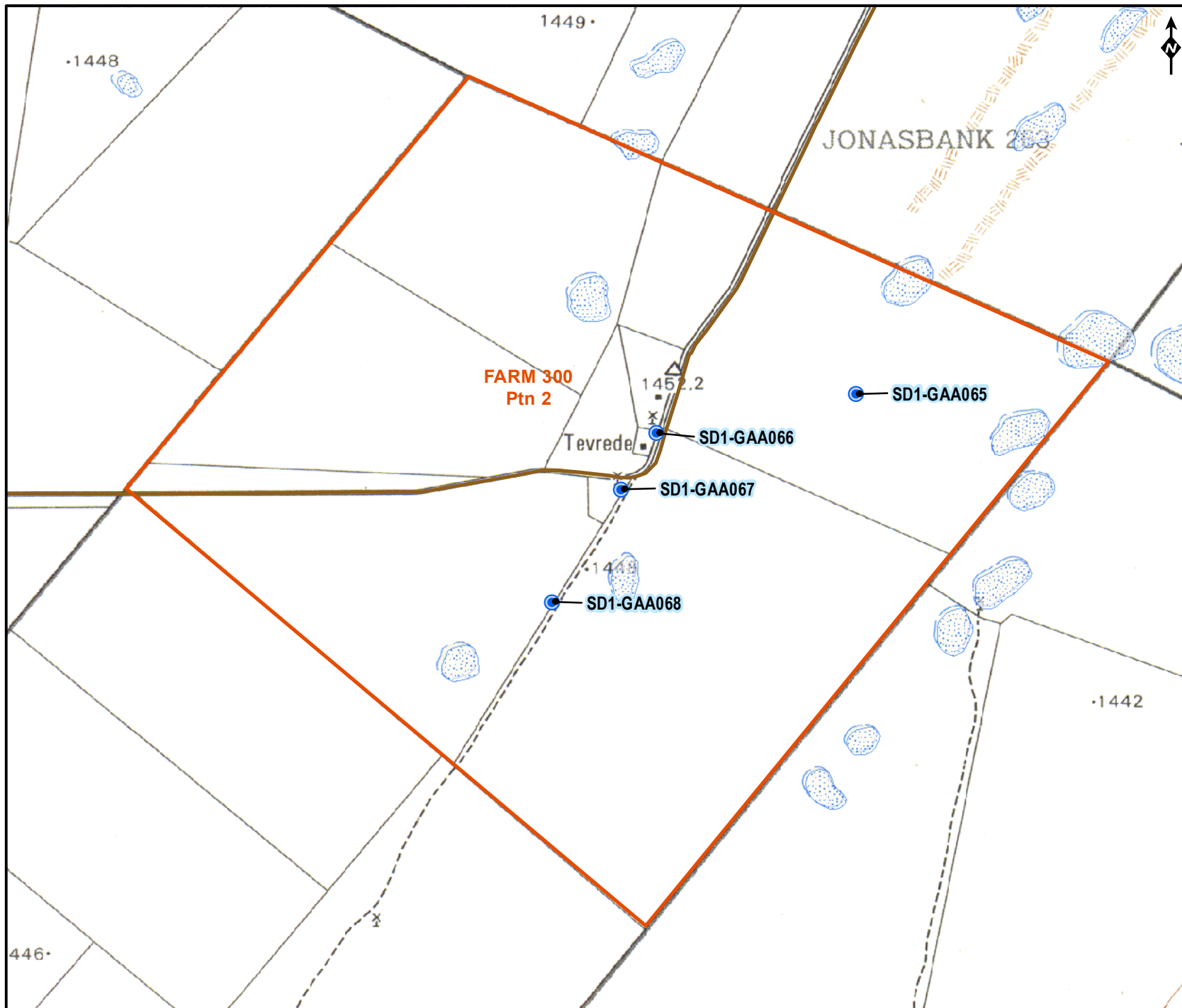


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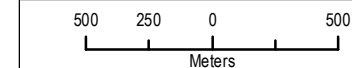


## **2.6 Cobus van Niekerk**



#### LEGEND

- Existing borehole survey
- Farm 300 Ptn 2
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



**RESOURCES/NOTES**  
 Coordinate System: GCS WGS 1984  
 Datum: WGS 1984

**PROJECT**  
 GW ASSESSMENT VGG SCHEME

**TITLE**  
**FARM 300 - TEVREDE**  
**COBUS VAN NIEKER**

|                      |    |            |
|----------------------|----|------------|
| PROJECT No. 11613568 |    | REV 0      |
| SCALE 1:30 000       |    | A4         |
| GIS                  | MB | 01/04/2014 |
| CHECK                | DB | 01/04/2014 |
| REVIEW               | FW | 01/04/2014 |

## COBUS VAN NIEKERK - BASIC SITE INFORMATION

| SITE LOCATION          |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:       | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0063            | SD1-GAA065 | RE300/2  | TEVREDE               | B          | 28.26988967  | 23.683860001  | 1447.30      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0064            | SD1-GAA066 | RE300/2  | TEVREDE               | B          | 28.27183967  | 23.673790001  | 1452.30      | 0.07         | 165        |                 | 4.41         |            |                |                       |                |                 |                   |
| 2823BCX0065            | SD1-GAA067 | RE300/2  | TEVREDE               | B          | 28.27467967  | 23.672040001  | 1450.60      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0066            | SD1-GAA068 | RE300/2  | TEVREDE               | B          | 28.28033967  | 23.668560001  | 1447.80      | 0.09         | 165        |                 | 4.92         |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>        |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> |              |            |                | 4.92                  |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Minimum:</b> |              |            |                | 4.41                  |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
| <b>Nr. of sites:</b> 4 |            |          |                       |            |              |               |              |              |            | <b>Average:</b> |              |            |                | 4.67                  |                |                 |                   |

NOTE:  
 "Yield" represents cumulative blow yield  
 The recommended abstraction ("Rec. abs.")  
 is based on a 24 hour duty cycle  
 (based on test pumping result)



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 Project No.: 11613568

## COBUS VAN NIEKERK - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BCX0064    **Number:** SD1-GAA066    **Site Name:** TEVREDE

| Samp. Nr./Type | Date/Time samp. | pH   | EC    | TDS    | Ca   | Mg    | Na    | K    | Si   | T. Alk. | Cl  | SO4 | NO3 as N | F     |
|----------------|-----------------|------|-------|--------|------|-------|-------|------|------|---------|-----|-----|----------|-------|
| SD1-GA066      | 20120216 0800   | 8.29 | 169 † | 1220 † | 66.1 | 146 ‡ | 124 † | 18.8 | 28.1 | 594     | 198 | 124 | 10.5 †   | 0.589 |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

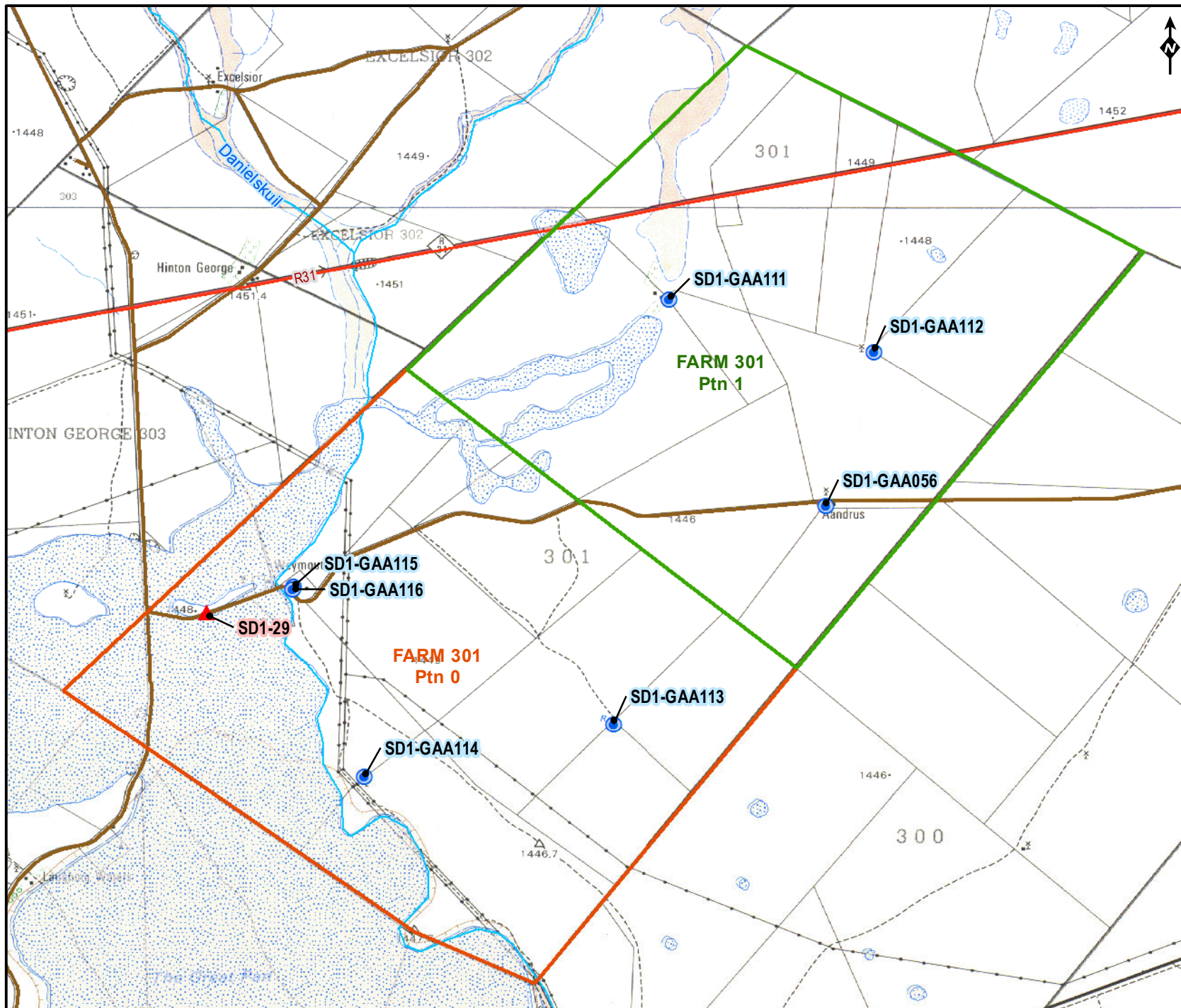
Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source



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Project No.: 11613568

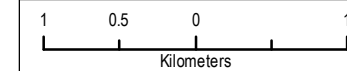


## **2.7 Daan van Deventer**



#### LEGEND

- ▲ Newly drilled borehole
- Existing borehole survey
- Farm 301 Ptn 0
- Farm 301 Ptn 1
- Main road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



**RESOURCES/NOTES**  
 Coordinate System: GCS WGS 1984  
 Datum: WGS 1984

**PROJECT**  
 GW ASSESSMENT VGG SCHEME

**TITLE**  
**FARM 301**  
**AANDRUS - WEYMOUTH**  
**DAAN VAN DEVENTER**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:50 000       | A4         |
| GIS MB               | 01/04/2014 |
| CHECK DB             | 01/04/2014 |
| REVIEW FW            | 01/04/2014 |



**Borehole Construction and Geological Log**

Date compiled: 2013/06/13

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0182 Number: SD1-29 Site type: Borehole

Distr./Farm No.: 301

Site Name/Des.: FARM 301

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.284557

Reg./BB.:

Topo-set.:

Depth [m]: 68.65

Longitude [°]: 23.585885

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.55

Altitude [m]: 1442.75

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

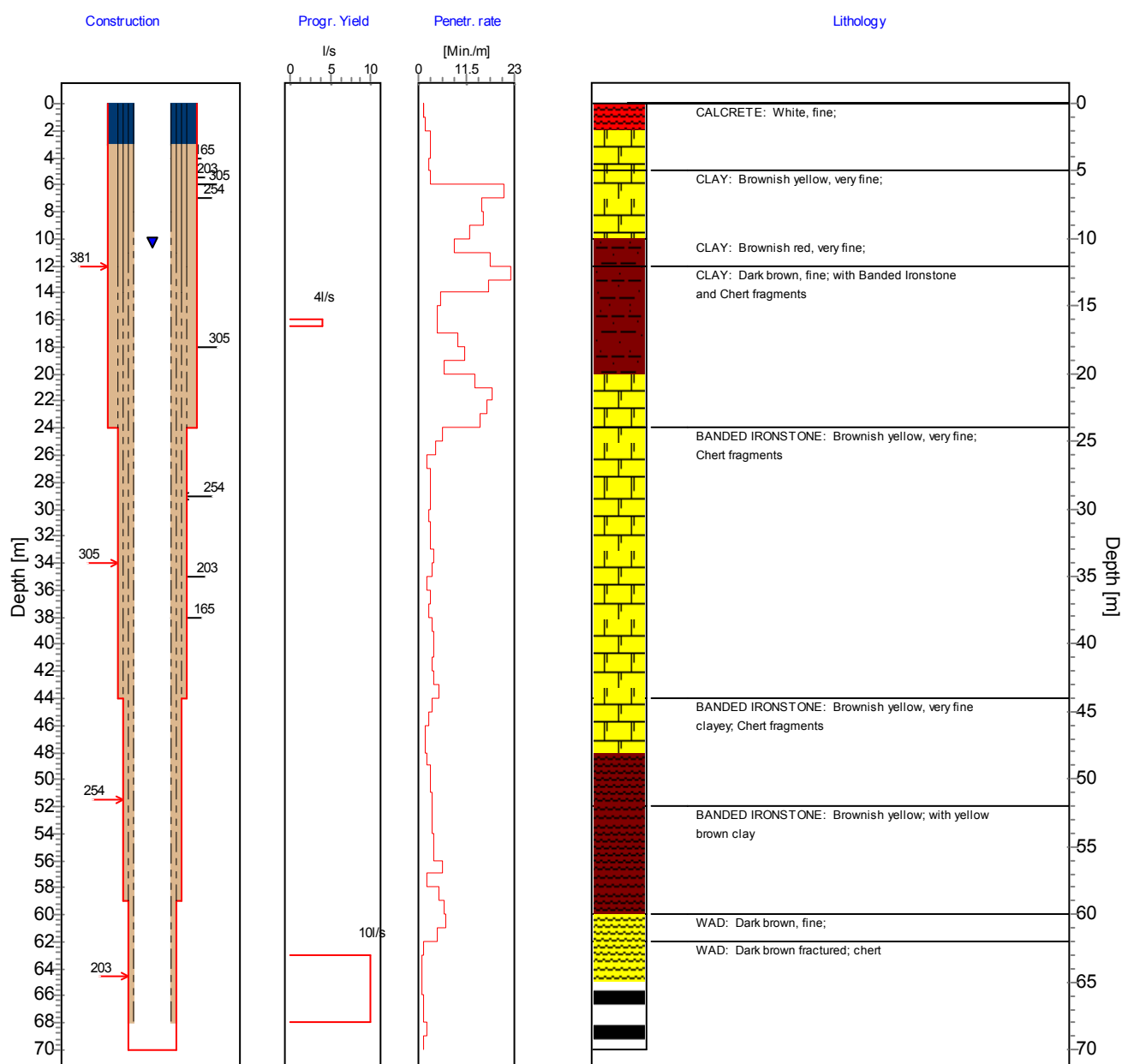
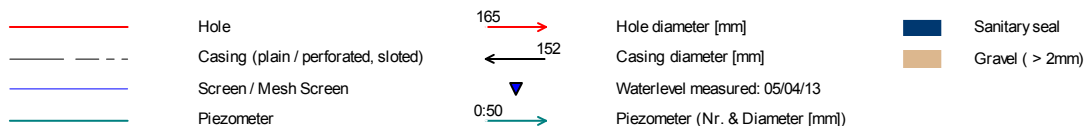
Drain. reg.: C92A

Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

**Construction and Geohydrological Legend**

COMMENT:

**Golder  
Associates**

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Fax: 012 - 364 4001  
Project No.: 11613568



## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0182 Number: SD1-29 Site type: Borehole

Distr./Farm No.: 301 Site Name/Descr.: FARM 301

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.284557 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 11.07    |
| Longitude [°]: | 23.585885 | Alt. No. 2:      |  | Depth [m]:    | 68.65 | WL status:      | Static   |
| Altitude [m]:  | 1442.75   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.55  | Date WL meas.:  | 20130517 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**

Type of Inst.: Pulley Diam. [mm]:  
Manufacturer: Depth to Intk. [m]:

**Engine:**

Manufacturer: Power Rating [kW]  
Type of Power: Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: Unused

Purpose: Production (water supply)

Consumer: Non-urban

Application: Domestic - all purposes

### WATER CHEMISTRY:

Sample No.: SD1-29 Date sampled: 20130519 Depth sampl. [m]: 58.80 Comment:

#### Main Parameters:

|            |      |     |        |           |       |                        |                        |
|------------|------|-----|--------|-----------|-------|------------------------|------------------------|
| pH:        | 7.5  | Na: | 13.3   | Cl:       | 28.8  | Calculated Parameters: | Bacteriol. Parameters: |
| EC: [mS/m] | 58.7 | K:  | 4.97   | NO3 as N: | 3.61  | Langel.: 0.19          | E.Coli:                |
| TDS:       | 402  | Si: | 17.8   | SO4:      | 23.2  | Aggr-Ind: 12.24        | Faec. co:              |
| T. Alk.:   | 282  | Al: | < 0.05 | F:        | 0.129 | Ion-bal: 0.86          | Total Co:              |
| Ca:        | 78.9 | Fe: | < 0.05 |           |       | CaCO3: 330.94          | SPC:                   |
| Mg:        | 32.6 | Mn: | < 0.05 |           |       |                        |                        |

Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption  
 † Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit  
 † Value exceeds recommended minimum limit ‡ Value exceeds minimum allowable limit

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 63.00            | 68.00             | 10.00      | Notch (V- or U-notch) |              |         |
| 16.00            | 16.50             | 4.00       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 8.00        | 165        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 11.00       | 203        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 12.00       | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 14.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 8.00             | 68.00       | 165        | Steel    |              | Perforated or slotted |                                |            |             |
| 11.00            | 59.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |
| 12.00            | 24.00       | 305        | Steel    |              | Perforated or slotted |                                |            |             |
| 14.00            | 44.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130517 | 60           | 58.80              | 4.22             | 2.44       |            |       |          |         |         |
| STEP TEST STEP 2 | 20130517 | 60           | 58.80              | 10.11            | 15.52      |            |       |          |         |         |
| STEP TEST STEP 3 | 20130517 | 60           | 58.80              | 15.12            | 32.14      |            |       |          |         |         |
| STEP TEST STEP 4 | 20130517 | 10           | 58.80              | 20.12            | 47.57      | 100        | 150   |          |         |         |
| CONSTANT         | 20130517 | 2880         | 58.80              | 10.10            | 21.98      | 100        | 300   |          |         |         |



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 Project No.: 11613568



# PUMPING TEST REPORT

Date compiled: 2013/06/14

## BASIC SITE INFORMATION:

Site Identifier: 2823BCX0182 Number: SD1-29

Site type: Borehole

Distr./Farm No.: 301

Site Name/Des.: FARM 301

Latitude [°] 28.284557  
Longitude [°] 23.585885  
Altitude [m]: 1442.75

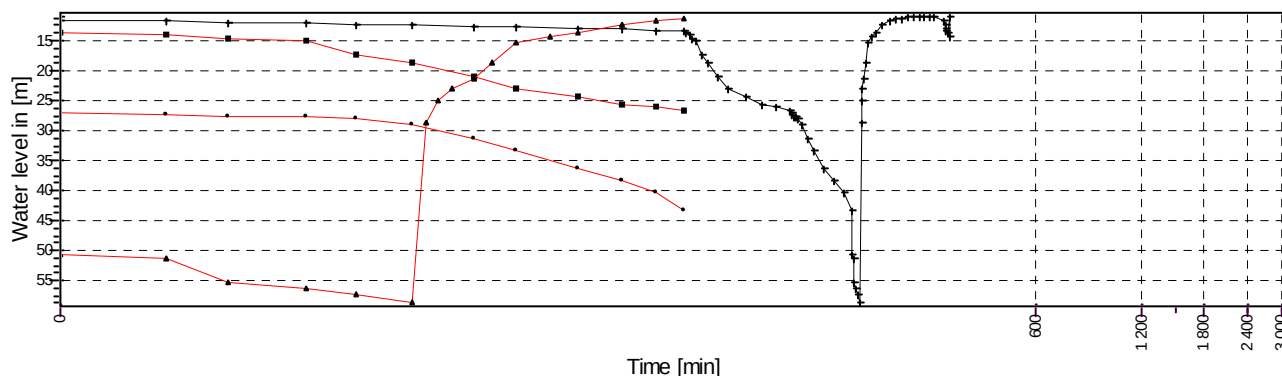
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 165  
Depth [m]: 68.65  
Col. ht. [mm]: 0.55

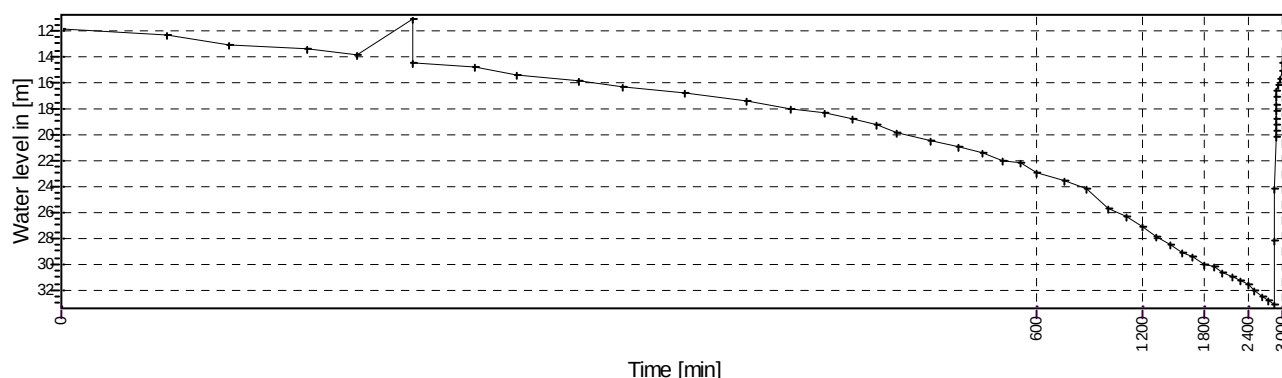
Water lev. [m]: 11.07  
Piezometer: 0  
Date WL meas.: 20130517

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 58.80               | 20130517      | 1130 | 20130517    | 1710 |                               |           |                 |
| GOLD       | Constant rate test | 58.80               | 20130517      | 1700 | 20130519    | 2200 |                               |           |                 |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1130        | 60           | 58.80              | 4.22             | 2.44       |            |     |                 |                            |             |         | 1.73 |
| STEP TEST STEP 2 | 1230        | 60           | 58.80              | 10.11            | 15.52      |            |     |                 |                            |             |         | 0.65 |
| STEP TEST STEP 3 | 1330        | 60           | 58.80              | 15.12            | 32.14      |            |     |                 |                            |             |         | 0.47 |
| STEP TEST STEP 4 | 1430        | 10           | 58.80              | 20.12            | 47.57      |            | 100 | 150             |                            |             |         | 0.42 |
| CONSTANT         | 1700        | 2880         | 58.80              | 10.10            | 21.98      |            | 100 | 300             |                            |             |         | 0.46 |



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Project No.: 11613568

## DAAN VAN DEVENTER - BASIC SITE INFORMATION

| SITE LOCATION    |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier: | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0054      | SD1-GAA056 | 301/1    | AANDRUS               | B          | 28.27541967  | 23.637830001  | 1446.80      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0100      | SD1-GAA111 | 301/1    | AANDRUS               | B          | 28.25806967  | 23.624670001  | 1443.60      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0101      | SD1-GAA112 | 301/1    | AANDRUS               | B          | 28.26245967  | 23.641910001  | 1448.60      |              |            |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0102      | SD1-GAA113 | RE301/0  | WEYMOUTH              | B          | 28.29371967  | 23.620040001  | 1448.60      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0103      | SD1-GAA114 | RE301/0  | WEYMOUTH              | B          | 28.29816967  | 23.599170001  | 1446.90      | 0.31         | 165        |                 | 12.46        |            |                |                       |                |                 |                   |
| 2823BCX0104      | SD1-GAA115 | RE301/0  | WEYMOUTH              | B          | 28.28219967  | 23.593180001  | 1445.00      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0105      | SD1-GAA116 | RE301/0  | WEYMOUTH              | B          | 28.28235967  | 23.593110001  | 1445.10      | 0.24         | 165        | 17.00           | 11.66        |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>  |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> | 17.00        | 12.46      |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Minimum:</b> | 17.00        | 11.66      |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Average:</b> | 17.00        | 12.06      |                |                       |                |                 |                   |

### SUMMARY:

Site Type:

B = Borehole

Nr. of sites: 7

Maximum: 17.00 12.46

Minimum: 17.00 11.66

Sum:

Average: 17.00 12.06

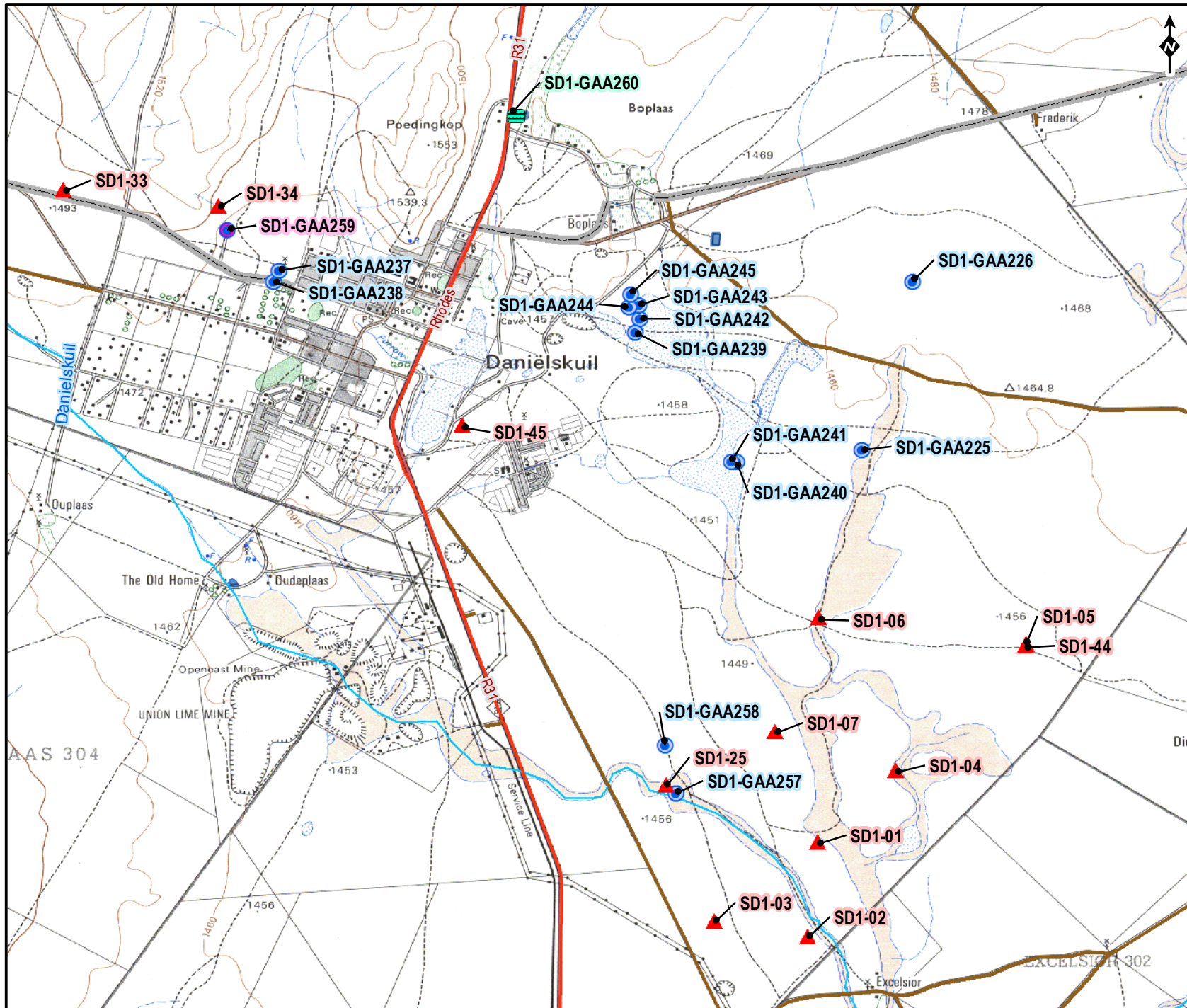
NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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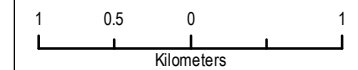


## **2.8 Danielskuil Municipality**



#### LEGEND

- ▲ Newly drilled borehole
- Existing borehole survey
- Existing borehole tested
- Danielskuil\_Oog
- Main road
- Secondary road
- Other road
- Street
- Rivers
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**DANIELSKUIL  
MUNICIPALITY**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:50 000       | A4         |
| GIS MB               | 16/04/2014 |
| CHECK DB             | 16/04/2014 |
| REVIEW FW            | 16/04/2014 |

## DANIELSKUIL MUNICIPALITY - BASIC SITE INFORMATION

| SITE LOCATION        |            |                                                     |                                  |            |              |               |              |              |            | GEOHYDROLOGY    |              |            | MANAGEMENT RECOMMEND. |                    |                |                 |                   |
|----------------------|------------|-----------------------------------------------------|----------------------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|-----------------------|--------------------|----------------|-----------------|-------------------|
| Site Identifier:     | Number:    | District                                            | Site name/Description            | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s]        | Depth to Intk. [m] | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823AB00044          | SD1-GAA260 | 304                                                 | DANIELSKUIL OOG                  | F          | 28.16593967  | 23.556230001  | 1465.05      |              |            | 10000           | 43.87        |            |                       |                    |                |                 |                   |
| 2823BA00061          | SD1-GAA257 |                                                     | OUPLAAS                          | B          | 28.22355967  | 23.569980001  | 1447.90      | 0.24         | 165        | 14.44           | 6.93         |            |                       |                    |                |                 |                   |
| 2823BA00161          | SD1-GAA245 |                                                     | DANIELSKUIL MEENT (APIE SE GAT3) | B          | 28.18168967  | 23.566220001  | 1454.16      | 0.24         | 165        | 90.00           | 9.84         | 1.00       |                       |                    |                |                 |                   |
| 2823BA00162          | SD1-GAA243 |                                                     | DANIELSKUIL(APIE SE GAT2)        | B          | 28.18256967  | 23.566920001  | 1453.76      |              | 200        | 90.00           | 9.58         | 39.00      |                       |                    |                |                 |                   |
| 2823BA00163          | SD1-GAA244 |                                                     | DANIELSKUIL MEENT (APIE SE GAT)  | B          | 28.18272967  | 23.566030001  | 1454.70      | 0.40         | 200        | 102.00          | 9.31         | 24.00      |                       |                    | 8.00           | 24              | 691.20            |
| 2823BA00164          | SD1-GAA241 |                                                     | DANIELSKUIL MEENT PTN. DANLIME 3 | B          | 28.19574967  | 23.574667001  | 1448.92      |              | 200        | 33.00           | 9.04         | 10.00      |                       |                    |                |                 |                   |
| 2823BA00165          | SD1-GAA237 |                                                     | DANIELS ALLOTMENT PTN. DANLIME 1 | B          | 28.17966667  | 23.536700001  | 1470.10      | 0.00         | 254        | 68.00           | 22.26        |            |                       |                    |                |                 |                   |
| 2823BAX0001          | SD1-GAA225 |                                                     | DANIELSKUIL                      | B          | 28.19478967  | 23.585570001  | 1455.91      | 0.40         | 165        |                 | 14.86        |            |                       |                    |                |                 |                   |
| 2823BAX0002          | SD1-GAA226 |                                                     | DANIELSKUIL                      | B          | 28.18061967  | 23.589880001  | 1467.32      |              | 168        |                 |              |            |                       |                    |                |                 |                   |
| 2823BAX0012          | SD1-GAA238 |                                                     | DANIELSKUIL PTN. INVAL (BACKUP)  | B          | 28.18060967  | 23.536220001  | 1469.92      |              | 254        |                 |              |            |                       |                    |                |                 |                   |
| 2823BAX0013          | SD1-GAA242 |                                                     | DANIELSKUIL (PILOT BH)           | B          | 28.18374967  | 23.567000001  | 1450.40      | 0.02         |            |                 |              |            |                       |                    |                |                 |                   |
| 2823BAX0019          | SD1-GAA258 | 0                                                   | DANIELSKUIL                      | B          | 28.21951967  | 23.569120001  | 1448.40      |              | 165        |                 |              |            |                       |                    |                |                 |                   |
| <b>SUMMARY:</b>      |            | Site Type:<br>B = Borehole<br>F = Fountain / Spring |                                  |            |              |               |              |              |            | <b>Maximum:</b> | 10000        | 43.87      | 39.00                 |                    | 8.00           |                 | 691.20            |
| <b>Nr. of sites:</b> |            | 12                                                  |                                  |            |              |               |              |              |            | <b>Minimum:</b> | 14.44        | 6.93       | 1.00                  |                    | 8.00           |                 | 691.20            |
|                      |            |                                                     |                                  |            |              |               |              |              |            | <b>Sum:</b>     |              |            | 74.00                 |                    | 8.00           |                 | 691.20            |
|                      |            |                                                     |                                  |            |              |               |              |              |            | <b>Average:</b> | 1485         | 15.71      | 18.50                 |                    | 8.00           |                 | 691.20            |

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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Project No.: 11613568

## DANIELSKUIL MUNICIPALITY - TIME DEPENDENT CHEMISTRY REPORT

|                                     |                 |  |                           |        |       |                                                    |      |      |      |      |        |        |        |      |      |          |       |         |
|-------------------------------------|-----------------|--|---------------------------|--------|-------|----------------------------------------------------|------|------|------|------|--------|--------|--------|------|------|----------|-------|---------|
| <b>Site Identifier:</b> 2823AB00044 |                 |  | <b>Number:</b> SD1-GAA260 |        |       | <b>Site Name:</b> DANIELSKUIL OOG                  |      |      |      |      |        |        |        |      |      |          |       |         |
| Samp. Nr./Type                      | Date/Time samp. |  | pH                        | EC     | TDS   | Ca                                                 | Mg   | Na   | K    | Si   | Al     | Fe     | Mn     | Cl   | SO4  | NO3 as N | F     | T. Alk. |
| SD1-GA260                           | 20130228 1130   |  | 8.04                      | 29.7   | 172   | 43.3                                               | 13.2 | 6.78 | 1.77 | 9.1  | < 0.05 | < 0.05 | < 0.05 | 6.14 | 12   | 1.94     | < 0.1 | 156     |
| <b>Site Identifier:</b> 2823BA00165 |                 |  | <b>Number:</b> SD1-GAA237 |        |       | <b>Site Name:</b> DANIELS ALLOTMENT PTN. DANLIME 1 |      |      |      |      |        |        |        |      |      |          |       |         |
| Samp. Nr./Type                      | Date/Time samp. |  | pH                        | EC     | TDS   | Ca                                                 | Mg   | Na   | K    | Si   | Al     | Fe     | Mn     | Cl   | SO4  | NO3 as N | F     | T. Alk. |
| SD1-GA237                           | 20121112 0800   |  | 7.93                      | 19.1   | 114   | 25.6                                               | 10.5 | 4.74 | 1.65 | 8.33 | 0.01   | 0      | 0      | 4.16 | 7.81 | 0.47     | 0.11  | 98.2    |
| <b>Site Identifier:</b> 2823BAX0001 |                 |  | <b>Number:</b> SD1-GAA225 |        |       | <b>Site Name:</b> DANIELSKUIL                      |      |      |      |      |        |        |        |      |      |          |       |         |
| Samp. Nr./Type                      | Date/Time samp. |  | pH                        | EC     | TDS   | Ca                                                 | Mg   | Na   | K    | Si   | Al     | Fe     | Mn     | Cl   | SO4  | NO3 as N | F     | T. Alk. |
| SD1-GA225                           | 20121112 0800   |  | 7.92                      | 74.5 † | 554 † | 118                                                | 38.7 | 16.9 | 3.78 | 15.4 | 0.02   | 0      | 0      | 38.6 | 32.5 | 7.09     | < 0.1 | 344     |

Chemistry Standard: SABS for human consumption  
 † Value exceeds recommended maximum limit  
 ‡ Value exceeds maximum allowable limit  
 ! Value exceeds recommended minimum limit  
 j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
 EC [mS/m]  
 Nitrate as N

Sample Type Code Explanation:  
 D: Drinking water  
 E: Effluent  
 K: Sewage  
 O: Organic  
 P: Pressed or pellet  
 R: Rock  
 S: Soil  
 X: Other source



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 Fax: 012 - 364 4001  
 Project No.: 1400755

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0021 Number: SD1-01 Site type: Borehole

Distr./Farm No.:

Site Name/Des.: DANIELSKUIL

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.227865

Reg./BB.:

Topo-set.:

Depth [m]: 82.00

Longitude [°]: 23.581901

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.42

Altitude [m]: 1447.07

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: D73A

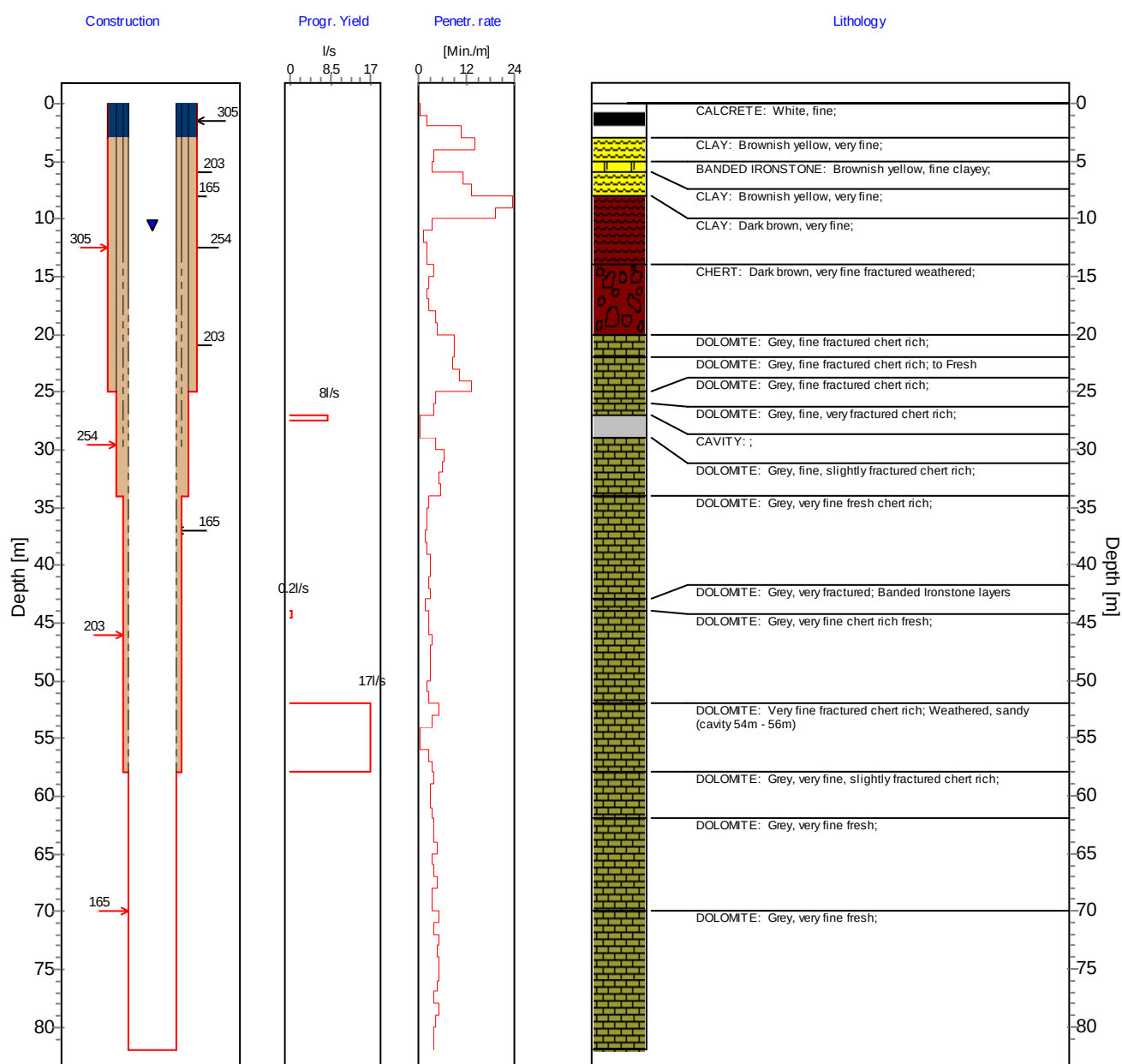
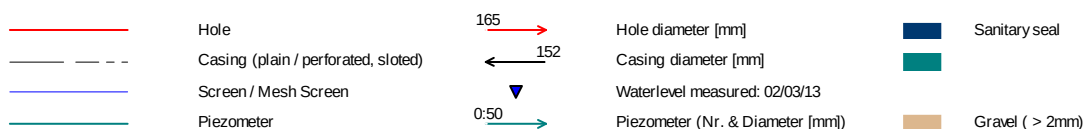
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



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Project No.: 11613568



## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0021 Number: SD1-01 Site type: Borehole

Distr./Farm No.: Site Name/Descr.: DANIELSKUIL

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.227865 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 11.75    |
| Longitude [°]: | 23.581901 | Alt. No. 2:      |  | Depth [m]:    | 82.00 | WL status:      | Static   |
| Altitude [m]:  | 1447.07   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.42  | Date WL meas.:  | 20130418 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| <b>Pump:</b>   |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| <b>Engine:</b> |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                    |      |                        |        |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|--------------------|------|------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.: SD1-01 |      | Date sampled: 20130420 |        | Depth sampl. [m]: 70.50                                                                                                                                                                                                                                                          |       | Comment:               |        |           |
| Main Parameters:   |      |                        |        | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:                | 7.51 | Na:                    | 11.2   | Cl:                                                                                                                                                                                                                                                                              | 28.6  | Langel.:               | 0.34   | E.Coli:   |
| EC: [mS/m]         | 68.2 | K:                     | 2.05   | NO3 as N:                                                                                                                                                                                                                                                                        | 3.16  | Aggr-Ind:              | 12.41  | Faec. co: |
| TDS:               | 418  | Si:                    | 12.8   | SO4:                                                                                                                                                                                                                                                                             | 23.9  | Ion-bal:               | 0.42   | Total Co: |
| T. Alk.:           | 351  | Al:                    | < 0.05 | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 404.40 | SPC:      |
| Ca:                | 91.2 | Fe:                    | < 0.05 | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ; Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:                | 43   | Mn:                    | 0.12 † |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 27.00            | 27.50             | 8.00       | Notch (V- or U-notch) |              |         |
| 44.00            | 44.50             | 0.20       | Notch (V- or U-notch) |              |         |
| 52.00            | 58.00             | 17.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] to Bot. [m] |       | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]: Length Width |  | Hor. Dist. | Vert. Dist. |
|------------------------------|-------|------------|----------|--------------|-----------------------|-----------------------------|--|------------|-------------|
| 0.00                         | 3.00  | 305        | Steel    |              | Plain casing          |                             |  |            |             |
| 0.00                         | 25.00 | 254        | Steel    |              | Plain casing          |                             |  |            |             |
| 0.00                         | 12.00 | 203        | Steel    |              | Plain casing          |                             |  |            |             |
| 12.00                        | 30.00 | 203        | Steel    |              | Perforated or slotted |                             |  |            |             |
| 0.00                         | 16.00 | 165        | Steel    |              | Plain casing          |                             |  |            |             |
| 16.00                        | 58.00 | 165        | Steel    |              | Perforated or slotted |                             |  |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery % | Recovery [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|------------|----------------|----------|---------|---------|
| STEP TEST STEP 1 | 20130418 | 60           | 70.50              | 5.04             | 0.90       |            |                |          |         |         |
| STEP TEST STEP 2 | 20130418 | 60           | 70.50              | 10.01            | 1.94       |            |                |          |         |         |
| STEP TEST STEP 3 | 20130418 | 60           | 70.50              | 15.05            | 3.94       |            |                |          |         |         |
| STEP TEST STEP 4 | 20130418 | 60           | 70.50              | 20.20            | 4.54       | 100        | 240            |          |         |         |
| CONSTANT         | 20130419 | 1440         | 70.50              | 15.02            | 4.16       | 100        | 300            |          |         |         |



**Golder Associates**

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Project No.: 11613568



# PUMPING TEST REPORT

Date compiled: 2013/06/13

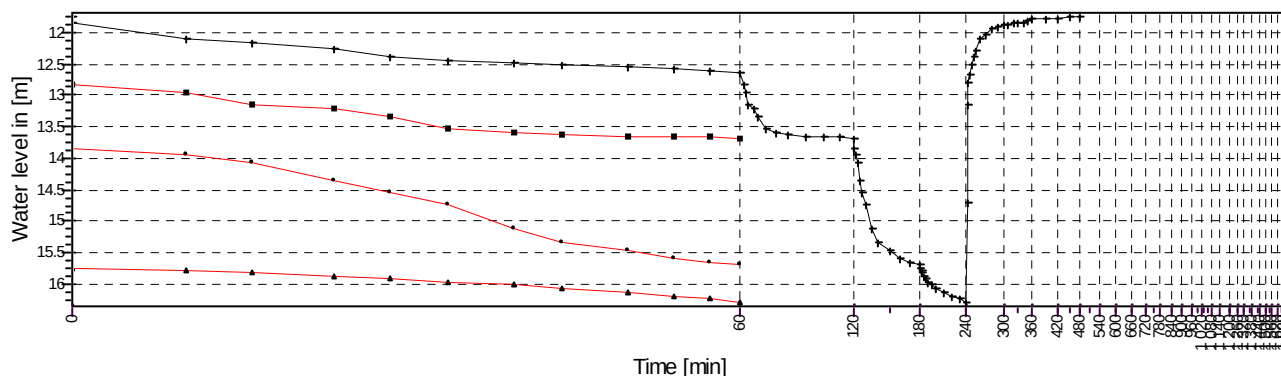
**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0021 Number: SD1-01 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

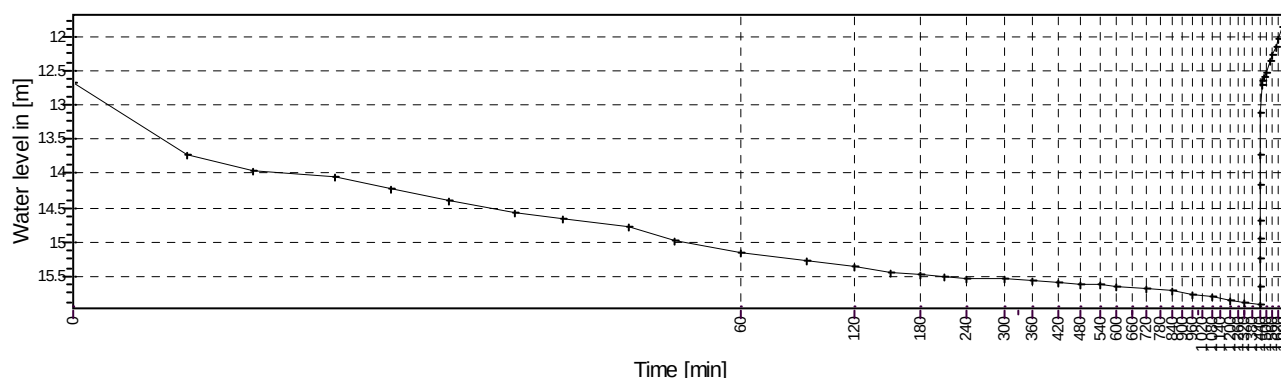
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.227865 | Alt. No. 1:      |  | Diam. [mm]:    | 165   | Water lev. [m]: | 11.75    |
| Longitude [°] | 23.581901 | Alt. No. 2:      |  | Depth [m]:     | 82.00 | Piezometer:     | 0        |
| Altitude [m]: | 1447.07   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.42  | Date WL meas.:  | 20130418 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 70.50               | 20130418      | 1300 | 20130418    | 2100 |                               |           |                 |
| GOLD       | Constant rate test | 70.50               | 20130419      | 0800 | 20130420    | 1300 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | % | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|---|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1300        | 60           | 70.50              | 5.04             | 0.90       |            |   |                 |                            |             |         | 5.60 |
| STEP TEST STEP 2 | 1400        | 60           | 70.50              | 10.01            | 1.94       |            |   |                 |                            |             |         | 5.16 |
| STEP TEST STEP 3 | 1500        | 60           | 70.50              | 15.05            | 3.94       |            |   |                 |                            |             |         | 3.82 |
| STEP TEST STEP 4 | 1600        | 60           | 70.50              | 20.20            | 4.54       | 100        |   | 240             |                            |             |         | 4.45 |
| CONSTANT         | 0800        | 1440         | 70.50              | 15.02            | 4.16       | 100        |   | 300             |                            |             |         | 3.61 |



Golder Associates Africa, Pretoria  
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Project No.: 11613568

# Borehole Construction and Geological Log

Date compiled: 2013/05/17

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0018 Number: SD1-02 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

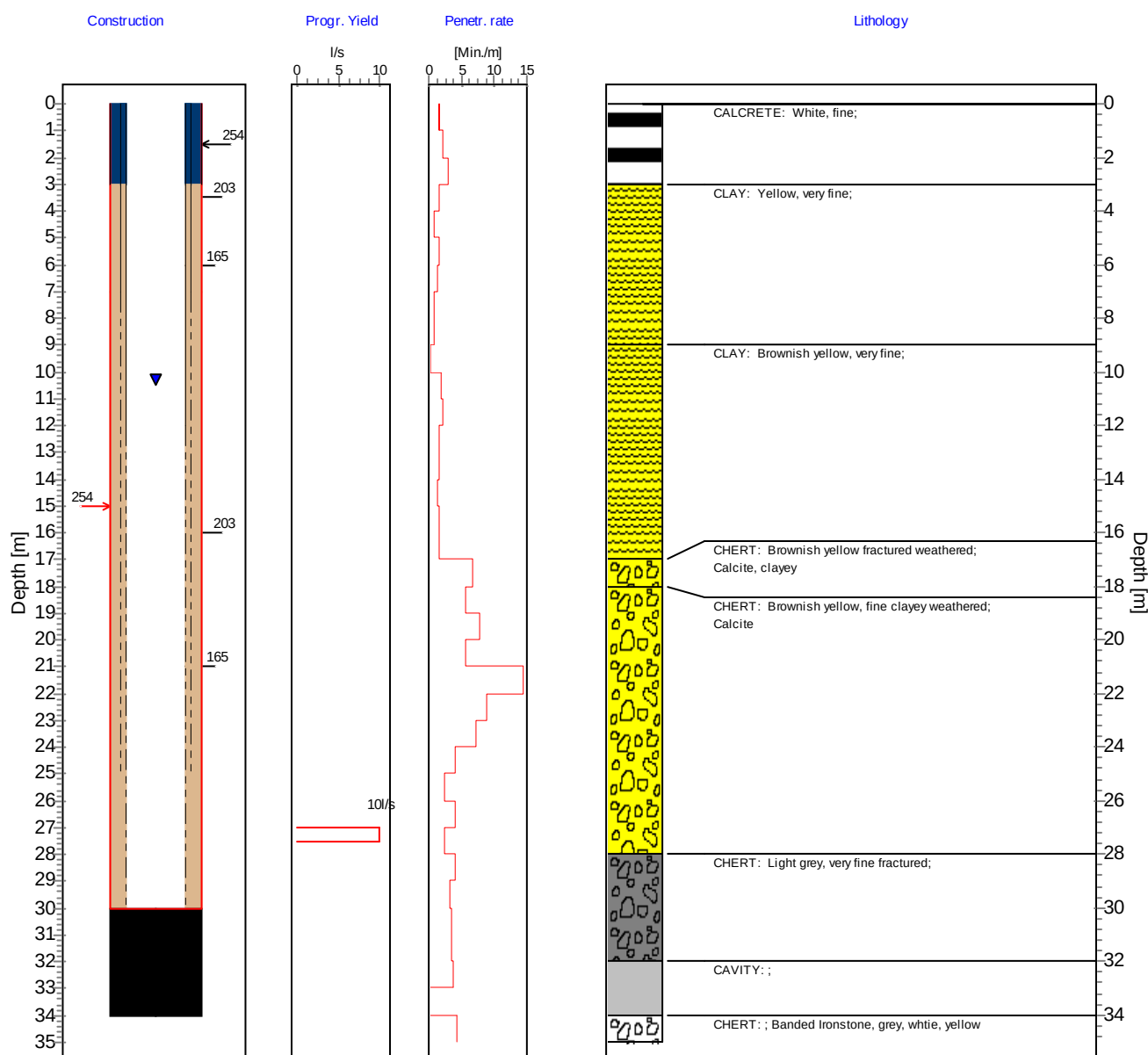
Region Type: Water supply authority Region Descr.: KGATELOPELE LM

|                                          |           |                                       |                    |
|------------------------------------------|-----------|---------------------------------------|--------------------|
| Latitude [°]: 28.235320                  | Reg./BB.: | Topo-set:                             | Depth [m]: 30.00   |
| Longitude [°]: 23.580940                 | G-Nr.:    | Site status: Unused                   | Col. ht. [m]: 0.50 |
| Altitude [m]: 0                          |           | Site purp.: Production (water supply) | Diam. [mm]: 165    |
| Coord. acc.: Accurate to within 10 units |           | Use applic.: Domestic - all purposes  | Drain. reg.: C92A  |
| Coord. meth.: Altimeter                  |           | Equipment: No equipment               | Rep. inst.: GOLD   |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend

|  |                                      |        |                                  |  |                |
|--|--------------------------------------|--------|----------------------------------|--|----------------|
|  | Hole                                 | 165 →  | Hole diameter [mm]               |  | Sanitary seal  |
|  | Casing (plain / perforated, slotted) | ← 152  | Casing diameter [mm]             |  | Gravel (> 2mm) |
|  | Screen / Mesh Screen                 | ▼      | Waterlevel measured: 02/03/13    |  |                |
|  | Piezometer                           | 0:50 → | Piezometer (Nr. & Diameter [mm]) |  |                |



COMMENT:



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0018 Number: SD1-02 Site type: Borehole

Distr./Farm No.: Site Name/Descr.: DANIELSKUIL

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.235771 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 10.80    |
| Longitude [°]: | 23.581019 | Alt. No. 2:      |  | Depth [m]:    | 30.00 | WL status:      | Static   |
| Altitude [m]:  | 1445.68   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.51  | Date WL meas.:  | 20130416 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| <b>Pump:</b>   |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| <b>Engine:</b> |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                    |      |                        |        |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|--------------------|------|------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.: SD1-02 |      | Date sampled: 20130417 |        | Depth sampl. [m]: 28.50                                                                                                                                                                                                                                                          |       | Comment:               |        |           |
| Main Parameters:   |      |                        |        | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:                | 7.39 | Na:                    | 11.7   | Cl:                                                                                                                                                                                                                                                                              | 28.8  | Langel.:               | 0.16   | E.Coli:   |
| EC: [mS/m]         | 62.4 | K:                     | 2.32   | NO3 as N:                                                                                                                                                                                                                                                                        | 4.16  | Aggr-Ind:              | 12.22  | Faec. co: |
| TDS:               | 356  | Si:                    | 12.5   | SO4:                                                                                                                                                                                                                                                                             | 28.2  | Ion-bal:               | 0.27   | Total Co: |
| T. Alk.:           | 299  | Al:                    | < 0.05 | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 357.72 | SPC:      |
| Ca:                | 89.8 | Fe:                    | < 0.05 | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ; Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:                | 32.5 | Mn:                    | < 0.05 |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 27.00            | 27.50             | 10.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 3.00        | 254        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 7.00        | 203        | Steel    |              | Plain casing          |                                |            |             |
| 7.00             | 25.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |
| 0.00             | 12.00       | 165        | Steel    |              | Plain casing          |                                |            |             |
| 12.00            | 30.00       | 165        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130416 | 60           | 28.50              | 5.09             | 0.86       |            |       |          |         |         |
| STEP TEST STEP 2 | 20130416 | 60           | 28.50              | 10.04            | 2.43       |            |       |          |         |         |
| STEP TEST STEP 3 | 20130416 | 60           | 28.50              | 15.07            | 3.42       |            |       |          |         |         |
| STEP TEST STEP 4 | 20130416 | 60           | 28.50              | 20.14            | 6.34       | 100        | 90    |          |         |         |
| CONSTANT         | 20130416 | 1440         | 28.50              | 15.02            | 3.36       | 100        | 240   |          |         |         |



**Golder Associates**

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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 03/03/2014

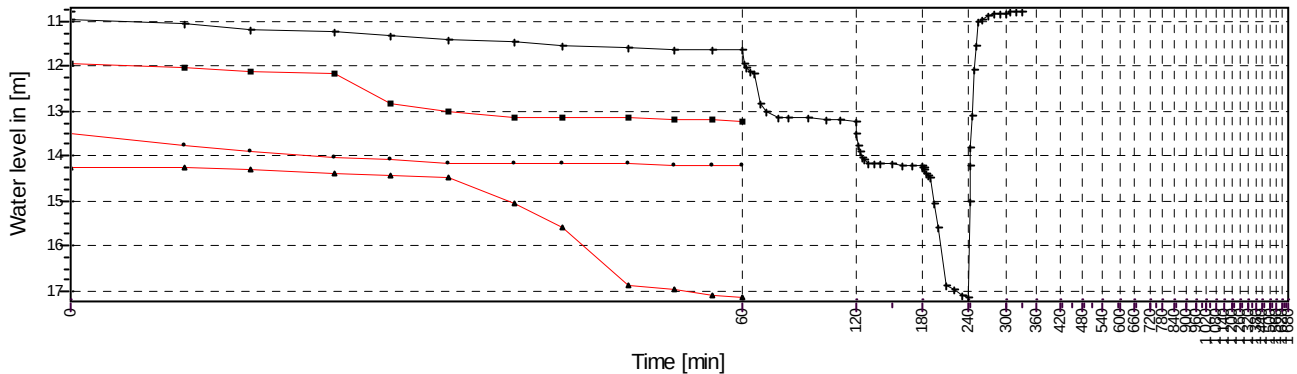
**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0018 Number: SD1-02 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

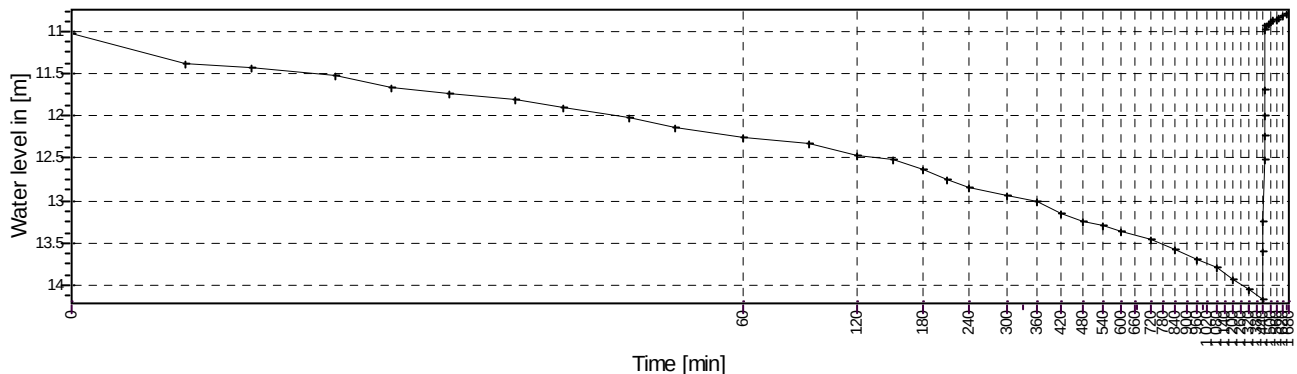
|               |           |                  |                |       |                 |          |
|---------------|-----------|------------------|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.235771 | Alt. No. 1:      | Diam. [mm]:    | 165   | Water lev. [m]: | 10.80    |
| Longitude [°] | 23.581019 | Alt. No. 2:      | Depth [m]:     | 30.00 | Piezometer:     | 0        |
| Altitude [m]: | 1445.68   | Rep. inst.: GOLD | Col. ht. [mm]: | 0.51  | Date WL meas.:  | 20130416 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



| PUMPING TEST: |                    | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|---------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD          | Step test          | 28.50               | 20130416      | 1000 | 20130416    | 1530 |                               |           |                 |
| GOLD          | Constant rate test | 28.50               | 20130416      | 1730 | 20130417    | 2130 |                               |           |                 |

| TESTING DETAILS: |             | Durat. [min] | Depth to intk. [m] | Disch. rate [l/s] | Drawd. [m] | Recov. [m] | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|-------------------|------------|------------|-----------------|----------------------------|-------------|---------|------|
| Description      | Time start. |              |                    |                   |            | %          |                 |                            |             |         |      |
| STEP TEST STEP 1 | 1000        | 60           | 28.50              | 5.09              | 0.86       |            |                 |                            |             |         | 5.92 |
| STEP TEST STEP 2 | 1100        | 60           | 28.50              | 10.04             | 2.43       |            |                 |                            |             |         | 4.13 |
| STEP TEST STEP 3 | 1200        | 60           | 28.50              | 15.07             | 3.42       |            |                 |                            |             |         | 4.41 |
| STEP TEST STEP 4 | 1300        | 60           | 28.50              | 20.14             | 6.34       | 100        | 90              |                            |             |         | 3.18 |
| CONSTANT         | 1730        | 1440         | 28.50              | 15.02             | 3.36       | 100        | 240             |                            |             |         | 4.47 |



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Project No.: 11613568

**Borehole Construction and Geological Log**

Date compiled: 2013/06/13

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0022 Number: SD1-03 Site type: Borehole

Distr./Farm No.:

Site Name/Des.: DANIELSKUIL

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.234455

Reg./BB.:

Topo-set.:

Depth [m]: 82.60

Longitude [°]: 23.573174

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.59

Altitude [m]: 1448.10

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

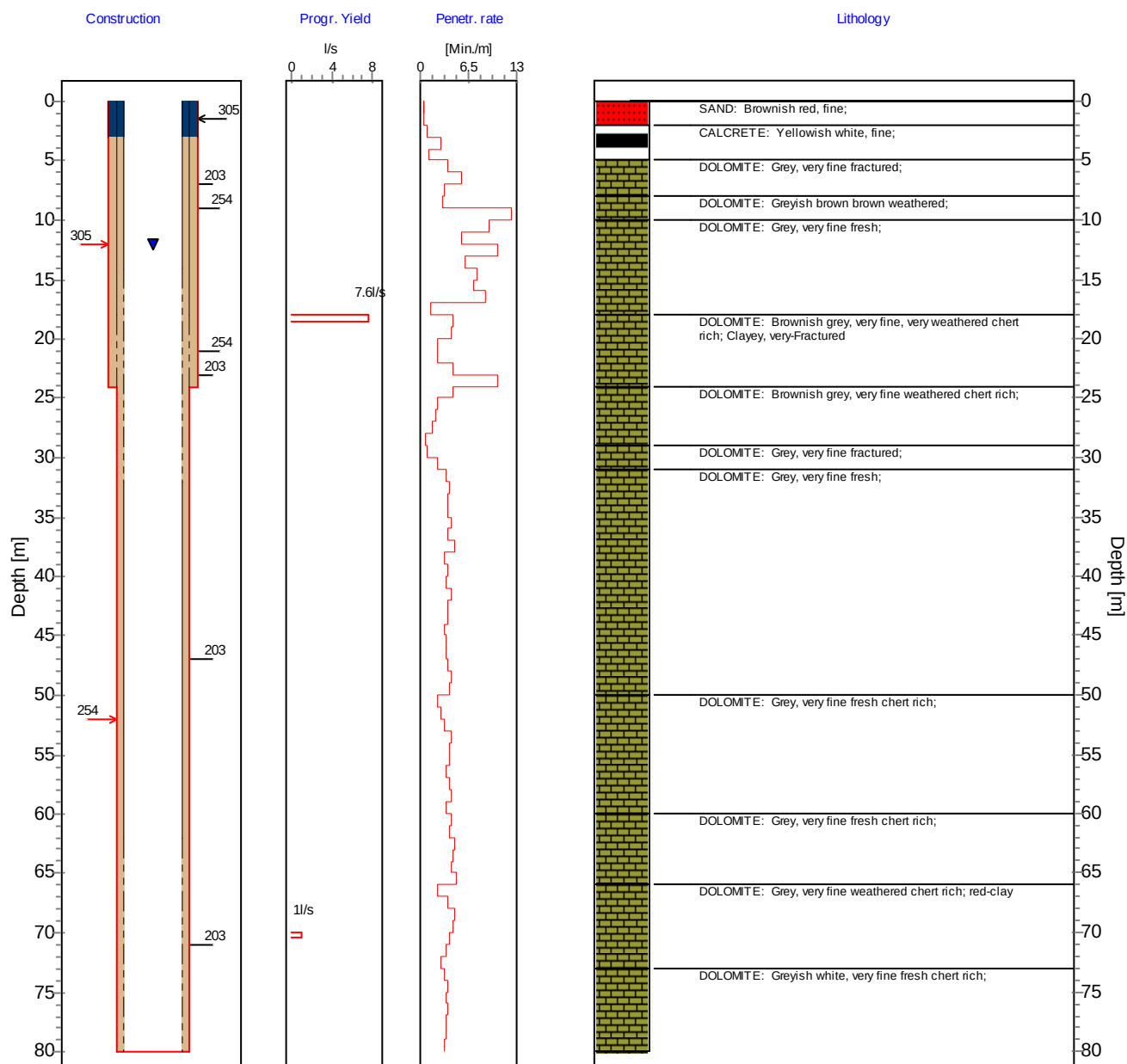
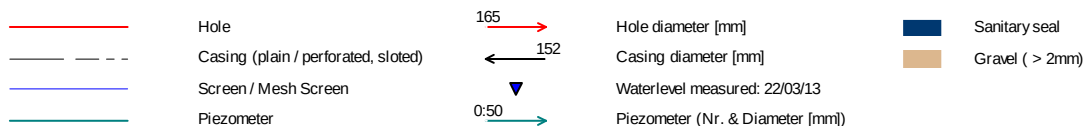
Drain. reg.: C92A

Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

**Construction and Geohydrological Legend**

COMMENT:

**Golder  
Associates**

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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0022 Number: SD1-03 Site type: Borehole

Distr./Farm No.: Site Name/Descr.: DANIELSKUIL

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.234455 | Alt. No. 1:      |  | Diam. [mm]:   | 203   | Water lev. [m]: | 13.35    |
| Longitude [°]: | 23.573174 | Alt. No. 2:      |  | Depth [m]:    | 82.60 | WL status:      | Static   |
| Altitude [m]:  | 1448.10   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.59  | Date WL meas.:  | 20130413 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |
|----------------|--|---------------------|
| <b>Pump:</b>   |  |                     |
| Type of Inst.: |  | Pulley Diam. [mm]:  |
| Manufacturer:  |  | Depth to Intk. [m]: |
| <b>Engine:</b> |  |                     |
| Manufacturer:  |  | Power Rating [kW]   |
| Type of Power: |  | Pulley Diam. [mm]:  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                    |      |                        |        |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|--------------------|------|------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.: SD1-03 |      | Date sampled: 20130414 |        | Depth sampl. [m]: 70.50                                                                                                                                                                                                                                                          |       | Comment:               |        |           |
| Main Parameters:   |      |                        |        | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:                | 7.26 | Na:                    | 11.9   | Cl:                                                                                                                                                                                                                                                                              | 27    | Langel.:               | 0.02   | E.Coli:   |
| EC: [mS/m]         | 60.8 | K:                     | 2.24   | NO3 as N:                                                                                                                                                                                                                                                                        | 2.96  | Aggr-Ind:              | 12.08  | Faec. co: |
| TDS:               | 434  | Si:                    | 15     | SO4:                                                                                                                                                                                                                                                                             | 41.4  | Ion-bal:               | -0.28  | Total Co: |
| T. Alk.:           | 279  | Al:                    | < 0.05 | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 340.17 | SPC:      |
| Ca:                | 94.8 | Fe:                    | < 0.05 | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ; Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:                | 25.2 | Mn:                    | < 0.05 |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 18.00            | 18.50             | 7.60       | Notch (V- or U-notch) |              |         |
| 70.00            | 70.50             | 1.00       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 3.00        | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 18.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 14.00       | 203        | Steel    |              | Plain casing          |                                |            |             |
| 14.00            | 32.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |
| 32.00            | 62.00       | 203        | Steel    |              | Plain casing          |                                |            |             |
| 62.00            | 80.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |
| 18.00            | 24.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %   | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|-----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130413 | 60           | 70.50              | 3.02             | 1.04       |              |     |       |          |         |         |
| STEP TEST STEP 2 | 20130413 | 60           | 70.50              | 6.04             | 1.70       |              |     |       |          |         |         |
| STEP TEST STEP 3 | 20130413 | 60           | 70.50              | 12.04            | 4.53       |              |     |       |          |         |         |
| STEP TEST STEP 4 | 20130413 | 60           | 70.50              | 24.01            | 54.70      | 0.19         | 100 | 300   |          |         |         |
| CONSTANT         | 20130413 | 1440         | 70.50              | 12.08            | 18.27      | 0.48         | 97  | 1440  |          |         |         |



**Golder Associates**

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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 2013/06/13

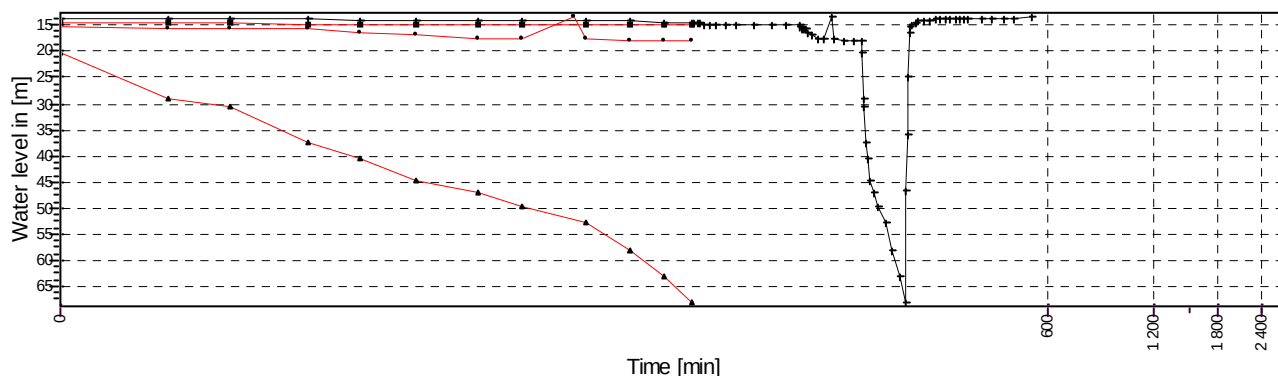
**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0022 Number: SD1-03 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

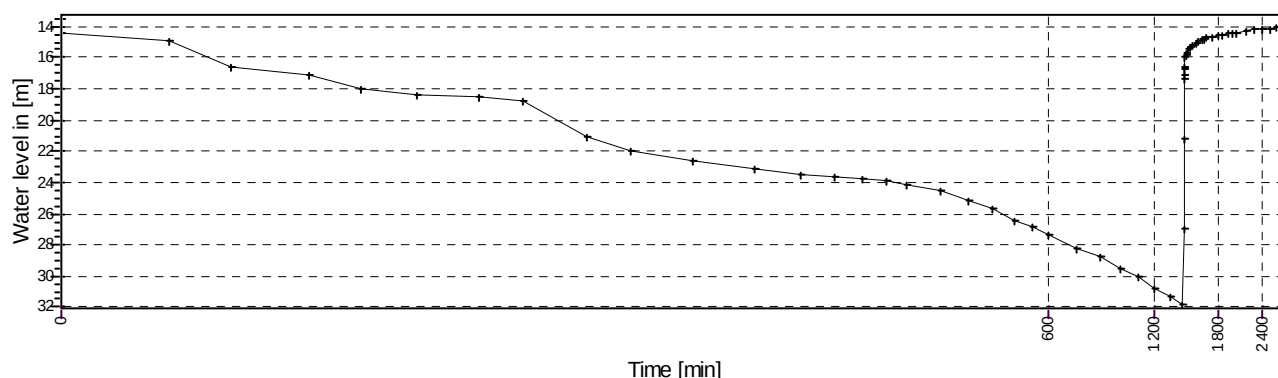
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.234455 | Alt. No. 1:      |  | Diam. [mm]:    | 203   | Water lev. [m]: | 13.35    |
| Longitude [°] | 23.573174 | Alt. No. 2:      |  | Depth [m]:     | 82.60 | Piezometer:     | 0        |
| Altitude [m]: | 1448.10   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.59  | Date WL meas.:  | 20130413 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GEOM       | Step test          | 70.50               | 20130413      | 0700 | 20130413    | 1600 |                               |           |                 |
| GEOM       | Constant rate test | 70.50               | 20130413      | 1630 | 20130415    | 1630 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 0700        | 60           | 70.50              | 3.02             | 1.04       |            |     |                 |                            |             |         | 2.90 |
| STEP TEST STEP 2 | 0800        | 60           | 70.50              | 6.04             | 1.70       |            |     |                 |                            |             |         | 3.55 |
| STEP TEST STEP 3 | 0900        | 60           | 70.50              | 12.04            | 4.53       |            |     |                 |                            |             |         | 2.66 |
| STEP TEST STEP 4 | 1000        | 60           | 70.50              | 24.01            | 54.70      | 0.19       | 100 | 300             |                            |             |         | 0.44 |
| CONSTANT         | 1630        | 1440         | 70.50              | 12.08            | 18.27      | 0.48       | 97  | 1440            |                            |             |         | 0.66 |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0023 Number: SD1-04 Site type: Borehole

Distr./Farm No.:

Site Name/Des.: DANIELSKUIL

Region Type: Water supply authority

Region Descr.: KATGELOPELE LM

Latitude [°]: 28.221849

Reg./BB.:

Topo-set.:

Depth [m]: 61.55

Longitude [°]: 23.588400

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.51

Altitude [m]: 1448.99

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

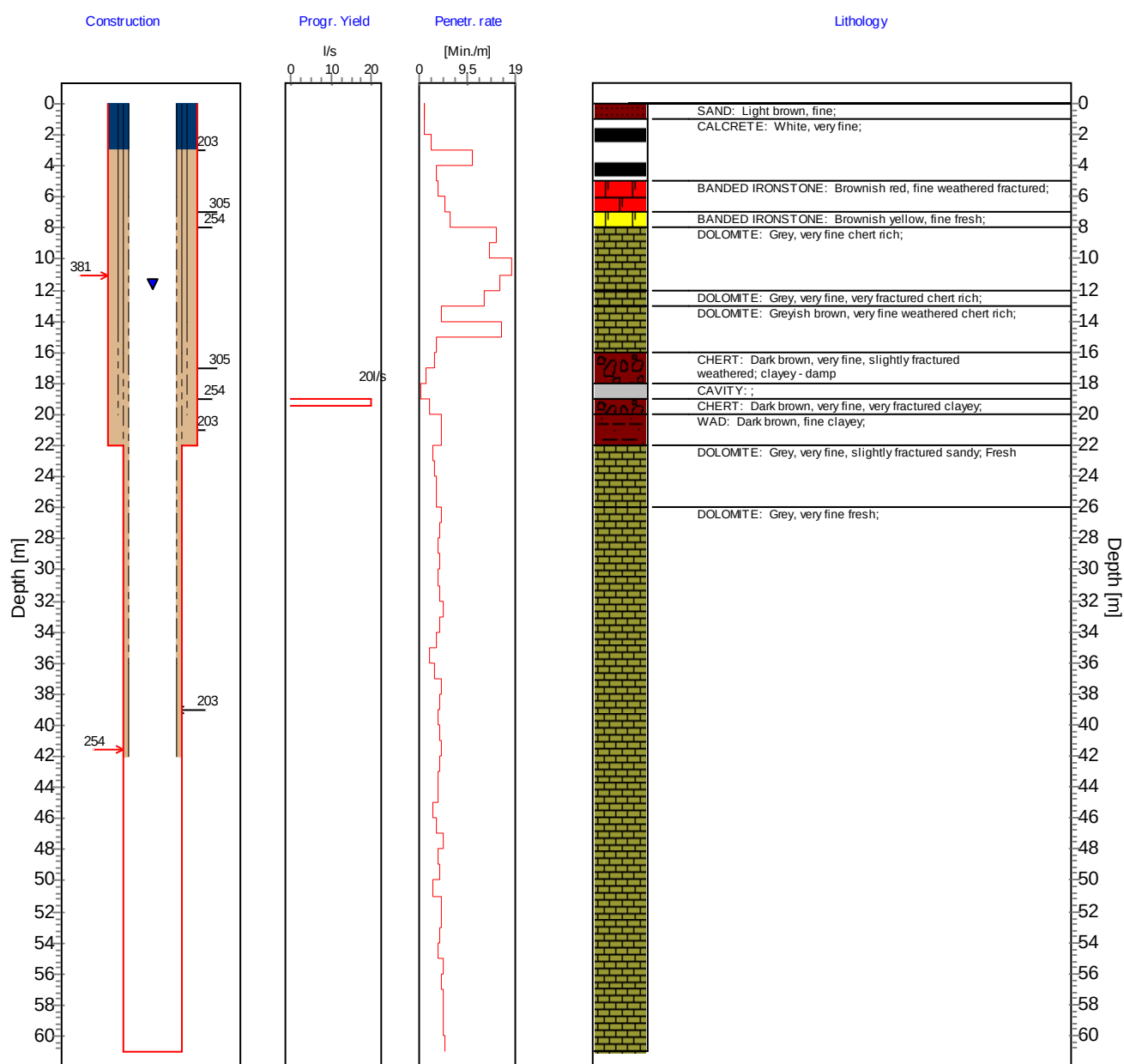
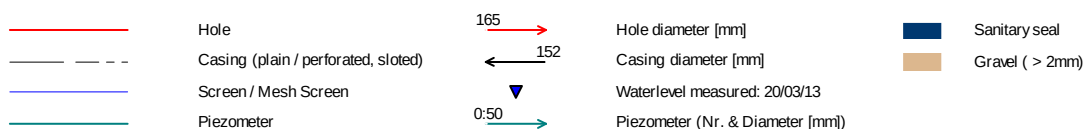
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



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 Project No.: 11613568



## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0023 Number: SD1-04 Site type: Borehole

Distr./Farm No.: Site Name/Descr.: DANIELSKUIL

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.221849 | Alt. No. 1: |      | Diam. [mm]:   | 203   | Water lev. [m]: | 12.99    |
| Longitude [°]: | 23.588400 | Alt. No. 2: |      | Depth [m]:    | 61.55 | WL status:      | Static   |
| Altitude [m]:  | 1448.99   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.51  | Date WL meas.:  | 20130421 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| <b>Pump:</b>   |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| <b>Engine:</b> |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-04 | Date sampled: | 20130422 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 28.50 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.25   | Na:           | 10.7     | Cl:                                                                                                                                                                                                                                                                              | 26.2  | Langel.:               | 0.09   | E.Coli:   |
| EC: [mS/m]       | 69.5   | K:            | 1.61     | NO3 as N:                                                                                                                                                                                                                                                                        | 2.75  | Aggr-Ind:              | 12.17  | Faec. co: |
| TDS:             | 370    | Si:           | 12.8     | SO4:                                                                                                                                                                                                                                                                             | 25.7  | Ion-bal:               | 0.56   | Total Co: |
| T. Alk.:         | 369    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 422.47 | SPC:      |
| Ca:              | 90.2   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 48     | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 19.00            | 19.50             | 20.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 14.00       | 305        | Steel    |              | Plain casing          |                                |            |             |
| 14.00            | 20.00       | 305        | Steel    |              | Perforated or slotted |                                |            |             |
| 0.00             | 16.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 16.00            | 22.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |
| 0.00             | 6.00        | 203        | Steel    |              | Plain casing          |                                |            |             |
| 6.00             | 36.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |
| 36.00            | 42.00       | 203        | Steel    |              | Plain casing          |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130421 | 60           | 28.50              | 5.09             | 0.32       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130421 | 60           | 28.50              | 10.05            | 0.76       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130421 | 60           | 28.50              | 15.03            | 1.04       |                |       |          |         |         |
| STEP TEST STEP 4 | 20130421 | 60           | 28.50              | 20.09            | 1.47       | 100            | 120   |          |         |         |
| CONSTANT         | 20130421 | 1440         | 28.50              | 20.08            | 1.31       | 100            | 960   | 1686     |         |         |

### RECOMMENDATIONS:

| Prior.                                                                                          | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|-------------------------------------------------------------------------------------------------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1                                                                                               | Mono-type pump | 48.00              | Electric motor | 20              | 10.00             | CLASS 0       | 6.60                 | 18.00                 |
| <b>Note:</b> 1. Production borehole.<br>2. Install water level monitoring facility in borehole. |                |                    |                |                 |                   |               |                      |                       |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 28/03/2014

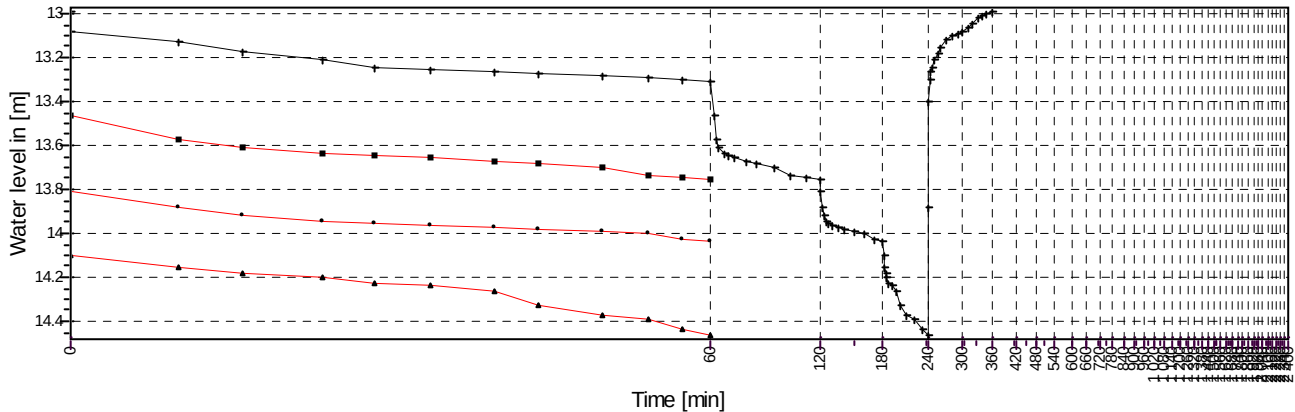
**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0023 Number: SD1-04 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

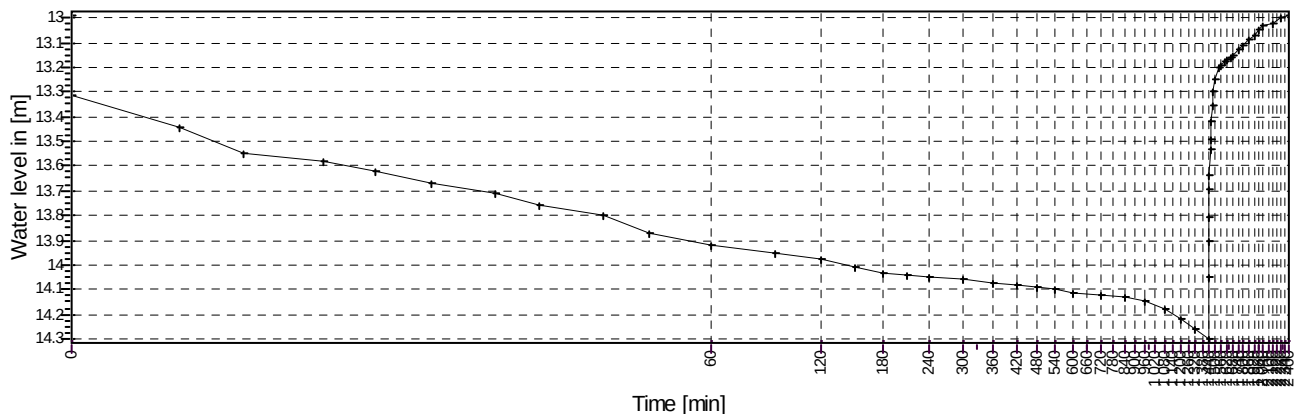
|               |           |                  |                |       |                 |          |
|---------------|-----------|------------------|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.221849 | Alt. No. 1:      | Diam. [mm]:    | 203   | Water lev. [m]: | 12.99    |
| Longitude [°] | 23.588400 | Alt. No. 2:      | Depth [m]:     | 61.55 | Piezometer:     | 0        |
| Altitude [m]: | 1448.99   | Rep. inst.: GOLD | Col. ht. [mm]: | 0.51  | Date WL meas.:  | 20130421 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



| PUMPING TEST: |                    | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|---------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| Rep. Inst.    | Meth. tested       |                     |               |      |             |      |                               |           |                 |
| GOLD          | Step test          | 28.50               | 20130421      | 1130 | 20130421    | 1730 |                               |           |                 |
| GOLD          | Constant rate test | 28.50               | 20130421      | 1730 | 20130423    | 0930 | 1686                          |           | 8.30            |

| TESTING DETAILS: |             | Durat. [min] | Depth to intk. [m] | Disch. rate [l/s] | Drawd. [m] | Recov. [m] | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|-------------------|------------|------------|-----------------|----------------------------|-------------|---------|-------|
| Description      | Time start. |              |                    |                   |            | %          |                 |                            |             |         |       |
| STEP TEST STEP 1 | 1130        | 60           | 28.50              | 5.09              | 0.32       |            |                 |                            |             |         | 15.91 |
| STEP TEST STEP 2 | 1230        | 60           | 28.50              | 10.05             | 0.76       |            |                 |                            |             |         | 13.22 |
| STEP TEST STEP 3 | 1330        | 60           | 28.50              | 15.03             | 1.04       |            |                 |                            |             |         | 14.45 |
| STEP TEST STEP 4 | 1430        | 60           | 28.50              | 20.09             | 1.47       | 100        | 120             |                            |             |         | 13.67 |
| CONSTANT         | 1730        | 1440         | 28.50              | 20.08             | 1.31       | 100        | 960             | 1686                       |             |         | 15.33 |



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Project No.: 11613568

# Borehole Construction and Geological Log

Date compiled: 2013/06/13

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0024 Number: SD1-05 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

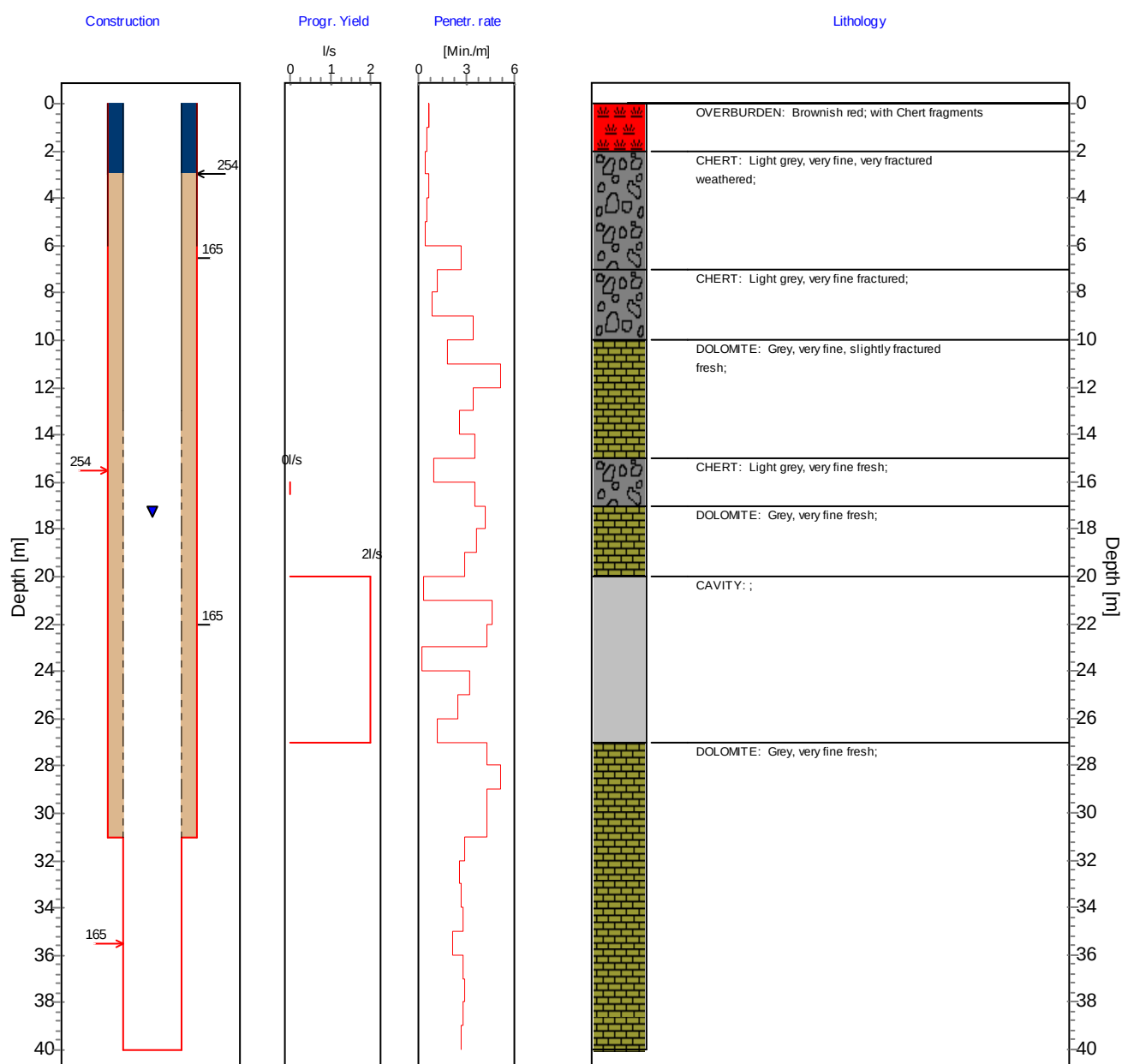
Region Type: Water supply authority Region Descr.: KGATELOPELE LM

|                                        |           |                                       |                    |
|----------------------------------------|-----------|---------------------------------------|--------------------|
| Latitude [°]: 28.211188                | Reg./BB.: | Topo-set.:                            | Depth [m]: 36.67   |
| Longitude [°]: 23.599388               | G-Nr.:    | Site status: Unused                   | Col. ht. [m]: 0.56 |
| Altitude [m]: 1457.23                  |           | Site purp.: Production (water supply) | Diam. [mm]: 165    |
| Coord. acc.: Accurate to within 1 unit |           | Use applic.: Domestic - all purposes  | Drain. reg.: C92A  |
| Coord. meth.: Altimeter                |           | Equipment: No equipment               | Rep. inst.: GOLD   |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend

|       |                                      |        |                                  |   |                 |
|-------|--------------------------------------|--------|----------------------------------|---|-----------------|
| —     | Hole                                 | 165 →  | Hole diameter [mm]               | ■ | Sanitary seal   |
| — — — | Casing (plain / perforated, slotted) | ← 152  | Casing diameter [mm]             | ■ | Gravel ( > 2mm) |
| —     | Screen / Mesh Screen                 | ▼      | Waterlevel measured: 25/03/13    |   |                 |
| —     | Piezometer                           | 0:50 → | Piezometer (Nr. & Diameter [mm]) |   |                 |



COMMENT:



**Golder Associates**

Golder Associates Africa, Pretoria  
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Tel: 012 - 364 4000  
Fax: 012 - 364 4001  
Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0024 Number: SD1-05 Site type: Borehole

Distr./Farm No.:

Site Name/Descr.: DANIELSKUIL

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.211188 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 18.61    |
| Longitude [°]: | 23.599388 | Alt. No. 2:      |  | Depth [m]:    | 36.67 | WL status:      | Static   |
| Altitude [m]:  | 1457.23   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.56  | Date WL meas.:  | 20130424 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

Pump:

Type of Inst.:

Manufacturer:

Pulley Diam. [mm]:

Depth to Intk. [m]:

Engine:

Manufacturer:

Type of Power:

Power Rating [kW]

Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: Unused

Purpose: Production (water supply)

Consumer: Non-urban

Application: Domestic - all purposes

### WATER CHEMISTRY:

Sample No.: SD1-05

Date sampled: 20130426

Depth sampl. [m]: 28.50

Comment:

Main Parameters:

Calculated Parameters:

Bacteriol. Parameters:

|            |        |     |        |                                                                                                                                                                                                                                                                                  |       |           |        |           |  |
|------------|--------|-----|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|--------|-----------|--|
| pH:        | 7.17   | Na: | 11.3   | Cl:                                                                                                                                                                                                                                                                              | 29.5  | Langel.:  | 0.04   | E.Coli:   |  |
| EC: [mS/m] | 73.7 † | K:  | 1.61   | NO3 as N:                                                                                                                                                                                                                                                                        | 2.14  | Aggr-Ind: | 12.13  | Faec. co: |  |
| TDS:       | 490    | Si: | 13.2   | SO4:                                                                                                                                                                                                                                                                             | 23.6  | Ion-bal:  | 1.05   | Total Co: |  |
| T. Alk.:   | 392    | Al: | < 0.05 | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:    | 449.35 | SPC:      |  |
| Ca:        | 92.4   | Fe: | < 0.05 | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ; Value exceeds minimum allowable limit |       |           |        |           |  |
| Mg:        | 53.2   | Mn: | < 0.05 |                                                                                                                                                                                                                                                                                  |       |           |        |           |  |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 20.00            | 27.00             | 2.00       | Notch (V- or U-notch) |              |         |
| 16.00            | 16.50             | 0.00       | Notch (V- or U-notch) |              | DAMP    |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 6.00        | 254        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 13.00       | 165        | Steel    |              | Plain casing          |                                |            |             |
| 13.00            | 31.00       | 165        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130424 | 60           | 28.50              | 2.19             | 0          |            |       |          |         |         |
| STEP TEST STEP 2 | 20130424 | 60           | 28.50              | 5.31             | 0.03       |            |       |          |         |         |
| STEP TEST STEP 3 | 20130424 | 60           | 28.50              | 12.29            | 0.29       |            |       |          |         |         |
| STEP TEST STEP 4 | 20130424 | 60           | 28.50              | 22.50            | 0.78       | 100        | 5     |          |         |         |
| CONSTANT         | 20130425 | 2880         | 28.50              | 20.02            | 0.62       | 100        | 60    |          |         |         |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 2013/06/13

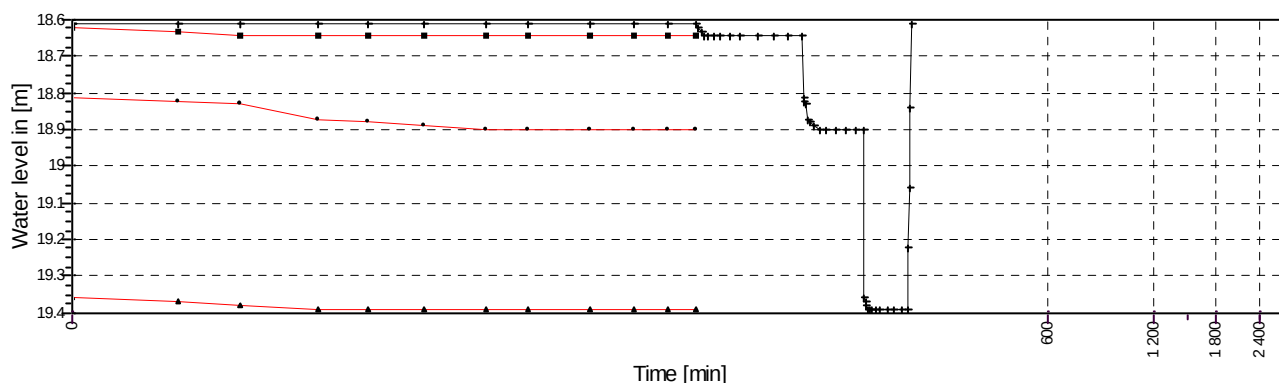
**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0024 Number: SD1-05 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

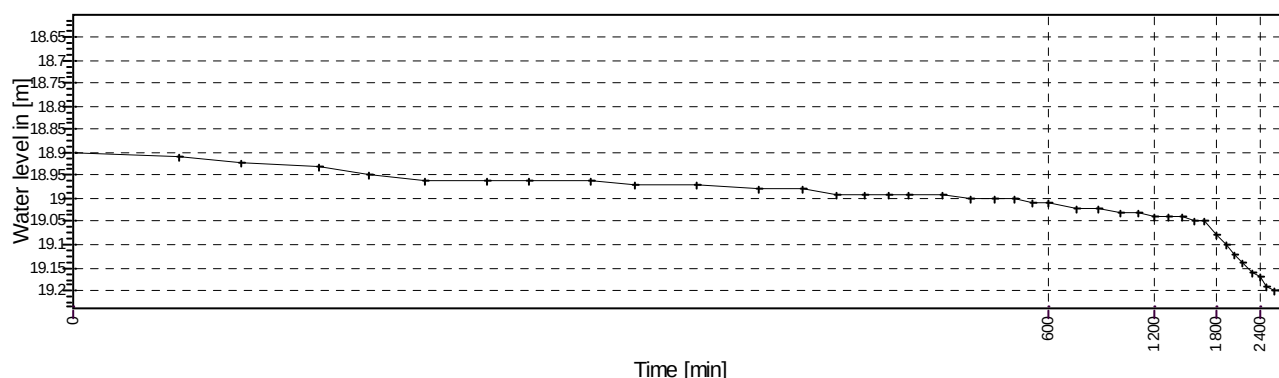
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.211188 | Alt. No. 1:      |  | Diam. [mm]:    | 165   | Water lev. [m]: | 18.61    |
| Longitude [°] | 23.599388 | Alt. No. 2:      |  | Depth [m]:     | 36.67 | Piezometer:     | 0        |
| Altitude [m]: | 1457.23   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.56  | Date WL meas.:  | 20130424 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 28.50               | 20130424      | 0800 | 20130424    | 1205 |                               |           |                 |
| GOLD       | Constant rate test | 28.50               | 20130425      | 0800 | 20130427    | 0900 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 0800        | 60           | 28.50              | 2.19             | 0          |            |     |                 |                            |             |         | 0.00  |
| STEP TEST STEP 2 | 0900        | 60           | 28.50              | 5.31             | 0.03       |            |     |                 |                            |             |         | 177.0 |
| STEP TEST STEP 3 | 1000        | 60           | 28.50              | 12.29            | 0.29       |            |     |                 |                            |             |         | 42.38 |
| STEP TEST STEP 4 | 1100        | 60           | 28.50              | 22.50            | 0.78       |            | 100 | 5               |                            |             |         | 28.85 |
| CONSTANT         | 0800        | 2880         | 28.50              | 20.02            | 0.62       |            | 100 | 60              |                            |             |         | 32.29 |



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Project No.: 11613568

**Borehole Construction and Geological Log**

Date compiled: 2013/06/13

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0025 Number: SD1-06 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

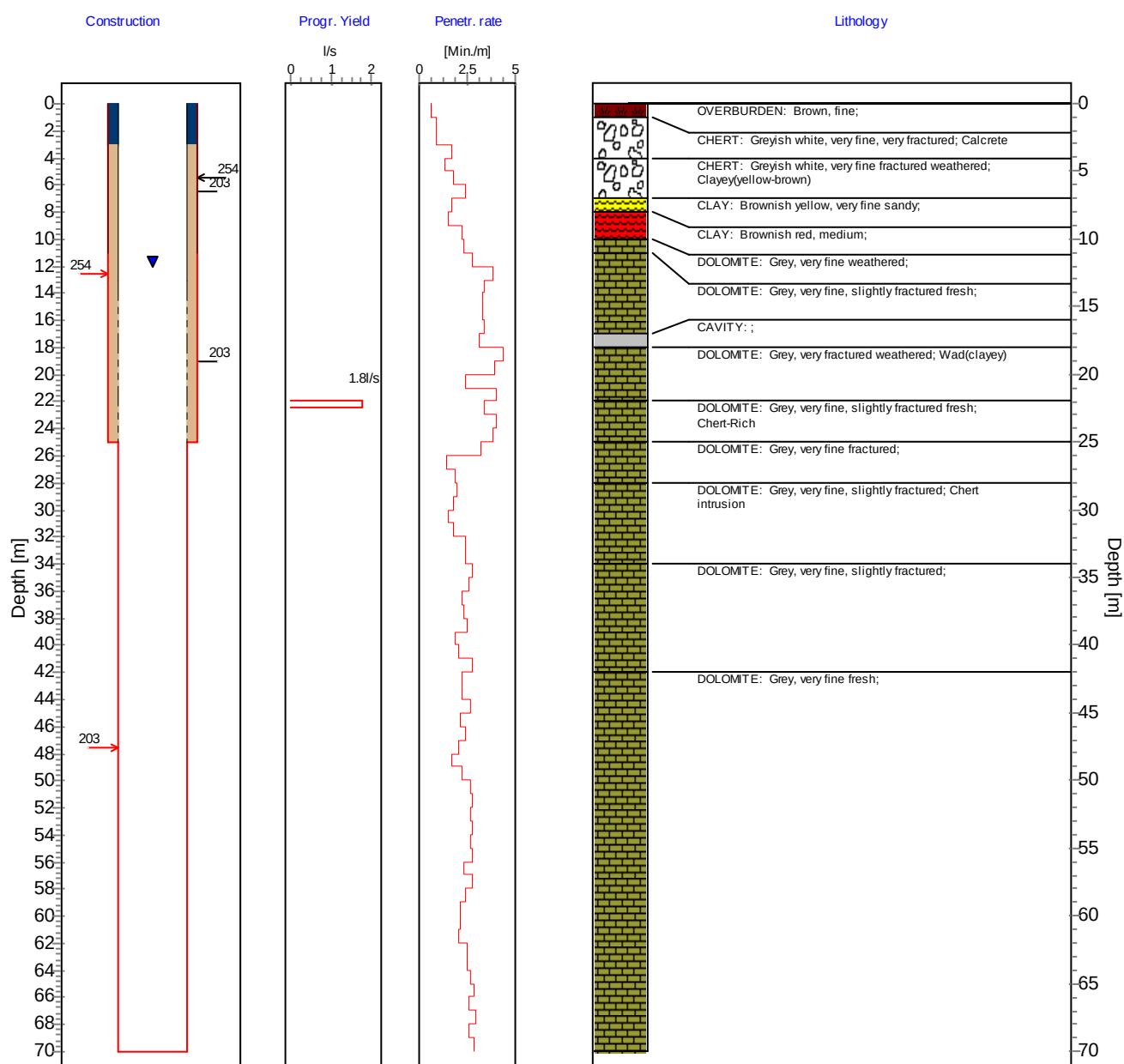
Region Type: Water supply authority Region Descr.: KGATELOPELE LM

|                |                           |           |                                       |               |       |
|----------------|---------------------------|-----------|---------------------------------------|---------------|-------|
| Latitude [°]:  | 28.209010                 | Reg./BB.: | Topo-set.:                            | Depth [m]:    | 70.26 |
| Longitude [°]: | 23.581922                 | G-Nr.:    | Site status: Unused                   | Col. ht. [m]: | 0.51  |
| Altitude [m]:  | 1449.80                   |           | Site purp.: Production (water supply) | Diam. [mm]:   | 203   |
| Coord. acc.:   | Accurate to within 1 unit |           |                                       | Drain. reg.:  | C92A  |
| Coord. meth.:  | Altimeter                 |           |                                       | Rep. inst.:   | GOLD  |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

**Construction and Geohydrological Legend**

|  |                                      |        |                                  |  |                |
|--|--------------------------------------|--------|----------------------------------|--|----------------|
|  | Hole                                 | 165 →  | Hole diameter [mm]               |  | Sanitary seal  |
|  | Casing (plain / perforated, slotted) | ← 152  | Casing diameter [mm]             |  | Gravel (> 2mm) |
|  | Screen / Mesh Screen                 | ▼      | Waterlevel measured: 25/03/13    |  |                |
|  | Piezometer                           | 0:50 → | Piezometer (Nr. & Diameter [mm]) |  |                |



COMMENT:



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0025 Number: SD1-06 Site type: Borehole

Distr./Farm No.: Site Name/Descr.: DANIELSKUIL

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.209010 | Alt. No. 1:      |  | Diam. [mm]:   | 203   | Water lev. [m]: | 18.95    |
| Longitude [°]: | 23.581922 | Alt. No. 2:      |  | Depth [m]:    | 70.26 | WL status:      | Static   |
| Altitude [m]:  | 1449.80   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.51  | Date WL meas.:  | 20130427 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| <b>Pump:</b>   |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| <b>Engine:</b> |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                    |        |                        |        |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|--------------------|--------|------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.: SD1-06 |        | Date sampled: 20130427 |        | Depth sampl. [m]: 58.80                                                                                                                                                                                                                                                          |       | Comment:               |        |           |
| Main Parameters:   |        |                        |        | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:                | 7.47   | Na:                    | 11.8   | Cl:                                                                                                                                                                                                                                                                              | 35.5  | Langel.:               | 0.37   | E.Coli:   |
| EC: [mS/m]         | 76.2 † | K:                     | 1.89   | NO3 as N:                                                                                                                                                                                                                                                                        | 3.02  | Aggr-Ind:              | 12.45  | Faec. co: |
| TDS:               | 420    | Si:                    | 12.9   | SO4:                                                                                                                                                                                                                                                                             | 28.8  | Ion-bal:               | 0.33   | Total Co: |
| T. Alk.:           | 382    | Al:                    | < 0.05 | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 448.19 | SPC:      |
| Ca:                | 101    | Fe:                    | < 0.05 | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ; Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:                | 47.7   | Mn:                    | < 0.05 |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 22.00            | 22.50             | 1.80       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 11.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 13.00       | 203        | Steel    |              | Plain casing          |                                |            |             |
| 13.00            | 25.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m³/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130427 | 60           | 58.80              | 2.10             | 2.11       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130427 | 60           | 58.80              | 5.20             | 13.71      |                |       |          |         |         |
| STEP TEST STEP 3 | 20130427 | 10           | 58.80              | 10.00            | 39.80      | 100            | 180   |          |         |         |
| PUMP INLET       | 20130427 | 20           | 58.80              | 4.54             | 39.85      |                |       |          |         |         |



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Project No.: 11613568

# PUMPING TEST REPORT

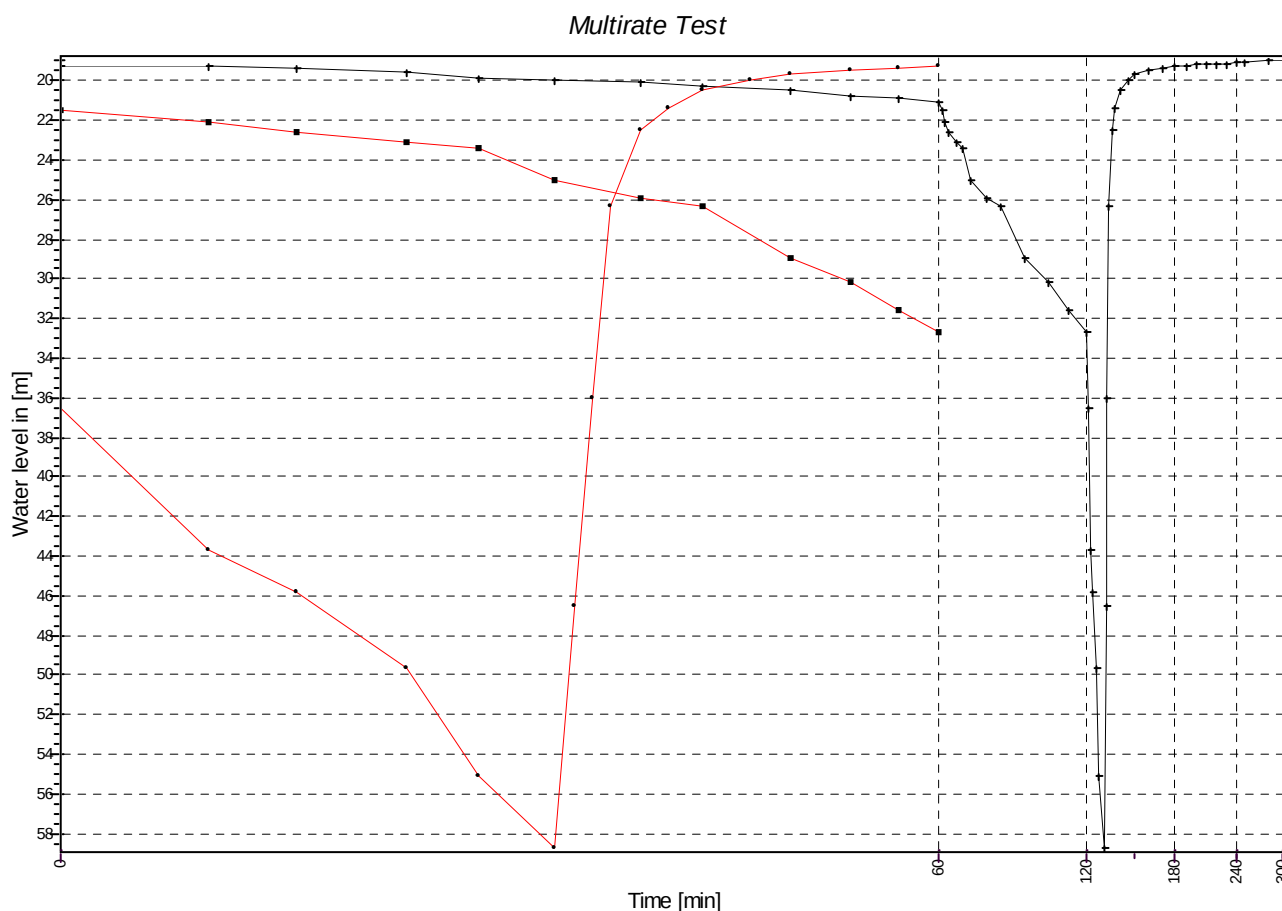
Date compiled: 2013/06/13

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0025 Number: SD1-06 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.209010 | Alt. No. 1:      |  | Diam. [mm]:    | 203   | Water lev. [m]: | 18.95    |
| Longitude [°] | 23.581922 | Alt. No. 2:      |  | Depth [m]:     | 70.26 | Piezometer:     | 0        |
| Altitude [m]: | 1449.80   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.51  | Date WL meas.:  | 20130427 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)



## PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test    | 58.80               | 20130427      | 1400 | 20130427    | 1910 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1400        | 60           | 58.80              | 2.10             | 2.11       |            |     |                 |                            |             |         | 1.00 |
| STEP TEST STEP 2 | 1500        | 60           | 58.80              | 5.20             | 13.71      |            |     |                 |                            |             |         | 0.38 |
| STEP TEST STEP 3 | 1600        | 10           | 58.80              | 10.00            | 39.80      |            | 100 | 180             |                            |             |         | 0.25 |
| PUMP INLET       | 1910        | 20           | 58.80              | 4.54             | 39.85      |            |     |                 |                            |             |         | 0.11 |



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# Borehole Construction and Geological Log

Date compiled: 2013/06/13

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0026 Number: SD1-07 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

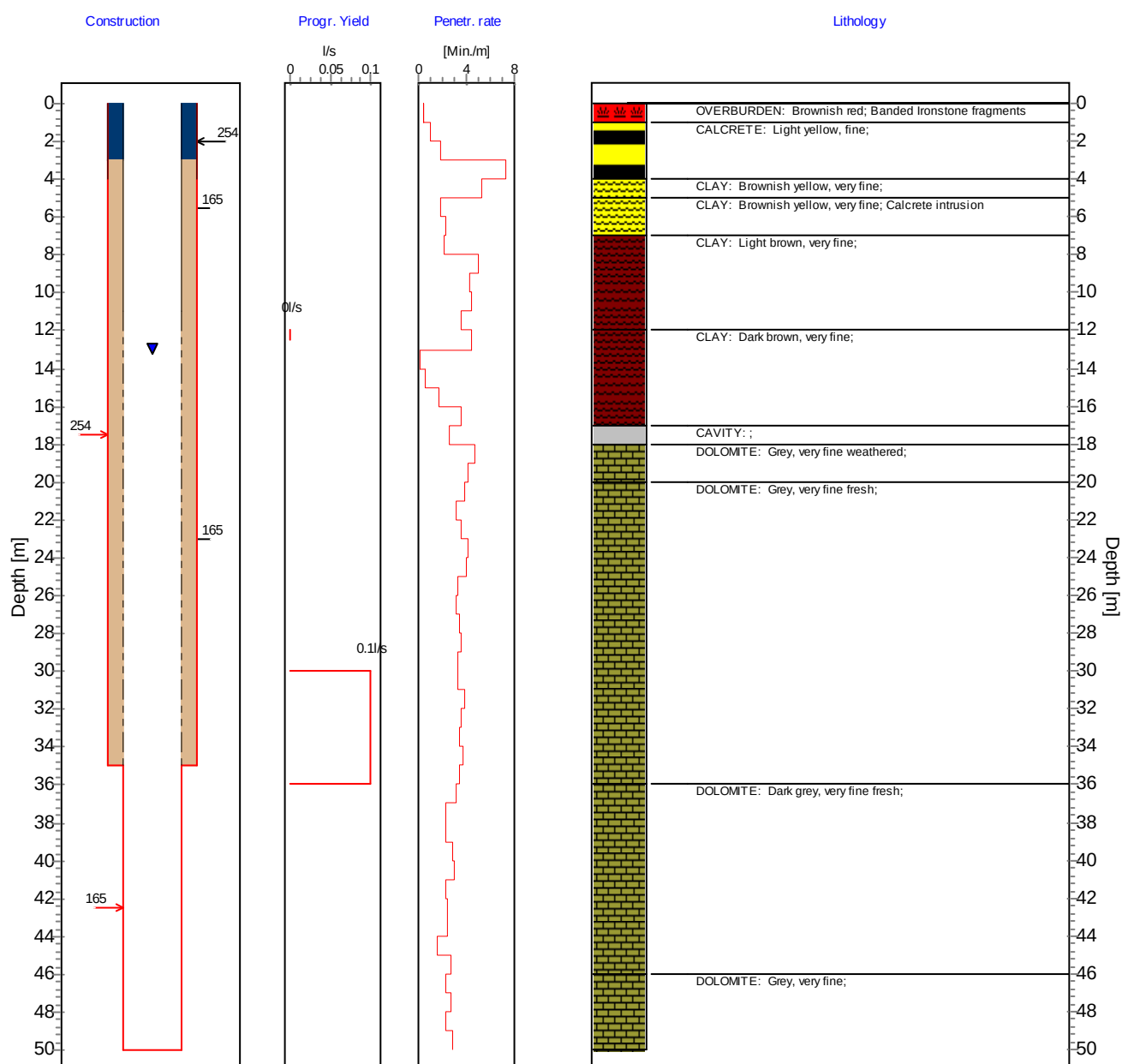
Region Type: Water supply authority Region Descr.: KGATELOPELE LM

|                                        |           |                                       |                    |
|----------------------------------------|-----------|---------------------------------------|--------------------|
| Latitude [°]: 28.218558                | Reg./BB.: | Topo-set.:                            | Depth [m]: 50.00   |
| Longitude [°]: 23.578336               | G-Nr.:    | Site status: Unused                   | Col. ht. [m]: 0.52 |
| Altitude [m]: 1450.11                  |           | Site purp.: Production (water supply) | Diam. [mm]: 165    |
| Coord. acc.: Accurate to within 1 unit |           | Use applic.: Domestic - all purposes  | Drain. reg.: C92A  |
| Coord. meth.: Altimeter                |           | Equipment: No equipment               | Rep. inst.: GOLD   |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend

|  |                                      |        |                                  |  |                |
|--|--------------------------------------|--------|----------------------------------|--|----------------|
|  | Hole                                 | 165 →  | Hole diameter [mm]               |  | Sanitary seal  |
|  | Casing (plain / perforated, slotted) | ← 152  | Casing diameter [mm]             |  | Gravel (> 2mm) |
|  | Screen / Mesh Screen                 | ▼      | Waterlevel measured: 22/03/13    |  |                |
|  | Piezometer                           | 0:50 → | Piezometer (Nr. & Diameter [mm]) |  |                |



COMMENT:



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Project No.: 11613568

# Borehole Construction and Geological Log

Date compiled: 2013/06/13

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0027 Number: SD1-25 Site type: Borehole

Distr./Farm No.:

Site Name/Des.: DANIELSKUIL

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.223085

Reg./BB.:

Topo-set.:

Depth [m]: 51.50

Longitude [°]: 23.569143

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.57

Altitude [m]: 1446.64

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

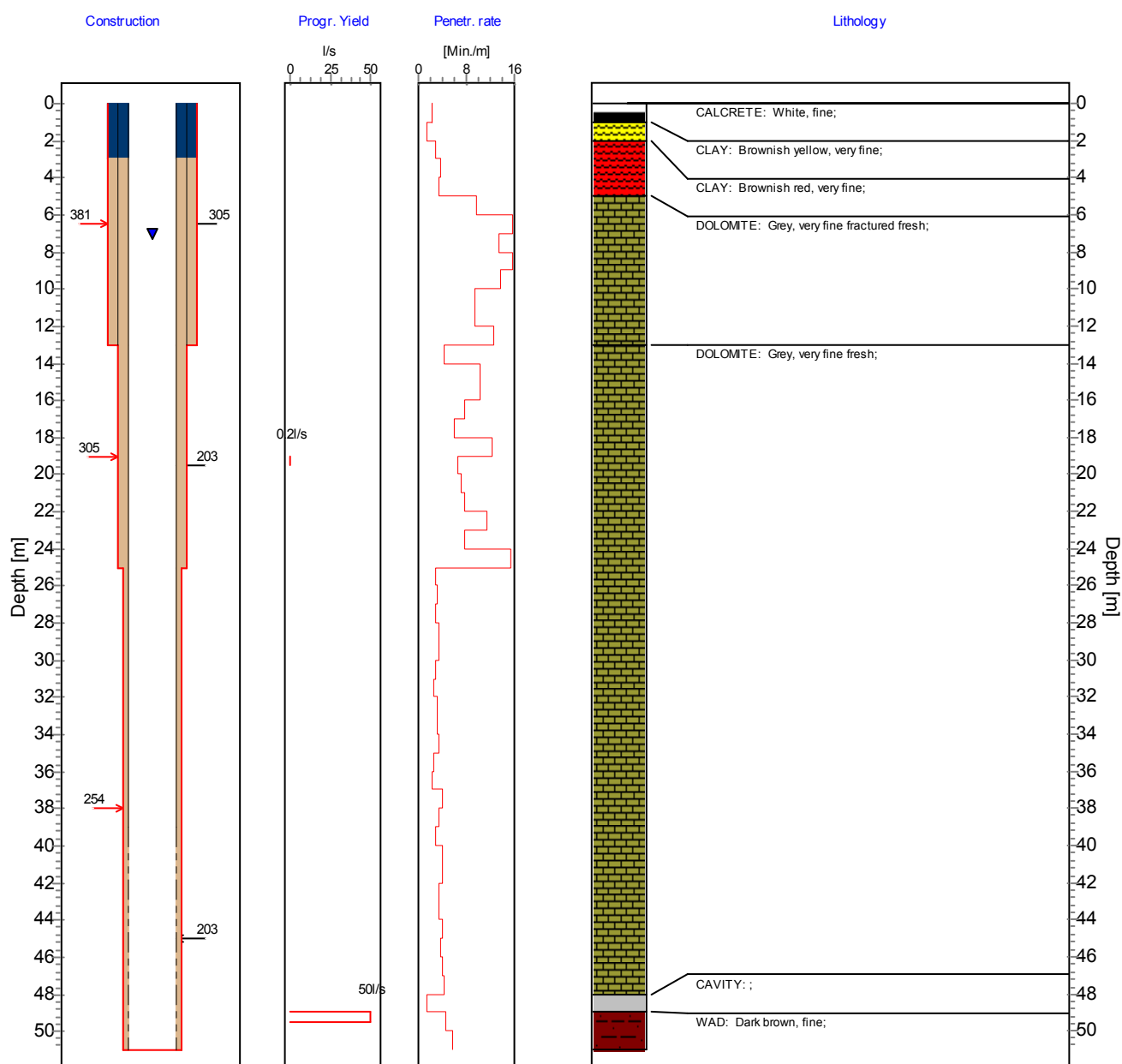
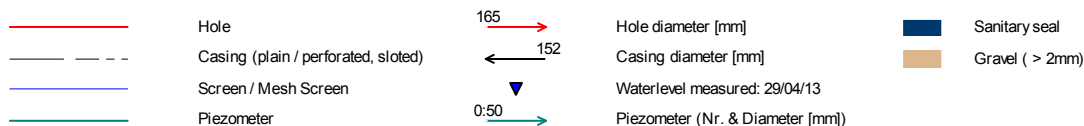
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0027 Number: SD1-25 Site type: Borehole

Distr./Farm No.: Site Name/Descr.: DANIELSKUIL

|                          |                  |                    |                         |
|--------------------------|------------------|--------------------|-------------------------|
| Latitude [°]: 28.223085  | Alt. No. 1:      | Diam. [mm]: 203    | Water lev. [m]: 8.20    |
| Longitude [°]: 23.569143 | Alt. No. 2:      | Depth [m]: 51.50   | WL status: Static       |
| Altitude [m]: 1446.64    | Rep. inst.: GOLD | Col. ht. [m]: 0.57 | Date WL meas.: 20130520 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| Pump:          |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| Engine:        |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                    |                        |                                                                                                                                                                                                                                                                                  |                                               |
|--------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Sample No.: SD1-25 | Date sampled: 20130522 | Depth sampl. [m]: 46.80                                                                                                                                                                                                                                                          | Comment:                                      |
| Main Parameters:   |                        |                                                                                                                                                                                                                                                                                  | Calculated Parameters: Bacteriol. Parameters: |
| pH: 7.47           | Na: 19.6               | Cl: 44.8                                                                                                                                                                                                                                                                         | Langel.: 0.14 E.Coli:                         |
| EC: [mS/m] 61.1    | K: 2.9                 | NO3 as N: 4.2                                                                                                                                                                                                                                                                    | Aggr-Ind: 12.20 Faec. co:                     |
| TDS: 418           | Si: 12.4               | SO4: 45.3                                                                                                                                                                                                                                                                        | Ion-bal: 0.86 Total Co:                       |
| T. Alk.: 238       | Al: < 0.05             | F: < 0.1                                                                                                                                                                                                                                                                         | CaCO3: 323.59 SPC:                            |
| Ca: 89.8           | Fe: < 0.05             | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |                                               |
| Mg: 24.2           | Mn: < 0.05             |                                                                                                                                                                                                                                                                                  |                                               |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 19.00            | 19.50             | 0.20       | Notch (V- or U-notch) |              |         |
| 49.00            | 49.50             | 50.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]: Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|-----------------------------|------------|-------------|
| 0.00             | 13.00       | 305        | Steel    |              | Plain casing          |                             |            |             |
| 0.00             | 39.00       | 203        | Steel    |              | Plain casing          |                             |            |             |
| 39.00            | 51.00       | 203        | Steel    |              | Perforated or slotted |                             |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|----------|---------|---------|
| STEP TEST STEP 1 | 20130520 | 60           | 46.80              | 8.13             | 0.24       |                |          |         |         |
| STEP TEST STEP 2 | 20130520 | 60           | 46.80              | 16.50            | 0.54       |                |          |         |         |
| STEP TEST STEP 3 | 20130520 | 60           | 46.80              | 24.31            | 0.82       |                |          |         |         |
| STEP TEST STEP 4 | 20130520 | 60           | 46.80              | 30.32            | 1.18       | 100            | 10       |         |         |
| CONSTANT         | 20130521 | 2880         | 46.80              | 30.29            | 1.83       | 100            | 30       | 2533    | 0.0197  |

### RECOMMENDATIONS:

| Prior.                                                                                          | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|-------------------------------------------------------------------------------------------------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1                                                                                               | Mono-type pump | 48.00              | Electric motor | 12              | 15.00             | CLASS 0       | 4.40                 | 48.00                 |
| <b>Note:</b> 1. Production borehole.<br>2. Install water level monitoring facility in borehole. |                |                    |                |                 |                   |               |                      |                       |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 28/03/2014

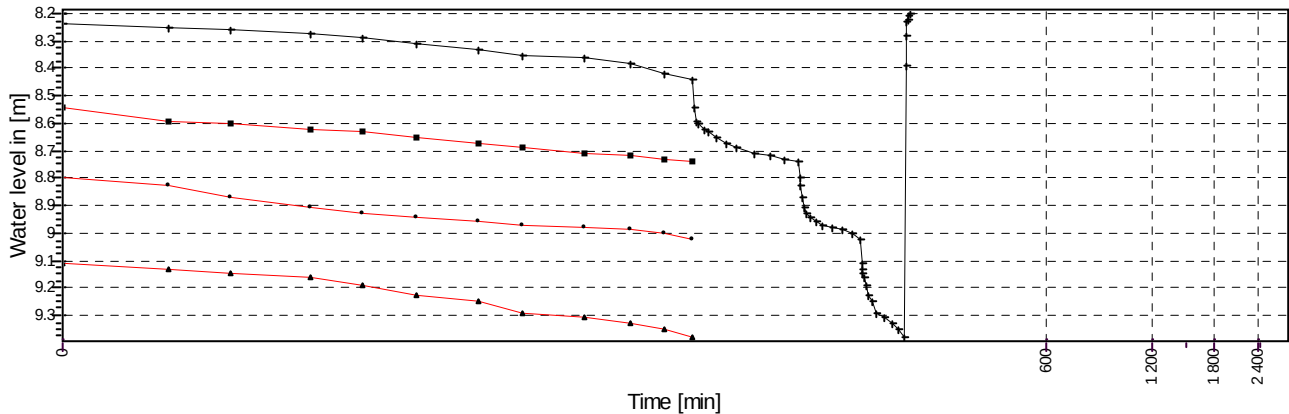
**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0027 Number: SD1-25 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

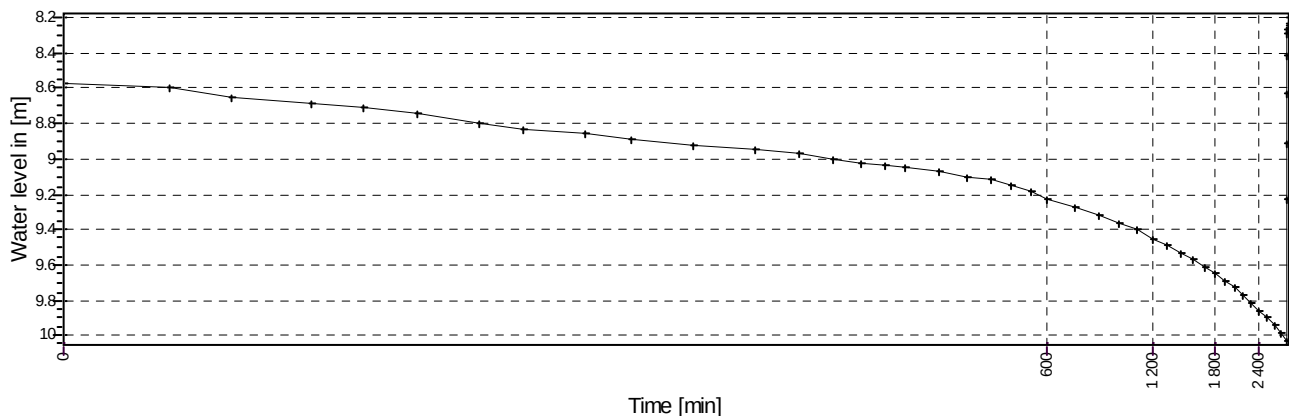
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.223085 | Alt. No. 1:      |  | Diam. [mm]:    | 203   | Water lev. [m]: | 8.20     |
| Longitude [°] | 23.569143 | Alt. No. 2:      |  | Depth [m]:     | 51.50 | Piezometer:     | 0        |
| Altitude [m]: | 1446.64   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.57  | Date WL meas.:  | 20130520 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



| PUMPING TEST: |                    | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|---------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| Rep. Inst.    | Meth. tested       |                     |               |      |             |      |                               |           |                 |
| GOLD          | Step test          | 46.80               | 20130520      | 1220 | 20130520    | 1630 |                               |           |                 |
| GOLD          | Constant rate test | 46.80               | 20130521      | 0800 | 20130523    | 0830 | 2533                          | 0.0197    | 7.50            |

| TESTING DETAILS: |             | Durat. [min] | Depth to intk. [m] | Disch. rate [l/s] | Drawd. [m] | Recov. [m] | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|-------------------|------------|------------|-----------------|----------------------------|-------------|---------|-------|
| Description      | Time start. |              |                    |                   |            | %          |                 |                            |             |         |       |
| STEP TEST STEP 1 | 1220        | 60           | 46.80              | 8.13              | 0.24       |            |                 |                            |             |         | 33.88 |
| STEP TEST STEP 2 | 1320        | 60           | 46.80              | 16.50             | 0.54       |            |                 |                            |             |         | 30.56 |
| STEP TEST STEP 3 | 1420        | 60           | 46.80              | 24.31             | 0.82       |            |                 |                            |             |         | 29.65 |
| STEP TEST STEP 4 | 1520        | 60           | 46.80              | 30.32             | 1.18       | 100        | 10              |                            |             |         | 25.69 |
| CONSTANT         | 0800        | 2880         | 46.80              | 30.29             | 1.83       | 100        | 30              | 2533                       |             | 0.0197  | 16.55 |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0031 Number: SD1-33 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.173100

Reg./BB.:

Topo-set.:

Depth [m]: 74.80

Longitude [°]: 23.518600

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.60

Altitude [m]: 1494.17

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

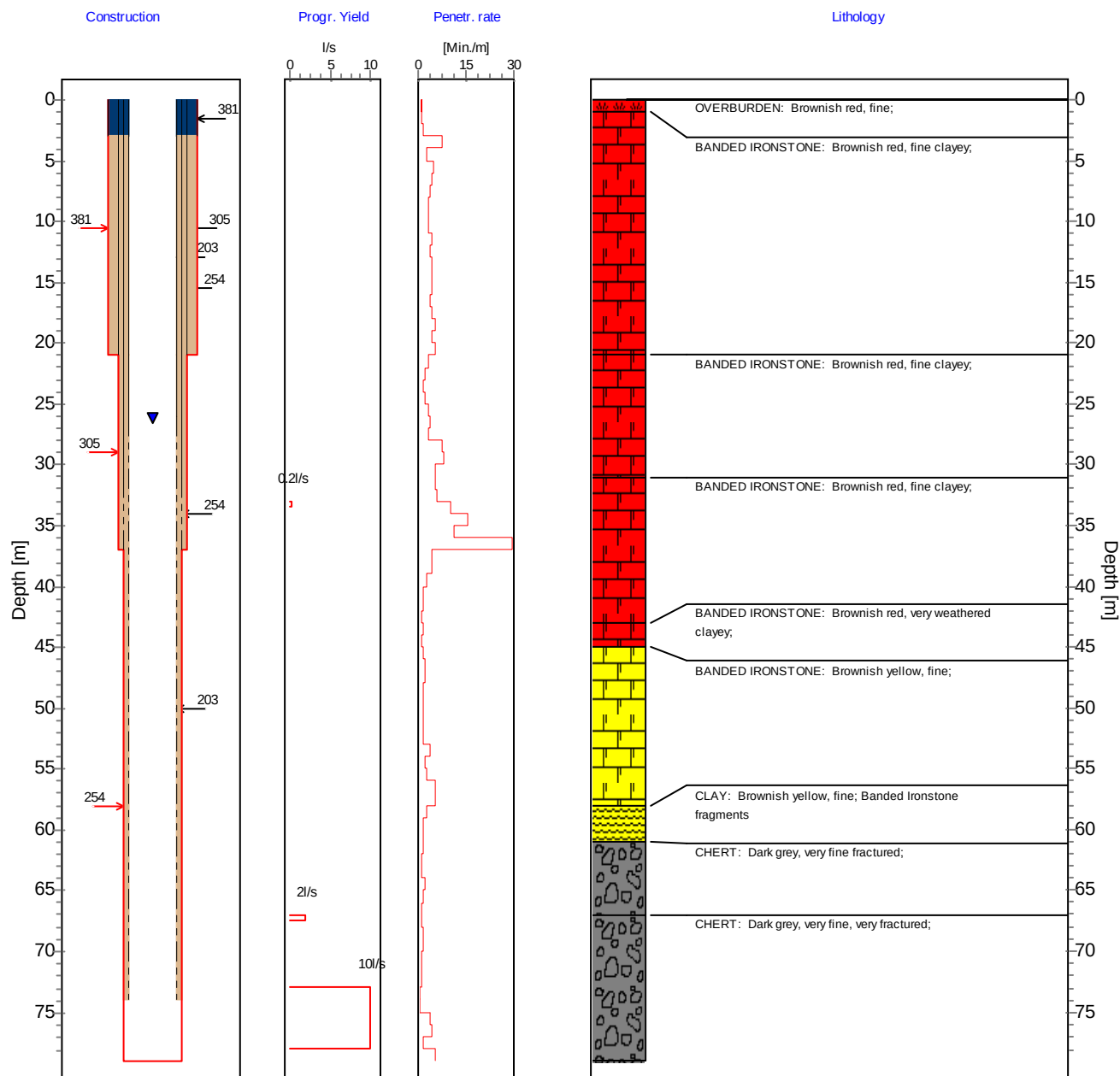
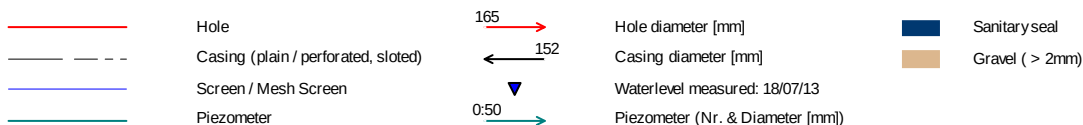
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



Golder Associates Africa, Pretoria  
 P O Box 13776, Hatfield, 00285  
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 Fax: 012 - 364 4001  
 Project No.: 13615335

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0031 Number: SD1-33 Site type: Borehole

Distr./Farm No.: Site Name/Descr.: DANIELSKUIL

|                          |                  |                    |                         |
|--------------------------|------------------|--------------------|-------------------------|
| Latitude [°]: 28.173100  | Alt. No. 1:      | Diam. [mm]: 203    | Water lev. [m]: 26.20   |
| Longitude [°]: 23.518600 | Alt. No. 2:      | Depth [m]: 74.80   | WL status: Static       |
| Altitude [m]: 1494.17    | Rep. inst.: GOLD | Col. ht. [m]: 0.60 | Date WL meas.: 20130718 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| Pump:          |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| Engine:        |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                    |                        |                                                                                                                                                                                                                                                                                  |                                               |
|--------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Sample No.: SD1-33 | Date sampled: 20130721 | Depth sampl. [m]: 64.80                                                                                                                                                                                                                                                          | Comment:                                      |
| Main Parameters:   |                        |                                                                                                                                                                                                                                                                                  | Calculated Parameters: Bacteriol. Parameters: |
| pH: 7.64           | Na: 6.39               | Cl: 7.65                                                                                                                                                                                                                                                                         | Langel.: -0.35 E.Coli:                        |
| EC: [mS/m] 22.1    | K: 2.17                | NO3 as N: 1.23                                                                                                                                                                                                                                                                   | Aggr-Ind: 11.59 Faec. co:                     |
| TDS: 136           | Si: 8.35               | SO4: 11.5                                                                                                                                                                                                                                                                        | Ion-bal: 7.38 † Total Co:                     |
| T. Alk.: 103       | Al: < 0.05             | F: < 0.1                                                                                                                                                                                                                                                                         | CaCO3: 134.54 SPC:                            |
| Ca: 34.8           | Fe: < 0.05             | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit j Value exceeds minimum allowable limit |                                               |
| Mg: 11.6           | Mn: < 0.05             |                                                                                                                                                                                                                                                                                  |                                               |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 33.00            | 33.50             | 0.20       | Notch (V- or U-notch) |              |         |
| 67.00            | 67.50             | 2.00       | Notch (V- or U-notch) |              |         |
| 73.00            | 78.00             | 10.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]: Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|-----------------------------|------------|-------------|
| 0.00             | 3.00        | 381        | Steel    |              | Plain casing          |                             |            |             |
| 0.00             | 21.00       | 305        | Steel    |              | Plain casing          |                             |            |             |
| 0.00             | 31.00       | 254        | Steel    |              | Plain casing          |                             |            |             |
| 31.00            | 37.00       | 254        | Steel    |              | Perforated or slotted |                             |            |             |
| 0.00             | 26.00       | 203        | Steel    |              | Plain casing          |                             |            |             |
| 26.00            | 74.00       | 203        | Steel    |              | Perforated or slotted |                             |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130718 | 60           | 64.80              | 5.55             | 3.38       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130718 | 60           | 64.80              | 10.24            | 13.97      |                |       |          |         |         |
| STEP TEST STEP 3 | 20130718 | 60           | 64.80              | 15.54            | 24.37      |                |       |          |         |         |
| STEP TEST STEP 4 | 20130718 | 30           | 64.80              | 20.10            | 38.60      | 100            | 100   |          |         |         |
| PUMP INLET       | 20130718 | 30           | 64.80              | 18.10            | 38.60      |                |       |          |         |         |
| CONSTANT         | 20130718 | 4320         | 68.80              | 12.18            | 15.74      | 100            | 1080  | 68       | 0.04    |         |

### RECOMMENDATIONS:

| Prior.                                                                                          | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|-------------------------------------------------------------------------------------------------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1                                                                                               | Mono-type pump | 63.00              | Electric motor | 12              | 5.00              | CLASS 0       | 30.00                | 36.00                 |
| <b>Note:</b> 1. Production borehole.<br>2. Install water level monitoring facility in borehole. |                |                    |                |                 |                   |               |                      |                       |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 10/10/2013

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0031 Number: SD1-33 Site type: Borehole

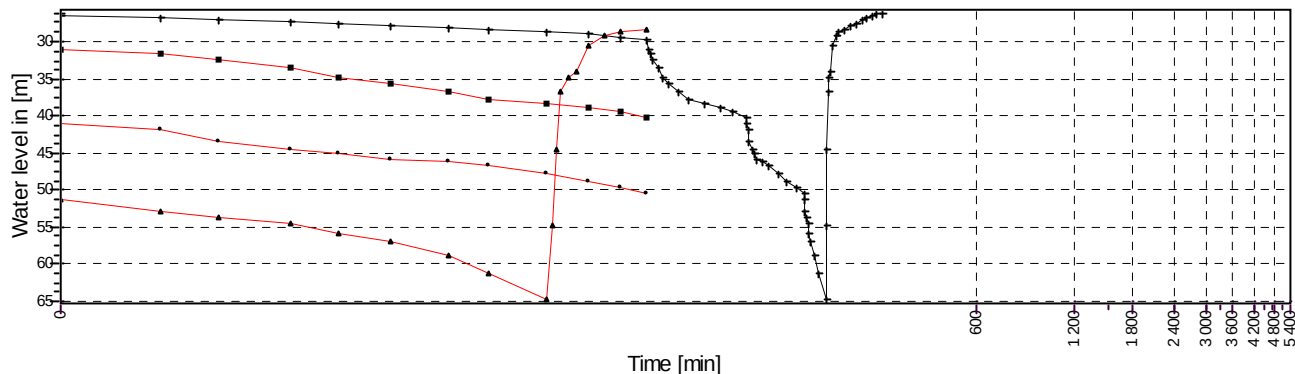
Distr./Farm No.:

Site Name/Des.: DANIELSKUIL

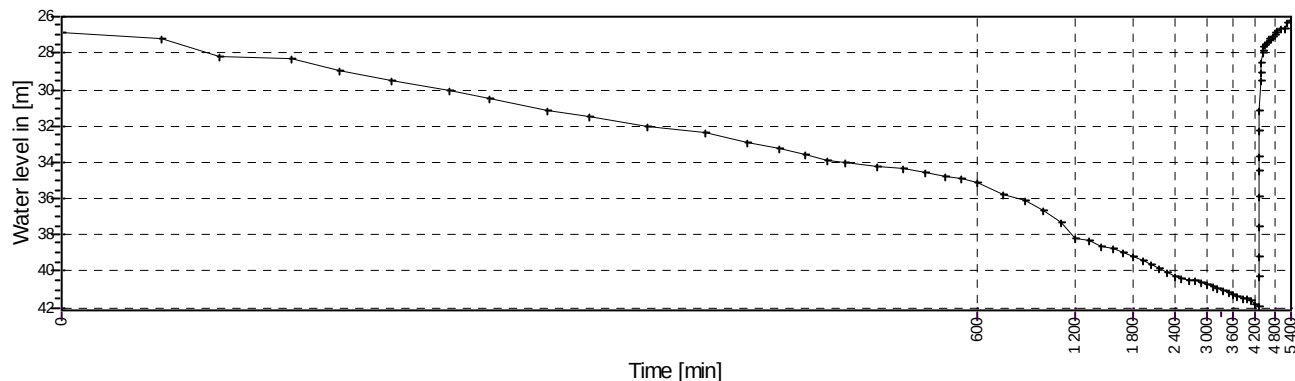
|               |           |                  |                |       |                 |          |
|---------------|-----------|------------------|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.173100 | Alt. No. 1:      | Diam. [mm]:    | 203   | Water lev. [m]: | 26.20    |
| Longitude [°] | 23.518600 | Alt. No. 2:      | Depth [m]:     | 74.80 | Piezometer:     | 0        |
| Altitude [m]: | 1494.17   | Rep. inst.: GOLD | Col. ht. [mm]: | 0.60  | Date WL meas.:  | 20130718 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 64.80               | 20130718      | 1200 | 20130718    | 1710 |                               |           |                 |
| GOLD       | Constant rate test | 64.80               | 20130718      | 1800 | 20130722    | 1200 | 68                            | 0.04      | 2.50            |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1200        | 60           | 64.80              | 5.55             | 3.38       |            |     |                 |                            |             |         | 1.64 |
| STEP TEST STEP 2 | 1300        | 60           | 64.80              | 10.24            | 13.97      |            |     |                 |                            |             |         | 0.73 |
| STEP TEST STEP 3 | 1400        | 60           | 64.80              | 15.54            | 24.37      |            |     |                 |                            |             |         | 0.64 |
| STEP TEST STEP 4 | 1500        | 30           | 64.80              | 20.10            | 38.60      |            | 100 | 100             |                            |             |         | 0.52 |
| PUMP INLET       | 1710        | 30           | 64.80              | 18.10            | 38.60      |            |     |                 |                            |             |         | 0.47 |
| CONSTANT         | 1800        | 4320         | 68.80              | 12.18            | 15.74      |            | 100 | 1080            | 68                         |             | 0.04    | 0.77 |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0030 Number: SD1-34 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

Region Type: Water supply authority

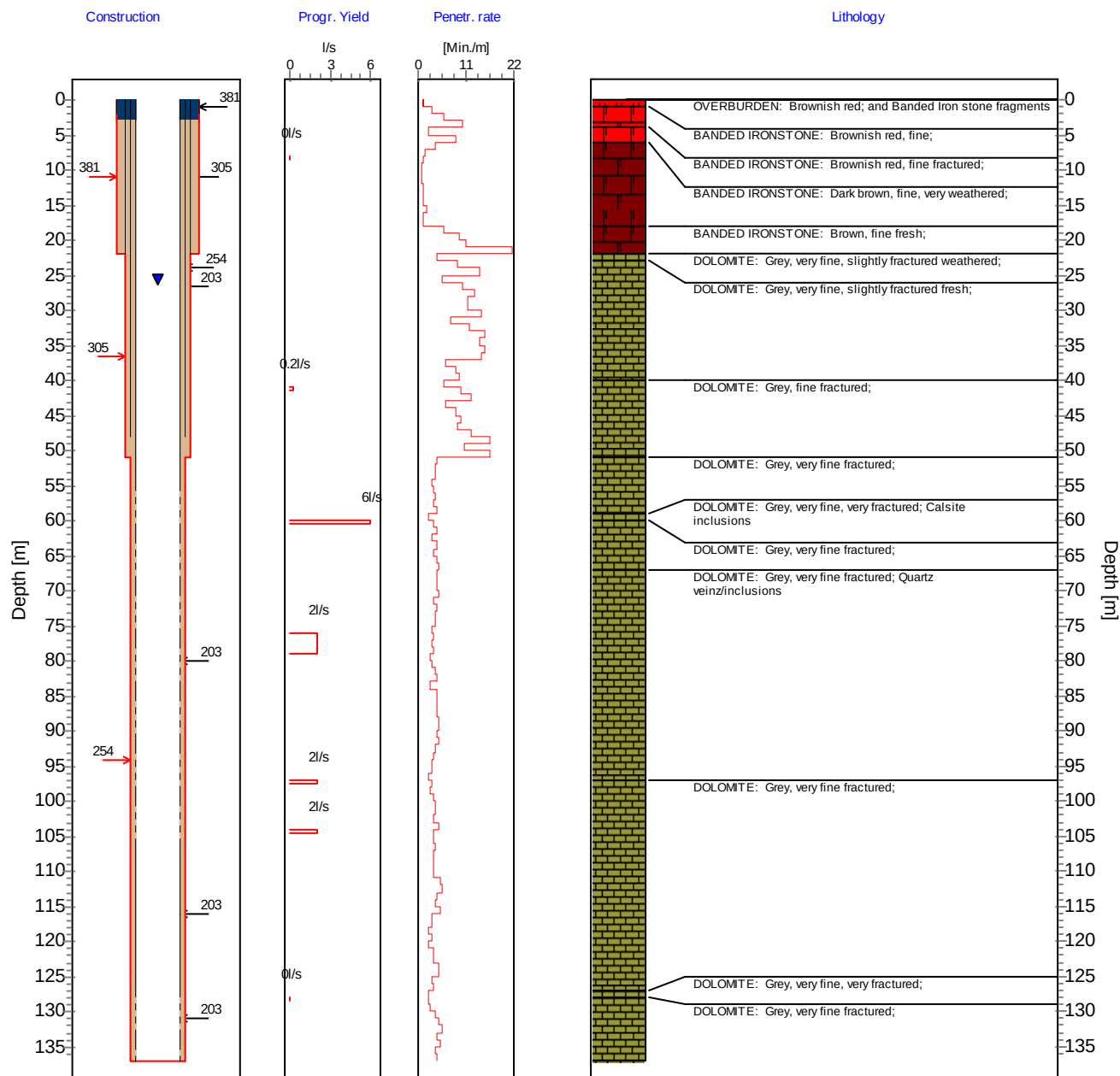
Region Descr.: KGATELOPELE LM

|                |                           |           |                                       |               |        |
|----------------|---------------------------|-----------|---------------------------------------|---------------|--------|
| Latitude [°]:  | 28.174470                 | Reg./BB.: | Topo-set.:                            | Depth [m]:    | 137.59 |
| Longitude [°]: | 23.531610                 | G-Nr.:    | Site status: Unused                   | Col. ht. [m]: | 0.44   |
| Altitude [m]:  | 1493.40                   |           | Site purp.: Production (water supply) | Diam. [mm]:   | 203    |
| Coord. acc.:   | Accurate to within 1 unit |           | Use applic.: Domestic - all purposes  | Drain. reg.:  | C92A   |
| Coord. meth.:  | Altimeter                 |           | Equipment: No equipment               | Rep. inst.:   | GOLD   |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend

|  |                                      |        |                                  |  |                |
|--|--------------------------------------|--------|----------------------------------|--|----------------|
|  | Hole                                 | 165 →  | Hole diameter [mm]               |  | Sanitary seal  |
|  | Casing (plain / perforated, slotted) | ← 152  | Casing diameter [mm]             |  | Gravel (> 2mm) |
|  | Screen / Mesh Screen                 | ▼      | Waterlevel measured: 22/06/13    |  |                |
|  | Piezometer                           | 0:50 → | Piezometer (Nr. & Diameter [mm]) |  |                |



COMMENT:



Golder Associates Africa, Pretoria  
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Project No.: 13615335



## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0030 Number: SD1-34 Site type: Borehole

Distr./Farm No.: Site Name/Descr.: DANIELSKUIL

|                |           |             |      |               |        |                 |          |
|----------------|-----------|-------------|------|---------------|--------|-----------------|----------|
| Latitude [°]:  | 28.174470 | Alt. No. 1: |      | Diam. [mm]:   | 203    | Water lev. [m]: | 26.40    |
| Longitude [°]: | 23.531610 | Alt. No. 2: |      | Depth [m]:    | 137.59 | WL status:      | Static   |
| Altitude [m]:  | 1493.40   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.44   | Date WL meas.:  | 20130713 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |  |
|----------------|--|---------------------|--|
| Pump:          |  | Pulley Diam. [mm]:  |  |
| Type of Inst.: |  | Depth to Intk. [m]: |  |
| Manufacturer:  |  |                     |  |
| Engine:        |  | Power Rating [kW]   |  |
| Manufacturer:  |  | Pulley Diam. [mm]:  |  |
| Type of Power: |  |                     |  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                  |        |                        |          |                        |        |           |        |
|------------------|--------|------------------------|----------|------------------------|--------|-----------|--------|
| Sample No.:      | SD1-34 | Date sampled:          | 20130714 | Depth sampl. [m]:      | 76.80  | Comment:  |        |
| Main Parameters: |        | Calculated Parameters: |          | Bacteriol. Parameters: |        |           |        |
| pH:              | 7.46   | Na:                    | 5        | Cl:                    | 5.34   | Langel.:  | -0.22  |
| EC: [mS/m]       | 35.2   | K:                     | 2.07     | NO3 as N:              | < 0.3  | Aggr-Ind: | 11.76  |
| TDS:             | 236    | Si:                    | 7.46     | SO4:                   | 49.2   | Ion-bal:  | 2.37   |
| T. Alk.:         | 140    | Al:                    | < 0.05   | F:                     | 1.05 † | CaCO3:    | 198.90 |
| Ca:              | 57.3   | Fe:                    | < 0.05   |                        |        | SPC:      |        |
| Mg:              | 13.6   | Mn:                    | 0.29 †   |                        |        |           |        |

Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit j Value exceeds minimum allowable limit

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 8.00             | 8.50              | 0.00       | Notch (V- or U-notch) |              | MOIST   |
| 41.00            | 41.50             | 0.20       | Notch (V- or U-notch) |              |         |
| 60.00            | 60.50             | 6.00       | Notch (V- or U-notch) |              |         |
| 76.00            | 79.00             | 2.00       | Notch (V- or U-notch) |              |         |
| 97.00            | 97.50             | 2.00       | Notch (V- or U-notch) |              |         |
| 104.00           | 104.50            | 2.00       | Notch (V- or U-notch) |              |         |
| 128.00           | 128.50            | 0.00       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]: Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|-----------------------------|------------|-------------|
| 0.00             | 2.00        | 381        | Steel    |              | Plain casing          |                             |            |             |
| 0.00             | 22.00       | 305        | Steel    |              | Plain casing          |                             |            |             |
| 0.00             | 48.00       | 254        | Steel    |              | Plain casing          |                             |            |             |
| 0.00             | 53.00       | 203        | Steel    |              | Plain casing          |                             |            |             |
| 53.00            | 107.00      | 203        | Steel    |              | Perforated or slotted |                             |            |             |
| 107.00           | 125.00      | 203        | Steel    |              | Plain casing          |                             |            |             |
| 125.00           | 137.00      | 203        | Steel    |              | Perforated or slotted |                             |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130713 | 60           | 76.80              | 6.24             | 2.19       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130713 | 60           | 76.80              | 12.42            | 8.45       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130713 | 60           | 76.80              | 16.22            | 26.30      |                |       |          |         |         |
| STEP TEST STEP 4 | 20130713 | 15           | 76.80              | 20.14            | 50.10      | 0.42           | 99    | 300      |         |         |
| PUMP INLET       | 20130713 | 25           | 76.80              | 18.14            | 50.40      |                |       |          |         |         |
| CONSTANT         | 20130713 | 4320         | 76.80              | 12.18            | 13.47      | 100            | 2160  | 71       | 0.04    |         |



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

| RECOMMENDATIONS:                                                                                                                                            |                |                       |                |                    |                      |               |                         |                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------|----------------|--------------------|----------------------|---------------|-------------------------|--------------------------|
| Prior.                                                                                                                                                      | Rec. equipm.   | Depth<br>to intk. [m] | Type of power  | Duty cyc.<br>[hrs] | Disch. rate<br>[l/s] | Water quality | Dyn. water<br>level [m] | Crit. water<br>level [m] |
| 1                                                                                                                                                           | Mono-type pump | 60.00                 | Electric motor | 12                 | 5.00                 | CLASS 2       | 35.00                   | 29.00                    |
| <b>Note:</b> 1. Production Borehole.<br>2. (F = 1.05 mg/l) Blend water before human consumption.<br>3. Install water level monitoring facility in borehole. |                |                       |                |                    |                      |               |                         |                          |

# PUMPING TEST REPORT

Date compiled: 10/10/2013

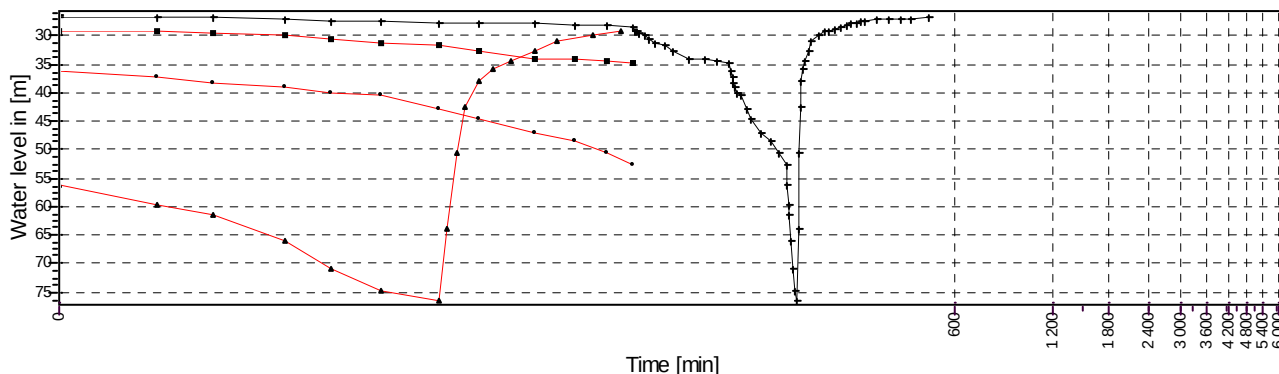
**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0030 Number: SD1-34 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

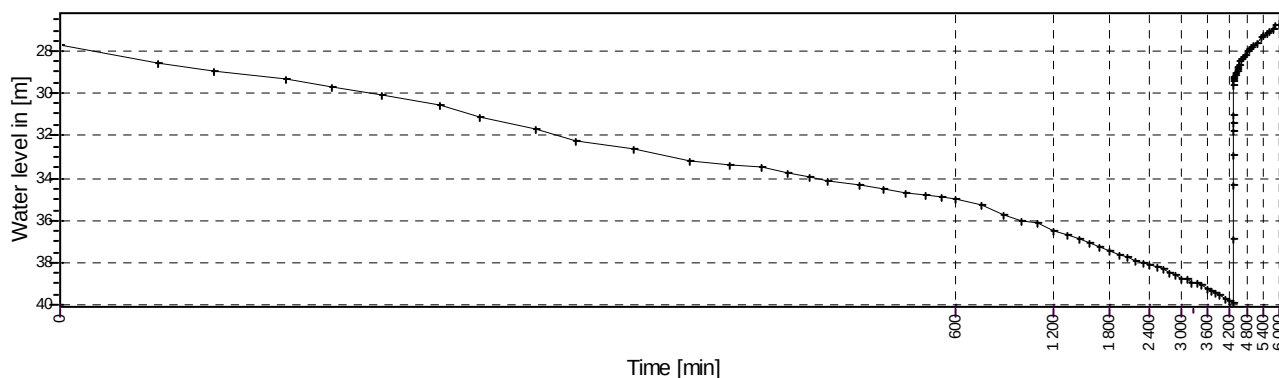
|               |           |                  |  |                |        |                 |          |
|---------------|-----------|------------------|--|----------------|--------|-----------------|----------|
| Latitude [°]  | 28.174470 | Alt. No. 1:      |  | Diam. [mm]:    | 203    | Water lev. [m]: | 26.40    |
| Longitude [°] | 23.531610 | Alt. No. 2:      |  | Depth [m]:     | 137.59 | Piezometer:     | 0        |
| Altitude [m]: | 1493.40   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.44   | Date WL meas.:  | 20130713 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m²/d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|------------------|-----------|-----------------|
| GOLD       | Step test          | 76.80               | 20130713      | 0700 | 20130713    | 1515 |                  |           |                 |
| GOLD       | Constant rate test | 76.80               | 20130713      | 1700 | 20130718    | 0500 | 71               | 0.04      | 2.50            |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m²/d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|---------------|-------------|---------|------|
| STEP TEST STEP 1 | 0700        | 60           | 76.80              | 6.24             | 2.19       |            |     |                 |               |             |         | 2.85 |
| STEP TEST STEP 2 | 0800        | 60           | 76.80              | 12.42            | 8.45       |            |     |                 |               |             |         | 1.47 |
| STEP TEST STEP 3 | 0900        | 60           | 76.80              | 16.22            | 26.30      |            |     |                 |               |             |         | 0.62 |
| STEP TEST STEP 4 | 1000        | 15           | 76.80              | 20.14            | 50.10      | 0.42       | 99  | 300             |               |             |         | 0.40 |
| PUMP INLET       | 1635        | 25           | 76.80              | 18.14            | 50.40      |            |     |                 |               |             |         | 0.36 |
| CONSTANT         | 1700        | 4320         | 76.80              | 12.18            | 13.47      |            | 100 | 2160            | 71            |             | 0.04    | 0.90 |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0032 Number: SD1-44 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.211340

Reg./BB.:

Topo-set.:

Depth [m]: 34.42

Longitude [°]: 23.599290

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.49

Altitude [m]: 1457.28

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

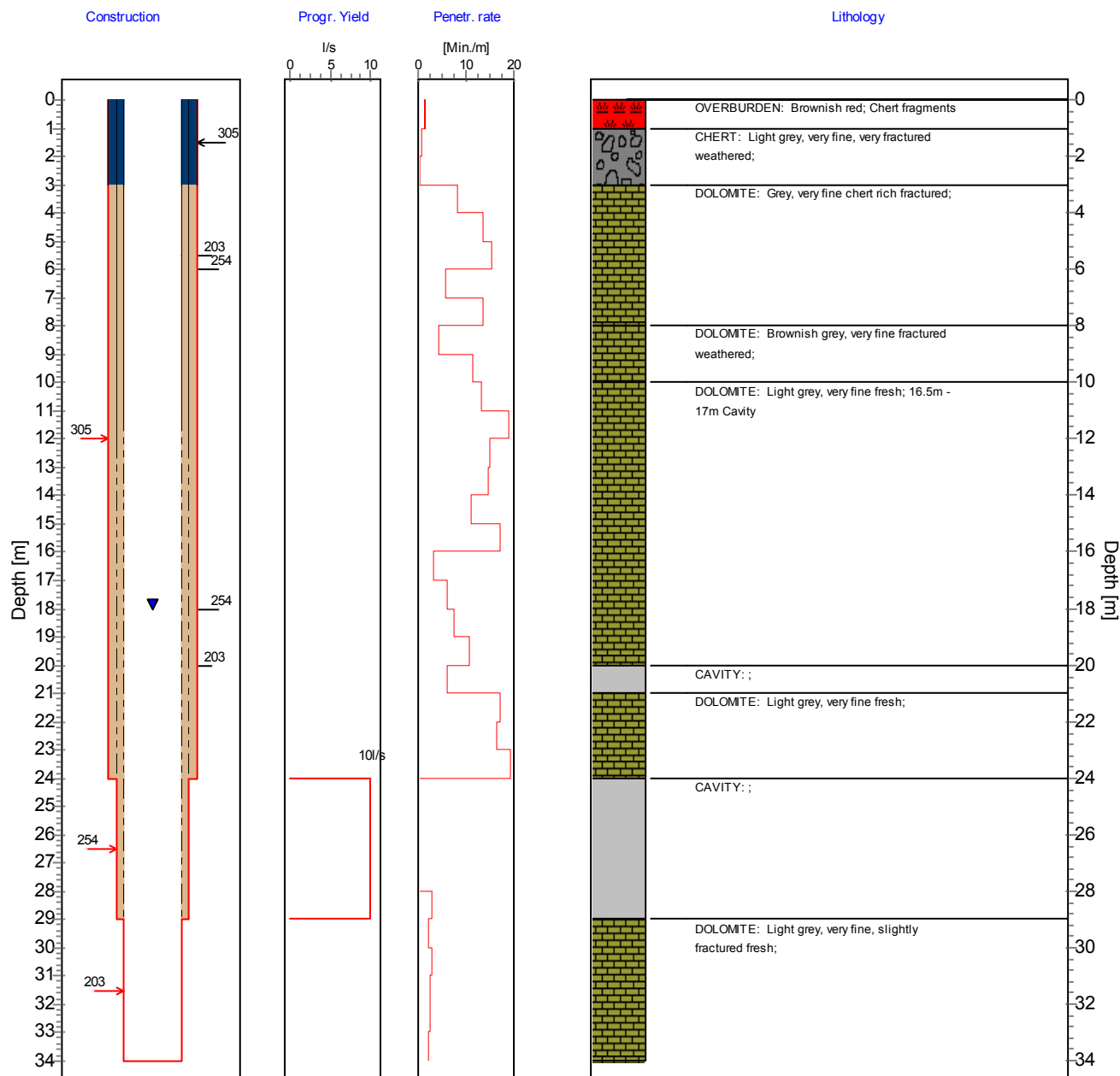
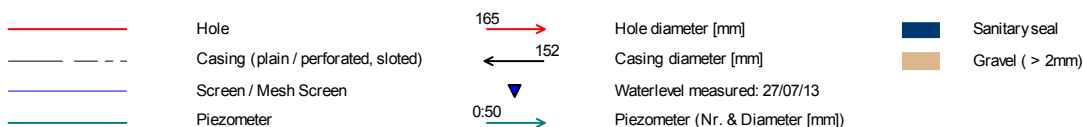
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:

Golder  
Associates

Golder Associates Africa, Pretoria  
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 Tel: 012 - 364 4000  
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 Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0032 Number: SD1-44 Site type: Borehole

Distr./Farm No.: Site Name/Descr.: DANIELSKUIL

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.211340 | Alt. No. 1: |      | Diam. [mm]:   | 203   | Water lev. [m]: | 18.54    |
| Longitude [°]: | 23.599290 | Alt. No. 2: |      | Depth [m]:    | 34.42 | WL status:      | Static   |
| Altitude [m]:  | 1457.28   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.49  | Date WL meas.:  | 20140117 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |  |
|----------------|--|---------------------|--|
| Pump:          |  | Pulley Diam. [mm]:  |  |
| Type of Inst.: |  | Depth to Intk. [m]: |  |
| Manufacturer:  |  |                     |  |
| Engine:        |  | Power Rating [kW]   |  |
| Manufacturer:  |  | Pulley Diam. [mm]:  |  |
| Type of Power: |  |                     |  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                      |       |                        |        |           |
|------------------|--------|---------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-44 | Date sampled: | 20130810 | Depth sampl. [m]:                                                                                                                                                                                                                                                                    | 28.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                               |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.73   | Na:           | 10.5     | Cl:                                                                                                                                                                                                                                                                                  | 28.4  | Langel.:               | 0.46   | E.Coli:   |
| EC: [mS/m]       | 73.9 † | K:            | 1.46     | NO3 as N:                                                                                                                                                                                                                                                                            | 1.99  | Aggr-Ind:              | 12.54  | Faec. co: |
| TDS:             | 500 †  | Si:           | 14.9     | SO4:                                                                                                                                                                                                                                                                                 | 23.9  | Ion-bal:               | -8.76  | Total Co: |
| T. Alk.:         | 395    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                                   | 0.185 | CaCO3:                 | 367.50 | SPC:      |
| Ca:              | 65.2   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit   ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit   ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 49.8   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                      |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 24.00            | 29.00             | 10.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 3.00        | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 12.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 12.00            | 24.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |
| 0.00             | 11.00       | 203        | Steel    |              | Plain casing          |                                |            |             |
| 11.00            | 29.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %  | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130807 | 60           | 28.80              | 8.52             | 0.06       |              |    |       |          |         |         |
| STEP TEST STEP 2 | 20130807 | 60           | 28.80              | 16.40            | 0.12       |              |    |       |          |         |         |
| STEP TEST STEP 3 | 20130807 | 60           | 28.80              | 24.30            | 0.18       |              |    |       |          |         |         |
| STEP TEST STEP 4 | 20130807 | 60           | 28.80              | 30.21            | 0.30       | 100          | 10 |       |          |         |         |
| CONSTANT         | 20130807 | 4320         | 28.80              | 30.16            | 1.14       | 100          | 20 | 748   |          |         |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 30.00              | Electric motor | 24              | 20.00             | CLASS 0       | 7.70                 | 23.00                 |

**Note:** 1. Production borehole.  
2. Install water level monitoring facility in borehole.



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 28/03/2014

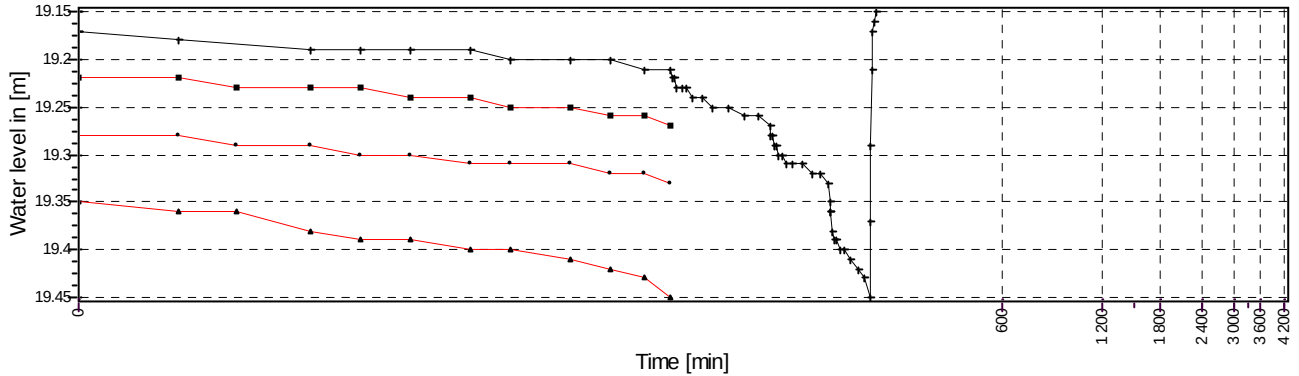
**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0032 Number: SD1-44 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

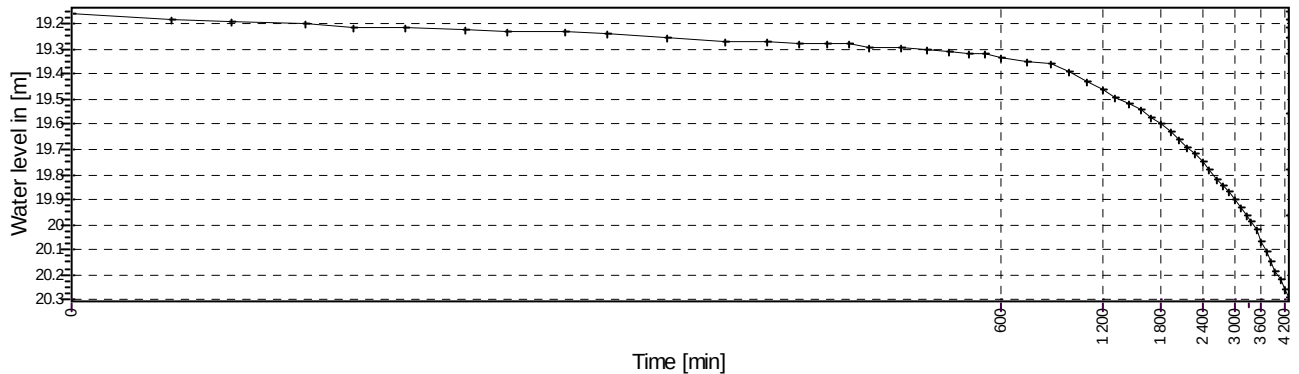
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.211340 | Alt. No. 1:      |  | Diam. [mm]:    | 203   | Water lev. [m]: | 18.54    |
| Longitude [°] | 23.599290 | Alt. No. 2:      |  | Depth [m]:     | 34.42 | Piezometer:     | 0        |
| Altitude [m]: | 1457.28   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.49  | Date WL meas.:  | 20140117 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



| PUMPING TEST: |                    | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|---------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| Rep. Inst.    | Meth. tested       |                     |               |      |             |      |                               |           |                 |
| GOLD          | Step test          | 28.80               | 20130807      | 1000 | 20130807    | 1410 |                               |           |                 |
| GOLD          | Constant rate test | 28.80               | 20130807      | 1500 | 20130810    | 1520 | 748                           |           | 20.00           |

| TESTING DETAILS: |             | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----------------|----------------------------|-------------|---------|-------|
| Description      | Time start. |              |                    |                  |            | %          |                 |                            |             |         |       |
| STEP TEST STEP 1 | 1000        | 60           | 28.80              | 8.52             | 0.06       |            |                 |                            |             |         | 142.0 |
| STEP TEST STEP 2 | 1100        | 60           | 28.80              | 16.40            | 0.12       |            |                 |                            |             |         | 136.6 |
| STEP TEST STEP 3 | 1200        | 60           | 28.80              | 24.30            | 0.18       |            |                 |                            |             |         | 135.0 |
| STEP TEST STEP 4 | 1300        | 60           | 28.80              | 30.21            | 0.30       | 100        | 10              |                            |             |         | 100.7 |
| CONSTANT         | 1500        | 4320         | 28.80              | 30.16            | 1.14       | 100        | 20              | 748                        |             |         | 26.46 |



Golder Associates Africa, Pretoria  
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Project No.: 11613568

# Borehole Construction and Geological Log

Date compiled: 03/03/2014

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0033 Number: SD1-45 Site type: Borehole

Distr./Farm No.: Site Name/Des.: DANIELSKUIL

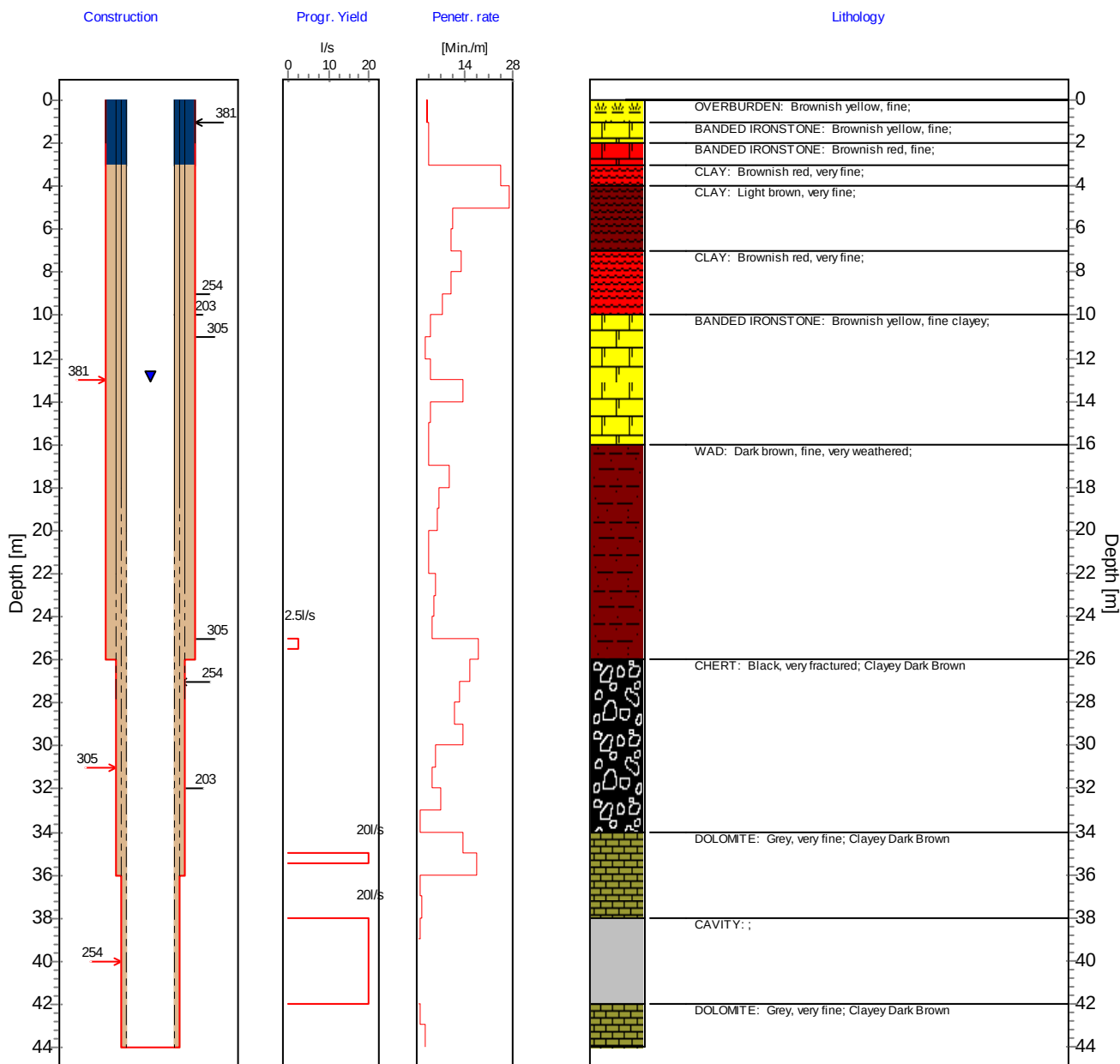
Region Type: Water supply authority Region Descr.: KGATELOPELE LM

|                                          |           |                                       |                    |
|------------------------------------------|-----------|---------------------------------------|--------------------|
| Latitude [°]: 28.192840                  | Reg./BB.: | Topo-set.:                            | Depth [m]: 44.90   |
| Longitude [°]: 23.552020                 | G-Nr.:    | Site status: Unused                   | Col. ht. [m]: 0.40 |
| Altitude [m]: 1453.90                    |           | Site purp.: Production (water supply) | Diam. [mm]: 203    |
| Coord. acc.: Accurate to within 10 units |           | Use applic.: Domestic - all purposes  | Drain. reg.: C92A  |
| Coord. meth.: Altimeter                  |           | Equipment: No equipment               | Rep. inst.: GOLD   |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend

|  |                                      |        |                                  |  |                |
|--|--------------------------------------|--------|----------------------------------|--|----------------|
|  | Hole                                 | 165 →  | Hole diameter [mm]               |  | Sanitary seal  |
|  | Casing (plain / perforated, slotted) | ← 152  | Casing diameter [mm]             |  | Gravel (> 2mm) |
|  | Screen / Mesh Screen                 | ▼      | Waterlevel measured: 03/07/12    |  |                |
|  | Piezometer                           | 0:50 → | Piezometer (Nr. & Diameter [mm]) |  |                |



COMMENT:



Golder Associates Africa, Pretoria  
P O Box 13776, Hatfield, 00285  
Tel: 012 - 364 4000  
Fax: 012 - 364 4001  
Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BAX0033 Number: SD1-45 Site type: Borehole

Distr./Farm No.: Site Name/Descr.: DANIELSKUIL

|                          |                  |                    |                         |
|--------------------------|------------------|--------------------|-------------------------|
| Latitude [°]: 28.192840  | Alt. No. 1:      | Diam. [mm]: 203    | Water lev. [m]: 12.86   |
| Longitude [°]: 23.552020 | Alt. No. 2:      | Depth [m]: 44.90   | WL status: Static       |
| Altitude [m]: 1453.90    | Rep. inst.: GOLD | Col. ht. [m]: 0.40 | Date WL meas.: 20140118 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| Pump:          |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| Engine:        |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                    |                        |                                                                                                                                                                                                                                                                                  |                                               |
|--------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Sample No.: SD1-45 | Date sampled: 20140216 | Depth sampl. [m]: 40.80                                                                                                                                                                                                                                                          | Comment:                                      |
| Main Parameters:   |                        |                                                                                                                                                                                                                                                                                  | Calculated Parameters: Bacteriol. Parameters: |
| pH: 7.93           | Na: 9.34               | Cl: 16.6                                                                                                                                                                                                                                                                         | Langel.: 0.43 E.Coli:                         |
| EC: [mS/m] 44.6    | K: 3.28                | NO3 as N: 3.27                                                                                                                                                                                                                                                                   | Aggr-Ind: 12.45 Faec. co:                     |
| TDS: 282           | Si: 10.2               | SO4: 23.7                                                                                                                                                                                                                                                                        | Ion-bal: 3.19 Total Co:                       |
| T. Alk.: 201       | Al: < 0.05             | F: 0.153                                                                                                                                                                                                                                                                         | CaCO3: 253.85 SPC:                            |
| Ca: 66.3           | Fe: 0.14 †             | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |                                               |
| Mg: 21.5           | Mn: < 0.05             |                                                                                                                                                                                                                                                                                  |                                               |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 25.00            | 25.50             | 2.50       | Notch (V- or U-notch) |              |         |
| 35.00            | 35.50             | 20.00      | Notch (V- or U-notch) |              |         |
| 38.00            | 42.00             | 20.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]: Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|-----------------------------|------------|-------------|
| 0.00             | 2.00        | 381        | Steel    |              | Plain casing          |                             |            |             |
| 0.00             | 22.00       | 305        | Steel    |              | Plain casing          |                             |            |             |
| 22.00            | 28.00       | 305        | Steel    |              | Perforated or slotted |                             |            |             |
| 0.00             | 18.00       | 254        | Steel    |              | Plain casing          |                             |            |             |
| 18.00            | 36.00       | 254        | Steel    |              | Perforated or slotted |                             |            |             |
| 0.00             | 20.00       | 203        | Steel    |              | Plain casing          |                             |            |             |
| 20.00            | 44.00       | 203        | Steel    |              | Perforated or slotted |                             |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130811 | 60           | 40.80              | 8.09             | 0.30       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130811 | 60           | 40.80              | 16.01            | 0.69       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130811 | 60           | 40.80              | 24.04            | 1.32       |                |       |          |         |         |
| STEP TEST STEP 4 | 20130811 | 60           | 40.80              | 30.01            | 1.66       | 100            | 15    |          |         |         |
| CONSTANT (1)     | 20130812 | 2880         | 40.80              | 30.04            | 2.05       | 100            | 540   | 1948     | 0.03    |         |
| CONSTANT (2)     | 20140117 | 120          | 40.80              | 30.05            | 1.49       | 100            | 3     |          |         |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 33.00              | Electric motor | 12              | 5.00              | CLASS 1       | 4.50                 | 34.00                 |



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Project No.: 11613568



## MANAGEMENT RECOMMENDATIONS

**Note:** 1. Production borehole.  
2. (Fe 0.14 mg/l) Blend water before human consumption.  
3. Install water level monitoring facility in borehole.

# PUMPING TEST REPORT

Date compiled: 25/03/2014

## BASIC SITE INFORMATION:

Site Identifier: 2823BAX0033 Number: SD1-45

Site type: Borehole

Distr./Farm No.:

Site Name/Des.: DANIELSKUIL

Latitude [°] 28.192840  
Longitude [°] 23.552020  
Altitude [m]: 1453.90

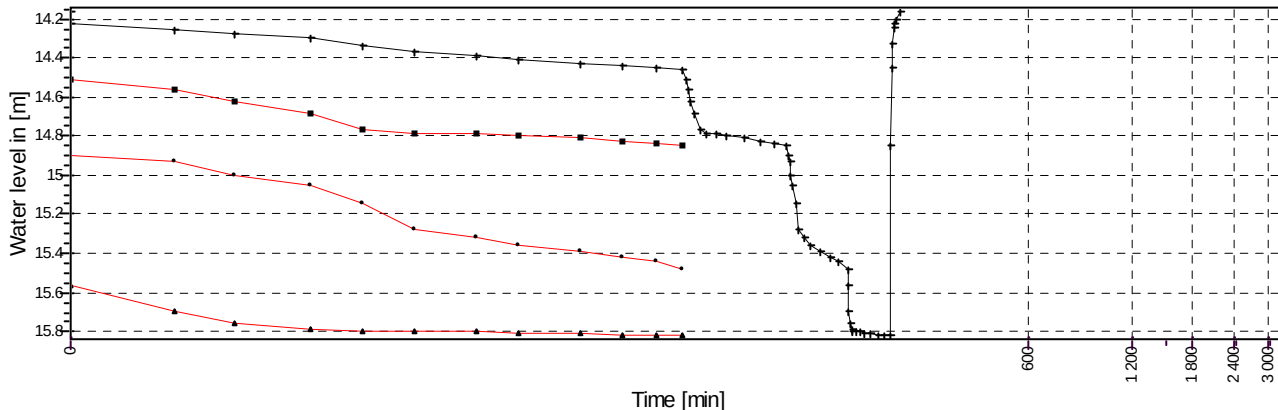
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 203  
Depth [m]: 44.90  
Col. ht. [mm]: 0.40

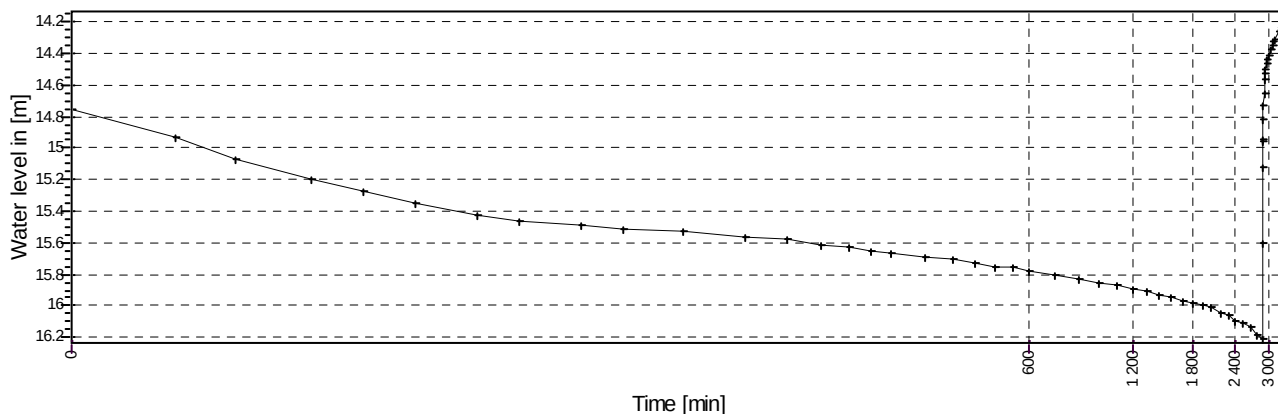
Water lev. [m]: 12.86  
Piezometer: 0  
Date WL meas.: 20140118

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 40.80               | 20130811      | 1120 | 20130811    | 1535 |                               |           |                 |
| GOLD       | Constant rate test | 40.80               | 20130812      | 0800 | 20130814    | 1700 | 1948                          | 0.03      | 10.00           |

### TESTING DETAILS:

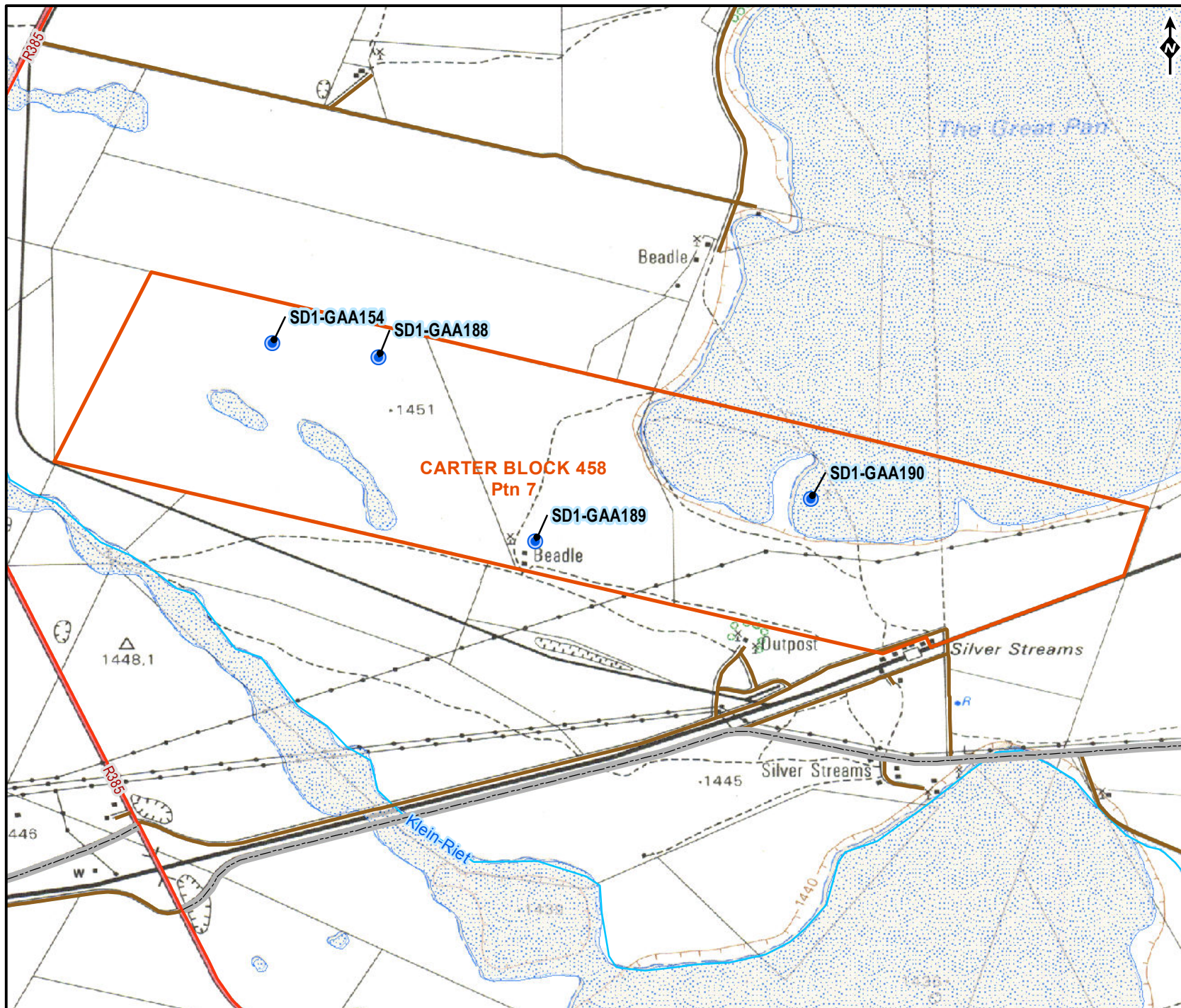
| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate [l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|-------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 1120        | 60           | 40.80              | 8.09              | 0.30       |            |     |                 |                            |             |         | 26.97 |
| STEP TEST STEP 2 | 1220        | 60           | 40.80              | 16.01             | 0.69       |            |     |                 |                            |             |         | 23.20 |
| STEP TEST STEP 3 | 1320        | 60           | 40.80              | 24.04             | 1.32       |            |     |                 |                            |             |         | 18.21 |
| STEP TEST STEP 4 | 1420        | 60           | 40.80              | 30.01             | 1.66       | 100        | 15  |                 |                            |             |         | 18.08 |
| CONSTANT (1)     | 0800        | 2880         | 40.80              | 30.04             | 2.05       | 100        | 540 | 1948            |                            |             | 0.03    | 14.65 |



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Project No.: 11613568

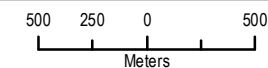


## **2.9 Dries Scheepers**



#### LEGEND

- Existing borehole survey
- Carter Block 458 Ptn 7
- Main road
- Secondary road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**CARTER BLOCK 458 PTN 7  
ELIM - BEADLE  
DRIES SCHEEPERS**

|                      |    |            |
|----------------------|----|------------|
| PROJECT No. 11613568 |    | REV 0      |
| SCALE 1:35 000       |    | A4         |
| GIS                  | MB | 01/04/2014 |
| CHECK                | DB | 01/04/2014 |
| REVIEW               | FW | 01/04/2014 |

## DRIES SCHEEPERS - BASIC SITE INFORMATION

| SITE LOCATION    |            |          |                            |            |              |               |              |              |            | GEOHYDROLOGY |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------|------------|----------|----------------------------|------------|--------------|---------------|--------------|--------------|------------|--------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier: | Number:    | District | Site name/Description      | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]    | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0139      | SD1-GAA154 | RE458/7  | CARTER BLOCK PTN. ELIM     | B          | 28.32757967  | 23.542300001  | 1446.80      | 0.20         | 165        | 40.00        | 19.90        | 6.67       |                |                       | 0              | 0               |                   |
| 2823BCX0140      | SD1-GAA188 | RE458/7  | CARTER BLOCK PTN. ELIM     | B          | 28.32841967  | 23.548570001  | 1449.80      | 0.10         | 165        | 40.00        | 21.90        |            |                |                       |                |                 |                   |
| 2823BCX0141      | SD1-GAA189 | RE458/7  | CARTER BLOCK PTN. BEADLE   | B          | 28.33922967  | 23.557760001  | 1447.40      | 0.20         | 165        | 30.00        | 20.05        | 0.42       |                |                       |                |                 |                   |
| 2823BCX0142      | SD1-GAA190 | RE458/7  | CARTER BLOCK PTN. ELIM     | B          | 28.33672967  | 23.573970001  | 1435.50      | 0.71         |            |              | 1.66         | 8.33       |                |                       | 0              | 0               |                   |
| SUMMARY:         |            |          | Site Type:<br>B = Borehole |            |              |               |              |              | Maximum:   |              | 40.00        | 21.90      | 8.33           |                       |                |                 |                   |
|                  |            |          |                            |            |              |               |              |              | Minimum:   |              | 30.00        | 1.66       | 0.42           |                       |                |                 |                   |
| Nr. of sites:    |            |          | 4                          |            |              |               |              |              | Sum:       |              |              |            | 15.41          |                       |                |                 |                   |
|                  |            |          |                            |            |              |               |              |              | Average:   |              | 36.67        | 15.88      | 5.14           |                       |                |                 |                   |

Site Type:  
B = Borehole

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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Project No.: 11613568

## DRIES SCHEEPERS - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BCX0139    **Number:** SD1-GAA154    **Site Name:** CARTER BLOCK PTN. ELIM

| Samp. Nr./Type | Date/Time samp. | pH   | EC   | TDS | Ca | Mg   | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|------|-----|----|------|------|------|------|---------|------|------|----------|-------|
| SD1-GA154      | 20120216 0800   | 7.83 | 47.7 | 320 | 62 | 31.4 | 5.05 | 1.35 | 16.6 | 276     | 7.88 | 6.71 | 1.13     | 0.163 |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source



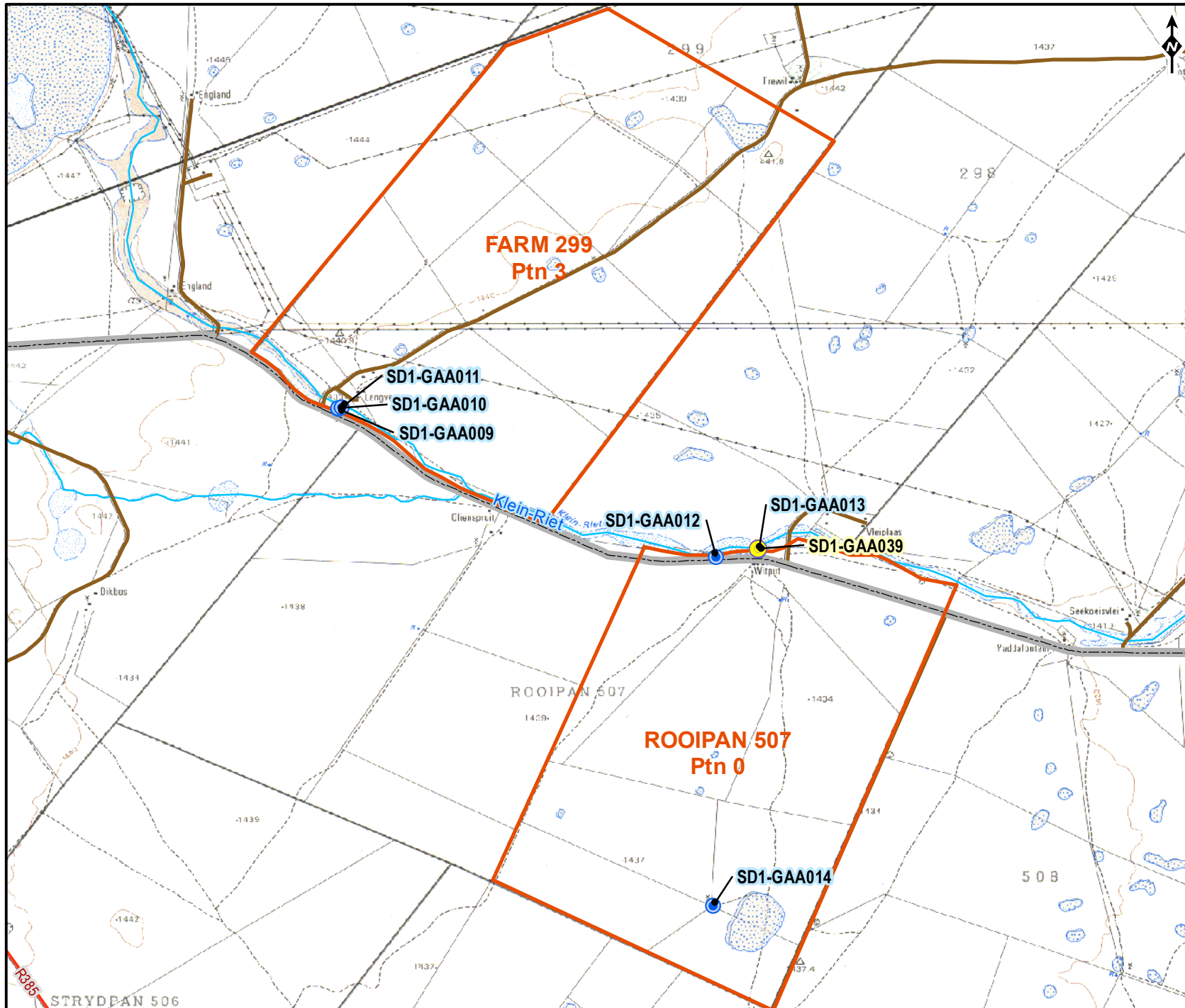
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Tel: 012 - 364 4000  
Fax: 012 - 364 4001  
Project No.: 11613568



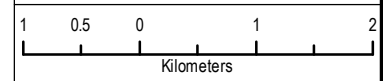
## **2.10 G. du Plessis**



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- LEGEND**
- Existing borehole survey
  - Well point
  - Farm 299 Ptn 3
  - Rooipan 507 Ptn 0
  - Main road
  - Secondary road
  - Other road
  - Rivers
  - Dam
  - Pan
  - Marsh vlei



**RESOURCES/NOTES**  
Coordinate System: GCS WGS 1984  
Datum: WGS 1984

**PROJECT**  
GW ASSESSMENT VGG SCHEME

**TITLE**  
**FARM 299 PTN 3**  
**ROOIPAN PTN 0**  
**G DU PLESSIS**

|                      |    |            |
|----------------------|----|------------|
| PROJECT No. 11613568 |    | REV 0      |
| SCALE 1:65 000       |    | A4         |
| GIS                  | MB | 23/04/2014 |
| CHECK                | DB | 23/04/2014 |
| REVIEW               | FW | 23/04/2014 |





## G DU PLESSIS - BASIC SITE INFORMATION

| SITE LOCATION          |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:       | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0009            | SD1-GAA009 | 299/3    | LANGVERWAGHT          | B          | 28.35766967  | 23.637970001  | 1434.90      | 0.72         | 165        |                 | 5.22         |            |                |                       |                |                 |                   |
| 2823BCX0010            | SD1-GAA010 | 299/3    | LANGVERWAGHT          | B          | 28.35759967  | 23.637960001  | 1434.70      | 0.27         | 165        |                 | 4.99         |            |                |                       |                |                 |                   |
| 2823BCX0011            | SD1-GAA011 | 299/3    | LANGVERWAGHT          | B          | 28.35741967  | 23.638330001  | 1433.90      | 0.43         | 165        |                 | 4.54         |            |                |                       |                |                 |                   |
| 2823BCX0012            | SD1-GAA012 | 507/1    | ROOIPAN PTN. WITPUT   | B          | 28.37374967  | 23.679060001  | 1430.50      | 0.43         | 165        |                 | 2.20         |            |                |                       |                |                 |                   |
| 2823BCX0013            | SD1-GAA013 | 507/1    | ROOIPAN PTN. WITPUT   | B          | 28.37311967  | 23.683780001  | 1427.30      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0014            | SD1-GAA014 | 507/1    | ROOIPAN PTN. WITPUT   | B          | 28.41176967  | 23.678770001  | 1435.00      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0038            | SD1-GAA039 | RE507/0  | ROOIPAN PTN. WITPUT   | W          | 28.37286967  | 23.683650001  | 1426.00      |              |            |                 |              |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>        |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> |              |            |                | 5.22                  |                |                 |                   |
| <b>Nr. of sites:</b> 7 |            |          |                       |            |              |               |              |              |            | <b>Minimum:</b> |              |            |                | 2.20                  |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Average:</b> |              |            |                | 4.24                  |                |                 |                   |

Site Type:  
B = Borehole  
W = Well point

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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Project No.: 11613568

## G DU PLESSIS - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BCX0009    **Number:** SD1-GAA009    **Site Name:** LANGVERWAGHT

| Samp. Nr./Type | Date/Time samp. | pH   | EC    | TDS   | Ca  | Mg   | Na   | K    | Si   | T. Alk. | Cl  | SO4  | NO3 as N | F     |
|----------------|-----------------|------|-------|-------|-----|------|------|------|------|---------|-----|------|----------|-------|
| SD1-GA009      | 20120216 0800   | 8.03 | 100 † | 710 † | 116 | 54.8 | 38.1 | 4.84 | 18.1 | 327     | 111 | 89.6 | 3.9      | 0.233 |

**Site Identifier:** 2823BCX0012    **Number:** SD1-GAA012    **Site Name:** ROOIPAN PTN. WITPUT

| Samp. Nr./Type | Date/Time samp. | pH   | EC     | TDS   | Ca   | Mg | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|--------|-------|------|----|------|------|------|---------|------|------|----------|-------|
| SD1-GA012      | 20120216 0800   | 7.59 | 74.2 † | 506 † | 82.5 | 41 | 28.5 | 4.85 | 17.8 | 317     | 27.1 | 20.7 | 3.03     | 0.111 |

Chemistry Standard: SABS for human consumption  
 † Value exceeds recommended maximum limit  
 ‡ Value exceeds maximum allowable limit  
 ! Value exceeds recommended minimum limit  
 j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
 EC [mS/m]  
 Nitrate as N

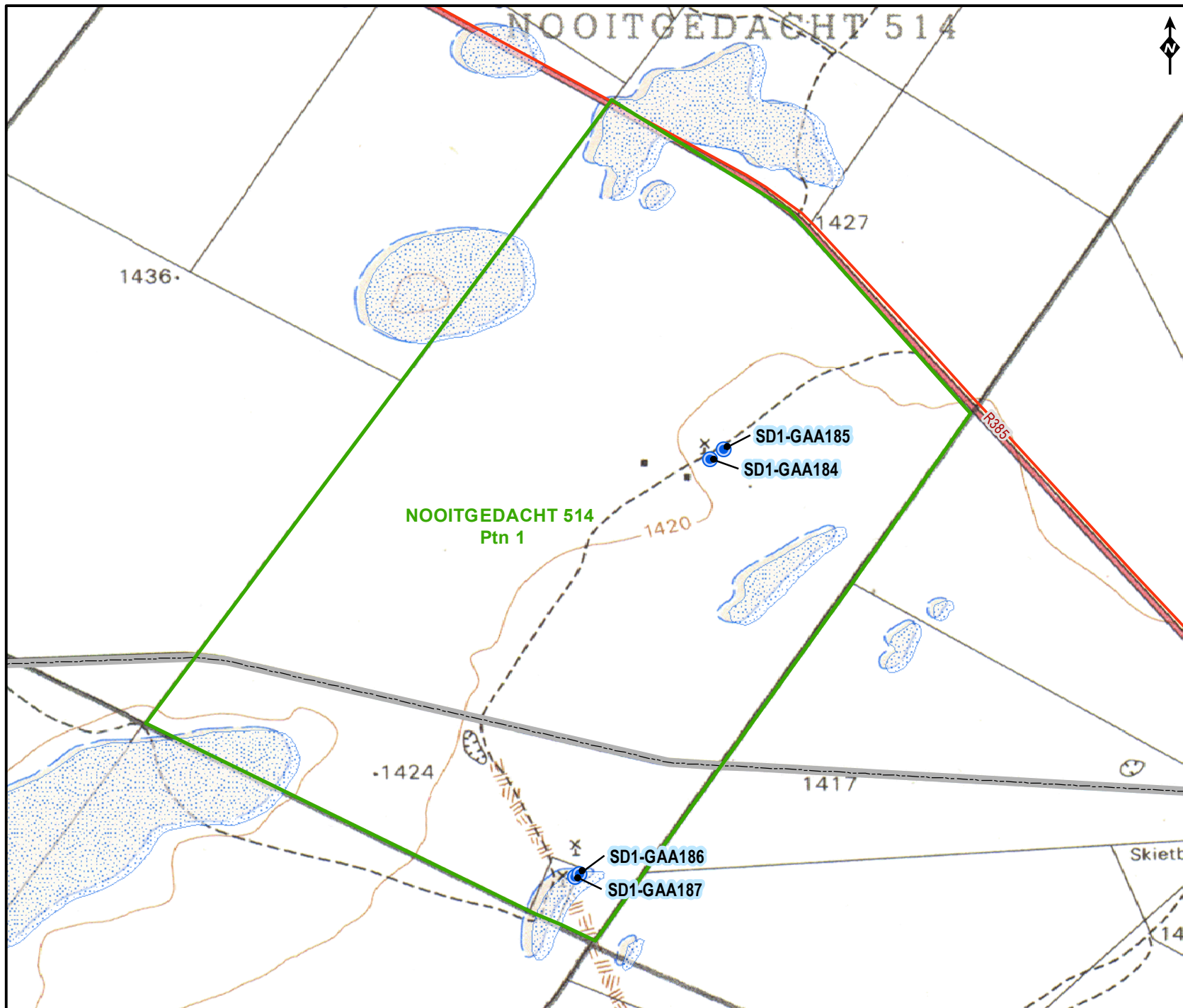
Sample Type Code Explanation:  
 D: Drinking water  
 E: Effluent  
 K: Sewage  
 O: Organic  
 P: Pressed or pellet  
 R: Rock  
 S: Soil  
 X: Other source



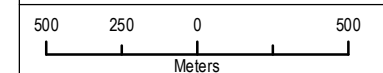
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 Tel: 012 - 364 4000  
 Fax: 012 - 364 4001  
 Project No.: 11613568



## **2.11 G. Faber**



- LEGEND**
- Existing borehole survey
  - Nooitgedacht 514 Ptn
  - Main road
  - Secondary road
  - Rivers
  - Dam
  - Pan
  - Marsh vlei



**RESOURCES/NOTES**  
Coordinate System: GCS WGS 1984  
Datum: WGS 1984

**PROJECT**  
GW ASSESSMENT VGG SCHEME

**TITLE**  
**NOOITGEDACHT 514 PTN 1**  
**GERT FABER**

|                      |    |            |
|----------------------|----|------------|
| PROJECT No. 11613568 |    | REV 0      |
| SCALE 1:25 000       |    | A4         |
| GIS                  | MB | 01/04/2014 |
| CHECK                | DB | 01/04/2014 |
| REVIEW               | FW | 01/04/2014 |



## GERT FABER - BASIC SITE INFORMATION

| SITE LOCATION    |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier: | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BC00083      | SD1-GAA185 | 514/1    | NOOITGEDAGHT          | B          | 28.46382967  | 23.646790001  | 1419.70      |              | 165        | 42.00           |              |            |                |                       | 0              | 0               |                   |
| 2823BC00084      | SD1-GAA184 | 514/1    | NOOITGEDAGHT          | B          | 28.46423967  | 23.646220001  | 1419.00      |              | 165        | 21.00           | 9.10         |            |                |                       |                |                 |                   |
| 2823BC00086      | SD1-GAA187 | 514/1    | NOOITGEDAGHT          | B          | 28.48176967  | 23.640530001  | 1418.20      |              | 165        |                 | 5.32         |            |                |                       |                |                 |                   |
| 2823BC00087      | SD1-GAA186 | 514/3    | NOOITGEDAGHT          | B          | 28.48164967  | 23.640720001  | 1418.10      |              | 165        | 14.00           | 2.57         |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>  |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> | 42.00        | 9.10       |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Minimum:</b> | 14.00        | 2.57       |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Average:</b> | 25.67        | 5.66       |                |                       |                |                 |                   |

### SUMMARY:

Site Type:  
B = Borehole

Nr. of sites: 4

**Maximum:** 42.00 9.10  
**Minimum:** 14.00 2.57  
**Sum:**  
**Average:** 25.67 5.66

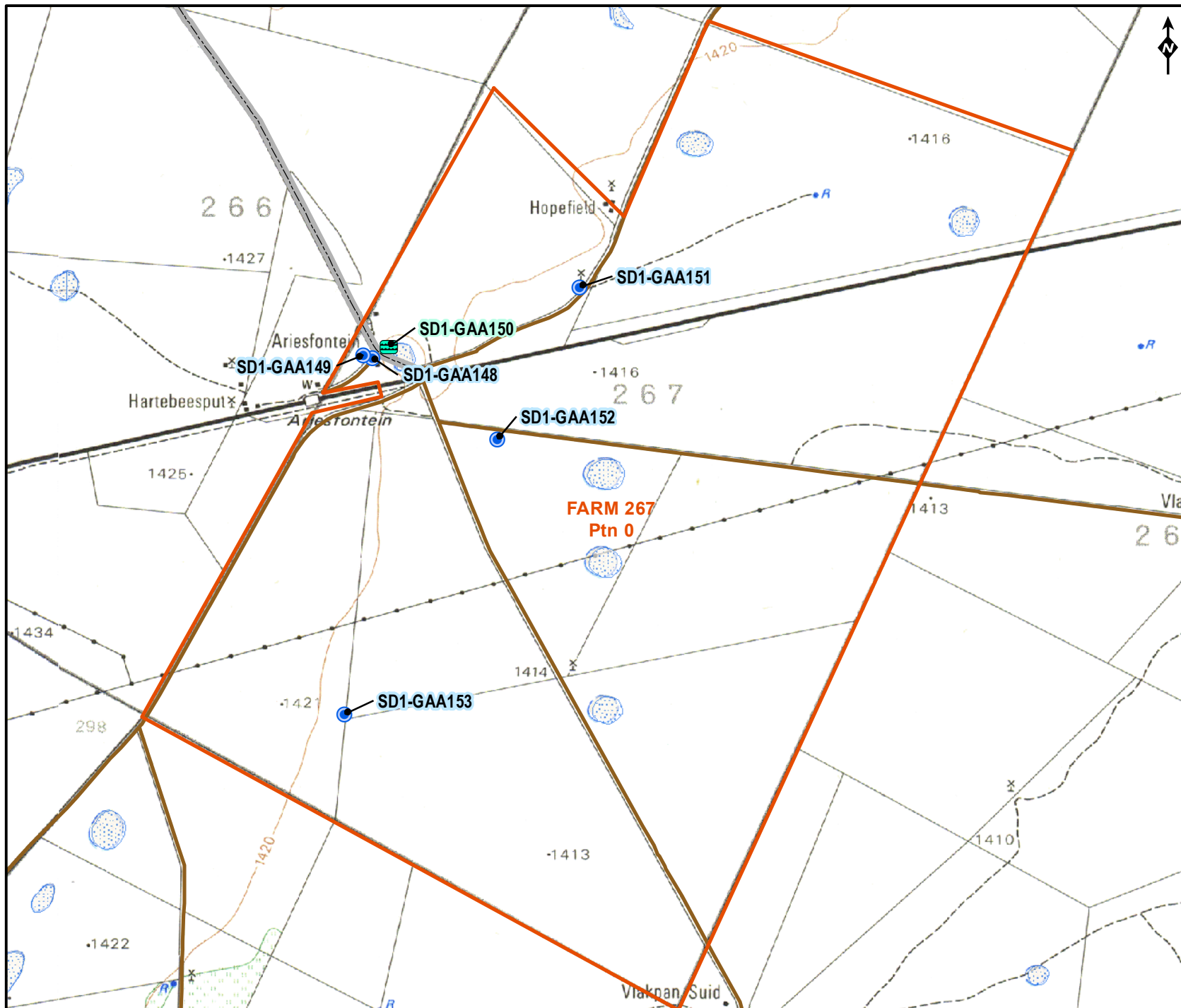
NOTE:  
 "Yield" represents cumulative blow yield  
 The recommended abstraction ("Rec. abs.")  
 is based on a 24 hour duty cycle  
 (based on test pumping result)



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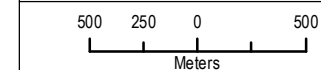


## 2.12 Gerrie Cloete



#### LEGEND

- Existing borehole survey
- Fountain
- Farm 267 Ptn 0
- Secondary road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**FARM 267 PTN 0**  
**GERRIE CLOETE**

|                      |    |            |
|----------------------|----|------------|
| PROJECT No. 11613568 |    | REV 0      |
| SCALE 1:35 000       |    | A4         |
| GIS                  | MB | 01/04/2014 |
| CHECK                | DB | 01/04/2014 |
| REVIEW               | FW | 01/04/2014 |

## GERRIE CLOETE - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BDX0014    **Number:** SD1-GAA148    **Site Name:** ARRIESFONTEIN

| Samp. Nr./Type | Date/Time samp. | pH   | EC     | TDS   | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|--------|-------|------|------|------|------|------|---------|------|------|----------|-------|
| SD1-GA148      | 20120216 0800   | 7.69 | 75.2 † | 514 † | 86.6 | 60.9 | 17.1 | 2.36 | 16.5 | 369     | 43.3 | 26.6 | 1.84     | 0.195 |

**Site Identifier:** 2823BDX0016    **Number:** SD1-GAA150    **Site Name:** ARRIESFONTEIN FOUNTAIN

| Samp. Nr./Type | Date/Time samp. | pH   | EC     | TDS   | Ca   | Mg     | Na | K   | Si   | T. Alk. | Cl | SO4  | NO3 as N | F     |
|----------------|-----------------|------|--------|-------|------|--------|----|-----|------|---------|----|------|----------|-------|
| SD1-GA150      | 20120216 0800   | 7.97 | 89.5 † | 664 † | 76.6 | 83.2 † | 23 | 4.9 | 27.1 | 471     | 51 | 25.6 | < 0.3    | 0.277 |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source



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Project No.: 11613568



## GERRIE CLOETE - BASIC SITE INFORMATION

| SITE LOCATION          |            |          |                        |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------------|------------|----------|------------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:       | Number:    | District | Site name/Description  | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BDX0014            | SD1-GAA148 | RE267/0  | ARRIESFONTEIN          | B          | 28.28018967  | 23.768010001  | 1427.40      | 0.14         | 165        | 40.00           | 3.42         |            |                |                       | 0              | 0               |                   |
| 2823BDX0015            | SD1-GAA149 | RE267/0  | ARRIESFONTEIN          | B          | 28.28006967  | 23.767470001  | 1427.80      | 0.19         | 165        | 9.14            | 3.74         |            |                |                       |                |                 |                   |
| 2823BDX0016            | SD1-GAA150 | RE267/0  | ARRIESFONTEIN FOUNTAIN | F          | 28.27956967  | 23.768960001  | 1423.20      |              |            |                 |              |            |                |                       |                |                 |                   |
| 2823BDX0017            | SD1-GAA151 | RE267/0  | ARRIESFONTEIN          | B          | 28.27603967  | 23.780200001  | 1422.74      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BDX0018            | SD1-GAA152 | RE267/0  | ARRIESFONTEIN          | B          | 28.28499967  | 23.775380001  | 1422.99      | 0.15         | 165        |                 | 2.31         |            |                |                       |                |                 |                   |
| 2823BDX0019            | SD1-GAA153 | RE267/0  | ARRIESFONTEIN          | B          | 28.30120967  | 23.766360001  | 1424.72      | 0.25         | 165        |                 | 30.50        |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>        |            |          |                        |            |              |               |              |              |            | <b>Maximum:</b> | 40.00        | 30.50      |                |                       |                |                 |                   |
|                        |            |          |                        |            |              |               |              |              |            | <b>Minimum:</b> | 9.14         | 2.31       |                |                       |                |                 |                   |
|                        |            |          |                        |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
| <b>Nr. of sites:</b> 6 |            |          |                        |            |              |               |              |              |            | <b>Average:</b> | 24.57        | 9.99       |                |                       |                |                 |                   |

Site Type:  
B = Borehole  
F = Fountain / Spring

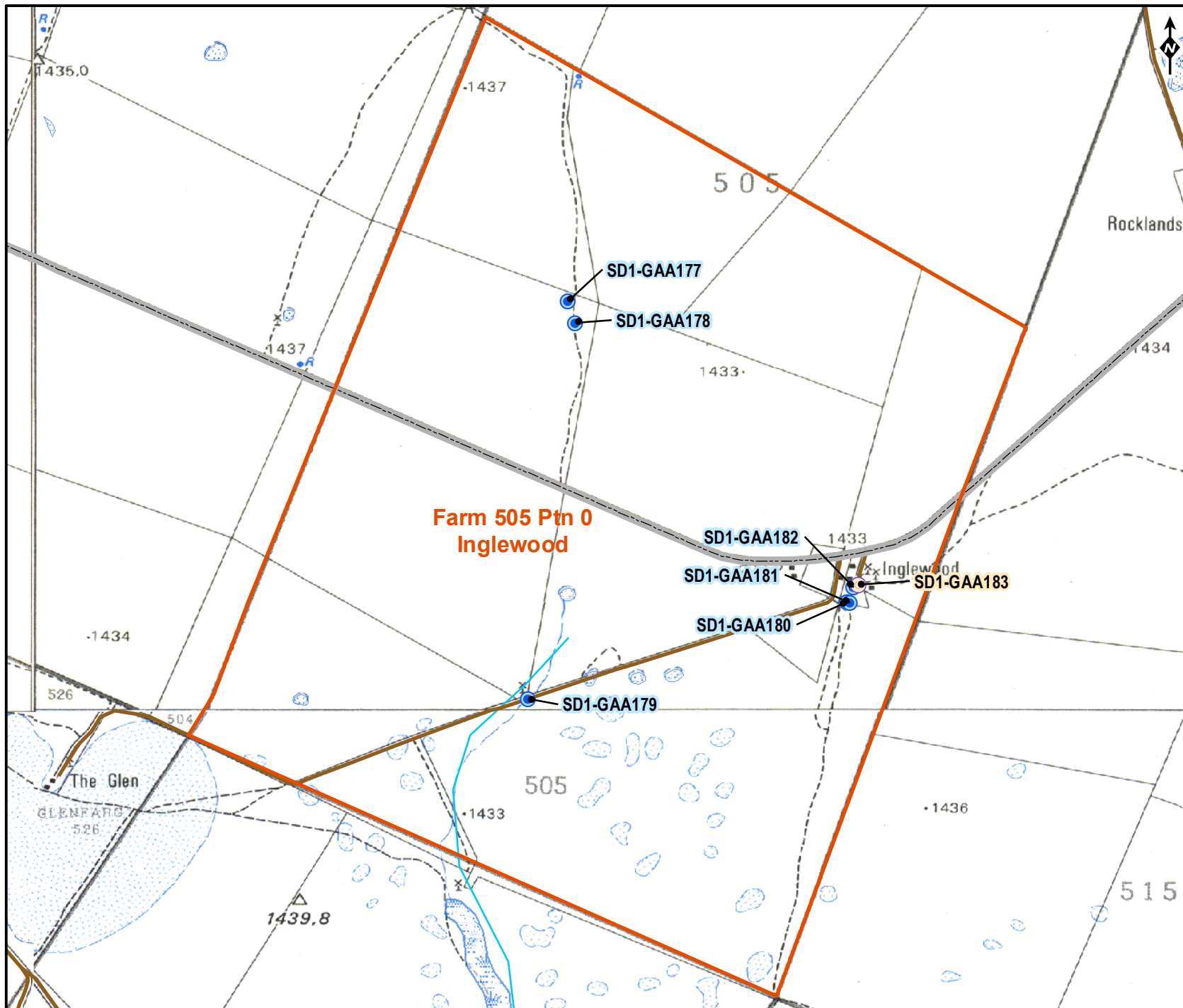
NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



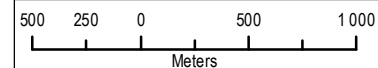
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Fax: 012 - 364 4001  
Project No.: 11613568



## **2.13 Hannes Cornelissen**



- LEGEND**
- Existing borehole survey
  - Dug well
  - Farm 505 - Inglewood
  - Secondary road
  - Other road
  - Rivers
  - Dam
  - Pan
  - Marsh vlei



**RESOURCES/NOTES**  
Coordinate System: GCS WGS 1984  
Datum: WGS 1984

**PROJECT**  
GW ASSESSMENT VGG SCHEME

**TITLE**  
**FARM 505 - INGLEWOOD**  
**HANNES CORNELISSEN**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:35 000       | A4         |
| GIS MB               | 16/04/2014 |
| CHECK DB             | 16/04/2014 |
| REVIEW FW            | 16/04/2014 |



## HANNES CORNELISSEN - BASIC SITE INFORMATION

| SITE LOCATION    |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier: | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0132      | SD1-GAA177 | RE505/0  | INGLEWOOD             | B          | 28.47628967  | 23.530900001  | 1435.50      | 0.15         | 165        | 30.00           | 17.10        |            |                |                       |                |                 |                   |
| 2823BCX0133      | SD1-GAA178 | RE505/0  | INGLEWOOD             | B          | 28.47752967  | 23.531330001  | 1437.00      | 0.24         | 165        |                 | 17.13        |            |                |                       |                |                 |                   |
| 2823BCX0134      | SD1-GAA179 | RE505/0  | INGLEWOOD             | B          | 28.49965967  | 23.528540001  | 1433.70      | 0.16         | 165        |                 | 20.18        |            |                |                       |                |                 |                   |
| 2823BCX0135      | SD1-GAA180 | RE505/0  | INGLEWOOD             | B          | 28.49396967  | 23.547310001  | 1433.40      |              | 165        | 40.00           |              |            |                |                       |                |                 |                   |
| 2823BCX0136      | SD1-GAA181 | RE505/0  | INGLEWOOD             | B          | 28.49398967  | 23.547440001  | 1433.30      |              | 165        | 40.00           |              |            |                |                       |                |                 |                   |
| 2823BCX0137      | SD1-GAA182 | RE505/0  | INGLEWOOD             | B          | 28.49306967  | 23.547690001  | 1431.40      | 0.18         | 140        | 40.00           | 10.94        |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>  |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> | 40.00        | 20.18      |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Minimum:</b> | 30.00        | 10.94      |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Average:</b> | 37.50        | 16.34      |                |                       |                |                 |                   |

### SUMMARY:

Site Type:  
B = Borehole

Nr. of sites: 6

Maximum: 40.00 20.18

Minimum: 30.00 10.94

Sum:

Average: 37.50 16.34

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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Project No.: 11613568

## HANNES CORNELISSEN - TIME DEPENDENT CHEMISTRY REPORT

Site Identifier: 2823BCX0132 Number: SD1-GAA177 Site Name: INGLEWOOD

| Samp. Nr./Type | Date/Time samp. | pH  | EC     | TDS   | Ca  | Mg   | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|-----|--------|-------|-----|------|------|------|------|---------|------|------|----------|-------|
| SD1-GA177      | 20120216 0800   | 7.7 | 86.4 † | 562 † | 114 | 42.8 | 25.6 | 4.88 | 19.5 | 382     | 57.1 | 42.2 | 3.74     | 0.174 |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

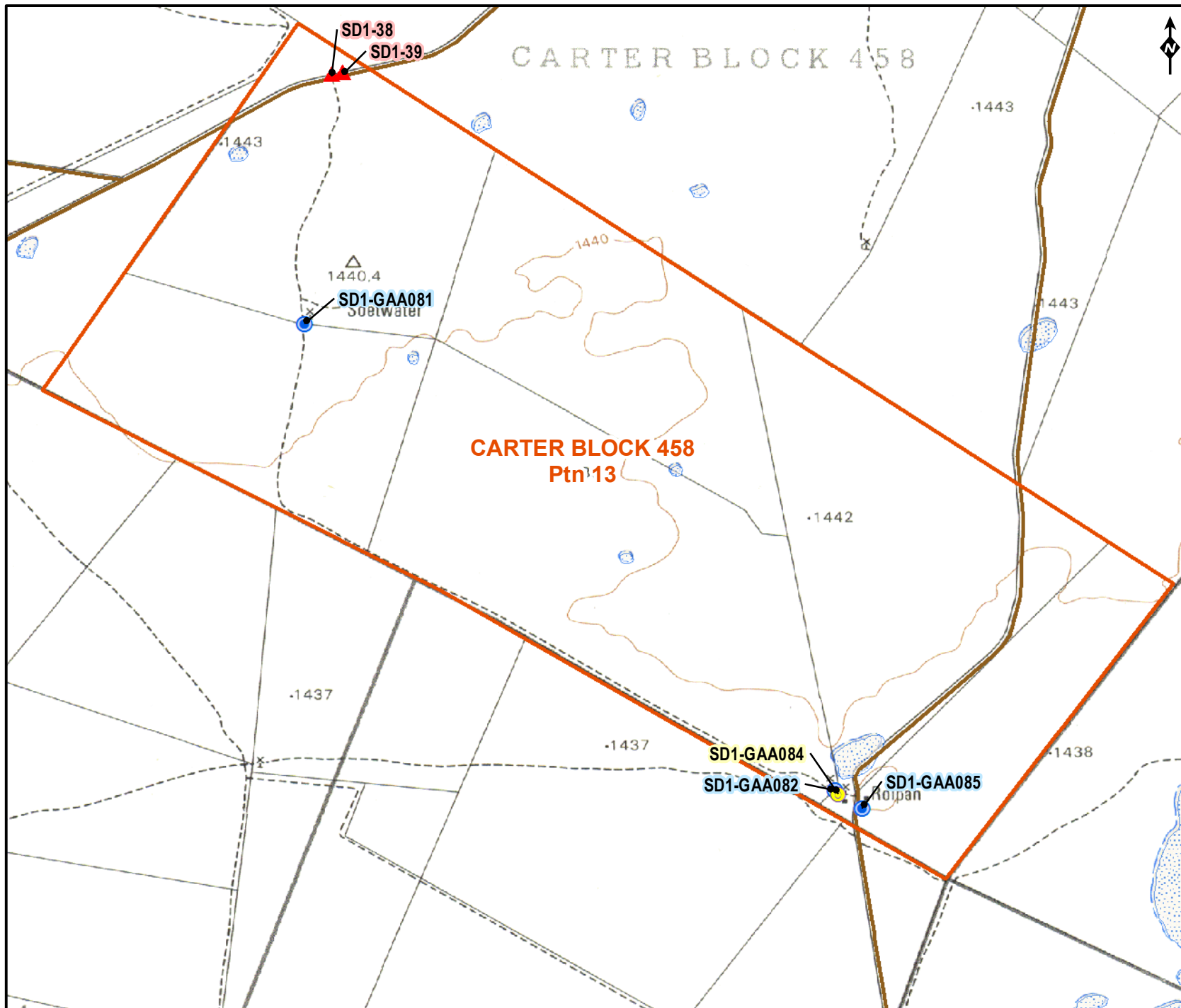
Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source



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Project No.: 11613568

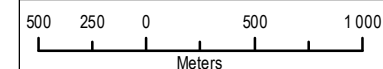


## 2.14 Hannes Meyer



#### LEGEND

- ▲ Newly drilled borehole
- Existing borehole survey
- Well point
- Carter Block 458 Ptn 13
- Other road
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**CARTER BLOCK PTN 13  
HANNES MEYER**

|                      |    |            |
|----------------------|----|------------|
| PROJECT No. 11613568 |    | REV 0      |
| SCALE 1:35 000       |    | A4         |
| GIS                  | MB | 24/04/2014 |
| CHECK                | DB | 24/04/2014 |
| REVIEW               | FW | 24/04/2014 |



## HANNES MEYER - BASIC SITE INFORMATION

| SITE LOCATION    |            |                                              |                          |            |              |               |              |              |            | GEOHYDROLOGY |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------|------------|----------------------------------------------|--------------------------|------------|--------------|---------------|--------------|--------------|------------|--------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier: | Number:    | District                                     | Site name/Description    | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]    | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0079      | SD1-GAA081 | 458/13                                       | CARTER BLOCK PTN. ROLPAN | B          | 28.41705967  | 23.530390001  | 1441.10      |              | 165        |              |              |            |                |                       |                |                 |                   |
| 2823BCX0080      | SD1-GAA082 | 458/13                                       | CARTER BLOCK PTN. ROLPAN | B          | 28.44446967  | 23.561550001  | 1437.60      |              | 165        |              |              |            |                |                       |                |                 |                   |
| 2823BCX0081      | SD1-GAA084 | 458/13                                       | CARTER BLOCK PTN. ROLPAN | W          | 28.44466967  | 23.561740001  | 1438.10      | 0.10         |            |              | 6.55         |            |                |                       |                |                 |                   |
| 2823BCX0082      | SD1-GAA085 | 458/13                                       | CARTER BLOCK PTN. ROLPAN | B          | 28.44552967  | 23.563150001  | 1437.80      | 0.22         | 165        |              | 9.93         |            |                |                       |                |                 |                   |
| SUMMARY:         |            | Site Type:<br>B = Borehole<br>W = Well point |                          |            |              |               |              |              | Maximum:   |              | 9.93         |            |                |                       |                |                 |                   |
| Nr. of sites:    |            | 4                                            |                          |            |              |               |              |              | Minimum:   |              | 6.55         |            |                |                       |                |                 |                   |
|                  |            |                                              |                          |            |              |               |              |              | Sum:       |              |              |            |                |                       |                |                 |                   |
|                  |            |                                              |                          |            |              |               |              |              | Average:   |              | 8.24         |            |                |                       |                |                 |                   |

NOTE:  
 "Yield" represents cumulative blow yield  
 The recommended abstraction ("Rec. abs.")  
 is based on a 24 hour duty cycle  
 (based on test pumping result)



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 Project No.: 11613568



## HANNES MEYER - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BCX0082    **Number:** SD1-GAA085    **Site Name:** CARTER BLOCK PTN. ROLPAN

| Samp. Nr./Type | Date/Time samp. | pH   | EC     | TDS   | Ca  | Mg   | Na   | K   | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|--------|-------|-----|------|------|-----|------|---------|------|------|----------|-------|
| SD1-GA085      | 20120216 0800   | 7.79 | 95.2 † | 656 † | 104 | 52.5 | 37.2 | 9.2 | 24.6 | 376     | 77.7 | 47.8 | 8.88     | 0.379 |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source



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**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0209 Number: SD1-39 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

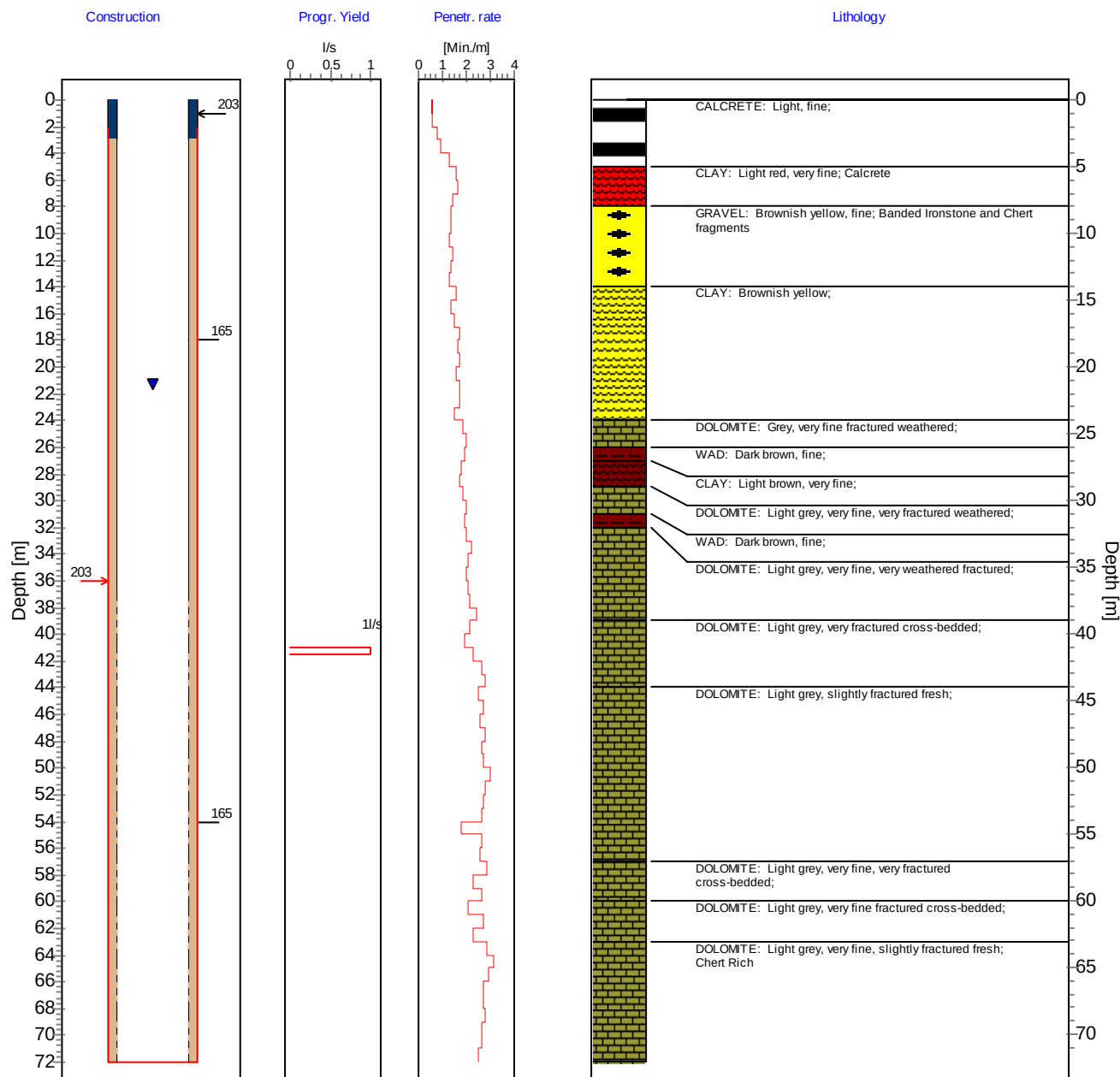
Region Descr.: KGATELOPELE LM

|                |                           |           |                                       |               |       |
|----------------|---------------------------|-----------|---------------------------------------|---------------|-------|
| Latitude [°]:  | 28.402400                 | Reg./BB.: | Topo-set.:                            | Depth [m]:    | 72.00 |
| Longitude [°]: | 23.532620                 | G-Nr.:    | Site status: Unused                   | Col. ht. [m]: | 0.53  |
| Altitude [m]:  | 1442.98                   |           | Site purp.: Production (water supply) | Diam. [mm]:   | 165   |
| Coord. acc.:   | Accurate to within 1 unit |           | Use applic.: Domestic - all purposes  | Drain. reg.:  | C92C  |
| Coord. meth.:  | Altimeter                 |           | Equipment: No equipment               | Rep. inst.:   | GOLD  |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend

|       |                                      |        |                                  |   |                |
|-------|--------------------------------------|--------|----------------------------------|---|----------------|
| —     | Hole                                 | 165 →  | Hole diameter [mm]               | ■ | Sanitary seal  |
| — — — | Casing (plain / perforated, slotted) | ← 152  | Casing diameter [mm]             | ■ | Gravel (> 2mm) |
| —     | Screen / Mesh Screen                 | ▼      | Waterlevel measured: 06/07/13    |   |                |
| —     | Piezometer                           | 0:50 → | Piezometer (Nr. & Diameter [mm]) |   |                |



COMMENT:



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0208 Number: SD1-38 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.402510

Reg./BB.:

Topo-set.:

Depth [m]: 70.00

Longitude [°]: 23.531990

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.49

Altitude [m]: 1443.05

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92C

Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

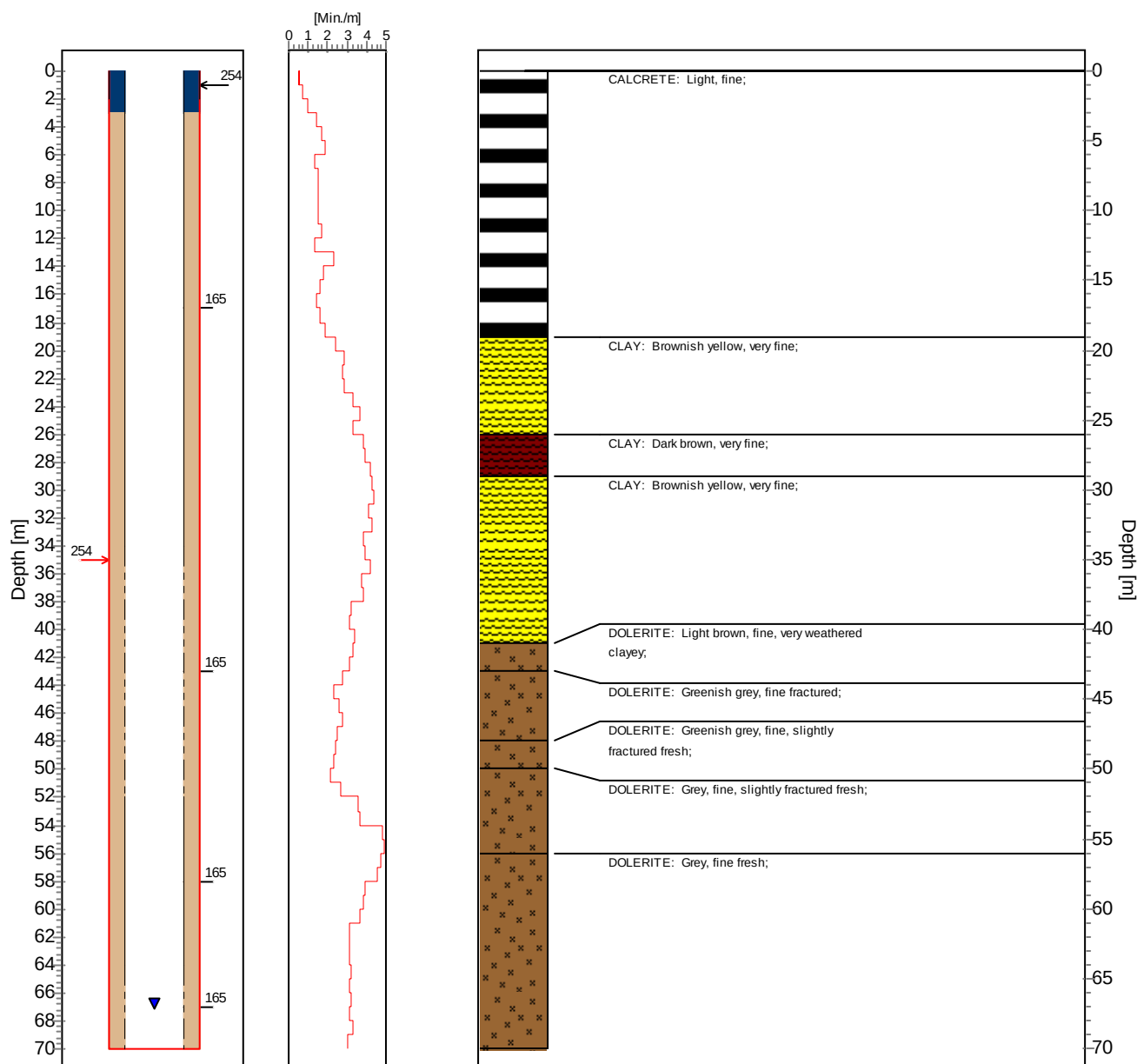
## Construction and Geohydrological Legend

|  |                                      |        |                                  |  |                |
|--|--------------------------------------|--------|----------------------------------|--|----------------|
|  | Hole                                 | 165 →  | Hole diameter [mm]               |  | Sanitary seal  |
|  | Casing (plain / perforated, slotted) | ← 152  | Casing diameter [mm]             |  | Gravel (> 2mm) |
|  | Screen / Mesh Screen                 |        | Waterlevel measured: 09/07/13    |  |                |
|  | Piezometer                           | 0:50 → | Piezometer (Nr. & Diameter [mm]) |  |                |

Construction

Penetr. rate

Lithology



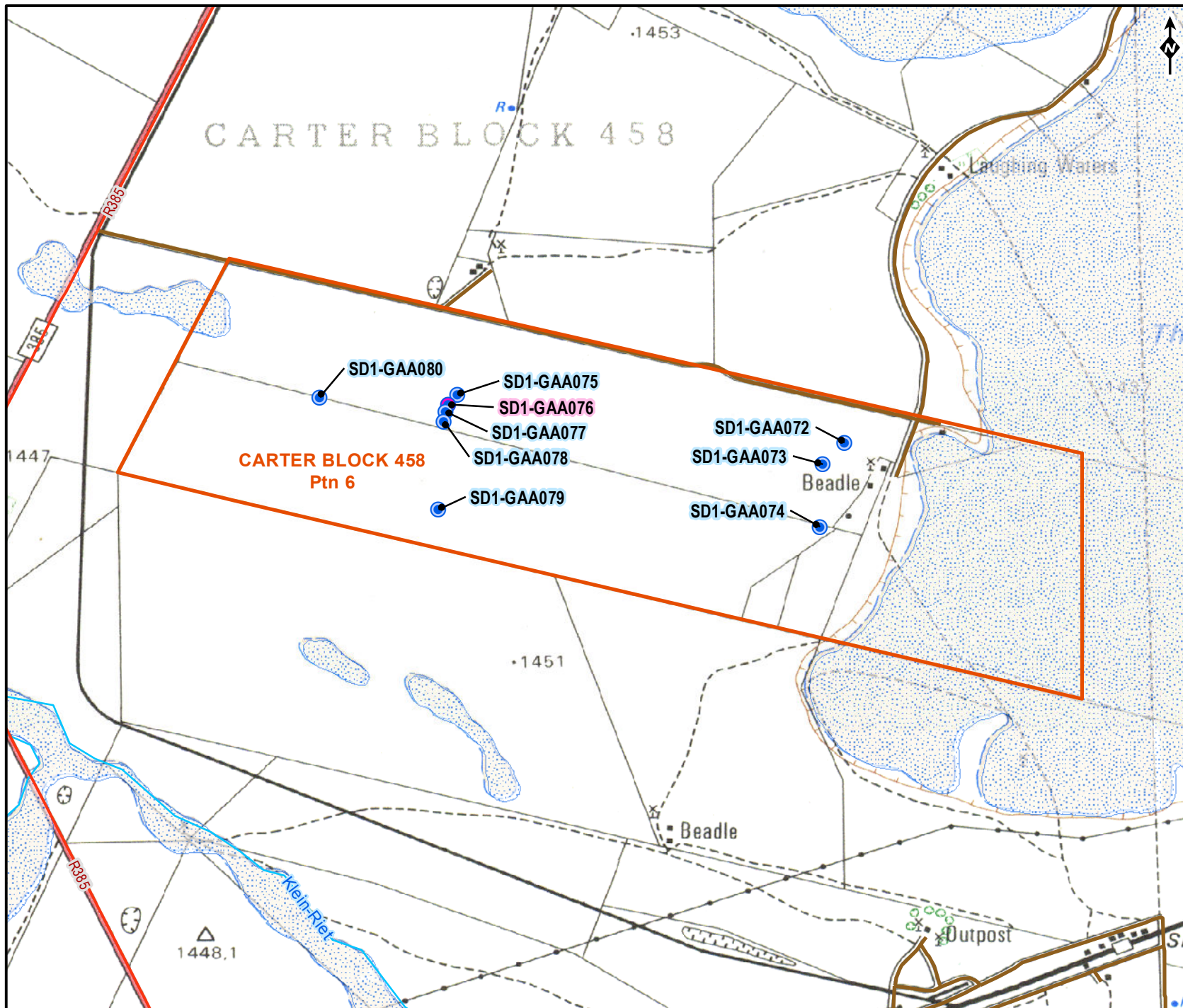
COMMENT:



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 Fax: 012 - 364 4001  
 Project No.: 11613568

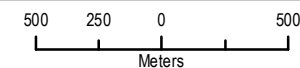


## 2.15 Hennie Van Zyl



#### LEGEND

- Existing borehole survey
- Existing borehole tested
- Carter Block 458 Ptn 6
- Main road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**CARTER BLOCK 458 PTN 6**  
**HENNIE VAN ZYL**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:30 000       | A4         |
| GIS MB               | 24/04/2014 |
| CHECK DB             | 24/04/2014 |
| REVIEW FW            | 24/04/2014 |



## HENNIE VAN ZYL - BASIC SITE INFORMATION

| SITE LOCATION          |            |          |                          |            |              |               |              |              |            | GEOHYDROLOGY    |              |            | MANAGEMENT RECOMMEND. |                    |                |                 |                   |
|------------------------|------------|----------|--------------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|-----------------------|--------------------|----------------|-----------------|-------------------|
| Site Identifier:       | Number:    | District | Site name/Description    | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s]        | Depth to Intk. [m] | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0070            | SD1-GAA072 | RE458/6  | CARTER BLOCK PTN. BEADLE | B          | 28.32045967  | 23.565940001  | 1440.80      | 0.28         | 165        | 50.00           | 6.53         |            |                       |                    |                |                 |                   |
| 2823BCX0071            | SD1-GAA073 | RE458/6  | CARTER BLOCK PTN. BEADLE | B          | 28.32156967  | 23.564810001  | 1442.40      | 0.48         | 165        | 50.00           | 6.52         | 3.61       |                       |                    |                |                 |                   |
| 2823BCX0072            | SD1-GAA074 | RE458/6  | CARTER BLOCK PTN. BEADLE | B          | 28.32472967  | 23.564690001  | 1446.10      |              | 165        | 50.00           | 7.09         | 0.10       |                       |                    |                |                 |                   |
| 2823BCX0073            | SD1-GAA075 | RE458/6  | CARTER BLOCK PTN. BEADLE | B          | 28.31804967  | 23.546440001  | 1450.90      | 0.20         | 254        | 46.00           | 16.80        | 16.67      |                       |                    |                |                 |                   |
| 2823BCX0075            | SD1-GAA077 | RE458/6  | CARTER BLOCK PTN. BEADLE | B          | 28.31891967  | 23.545860001  | 1450.50      | 0.24         | 165        | 23.00           | 16.21        | 27.78      |                       |                    | 6.94           | 48              | 1199.23           |
| 2823BCX0076            | SD1-GAA078 | RE458/6  | CARTER BLOCK PTN. BEADLE | B          | 28.31943967  | 23.545730001  | 1449.00      | 0.43         | 165        | 46.00           | 16.27        | 27.78      |                       |                    |                |                 |                   |
| 2823BCX0077            | SD1-GAA079 | RE458/6  | CARTER BLOCK PTN. BEADLE | B          | 28.32383967  | 23.545480001  | 1448.80      | 0.20         | 203        | 38.00           | 16.00        | 5.56       |                       |                    |                |                 |                   |
| 2823BCX0078            | SD1-GAA080 | RE458/6  | CARTER BLOCK PTN. BEADLE | B          | 28.31818967  | 23.539480001  | 1446.60      | 0.19         | 165        | 50.00           | 14.41        | 5.56       |                       |                    |                |                 |                   |
| <b>SUMMARY:</b>        |            |          |                          |            |              |               |              |              |            | <b>Maximum:</b> | 50.00        | 16.80      | 27.78                 |                    | 6.94           |                 | 1199.23           |
|                        |            |          |                          |            |              |               |              |              |            | <b>Minimum:</b> | 23.00        | 6.52       | 0.10                  |                    | 6.94           |                 | 1199.23           |
|                        |            |          |                          |            |              |               |              |              |            | <b>Sum:</b>     |              |            | 87.04                 |                    | 6.94           |                 | 1199.23           |
|                        |            |          |                          |            |              |               |              |              |            | <b>Average:</b> | 44.13        | 12.48      | 12.43                 |                    | 6.94           |                 | 1199.23           |
| <b>Nr. of sites:</b> 8 |            |          |                          |            |              |               |              |              |            |                 |              |            |                       |                    |                |                 |                   |

Site Type:  
B = Borehole

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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Project No.: 11613568

## HENNIE VAN ZYL - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BCX0075    **Number:** SD1-GAA077    **Site Name:** CARTER BLOCK PTN. BEADLE

| Samp. Nr./Type | Date/Time samp. | pH   | EC   | TDS | Ca  | Mg   | Na   | K    | Si | T. Alk. | Cl | SO4  | NO3 as N | F     |
|----------------|-----------------|------|------|-----|-----|------|------|------|----|---------|----|------|----------|-------|
| SD1-GA077      | 20120216 0800   | 7.56 | 66.4 | 432 | 104 | 25.7 | 13.1 | 2.05 | 12 | 271     | 37 | 59.3 | 3.66     | 0.105 |

**Site Identifier:** 2823BCX0077    **Number:** SD1-GAA079    **Site Name:** CARTER BLOCK PTN. BEADLE

| Samp. Nr./Type | Date/Time samp. | pH   | EC   | TDS | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|------|-----|------|------|------|------|------|---------|------|------|----------|-------|
| SD1-GA079      | 20120216 0800   | 7.54 | 56.5 | 452 | 96.8 | 24.3 | 12.1 | 1.91 | 12.7 | 207     | 35.9 | 55.1 | 3.96     | < 0.1 |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source



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Fax: 012 - 364 4001  
Project No.: 11613568



## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0074 Number: SD1-GAA076 Site type: Borehole

Distr./Farm No.: RE458/6 Site Name/Descr.: CARTER BLOCK PTN. BEADLE

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.318570 | Alt. No. 1:      |  | Diam. [mm]:   | 153   | Water lev. [m]: | 15.46    |
| Longitude [°]: | 23.545970 | Alt. No. 2:      |  | Depth [m]:    | 24.34 | WL status:      | Static   |
| Altitude [m]:  | 1445.60   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.53  | Date WL meas.:  | 20121023 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
Type of Inst.: No information Pulley Diam. [mm]:  
Manufacturer: Depth to Intk. [m]:

**Engine:**  
Manufacturer: Power Rating [kW]  
Type of Power: No information Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: No information  
Purpose: No information  
Consumer: No information  
Application: No information

### WATER CHEMISTRY:

|                  |      |               |          |                                                                                                                                                                                                                                                                                        |       |           |                        |           |   |
|------------------|------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|------------------------|-----------|---|
| Sample No.:      | SD1- | Date sampled: | 20121025 | Depth sampl. [m]:                                                                                                                                                                                                                                                                      | 23.80 | Comment:  |                        |           |   |
| Main Parameters: |      |               |          | Calculated Parameters:                                                                                                                                                                                                                                                                 |       |           | Bacteriol. Parameters: |           |   |
| pH:              | 7.54 | Na:           | 12.4     | Cl:                                                                                                                                                                                                                                                                                    | 36.4  | Langel.:  | 0.32                   | E.Coli:   | 0 |
| EC: [mS/m]       | 67.1 | K:            | 1.82     | NO3 as N:                                                                                                                                                                                                                                                                              | 3.5   | Aggr-Ind: | 12.38                  | Faec. co: | 0 |
| TDS:             | 462  | Si:           | 13.3     | SO4:                                                                                                                                                                                                                                                                                   | 57.6  | Ion-bal:  | 1.49                   | Total Co: | 0 |
| T. Alk.:         | 268  | Al:           | <0.05    | F:                                                                                                                                                                                                                                                                                     | 0.111 | CaCO3:    | 374.62                 | SPC:      | 0 |
| Ca:              | 103  | Fe:           | <0.05    | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    ¡ Value exceeds minimum allowable limit |       |           |                        |           |   |
| Mg:              | 28.6 | Mn:           | <0.05    |                                                                                                                                                                                                                                                                                        |       |           |                        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %  | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121023 | 60           | 23.80              | 1.80             | 1.43       |              |    |       |          |         |         |
| STEP TEST STEP 2 | 20121023 | 60           | 23.80              | 4.11             | 2.51       |              |    |       |          |         |         |
| STEP TEST STEP 3 | 20121023 | 60           | 23.80              | 10.65            | 5.28       | 1.13         | 79 | 240   |          |         |         |
| CONSTANT         | 20121023 | 720          | 23.80              | 9.05             | 3.11       | 0.09         | 97 | 720   |          |         |         |



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Project No.: 11613568



# PUMPING TEST REPORT

Date compiled: 2012/11/01

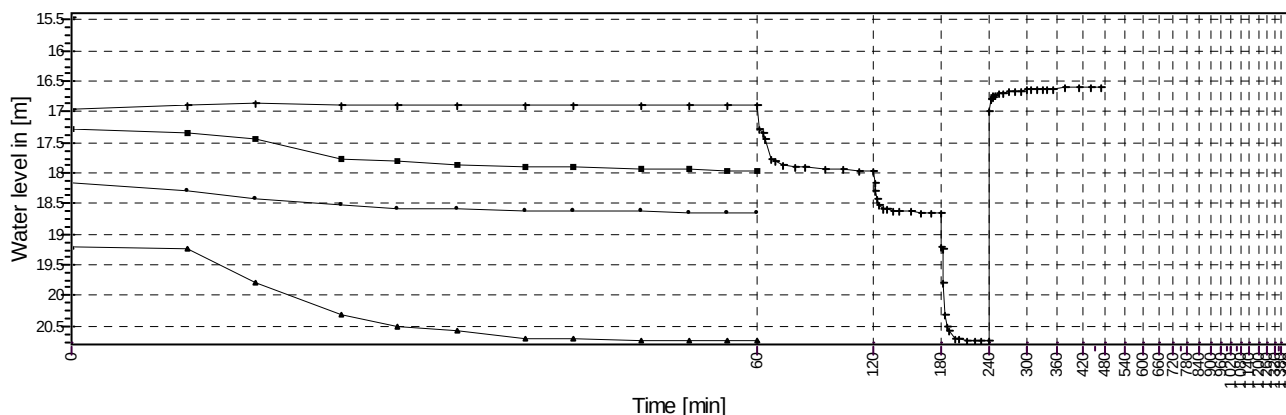
**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0074 Number: SD1-GAA076 Site type: Borehole

Distr./Farm No.: RE458/6 Site Name/Des.: CARTER BLOCK PTN. BEADLE

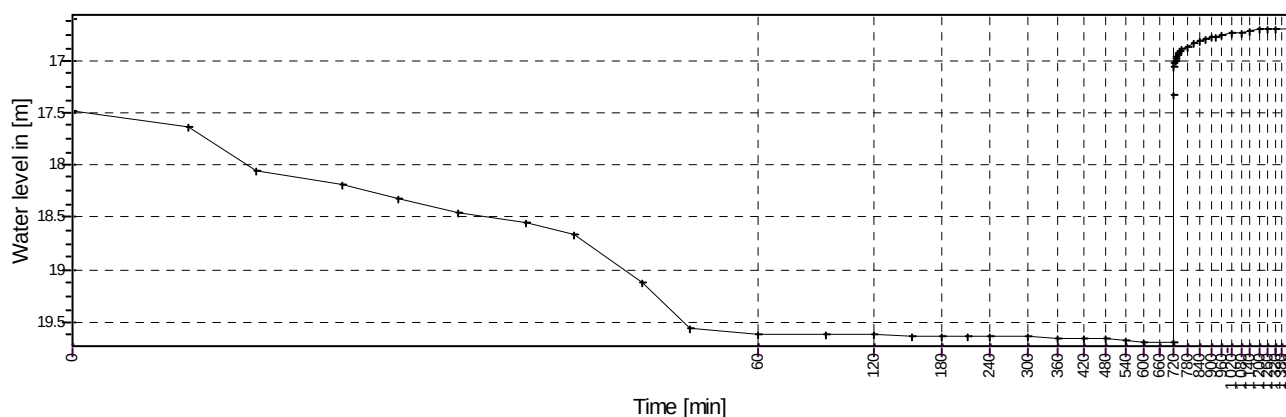
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.318570 | Alt. No. 1:      |  | Diam. [mm]:    | 153   | Water lev. [m]: | 15.46    |
| Longitude [°] | 23.545970 | Alt. No. 2:      |  | Depth [m]:     | 24.34 | Piezometer:     | 0        |
| Altitude [m]: | 1445.60   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.53  | Date WL meas.:  | 20121023 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



| PUMPING TEST: |                    | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|---------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| Rep. Inst.    | Meth. tested       |                     |               |      |             |      |                               |           |                 |
| GOLD          | Step test          | 23.80               | 20121023      | 1125 | 20121023    | 1915 |                               |           |                 |
| GOLD          | Constant rate test | 23.80               | 20121023      | 1930 | 20121024    | 1930 |                               |           |                 |

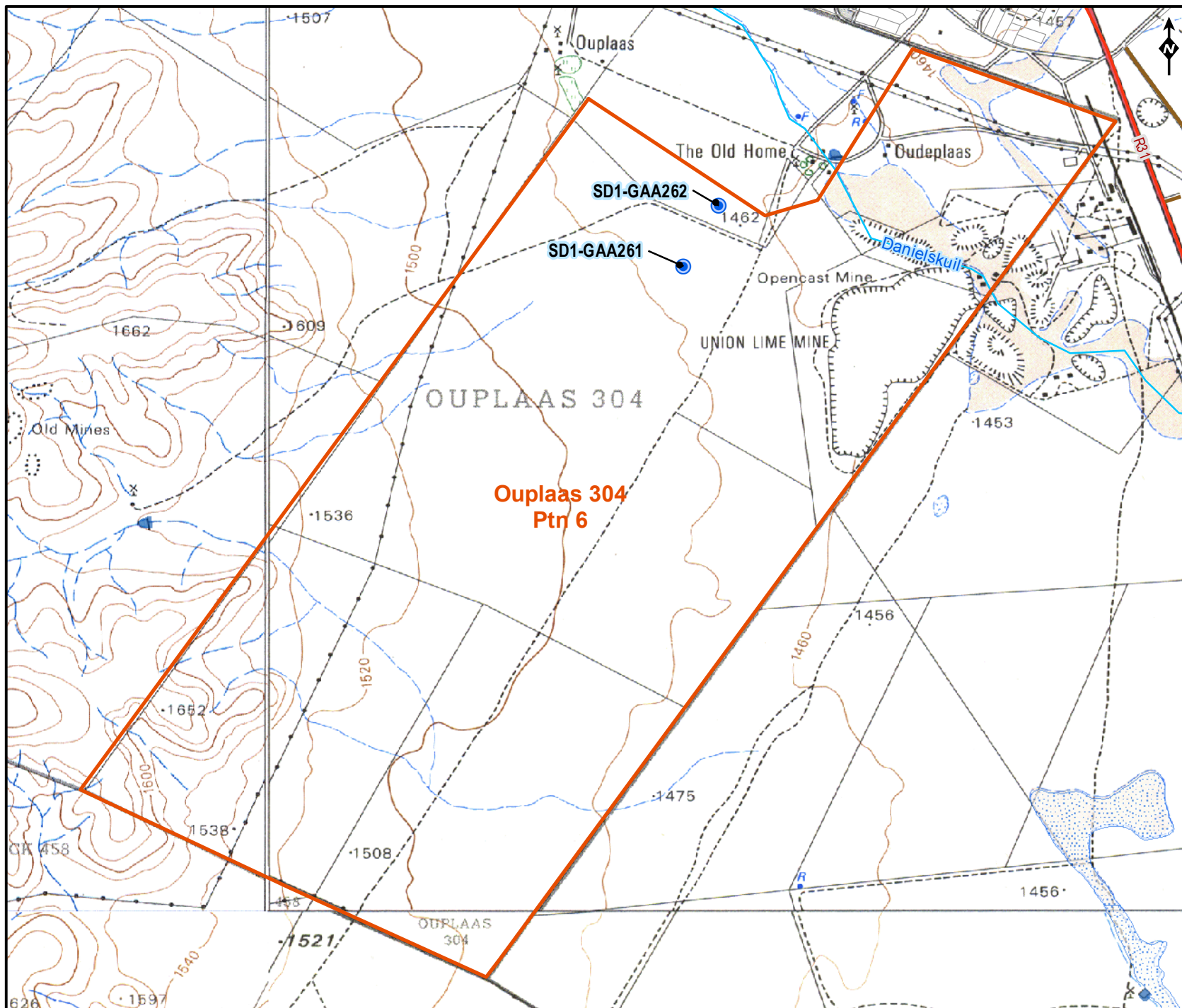
| TESTING DETAILS: |             | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|----------------------------|-------------|---------|------|
| Description      | Time start. |              |                    |                  |            |            |    |                 |                            |             |         |      |
| STEP TEST STEP 1 | 1125        | 60           | 23.80              | 1.80             | 1.43       |            |    |                 |                            |             |         | 1.26 |
| STEP TEST STEP 2 | 1225        | 60           | 23.80              | 4.11             | 2.51       |            |    |                 |                            |             |         | 1.64 |
| STEP TEST STEP 3 | 1325        | 60           | 23.80              | 10.65            | 5.28       | 1.13       | 79 | 240             |                            |             |         | 2.02 |
| CONSTANT         | 1930        | 720          | 23.80              | 9.05             | 3.11       | 0.09       | 97 | 720             |                            |             |         | 2.91 |



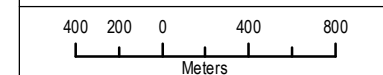
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Fax: 012 - 364 4001  
Project No.: 11613568



## **2.16 Idwala Mine**



- LEGEND**
- Existing borehole survey
  - Ouplaas 304 Ptn 6
  - Main road
  - Other road
  - Street
  - Rivers
  - Dam
  - Pan
  - Marsh vlei



**RESOURCES/NOTES**  
 Coordinate System: GCS WGS 1984  
 Datum: WGS 1984

**PROJECT**  
 GW ASSESSMENT VGG SCHEME

**TITLE**  
**OUPLAAS 304 PTN 6**  
**IDWALA MINE**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:35 000       | A4         |
| GIS MB               | 25/04/2014 |
| CHECK DB             | 25/04/2014 |
| REVIEW FW            | 25/04/2014 |



## IDWALA MINE - BASIC SITE INFORMATION

| SITE LOCATION    |            |                            |                           |            |              |               |              |              |            | GEOHYDROLOGY |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------|------------|----------------------------|---------------------------|------------|--------------|---------------|--------------|--------------|------------|--------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier: | Number:    | District                   | Site name/Description     | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]    | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BA00046      | SD1-GAA262 | 304                        | OUPLAAS - MAIN WATER HOLE | B          | 28.20885967  | 23.526060001  | 1467.80      |              | 203        | 36.00        | 10.94        |            |                |                       |                |                 |                   |
| 2823BAX0020      | SD1-GAA261 | 304                        | OUPLAAS - MAIN WATER HOLE | B          | 28.21247967  | 23.523940001  | 1476.30      | 235          | 203        |              | 12.04        |            |                |                       |                |                 |                   |
| SUMMARY:         |            | Site Type:<br>B = Borehole |                           |            |              |               |              |              | Maximum:   | 36.00        | 12.04        |            |                |                       |                |                 |                   |
|                  |            |                            |                           |            |              |               |              |              | Minimum:   | 36.00        | 10.94        |            |                |                       |                |                 |                   |
| Nr. of sites:    |            | 2                          |                           |            |              |               |              |              | Sum:       |              |              |            |                |                       |                |                 |                   |
|                  |            |                            |                           |            |              |               |              |              | Average:   | 36.00        | 11.49        |            |                |                       |                |                 |                   |

Site Type:  
B = Borehole

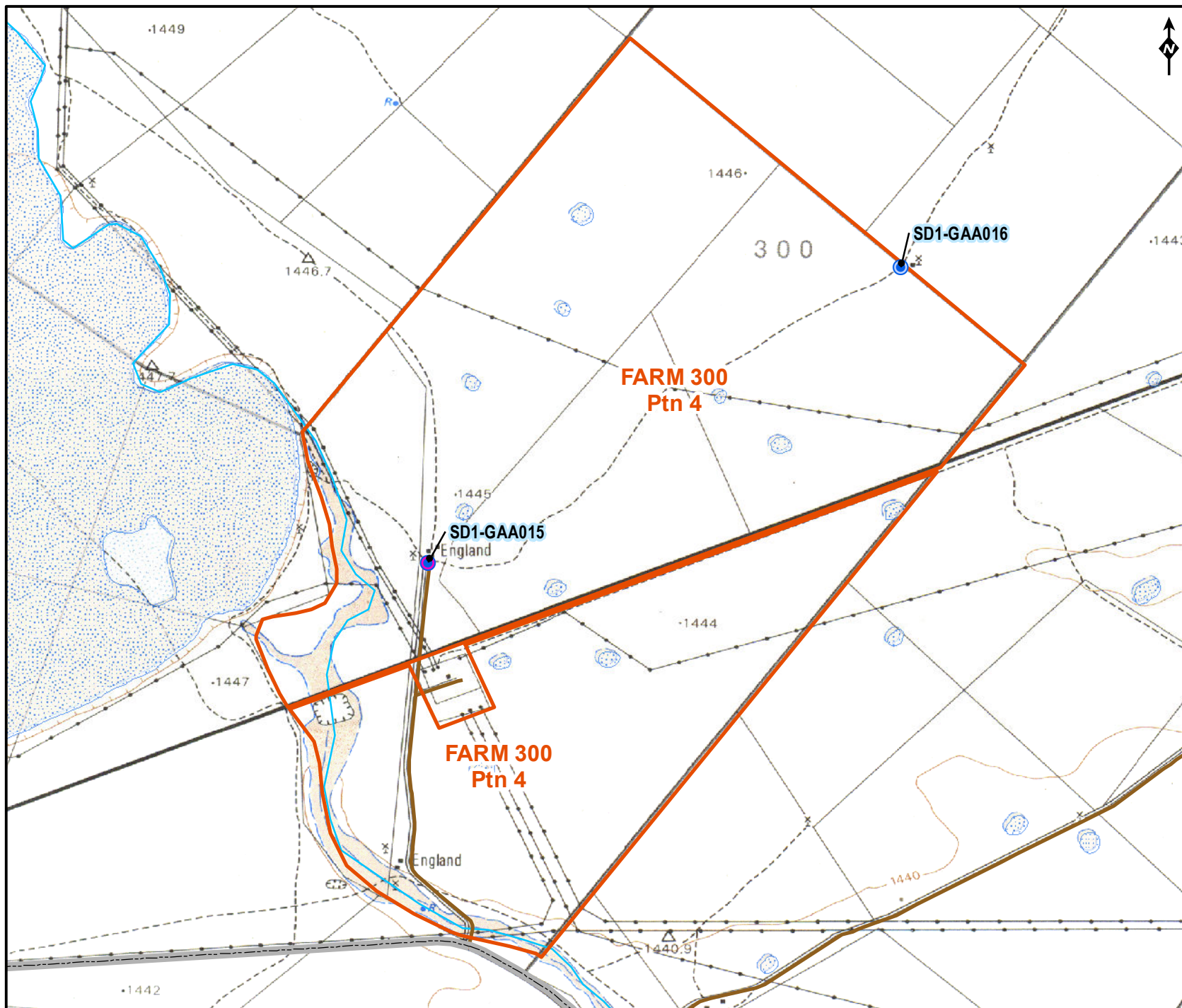
NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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Project No.: 11613568

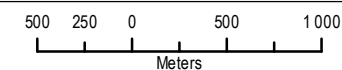


## 2.17 I.H. Vermeulen



#### LEGEND

- Existing borehole survey
- Existing borehole tested
- Farm 300 Ptn 4
- Secondary road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**FARM 300 PTN 4  
IH VERMEULEN**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:40 000       | A4         |
| GIS MB               | 25/04/2014 |
| CHECK DB             | 25/04/2014 |
| REVIEW FW            | 25/04/2014 |





## IH VERMEULEN - BASIC SITE INFORMATION

| SITE LOCATION                                 |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY                                                                                                            |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|-----------------------------------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-------------------------------------------------------------------------------------------------------------------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:                              | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]                                                                                                               | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0015                                   | SD1-GAA015 | RE300/4  | ENGLAND               | B          | 28.32416967  | 23.621870001  | 1443.80      | 0.48         | 165        | 31.60                                                                                                                   | 10.72        |            |                |                       |                |                 |                   |
| 2823BCX0016                                   | SD1-GAA016 | RE300/4  | ENGELAND              | B          | 28.30435067  | 23.653700201  | 1442.50      |              | 165        |                                                                                                                         |              |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b><br><br><b>Nr. of sites:</b> 2 |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> 31.60      10.72<br><b>Minimum:</b> 31.60      10.72<br><b>Sum:</b><br><b>Average:</b> 31.60      10.72 |              |            |                |                       |                |                 |                   |

NOTE:  
 "Yield" represents cumulative blow yield  
 The recommended abstraction ("Rec. abs.")  
 is based on a 24 hour duty cycle  
 (based on test pumping result)



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 Project No.: 11613568

## IH VERMEULEN - TIME DEPENDENT CHEMISTRY REPORT

Site Identifier: 2823BCX0015 Number: SD1-GAA015 Site Name: ENGLAND

| Samp. Nr./Type | Date/Time samp. | pH   | EC     | TDS | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|--------|-----|------|------|------|------|------|---------|------|------|----------|-------|
| SD1-GA015      | 20121008 1150   | 7.55 | 70.1 † | 468 | 98.9 | 35.9 | 11.2 | 3.03 | 21.2 | 303     | 56.2 | 16.5 | 6.66     | 0.153 |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source

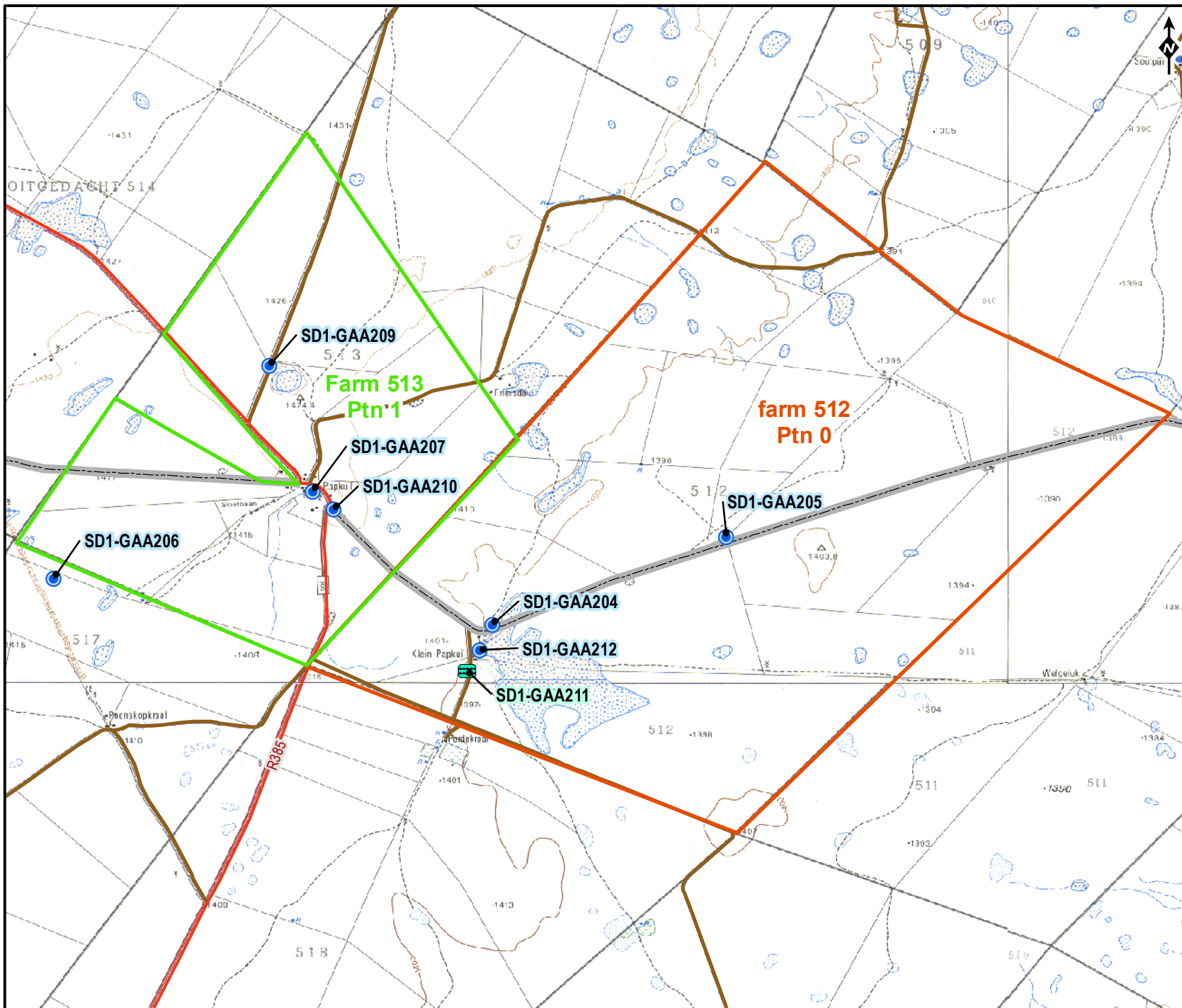


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Project No.: 11613568



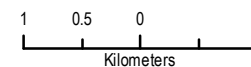


## 2.18 Julius Gers



#### LEGEND

- Existing borehole survey
- Fountain
- Farm 513 Ptn 1
- Farm 512 Ptn 0
- Main road
- Secondary road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**FARM 512 PTN 1  
FARM 513 PTN 0  
J GERS**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:65 000       | A4         |
| GIS MB               | 25/04/2014 |
| CHECK DB             | 25/04/2014 |
| REVIEW FW            | 25/04/2014 |



## J GERS - BASIC SITE INFORMATION

| SITE LOCATION    |            |                                                     |                       |            |              |               |              |              |            | GEOHYDROLOGY |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |  |
|------------------|------------|-----------------------------------------------------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|--------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|--|
| Site Identifier: | Number:    | District                                            | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]    | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |  |
| 2823BC00061      | SD1-GAA209 | 513/2                                               | PAPKUIL               | B          | 28.46573967  | 23.669070001  | 1423.40      | 0.10         | 165        | 14.70        | 3.80         |            |                |                       |                |                 |                   |  |
| 2823BC00067      | SD1-GAA210 | 513/2                                               | PAPKUIL               | B          | 28.48144967  | 23.676080001  | 1423.00      |              | 165        |              | 8.09         |            |                |                       |                |                 |                   |  |
| 2823BC00068      | SD1-GAA207 | 513/2                                               | PAPKUIL               | B          | 28.47946967  | 23.673830001  | 1420.20      |              | 165        |              | 0.56         |            |                |                       |                |                 |                   |  |
| 2823BC00069      | SD1-GAA206 | 517/2                                               | POENSKOPKRAAL-TBC     | B          | 28.48895967  | 23.645540001  | 1414.50      |              | 165        |              |              |            |                |                       |                |                 |                   |  |
| 2823BC00074      | SD1-GAA205 | RE512/0                                             | KLEIN PAPKUIL         | B          | 28.48442967  | 23.718930001  | 1401.03      |              | 165        |              | 7.70         |            |                |                       |                |                 |                   |  |
| 2823BC00075      | SD1-GAA204 | RE512/0                                             | KLEIN PAPKUIL         | B          | 28.49400967  | 23.693370001  | 1401.69      |              | 165        |              | 7.59         |            |                |                       |                |                 |                   |  |
| 2823BC00077      | SD1-GAA212 | 512/0                                               | KLEIN PAPKUIL         | B          | 28.49680967  | 23.691960001  | 1399.56      |              | 165        |              | 5.74         |            |                |                       |                |                 |                   |  |
| 2823BC00079      | SD1-GAA211 | 512/0                                               | KLEIN PAPKUIL         | F          | 28.49907967  | 23.690650001  | 1400.74      |              |            |              | 1.43         |            |                |                       |                |                 |                   |  |
| SUMMARY:         |            | Site Type:<br>B = Borehole<br>F = Fountain / Spring |                       |            |              |               |              | Maximum:     |            | 14.70        | 8.09         |            |                |                       |                |                 |                   |  |
| Nr. of sites:    |            | 8                                                   |                       |            |              |               |              | Minimum:     |            | 14.70        | 0.56         |            |                |                       |                |                 |                   |  |
|                  |            |                                                     |                       |            |              |               |              |              |            | Sum:         |              |            |                |                       |                |                 |                   |  |
|                  |            |                                                     |                       |            |              |               |              |              |            | Average:     |              | 14.70      | 4.99           |                       |                |                 |                   |  |

Site Type:  
B = Borehole  
F = Fountain / Spring

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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Project No.: 11613568

## J GERS - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BC00077 **Number:** SD1-GAA212 **Site Name:** KLEIN PAPKUIL

| Samp. Nr./Type | Date/Time samp. | pH   | EC     | TDS   | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|--------|-------|------|------|------|------|------|---------|------|------|----------|-------|
| SD1-GA212      | 20120327 1530   | 7.75 | 75.2 † | 562 † | 96.6 | 43.4 | 28.5 | 10.2 | 19.1 | 285     | 66.4 | 43.8 | 3.98     | 0.148 |

**Site Identifier:** 2823BC00079 **Number:** SD1-GAA211 **Site Name:** KLEIN PAPKUIL

| Samp. Nr./Type | Date/Time samp. | pH  | EC     | TDS   | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl | SO4  | NO3 as N | F     |
|----------------|-----------------|-----|--------|-------|------|------|------|------|------|---------|----|------|----------|-------|
| SD1-GA211      | 20120327 1515   | 7.7 | 76.6 † | 552 † | 97.1 | 42.7 | 26.7 | 4.33 | 18.9 | 321     | 61 | 40.7 | 2.08     | 0.196 |

Chemistry Standard: SABS for human consumption  
 † Value exceeds recommended maximum limit  
 ‡ Value exceeds maximum allowable limit  
 ! Value exceeds recommended minimum limit  
 j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
 EC [mS/m]  
 Nitrate as N

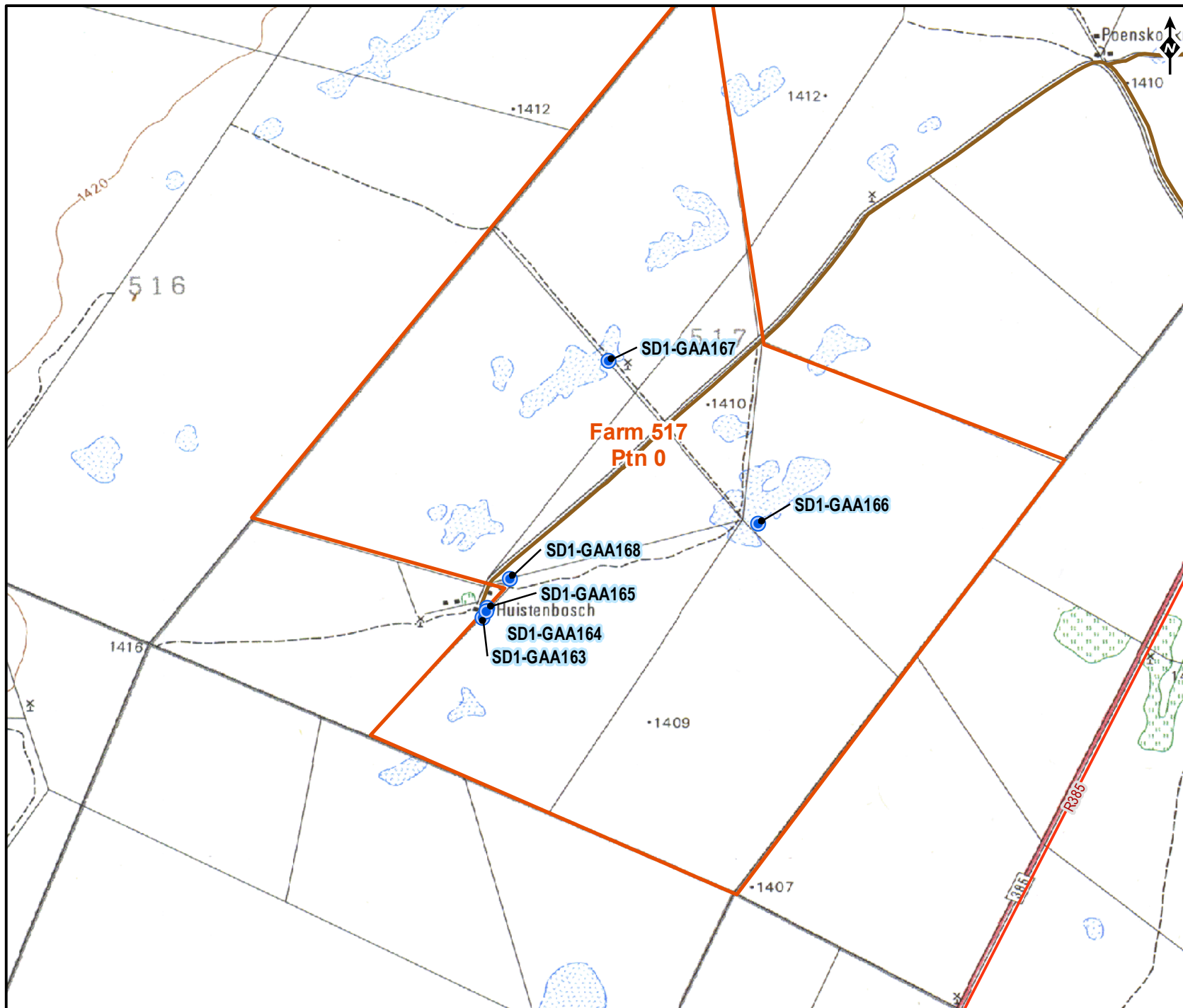
Sample Type Code Explanation:  
 D: Drinking water  
 E: Effluent  
 K: Sewage  
 O: Organic  
 P: Pressed or pellet  
 R: Rock  
 S: Soil  
 X: Other source



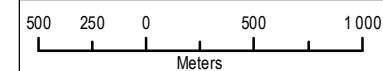
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 Project No.: 11613568



## **2.19 Jacques Jacobs**



- LEGEND**
- Existing borehole survey
  - Farm 517 Ptn 0
  - Main road
  - Other road
  - Rivers
  - Dam
  - Pan
  - Marsh vlei



**RESOURCES/NOTES**  
Coordinate System: GCS WGS 1984  
Datum: WGS 1984

**PROJECT**  
GW ASSESSMENT VGG SCHEME

**TITLE**  
**FARM 517 PTN 0**  
**JACQUES JACOBS**

|                      |    |            |
|----------------------|----|------------|
| PROJECT No. 11613568 |    | REV 0      |
| SCALE 1:35 000       |    | A4         |
| GIS                  | MB | 22/04/2014 |
| CHECK                | DB | 22/04/2014 |
| REVIEW               | FW | 22/04/2014 |



## JACQUES JACOBS - BASIC SITE INFORMATION

| SITE LOCATION    |            |                            |                       |            |              |               |              |              |            | GEOHYDROLOGY |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------|------------|----------------------------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|--------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier: | Number:    | District                   | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]    | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823DAX0005      | SD1-GAA163 | RE517/0                    | HUISTENBOSCH          | B          | 28.53810967  | 23.615180001  | 1414.10      | 0.08         | 165        |              | 5.03         |            |                |                       |                |                 |                   |
| 2823DAX0006      | SD1-GAA164 | RE517/0                    | HUISTENBOSCH          | B          | 28.53773967  | 23.615440001  | 1414.06      |              | 165        |              |              |            |                |                       |                |                 |                   |
| 2823DAX0007      | SD1-GAA165 | RE517/0                    | HUISTENBOSCH          | B          | 28.53751967  | 23.615460001  | 1414.12      | 0.14         | 165        |              | 4.77         |            |                |                       | 0              | 0               |                   |
| 2823DAX0008      | SD1-GAA166 | RE517/0                    | HUISTENBOSCH          | B          | 28.53256967  | 23.631410001  | 1411.37      | 0.25         | 165        |              | 4.74         |            |                |                       |                |                 |                   |
| 2823DAX0009      | SD1-GAA167 | RE517/0                    | HUISTENBOSCH          | B          | 28.52302967  | 23.622580001  | 1410.50      |              | 165        |              |              |            |                |                       |                |                 |                   |
| 2823DAX0010      | SD1-GAA168 | RE517/0                    | HUISTENBOSCH          | B          | 28.53581967  | 23.616780001  | 1409.20      |              | 165        |              |              |            |                |                       |                |                 |                   |
| SUMMARY:         |            | Site Type:<br>B = Borehole |                       |            |              |               |              |              | Maximum:   |              | 5.03         |            |                |                       |                |                 |                   |
|                  |            |                            |                       |            |              |               |              |              | Minimum:   |              | 4.74         |            |                |                       |                |                 |                   |
| Nr. of sites:    |            | 6                          |                       |            |              |               |              |              | Sum:       |              |              |            |                |                       |                |                 |                   |
|                  |            |                            |                       |            |              |               |              |              | Average:   |              | 4.85         |            |                |                       |                |                 |                   |

Site Type:  
B = Borehole

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



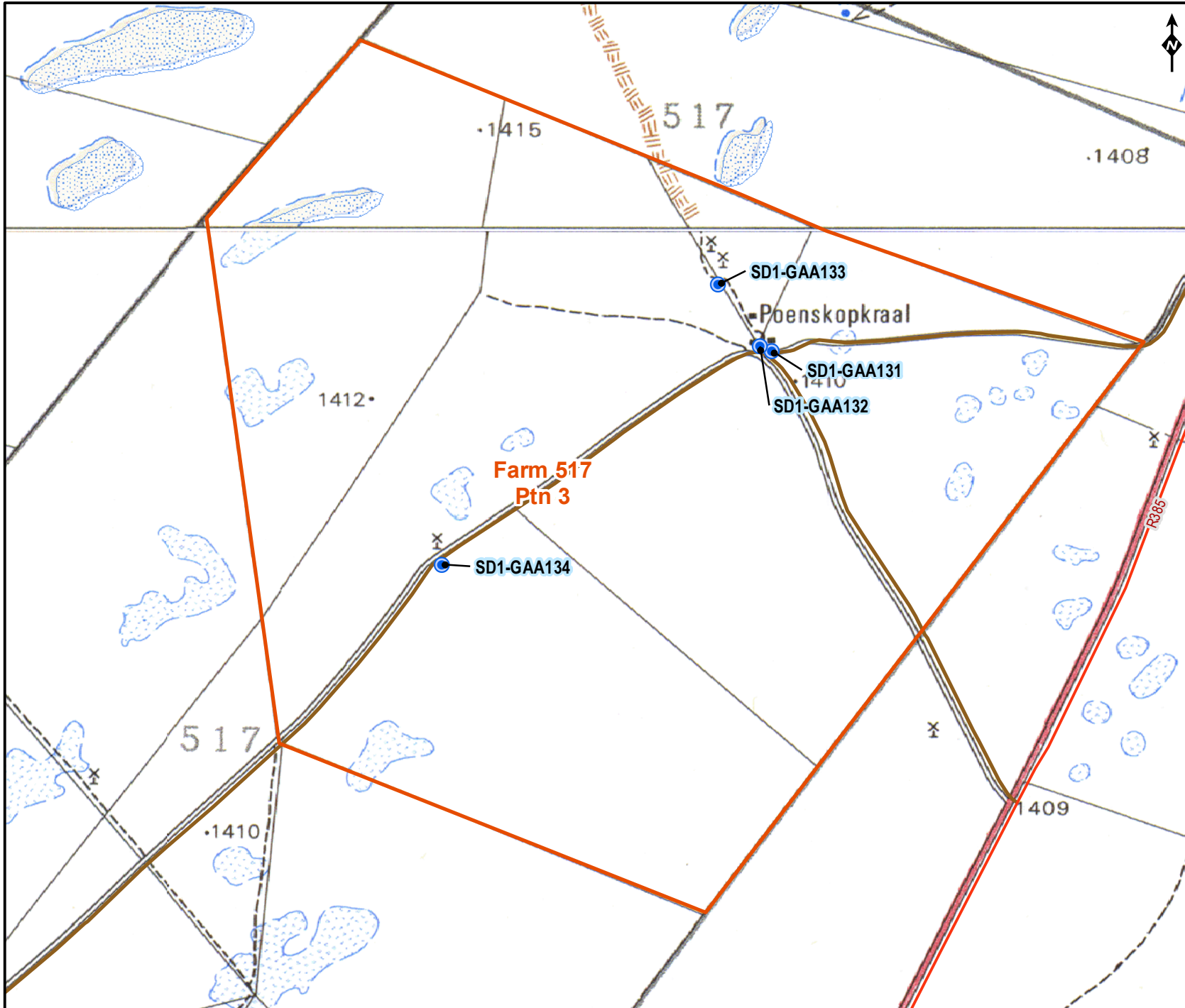
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Project No.: 11613568



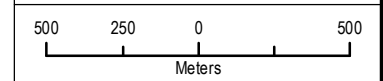
## 2.20 Johan du Plessis



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- LEGEND**
- Existing borehole survey
  - Farm 517 Ptn 3
  - Main road
  - Other road
  - Rivers
  - Dam
  - Pan
  - Marsh vlei



**RESOURCES/NOTES**  
Coordinate System: GCS WGS 1984  
Datum: WGS 1984

**PROJECT**  
GW ASSESSMENT VGG SCHEME

**TITLE**  
**FARM 517 PTN 3**  
**JOHAN DU PLESSIS**

|                      |    |            |
|----------------------|----|------------|
| PROJECT No. 11613568 |    | REV 0      |
| SCALE 1:25 000       |    | A4         |
| GIS                  | MB | 22/04/2014 |
| CHECK                | DB | 22/04/2014 |
| REVIEW               | FW | 22/04/2014 |



## JOHAN DU PLESSIS - BASIC SITE INFORMATION

| SITE LOCATION          |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:       | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823DAX0001            | SD1-GAA131 | 517/3    | POENSKOPKRAAL         | B          | 28.50542967  | 23.652060001  | 1411.20      | 1.25         | 165        |                 | 5.04         |            |                |                       |                |                 |                   |
| 2823DAX0002            | SD1-GAA132 | 517/3    | POENSKOPKRAAL         | B          | 28.50523967  | 23.651580001  | 1410.20      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823DAX0003            | SD1-GAA133 | 517/3    | POENSKOPKRAAL         | B          | 28.50264967  | 23.649850001  | 1409.20      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823DAX0004            | SD1-GAA134 | 517/3    | POENSKOPKRAAL         | B          | 28.51435967  | 23.638260001  | 1411.30      | 0.19         | 165        |                 | 5.46         |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>        |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> |              |            |                | 5.46                  |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Minimum:</b> |              |            |                | 5.04                  |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
| <b>Nr. of sites:</b> 4 |            |          |                       |            |              |               |              |              |            | <b>Average:</b> |              |            |                | 5.25                  |                |                 |                   |

NOTE:  
 "Yield" represents cumulative blow yield  
 The recommended abstraction ("Rec. abs.")  
 is based on a 24 hour duty cycle  
 (based on test pumping result)



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## JOHAN DU PLESSIS - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823DAX0004    **Number:** SD1-GAA134    **Site Name:** POENSKOPKRAAL

| Samp. Nr./Type | Date/Time samp. | pH   | EC   | TDS   | Ca  | Mg   | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|------|-------|-----|------|------|------|------|---------|------|------|----------|-------|
| SD1-GA134      | 20120216 0800   | 7.57 | 94 † | 674 † | 120 | 65.9 | 20.8 | 1.19 | 24.6 | 461     | 52.9 | 42.3 | 2.94     | 0.268 |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source



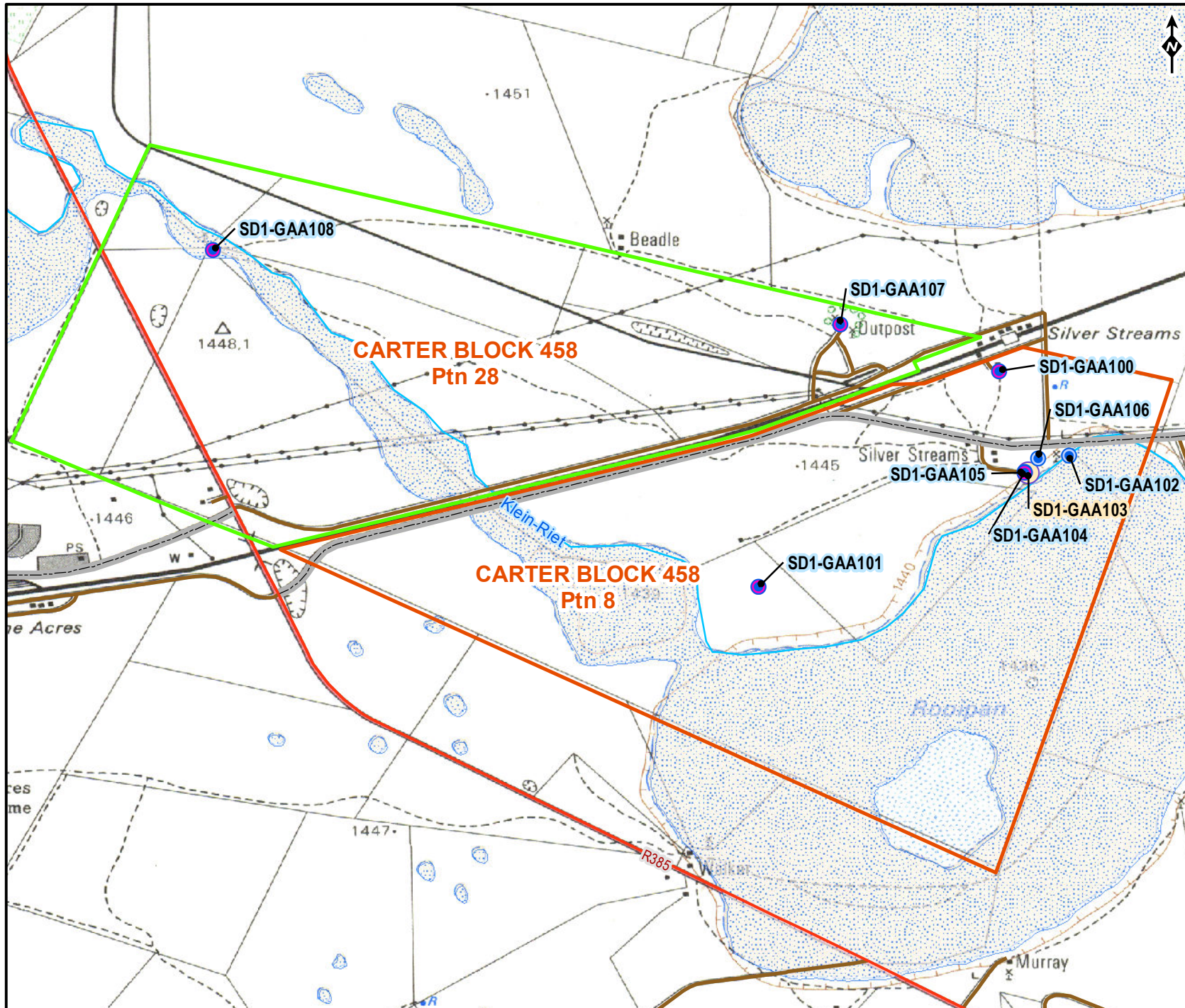
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Project No.: 11613568



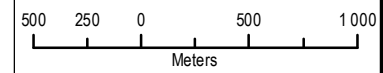
## **2.21 Johan Faihst**



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- LEGEND**
- Existing borehole survey
  - Existing borehole tested
  - Dug well
  - Carter Block 458 Ptn 28
  - Carter Block 458 Ptn 8
  - Main road
  - Secondary road
  - Other road
  - Street
  - Rivers
  - Dam
  - Pan
  - Marsh vlei



**RESOURCES/NOTES**  
Coordinate System: GCS WGS 1984  
Datum: WGS 1984

**PROJECT**  
GW ASSESSMENT VGG SCHEME

**TITLE**  
**CARTER BLOCK 458 PTN 8 & 28**  
**JOHAN FAHST**

|                      |          |            |
|----------------------|----------|------------|
| PROJECT No. 11613568 |          | REV 0      |
| SCALE                | 1:35 000 | A4         |
| GIS                  | MB       | 24/04/2014 |
| CHECK                | DB       | 24/04/2014 |
| REVIEW               | FW       | 24/04/2014 |



## JOHAN FAIHST - BASIC SITE INFORMATION

| SITE LOCATION          |            |          |                                  |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------------|------------|----------|----------------------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:       | Number:    | District | Site name/Description            | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0093            | SD1-GAA102 | RE458/8  | CARTER BLOCK PTN. SILVER STREAMS | B          | 28.35272967  | 23.583400001  | 1439.90      | 0.36         | 165        | 40.00           | 6.49         |            |                |                       |                |                 |                   |
| 2823BCX0095            | SD1-GAA104 | RE458/8  | CARTER BLOCK PTN. SILVER STREAMS | B          | 28.35366967  | 23.580820001  | 1440.40      | 0.12         | 165        |                 | 12.18        |            |                |                       |                |                 |                   |
| 2823BCX0097            | SD1-GAA106 | RE458/8  | CARTER BLOCK PTN. SILVER STREAMS | B          | 28.35289967  | 23.581580001  | 1444.40      | 0.27         | 165        | 35.00           | 10.83        |            |                |                       | 0.33           | 2               | 2.38              |
| <b>SUMMARY:</b>        |            |          |                                  |            |              |               |              |              |            | <b>Maximum:</b> | 40.00        | 12.18      |                |                       | 0.33           |                 | 2.38              |
|                        |            |          |                                  |            |              |               |              |              |            | <b>Minimum:</b> | 35.00        | 6.49       |                |                       | 0.33           |                 | 2.38              |
|                        |            |          |                                  |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       | 0.33           |                 | 2.38              |
|                        |            |          |                                  |            |              |               |              |              |            | <b>Average:</b> | 37.50        | 9.83       |                |                       | 0.33           |                 | 2.38              |
| <b>Nr. of sites:</b> 3 |            |          |                                  |            |              |               |              |              |            |                 |              |            |                |                       |                |                 |                   |

Site Type:  
B = Borehole

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0091 Number: SD1-GAA100 Site type: Borehole

Distr./Farm No.: RE458/8 Site Name/Descr.: CARTER BLOCK PTN. SILVER STREAMS

|                |           |                  |  |               |       |                 |  |
|----------------|-----------|------------------|--|---------------|-------|-----------------|--|
| Latitude [°]:  | 28.347770 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: |  |
| Longitude [°]: | 23.579310 | Alt. No. 2:      |  | Depth [m]:    | 40.00 | WL status:      |  |
| Altitude [m]:  | 1445.10   | Rep. inst.: GOLD |  | Col. ht. [m]: |       | Date WL meas.:  |  |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |          |                           |
|----------------|----------|---------------------------|
| <b>Pump:</b>   |          |                           |
| Type of Inst.: | Windpump | Pulley Diam. [mm]:        |
| Manufacturer:  | CW5      | Depth to Intk. [m]: 13.85 |
| <b>Engine:</b> |          |                           |
| Manufacturer:  |          | Power Rating [kW]         |
| Type of Power: | Wind     | Pulley Diam. [mm]:        |

### USE APPLICATION:

Site Status: Dry  
Purpose:  
Consumer:  
Application:

### WATER CHEMISTRY:

| Sample No.:      | Date sampled: | Depth sampl. [m]:                                                                                                                                                                                                                                                                    | Comment:               |                        |
|------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------|
| Main Parameters: |               |                                                                                                                                                                                                                                                                                      | Calculated Parameters: | Bacteriol. Parameters: |
| pH:              | Na:           | Cl:                                                                                                                                                                                                                                                                                  | Langel.:               | E.Coli:                |
| EC: [mS/m]       | K:            | NO3 as N:                                                                                                                                                                                                                                                                            | Aggr-Ind:              | Faec. co:              |
| TDS:             | Si:           | SO4:                                                                                                                                                                                                                                                                                 | Ion-bal:               | Total Co:              |
| T. Alk.:         | Al:           | F:                                                                                                                                                                                                                                                                                   | CaCO3:                 | SPC:                   |
| Ca:              | Fe:           | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit   ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit   ¡ Value exceeds minimum allowable limit |                        |                        |
| Mg:              | Mn:           |                                                                                                                                                                                                                                                                                      |                        |                        |

| RECOMMENDATIONS: |              | Depth        | Duty cyc.     | Disch. rate |       | Dyn. water    | Crit. water |           |
|------------------|--------------|--------------|---------------|-------------|-------|---------------|-------------|-----------|
| Prior.           | Rec. equipm. | to intk. [m] | Type of power | [hrs]       | [l/s] | Water quality | level [m]   | level [m] |

1 0 0

**Note:** 1. This borehole collapsed. Pulling out pipes 13.85m.  
2. Borehole is Dry.  
3. The Windmill is not working. Poor condition.



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0092 Number: SD1-GAA101 Site type: Borehole

Distr./Farm No.: RE458/8 Site Name/Descr.: CARTER BLOCK PTN. SILVER STREAMS

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.360460 | Alt. No. 1:      |  | Diam. [mm]:   | 155   | Water lev. [m]: | 17.76    |
| Longitude [°]: | 23.565180 | Alt. No. 2:      |  | Depth [m]:    | 23.65 | WL status:      | Static   |
| Altitude [m]:  | 1446.14   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.43  | Date WL meas.:  | 20121017 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |          |                           |  |
|----------------|----------|---------------------------|--|
| <b>Pump:</b>   |          | <b>Pulley Diam. [mm]:</b> |  |
| Type of Inst.: | Windpump | Depth to Intk. [m]:       |  |
| Manufacturer:  |          |                           |  |
| <b>Engine:</b> |          | <b>Power Rating [kW]</b>  |  |
| Manufacturer:  |          | Pulley Diam. [mm]:        |  |
| Type of Power: | Wind     |                           |  |

### USE APPLICATION:

|              |                |
|--------------|----------------|
| Site Status: | Unused         |
| Purpose:     | No information |
| Consumer:    | No information |
| Application: | No information |

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                        |       |           |                        |           |   |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|------------------------|-----------|---|
| Sample No.:      | SD1-   | Date sampled: | 20121025 | Depth sampl. [m]:                                                                                                                                                                                                                                                                      | 23.10 | Comment:  |                        |           |   |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                                 |       |           | Bacteriol. Parameters: |           |   |
| pH:              | 6.91   | Na:           | 28.2     | Cl:                                                                                                                                                                                                                                                                                    | 292 † | Langel.:  | 0.26                   | E.Coli:   | 0 |
| EC: [mS/m]       | 154 †  | K:            | 11       | NO3 as N:                                                                                                                                                                                                                                                                              | <0.3  | Aggr-Ind: | 12.42                  | Faec. co: | 0 |
| TDS:             | 1030 † | Si:           | 22.8     | SO4:                                                                                                                                                                                                                                                                                   | 25.3  | Ion-bal:  | -4.63                  | Total Co: | 0 |
| T. Alk.:         | 529    | Al:           | <0.05    | F:                                                                                                                                                                                                                                                                                     | <0.1  | CaCO3:    | 807.44                 | SPC:      | 0 |
| Ca:              | 244 ‡  | Fe:           | 1.02 ‡   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    ‡ Value exceeds minimum allowable limit |       |           |                        |           |   |
| Mg:              | 48.3   | Mn:           | 1.5 ‡    |                                                                                                                                                                                                                                                                                        |       |           |                        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | Recovery [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|----------------|----------|---------|---------|
| STEP TEST STEP 1 | 20121017 | 28           | 23.10              | 0.50             | 5.34       | 0.08           | 99             | 60       |         |         |
| PUMP INLET       | 20121017 | 12           | 23.10              | 0.12             | 5.34       |                |                |          |         |         |

| RECOMMENDATIONS: |              | Depth        | Duty cyc.     | Disch. rate |       | Dyn. water    | Crit. water |           |
|------------------|--------------|--------------|---------------|-------------|-------|---------------|-------------|-----------|
| Prior.           | Rec. equipm. | to intk. [m] | Type of power | [hrs]       | [l/s] | Water quality | level [m]   | level [m] |

1

0

0

Note: 1. Bee's in borehole



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# PUMPING TEST REPORT

Date compiled: 2012/10/29

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0092 Number: SD1-GAA101 Site type: Borehole

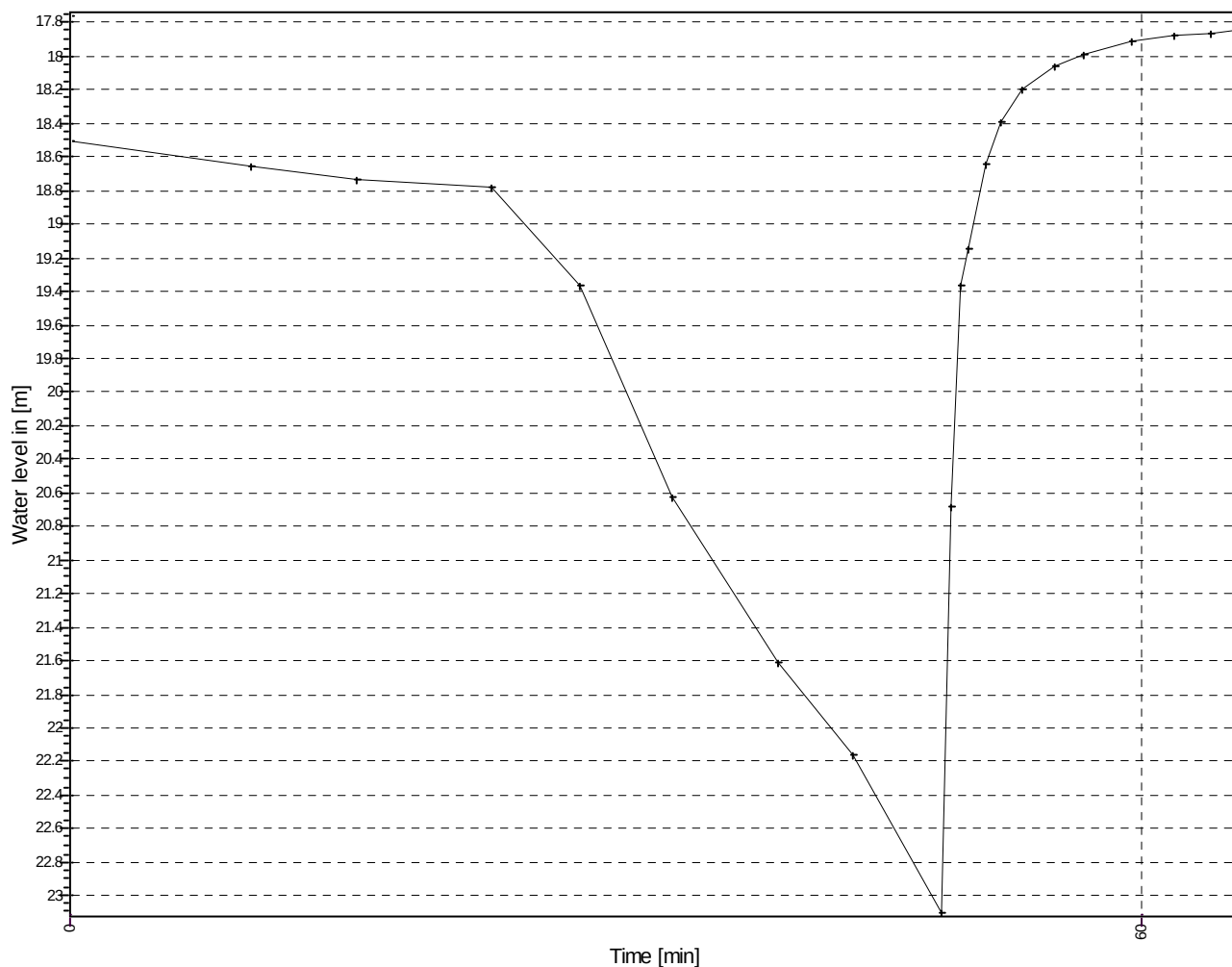
Distr./Farm No.: RE458/8

Site Name/Des.: CARTER BLOCK PTN. SILVER STREAMS

|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.360460 | Alt. No. 1:      |  | Diam. [mm]:    | 155   | Water lev. [m]: | 17.76    |
| Longitude [°] | 23.565180 | Alt. No. 2:      |  | Depth [m]:     | 23.65 | Piezometer:     | 0        |
| Altitude [m]: | 1446.14   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.43  | Date WL meas.:  | 20121017 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test    | 23.10               | 20121017      | 0720 | 20121017    | 0848 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 0720        | 28           | 23.10              | 0.50             | 5.34       | 0.08       | 99 | 60              |                            |             |         | 0.09 |
| PUMP INLET       | 0848        | 12           | 23.10              | 0.12             | 5.34       |            |    |                 |                            |             |         | 0.02 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0096 Number: SD1-GAA105 Site type: Borehole

Distr./Farm No.: RE458/8 Site Name/Descr.: CARTER BLOCK PTN. SILVER STREAMS

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.353740 | Alt. No. 1:      |  | Diam. [mm]:   | 170   | Water lev. [m]: | 11.00    |
| Longitude [°]: | 23.580790 | Alt. No. 2:      |  | Depth [m]:    | 56.04 | WL status:      | Static   |
| Altitude [m]:  | 1440.17   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.30  | Date WL meas.:  | 20121018 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                  |                     |       |
|----------------|------------------|---------------------|-------|
| <b>Pump:</b>   |                  |                     |       |
| Type of Inst.: | Submersible pump | Pulley Diam. [mm]:  |       |
| Manufacturer:  | SPERONI          | Depth to Intk. [m]: | 29.68 |
| <b>Engine:</b> |                  |                     |       |
| Manufacturer:  |                  | Power Rating [kW]   | 11    |
| Type of Power: | Electric motor   | Pulley Diam. [mm]:  |       |

### USE APPLICATION:

|              |                                    |
|--------------|------------------------------------|
| Site Status: | In use                             |
| Purpose:     | Production (water supply)          |
| Consumer:    | Non-urban                          |
| Application: | Agricultural - stock watering only |

### WATER CHEMISTRY:

|                                                                                      |        |               |          |                                                                                                        |       |                        |        |           |   |
|--------------------------------------------------------------------------------------|--------|---------------|----------|--------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|---|
| Sample No.:                                                                          | SD1-   | Date sampled: | 20121025 | Depth sampl. [m]:                                                                                      | 50.80 | Comment:               |        |           |   |
| Main Parameters:                                                                     |        |               |          | Calculated Parameters:                                                                                 |       | Bacteriol. Parameters: |        |           |   |
| pH:                                                                                  | 7.89   | Na:           | 54.1     | Cl:                                                                                                    | 187   | Langel.:               | -0.23  | E.Coli:   | 0 |
| EC: [mS/m]                                                                           | 137 †  | K:            | 8.33     | NO3 as N:                                                                                              | 23 ‡  | Aggr-Ind:              | 11.89  | Faec. co: | 0 |
| TDS:                                                                                 | 1010 † | Si:           | 19.6     | SO4:                                                                                                   | 101   | Ion-bal:               | -24.97 | Total Co: | 0 |
| T. Alk.:                                                                             | 335    | Al:           | <0.05    | F:                                                                                                     | 0.132 | CaCO3:                 | 343.76 | SPC:      | 0 |
| Ca:                                                                                  | 12     | Fe:           | <0.05    | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption |       |                        |        |           |   |
| Mg:                                                                                  | 76.3 † | Mn:           | <0.05    | † Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit                   |       |                        |        |           |   |
| ! Value exceeds recommended minimum limit    ‡ Value exceeds minimum allowable limit |        |               |          |                                                                                                        |       |                        |        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %  | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121018 | 60           | 50.80              | 0.63             | 1.89       |              |    |       |          |         |         |
| STEP TEST STEP 2 | 20121018 | 60           | 50.80              | 1.16             | 4.86       |              |    |       |          |         |         |
| STEP TEST STEP 3 | 20121018 | 60           | 50.80              | 2.10             | 14.33      |              |    |       |          |         |         |
| STEP TEST STEP 4 | 20121018 | 16           | 50.80              | 3.14             | 39.80      | 0.43         | 99 | 210   |          |         |         |
| PUMP INLET       | 20121018 | 24           | 50.80              | 1.97             | 39.80      |              |    |       |          |         |         |
| CONSTANT         | 20121019 | 720          | 50.80              | 1.41             | 9.74       | 0.46         | 95 | 720   |          |         |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm. | Depth to intk. [m] | Type of power | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|--------------|--------------------|---------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      |              |                    |               | 8               | 0.42              |               |                      |                       |



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# PUMPING TEST REPORT

Date compiled: 2012/10/26

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0096 Number: SD1-GAA105 Site type: Borehole

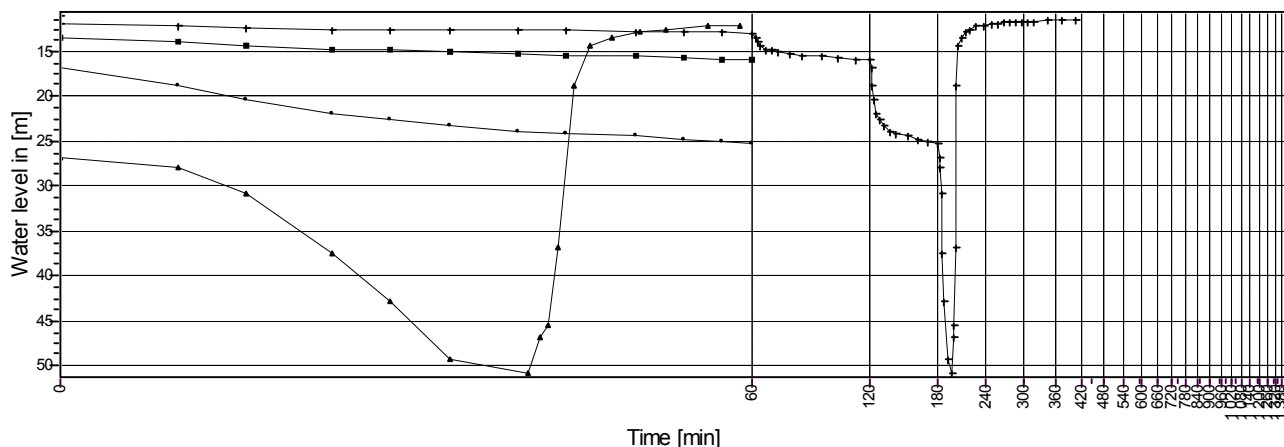
Distr./Farm No.: RE458/8

Site Name/Des.: CARTER BLOCK PTN. SILVER STREAMS

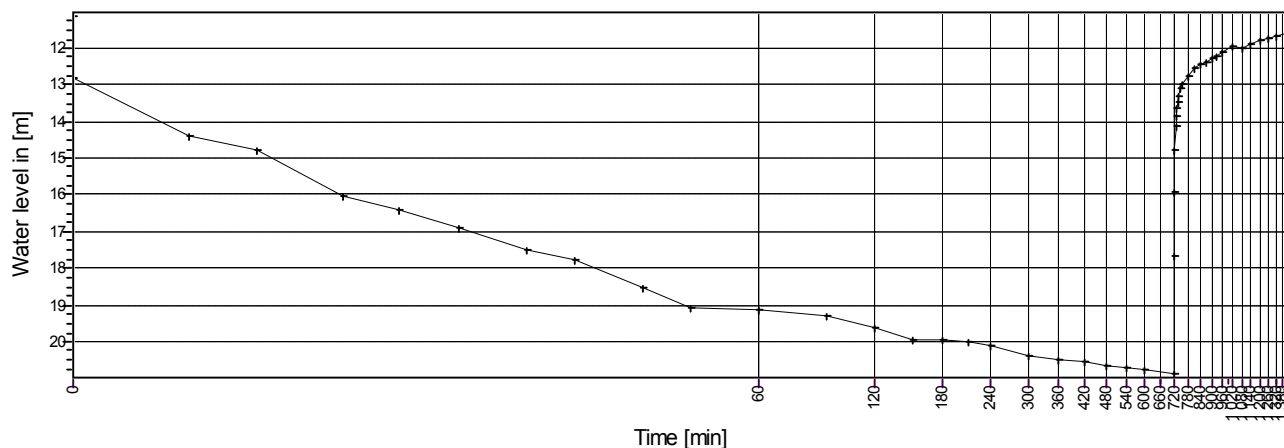
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.353740 | Alt. No. 1:      |  | Diam. [mm]:    | 170   | Water lev. [m]: | 11.00    |
| Longitude [°] | 23.580790 | Alt. No. 2:      |  | Depth [m]:     | 56.04 | Piezometer:     | 0        |
| Altitude [m]: | 1440.17   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.30  | Date WL meas.:  | 20121018 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 50.80               | 20121018      | 1105 | 20121018    | 1751 |                               |           |                 |
| GOLD       | Constant rate test | 50.80               | 20121019      | 0710 | 20121020    | 0710 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1105        | 60           | 50.80              | 0.63             | 1.89       |            |    |                 |                            |             |         | 0.33 |
| STEP TEST STEP 2 | 1205        | 60           | 50.80              | 1.16             | 4.86       |            |    |                 |                            |             |         | 0.24 |
| STEP TEST STEP 3 | 1305        | 60           | 50.80              | 2.10             | 14.33      |            |    |                 |                            |             |         | 0.15 |
| STEP TEST STEP 4 | 1405        | 16           | 50.80              | 3.14             | 39.80      | 0.43       | 99 | 210             |                            |             |         | 0.08 |
| PUMP INLET       | 1751        | 24           | 50.80              | 1.97             | 39.80      |            |    |                 |                            |             |         | 0.05 |
| CONSTANT         | 0710        | 720          | 50.80              | 1.41             | 9.74       | 0.46       | 95 | 720             |                            |             |         | 0.14 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0098 Number: SD1-GAA107 Site type: Borehole

Distr./Farm No.: RE458/8 Site Name/Descr.: CARTER BLOCK PTN. SILVER STREAMS

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.345070 | Alt. No. 1:      |  | Diam. [mm]:   | 155   | Water lev. [m]: | 14.69    |
| Longitude [°]: | 23.569970 | Alt. No. 2:      |  | Depth [m]:    | 30.20 | WL status:      | Static   |
| Altitude [m]:  | 1444.29   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.31  | Date WL meas.:  | 20121020 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                  |                     |       |
|----------------|------------------|---------------------|-------|
| <b>Pump:</b>   |                  |                     |       |
| Type of Inst.: | Submersible pump | Pulley Diam. [mm]:  |       |
| Manufacturer:  | FRANKLIN         | Depth to Intk. [m]: | 29.52 |
| <b>Engine:</b> |                  |                     |       |
| Manufacturer:  |                  | Power Rating [kW]   |       |
| Type of Power: | Wind             | Pulley Diam. [mm]:  |       |

### USE APPLICATION:

|              |                         |
|--------------|-------------------------|
| Site Status: | In use                  |
| Purpose:     | Standby                 |
| Consumer:    | Non-urban               |
| Application: | Domestic - all purposes |

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                        |        |                        |        |           |   |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------|--------|-----------|---|
| Sample No.:      | SD1-   | Date sampled: | 20121025 | Depth sampl. [m]:                                                                                                                                                                                                                                                                      | 26.10  | Comment:               |        |           |   |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                                 |        | Bacteriol. Parameters: |        |           |   |
| pH:              | 7.64   | Na:           | 111 †    | Cl:                                                                                                                                                                                                                                                                                    | 310 †  | Langel.:               | 0.48   | E.Coli:   | 0 |
| EC: [mS/m]       | 167 †  | K:            | 14.2     | NO3 as N:                                                                                                                                                                                                                                                                              | 14.5 † | Aggr-Ind:              | 12.63  | Faec. co: | 0 |
| TDS:             | 1270 † | Si:           | 18.7     | SO4:                                                                                                                                                                                                                                                                                   | 207 †  | Ion-bal:               | 1.35   | Total Co: | 0 |
| T. Alk.:         | 247    | Al:           | <0.05    | F:                                                                                                                                                                                                                                                                                     | 0.127  | CaCO3:                 | 718.34 | SPC:      | 0 |
| Ca:              | 159 †  | Fe:           | <0.05    | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    ¡ Value exceeds minimum allowable limit |        |                        |        |           |   |
| Mg:              | 78.2 † | Mn:           | <0.05    |                                                                                                                                                                                                                                                                                        |        |                        |        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | Recovery [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|----------------|----------|---------|---------|
| STEP TEST STEP 1 | 20121020 | 20           | 26.10              | 0.53             | 11.41      | 0 100          | 40             |          |         |         |
| PUMP INLET       | 20121020 | 10           | 26.10              |                  | 11.41      |                |                |          |         |         |

# PUMPING TEST REPORT

Date compiled: 2012/10/26

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0098 Number: SD1-GAA107 Site type: Borehole

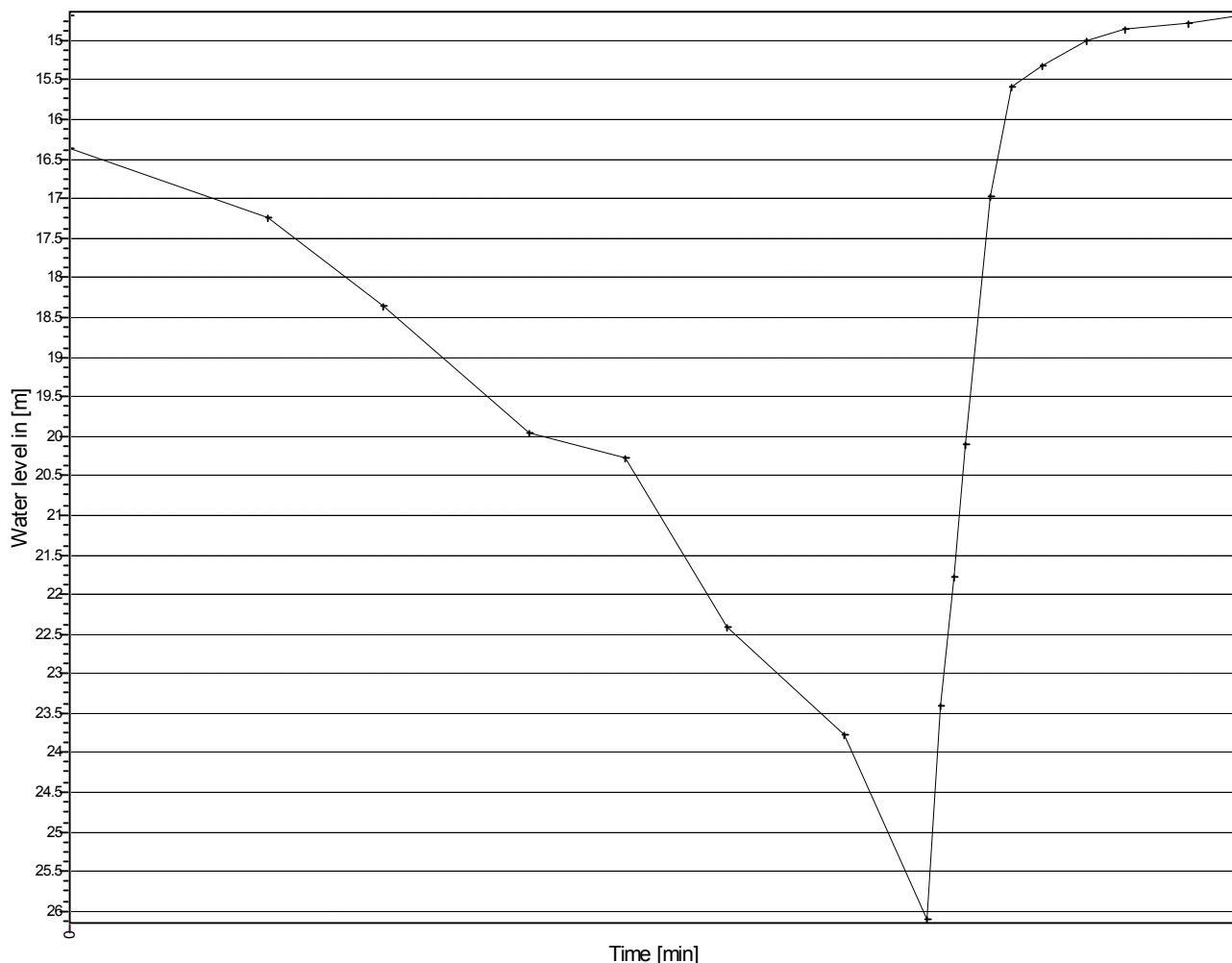
Distr./Farm No.: RE458/8

Site Name/Des.: CARTER BLOCK PTN. SILVER STREAMS

|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.345070 | Alt. No. 1:      |  | Diam. [mm]:    | 155   | Water lev. [m]: | 14.69    |
| Longitude [°] | 23.569970 | Alt. No. 2:      |  | Depth [m]:     | 30.20 | Piezometer:     | 0        |
| Altitude [m]: | 1444.29   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.31  | Date WL meas.:  | 20121020 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test    | 26.10               | 20121020      | 1330 | 20121020    | 1430 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1330        | 20           | 26.10              | 0.53             | 11.41      | 0          | 100 | 40              |                            |             |         | 0.05 |
| PUMP INLET       | 1430        | 10           | 26.10              |                  | 11.41      |            |     |                 |                            |             |         | 0.00 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0099 Number: SD1-GAA108 Site type: Borehole

Distr./Farm No.: RE458/8 Site Name/Descr.: CARTER BLOCK PTN. SILVER STREAMS

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.340710 | Alt. No. 1:      |  | Diam. [mm]:   | 170   | Water lev. [m]: | 22.02    |
| Longitude [°]: | 23.533200 | Alt. No. 2:      |  | Depth [m]:    | 39.00 | WL status:      | Static   |
| Altitude [m]:  | 1444.99   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.33  | Date WL meas.:  | 20121020 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                    |                     |       |
|----------------|--------------------|---------------------|-------|
| <b>Pump:</b>   |                    |                     |       |
| Type of Inst.: | Submersible pump   | Pulley Diam. [mm]:  |       |
| Manufacturer:  | PECIPROCAL CYLINDE | Depth to Intk. [m]: | 37.40 |
| <b>Engine:</b> |                    |                     |       |
| Manufacturer:  |                    | Power Rating [kW]   | 0.5   |
| Type of Power: | Electric motor     | Pulley Diam. [mm]:  |       |

### USE APPLICATION:

|              |                                    |
|--------------|------------------------------------|
| Site Status: | In use                             |
| Purpose:     | Production (water supply)          |
| Consumer:    | Non-urban                          |
| Application: | Agricultural - stock watering only |

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                        |       |           |                        |           |   |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|------------------------|-----------|---|
| Sample No.:      | SD1-   | Date sampled: | 20121025 | Depth sampl. [m]:                                                                                                                                                                                                                                                                      | 36.00 | Comment:  |                        |           |   |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                                 |       |           | Bacteriol. Parameters: |           |   |
| pH:              | 7.71   | Na:           | 24.4     | Cl:                                                                                                                                                                                                                                                                                    | 90.2  | Langel.:  | 0.61                   | E.Coli:   | 0 |
| EC: [mS/m]       | 86.3 † | K:            | 2.7      | NO3 as N:                                                                                                                                                                                                                                                                              | 6     | Aggr-Ind: | 12.69                  | Faec. co: | 0 |
| TDS:             | 656 †  | Si:           | 17.6     | SO4:                                                                                                                                                                                                                                                                                   | 46.2  | Ion-bal:  | 2.95                   | Total Co: | 0 |
| T. Alk.:         | 297    | Al:           | <0.05    | F:                                                                                                                                                                                                                                                                                     | 0.103 | CaCO3:    | 467.48                 | SPC:      | 0 |
| Ca:              | 130    | Fe:           | <0.05    | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    ¡ Value exceeds minimum allowable limit |       |           |                        |           |   |
| Mg:              | 34.8   | Mn:           | <0.05    |                                                                                                                                                                                                                                                                                        |       |           |                        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121020 | 60           | 36.00              | 0.55             | 1.08       |                |       |          |         |         |
| STEP TEST STEP 2 | 20121020 | 60           | 36.00              | 1.03             | 1.20       |                |       |          |         |         |
| STEP TEST STEP 3 | 20121020 | 60           | 36.00              | 1.63             | 2.74       |                |       |          |         |         |
| STEP TEST STEP 4 | 20121020 | 30           | 36.00              | 5.22             | 13.34      | 100            | 7     |          |         |         |
| PUMP INLET       | 20121020 | 25           | 36.00              | 3.06             | 13.98      |                |       |          |         |         |
| CONSTANT         | 20121020 | 720          | 36.00              | 2.83             | 1.24       | 100            | 3     |          |         |         |

# PUMPING TEST REPORT

Date compiled: 2012/10/26

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0099 Number: SD1-GAA108 Site type: Borehole

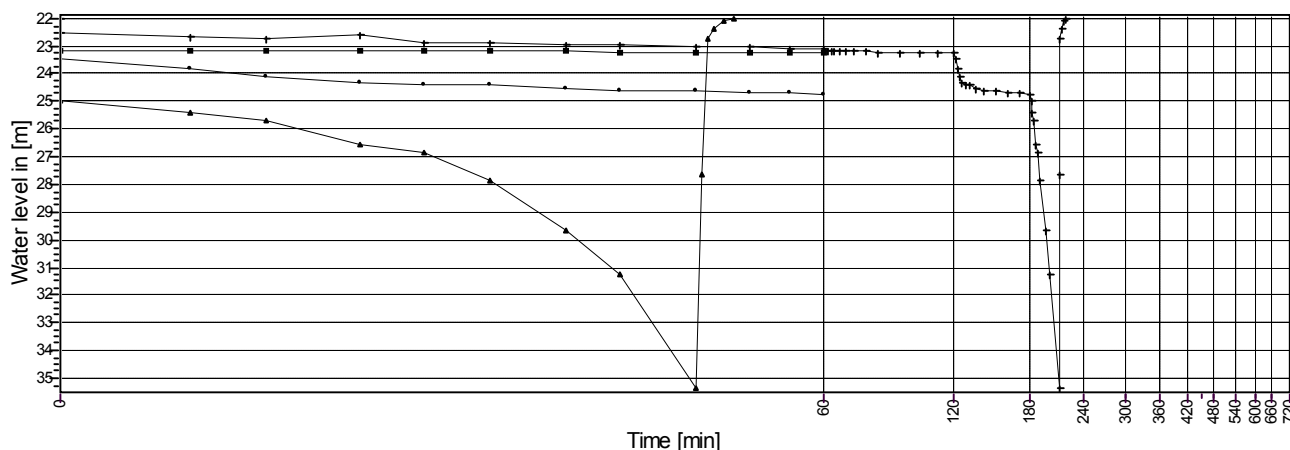
Distr./Farm No.: RE458/8

Site Name/Des.: CARTER BLOCK PTN. SILVER STREAMS

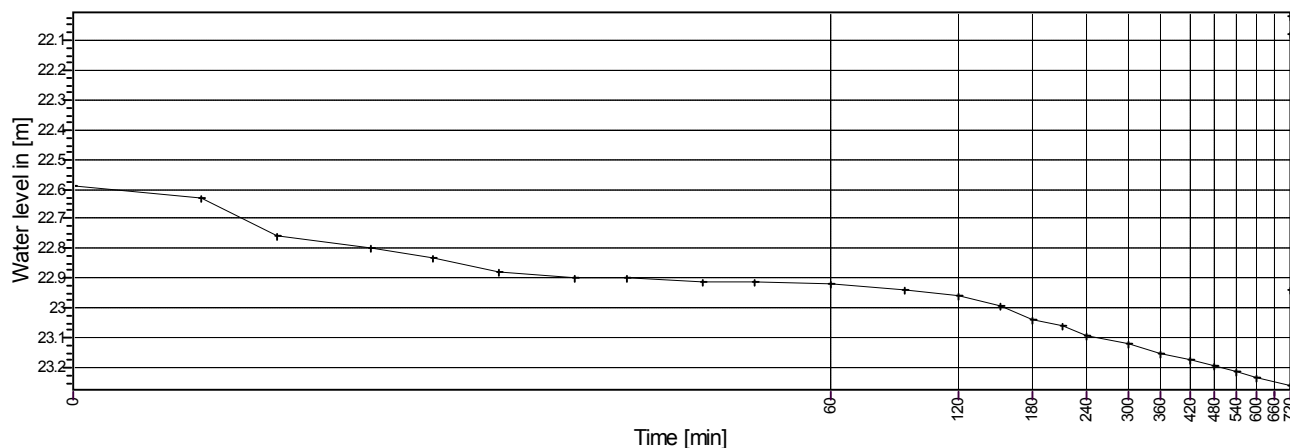
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.340710 | Alt. No. 1:      |  | Diam. [mm]:    | 170   | Water lev. [m]: | 22.02    |
| Longitude [°] | 23.533200 | Alt. No. 2:      |  | Depth [m]:     | 39.00 | Piezometer:     | 0        |
| Altitude [m]: | 1444.99   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.33  | Date WL meas.:  | 20121020 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 36.00               | 20121020      | 0720 | 20121020    | 1057 |                               |           |                 |
| GOLD       | Constant rate test | 36.00               | 20121020      | 1200 | 20121021    | 0003 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 0720        | 60           | 36.00              | 0.55             | 1.08       |            |     |                 |                            |             |         | 0.51 |
| STEP TEST STEP 2 | 0820        | 60           | 36.00              | 1.03             | 1.20       |            |     |                 |                            |             |         | 0.86 |
| STEP TEST STEP 3 | 0920        | 60           | 36.00              | 1.63             | 2.74       |            |     |                 |                            |             |         | 0.59 |
| STEP TEST STEP 4 | 1020        | 30           | 36.00              | 5.22             | 13.34      |            | 100 | 7               |                            |             |         | 0.39 |
| PUMP INLET       | 1057        | 25           | 36.00              | 3.06             | 13.98      |            |     |                 |                            |             |         | 0.22 |
| CONSTANT         | 1200        | 720          | 36.00              | 2.83             | 1.24       |            | 100 | 3               |                            |             |         | 2.28 |

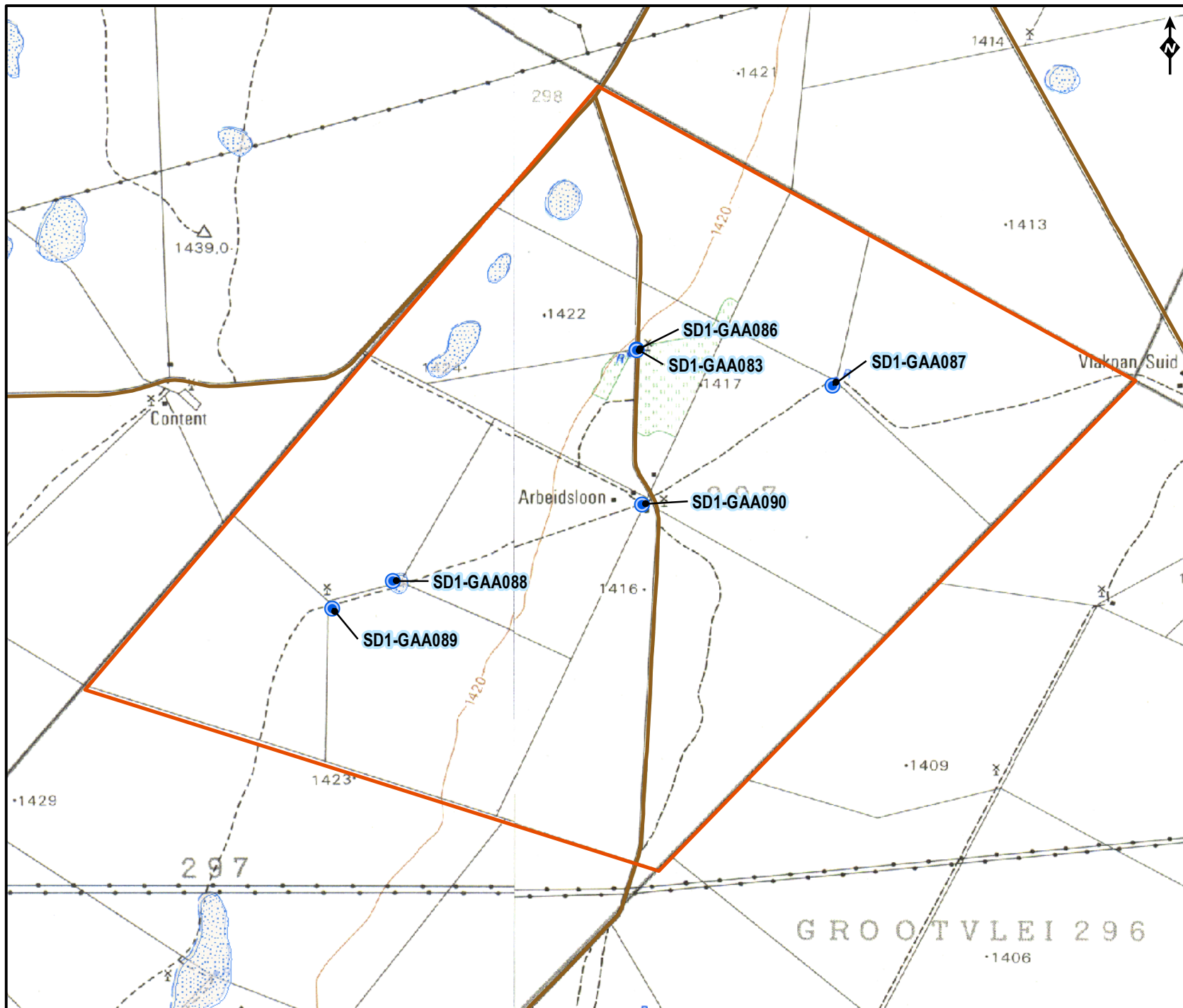


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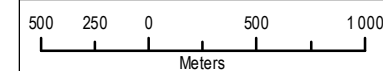


## **2.22 Keith Williams**





- LEGEND**
- Existing borehole survey
  - Farm 297 Ptn 1
  - Other road
  - Rivers
  - Dam
  - Pan
  - Marsh vlei



**RESOURCES/NOTES**  
Coordinate System: GCS WGS 1984  
Datum: WGS 1984

**PROJECT**  
GW ASSESSMENT VGG SCHEME

**TITLE**  
**FARM 297 PTN 1**  
**KEITH WILLIAMS**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:35 000       | A4         |
| GIS MB               | 23/04/2014 |
| CHECK DB             | 23/04/2014 |
| REVIEW FW            | 23/04/2014 |



## KEITH WILLIAMS - BASIC SITE INFORMATION

| SITE LOCATION    |            |                            |                       |            |              |               |              |              |            | GEOHYDROLOGY |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------|------------|----------------------------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|--------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier: | Number:    | District                   | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]    | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0083      | SD1-GAA088 | 297/1                      | ARBEIDSLOON           | B          | 28.33040967  | 23.742390001  | 1421.80      |              | 165        | 30.00        |              |            |                |                       |                |                 |                   |
| 2823BCX0084      | SD1-GAA089 | 297/1                      | ARBEIDSLOON           | B          | 28.33203967  | 23.738830001  | 1423.30      | 0.13         | 165        |              | 3.36         |            |                |                       |                |                 |                   |
| 2823BDX0001      | SD1-GAA083 | 297/1                      | ARBEIDSLOON           | B          | 28.31680967  | 23.756720001  | 1423.15      | 0.10         | 165        | 30.00        | 4.48         |            |                |                       |                |                 |                   |
| 2823BDX0002      | SD1-GAA086 | 297/1                      | ARBEIDSLOON           | B          | 28.31685967  | 23.756730001  | 1423.20      | 0.33         | 165        | 5.00         | 4.12         |            |                |                       |                |                 |                   |
| 2823BDX0003      | SD1-GAA087 | 297/1                      | ARBEIDSLOON           | B          | 28.31889967  | 23.768240001  | 1419.76      | 0.70         | 165        | 18.00        | 3.69         |            |                |                       |                |                 |                   |
| 2823BDX0004      | SD1-GAA090 | 297/1                      | ARBEIDSLOON           | B          | 28.32591967  | 23.757060001  | 1420.94      |              | 165        | 18.00        |              |            |                |                       |                |                 |                   |
| SUMMARY:         |            | Site Type:<br>B = Borehole |                       |            |              |               |              |              | Maximum:   |              | 30.00        | 4.48       |                |                       |                |                 |                   |
|                  |            |                            |                       |            |              |               |              |              | Minimum:   |              | 5.00         | 3.36       |                |                       |                |                 |                   |
| Nr. of sites:    |            | 6                          |                       |            |              |               |              |              | Sum:       |              |              |            |                |                       |                |                 |                   |
|                  |            |                            |                       |            |              |               |              |              | Average:   |              | 20.20        | 3.91       |                |                       |                |                 |                   |

Site Type:  
B = Borehole

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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Project No.: 11613568

## KEITH WILLIAMS - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BDX0001 **Number:** SD1-GAA083 **Site Name:** ARBEIDSLOON

| Samp. Nr./Type | Date/Time samp. | pH   | EC    | TDS   | Ca  | Mg     | Na | K    | Si   | T. Alk. | Cl  | SO4  | NO3 as N | F     |
|----------------|-----------------|------|-------|-------|-----|--------|----|------|------|---------|-----|------|----------|-------|
| SD1-GA083      | 20120216 0800   | 7.81 | 132 † | 994 † | 106 | 97.4 † | 54 | 3.32 | 22.8 | 458     | 160 | 68.5 | 9.01     | 0.365 |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

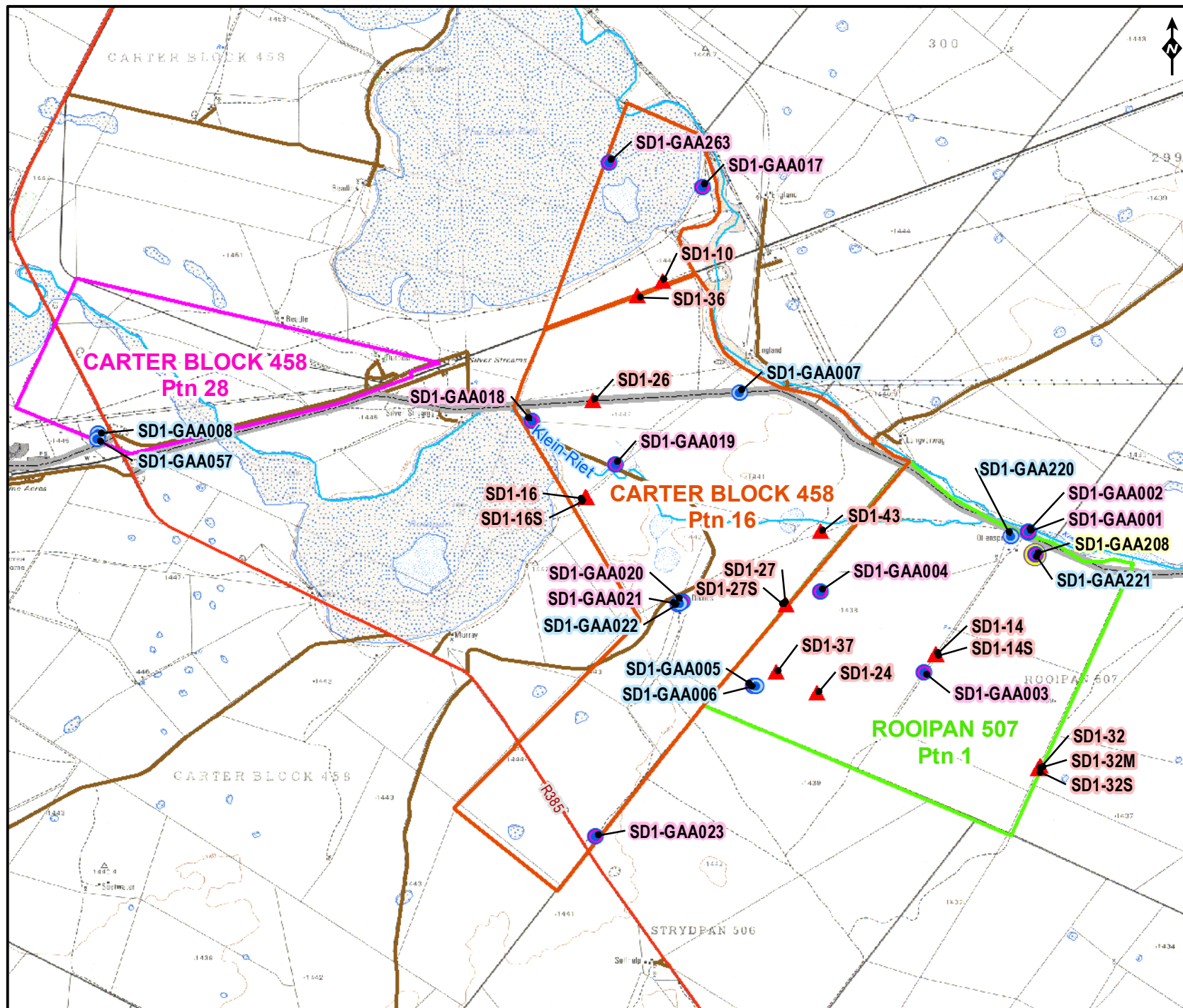
Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source



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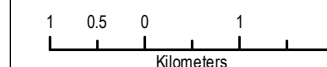


## 2.23 Kokkie York



#### LEGEND

- ▲ Newly drilled borehole
- Existing borehole survey
- Existing borehole tested
- Well point
- ▭ Carter Block 458 Ptn 28
- ▭ Carter Block 458 Ptn 16
- ▭ Rooipan 507 Ptn 1
- Main road
- Secondary road
- Other road
- Street
- Rivers
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**CARTER BLOCK PTN 16 & 28  
ROOIPAN PTN 1  
KOKKIE YORK**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:80 000       | A4         |
| GIS MB               | 23/04/2014 |
| CHECK DB             | 23/04/2014 |
| REVIEW FW            | 23/04/2014 |



## KOKKIE YORK - BASIC SITE INFORMATION

| SITE LOCATION    |            |                            |                           |            |              |               |              |              |            | GEOHYDROLOGY |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------|------------|----------------------------|---------------------------|------------|--------------|---------------|--------------|--------------|------------|--------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier: | Number:    | District                   | Site name/Description     | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]    | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0005      | SD1-GAA006 | 507/1                      | ROOIPAN PTN. OLIENSPRUIT  | B          | 28.38934967  | 23.620650001  | 1438.85      | 0.00         | 165        | 45.00        | 8.89         |            |                |                       |                |                 |                   |
| 2823BCX0006      | SD1-GAA005 | 507/1                      | ROOIPAN PTN. OLIENSPRUIT  | B          | 28.38937967  | 23.620230001  | 1436.06      | 0.33         | 160        | 38.31        | 10.90        |            |                |                       |                |                 |                   |
| 2823BCX0007      | SD1-GAA007 | RE458/3                    | CARTERBLOCK PTN. DIKBOS   | B          | 28.34997967  | 23.618450001  | 1443.50      |              |            |              | 9.44         |            |                |                       |                |                 |                   |
| 2823BCX0008      | SD1-GAA008 | RE458/3                    | CARTER BLOCK PTN. PAPKUIL | B          | 28.35547967  | 23.532430001  | 1447.10      | 0.32         | 165        | 130.00       | 15.40        |            |                |                       |                |                 |                   |
| 2823BCX0022      | SD1-GAA022 | RE45816                    | CARTER BLOCK PTN. DIKBOS  | B          | 28.37818967  | 23.610390001  | 1442.50      | 0.34         |            |              | 12.07        |            |                |                       |                |                 |                   |
| 2823BCX0055      | SD1-GAA057 | 458                        | CARTER BLOCK              | B          | 28.35624967  | 23.532270001  | 1447.70      | 0.10         | 165        | 85.00        | 21.24        |            |                |                       |                |                 |                   |
| 2823BCX0166      | SD1-GAA220 | 507                        | ROOIPAN PTN. OLIENSPRUIT  | B          | 28.36918967  | 23.654920001  | 1434.50      | 0.36         | 130        | 52.24        | 10.87        |            |                |                       |                |                 |                   |
| 2823BCX0167      | SD1-GAA221 | 507                        | ROOIPAN PTN. OLIENHOUT    | B          | 28.37161967  | 23.658120001  | 1436.30      |              | 165        |              | 10.04        |            |                |                       |                |                 |                   |
| SUMMARY:         |            | Site Type:<br>B = Borehole |                           |            |              |               |              |              | Maximum:   |              | 130.00       | 21.24      |                |                       |                |                 |                   |
|                  |            |                            |                           |            |              |               |              |              | Minimum:   |              | 38.31        | 8.89       |                |                       |                |                 |                   |
| Nr. of sites:    |            | 8                          |                           |            |              |               |              |              | Sum:       |              |              |            |                |                       |                |                 |                   |
|                  |            |                            |                           |            |              |               |              |              | Average:   |              | 70.11        | 12.36      |                |                       |                |                 |                   |

### SUMMARY:

Site Type:

B = Borehole

Maximum: 130.00 21.24

Minimum: 38.31 8.89

Sum:

Average: 70.11 12.36

Nr. of sites: 8

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0188 Number: SD1-14 Site type: Borehole

Distr./Farm No.: 508

Site Name/Des.: ROOIPAN

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.385320

Reg./BB.:

Topo-set.:

Depth [m]: 67.50

Longitude [°]: 23.644800

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.45

Altitude [m]: 1437.63

Site purp.: Production (water supply)

Diam. [mm]: 254

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

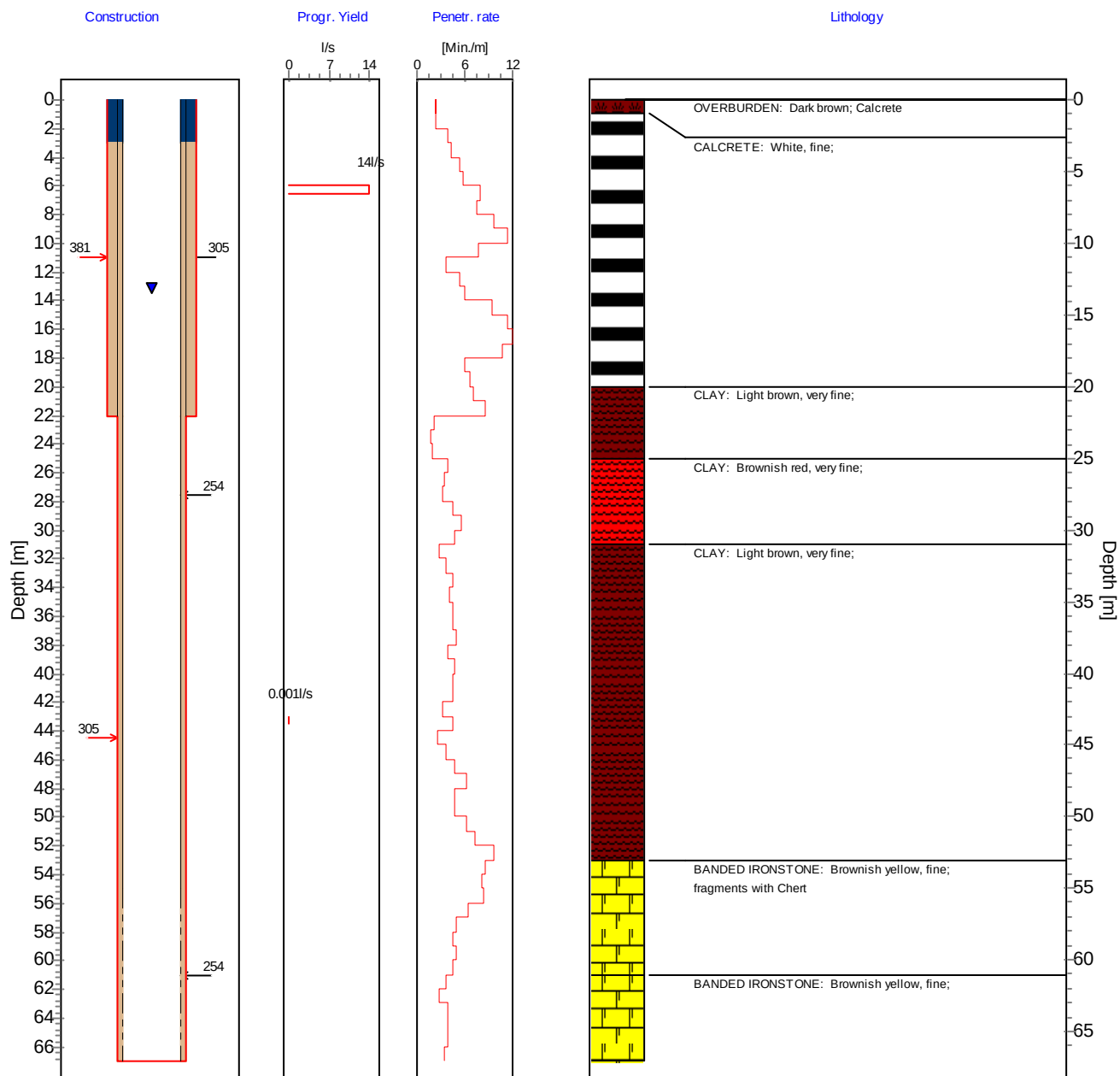
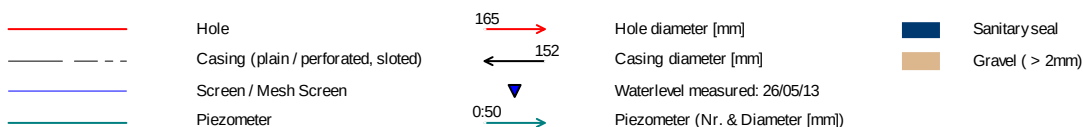
Coord. meth.: Altimeter

Equipment:

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



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Project No.: 11613568



## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0188 Number: SD1-14 Site type: Borehole

Distr./Farm No.: 508 Site Name/Descr.: ROOIPAN

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.385320 | Alt. No. 1:      |  | Diam. [mm]:   | 254   | Water lev. [m]: | 14.53    |
| Longitude [°]: | 23.644800 | Alt. No. 2:      |  | Depth [m]:    | 67.50 | WL status:      | Static   |
| Altitude [m]:  | 1437.63   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.45  | Date WL meas.:  | 20130606 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
Type of Inst.: Pulley Diam. [mm]:  
Manufacturer: Depth to Intk. [m]:

**Engine:**  
Manufacturer: Power Rating [kW]  
Type of Power: Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-14 | Date sampled: | 20130608 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 58.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.69   | Na:           | 5.85     | Cl:                                                                                                                                                                                                                                                                              | 8.6   | Langel.:               | 0.29   | E.Coli:   |
| EC: [mS/m]       | 44.6   | K:            | 1.67     | NO3 as N:                                                                                                                                                                                                                                                                        | 0.96  | Aggr-Ind:              | 12.32  | Faec. co: |
| TDS:             | 312    | Si:           | 18.7     | SO4:                                                                                                                                                                                                                                                                             | 7.44  | Ion-bal:               | 3.67   | Total Co: |
| T. Alk.:         | 252    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 281.68 | SPC:      |
| Ca:              | 67.4   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 27.6   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 6.00             | 6.50              | 14.00      | Notch (V- or U-notch) |              |         |
| 43.00            | 43.50             | 0.00100    | Notch (V- or U-notch) |              | SEEPAGE |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 22.00       | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 55.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 55.00            | 67.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m³/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130606 | 60           | 58.80              | 4.03             | 4.48       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130606 | 60           | 58.80              | 8.52             | 14.87      |                |       |          |         |         |
| STEP TEST STEP 3 | 20130606 | 10           | 58.80              | 12.04            | 44.19      | 100            | 150   |          |         |         |
| PUMP INLET       | 20130606 | 20           | 58.80              | 8.42             | 44.27      |                |       |          |         |         |
| CONSTANT         | 20130606 | 2880         | 58.80              | 6.13             | 7.17       | 100            | 360   |          |         |         |



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# PUMPING TEST REPORT

Date compiled: 18/09/2013

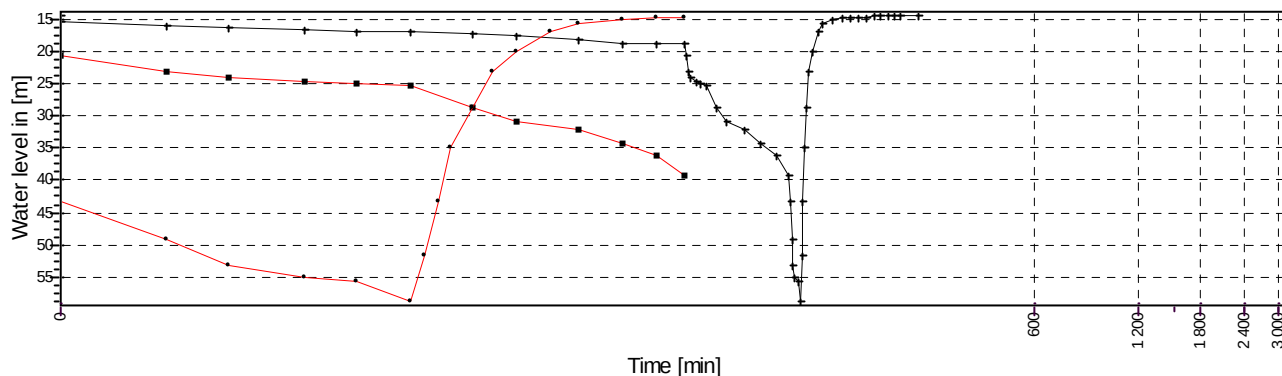
**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0188 Number: SD1-14 Site type: Borehole

Distr./Farm No.: 508 Site Name/Des.: ROOIPAN

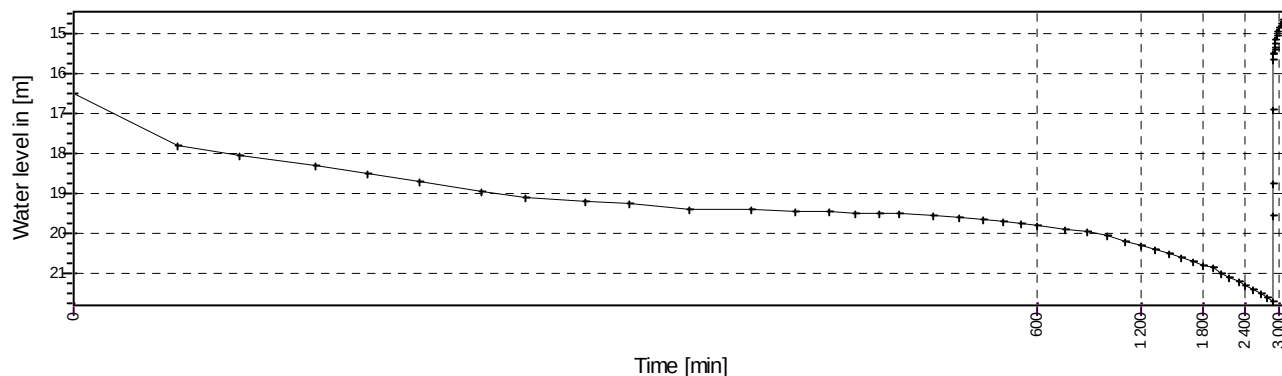
|               |           |                  |                |       |                 |          |
|---------------|-----------|------------------|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.385320 | Alt. No. 1:      | Diam. [mm]:    | 254   | Water lev. [m]: | 14.53    |
| Longitude [°] | 23.644800 | Alt. No. 2:      | Depth [m]:     | 67.50 | Piezometer:     | 0        |
| Altitude [m]: | 1437.63   | Rep. inst.: GOLD | Col. ht. [mm]: | 0.45  | Date WL meas.:  | 20130606 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 58.80               | 20130606      | 0800 | 20130606    | 1240 |                               |           |                 |
| GOLD       | Constant rate test | 58.80               | 20130616      | 1400 | 20130618    | 2000 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 0800        | 60           | 58.80              | 4.03             | 4.48       |            |     |                 |                            |             |         | 0.90 |
| STEP TEST STEP 2 | 0900        | 60           | 58.80              | 8.52             | 14.87      |            |     |                 |                            |             |         | 0.57 |
| STEP TEST STEP 3 | 1000        | 10           | 58.80              | 12.04            | 44.19      |            | 100 | 150             |                            |             |         | 0.27 |
| PUMP INLET       | 1240        | 20           | 58.80              | 8.42             | 44.27      |            |     |                 |                            |             |         | 0.19 |
| CONSTANT         | 1400        | 2880         | 58.80              | 6.13             | 7.17       |            | 100 | 360             |                            |             |         | 0.85 |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0189 Number: SD1-14S Site type: Borehole

Distr./Farm No.: 507

Site Name/Des.: ROOIPAN

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.385380

Reg./BB.:

Topo-set.:

Depth [m]: 18.00

Longitude [°]: 23.644760

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.60

Altitude [m]: 1437.54

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

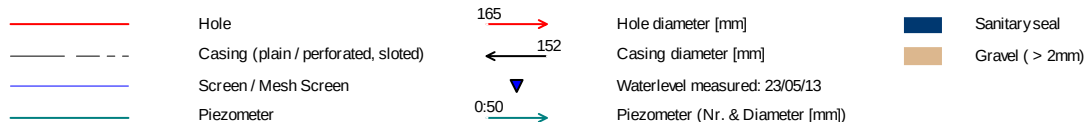
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

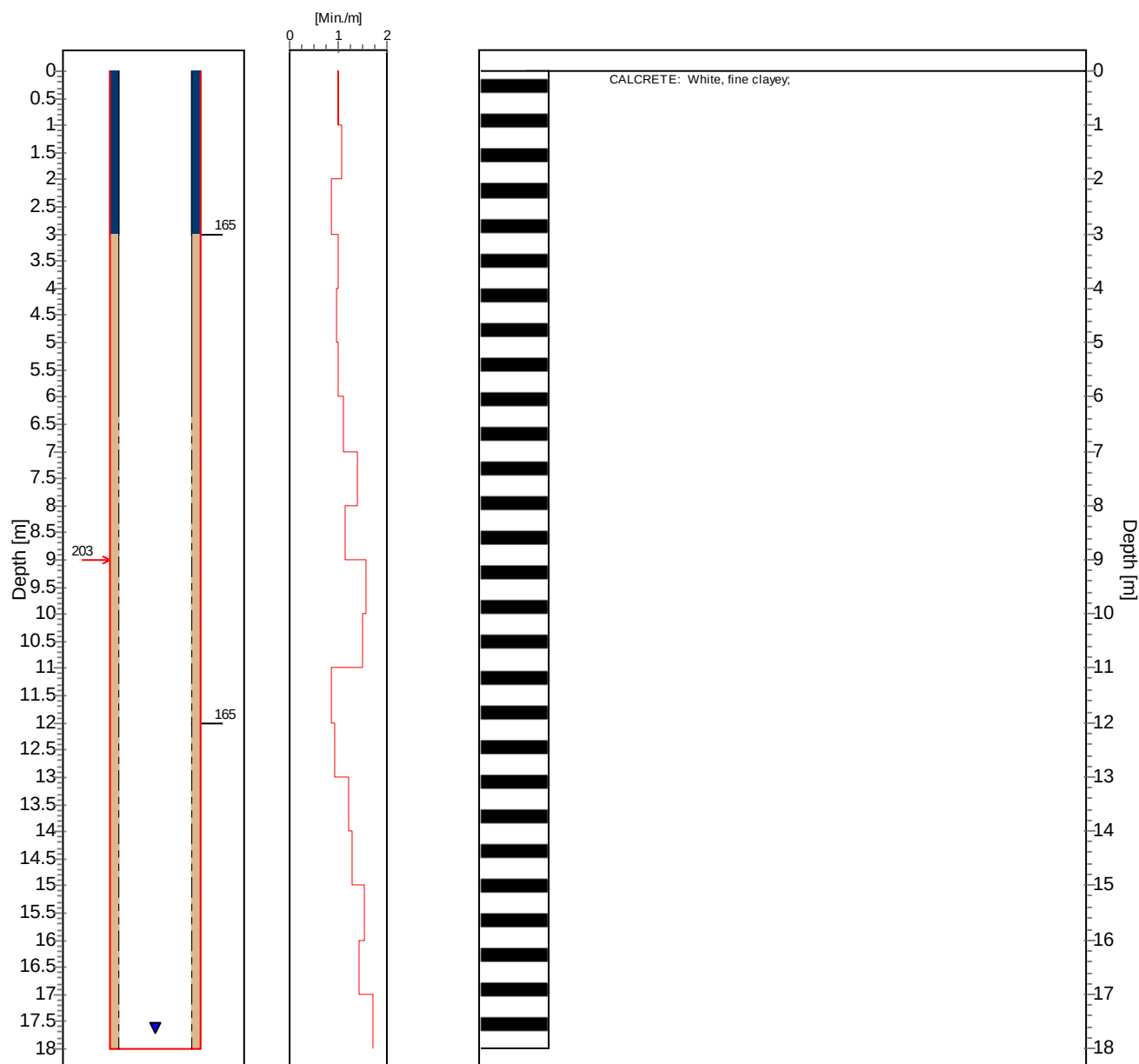
## Construction and Geohydrological Legend



Construction

Penetr. rate

Lithology



COMMENT:



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Fax: 012 - 364 4001  
Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0189 Number: SD1-14S Site type: Borehole

Distr./Farm No.: 507 Site Name/Descr.: ROOIPAN

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.385380 | Alt. No. 1: |      | Diam. [mm]:   | 165   | Water lev. [m]: | 13.24    |
| Longitude [°]: | 23.644760 | Alt. No. 2: |      | Depth [m]:    | 18.00 | WL status:      | Static   |
| Altitude [m]:  | 1437.54   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.60  | Date WL meas.:  | 20130620 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
Type of Inst.: Pulley Diam. [mm]:  
Manufacturer: Depth to Intk. [m]:

**Engine:**  
Manufacturer: Power Rating [kW]  
Type of Power: Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |         |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|---------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-14S | Date sampled: | 20130713 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 0     | Comment:               |        |           |
| Main Parameters: |         |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.76    | Na:           | 7.3      | Cl:                                                                                                                                                                                                                                                                              | 14.8  | Langel.:               | -0.12  | E.Coli:   |
| EC: [mS/m]       | 35      | K:            | 3.2      | NO3 as N:                                                                                                                                                                                                                                                                        | < 0.3 | Aggr-Ind:              | 11.87  | Faec. co: |
| TDS:             | 208     | Si:           | 1.72     | SO4:                                                                                                                                                                                                                                                                             | 14.1  | Ion-bal:               | -0.15  | Total Co: |
| T. Alk.:         | 187     | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 203.27 | SPC:      |
| Ca:              | 27.4    | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ; Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 32.8    | Mn:           | 0.11 †   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 6.00        | 165        | Steel    |              | Plain casing          |                                |            |             |
| 6.00             | 18.00       | 165        | Steel    |              | Perforated or slotted |                                |            |             |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0186 Number: SD1-16 Site type: Borehole

Distr./Farm No.: Site Name/Des.: LIME ACRES

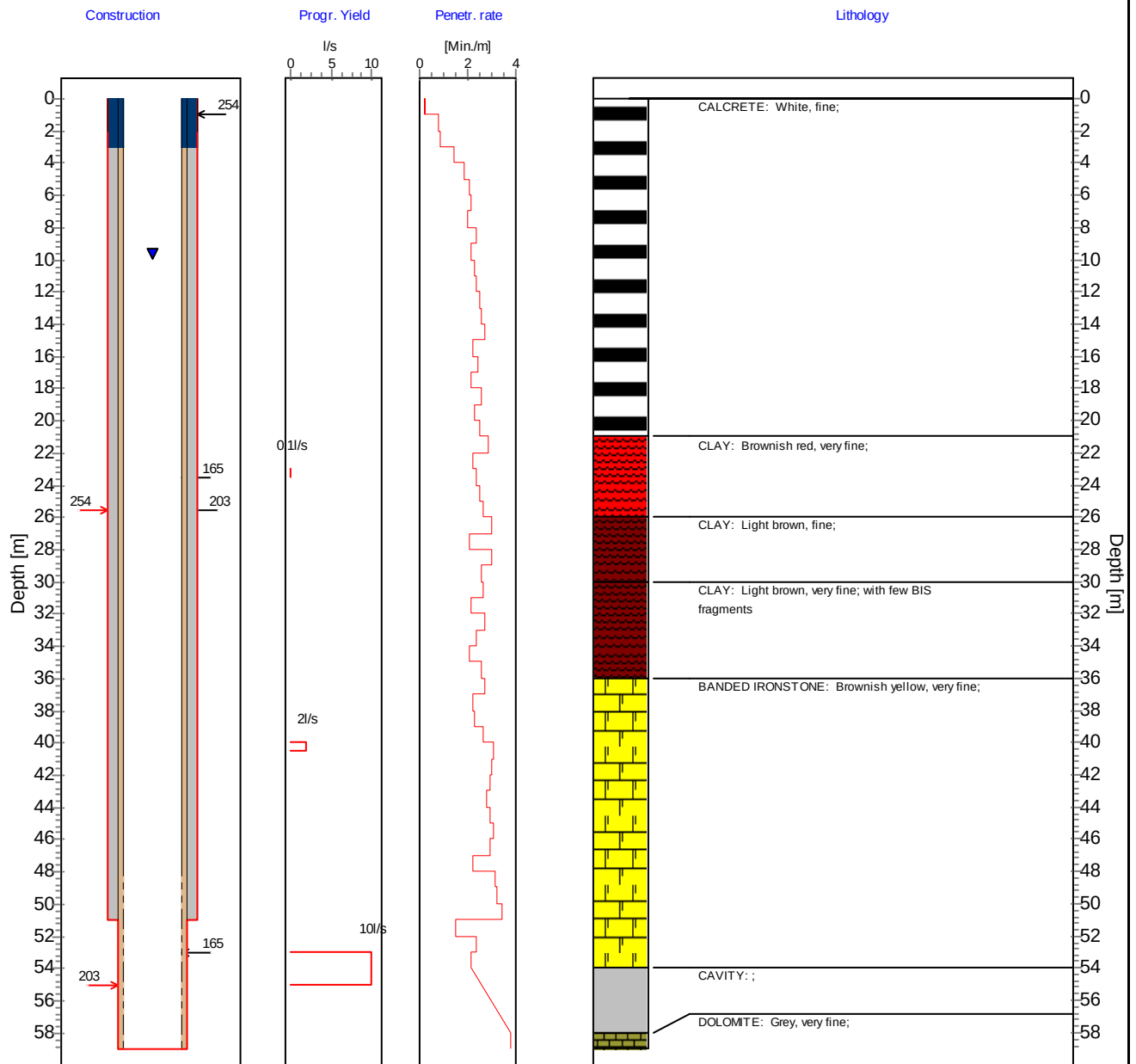
Region Type: Water supply authority Region Descr.: KGATELOPELE LM

|                                        |           |                                       |                    |
|----------------------------------------|-----------|---------------------------------------|--------------------|
| Latitude [°]: 28.364280                | Reg./BB.: | Topo-set.:                            | Depth [m]: 59.40   |
| Longitude [°]: 23.597800               | G-Nr.:    | Site status: Unused                   | Col. ht. [m]: 0.60 |
| Altitude [m]: 1441.14                  |           | Site purp.: Production (water supply) | Diam. [mm]: 165    |
| Coord. acc.: Accurate to within 1 unit |           | Use applic.: Domestic - all purposes  | Drain. reg.: C92A  |
| Coord. meth.: Altimeter                |           | Equipment: No equipment               | Rep. inst.: GOLD   |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend

|  |                                      |        |                                  |  |                   |
|--|--------------------------------------|--------|----------------------------------|--|-------------------|
|  | Hole                                 | 165 →  | Hole diameter [mm]               |  | Bentonite or clay |
|  | Casing (plain / perforated, slotted) | ← 152  | Casing diameter [mm]             |  | Gravel (> 2mm)    |
|  | Screen / Mesh Screen                 | ▼      | Waterlevel measured: 24/05/13    |  | Sanitary seal     |
|  | Piezometer                           | 0:50 → | Piezometer (Nr. & Diameter [mm]) |  |                   |



COMMENT:



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0186 Number: SD1-16 Site type: Borehole

Distr./Farm No.: Site Name/Descr.: LIME ACRES

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.364280 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 10.28    |
| Longitude [°]: | 23.597800 | Alt. No. 2:      |  | Depth [m]:    | 59.40 | WL status:      | Static   |
| Altitude [m]:  | 1441.14   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.60  | Date WL meas.:  | 20130530 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |  |
|----------------|--|---------------------|--|
| Pump:          |  | Pulley Diam. [mm]:  |  |
| Type of Inst.: |  | Depth to Intk. [m]: |  |
| Manufacturer:  |  |                     |  |
| Engine:        |  | Power Rating [kW]   |  |
| Manufacturer:  |  | Pulley Diam. [mm]:  |  |
| Type of Power: |  |                     |  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                  |        |                        |          |                        |       |           |        |
|------------------|--------|------------------------|----------|------------------------|-------|-----------|--------|
| Sample No.:      | SD1-16 | Date sampled:          | 20130501 | Depth sampl. [m]:      | 52.80 | Comment:  |        |
| Main Parameters: |        | Calculated Parameters: |          | Bacteriol. Parameters: |       |           |        |
| pH:              | 7.42   | Na:                    | 23.3     | Cl:                    | 51.9  | Langel.:  | 0.20   |
| EC: [mS/m]       | 73.1 † | K:                     | 4.16     | NO3 as N:              | 5.41  | Aggr-Ind: | 12.26  |
| TDS:             | 504 †  | Si:                    |          | SO4:                   | 45.2  | Ion-bal:  | 0.96   |
| T. Alk.:         | 296    | Al:                    | < 0.05   | F:                     | < 0.1 | CaCO3:    | 388.28 |
| Ca:              | 94.3   | Fe:                    | < 0.05   |                        |       | SPC:      |        |
| Mg:              | 37.2   | Mn:                    | < 0.05   |                        |       |           |        |

Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption  
 † Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit  
 ! Value exceeds recommended minimum limit § Value exceeds minimum allowable limit

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 23.00            | 23.50             | 0.10       | Notch (V- or U-notch) |              |         |
| 53.00            | 55.00             | 10.00      | Notch (V- or U-notch) |              |         |
| 40.00            | 40.50             | 2.00       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]: Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|-----------------------------|------------|-------------|
| 0.00             | 2.00        | 254        | Steel    |              | Plain casing          |                             |            |             |
| 0.00             | 47.00       | 165        | Steel    |              | Plain casing          |                             |            |             |
| 0.00             | 51.00       | 203        | Steel    |              | Plain casing          |                             |            |             |
| 47.00            | 59.00       | 165        | Steel    |              | Perforated or slotted |                             |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130530 | 60           | 52.80              | 5.16             | 0.33       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130530 | 60           | 52.80              | 10.25            | 0.85       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130530 | 60           | 52.80              | 15.22            | 1.21       |                |       |          |         |         |
| STEP TEST STEP 4 | 20130530 | 60           | 52.80              | 20.52            | 2.01       | 100            | 120   |          |         |         |
| CONSTANT         | 20130530 | 2880         | 52.80              | 20.09            | 3.07       | 100            | 240   | 934      |         |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 60.00              | Electric motor | 12              | 8.00              | CLASS 0       | 5.70                 | 39.00                 |

**Note:** 1. Production borehole.  
 2. Install water level monitoring facility in borehole.



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# PUMPING TEST REPORT

Date compiled: 28/03/2014

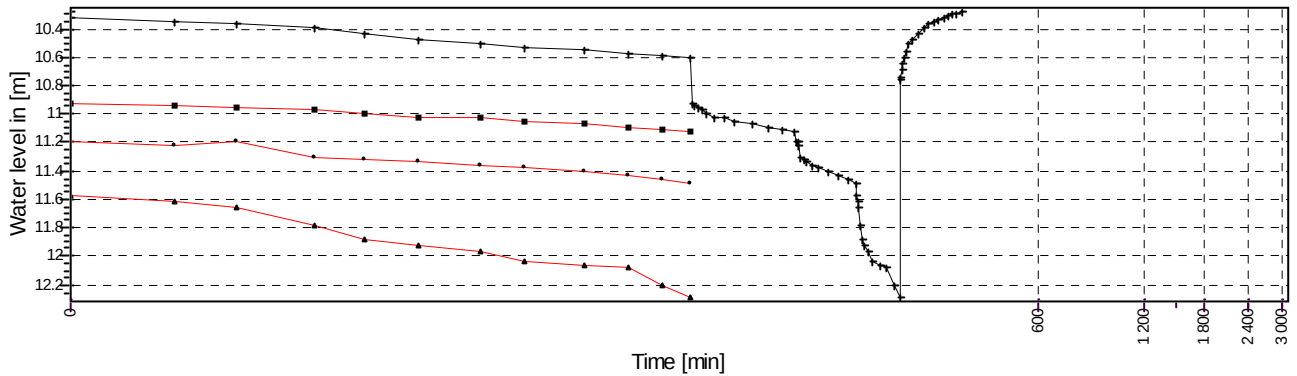
**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0186 Number: SD1-16 Site type: Borehole

Distr./Farm No.: Site Name/Des.: LIME ACRES

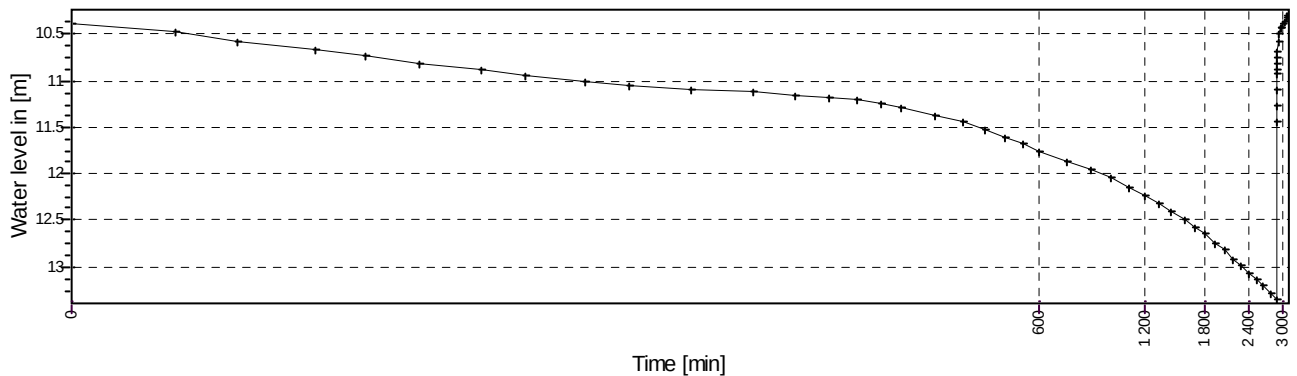
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.364280 | Alt. No. 1:      |  | Diam. [mm]:    | 165   | Water lev. [m]: | 10.28    |
| Longitude [°] | 23.597800 | Alt. No. 2:      |  | Depth [m]:     | 59.40 | Piezometer:     | 0        |
| Altitude [m]: | 1441.14   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.60  | Date WL meas.:  | 20130530 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 52.80               | 20130530      | 0800 | 20130530    | 1400 |                               |           |                 |
| GOLD       | Constant rate test | 52.80               | 20130530      | 1600 | 20130601    | 2000 | 934                           |           | 4.00            |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 0800        | 60           | 52.80              | 5.16             | 0.33       |            |     |                 |                            |             |         | 15.64 |
| STEP TEST STEP 2 | 0900        | 60           | 52.80              | 10.25            | 0.85       |            |     |                 |                            |             |         | 12.06 |
| STEP TEST STEP 3 | 1000        | 60           | 52.80              | 15.22            | 1.21       |            |     |                 |                            |             |         | 12.58 |
| STEP TEST STEP 4 | 1100        | 60           | 52.80              | 20.52            | 2.01       | 100        | 120 |                 |                            |             |         | 10.21 |
| CONSTANT         | 1600        | 2880         | 52.80              | 20.09            | 3.07       | 100        | 240 | 934             |                            |             |         | 6.54  |



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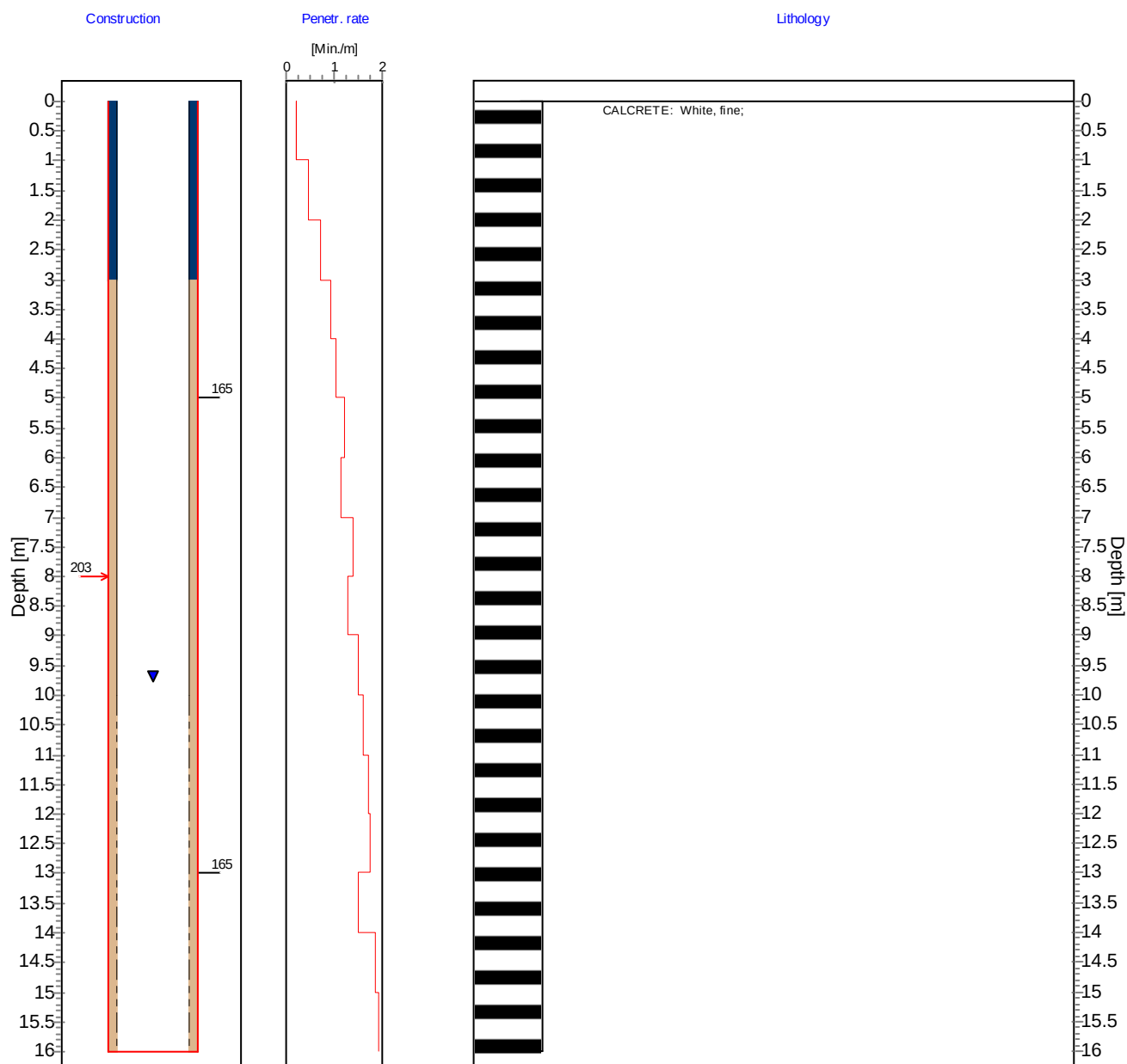
Date compiled: 2013/06/13

**Region Type:** Water supply authority **Region Descr.:** KGATELOPELE LM

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

|                                                                                   |                                      |                                                                                   |                                  |                                                                                   |                 |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------|-----------------|
|  | Hole                                 |  | Hole diameter [mm]               |  | Sanitary seal   |
|  | Casing (plain / perforated, slotted) |  | Casing diameter [mm]             |  | Gravel ( > 2mm) |
|  | Screen / Mesh Screen                 |  | Waterlevel measured: 24/05/13    |                                                                                   |                 |
|  | Piezometer                           |  | Piezometer (Nr. & Diameter [mm]) |                                                                                   |                 |



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0187 Number: SD1-16S Site type: Borehole

Distr./Farm No.: Site Name/Descr.: LIME ACRES

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.364410 | Alt. No. 1: |      | Diam. [mm]:   | 165   | Water lev. [m]: | 9.67     |
| Longitude [°]: | 23.597880 | Alt. No. 2: |      | Depth [m]:    | 16.00 | WL status:      | Static   |
| Altitude [m]:  | 1441.14   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.41  | Date WL meas.:  | 20130524 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
Type of Inst.: Pulley Diam. [mm]:  
Manufacturer: Depth to Intk. [m]:

**Engine:**  
Manufacturer: Power Rating [kW]  
Type of Power: Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |         |               |          |                                                                                                                                                                                                                                                                                      |       |                        |        |           |
|------------------|---------|---------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-16S | Date sampled: | 20130713 | Depth sampl. [m]:                                                                                                                                                                                                                                                                    | 0     | Comment:               |        |           |
| Main Parameters: |         |               |          | Calculated Parameters:                                                                                                                                                                                                                                                               |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.61    | Na:           | 7.67     | Cl:                                                                                                                                                                                                                                                                                  | 15.8  | Langel.:               | -0.45  | E.Coli:   |
| EC: [mS/m]       | 25.8    | K:            | 3.82     | NO3 as N:                                                                                                                                                                                                                                                                            | < 0.3 | Aggr-Ind:              | 11.50  | Faec. co: |
| TDS:             | 156     | Si:           | 0.88     | SO4:                                                                                                                                                                                                                                                                                 | 16.2  | Ion-bal:               | -0.69  | Total Co: |
| T. Alk.:         | 110     | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                                   | < 0.1 | CaCO3:                 | 126.87 | SPC:      |
| Ca:              | 28.1    | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit   ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit     Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 13.8    | Mn:           | 0.16 †   |                                                                                                                                                                                                                                                                                      |       |                        |        |           |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 10.00       | 165        | Steel    |              | Plain casing          |                                |            |             |
| 10.00            | 16.00       | 165        | Steel    |              | Perforated or slotted |                                |            |             |



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Project No.: 11613568



# PUMPING TEST REPORT

Date compiled: 31/03/2014

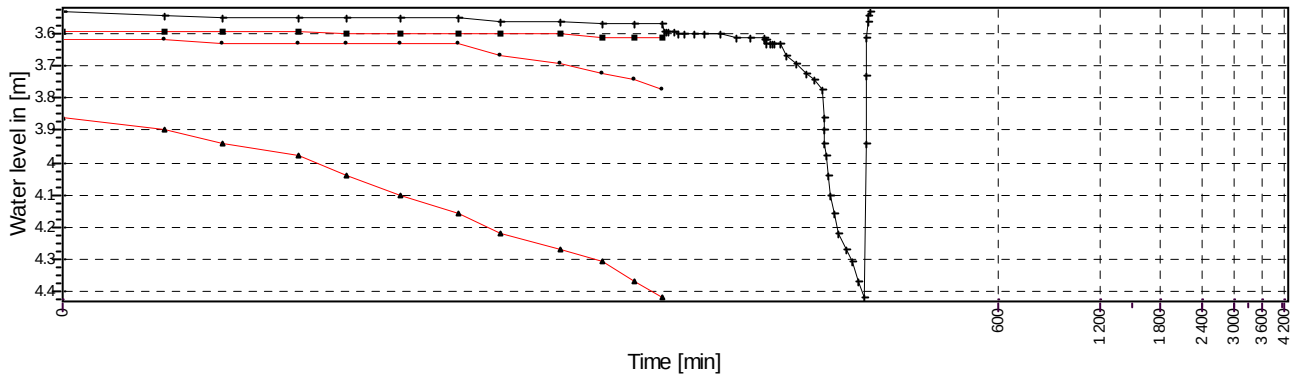
**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0176 Number: SD1-17 Site type: Borehole

Distr./Farm No.: 458 Site Name/Des.: CARTER BLOCK

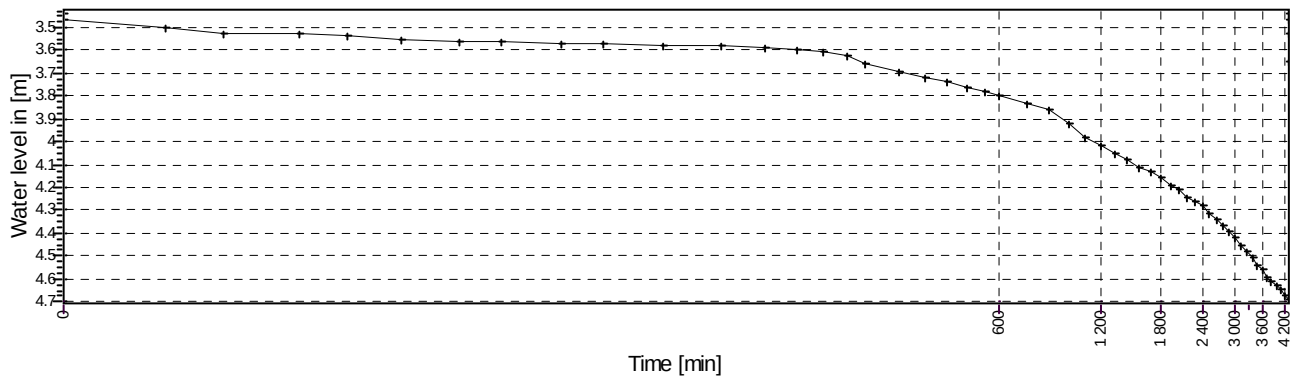
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.316070 | Alt. No. 1:      |  | Diam. [mm]:    | 203   | Water lev. [m]: | 3.44     |
| Longitude [°] | 23.580260 | Alt. No. 2:      |  | Depth [m]:     | 57.60 | Piezometer:     | 0        |
| Altitude [m]: | 1435.15   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.50  | Date WL meas.:  | 20130901 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



| PUMPING TEST: |                    | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|---------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD          | Step test          | 34.80               | 20130507      | 1330 | 20130507    | 1740 |                               |           |                 |
| GOLD          | Constant rate test | 34.80               | 20130508      | 0800 | 20130509    | 0930 |                               |           |                 |
| GOLD          | Constant rate test | 34.80               | 20130901      | 1000 | 20130904    | 1005 | 855                           |           | 7.50            |

| TESTING DETAILS: |             | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] % | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|--------------|-----------------|----------------------------|-------------|---------|-------|
| Description      | Time start. |              |                    |                  |            |              |                 |                            |             |         |       |
| STEP TEST STEP 1 | 1330        | 60           | 34.80              | 8.49             | 0.04       |              |                 |                            |             |         | 212.2 |
| STEP TEST STEP 2 | 1430        | 60           | 34.80              | 16.50            | 0.08       |              |                 |                            |             |         | 206.2 |
| STEP TEST STEP 3 | 1530        | 60           | 34.80              | 24.44            | 0.24       |              |                 |                            |             |         | 101.8 |
| STEP TEST STEP 4 | 1630        | 60           | 34.80              | 30.54            | 0.89       | 100          | 10              |                            |             |         | 34.31 |
| CONSTANT (1)     | 0800        | 1440         | 34.80              | 30.02            | 0.74       | 100          | 90              |                            |             |         | 40.57 |
| CONSTANT (2)     | 1000        | 4320         | 34.80              | 30.09            | 1.25       | 100          | 5               | 855                        |             |         | 24.07 |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 2013/06/14

## BASIC SITE INFORMATION:

Site Identifier: 2823BCX0176 Number: SD1-17

Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Latitude [°] 28.316070  
Longitude [°] 23.580260  
Altitude [m]: 1435.15

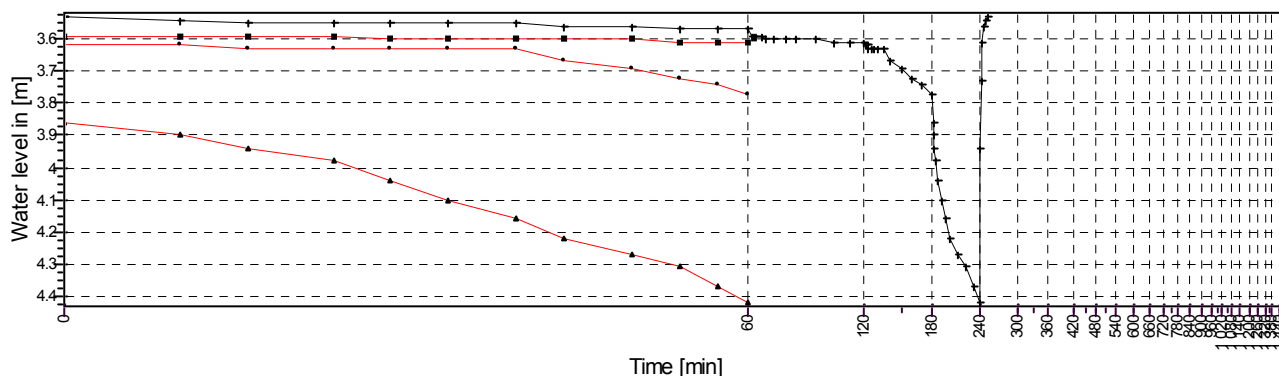
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 203  
Depth [m]: 57.60  
Col. ht. [mm]: 0.50

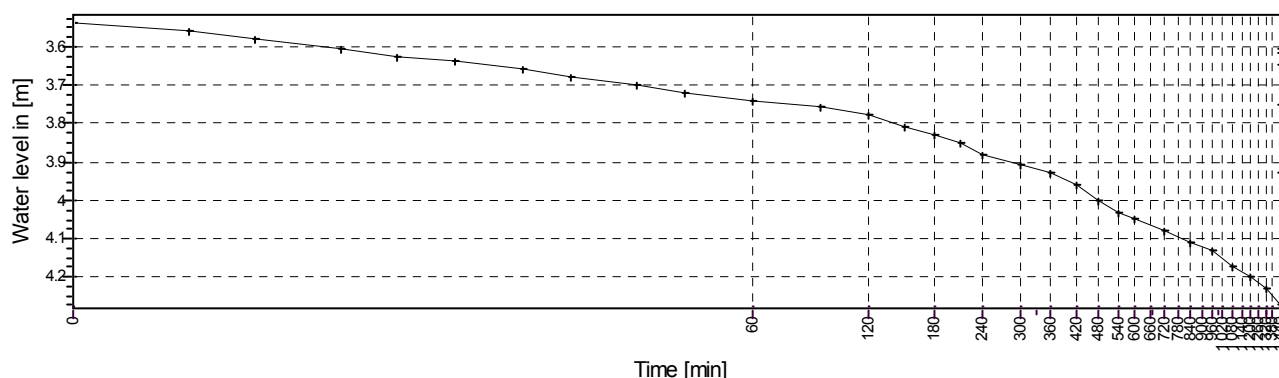
Water lev. [m]: 3.53  
Piezometer: 0  
Date WL meas.: 20130507

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 34.80               | 20130507      | 1330 | 20130507    | 1740 |                               |           |                 |
| GOLD       | Constant rate test | 34.80               | 20130508      | 0800 | 20130509    | 0930 |                               |           |                 |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 1330        | 60           | 34.80              | 8.49             | 0.04       |            |     |                 |                            |             |         | 212.2 |
| STEP TEST STEP 2 | 1430        | 60           | 34.80              | 16.50            | 0.08       |            |     |                 |                            |             |         | 206.2 |
| STEP TEST STEP 3 | 1530        | 60           | 34.80              | 24.44            | 0.24       |            |     |                 |                            |             |         | 101.8 |
| STEP TEST STEP 4 | 1630        | 60           | 34.80              | 30.54            | 0.89       |            | 100 | 10              |                            |             |         | 34.31 |
| CONSTANT         | 0800        | 1440         | 34.80              | 30.02            | 0.74       |            | 100 | 90              |                            |             |         | 40.57 |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0202 Number: SD1-18 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK PTN. 19

Region Type: Water supply authority

Region Descr.: LGATELOPELE LM

Latitude [°]: 28.389570

Reg./BB.:

Topo-set.:

Depth [m]: 72.00

Longitude [°]: 23.583700

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.44

Altitude [m]: 1443.18

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

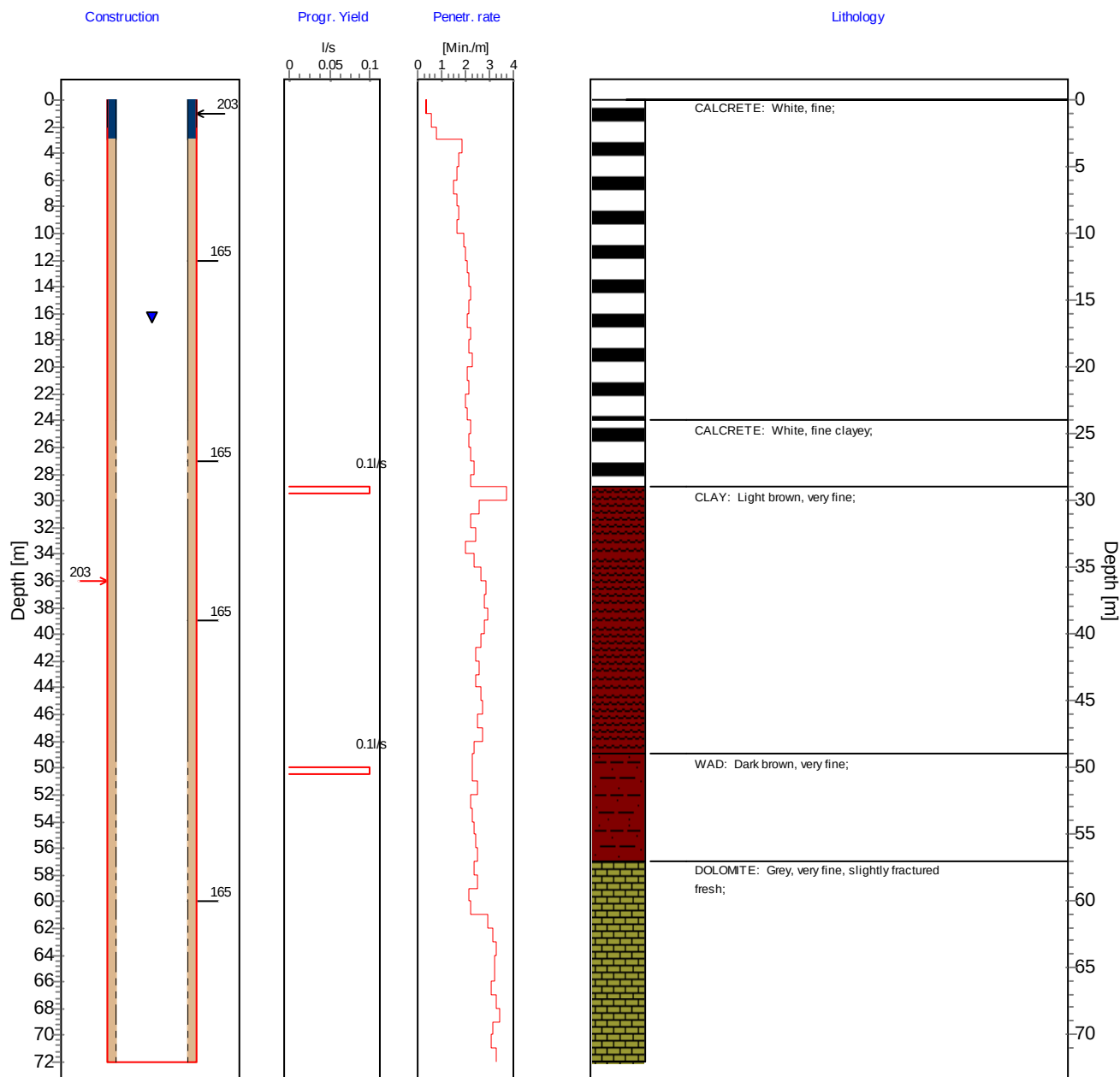
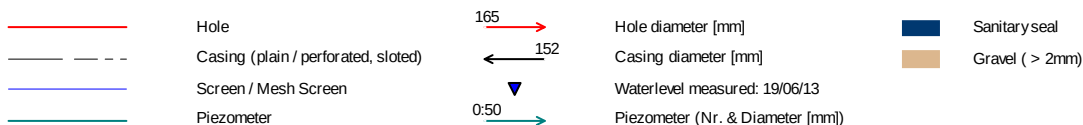
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



Golder Associates Africa, Pretoria  
 P O Box 13776, Hatfield, 00285  
 Tel: 012 - 364 4000  
 Fax: 012 - 364 4001  
 Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0195 Number: SD1-24 Site type: Borehole

Distr./Farm No.: 507

Site Name/Des.: ROOIPAN

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.390550

Reg./BB.:

Topo-set.:

Depth [m]: 68.50

Longitude [°]: 23.628790

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.45

Altitude [m]: 1437.27

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

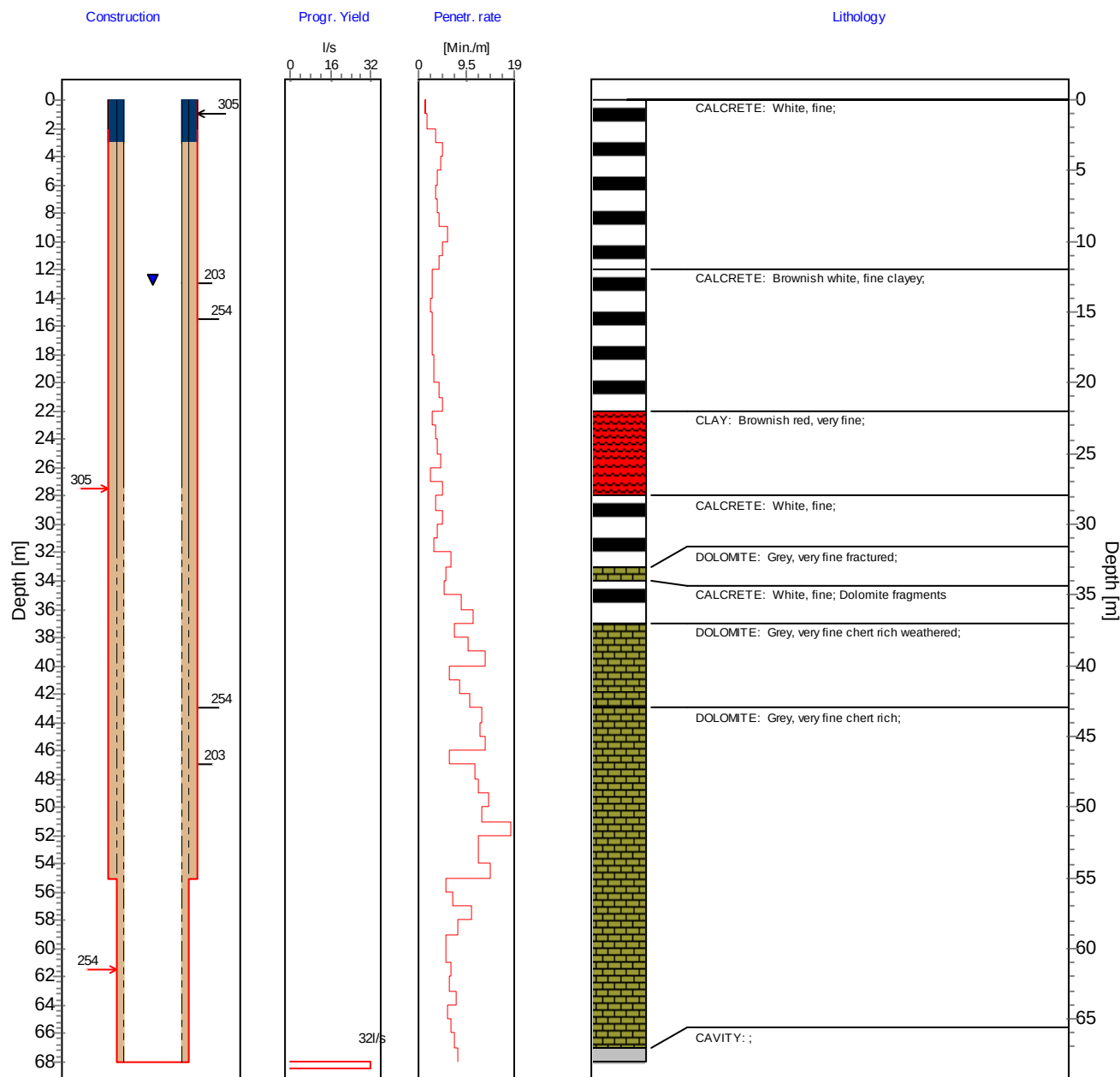
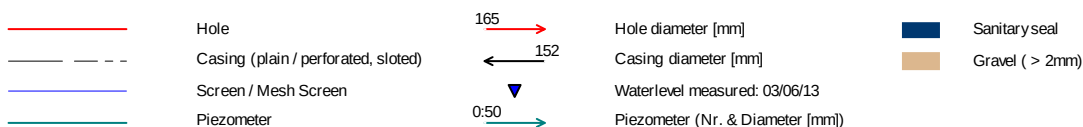
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



Golder Associates Africa, Pretoria  
 P O Box 13776, Hatfield, 00285  
 Tel: 012 - 364 4000  
 Fax: 012 - 364 4001  
 Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0195 Number: SD1-24 Site type: Borehole

Distr./Farm No.: 507 Site Name/Descr.: ROOIPAN

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.390550 | Alt. No. 1: |      | Diam. [mm]:   | 203   | Water lev. [m]: | 14.15    |
| Longitude [°]: | 23.628790 | Alt. No. 2: |      | Depth [m]:    | 68.50 | WL status:      | Static   |
| Altitude [m]:  | 1437.27   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.45  | Date WL meas.:  | 20130615 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |  |
|----------------|--|---------------------|--|
| Pump:          |  | Pulley Diam. [mm]:  |  |
| Type of Inst.: |  | Depth to Intk. [m]: |  |
| Manufacturer:  |  |                     |  |
| Engine:        |  | Power Rating [kW]   |  |
| Manufacturer:  |  | Pulley Diam. [mm]:  |  |
| Type of Power: |  |                     |  |

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-24 | Date sampled: | 20130616 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 64.50 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.58   | Na:           | 20       | Cl:                                                                                                                                                                                                                                                                              | 48.5  | Langel.:               | 0.35   | E.Coli:   |
| EC: [mS/m]       | 67.6   | K:            | 4.88     | NO3 as N:                                                                                                                                                                                                                                                                        | 3.39  | Aggr-Ind:              | 12.42  | Faec. co: |
| TDS:             | 476    | Si:           | 19.4     | SO4:                                                                                                                                                                                                                                                                             | 30.3  | Ion-bal:               | 3.21   | Total Co: |
| T. Alk.:         | 295    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 384.59 | SPC:      |
| Ca:              | 94.8   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 36     | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 68.00            | 68.50             | 32.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 2.00        | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 26.00       | 203        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 31.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 26.00            | 68.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |
| 31.00            | 55.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130615 | 60           | 64.50              | 8.32             | 0.06       |            |       |          |         |         |
| STEP TEST STEP 2 | 20130615 | 60           | 64.50              | 16.02            | 0.11       |            |       |          |         |         |
| STEP TEST STEP 3 | 20130615 | 60           | 64.50              | 24.51            | 0.63       |            |       |          |         |         |
| STEP TEST STEP 4 | 20130615 | 60           | 64.50              | 30.21            | 1.28       | 100        | 20    |          |         |         |
| CONSTANT         | 20130616 | 1440         | 64.50              | 30.10            | 1.16       | 100        | 180   | 486      |         |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 66.00              | Electric motor | 20              | 15.00             | CLASS 0       | 8.90                 | 66.00                 |

**Note:** 1. Production borehole.  
2. Install water level monitoring facility in borehole.



Golder Associates Africa, Pretoria  
P O Box 13776, Hatfield, 00285  
Tel: 012 - 364 4000  
Fax: 012 - 364 4001  
Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 31/03/2014

## BASIC SITE INFORMATION:

Site Identifier: 2823BCX0195 Number: SD1-24

Site type: Borehole

Distr./Farm No.: 507

Site Name/Des.: ROOIPAN

Latitude [°] 28.390550  
Longitude [°] 23.628790  
Altitude [m]: 1437.27

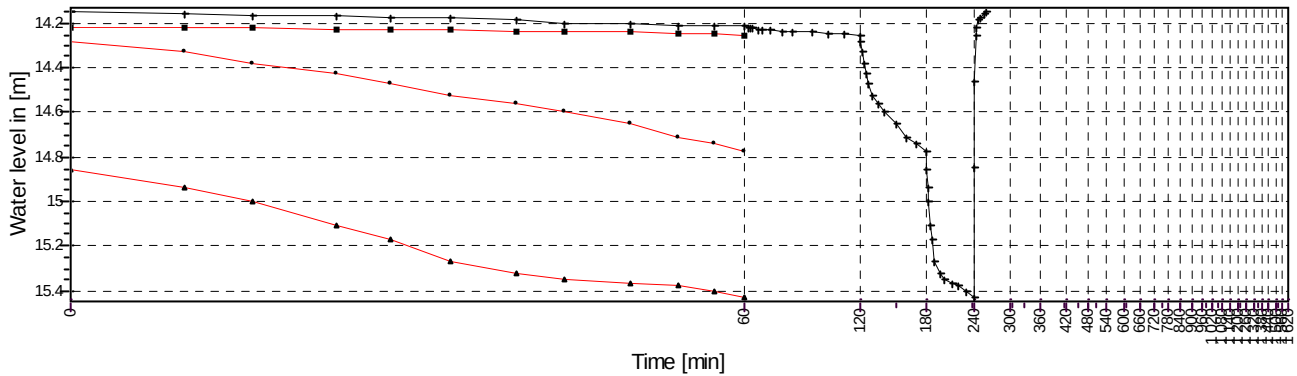
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 203  
Depth [m]: 68.50  
Col. ht. [mm]: 0.45

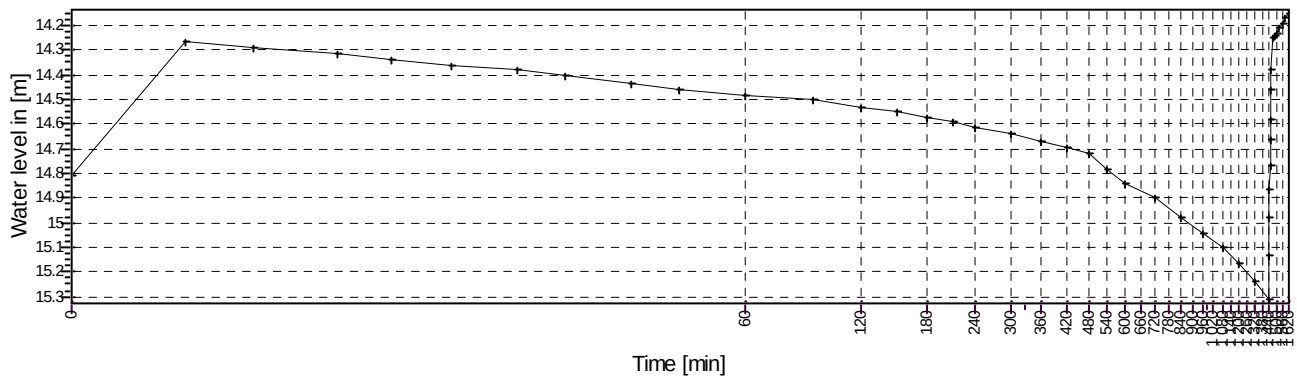
Water lev. [m]: 14.15  
Piezometer: 0  
Date WL meas.: 20130615

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 64.50               | 20130615      | 1330 | 20130615    | 1750 |                               |           |                 |
| GOLD       | Constant rate test | 64.50               | 20130616      | 0800 | 20130617    | 1100 | 486                           |           | 12.50           |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | % | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|---|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 1330        | 60           | 64.50              | 8.32             | 0.06       |            |   |                 |                            |             |         | 138.6 |
| STEP TEST STEP 2 | 1430        | 60           | 64.50              | 16.02            | 0.11       |            |   |                 |                            |             |         | 145.6 |
| STEP TEST STEP 3 | 1530        | 60           | 64.50              | 24.51            | 0.63       |            |   |                 |                            |             |         | 38.90 |
| STEP TEST STEP 4 | 1630        | 60           | 64.50              | 30.21            | 1.28       | 100        |   | 20              |                            |             |         | 23.60 |
| CONSTANT         | 0800        | 1440         | 64.50              | 30.10            | 1.16       | 100        |   | 180             | 486                        |             |         | 25.95 |



Golder Associates Africa, Pretoria  
P O Box 13776, Hatfield, 00285  
Tel: 012 - 364 4000  
Fax: 012 - 364 4001  
Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0190 Number: SD1-26 Site type: Borehole

Distr./Farm No.: Site Name/Des.: LIME ACRES

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.351290

Reg./BB.:

Topo-set.:

Depth [m]: 69.00

Longitude [°]: 23.598790

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.55

Altitude [m]: 1441.82

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

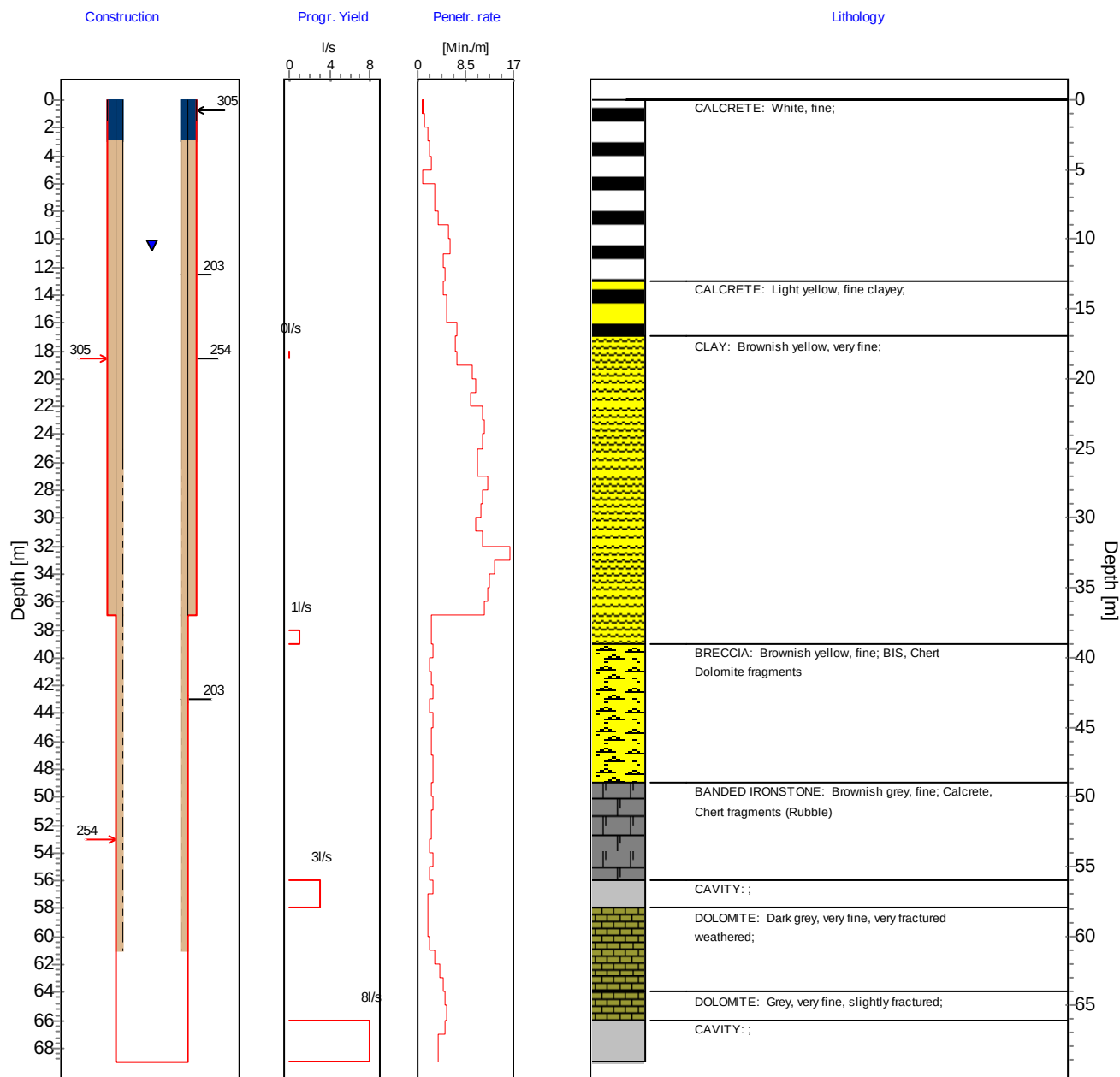
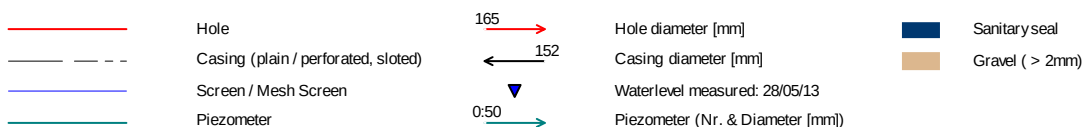
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:

Golder  
Associates

Golder Associates Africa, Pretoria  
P O Box 13776, Hatfield, 00285  
Tel: 012 - 364 4000  
Fax: 012 - 364 4001  
Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0190 Number: SD1-26 Site type: Borehole

Distr./Farm No.: Site Name/Descr.: LIME ACRES

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.351290 | Alt. No. 1: |      | Diam. [mm]:   | 203   | Water lev. [m]: | 10.90    |
| Longitude [°]: | 23.598790 | Alt. No. 2: |      | Depth [m]:    | 69.00 | WL status:      | Static   |
| Altitude [m]:  | 1441.82   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.55  | Date WL meas.:  | 20130603 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |  |
|----------------|--|---------------------|--|
| Pump:          |  | Pulley Diam. [mm]:  |  |
| Type of Inst.: |  | Depth to Intk. [m]: |  |
| Manufacturer:  |  |                     |  |
| Engine:        |  | Power Rating [kW]   |  |
| Manufacturer:  |  | Pulley Diam. [mm]:  |  |
| Type of Power: |  |                     |  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                  |        |                        |          |                        |       |           |        |
|------------------|--------|------------------------|----------|------------------------|-------|-----------|--------|
| Sample No.:      | SD1-26 | Date sampled:          | 20130605 | Depth sampl. [m]:      | 52.80 | Comment:  |        |
| Main Parameters: |        | Calculated Parameters: |          | Bacteriol. Parameters: |       |           |        |
| pH:              | 7.49   | Na:                    | 23.6     | Cl:                    | 51.8  | Langel.:  | 0.26   |
| EC: [mS/m]       | 72.9 † | K:                     | 4.41     | NO3 as N:              | 6.24  | Aggr-Ind: | 12.32  |
| TDS:             | 486    | Si:                    |          | SO4:                   | 44.8  | Ion-bal:  | 1.55   |
| T. Alk.:         | 293    | Al:                    | < 0.05   | F:                     | < 0.1 | CaCO3:    | 391.96 |
| Ca:              | 93.3   | Fe:                    | < 0.05   |                        |       | SPC:      |        |
| Mg:              | 38.7   | Mn:                    | < 0.05   |                        |       |           |        |

Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 18.00            | 18.50             | 0.00       | Notch (V- or U-notch) |              | DAMP    |
| 38.00            | 39.00             | 1.00       | Notch (V- or U-notch) |              |         |
| 56.00            | 58.00             | 3.00       | Notch (V- or U-notch) |              |         |
| 66.00            | 69.00             | 8.00       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]: Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|-----------------------------|------------|-------------|
| 0.00             | 1.50        | 305        | Steel    |              | Plain casing          |                             |            |             |
| 0.00             | 25.00       | 203        | Steel    |              | Plain casing          |                             |            |             |
| 0.00             | 37.00       | 254        | Steel    |              | Plain casing          |                             |            |             |
| 25.00            | 61.00       | 203        | Steel    |              | Perforated or slotted |                             |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|----------|---------|---------|
| STEP TEST STEP 1 | 20130603 | 60           | 52.80              | 5.32             | 0.66       |                |          |         |         |
| STEP TEST STEP 2 | 20130603 | 60           | 52.80              | 10.22            | 2.20       |                |          |         |         |
| STEP TEST STEP 3 | 20130603 | 60           | 52.80              | 15.15            | 3.81       |                |          |         |         |
| STEP TEST STEP 4 | 20130603 | 60           | 52.80              | 20.21            | 5.85       | 100            | 90       |         |         |
| CONSTANT         | 20130604 | 1440         | 52.80              | 15.06            | 3.79       | 100            | 210      | 747     |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 60.00              | Electric motor | 20              | 10.00             | CLASS 0       | 5.60                 | 55.00                 |

**Note:** 1. Production borehole.  
2. Install water level monitoring facility in borehole.



Golder Associates Africa, Pretoria  
P O Box 13776, Hatfield, 00285  
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Project No.: 11613568



# PUMPING TEST REPORT

Date compiled: 31/03/2014

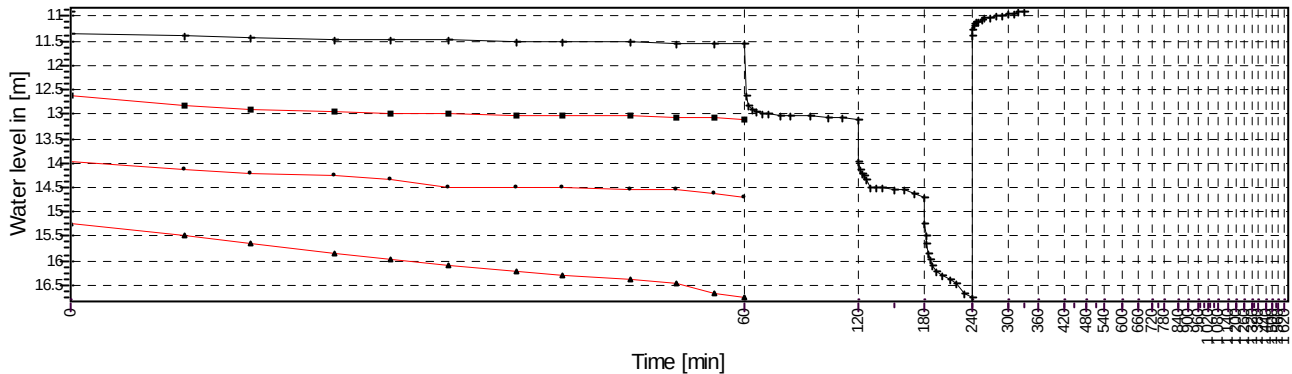
**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0190 Number: SD1-26 Site type: Borehole

Distr./Farm No.: Site Name/Des.: LIME ACRES

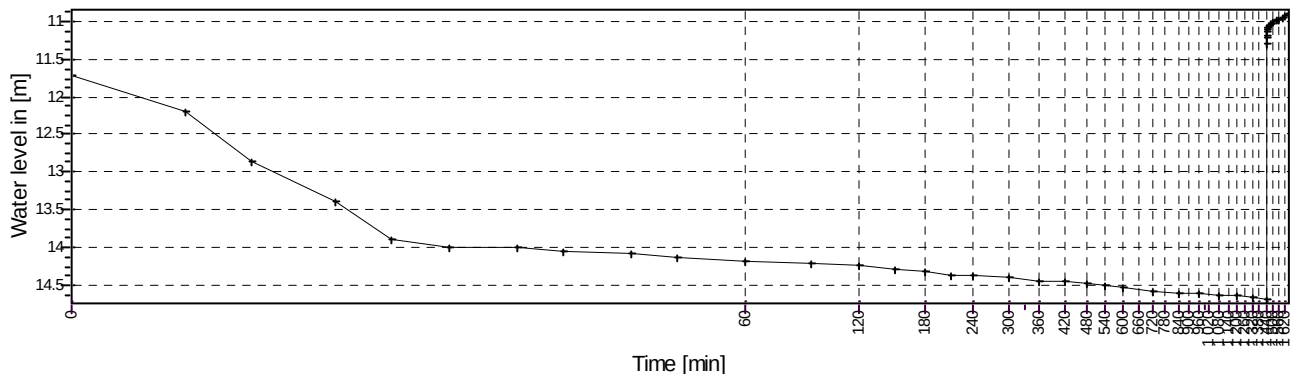
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.351290 | Alt. No. 1:      |  | Diam. [mm]:    | 203   | Water lev. [m]: | 10.90    |
| Longitude [°] | 23.598790 | Alt. No. 2:      |  | Depth [m]:     | 69.00 | Piezometer:     | 0        |
| Altitude [m]: | 1441.82   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.55  | Date WL meas.:  | 20130603 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



| PUMPING TEST: |                    | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|---------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD          | Step test          | 52.80               | 20130603      | 1320 | 20130603    | 1850 |                               |           |                 |
| GOLD          | Constant rate test | 52.80               | 20130604      | 0920 | 20130605    | 1250 | 747                           |           | 8.33            |

| TESTING DETAILS: |             | Durat. [min] | Depth to intk. [m] | Disch. rate [l/s] | Drawd. [m] | Recov. [m] | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|-------------------|------------|------------|-----------------|----------------------------|-------------|---------|------|
| Description      | Time start. |              |                    |                   |            | %          |                 |                            |             |         |      |
| STEP TEST STEP 1 | 1320        | 60           | 52.80              | 5.32              | 0.66       |            |                 |                            |             |         | 8.06 |
| STEP TEST STEP 2 | 1420        | 60           | 52.80              | 10.22             | 2.20       |            |                 |                            |             |         | 4.65 |
| STEP TEST STEP 3 | 1520        | 60           | 52.80              | 15.15             | 3.81       |            |                 |                            |             |         | 3.98 |
| STEP TEST STEP 4 | 1620        | 60           | 52.80              | 20.21             | 5.85       | 100        | 90              |                            |             |         | 3.45 |
| CONSTANT         | 0920        | 1440         | 52.80              | 15.06             | 3.79       | 100        | 210             | 747                        |             |         | 3.97 |



Golder Associates Africa, Pretoria  
P O Box 13776, Hatfield, 00285  
Tel: 012 - 364 4000  
Fax: 012 - 364 4001  
Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0198 Number: SD1-27 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK PTN. ROOIPAN

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.378680

Reg./BB.:

Topo-set.:

Depth [m]: 104.44

Longitude [°]: 23.624700

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.62

Altitude [m]: 1437.42

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

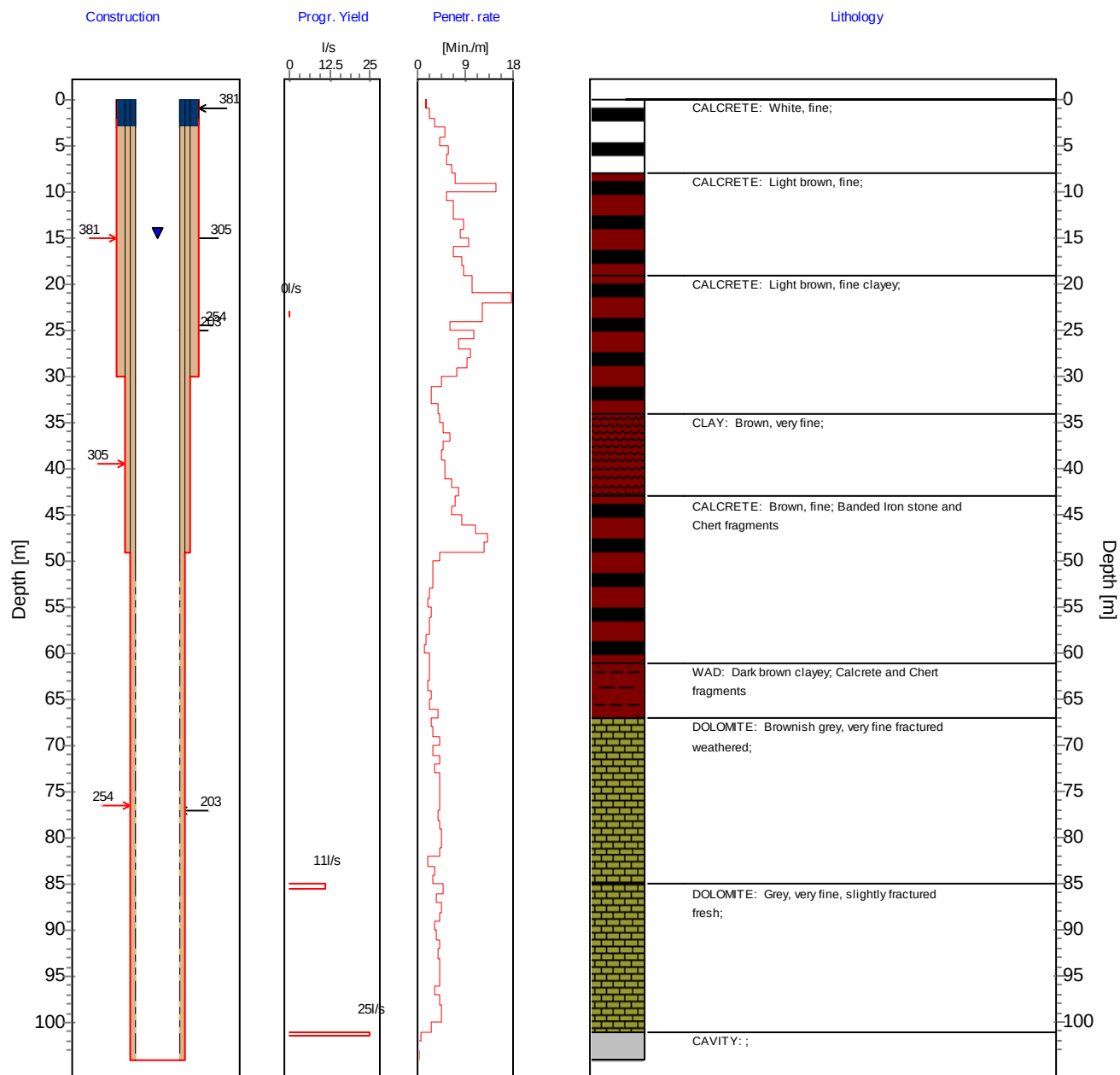
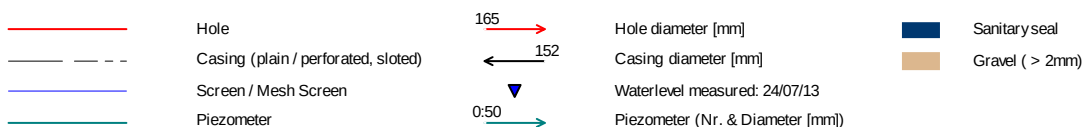
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



Golder Associates Africa, Pretoria  
 P O Box 13776, Hatfield, 00285  
 Tel: 012 - 364 4000  
 Fax: 012 - 364 4001  
 Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0198 Number: SD1-27 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK PTN. ROOIPAN

|                |           |             |      |               |        |                 |          |
|----------------|-----------|-------------|------|---------------|--------|-----------------|----------|
| Latitude [°]:  | 28.378680 | Alt. No. 1: |      | Diam. [mm]:   | 203    | Water lev. [m]: | 14.38    |
| Longitude [°]: | 23.624700 | Alt. No. 2: |      | Depth [m]:    | 104.44 | WL status:      | Static   |
| Altitude [m]:  | 1437.42   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.62   | Date WL meas.:  | 20130724 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |  |
|----------------|--|---------------------|--|
| Pump:          |  | Pulley Diam. [mm]:  |  |
| Type of Inst.: |  | Depth to Intk. [m]: |  |
| Manufacturer:  |  |                     |  |
| Engine:        |  | Power Rating [kW]   |  |
| Manufacturer:  |  | Pulley Diam. [mm]:  |  |
| Type of Power: |  |                     |  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-27 | Date sampled: | 20130726 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 82.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters. |        |           |
| pH:              | 7.58   | Na:           | 28.1     | Cl:                                                                                                                                                                                                                                                                              | 56.8  | Langel.:               | 0.18   | E.Coli:   |
| EC: [mS/m]       | 72.8 † | K:            | 5.39     | NO3 as N:                                                                                                                                                                                                                                                                        | 3.75  | Aggr-Ind:              | 12.25  | Faec. co: |
| TDS:             | 532 †  | Si:           | 16.6     | SO4:                                                                                                                                                                                                                                                                             | 44.2  | Ion-bal:               | -1.28  | Total Co: |
| T. Alk.:         | 289    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | 0.184 | CaCO3:                 | 350.13 | SPC:      |
| Ca:              | 64.5   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 46     | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 23.00            | 23.50             | 0.00       | Notch (V- or U-notch) |              | MOIST   |
| 85.00            | 85.50             | 11.00      | Notch (V- or U-notch) |              |         |
| 101.00           | 101.50            | 25.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 2.00        | 381        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 30.00       | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 49.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 50.00       | 203        | Steel    |              | Plain casing          |                                |            |             |
| 50.00            | 104.00      | 203        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %   | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|-----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130724 | 60           | 82.80              | 8.20             | 0.92       |              |     |       |          |         |         |
| STEP TEST STEP 2 | 20130724 | 60           | 82.80              | 16.30            | 1.61       |              |     |       |          |         |         |
| STEP TEST STEP 3 | 20130724 | 60           | 82.80              | 24.22            | 2.10       |              |     |       |          |         |         |
| STEP TEST STEP 4 | 20130724 | 60           | 82.80              | 30.12            | 3.49       | 100          | 60  |       |          |         |         |
| CONSTANT         | 20130724 | 2880         | 82.80              | 30.16            | 4.12       | 100          | 300 | 273   |          |         |         |

### RECOMMENDATIONS:

| Prior.                                                                                          | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|-------------------------------------------------------------------------------------------------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1                                                                                               | Mono-type pump | 84.00              | Electric motor | 20              | 10.00             | CLASS 0       | 6.00                 | 84.00                 |
| <b>Note:</b> 1. Production borehole.<br>2. Install water level monitoring facility in borehole. |                |                    |                |                 |                   |               |                      |                       |



Golder Associates Africa, Pretoria  
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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 31/03/2014

## BASIC SITE INFORMATION:

Site Identifier: 2823BCX0198 Number: SD1-27

Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK PTN. ROOIPAN

Latitude [°] 28.378680  
Longitude [°] 23.624700  
Altitude [m]: 1437.42

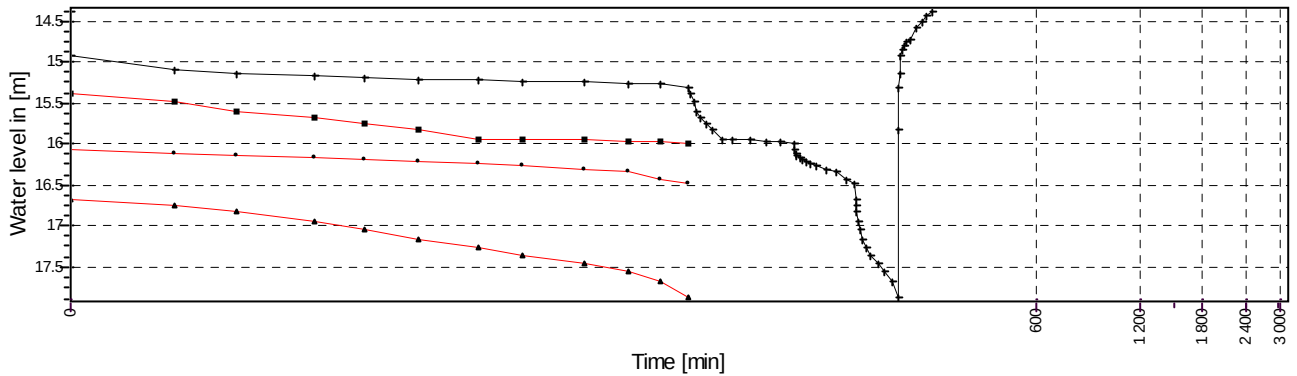
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 203  
Depth [m]: 104.44  
Col. ht. [mm]: 0.62

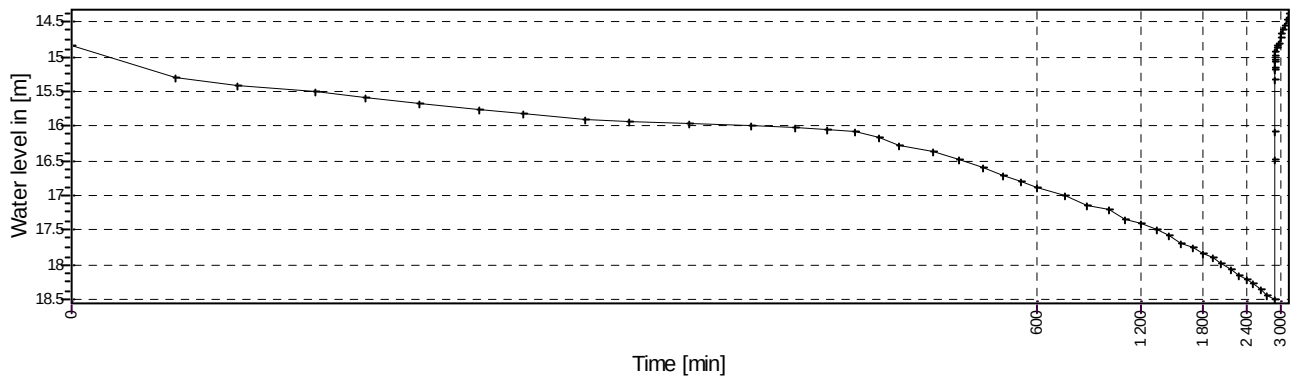
Water lev. [m]: 14.38  
Piezometer: 0  
Date WL meas.: 20130724

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 82.80               | 20130724      | 0700 | 20130724    | 1200 |                               |           |                 |
| GOLD       | Constant rate test | 82.80               | 20130724      | 1400 | 20130726    | 1900 | 273                           |           | 8.33            |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | % | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|---|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 0700        | 60           | 82.80              | 8.20             | 0.92       |            |   |                 |                            |             |         | 8.91  |
| STEP TEST STEP 2 | 0800        | 60           | 82.80              | 16.30            | 1.61       |            |   |                 |                            |             |         | 10.12 |
| STEP TEST STEP 3 | 0900        | 60           | 82.80              | 24.22            | 2.10       |            |   |                 |                            |             |         | 11.53 |
| STEP TEST STEP 4 | 1000        | 60           | 82.80              | 30.12            | 3.49       | 100        |   | 60              |                            |             |         | 8.63  |
| CONSTANT         | 1400        | 2880         | 82.80              | 30.16            | 4.12       | 100        |   | 300             | 273                        |             |         | 7.32  |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0196 Number: SD1-27S Site type: Borehole

Distr./Farm No.: 507

Site Name/Des.: ROOIPAN

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.378730

Reg./BB.:

Topo-set.:

Depth [m]: 18.00

Longitude [°]: 23.624720

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.61

Altitude [m]: 1437.38

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

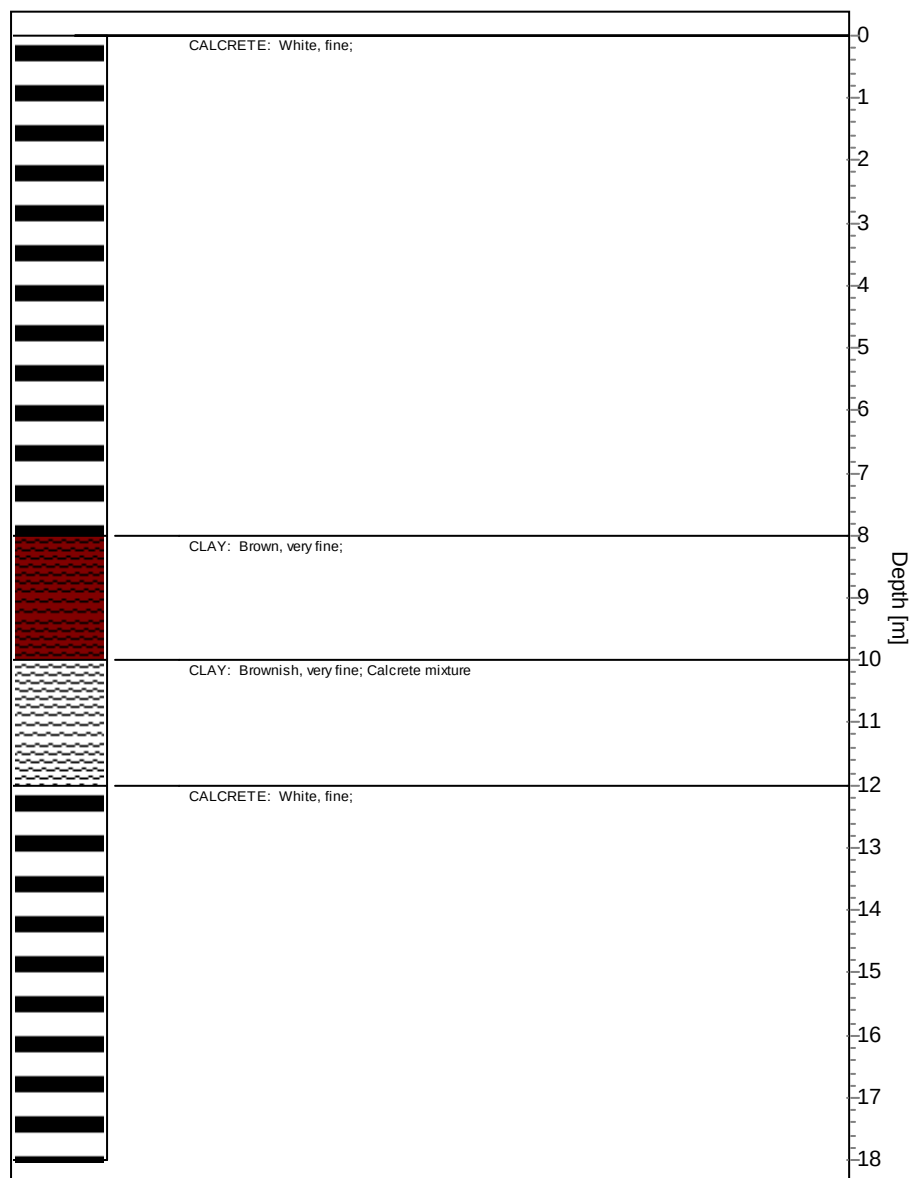
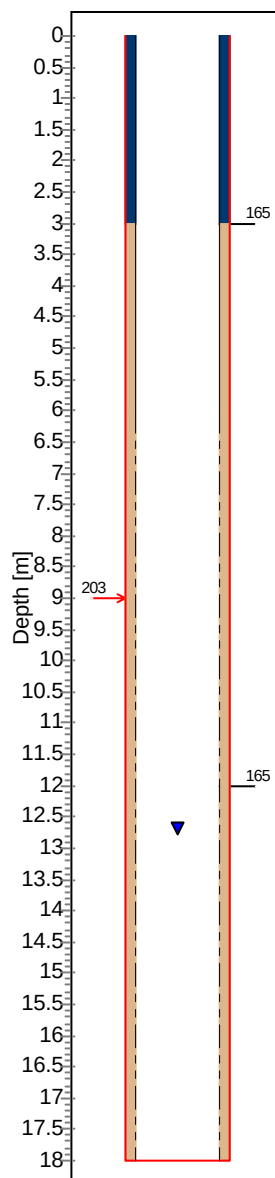
Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend

|                                                                                   |                                      |                                                                                   |      |                                  |                                                                                     |                |
|-----------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------|------|----------------------------------|-------------------------------------------------------------------------------------|----------------|
|  | Hole                                 |  | 165  | Hole diameter [mm]               |  | Sanitary seal  |
|  | Casing (plain / perforated, slotted) |  | 152  | Casing diameter [mm]             |  | Gravel (> 2mm) |
|  | Screen / Mesh Screen                 |  | 0:50 | Waterlevel measured: 20/06/13    |                                                                                     |                |
|  | Piezometer                           |  |      | Piezometer (Nr. & Diameter [mm]) |                                                                                     |                |

Construction

Lithology



COMMENT:



Golder Associates Africa, Pretoria  
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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0196 Number: SD1-27S Site type: Borehole

Distr./Farm No.: 507 Site Name/Descr.: ROOIPAN

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.378730 | Alt. No. 1: |      | Diam. [mm]:   | 165   | Water lev. [m]: | 12.69    |
| Longitude [°]: | 23.624720 | Alt. No. 2: |      | Depth [m]:    | 18.00 | WL status:      | Static   |
| Altitude [m]:  | 1437.38   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.61  | Date WL meas.:  | 20130620 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
Type of Inst.: Pulley Diam. [mm]:  
Manufacturer: Depth to Intk. [m]:

**Engine:**  
Manufacturer: Power Rating [kW]  
Type of Power: Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |         |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|---------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-27S | Date sampled: | 20130713 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 0     | Comment:               |        |           |
| Main Parameters: |         |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.7     | Na:           | 2.68     | Cl:                                                                                                                                                                                                                                                                              | 2.88  | Langel.:               | -0.15  | E.Coli:   |
| EC: [mS/m]       | 19.4    | K:            | 1.85     | NO3 as N:                                                                                                                                                                                                                                                                        | < 0.3 | Aggr-Ind:              | 11.80  | Faec. co: |
| TDS:             | 116     | Si:           | 1.54     | SO4:                                                                                                                                                                                                                                                                             | 8.05  | Ion-bal:               | -15.75 | Total Co: |
| T. Alk.:         | 149     | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 110.29 | SPC:      |
| Ca:              | 34.1    | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 6.13    | Mn:           | 0.22 †   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|                  |         |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 6.00        | 165        | Steel    |              | Plain casing          |                                |            |             |
| 6.00             | 18.00       | 165        | Steel    |              | Perforated or slotted |                                |            |             |



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Fax: 012 - 364 4001  
Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0191 Number: SD1-32 Site type: Borehole

Distr./Farm No.: 507

Site Name/Des.: ROOIPAN

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.400820

Reg./BB.:

Topo-set.:

Depth [m]: 73.90

Longitude [°]: 23.658530

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.53

Altitude [m]: 1436.43

Site purp.: Production (water supply)

Diam. [mm]: 190

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

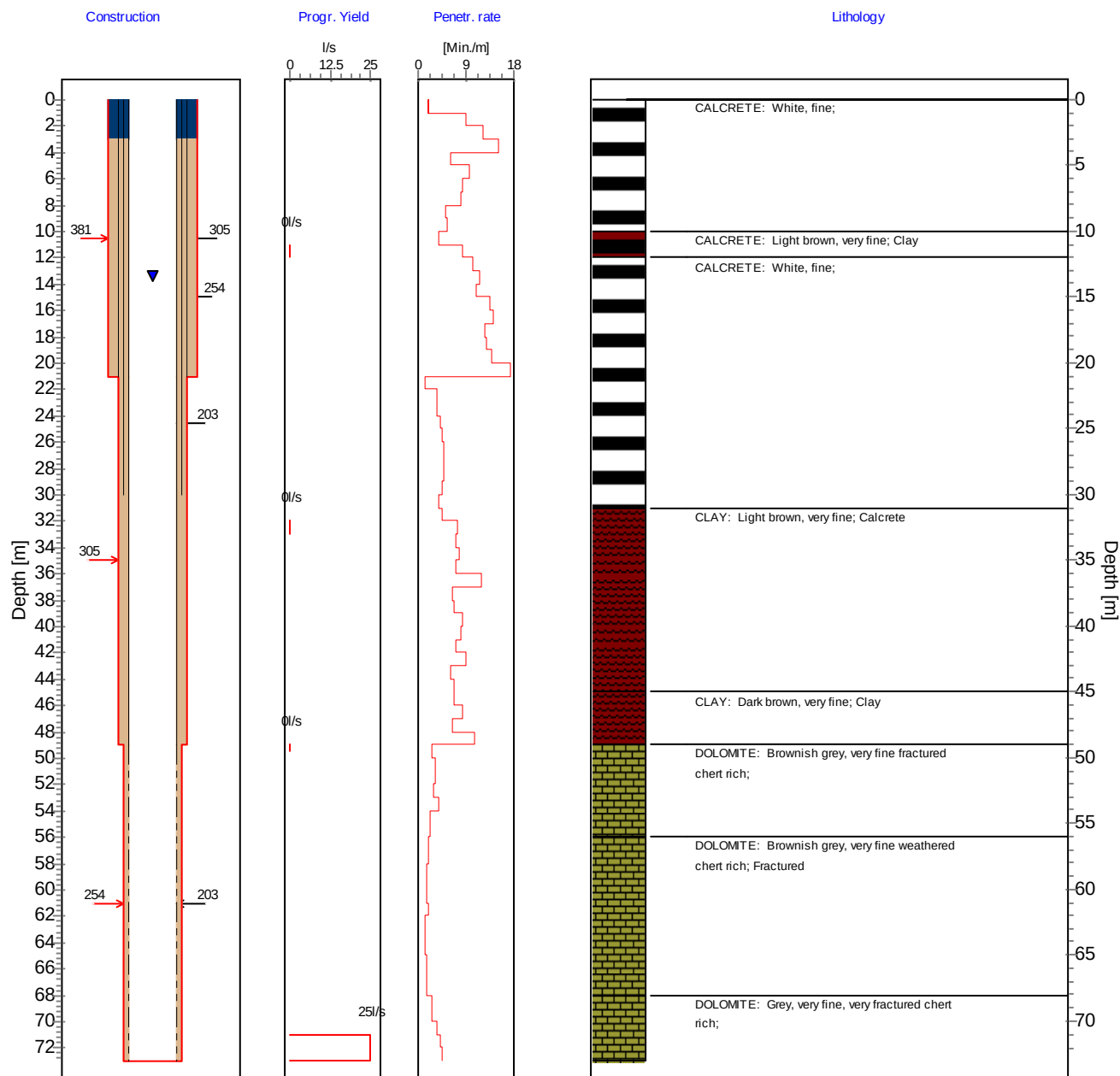
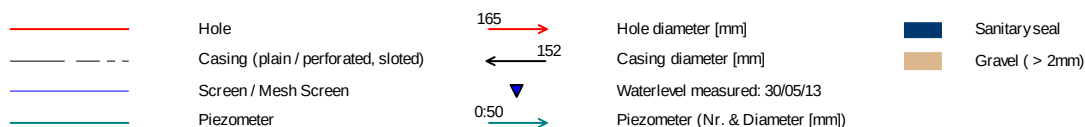
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



Golder Associates Africa, Pretoria  
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Fax: 012 - 364 4001  
Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0191 Number: SD1-32 Site type: Borehole

Distr./Farm No.: 507 Site Name/Descr.: ROOIPAN

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.400820 | Alt. No. 1: |      | Diam. [mm]:   | 190   | Water lev. [m]: | 14.12    |
| Longitude [°]: | 23.658530 | Alt. No. 2: |      | Depth [m]:    | 73.90 | WL status:      | Static   |
| Altitude [m]:  | 1436.43   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.53  | Date WL meas.:  | 20130727 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| <b>Pump:</b>   |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| <b>Engine:</b> |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-32 | Date sampled: | 20140218 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 70.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.2    | Na:           | 4.39     | Cl:                                                                                                                                                                                                                                                                              | 9.97  | Langel.:               | 0.05   | E.Coli:   |
| EC: [mS/m]       | 55.6   | K:            | 1.91     | NO3 as N:                                                                                                                                                                                                                                                                        | < 0.3 | Aggr-Ind:              | 12.10  | Faec. co: |
| TDS:             | 402    | Si:           |          | SO4:                                                                                                                                                                                                                                                                             | 3.59  | Ion-bal:               | -0.69  | Total Co: |
| T. Alk.:         | 325    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 327.40 | SPC:      |
| Ca:              | 97.1   | Fe:           | 1.21 ‡   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ; Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 20.7   | Mn:           | 0.14 †   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 11.00            | 12.00             | 0.00       | Notch (V- or U-notch) |              | DAMP    |
| 32.00            | 33.00             | 0.00       | Notch (V- or U-notch) |              | DAMP    |
| 49.00            | 49.50             | 0.00       | Notch (V- or U-notch) |              | SEEPAGE |
| 71.00            | 73.00             | 25.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] to Bot. [m] |       | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]: Length Width | Hor. Dist. | Vert. Dist. |
|------------------------------|-------|------------|----------|--------------|-----------------------|-----------------------------|------------|-------------|
| 0.00                         | 21.00 | 305        | Steel    |              | Plain casing          |                             |            |             |
| 0.00                         | 30.00 | 254        | Steel    |              | Plain casing          |                             |            |             |
| 0.00                         | 49.00 | 203        | Steel    |              | Plain casing          |                             |            |             |
| 49.00                        | 73.00 | 203        | Steel    |              | Perforated or slotted |                             |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130609 | 60           | 70.80              | 8.12             | 1.25       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130609 | 60           | 70.80              | 16.10            | 2.17       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130609 | 60           | 70.80              | 24.15            | 4.44       |                |       |          |         |         |
| STEP TEST STEP 4 | 20130609 | 60           | 70.80              | 30.10            | 7.04       | 100            | 30    |          |         |         |
| CONSTANT (1)     | 20130610 | 2880         | 70.80              | 25.08            | 3.91       | 100            | 120   |          |         |         |
| CONSTANT (2)     | 20130727 | 4320         | 70.80              | 30.24            | 5.33       | 100            | 40    | 1078     | 0.0003  |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 70.00              | Electric motor | 20              | 15.00             | CLASS 2       | 6.10                 | 70.00                 |

**Note:** 1. Production borehole.  
2. (F = 1.21 mg/l) Blend water before human consumption.  
3. Install water level monitoring facility in borehole.



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Project No.: 11613568



# PUMPING TEST REPORT

Date compiled: 31/03/2014

## BASIC SITE INFORMATION:

Site Identifier: 2823BCX0191 Number: SD1-32

Site type: Borehole

Distr./Farm No.: 507

Site Name/Des.: ROOIPAN

Latitude [°] 28.400820  
Longitude [°] 23.658530  
Altitude [m]: 1436.43

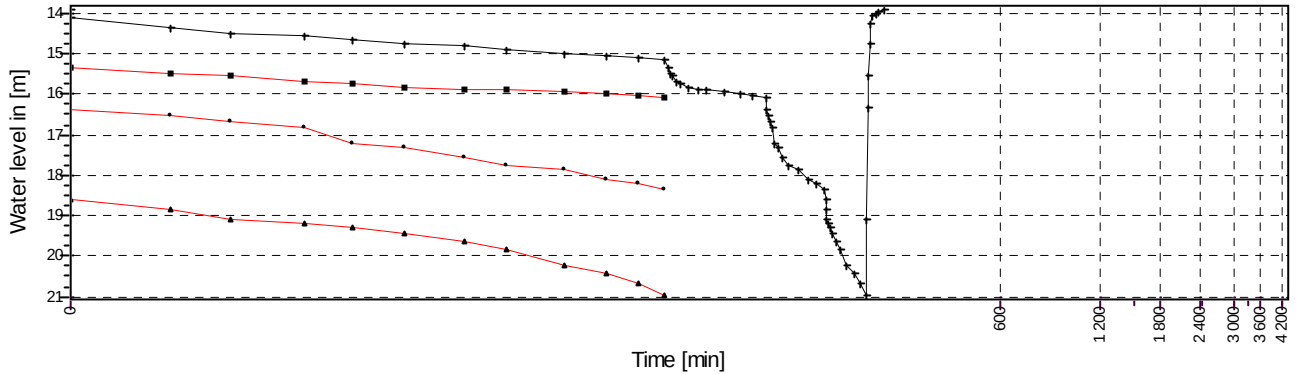
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 190  
Depth [m]: 73.90  
Col. ht. [mm]: 0.53

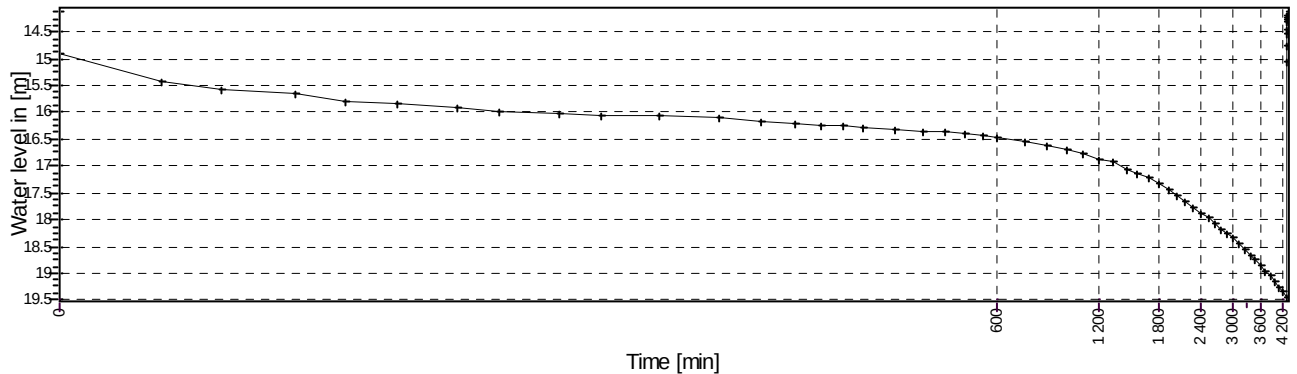
Water lev. [m]: 14.12  
Piezometer: 0  
Date WL meas.: 20130727

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 70.80               | 20130609      | 1230 | 20130609    | 1700 |                               |           |                 |
| GOLD       | Constant rate test | 70.80               | 20130610      | 0900 | 20130612    | 1100 |                               |           |                 |
| GOLD       | Constant rate test | 70.80               | 20130727      | 1400 | 20130730    | 1450 | 1078                          | 0.000321  | 12.50           |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | % | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|---|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1230        | 60           | 70.80              | 8.12             | 1.25       |            |   |                 |                            |             |         | 6.50 |
| STEP TEST STEP 2 | 1330        | 60           | 70.80              | 16.10            | 2.17       |            |   |                 |                            |             |         | 7.42 |
| STEP TEST STEP 3 | 1430        | 60           | 70.80              | 24.15            | 4.44       |            |   |                 |                            |             |         | 5.44 |
| STEP TEST STEP 4 | 1530        | 60           | 70.80              | 30.10            | 7.04       | 100        |   | 30              |                            |             |         | 4.28 |
| CONSTANT (1)     | 0900        | 2880         | 70.80              | 25.08            | 3.91       | 100        |   | 120             |                            |             |         | 6.41 |
| CONSTANT (2)     | 1400        | 4320         | 70.80              | 30.24            | 5.33       | 100        |   | 40              | 1078                       |             | 0.0003  | 5.67 |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 18/09/2013

## BASIC SITE INFORMATION:

Site Identifier: 2823BCX0191 Number: SD1-32

Site type: Borehole

Distr./Farm No.: 507

Site Name/Des.: ROOIPAN

Latitude [°] 28.400820  
Longitude [°] 23.658530  
Altitude [m]: 1436.43

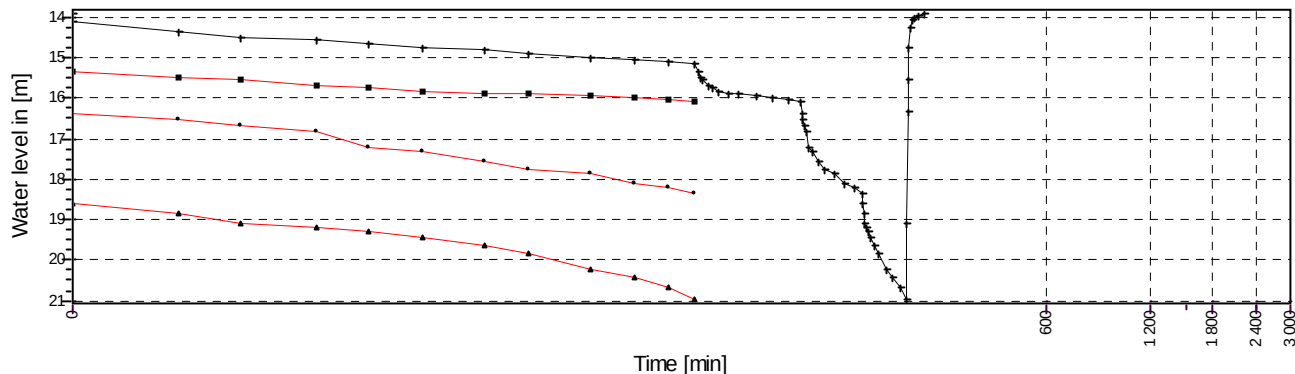
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 190  
Depth [m]: 73.90  
Col. ht. [mm]: 0.53

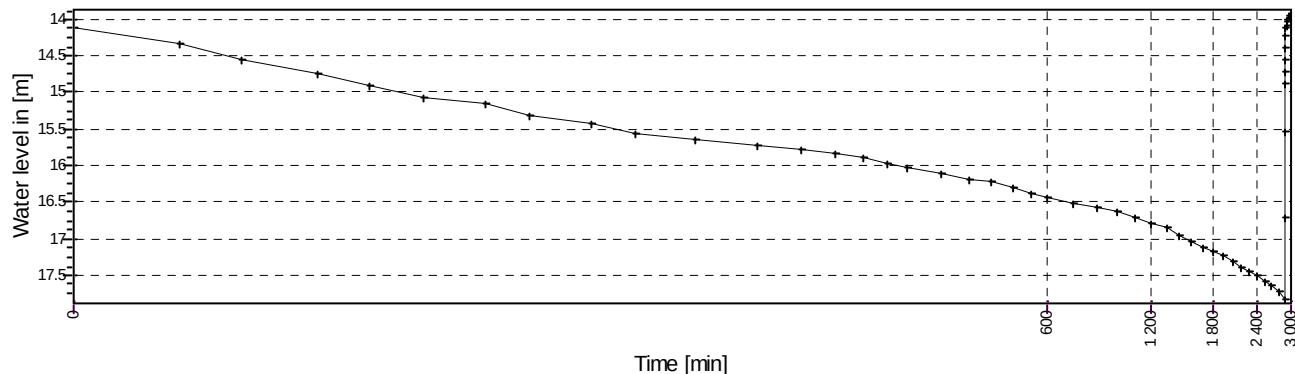
Water lev. [m]: 14.12  
Piezometer: 0  
Date WL meas.: 20130727

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 70.80               | 20130609      | 1230 | 20130609    | 1700 |                               |           |                 |
| GOLD       | Constant rate test | 70.80               | 20130610      | 0900 | 20130612    | 1100 |                               |           |                 |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1230        | 60           | 70.80              | 8.12             | 1.25       |            |     |                 |                            |             |         | 6.50 |
| STEP TEST STEP 2 | 1330        | 60           | 70.80              | 16.10            | 2.17       |            |     |                 |                            |             |         | 7.42 |
| STEP TEST STEP 3 | 1430        | 60           | 70.80              | 24.15            | 4.44       |            |     |                 |                            |             |         | 5.44 |
| STEP TEST STEP 4 | 1530        | 60           | 70.80              | 30.10            | 7.04       | 100        | 30  |                 |                            |             |         | 4.28 |
| CONSTANT (1)     | 0900        | 2880         | 70.80              | 25.08            | 3.91       | 100        | 120 |                 |                            |             |         | 6.41 |



Golder Associates Africa, Pretoria  
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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0211 Number: SD1-32M Site type: Borehole

Distr./Farm No.: 507

Site Name/Des.: ROOIPAN

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.400420

Reg./BB.:

Topo-set.:

Depth [m]: 72.00

Longitude [°]: 23.658710

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.50

Altitude [m]: 1435.90

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

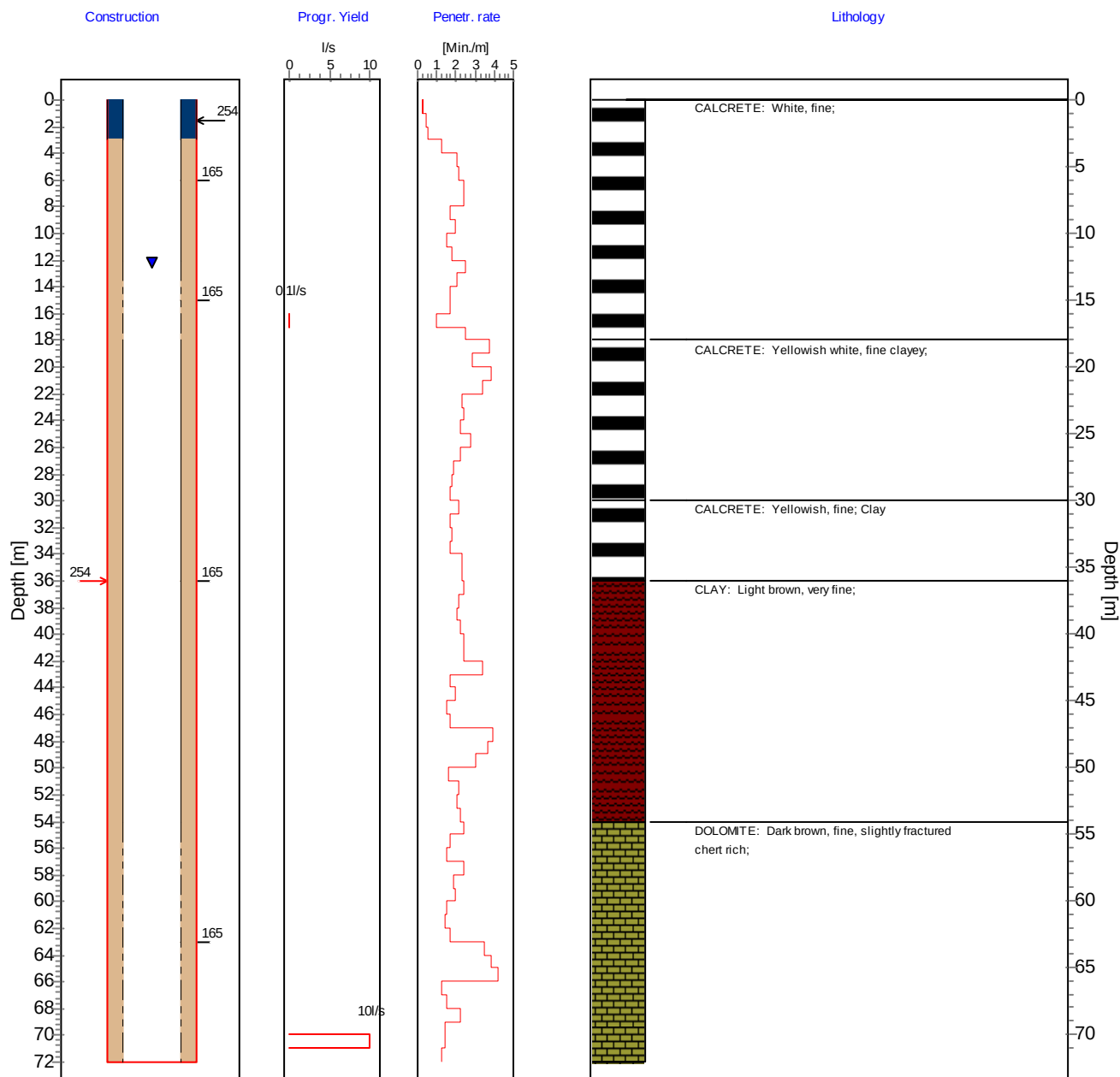
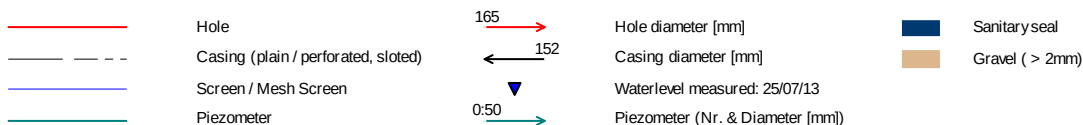
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0193 Number: SD1-32S Site type: Borehole

Distr./Farm No.: 507

Site Name/Des.: ROOIPAN

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.400790

Reg./BB.:

Topo-set.:

Depth [m]: 16.00

Longitude [°]: 23.658460

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.62

Altitude [m]: 1436.59

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

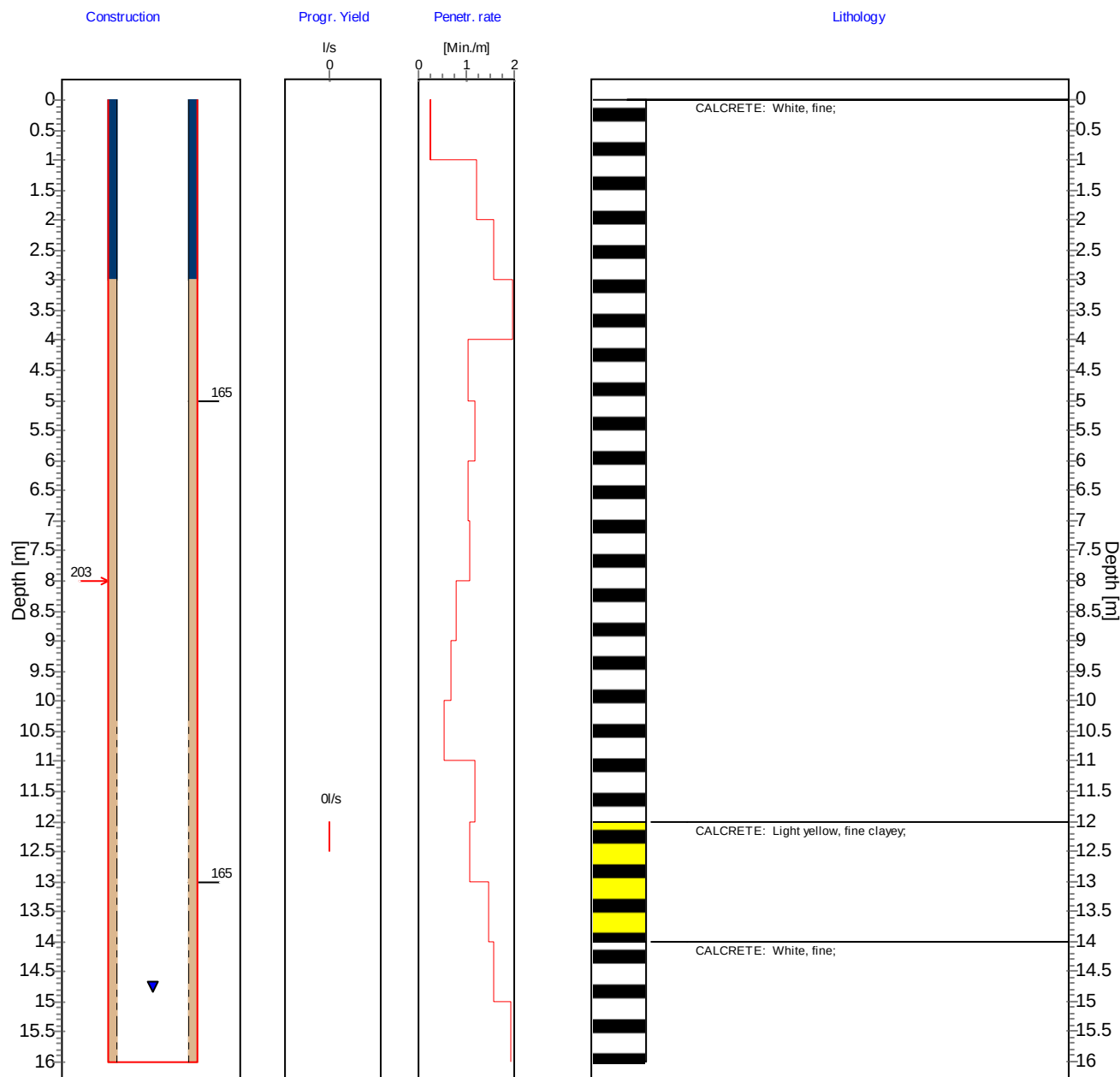
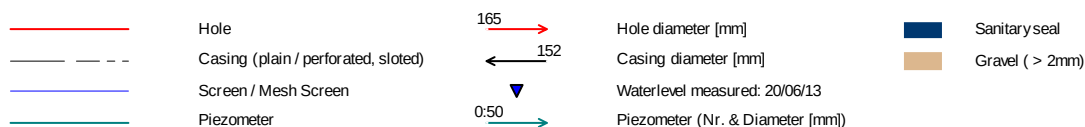
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



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 Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0193 Number: SD1-32S Site type: Borehole

Distr./Farm No.: 507 Site Name/Descr.: ROOIPAN

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.400790 | Alt. No. 1: |      | Diam. [mm]:   | 165   | Water lev. [m]: | 14.74    |
| Longitude [°]: | 23.658460 | Alt. No. 2: |      | Depth [m]:    | 16.00 | WL status:      | Static   |
| Altitude [m]:  | 1436.59   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.62  | Date WL meas.:  | 20130620 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
Type of Inst.: Pulley Diam. [mm]:  
Manufacturer: Depth to Intk. [m]:

**Engine:**  
Manufacturer: Power Rating [kW]  
Type of Power: Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |         |               |          |                                                                                                                                                                                                                                                                                      |       |                        |        |           |
|------------------|---------|---------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-32S | Date sampled: | 20130713 | Depth sampl. [m]:                                                                                                                                                                                                                                                                    | 0     | Comment:               |        |           |
| Main Parameters: |         |               |          | Calculated Parameters:                                                                                                                                                                                                                                                               |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.77    | Na:           | 3.77     | Cl:                                                                                                                                                                                                                                                                                  | 8.11  | Langel.:               | 0.00   | E.Coli:   |
| EC: [mS/m]       | 22.5    | K:            | 1.88     | NO3 as N:                                                                                                                                                                                                                                                                            | < 0.3 | Aggr-Ind:              | 11.97  | Faec. co: |
| TDS:             | 144     | Si:           | 0.07     | SO4:                                                                                                                                                                                                                                                                                 | 11    | Ion-bal:               | -16.56 | Total Co: |
| T. Alk.:         | 182     | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                                   | < 0.1 | CaCO3:                 | 137.02 | SPC:      |
| Ca:              | 35.3    | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit   ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit     Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 11.9    | Mn:           | 0.08 †   |                                                                                                                                                                                                                                                                                      |       |                        |        |           |
|                  |         |               |          |                                                                                                                                                                                                                                                                                      |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 12.00            | 12.50             | 0.00       | Notch (V- or U-notch) |              | DAMP    |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 10.00       | 165        | Steel    |              | Plain casing          |                                |            |             |
| 10.00            | 16.00       | 165        | Steel    |              | Perforated or slotted |                                |            |             |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0171 Number: SD1-36 Site type: Borehole

Distr./Farm No.: Site Name/Des.: LIME ACRES

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.337170

Reg./BB.:

Topo-set.:

Depth [m]: 70.90

Longitude [°]: 23.604710

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.45

Altitude [m]: 1443.95

Site purp.: Production (water supply)

Diam. [mm]: 254

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

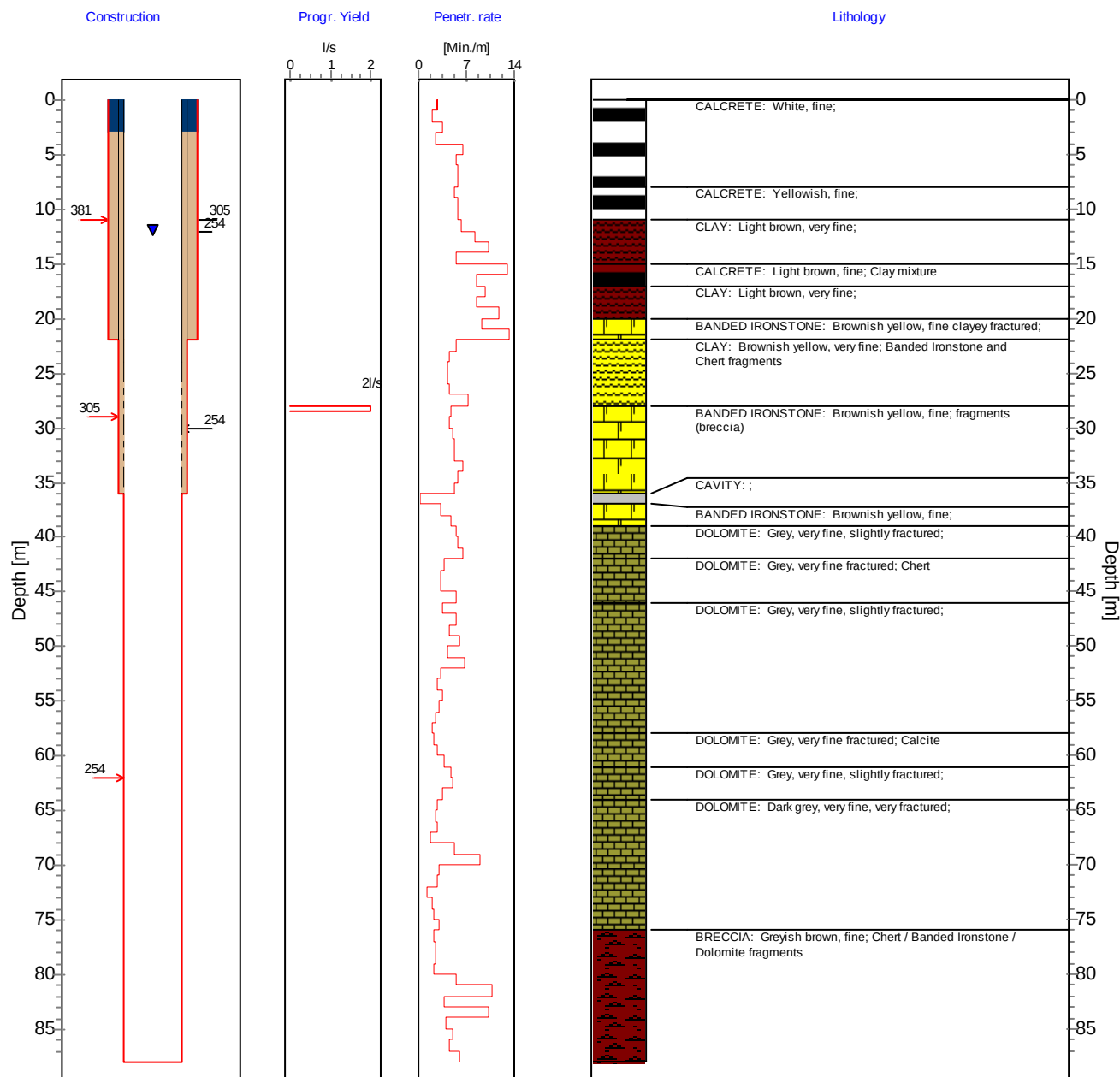
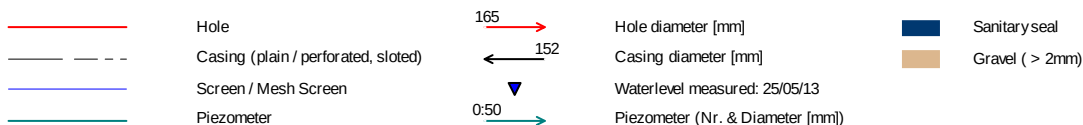
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



Golder Associates Africa, Pretoria  
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 Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0171 Number: SD1-36 Site type: Borehole

Distr./Farm No.: Site Name/Descr.: LIME ACRES

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.337170 | Alt. No. 1:      |  | Diam. [mm]:   | 254   | Water lev. [m]: | 12.75    |
| Longitude [°]: | 23.604710 | Alt. No. 2:      |  | Depth [m]:    | 70.90 | WL status:      | Static   |
| Altitude [m]:  | 1443.95   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.45  | Date WL meas.:  | 20130529 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

Pump:  
Type of Inst.: Pulley Diam. [mm]:  
Manufacturer: Depth to Intk. [m]:

Engine:  
Manufacturer: Power Rating [kW]  
Type of Power: Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-36 | Date sampled: | 20130529 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 34.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.62   | Na:           | 46.6     | Cl:                                                                                                                                                                                                                                                                              | 80.5  | Langel.:               | 0.27   | E.Coli:   |
| EC: [mS/m]       | 87.1 † | K:            | 8.25     | NO3 as N:                                                                                                                                                                                                                                                                        | 13 †  | Aggr-Ind:              | 12.37  | Faec. co: |
| TDS:             | 570 †  | Si:           | 16.2     | SO4:                                                                                                                                                                                                                                                                             | 76.7  | Ion-bal:               | -1.58  | Total Co: |
| T. Alk.:         | 290    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 401.63 | SPC:      |
| Ca:              | 76.9   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ; Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 51     | Mn:           | 0.07 †   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 28.00            | 28.50             | 2.00       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 22.00       | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 24.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 24.00            | 36.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130529 | 60           | 34.80              | 1.54             | 5.15       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130529 | 60           | 34.80              | 5.54             | 16.19      |                |       |          |         |         |
| STEP TEST STEP 3 | 20130529 | 10           | 34.80              | 7.64             | 22.18      | 100            | 40    |          |         |         |
| PUMP INLET       | 20130529 | 25           | 34.80              | 4.43             | 22.05      |                |       |          |         |         |



**Golder Associates**

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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 18/09/2013

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0171 Number: SD1-36 Site type: Borehole

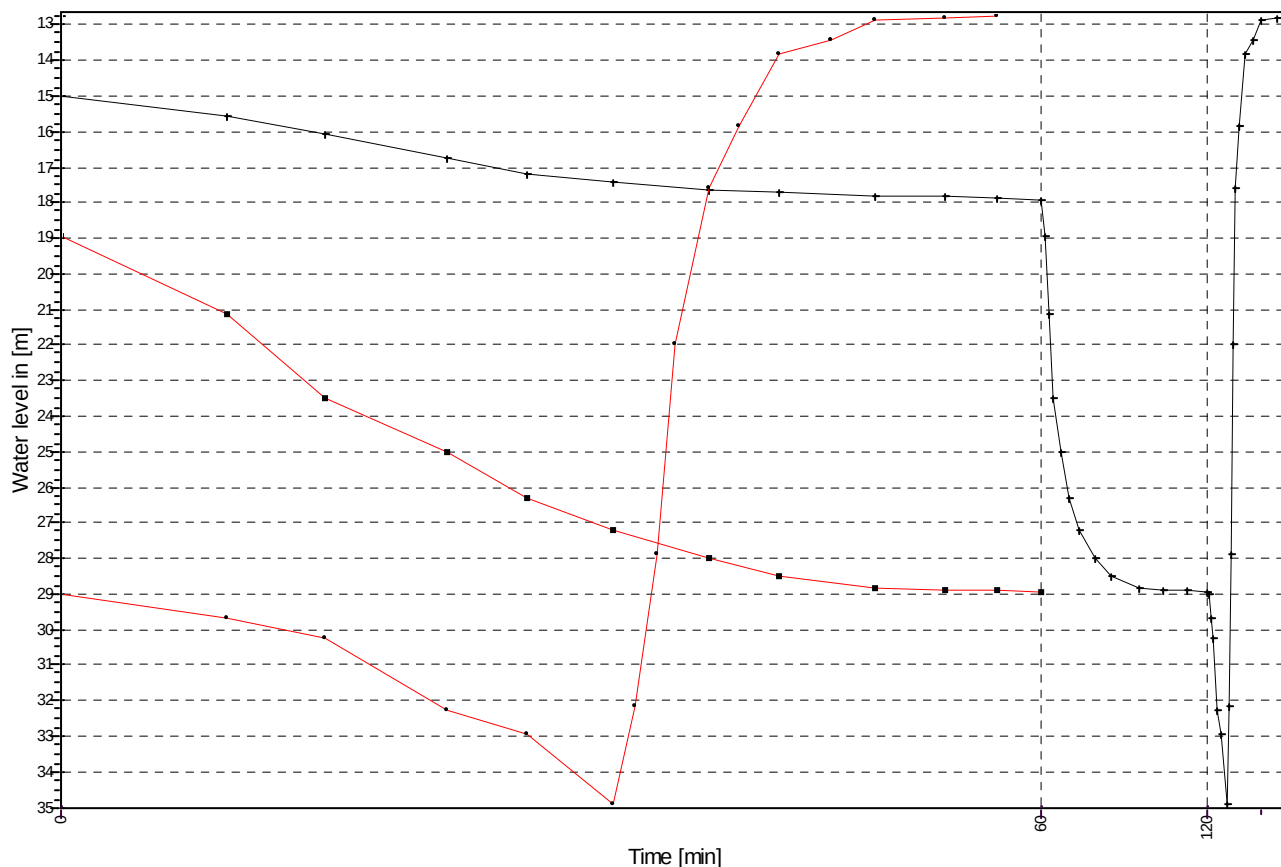
Distr./Farm No.:

Site Name/Des.: LIME ACRES

|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.337170 | Alt. No. 1:      |  | Diam. [mm]:    | 254   | Water lev. [m]: | 12.75    |
| Longitude [°] | 23.604710 | Alt. No. 2:      |  | Depth [m]:     | 70.90 | Piezometer:     | 0        |
| Altitude [m]: | 1443.95   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.45  | Date WL meas.:  | 20130529 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test    | 34.80               | 20130529      | 0820 | 20130529    | 1110 |                               |           |                 |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 0820        | 60           | 34.80              | 1.54             | 5.15       |            |     |                 |                            |             |         | 0.30 |
| STEP TEST STEP 2 | 0920        | 60           | 34.80              | 5.54             | 16.19      |            |     |                 |                            |             |         | 0.34 |
| STEP TEST STEP 3 | 1020        | 10           | 34.80              | 7.64             | 22.18      |            | 100 | 40              |                            |             |         | 0.34 |
| PUMP INLET       | 1110        | 25           | 34.80              | 4.43             | 22.05      |            |     |                 |                            |             |         | 0.20 |



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Project No.: 11613568



**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0194 Number: SD1-37 Site type: Borehole

Dist./Farm No.: 507

Site Name/Des.: ROOIPAN

Region Type: Water supply authority

Region Descr.: KGATELOPLELE LM

Latitude [°]: 28.387720

Reg./BB.:

Topo-set.:

Depth [m]: 82.00

Longitude [°]: 23.623330

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.53

Altitude [m]: 1436.74

Site purp.: Production (water supply)

Diam. [mm]: 254

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

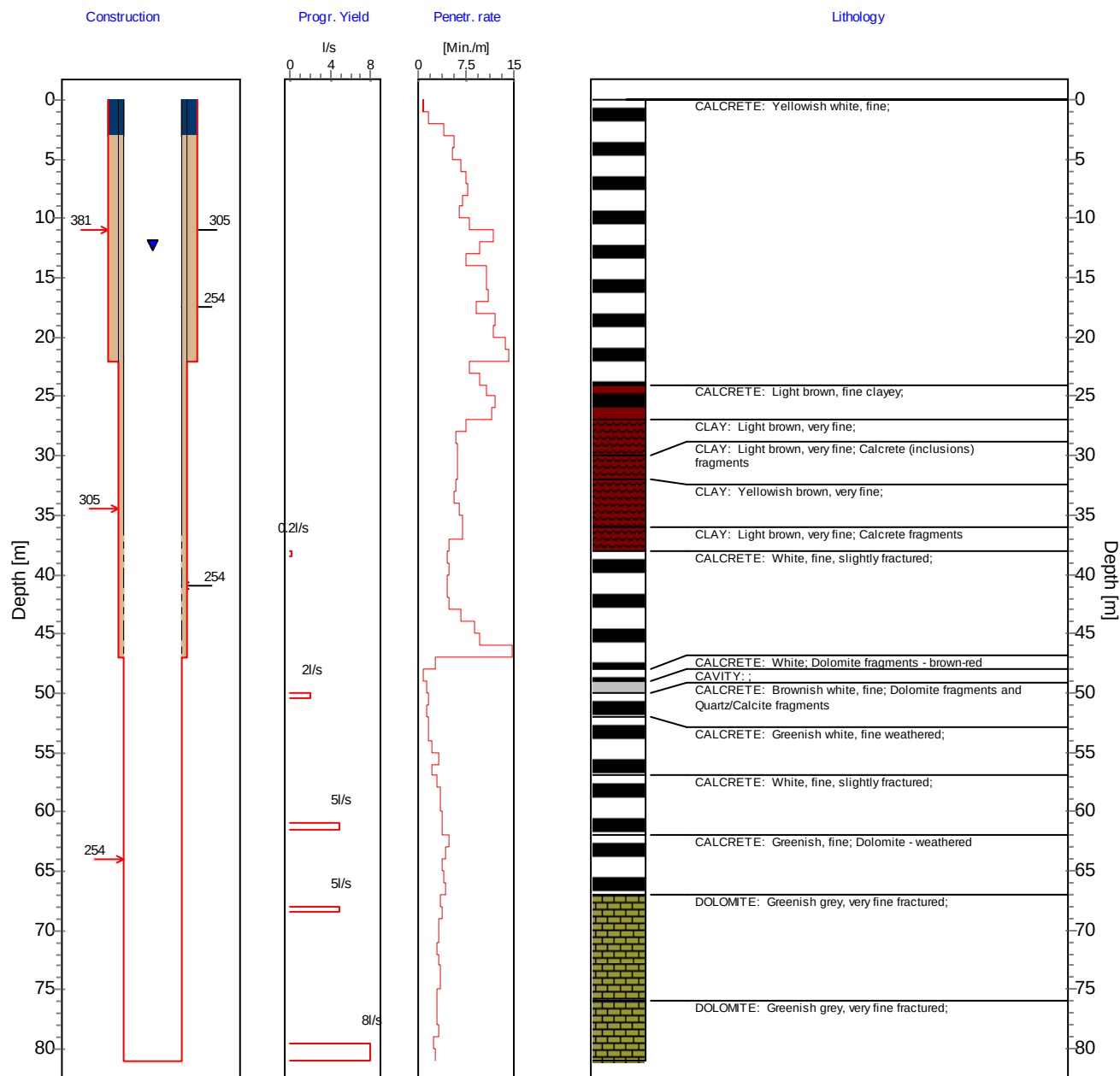
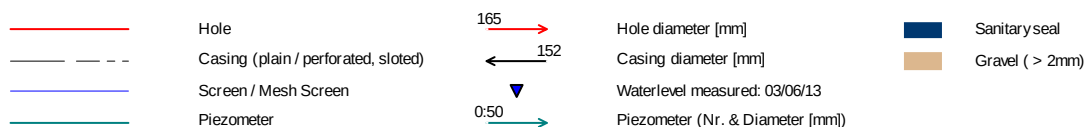
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



Golder Associates Africa, Pretoria  
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 Fax: 012 - 364 4001  
 Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0194 Number: SD1-37 Site type: Borehole

Distr./Farm No.: 507 Site Name/Descr.: ROOIPAN

|                |           |                  |               |       |                 |          |
|----------------|-----------|------------------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.387720 | Alt. No. 1:      | Diam. [mm]:   | 254   | Water lev. [m]: | 13.77    |
| Longitude [°]: | 23.623330 | Alt. No. 2:      | Depth [m]:    | 82.00 | WL status:      | Static   |
| Altitude [m]:  | 1436.74   | Rep. inst.: GOLD | Col. ht. [m]: | 0.53  | Date WL meas.:  | 20130618 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
Type of Inst.: Pulley Diam. [mm]:  
Manufacturer: Depth to Intk. [m]:

**Engine:**  
Manufacturer: Power Rating [kW]  
Type of Power: Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-37 | Date sampled: | 20130619 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 70.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.49   | Na:           | 21.6     | Cl:                                                                                                                                                                                                                                                                              | 63.1  | Langel.:               | 0.28   | E.Coli:   |
| EC: [mS/m]       | 72.6 † | K:            | 4.5      | NO3 as N:                                                                                                                                                                                                                                                                        | 3.83  | Aggr-Ind:              | 12.35  | Faec. co: |
| TDS:             | 486    | Si:           | 19.9     | SO4:                                                                                                                                                                                                                                                                             | 34.5  | Ion-bal:               | 2.45   | Total Co: |
| T. Alk.:         | 292    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 399.77 | SPC:      |
| Ca:              | 99.4   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 36.9   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 38.00            | 38.50             | 0.20       | Notch (V- or U-notch) |              |         |
| 50.00            | 50.50             | 2.00       | Notch (V- or U-notch) |              |         |
| 61.00            | 61.50             | 5.00       | Notch (V- or U-notch) |              |         |
| 68.00            | 68.50             | 5.00       | Notch (V- or U-notch) |              |         |
| 79.50            | 81.00             | 8.00       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 22.00       | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 35.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 35.00            | 47.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | T [m³/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|----------|---------|---------|
| STEP TEST STEP 1 | 20130618 | 60           | 70.80              | 5.20             | 2.04       |                |          |         |         |
| STEP TEST STEP 2 | 20130618 | 60           | 70.80              | 10.04            | 7.03       |                |          |         |         |
| STEP TEST STEP 3 | 20130618 | 60           | 70.80              | 17.18            | 19.17      |                |          |         |         |
| STEP TEST STEP 4 | 20130618 | 20           | 70.80              | 26.19            | 57.00      | 100            | 60       |         |         |
| CONSTANT         | 20130618 | 1440         | 70.80              | 15.05            | 12.63      | 100            | 90       |         |         |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 18/09/2013

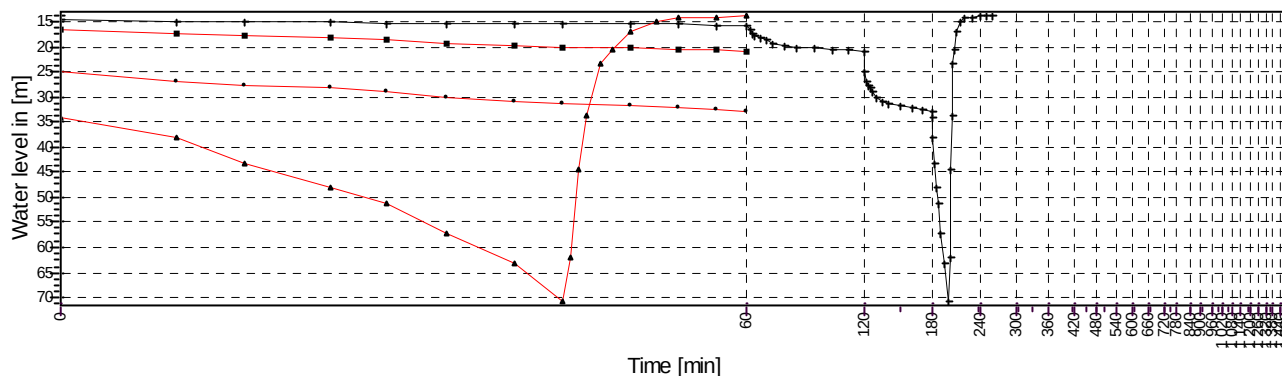
**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0194 Number: SD1-37 Site type: Borehole

Distr./Farm No.: 507 Site Name/Des.: ROOIPAN

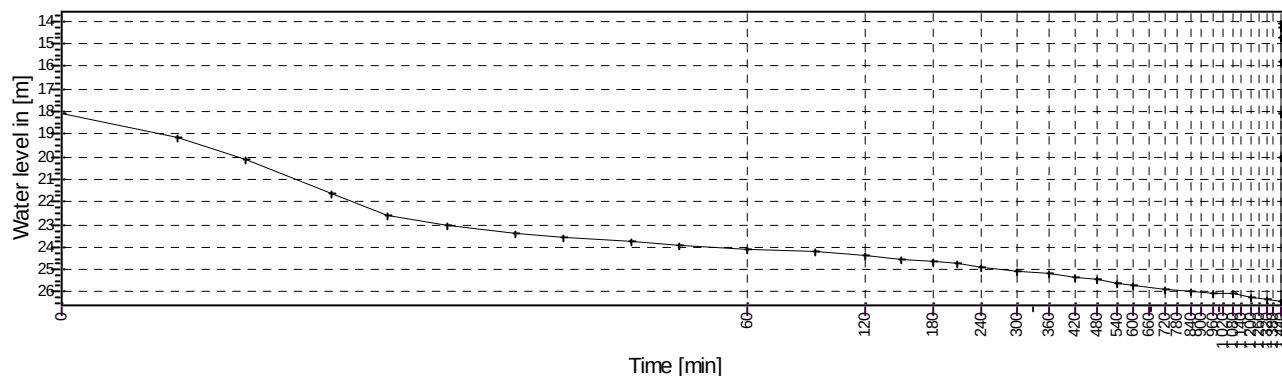
|               |           |                  |                |       |                 |          |
|---------------|-----------|------------------|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.387720 | Alt. No. 1:      | Diam. [mm]:    | 254   | Water lev. [m]: | 13.77    |
| Longitude [°] | 23.623330 | Alt. No. 2:      | Depth [m]:     | 82.00 | Piezometer:     | 0        |
| Altitude [m]: | 1436.74   | Rep. inst.: GOLD | Col. ht. [mm]: | 0.53  | Date WL meas.:  | 20130618 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 70.80               | 20130618      | 0700 | 20130618    | 1120 |                               |           |                 |
| GOLD       | Constant rate test | 70.80               | 20130618      | 1400 | 20130619    | 1530 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 0700        | 60           | 70.80              | 5.20             | 2.04       |            |    |                 |                            |             |         | 2.55 |
| STEP TEST STEP 2 | 0800        | 60           | 70.80              | 10.04            | 7.03       |            |    |                 |                            |             |         | 1.43 |
| STEP TEST STEP 3 | 0900        | 60           | 70.80              | 17.18            | 19.17      |            |    |                 |                            |             |         | 0.90 |
| STEP TEST STEP 4 | 1000        | 20           | 70.80              | 26.19            | 57.00      | 100        | 60 |                 |                            |             |         | 0.46 |
| CONSTANT         | 1400        | 1440         | 70.80              | 15.05            | 12.63      | 100        | 90 |                 |                            |             |         | 1.19 |



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Project No.: 11613568

# Borehole Construction and Geological Log

Date compiled: 03/03/2014

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0199 Number: SD1-43 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

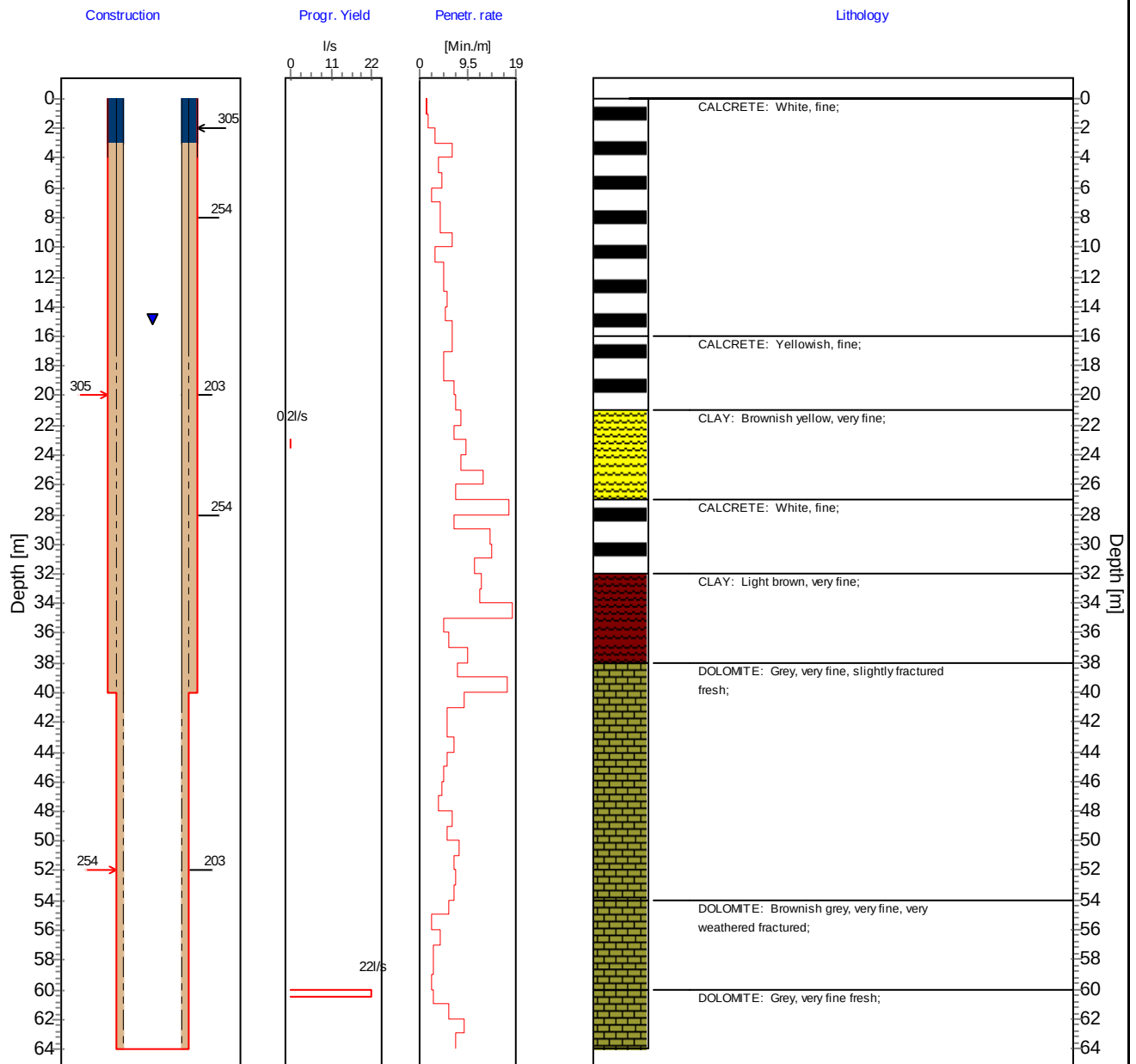
Region Descr.: KGATELOPELE LM

|                                        |           |                                       |                   |
|----------------------------------------|-----------|---------------------------------------|-------------------|
| Latitude [°]: 28.368830                | Reg./BB.: | Topo-set.:                            | Depth [m]: 68.00  |
| Longitude [°]: 23.629280               | G-Nr.:    | Site status: Unused                   | Col. ht. [m]:     |
| Altitude [m]: 1437.83                  |           | Site purp.: Production (water supply) | Diam. [mm]: 203   |
| Coord. acc.: Accurate to within 1 unit |           | Use applic.: Domestic - all purposes  | Drain. reg.: C92A |
| Coord. meth.: Altimeter                |           | Equipment: No equipment               | Rep. inst.: GOLD  |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend

|  |                                      |        |                                  |  |                |
|--|--------------------------------------|--------|----------------------------------|--|----------------|
|  | Hole                                 | 165 →  | Hole diameter [mm]               |  | Sanitary seal  |
|  | Casing (plain / perforated, slotted) | ← 152  | Casing diameter [mm]             |  | Gravel (> 2mm) |
|  | Screen / Mesh Screen                 | ▼      | Waterlevel measured: 20/06/13    |  |                |
|  | Piezometer                           | 0:50 → | Piezometer (Nr. & Diameter [mm]) |  |                |



COMMENT:



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0199 Number: SD1-43 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.368830 | Alt. No. 1: |      | Diam. [mm]:   | 203   | Water lev. [m]: | 14.17    |
| Longitude [°]: | 23.629280 | Alt. No. 2: |      | Depth [m]:    | 68.00 | WL status:      | Static   |
| Altitude [m]:  | 1437.83   | Rep. inst.: | GOLD | Col. ht. [m]: |       | Date WL meas.:  | 20140117 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |  |
|----------------|--|---------------------|--|
| Pump:          |  | Pulley Diam. [mm]:  |  |
| Type of Inst.: |  | Depth to Intk. [m]: |  |
| Manufacturer:  |  |                     |  |
| Engine:        |  | Power Rating [kW]   |  |
| Manufacturer:  |  | Pulley Diam. [mm]:  |  |
| Type of Power: |  |                     |  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-43 | Date sampled: | 20130622 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 64.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.39   | Na:           | 31.7     | Cl:                                                                                                                                                                                                                                                                              | 56.3  | Langel.:               | 0.06   | E.Coli:   |
| EC: [mS/m]       | 74.4 † | K:            | 5.3      | NO3 as N:                                                                                                                                                                                                                                                                        | 4.41  | Aggr-Ind:              | 12.14  | Faec. co: |
| TDS:             | 508 †  | Si:           | 15.5     | SO4:                                                                                                                                                                                                                                                                             | 45.2  | Ion-bal:               | -1.89  | Total Co: |
| T. Alk.:         | 300    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 350.32 | SPC:      |
| Ca:              | 74.8   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 39.8   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 23.00            | 23.50             | 0.20       | Notch (V- or U-notch) |              |         |
| 60.00            | 60.50             | 22.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 4.00        | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 16.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 16.00            | 40.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |
| 0.00             | 40.00       | 203        | Steel    |              | Plain casing          |                                |            |             |
| 40.00            | 64.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130620 | 60           | 64.80              | 5.50             | 0.77       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130620 | 60           | 64.80              | 14.03            | 5.81       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130620 | 60           | 64.80              | 24.21            | 13.04      |                |       |          |         |         |
| STEP TEST STEP 4 | 20130620 | 60           | 64.80              | 30.21            | 20.01      | 0              | 300   |          |         |         |
| CONSTANT         | 20130621 | 1440         | 64.80              | 15.00            | 6.27       | 100            | 1440  | 313      |         |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 60.00              | Electric motor | 20              | 5.00              | CLASS 0       | 5.40                 | 59.00                 |

**Note:** 1. Production borehole.  
2. Install water level monitoring facility in borehole.



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# PUMPING TEST REPORT

Date compiled: 31/03/2014

## BASIC SITE INFORMATION:

Site Identifier: 2823BCX0199 Number: SD1-43

Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Latitude [°] 28.368830  
Longitude [°] 23.629280  
Altitude [m]: 1437.83

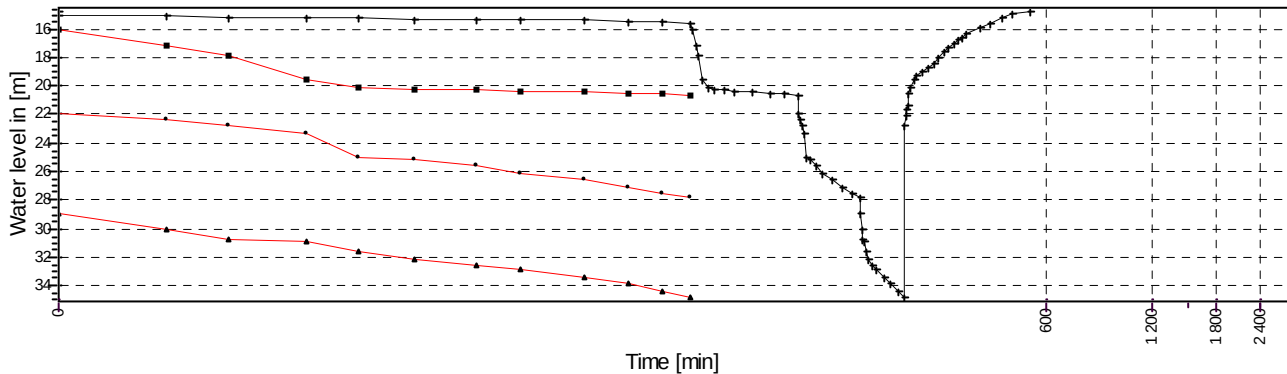
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 203  
Depth [m]: 68.00  
Col. ht. [mm]:

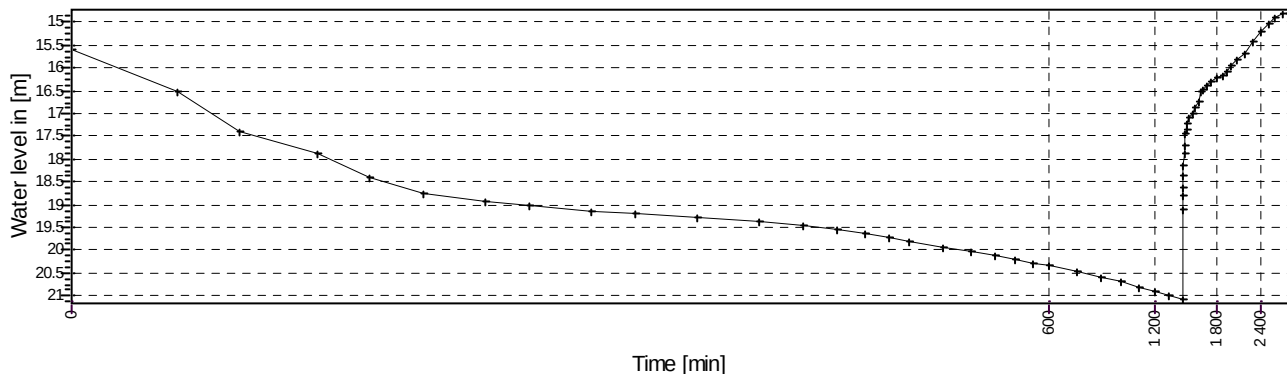
Water lev. [m]: 14.17  
Piezometer: 0  
Date WL meas.: 20140117

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 64.80               | 20130620      | 0900 | 20130620    | 1800 |                               |           |                 |
| GOLD       | Constant rate test | 64.80               | 20130621      | 1000 | 20130623    | 1000 | 313                           |           | 4.17            |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %    | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|------|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 0900        | 60           | 64.80              | 5.50             | 0.77       |            |      |                 |                            |             |         | 7.14 |
| STEP TEST STEP 2 | 1000        | 60           | 64.80              | 14.03            | 5.81       |            |      |                 |                            |             |         | 2.41 |
| STEP TEST STEP 3 | 1100        | 60           | 64.80              | 24.21            | 13.04      |            |      |                 |                            |             |         | 1.86 |
| STEP TEST STEP 4 | 1200        | 60           | 64.80              | 30.21            | 20.01      | 0          | 300  |                 |                            |             |         | 1.51 |
| CONSTANT         | 1000        | 1440         | 64.80              | 15.00            | 6.27       | 100        | 1440 | 313             |                            |             |         | 2.39 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0001 Number: SD1-GAA001 Site type: Borehole

Distr./Farm No.: 507/1 Site Name/Descr.: ROOIPAN PTN. OLIENSPRUIT

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.368740 | Alt. No. 1:      |  | Diam. [mm]:   | 120   | Water lev. [m]: | 5.97     |
| Longitude [°]: | 23.657210 | Alt. No. 2:      |  | Depth [m]:    | 50.39 | WL status:      | Static   |
| Altitude [m]:  | 1428.79   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.33  | Date WL meas.:  | 20120928 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
Type of Inst.: Submersible pump Pulley Diam. [mm]: 50  
Manufacturer: FRANKLIN Depth to Intk. [m]: 13.31

**Engine:**  
Manufacturer: Power Rating [kW]  
Type of Power: Electric motor Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: In use  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Agricultural - stock watering only

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-   | Date sampled: | 20121008 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 48.00 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.59   | Na:           | 28.7     | Cl:                                                                                                                                                                                                                                                                              | 54.3  | Langel.:               | 0.33   | E.Coli:   |
| EC: [mS/m]       | 74.7 † | K:            | 5.12     | NO3 as N:                                                                                                                                                                                                                                                                        | 3.85  | Aggr-Ind:              | 12.41  | Faec. co: |
| TDS:             | 490    | Si:           | 15.3     | SO4:                                                                                                                                                                                                                                                                             | 43.8  | Ion-bal:               | 0.05   | Total Co: |
| T. Alk.:         | 320    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | 0.167 | CaCO3:                 | 387.82 | SPC:      |
| Ca:              | 83.4   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ; Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 43.7   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|------------------|--------------------------------|------------|-------------|
| 0.00             | 12.45       | 120        | Steel    |              | Plain casing     |                                |            |             |

### TESTING DETAILS:

| Description        | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %   | [min] | T [m²/d] | Storage | Comment |
|--------------------|----------|--------------|--------------------|------------------|------------|--------------|-----|-------|----------|---------|---------|
| CALIBRATION STEP 1 | 20120928 | 30           | 48.00              | 1.16             | 0          |              |     |       |          |         |         |
| STEP TEST STEP 1   | 20120929 | 60           | 48.00              | 1.45             | 0.01       |              |     |       |          |         |         |
| STEP TEST STEP 2   | 20120929 | 60           | 48.00              | 3.02             | 0.02       |              |     |       |          |         |         |
| STEP TEST STEP 3   | 20120929 | 40           | 48.00              | 6.98             | 0.10       | 0            | 100 | 2     |          |         |         |
| CONSTANT           | 20120929 | 1080         | 48.00              | 6.03             | 0.07       |              | 100 | 3     |          |         |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm. | Depth to intk. [m] | Type of power | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|--------------|--------------------|---------------|-----------------|-------------------|---------------|----------------------|-----------------------|
|--------|--------------|--------------------|---------------|-----------------|-------------------|---------------|----------------------|-----------------------|

1

0 2.00

Note: 1. Pumping period = 8h/week.



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# PUMPING TEST REPORT

Date compiled: 2012/10/08

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0001 Number: SD1-GAA001 Site type: Borehole

Distr./Farm No.: 507/1

Site Name/Des.: ROOIPAN PTN. OLIENSPRUIT

Latitude [°] 28.368740

Alt. No. 1:

Diam. [mm]: 110

Water lev. [m]: 5.97

Longitude [°] 23.657210

Alt. No. 2:

Depth [m]: 50.39

Piezometer: 0

Altitude [m]: 1428.79

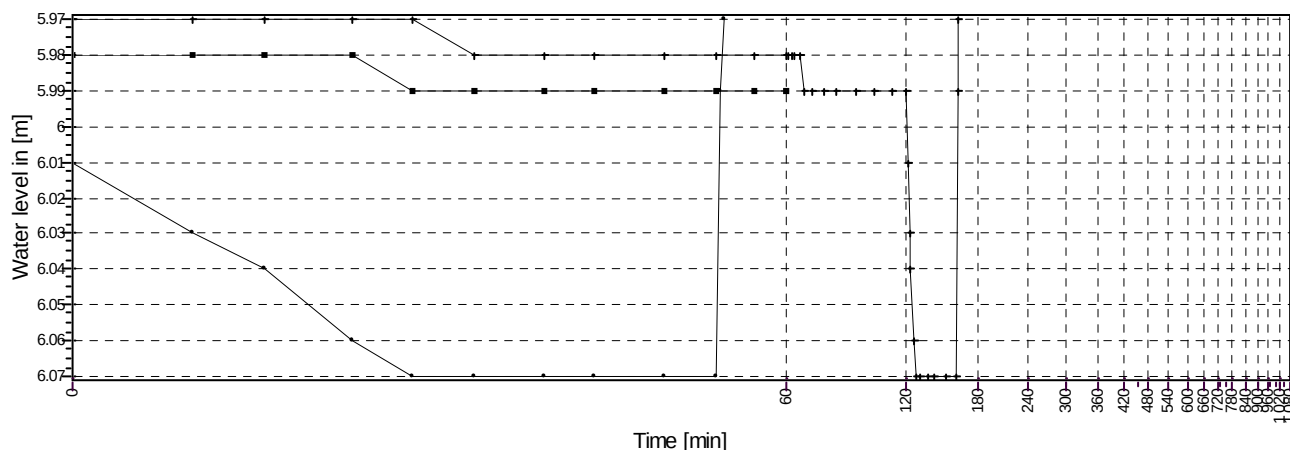
Rep. inst.: GOLD

Col. ht. [mm]: 0.33

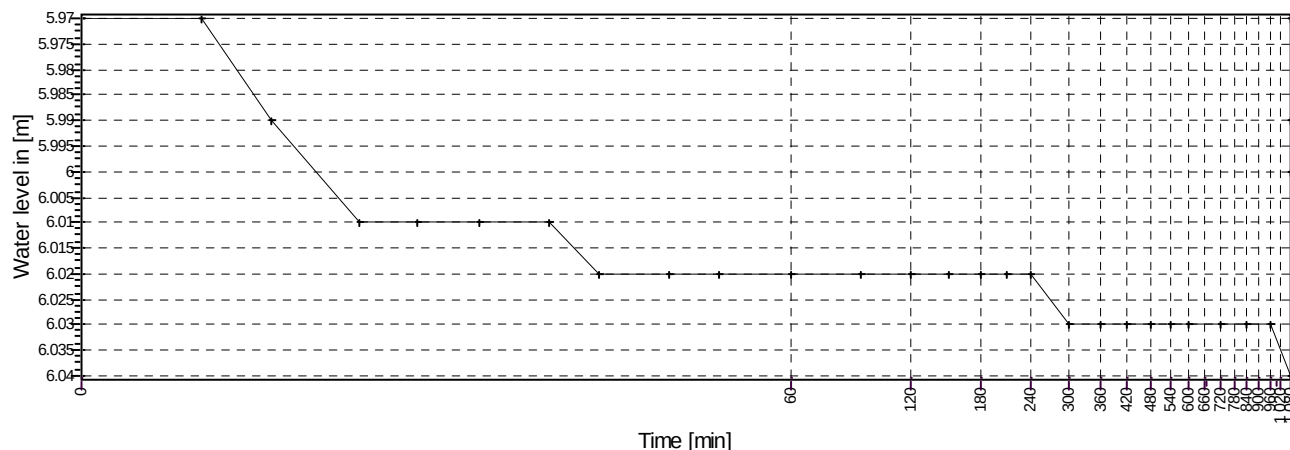
Date WL meas.: 20120928

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 48.00               | 20120929      | 0950 | 20120929    | 1232 |                               |           |                 |
| GOLD       | Constant rate test | 48.00               | 20120929      | 1400 | 20120930    | 0803 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 0950        | 60           | 48.00              | 1.45             | 0.01       |            |     |                 |                            |             |         | 145.0 |
| STEP TEST STEP 2 | 1050        | 60           | 48.00              | 3.02             | 0.02       |            |     |                 |                            |             |         | 151.0 |
| STEP TEST STEP 3 | 1150        | 40           | 48.00              | 6.98             | 0.10       | 0          | 100 | 2               |                            |             |         | 69.80 |
| CONSTANT         | 1400        | 1080         | 48.00              | 6.03             | 0.07       |            | 100 | 3               |                            |             |         | 86.14 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0002 Number: SD1-GAA002 Site type: Borehole

Distr./Farm No.: 507/1 Site Name/Descr.: ROOIPAN PTN. OLIENSPRUIT

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.368660 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 5.61     |
| Longitude [°]: | 23.657190 | Alt. No. 2:      |  | Depth [m]:    | 52.48 | WL status:      | Static   |
| Altitude [m]:  | 1428.67   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.39  | Date WL meas.:  | 20121001 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
Type of Inst.: Windpump Pulley Diam. [mm]: 115  
Manufacturer: Depth to Intk. [m]: 12.53

**Engine:**  
Manufacturer: Power Rating [kW]  
Type of Power: Wind Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: In use  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |       |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|-------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-  | Date sampled: | 20121008 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 48.00 | Comment:               |        |           |
| Main Parameters: |       |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.44  | Na:           | 27.9     | Cl:                                                                                                                                                                                                                                                                              | 54.1  | Langel.:               | 0.18   | E.Coli:   |
| EC: [mS/m]       | 75 †  | K:            | 4.97     | NO3 as N:                                                                                                                                                                                                                                                                        | 3.77  | Aggr-Ind:              | 12.26  | Faec. co: |
| TDS:             | 528 † | Si:           | 14.8     | SO4:                                                                                                                                                                                                                                                                             | 43.4  | Ion-bal:               | -0.83  | Total Co: |
| T. Alk.:         | 321   | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | 0.178 | CaCO3:                 | 381.86 | SPC:      |
| Ca:              | 82    | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ; Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 43.1  | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|------------------|--------------------------------|------------|-------------|
| 0.00             | 19.25       | 165        | Steel    |              | Plain casing     |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %   | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|-----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121001 | 60           | 48.00              | 1.13             | 0.06       |              |     |       |          |         |         |
| STEP TEST STEP 2 | 20121001 | 60           | 48.00              | 2.21             | 0.08       |              |     |       |          |         |         |
| STEP TEST STEP 3 | 20121001 | 60           | 48.00              | 4.33             | 0.17       |              | 100 | 40    |          |         |         |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 2012/10/08

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0002 Number: SD1-GAA002 Site type: Borehole

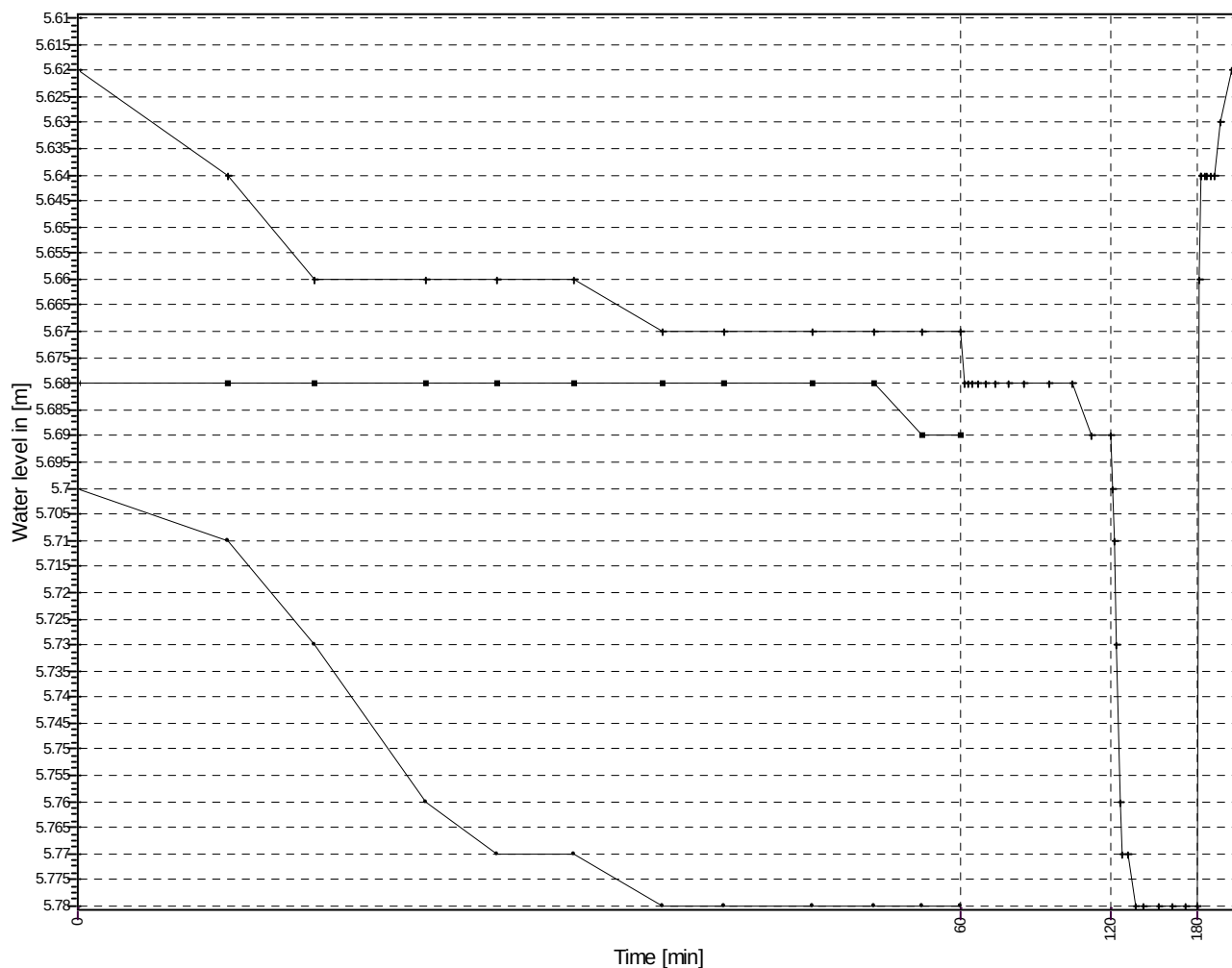
Distr./Farm No.: 507/1

Site Name/Des.: ROOIPAN PTN. OLIENSPRUIT

|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.368660 | Alt. No. 1:      |  | Diam. [mm]:    | 165   | Water lev. [m]: | 5.61     |
| Longitude [°] | 23.657190 | Alt. No. 2:      |  | Depth [m]:     | 52.48 | Piezometer:     | 0        |
| Altitude [m]: | 1428.67   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.39  | Date WL meas.:  | 20121001 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test    | 48.00               | 20121001      | 0650 | 20121001    | 1030 |                               |           |                 |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 0650        | 60           | 48.00              | 1.13             | 0.06       |            |     |                 |                            |             |         | 18.83 |
| STEP TEST STEP 2 | 0750        | 60           | 48.00              | 2.21             | 0.08       |            |     |                 |                            |             |         | 27.63 |
| STEP TEST STEP 3 | 0850        | 60           | 48.00              | 4.33             | 0.17       |            | 100 | 40              |                            |             |         | 25.47 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0003 Number: SD1-GAA003 Site type: Borehole

Distr./Farm No.: 507/1 Site Name/Descr.: ROOIPAN PTN. OLIENSPRUIT

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.387480 | Alt. No. 1: |      | Diam. [mm]:   | 165   | Water lev. [m]: | 11.67    |
| Longitude [°]: | 23.643210 | Alt. No. 2: |      | Depth [m]:    | 43.13 | WL status:      | Static   |
| Altitude [m]:  | 1438.21   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.31  | Date WL meas.:  | 20121002 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
 Type of Inst.: Windpump Pulley Diam. [mm]: 50  
 Manufacturer: SA Depth to Intk. [m]: 27.71

**Engine:**  
 Manufacturer: Power Rating [kW]  
 Type of Power: Wind Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: In use  
 Purpose: Production (water supply)  
 Consumer: Non-urban  
 Application: Agricultural - stock watering only

### WATER CHEMISTRY:

|                  |      |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |   |
|------------------|------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|---|
| Sample No.:      | SD1- | Date sampled: | 20121008 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 41.50 | Comment:               |        |           |   |
| Main Parameters: |      |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |   |
| pH:              | 7.79 | Na:           | 5.33     | Cl:                                                                                                                                                                                                                                                                              | 8.47  | Langel.:               | 0.39   | E.Coli:   | 0 |
| EC: [mS/m]       | 48.1 | K:            | 1.49     | NO3 as N:                                                                                                                                                                                                                                                                        | 1.15  | Aggr-Ind:              | 12.43  | Faec. co: | 0 |
| TDS:             | 318  | Si:           | 17.2     | SO4:                                                                                                                                                                                                                                                                             | 7.66  | Ion-bal:               | -0.06  | Total Co: | 0 |
| T. Alk.:         | 281  | Al:           | <0.05    | F:                                                                                                                                                                                                                                                                               | 0.217 | CaCO3:                 | 291.73 | SPC:      | 0 |
| Ca:              | 61.7 | Fe:           | <0.05    | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |   |
| Mg:              | 33.5 | Mn:           | <0.05    |                                                                                                                                                                                                                                                                                  |       |                        |        |           |   |
|                  |      |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %  | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121002 | 30           | 41.50              | 0.52             | 29.32      | 100          | 50 |       |          |         |         |
| PUMP INLET       | 20121002 | 10           | 41.50              | 0.24             | 29.83      |              |    |       |          |         |         |

# PUMPING TEST REPORT

Date compiled: 2012/10/08

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0003 Number: SD1-GAA003 Site type: Borehole

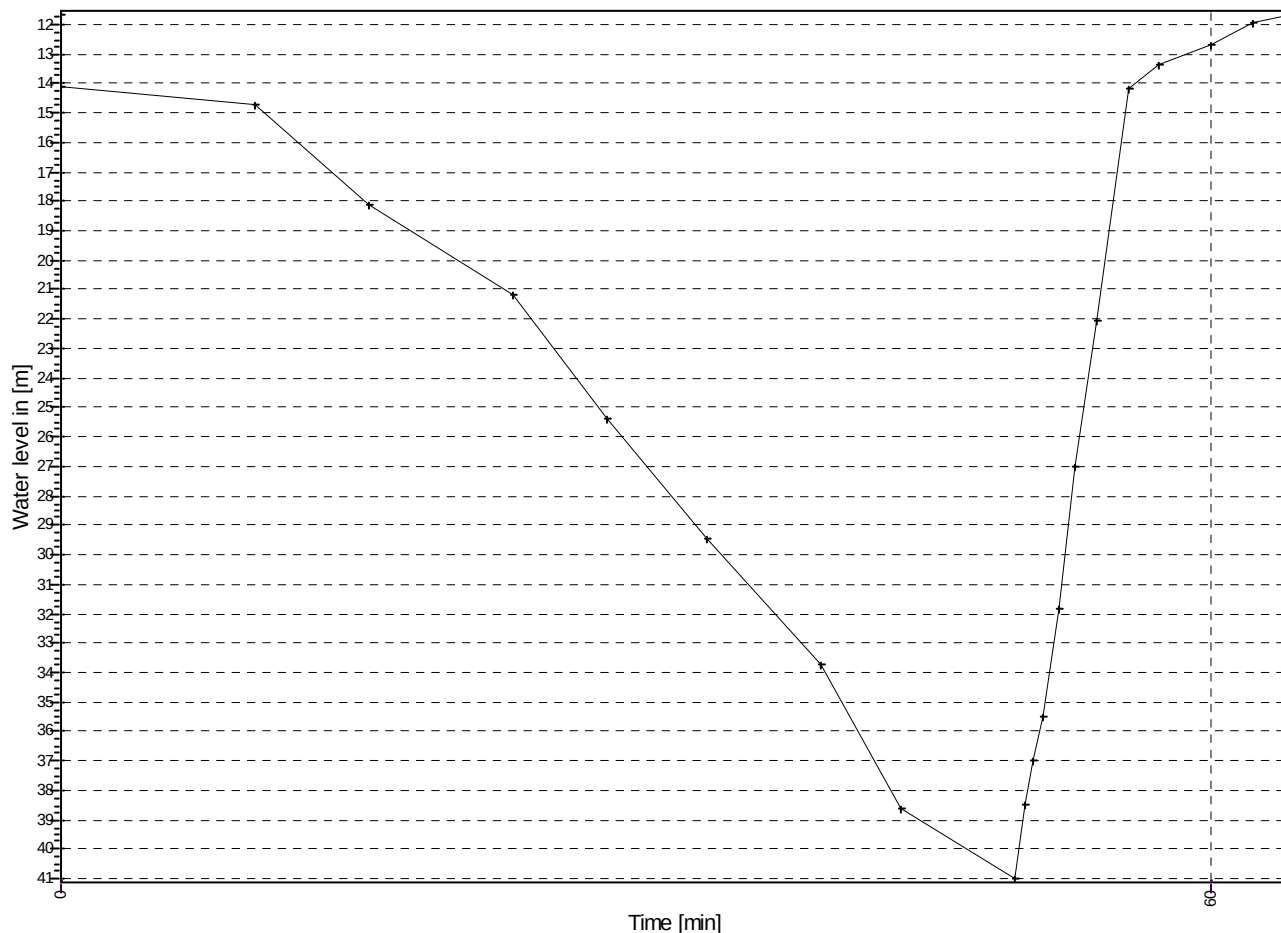
Distr./Farm No.: 507/1

Site Name/Des.: ROOIPAN PTN. OLIENSPRUIT

|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.387480 | Alt. No. 1:      |  | Diam. [mm]:    | 165   | Water lev. [m]: | 11.67    |
| Longitude [°] | 23.643210 | Alt. No. 2:      |  | Depth [m]:     | 43.13 | Piezometer:     | 0        |
| Altitude [m]: | 1438.21   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.31  | Date WL meas.:  | 20121002 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test    | 41.50               | 20121002      | 0810 | 20121002    | 0930 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 0810        | 30           | 41.50              | 0.52             | 29.32      |            | 50 | 100             |                            |             |         | 0.02 |
| PUMP INLET       | 0930        | 10           | 41.50              | 0.24             | 29.83      |            |    |                 |                            |             |         | 0.01 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0004 Number: SD1-GAA004 Site type: Borehole

Distr./Farm No.: 507/1 Site Name/Descr.: ROOIPAN PTN. OLIENSPRUIT

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.376710 | Alt. No. 1:      |  | Diam. [mm]:   | 160   | Water lev. [m]: | 12.01    |
| Longitude [°]: | 23.629310 | Alt. No. 2:      |  | Depth [m]:    | 16.24 | WL status:      | Static   |
| Altitude [m]:  | 1437.34   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.32  | Date WL meas.:  | 20121001 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

Pump: \_\_\_\_\_  
 Type of Inst.: \_\_\_\_\_ Pulley Diam. [mm]: \_\_\_\_\_  
 Manufacturer: \_\_\_\_\_ Depth to Intk. [m]: \_\_\_\_\_

Engine: \_\_\_\_\_  
 Manufacturer: \_\_\_\_\_ Power Rating [kW] \_\_\_\_\_  
 Type of Power: \_\_\_\_\_ Pulley Diam. [mm]: \_\_\_\_\_

### USE APPLICATION:

Site Status: Unused  
 Purpose: Production (water supply)  
 Consumer: Non-urban  
 Application: \_\_\_\_\_

### WATER CHEMISTRY:

|                  |      |               |          |                                                                                                                                                                                                                                                                                        |       |                        |        |           |
|------------------|------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1- | Date sampled: | 20121008 | Depth sampl. [m]:                                                                                                                                                                                                                                                                      | 14.80 | Comment:               |        |           |
| Main Parameters: |      |               |          | Calculated Parameters:                                                                                                                                                                                                                                                                 |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.34 | Na:           | 5.56     | Cl:                                                                                                                                                                                                                                                                                    | 6.49  | Langel.:               | 0.15   | E.Coli:   |
| EC: [mS/m]       | 51.5 | K:            | 2.02     | NO3 as N:                                                                                                                                                                                                                                                                              | < 0.3 | Aggr-Ind:              | 12.20  | Faec. co: |
| TDS:             | 348  | Si:           | 20.2     | SO4:                                                                                                                                                                                                                                                                                   | 6.86  | Ion-bal:               | -2.27  | Total Co: |
| T. Alk.:         | 306  | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                                     | < 0.1 | CaCO3:                 | 294.59 | SPC:      |
| Ca:              | 94.5 | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    ; Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 14.3 | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                        |       |                        |        |           |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|------------------|--------------------------------|------------|-------------|
| 0.00             | 1.38        | 160        | Steel    |              | Plain casing     |                                |            |             |

### TESTING DETAILS:

| Description        | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %  | [min] | T [m²/d] | Storage | Comment |
|--------------------|----------|--------------|--------------------|------------------|------------|--------------|----|-------|----------|---------|---------|
| CALIBRATION STEP 1 | 20121001 | 14           | 14.80              | 0.53             | 2.79       | 0.10         | 96 | 50    |          |         |         |
| PUMP INLET         | 20121001 | 6            | 14.80              | 0.12             | 2.79       |              |    |       |          |         |         |



# PUMPING TEST REPORT

Date compiled: 2012/10/08

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0004 Number: SD1-GAA004 Site type: Borehole

Distr./Farm No.: 507/1

Site Name/Des.: ROOIPAN PTN. OLIENSPRUIT

Latitude [°] 28.376710

Alt. No. 1:

Diam. [mm]: 160

Water lev. [m]: 12.01

Longitude [°] 23.629310

Alt. No. 2:

Depth [m]: 16.24

Piezometer: 0

Altitude [m]: 1437.34

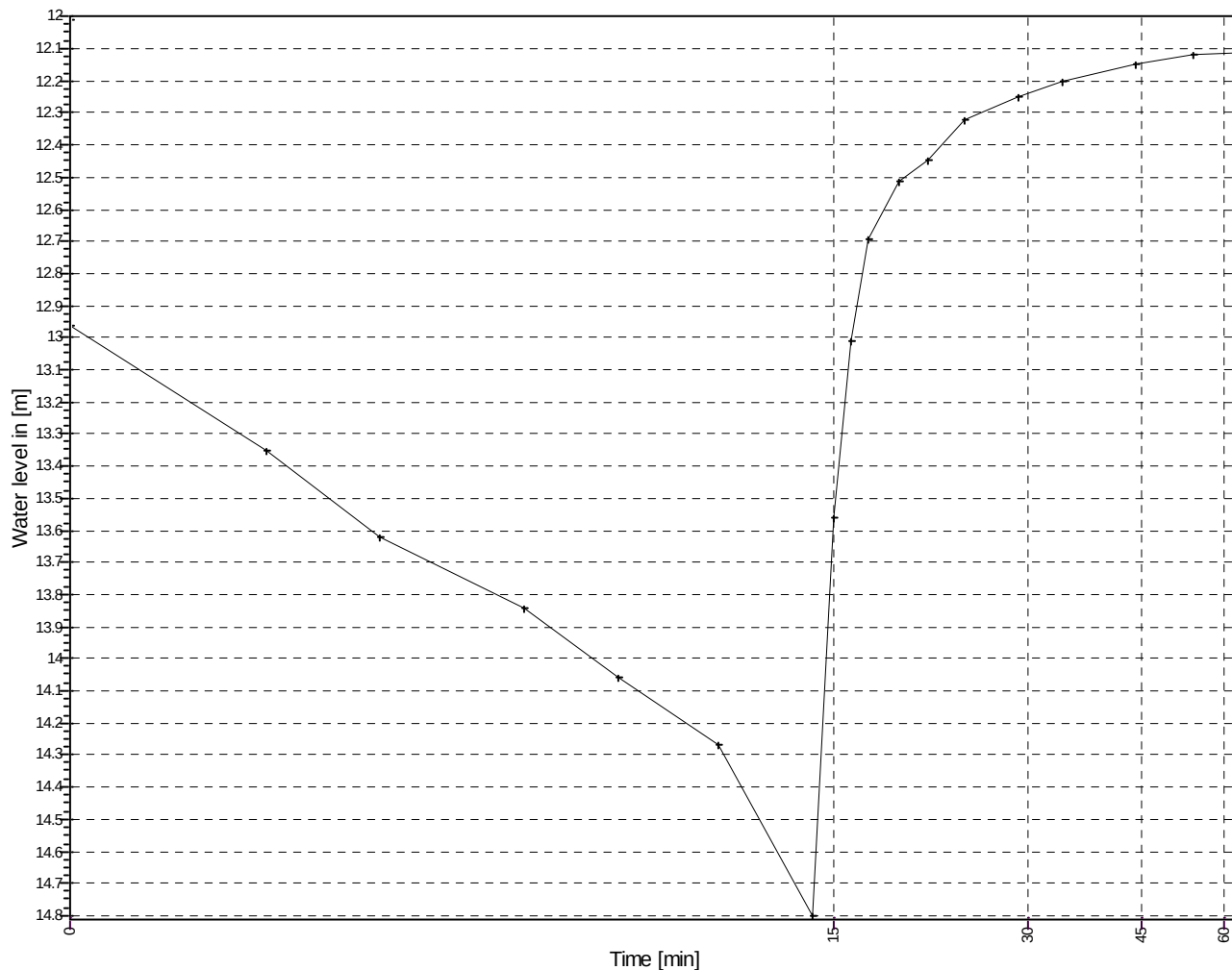
Rep. inst.: GOLD

Col. ht. [mm]: 0.32

Date WL meas.: 20121001

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested     | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Calibration test | 14.80               | 20121001      | 1200 | 20121001    | 1304 |                               |           |                 |

## TESTING DETAILS:

| Description        | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|--------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|----------------------------|-------------|---------|------|
| CALIBRATION STEP 1 | 1200        | 14           | 14.80              | 0.53             | 2.79       | 0.10       | 96 | 50              |                            |             |         | 0.19 |
| PUMP INLET         | 1304        | 6            | 14.80              | 0.12             | 2.79       |            |    |                 |                            |             |         | 0.04 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0017 Number: SD1-GAA017 Site type: Borehole

Distr./Farm No.: RE45816 Site Name/Descr.: CARTER BLOCK PTN. DIKBOS

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.322310 | Alt. No. 1: |      | Diam. [mm]:   | 165   | Water lev. [m]: | 12.16    |
| Longitude [°]: | 23.613530 | Alt. No. 2: |      | Depth [m]:    | 23.00 | WL status:      | Static   |
| Altitude [m]:  | 1445.79   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.24  | Date WL meas.:  | 20121003 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
 Type of Inst.: Windpump Pulley Diam. [mm]: 40  
 Manufacturer: CLIMAX Depth to Intk. [m]: 17.31

**Engine:**  
 Manufacturer: Power Rating [kW]  
 Type of Power: Wind Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: In use  
 Purpose: Production (water supply)  
 Consumer: Non-urban  
 Application: Agricultural - stock watering only

### WATER CHEMISTRY:

|                  |       |               |          |                                                                                                                                                                                                                                                                                    |        |                        |        |           |
|------------------|-------|---------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------|--------|-----------|
| Sample No.:      | SD1-  | Date sampled: | 20121008 | Depth sampl. [m]:                                                                                                                                                                                                                                                                  | 20.50  | Comment:               |        |           |
| Main Parameters: |       |               |          | Calculated Parameters:                                                                                                                                                                                                                                                             |        | Bacteriol. Parameters: |        |           |
| pH:              | 7.56  | Na:           | 60.5     | Cl:                                                                                                                                                                                                                                                                                | 185    | Langel.:               | 0.26   | E.Coli:   |
| EC: [mS/m]       | 131 † | K:            | 16.7     | NO3 as N:                                                                                                                                                                                                                                                                          | 19.5 † | Aggr-Ind:              | 12.40  | Faec. co: |
| TDS:             | 934 † | Si:           | 18.4     | SO4:                                                                                                                                                                                                                                                                               | 94.7   | Ion-bal:               | 0.76   | Total Co: |
| T. Alk.:         | 352   | Al:           | < 0.01   | F:                                                                                                                                                                                                                                                                                 | 0.147  | CaCO3:                 | 640.56 | SPC:      |
| Ca:              | 78.7  | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit  ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit  ; Value exceeds minimum allowable limit |        |                        |        |           |
| Mg:              | 108 ± | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                    |        |                        |        |           |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|------------------|--------------------------------|------------|-------------|
| 0.00             | 1.12        | 165        | Steel    |              | Plain casing     |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %   | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|-----|----------|---------|---------|
| STEP TEST STEP 1 | 20121003 | 7            | 20.50              | 0.55             | 8.83       | 0            | 100 | 120      |         |         |
| PUMP INLET       | 20121003 | 3            | 20.50              | 0.25             | 8.34       |              |     |          |         |         |



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# PUMPING TEST REPORT

Date compiled: 2012/10/08

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0017 Number: SD1-GAA017 Site type: Borehole

Distr./Farm No.: RE45816

Site Name/Des.: CARTER BLOCK PTN. DIKBOS

Latitude [°] 28.322310

Alt. No. 1:

Diam. [mm]: 165

Water lev. [m]: 12.16

Longitude [°] 23.613530

Alt. No. 2:

Depth [m]: 23.00

Piezometer: 0

Altitude [m]: 1445.79

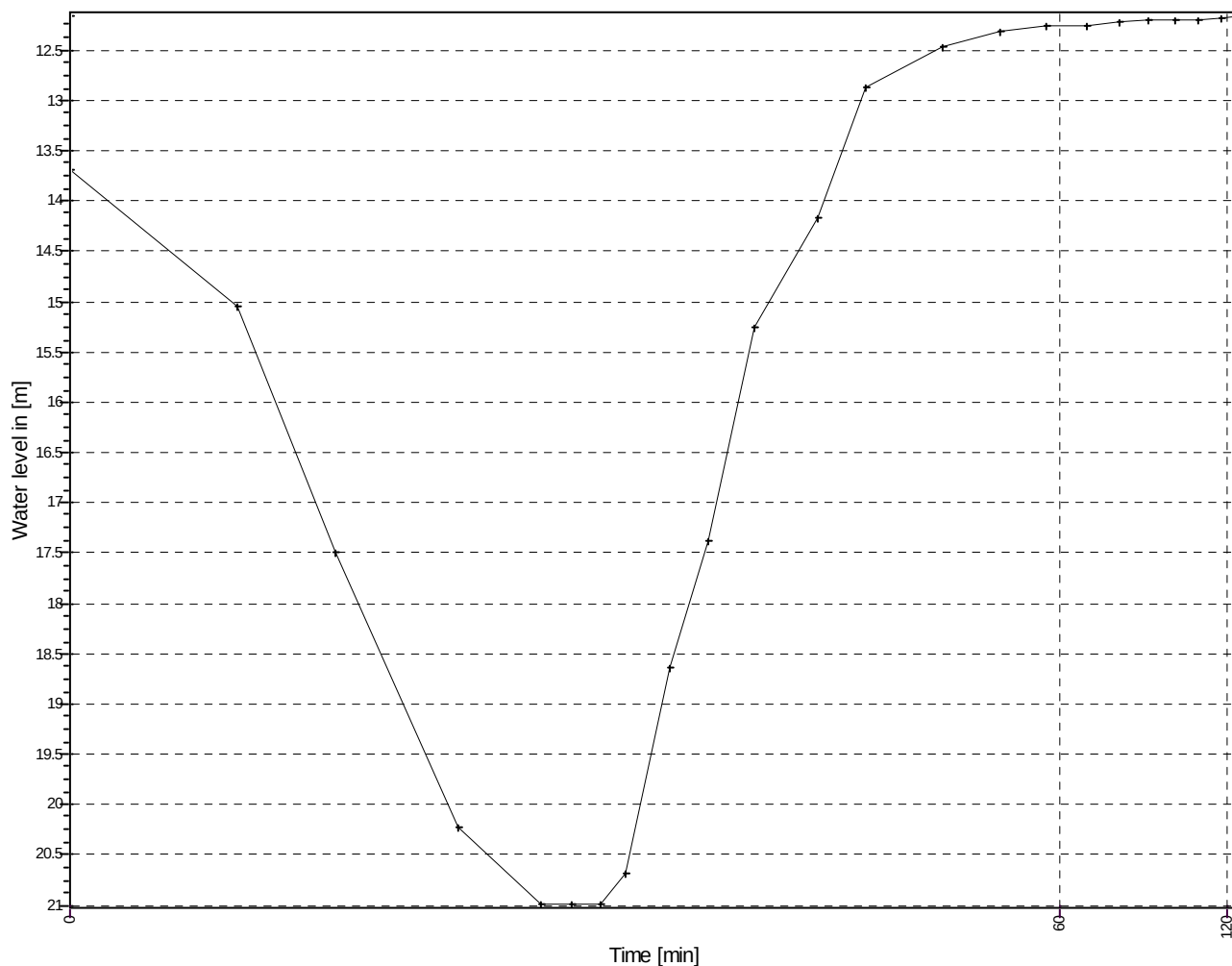
Rep. inst.: GOLD

Col. ht. [mm]: 0.24

Date WL meas.: 20121003

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test    | 20.50               | 20121003      | 1010 | 20121003    | 1217 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1010        | 7            | 20.50              | 0.55             | 8.83       | 0          | 100 | 120             |                            |             |         | 0.06 |
| PUMP INLET       | 1217        | 3            | 20.50              | 0.25             | 8.34       |            |     |                 |                            |             |         | 0.03 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0018 Number: SD1-GAA018 Site type: Borehole

Distr./Farm No.: RE45816 Site Name/Descr.: CARTE BLOCK PTN. DIKBOS

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.353820 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 10.21    |
| Longitude [°]: | 23.590590 | Alt. No. 2:      |  | Depth [m]:    | 30.10 | WL status:      | Static   |
| Altitude [m]:  | 1440.12   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.46  | Date WL meas.:  | 20121005 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
Type of Inst.: Windpump  
Manufacturer:  
Pulley Diam. [mm]:  
Depth to Intk. [m]: 16.70

**Engine:**  
Manufacturer:  
Type of Power: Wind  
Power Rating [kW]  
Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: In use  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Agricultural - stock watering only

### WATER CHEMISTRY:

|                  |        |               |                                                                                                                                                                                                                                                                                        |                        |        |                        |        |           |   |
|------------------|--------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------|------------------------|--------|-----------|---|
| Sample No.:      | SD1-   | Date sampled: | 20121023                                                                                                                                                                                                                                                                               | Depth sampl. [m]:      | 29.50  | Comment:               |        |           |   |
| Main Parameters: |        |               |                                                                                                                                                                                                                                                                                        | Calculated Parameters: |        | Bacteriol. Parameters: |        |           |   |
| pH:              | 7.73   | Na:           | 42.7                                                                                                                                                                                                                                                                                   | Cl:                    | 84.3   | Langel.:               | 0.44   | E.Coli:   | 0 |
| EC: [mS/m]       | 99.9 † | K:            | 9.63                                                                                                                                                                                                                                                                                   | NO3 as N:              | 22.8 ‡ | Aggr-Ind:              | 12.54  | Faec. co: | 0 |
| TDS:             | 732 †  | Si:           | 17                                                                                                                                                                                                                                                                                     | SO4:                   | 73     | Ion-bal:               | 2.87   | Total Co: | 0 |
| T. Alk.:         | 286    | Al:           |                                                                                                                                                                                                                                                                                        | F:                     | 0.18   | CaCO3:                 | 490.85 | SPC:      | 0 |
| Ca:              | 90.9   | Fe:           | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    ¶ Value exceeds minimum allowable limit |                        |        |                        |        |           |   |
| Mg:              | 64.2   | Mn:           |                                                                                                                                                                                                                                                                                        |                        |        |                        |        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121005 | 30           | 29.50              | 0.51             | 19.66      | 0.25           | 99    | 60       |         |         |
| PUMP INLET       | 20121005 | 10           | 29.50              | 0.42             | 19.29      |                |       |          |         |         |



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# PUMPING TEST REPORT

Date compiled: 2012/10/16

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0018 Number: SD1-GAA018 Site type: Borehole

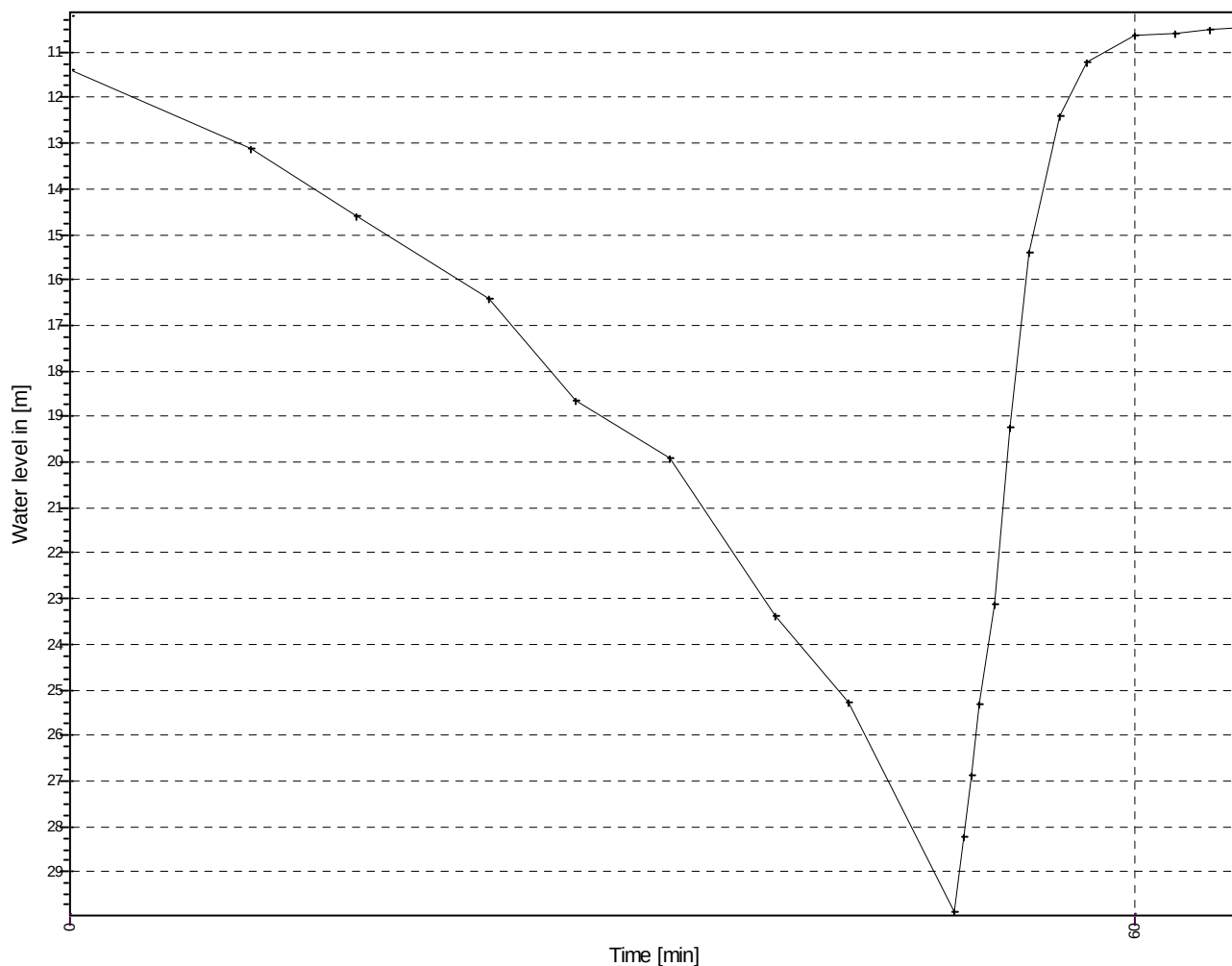
Distr./Farm No.: RE45816

Site Name/Des.: CARTE BLOCK PTN. DIKBOS

|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.353820 | Alt. No. 1:      |  | Diam. [mm]:    | 165   | Water lev. [m]: | 10.21    |
| Longitude [°] | 23.590590 | Alt. No. 2:      |  | Depth [m]:     | 30.10 | Piezometer:     | 0        |
| Altitude [m]: | 1440.12   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.46  | Date WL meas.:  | 20121005 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test    | 29.50               | 20121005      | 1250 | 20121005    | 1420 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1250        | 30           | 29.50              | 0.51             | 19.66      | 0.25       | 99 | 60              |                            |             |         | 0.03 |
| PUMP INLET       | 1420        | 10           | 29.50              | 0.42             | 19.29      |            |    |                 |                            |             |         | 0.02 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0019 Number: SD1-GAA019 Site type: Borehole

Distr./Farm No.: RE45816 Site Name/Descr.: CARTER BLOCK PTN. DIKBOS

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.359660 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 9.56     |
| Longitude [°]: | 23.601850 | Alt. No. 2:      |  | Depth [m]:    | 29.00 | WL status:      | Static   |
| Altitude [m]:  | 1440.31   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.42  | Date WL meas.:  | 20121002 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
 Type of Inst.: Windpump Pulley Diam. [mm]: 40  
 Manufacturer: CLIMAX Depth to Intk. [m]: 24.00

**Engine:**  
 Manufacturer: Power Rating [kW]  
 Type of Power: Wind Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: In use  
 Purpose: Production (water supply)  
 Consumer: Non-urban  
 Application: Agricultural - stock watering only

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                        |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-   | Date sampled: | 20121008 | Depth sampl. [m]:                                                                                                                                                                                                                                                                      | 26.10 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                                 |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.48   | Na:           | 24.4     | Cl:                                                                                                                                                                                                                                                                                    | 51.1  | Langel.:               | 0.21   | E.Coli:   |
| EC: [mS/m]       | 73.1 † | K:            | 4.79     | NO3 as N:                                                                                                                                                                                                                                                                              | 6.38  | Aggr-Ind:              | 12.28  | Faec. co: |
| TDS:             | 512 †  | Si:           | 14.2     | SO4:                                                                                                                                                                                                                                                                                   | 41.3  | Ion-bal:               | 0.81   | Total Co: |
| T. Alk.:         | 304    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                                     | 0.159 | CaCO3:                 | 390.29 | SPC:      |
| Ca:              | 83.4   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    ; Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 44.3   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                        |       |                        |        |           |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %   | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|-----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121002 | 60           | 26.10              | 0.50             | 2.54       |              |     |       |          |         |         |
| STEP TEST STEP 2 | 20121002 | 60           | 26.10              | 1.01             | 7.32       |              |     |       |          |         |         |
| STEP TEST STEP 3 | 20121002 | 10           | 26.10              | 1.50             | 16.54      |              | 100 | 40    |          |         |         |
| PUMP INLET       | 20121002 | 20           | 26.10              | 1.38             | 16.54      |              |     |       |          |         |         |
| CONSTANT         | 20121002 | 720          | 26.10              | 0.51             | 2.35       |              | 100 | 3     |          |         |         |



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# PUMPING TEST REPORT

Date compiled: 2012/10/08

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0019 Number: SD1-GAA019 Site type: Borehole

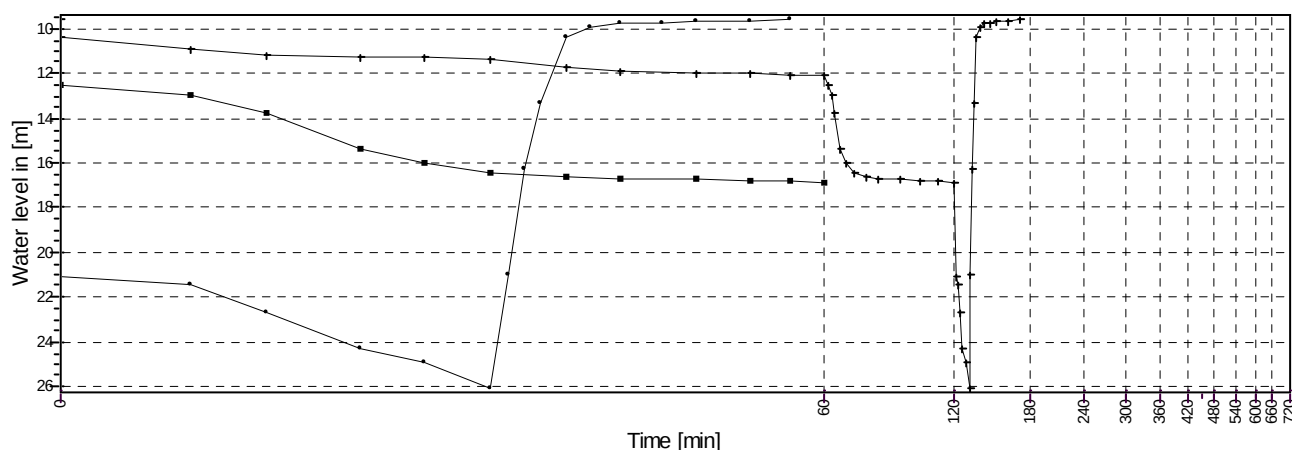
Distr./Farm No.: RE45816

Site Name/Des.: CARTER BLOCK PTN. DIKBOS

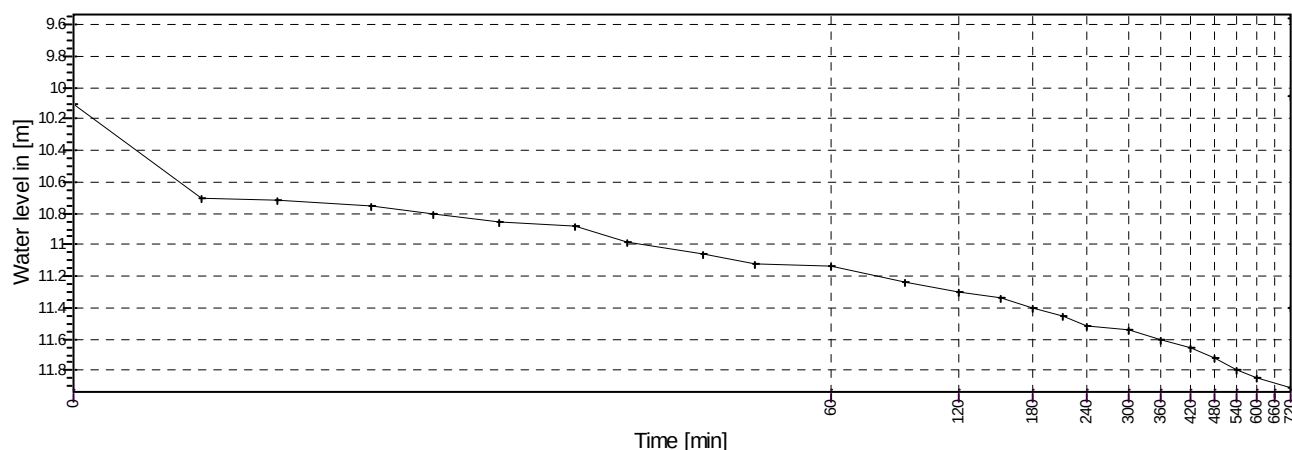
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.359660 | Alt. No. 1:      |  | Diam. [mm]:    | 165   | Water lev. [m]: | 9.56     |
| Longitude [°] | 23.601850 | Alt. No. 2:      |  | Depth [m]:     | 29.00 | Piezometer:     | 0        |
| Altitude [m]: | 1440.31   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.42  | Date WL meas.:  | 20121002 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m²/d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|------------------|-----------|-----------------|
| GOLD       | Step test          | 26.10               | 20121002      | 1030 | 20121002    | 1320 |                  |           |                 |
| GOLD       | Constant rate test | 26.10               | 20121002      | 1400 | 20121003    | 0203 |                  |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m²/d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|---------------|-------------|---------|------|
| STEP TEST STEP 1 | 1030        | 60           | 26.10              | 0.50             | 2.54       |            |     |                 |               |             |         | 0.20 |
| STEP TEST STEP 2 | 1130        | 60           | 26.10              | 1.01             | 7.32       |            |     |                 |               |             |         | 0.14 |
| STEP TEST STEP 3 | 1230        | 10           | 26.10              | 1.50             | 16.54      |            | 100 | 40              |               |             |         | 0.09 |
| PUMP INLET       | 1320        | 20           | 26.10              | 1.38             | 16.54      |            |     |                 |               |             |         | 0.08 |
| CONSTANT         | 1400        | 720          | 26.10              | 0.51             | 2.35       |            | 100 | 3               |               |             |         | 0.22 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0020 Number: SD1-GAA020 Site type: Borehole

Distr./Farm No.: RE45816 Site Name/Descr.: CARTER BLOCK PTN. DIKBOS

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.377940 | Alt. No. 1:      |  | Diam. [mm]:   | 160   | Water lev. [m]: | 13.36    |
| Longitude [°]: | 23.610850 | Alt. No. 2:      |  | Depth [m]:    | 37.33 | WL status:      | Static   |
| Altitude [m]:  | 1439.10   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.23  | Date WL meas.:  | 20121005 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
Type of Inst.: Windpump  
Manufacturer:  
Pulley Diam. [mm]:  
Depth to Intk. [m]:

**Engine:**  
Manufacturer:  
Type of Power: Wind  
Power Rating [kW]  
Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: Unused  
Purpose: No information  
Consumer: No information  
Application: No information

### WATER CHEMISTRY:

|                  |       |               |                                                                                                                                                                                                                                                                                  |                        |        |                        |        |           |   |
|------------------|-------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------|------------------------|--------|-----------|---|
| Sample No.:      | SD1-  | Date sampled: | 20121023                                                                                                                                                                                                                                                                         | Depth sampl. [m]:      | 32.80  | Comment:               |        |           |   |
| Main Parameters: |       |               |                                                                                                                                                                                                                                                                                  | Calculated Parameters: |        | Bacteriol. Parameters: |        |           |   |
| pH:              | 7.29  | Na:           | 48.7                                                                                                                                                                                                                                                                             | Cl:                    | 187    | Langel.:               | 0.31   | E.Coli:   | 0 |
| EC: [mS/m]       | 131 † | K:            | 5.48                                                                                                                                                                                                                                                                             | NO3 as N:              | 17.8 † | Aggr-Ind:              | 12.44  | Faec. co: | 0 |
| TDS:             | 886 † | Si:           | 23.2                                                                                                                                                                                                                                                                             | SO4:                   | 52.4   | Ion-bal:               | -4.05  | Total Co: | 0 |
| T. Alk.:         | 364   | Al:           |                                                                                                                                                                                                                                                                                  | F:                     | < 0.1  | CaCO3:                 | 575.15 | SPC:      | 0 |
| Ca:              | 157 † | Fe:           | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |                        |        |                        |        |           |   |
| Mg:              | 44.6  | Mn:           |                                                                                                                                                                                                                                                                                  |                        |        |                        |        |           |   |

### TESTING DETAILS:

| Description        | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|--------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| CALIBRATION STEP 1 | 20121005 | 15           | 32.80              | 0.43             | 4.10       |                |       |          |         |         |
| CALIBRATION STEP 2 | 20121005 | 15           | 32.80              | 0.84             | 10.08      |                |       |          |         |         |
| CALIBRATION STEP 3 | 20121005 | 15           | 32.80              | 1.23             | 17.72      |                |       |          |         |         |
| CALIBRATION STEP 4 | 20121005 | 3            | 32.80              | 1.23             | 19.44      | 100            | 50    |          |         |         |
| PUMP INLET         | 20121005 | 7            | 32.80              | 0.54             | 19.44      |                |       |          |         |         |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 2012/10/29

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0020 Number: SD1-GAA020 Site type: Borehole

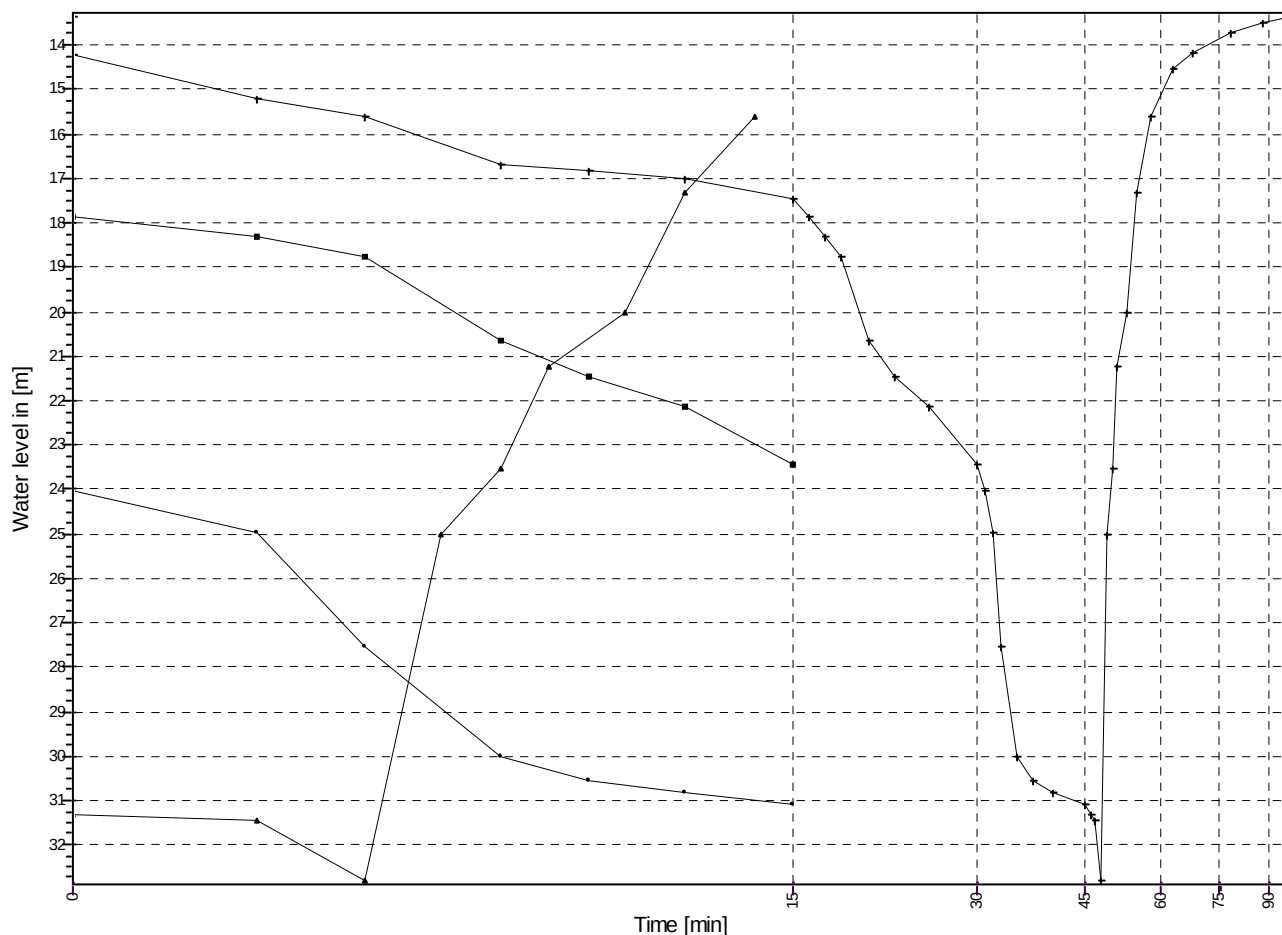
Distr./Farm No.: RE45816

Site Name/Des.: CARTER BLOCK PTN. DIKBOS

|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.377940 | Alt. No. 1:      |  | Diam. [mm]:    | 160   | Water lev. [m]: | 13.36    |
| Longitude [°] | 23.610850 | Alt. No. 2:      |  | Depth [m]:     | 37.33 | Piezometer:     | 0        |
| Altitude [m]: | 1439.10   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.23  | Date WL meas.:  | 20121005 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested     | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Calibration test | 32.80               | 20121005      | 1220 | 20121005    | 1358 |                               |           |                 |

## TESTING DETAILS:

| Description        | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate [l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|--------------------|-------------|--------------|--------------------|-------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| CALIBRATION STEP 1 | 1220        | 15           | 32.80              | 0.43              | 4.10       |            |     |                 |                            |             |         | 0.10 |
| CALIBRATION STEP 2 | 1235        | 15           | 32.80              | 0.84              | 10.08      |            |     |                 |                            |             |         | 0.08 |
| CALIBRATION STEP 3 | 1250        | 15           | 32.80              | 1.23              | 17.72      |            |     |                 |                            |             |         | 0.07 |
| CALIBRATION STEP 4 | 1305        | 3            | 32.80              | 1.23              | 19.44      |            | 100 | 50              |                            |             |         | 0.06 |
| PUMP INLET         | 1358        | 7            | 32.80              | 0.54              | 19.44      |            |     |                 |                            |             |         | 0.03 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0021 Number: SD1-GAA021 Site type: Borehole

Distr./Farm No.: RE45816 Site Name/Descr.: CARTER BLOCK PTN. DIKBOS

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.378370 | Alt. No. 1: |      | Diam. [mm]:   | 165   | Water lev. [m]: | 14.00    |
| Longitude [°]: | 23.610220 | Alt. No. 2: | DB3  | Depth [m]:    | 25.82 | WL status:      | Static   |
| Altitude [m]:  | 1439.19   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.33  | Date WL meas.:  | 20121003 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
Type of Inst.: Submersible pump  
Manufacturer: BRISAN  
Pulley Diam. [mm]:  
Depth to Intk. [m]: 23.00

**Engine:**  
Manufacturer:  
Type of Power: Electric motor  
Power Rating [kW]: 1.5  
Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: In use  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Agricultural - stock watering only

### WATER CHEMISTRY:

|                  |       |               |          |                                                                                                                                                                                                                                                                                        |       |                        |        |           |
|------------------|-------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-  | Date sampled: | 20121008 | Depth sampl. [m]:                                                                                                                                                                                                                                                                      | 23.80 | Comment:               |        |           |
| Main Parameters: |       |               |          | Calculated Parameters:                                                                                                                                                                                                                                                                 |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.2   | Na:           | 34.3     | Cl:                                                                                                                                                                                                                                                                                    | 116   | Langel.:               | 0.16   | E.Coli:   |
| EC: [mS/m]       | 102 † | K:            | 6.02     | NO3 as N:                                                                                                                                                                                                                                                                              | 8.72  | Aggr-Ind:              | 12.26  | Faec. co: |
| TDS:             | 642 † | Si:           | 20.9     | SO4:                                                                                                                                                                                                                                                                                   | 46.6  | Ion-bal:               | -0.48  | Total Co: |
| T. Alk.:         | 358   | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                                     | 0.143 | CaCO3:                 | 513.55 | SPC:      |
| Ca:              | 130   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    ; Value exceeds minimim allowable limit |       |                        |        |           |
| Mg:              | 46    | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                        |       |                        |        |           |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|------------------|--------------------------------|------------|-------------|
| 0.00             | 1.86        | 160        | Steel    |              | Plain casing     |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %   | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|-----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121003 | 60           | 23.80              | 0.55             | 2.00       |              |     |       |          |         |         |
| STEP TEST STEP 2 | 20121003 | 60           | 23.80              | 1.07             | 3.84       |              |     |       |          |         |         |
| STEP TEST STEP 3 | 20121003 | 3            | 23.80              | 2.00             | 9.80       |              | 100 | 120   |          |         |         |
| PUMP INLET       | 20121003 | 7            | 23.80              | 1.68             | 9.80       |              |     |       |          |         |         |
| CONSTANT         | 20121004 | 720          | 23.80              | 1.25             | 3.96       | 0.02         | 99  | 720   |          |         |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm. | Depth to intk. [m] | Type of power | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|--------------|--------------------|---------------|-----------------|-------------------|---------------|----------------------|-----------------------|
|--------|--------------|--------------------|---------------|-----------------|-------------------|---------------|----------------------|-----------------------|

1

8 2.00

Note:



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# PUMPING TEST REPORT

Date compiled: 2013/02/25

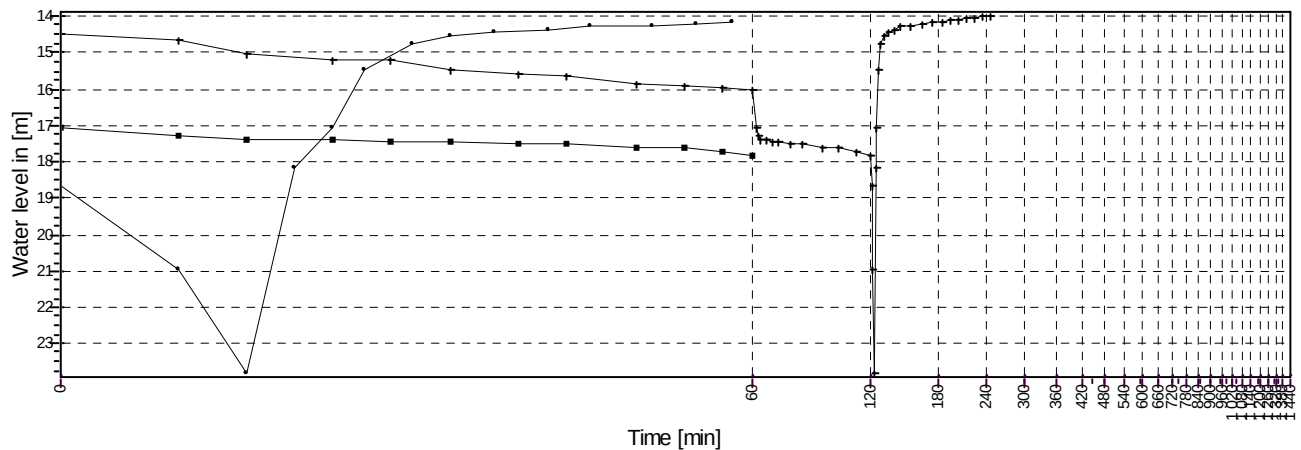
**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0021 Number: SD1-GAA021 Site type: Borehole

Distr./Farm No.: RE45816 Site Name/Des.: CARTER BLOCK PTN. DIKBOS

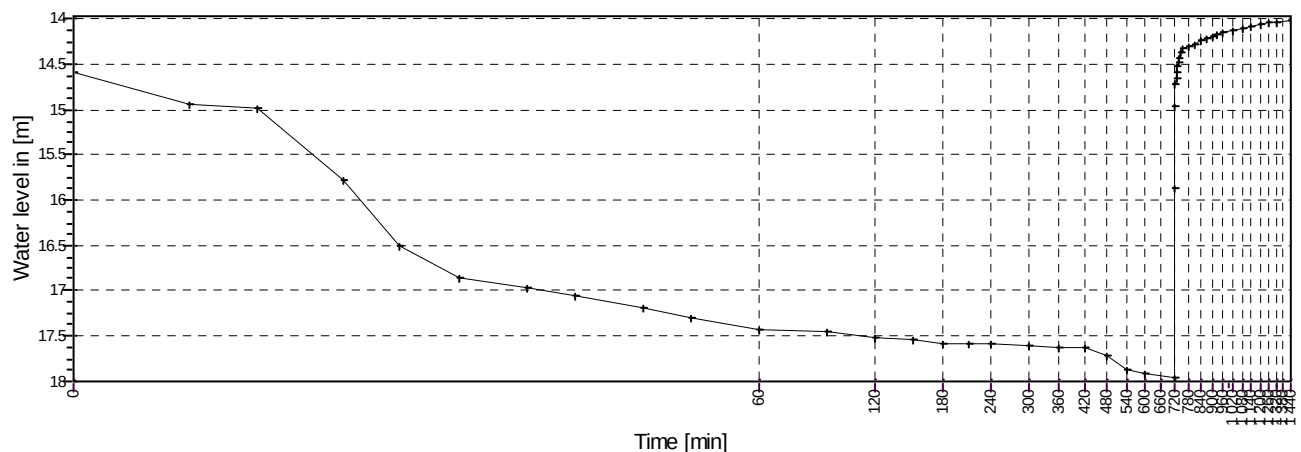
|               |           |             |      |                |       |                 |          |
|---------------|-----------|-------------|------|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.378370 | Alt. No. 1: |      | Diam. [mm]:    | 165   | Water lev. [m]: | 14.00    |
| Longitude [°] | 23.610220 | Alt. No. 2: | DB3  | Depth [m]:     | 25.82 | Piezometer:     | 0        |
| Altitude [m]: | 1439.19   | Rep. inst.: | GOLD | Col. ht. [mm]: | 0.33  | Date WL meas.:  | 20121003 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



| PUMPING TEST: |                    | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m²/d] | Storativ. | Rec. abs. [l/s] |
|---------------|--------------------|---------------------|---------------|------|-------------|------|------------------|-----------|-----------------|
| Rep. Inst.    | Meth. tested       |                     |               |      |             |      |                  |           |                 |
| GOLD          | Step test          | 23.80               | 20121003      | 1500 | 20121003    | 1903 |                  |           |                 |
| GOLD          | Constant rate test | 23.80               | 20121004      | 0800 | 20121005    | 0800 |                  |           |                 |

| TESTING DETAILS: |             | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m²/d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|---------------|-------------|---------|------|
| Description      | Time start. |              |                    |                  |            |            |     |                 |               |             |         |      |
| STEP TEST STEP 1 | 1500        | 60           | 23.80              | 0.55             | 2.00       |            |     |                 |               |             |         | 0.28 |
| STEP TEST STEP 2 | 1600        | 60           | 23.80              | 1.07             | 3.84       |            |     |                 |               |             |         | 0.28 |
| STEP TEST STEP 3 | 1700        | 3            | 23.80              | 2.00             | 9.80       |            | 100 | 120             |               |             |         | 0.20 |
| PUMP INLET       | 1903        | 7            | 23.80              | 1.68             | 9.80       |            |     |                 |               |             |         | 0.17 |
| CONSTANT         | 0800        | 720          | 23.80              | 1.25             | 3.96       | 0.02       | 99  | 720             |               |             |         | 0.32 |



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Project No.: 11613568



## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0023 Number: SD1-GAA023 Site type: Borehole

Distr./Farm No.: RE45816 Site Name/Descr.: CARTER BLOCK PTN. DIKBOS

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.409510 | Alt. No. 1:      |  | Diam. [mm]:   | 160   | Water lev. [m]: | 11.65    |
| Longitude [°]: | 23.599120 | Alt. No. 2:      |  | Depth [m]:    | 37.48 | WL status:      | Static   |
| Altitude [m]:  | 1443.48   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.28  | Date WL meas.:  | 20121006 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
 Type of Inst.: Windpump Pulley Diam. [mm]:  
 Manufacturer: CLIMAX Depth to Intk. [m]: 18.68

**Engine:**  
 Manufacturer: Power Rating [kW]  
 Type of Power: Wind Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: In use  
 Purpose: Production (water supply)  
 Consumer: Non-urban  
 Application: Agricultural - stock watering only

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                      |       |                        |        |           |   |
|------------------|--------|---------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|---|
| Sample No.:      | SD1-   | Date sampled: | 20121023 | Depth sampl. [m]:                                                                                                                                                                                                                                                                    | 32.80 | Comment:               |        |           |   |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                               |       | Bacteriol. Parameters: |        |           |   |
| pH:              | 7.36   | Na:           | 12.3     | Cl:                                                                                                                                                                                                                                                                                  | 31.3  | Langel.:               | 0.34   | E.Coli:   | 0 |
| EC: [mS/m]       | 77.8 † | K:            | 2.53     | NO3 as N:                                                                                                                                                                                                                                                                            | 2.35  | Aggr-Ind:              | 12.43  | Faec. co: | 0 |
| TDS:             | 514 †  | Si:           | 23.9     | SO4:                                                                                                                                                                                                                                                                                 | 15.2  | Ion-bal:               | 2.53   | Total Co: | 0 |
| T. Alk.:         | 424    | Al:           |          | F:                                                                                                                                                                                                                                                                                   | 0.153 | CaCO3:                 | 488.38 | SPC:      | 0 |
| Ca:              | 112    | Fe:           |          | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit   ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit   ¡ Value exceeds minimum allowable limit |       |                        |        |           |   |
| Mg:              | 50.8   | Mn:           |          |                                                                                                                                                                                                                                                                                      |       |                        |        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %  | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121006 | 60           | 32.80              | 0.54             | 7.66       |              |    |       |          |         |         |
| STEP TEST STEP 2 | 20121006 | 15           | 32.80              | 1.05             | 21.15      | 0.35         | 98 | 80    |          |         |         |
| PUMP INLET       | 20121006 | 25           | 32.80              | 0.63             | 21.15      |              |    |       |          |         |         |
| CONSTANT         | 20121006 | 720          | 32.80              | 0.54             | 8.69       | 0.46         | 95 | 720   |          |         |         |



**Golder Associates**

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# PUMPING TEST REPORT

Date compiled: 2012/10/16

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0023 Number: SD1-GAA023 Site type: Borehole

Distr./Farm No.: RE45816

Site Name/Des.: CARTER BLOCK PTN. DIKBOS

Latitude [°] 28.409510

Alt. No. 1:

Diam. [mm]: 160

Water lev. [m]: 11.65

Longitude [°] 23.599120

Alt. No. 2:

Depth [m]: 37.48

Piezometer: 0

Altitude [m]: 1443.48

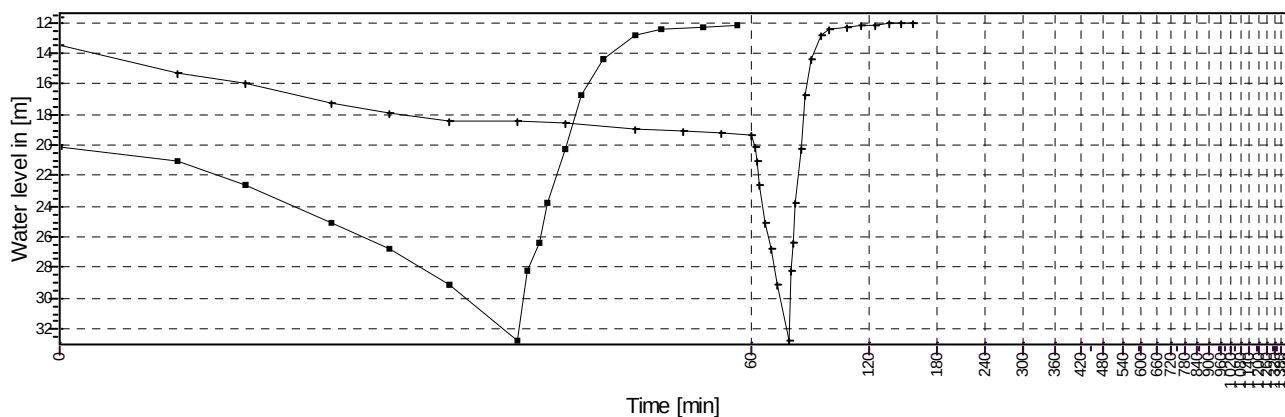
Rep. inst.: GOLD

Col. ht. [mm]: 0.28

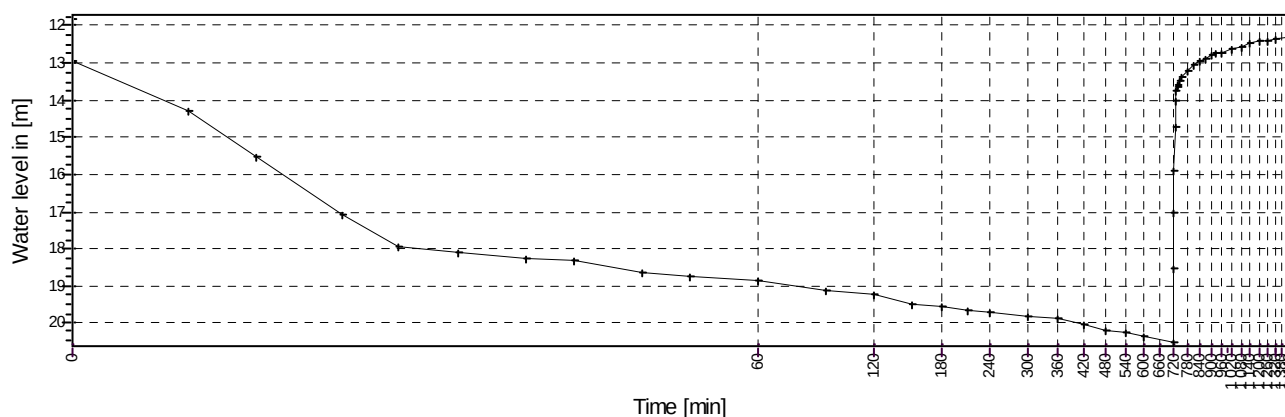
Date WL meas.: 20121006

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 32.80               | 20121006      | 1200 | 20121006    | 1435 |                               |           |                 |
| GOLD       | Constant rate test | 32.80               | 20121006      | 1750 | 20121007    | 1750 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1200        | 60           | 32.80              | 0.54             | 7.66       |            |    |                 |                            |             |         | 0.07 |
| STEP TEST STEP 2 | 1300        | 15           | 32.80              | 1.05             | 21.15      | 0.35       | 98 | 80              |                            |             |         | 0.05 |
| PUMP INLET       | 1435        | 25           | 32.80              | 0.63             | 21.15      |            |    |                 |                            |             |         | 0.03 |
| CONSTANT         | 1750        | 720          | 32.80              | 0.54             | 8.69       | 0.46       | 95 | 720             |                            |             |         | 0.06 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0185 Number: SD1-GAA263 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.319020 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 3.28     |
| Longitude [°]: | 23.600930 | Alt. No. 2:      |  | Depth [m]:    | 54.80 | WL status:      | Static   |
| Altitude [m]:  | 1436.12   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.75  | Date WL meas.:  | 20130528 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

Pump: \_\_\_\_\_  
 Type of Inst.: \_\_\_\_\_ Pulley Diam. [mm]: \_\_\_\_\_  
 Manufacturer: \_\_\_\_\_ Depth to Intk. [m]: \_\_\_\_\_

Engine: \_\_\_\_\_  
 Manufacturer: \_\_\_\_\_ Power Rating [kW] \_\_\_\_\_  
 Type of Power: \_\_\_\_\_ Pulley Diam. [mm]: \_\_\_\_\_

### USE APPLICATION:

Site Status: Unused  
 Purpose: Production (water supply)  
 Consumer: Non-urban  
 Application: \_\_\_\_\_

### WATER CHEMISTRY:

|                  |      |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1- | Date sampled: | 20130528 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 46.80 | Comment:               |        |           |
| Main Parameters: |      |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.49 | Na:           | 17.7     | Cl:                                                                                                                                                                                                                                                                              | 40.6  | Langel.:               | 0.26   | E.Coli:   |
| EC: [mS/m]       | 68.3 | K:            | 2.91     | NO3 as N:                                                                                                                                                                                                                                                                        | 4.06  | Aggr-Ind:              | 12.33  | Faec. co: |
| TDS:             | 460  | Si:           | 15.1     | SO4:                                                                                                                                                                                                                                                                             | 40    | Ion-bal:               | 0.26   | Total Co: |
| T. Alk.:         | 305  | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 378.65 | SPC:      |
| Ca:              | 91.1 | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 36.8 | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130528 | 60           | 46.80              | 5.21             | 0.09       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130528 | 60           | 46.80              | 10.20            | 0.23       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130528 | 60           | 46.80              | 15.21            | 0.34       |                |       |          |         |         |
| STEP TEST STEP 4 | 20130528 | 60           | 46.80              | 20.55            | 1.36       | 100            | 20    |          |         |         |



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# PUMPING TEST REPORT

Date compiled: 19/09/2013

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0185 Number: SD1-GAA263 Site type: Borehole

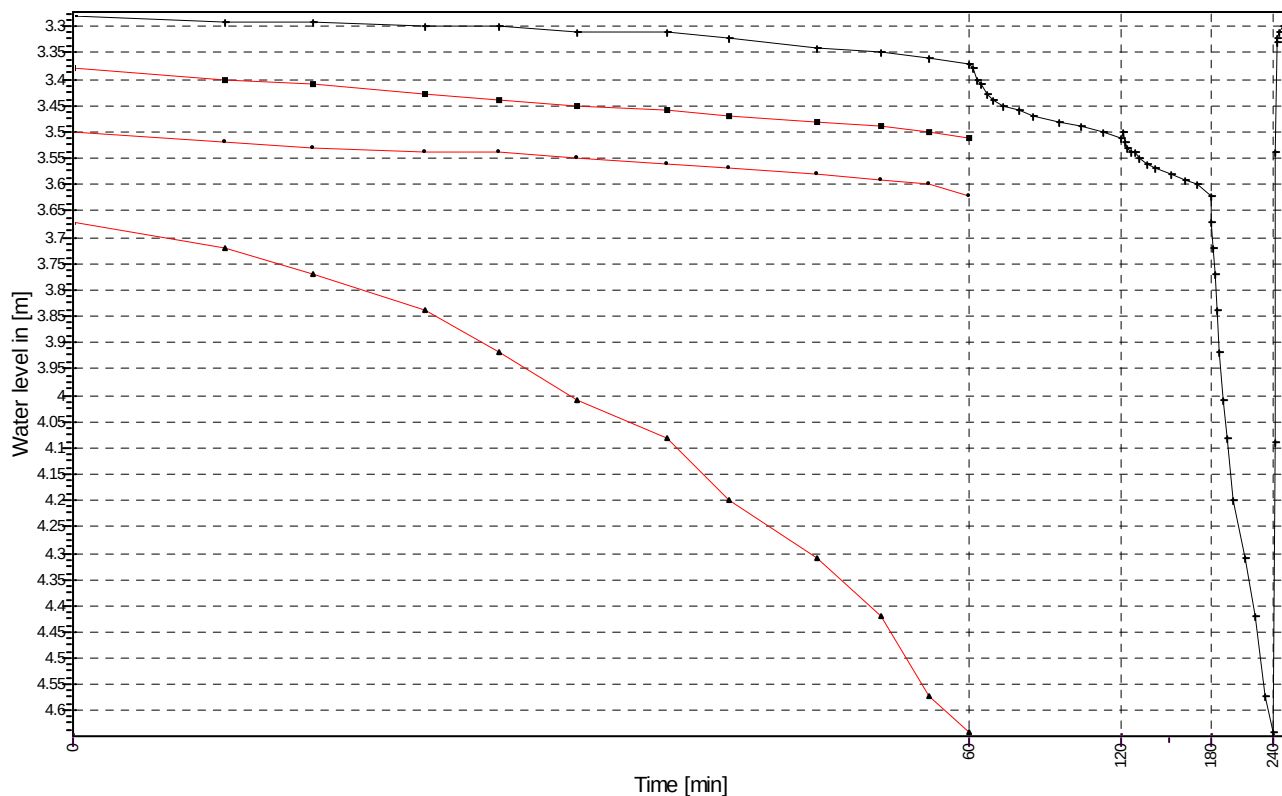
Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.319020 | Alt. No. 1:      |  | Diam. [mm]:    | 165   | Water lev. [m]: | 3.28     |
| Longitude [°] | 23.600930 | Alt. No. 2:      |  | Depth [m]:     | 54.80 | Piezometer:     | 0        |
| Altitude [m]: | 1436.12   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.75  | Date WL meas.:  | 20130528 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test    | 46.80               | 20130528      | 0730 | 20130528    | 1150 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 0730        | 60           | 46.80              | 5.21             | 0.09       |            |    |                 |                            |             |         | 57.89 |
| STEP TEST STEP 2 | 0830        | 60           | 46.80              | 10.20            | 0.23       |            |    |                 |                            |             |         | 44.35 |
| STEP TEST STEP 3 | 0930        | 60           | 46.80              | 15.21            | 0.34       |            |    |                 |                            |             |         | 44.74 |
| STEP TEST STEP 4 | 1030        | 60           | 46.80              | 20.55            | 1.36       | 100        | 20 |                 |                            |             |         | 15.11 |



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## KOKKIE YORK - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BCX0006 **Number:** SD1-GAA005 **Site Name:** ROOIPAN PTN. OLIENSPRUIT

| Samp. Nr./Type | Date/Time samp. | pH | EC | TDS | Ca | Mg | Na | K | Si | T. Alk. | Cl | SO4 | NO3 as N | F |
|----------------|-----------------|----|----|-----|----|----|----|---|----|---------|----|-----|----------|---|
| SD1-GA005      | 20121008 0800   |    |    |     |    |    |    |   |    |         |    |     |          |   |

**Site Identifier:** 2823BCX0008 **Number:** SD1-GAA008 **Site Name:** CARTER BLOCK PTN. PAPKUIL

| Samp. Nr./Type | Date/Time samp. | pH   | EC     | TDS   | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl  | SO4  | NO3 as N | F   |
|----------------|-----------------|------|--------|-------|------|------|------|------|------|---------|-----|------|----------|-----|
| SD1-GA008      | 20120216 0800   | 7.12 | 70.5 † | 522 † | 42.7 | 37.1 | 42.2 | 5.67 | 0.21 | 67.2    | 165 | 33.6 | 1.01     | 0.1 |

**Site Identifier:** 2823BCX0166 **Number:** SD1-GAA220 **Site Name:** ROOIPAN PTN. OLIENSPRUIT

| Samp. Nr./Type | Date/Time samp. | pH   | EC     | TDS   | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl   | SO4 | NO3 as N | F     |
|----------------|-----------------|------|--------|-------|------|------|------|------|------|---------|------|-----|----------|-------|
| SD1-GA220      | 20121023 0800   | 7.33 | 79.9 † | 576 † | 98.8 | 45.7 | 30.2 | 4.42 | 18.4 | 328     | 62.3 | 35  | 3.46     | 0.115 |

Chemistry Standard: SABS for human consumption  
 † Value exceeds recommended maximum limit  
 ‡ Value exceeds maximum allowable limit  
 ! Value exceeds recommended minimum limit  
 j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
 EC [mS/m]  
 Nitrate as N

Sample Type Code Explanation:  
 D: Drinking water  
 E: Effluent  
 K: Sewage  
 O: Organic  
 P: Pressed or pellet  
 R: Rock  
 S: Soil  
 X: Other source



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 Project No.: 11613568

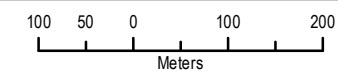


## 2.24 Lennox Cloete



#### LEGEND

- ▲ Newly drilled borehole
- Carter Block Ptn 3
- Secondary road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



**RESOURCES/NOTES**  
 Coordinate System: GCS WGS 1984  
 Datum: WGS 1984

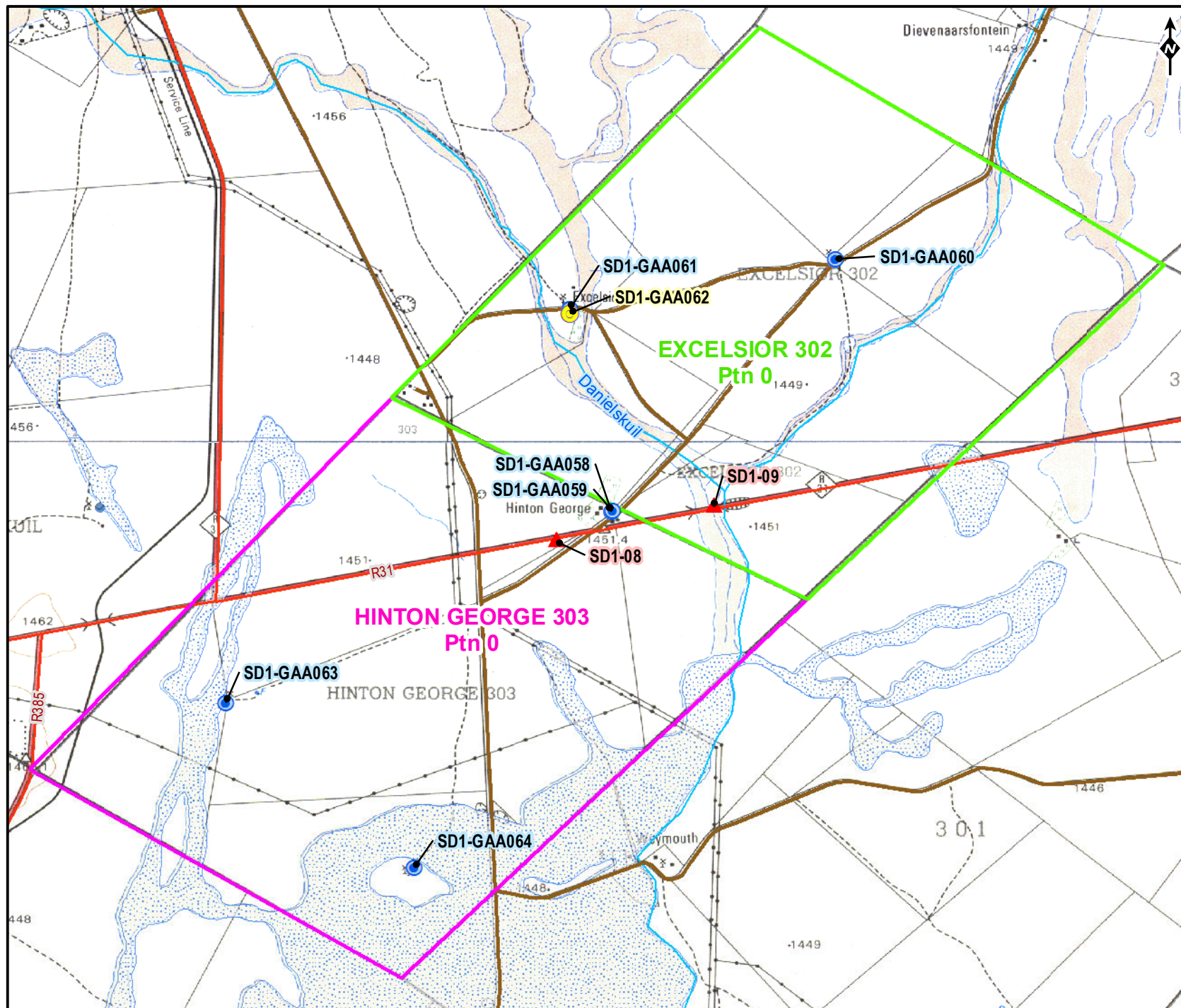
**PROJECT**  
 GW ASSESSMENT VGG SCHEME

**TITLE**  
**CARTER BLOCK PTN 3**  
**LENNOX CLOETE**

|                      |    |            |
|----------------------|----|------------|
| PROJECT No. 11613568 |    | REV 0      |
| SCALE 1:8 000        |    | A4         |
| GIS                  | MB | 24/04/2014 |
| CHECK                | DB | 24/04/2014 |
| REVIEW               | FW | 24/04/2014 |

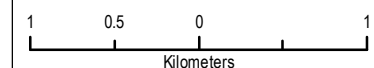






#### LEGEND

- ▲ Newly drilled borehole
- Existing borehole survey
- Well point
- ▭ Excelsior 302 Ptn 0
- ▭ Hinton George 303 Ptn 0
- Main road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**EXCELSIOR 302 PTN 0**  
**HINTON GEORGE 303 PTN 0**  
**LENNOX CLOETE**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:45 000       | A4         |
| GIS MB               | 23/04/2014 |
| CHECK DB             | 23/04/2014 |
| REVIEW FW            | 23/04/2014 |





## LENNOX CLOETE - BASIC SITE INFORMATION

| SITE LOCATION          |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:       | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0056            | SD1-GAA058 | 303/0    | HINTON GEORGE         | B          | 28.25559967  | 23.589740001  | 1452.00      | 0.02         | 165        |                 | 15.76        |            |                |                       |                |                 |                   |
| 2823BCX0057            | SD1-GAA059 | 303/0    | HINTON GEORGE         | B          | 28.25555967  | 23.589790001  | 1452.00      | 0.21         | 165        |                 | 15.84        |            |                |                       |                |                 |                   |
| 2823BCX0058            | SD1-GAA060 | 302      | EXCELSIOR             | B          | 28.23650967  | 23.606680001  | 1447.00      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0059            | SD1-GAA061 | 302      | EXCELSIOR             | B          | 28.24026967  | 23.586560001  | 1446.20      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0060            | SD1-GAA062 | 302      | EXCELSIOR             | W          | 28.24061967  | 23.586590001  | 1446.30      |              |            |                 | 12.66        |            |                |                       |                |                 |                   |
| 2823BCX0061            | SD1-GAA063 | 303/0    | HINTON GEORGE         | B          | 28.27006967  | 23.560580001  | 1445.20      | 0.57         | 165        |                 | 21.73        |            |                |                       |                |                 |                   |
| 2823BCX0062            | SD1-GAA064 | 303/0    | HINTON GEORGE         | B          | 28.28256967  | 23.574830001  | 1442.40      | 0.23         | 165        |                 | 7.53         |            |                |                       |                |                 |                   |
| 2823BCX0212            | SD1-35M    | 458      | CARTER BLOCK          | B          | 28.34543967  | 23.582760001  | 1442.16      | 0.40         | 165        | 30.00           | 9.68         | 20.00      |                |                       |                |                 |                   |
| <b>SUMMARY:</b>        |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> | 30.00        | 21.73      | 20.00          |                       |                |                 |                   |
| <b>Nr. of sites:</b> 8 |            |          |                       |            |              |               |              |              |            | <b>Minimum:</b> | 30.00        | 7.53       | 20.00          |                       |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Sum:</b>     |              |            | 20.00          |                       |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Average:</b> | 30.00        | 13.87      | 20.00          |                       |                |                 |                   |

Site Type:  
B = Borehole  
W = Well point

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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## LENNOX CLOETE - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BCX0058 **Number:** SD1-GAA060 **Site Name:** EXCELSIOR

| Samp. Nr./Type | Date/Time samp. | pH   | EC   | TDS | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|------|-----|------|------|------|------|------|---------|------|------|----------|-------|
| SD1-GA060      | 20121008 0800   | 7.84 | 59.8 | 412 | 75.1 | 35.4 | 13.2 | 2.85 | 20.9 | 287     | 27.3 | 15.3 | 6.33     | 0.135 |

**Site Identifier:** 2823BCX0059 **Number:** SD1-GAA061 **Site Name:** EXCELSIOR

| Samp. Nr./Type | Date/Time samp. | pH   | EC   | TDS | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|------|-----|------|------|------|------|------|---------|------|------|----------|-------|
| SD1-GA061      | 20120216 0800   | 7.96 | 52.7 | 398 | 71   | 45.3 | 10.5 | 1.56 | 14.6 | 250     | 25.9 | 44.2 | 3.36     | 0.149 |
| SD1-GA061      | 20121008 0800   | 7.62 | 68.6 | 436 | 73.8 | 42   | 25.3 | 3.11 | 16.3 | 324     | 28.5 | 22.4 | 1.9      | 0.126 |

**Site Identifier:** 2823BCX0060 **Number:** SD1-GAA062 **Site Name:** EXCELSIOR

| Samp. Nr./Type | Date/Time samp. | pH   | EC   | TDS | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|------|-----|------|------|------|------|------|---------|------|------|----------|-------|
| SD1-GA062      | 20121008 0800   | 7.54 | 59.1 | 318 | 62.9 | 37.5 | 21.3 | 2.68 | 14.4 | 291     | 30.7 | 19.3 | 2.27     | 0.155 |

Chemistry Standard: SABS for human consumption  
 † Value exceeds recommended maximum limit  
 ‡ Value exceeds maximum allowable limit  
 ! Value exceeds recommended minimum limit  
 j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
 EC [mS/m]  
 Nitrate as N

Sample Type Code Explanation:  
 D: Drinking water  
 E: Effluent  
 K: Sewage  
 O: Organic  
 P: Pressed or pellet  
 R: Rock  
 S: Soil  
 X: Other source



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 Fax: 012 - 364 4001  
 Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0178 Number: SD1-08 Site type: Borehole

Distr./Farm No.: 303

Site Name/Des.: HINTON GEORGE

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.257892

Reg./BB.:

Topo-set.:

Depth [m]: 39.85

Longitude [°]: 23.585559

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.53

Altitude [m]: 1449.15

Site purp.: Production (water supply)

Diam. [mm]: 254

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

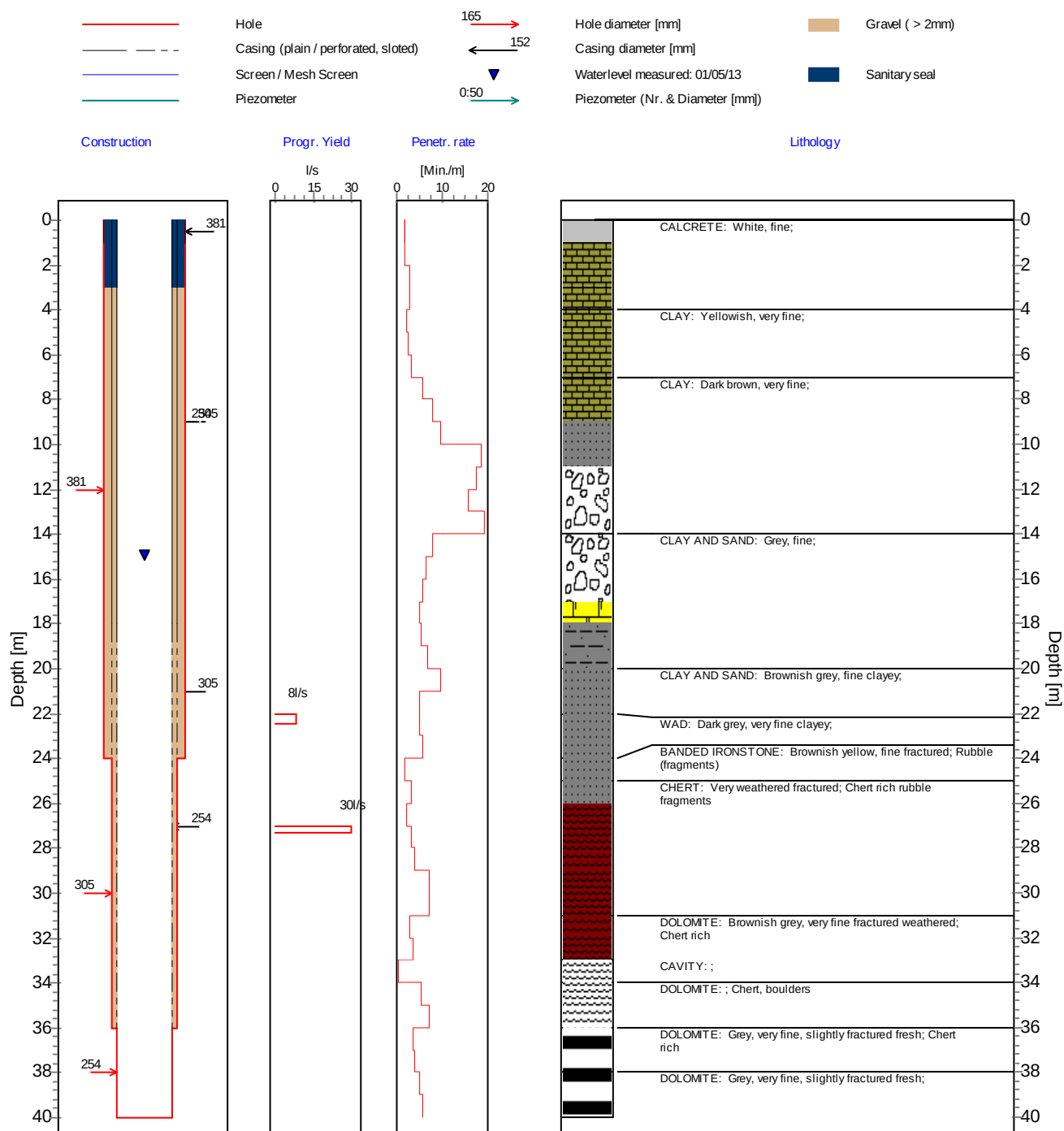
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:

Golder  
Associates

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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0178 Number: SD1-08 Site type: Borehole

Distr./Farm No.: 303 Site Name/Descr.: HINTON GEORGE

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.257892 | Alt. No. 1: |      | Diam. [mm]:   | 254   | Water lev. [m]: | 14.95    |
| Longitude [°]: | 23.585559 | Alt. No. 2: |      | Depth [m]:    | 39.85 | WL status:      | Static   |
| Altitude [m]:  | 1449.15   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.53  | Date WL meas.:  | 20130501 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |  |
|----------------|--|---------------------|--|
| Pump:          |  | Pulley Diam. [mm]:  |  |
| Type of Inst.: |  | Depth to Intk. [m]: |  |
| Manufacturer:  |  |                     |  |
| Engine:        |  | Power Rating [kW]   |  |
| Manufacturer:  |  | Pulley Diam. [mm]:  |  |
| Type of Power: |  |                     |  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-08 | Date sampled: | 20130502 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 34.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.29   | Na:           | 11.1     | Cl:                                                                                                                                                                                                                                                                              | 28.2  | Langel.:               | 0.08   | E.Coli:   |
| EC: [mS/m]       | 66.3   | K:            | 1.89     | NO3 as N:                                                                                                                                                                                                                                                                        | 3.55  | Aggr-Ind:              | 12.15  | Faec. co: |
| TDS:             | 400    | Si:           | 12.8     | SO4:                                                                                                                                                                                                                                                                             | 24.2  | Ion-bal:               | 0.58   | Total Co: |
| T. Alk.:         | 332    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 388.17 | SPC:      |
| Ca:              | 87     | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ‡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 41.6   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 27.00            | 27.30             | 30.00      | Notch (V- or U-notch) |              |         |
| 22.00            | 22.50             | 8.00       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 1.00        | 381        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 18.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 18.00       | 305        | Steel    |              | Plain casing          |                                |            |             |
| 18.00            | 24.00       | 305        | Steel    |              | Perforated or slotted |                                |            |             |
| 18.00            | 36.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130501 | 60           | 34.80              | 8.02             | 0.21       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130501 | 60           | 34.80              | 16.12            | 0.48       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130501 | 60           | 34.80              | 24.12            | 0.77       |                |       |          |         |         |
| STEP TEST STEP 4 | 20130501 | 60           | 34.80              | 30.21            | 1.09       | 0 100          | 5     |          |         |         |
| CONSTANT         | 20130501 | 1440         | 34.80              | 30.08            | 0.71       | 0 100          | 10    | 2573     |         |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 36.00              | Electric motor | 20              | 20.00             | CLASS 0       | 6.10                 | 26.00                 |

**Note:** 1. Production borehole.  
2. Install water level monitoring facility in borehole.



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# PUMPING TEST REPORT

Date compiled: 28/03/2014

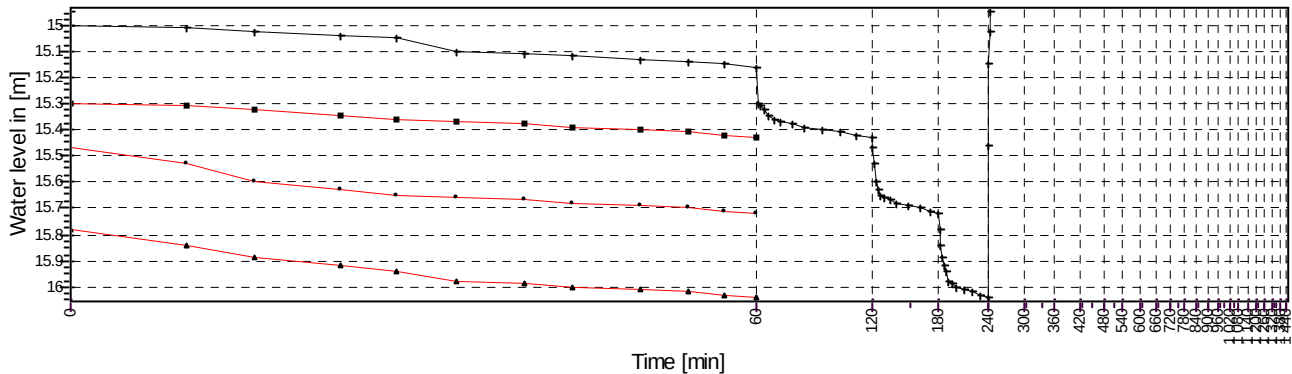
**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0178 Number: SD1-08 Site type: Borehole

Distr./Farm No.: 303 Site Name/Des.: HINTON GEORGE

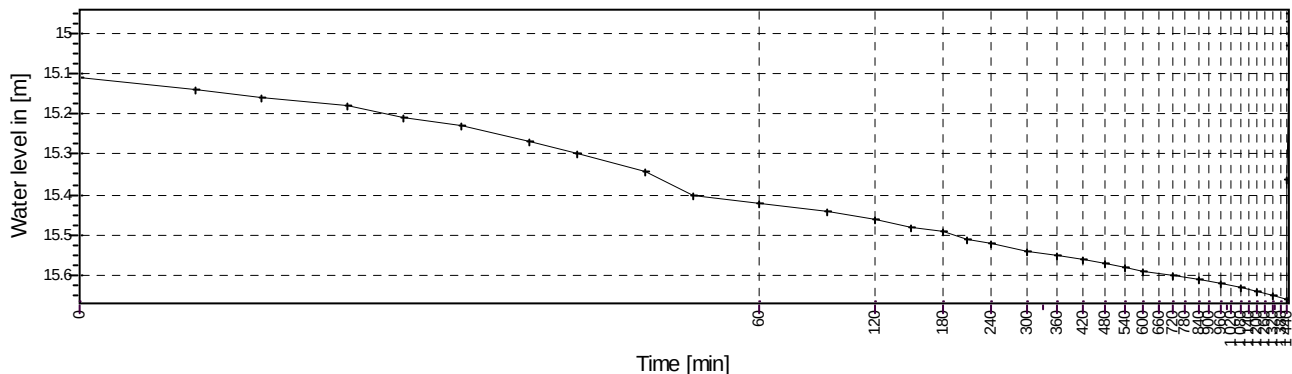
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.257892 | Alt. No. 1:      |  | Diam. [mm]:    | 254   | Water lev. [m]: | 14.95    |
| Longitude [°] | 23.585559 | Alt. No. 2:      |  | Depth [m]:     | 39.85 | Piezometer:     | 0        |
| Altitude [m]: | 1449.15   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.53  | Date WL meas.:  | 20130501 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



| PUMPING TEST: |                    | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|---------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| Rep. Inst.    | Meth. tested       |                     |               |      |             |      |                               |           |                 |
| GOLD          | Constant rate test | 34.80               | 20130501      | 0740 | 20130501    | 1145 |                               |           |                 |
| GOLD          | Constant rate test | 34.80               | 20130501      | 1600 | 20130502    | 1610 | 2573                          |           | 16.66           |

| TESTING DETAILS: |             | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|-------|
| Description      | Time start. |              |                    |                  |            |            |     |                 |                            |             |         |       |
| STEP TEST STEP 1 | 0740        | 60           | 34.80              | 8.02             | 0.21       |            |     |                 |                            |             |         | 38.19 |
| STEP TEST STEP 2 | 0840        | 60           | 34.80              | 16.12            | 0.48       |            |     |                 |                            |             |         | 33.58 |
| STEP TEST STEP 3 | 0940        | 60           | 34.80              | 24.12            | 0.77       |            |     |                 |                            |             |         | 31.32 |
| STEP TEST STEP 4 | 1040        | 60           | 34.80              | 30.21            | 1.09       | 0          | 100 | 5               |                            |             |         | 27.72 |
| CONSTANT         | 1600        | 1440         | 34.80              | 30.08            | 0.71       | 0          | 100 | 10              | 2573                       |             |         | 42.37 |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0174 Number: SD1-09 Site type: Borehole

Distr./Farm No.: 302

Site Name/Des.: EXCELSIOR

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.255266

Reg./BB.:

Topo-set.:

Depth [m]: 40.30

Longitude [°]: 23.597476

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.55

Altitude [m]: 1442.32

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

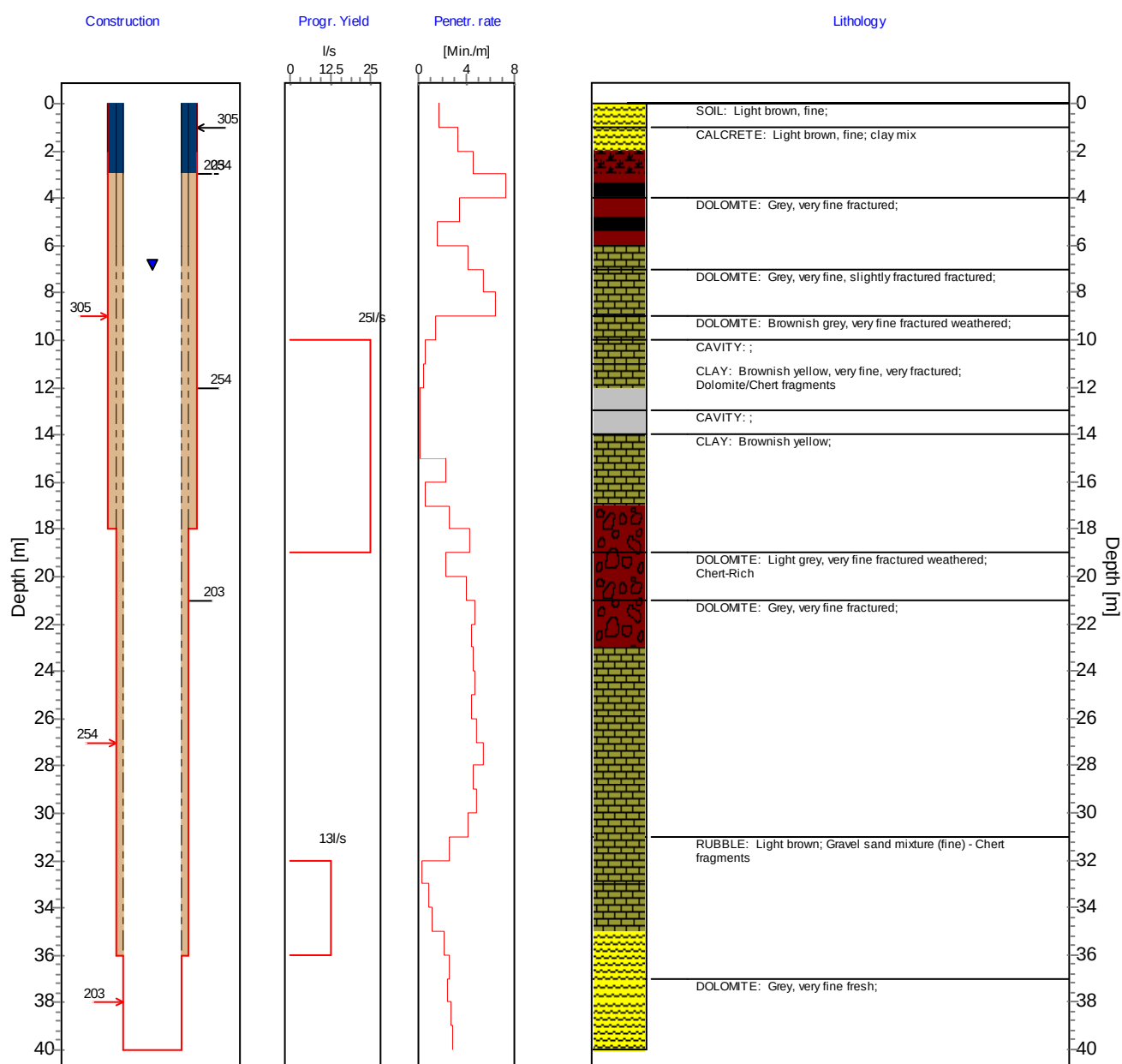
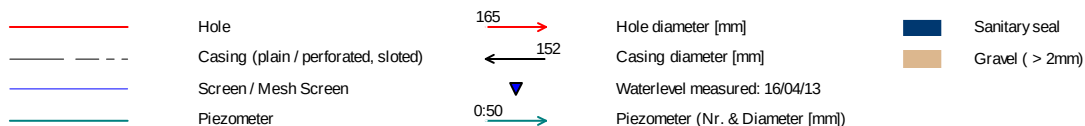
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:


**Golder  
Associates**

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 Fax: 012 - 364 4001  
 Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0174 Number: SD1-09 Site type: Borehole

Distr./Farm No.: 302 Site Name/Descr.: EXCELSIOR

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.255266 | Alt. No. 1:      |  | Diam. [mm]:   | 203   | Water lev. [m]: | 8.04     |
| Longitude [°]: | 23.597476 | Alt. No. 2:      |  | Depth [m]:    | 40.30 | WL status:      | Static   |
| Altitude [m]:  | 1442.32   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.55  | Date WL meas.:  | 20130428 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |  |
|----------------|--|---------------------|--|
| Pump:          |  | Pulley Diam. [mm]:  |  |
| Type of Inst.: |  | Depth to Intk. [m]: |  |
| Manufacturer:  |  |                     |  |
| Engine:        |  | Power Rating [kW]   |  |
| Manufacturer:  |  | Pulley Diam. [mm]:  |  |
| Type of Power: |  |                     |  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-09 | Date sampled: | 20130429 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 34.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.32   | Na:           | 15.7     | Cl:                                                                                                                                                                                                                                                                              | 29.5  | Langel.:               | 0.12   | E.Coli:   |
| EC: [mS/m]       | 73.1 † | K:            | 1.8      | NO3 as N:                                                                                                                                                                                                                                                                        | 3.91  | Aggr-Ind:              | 12.20  | Faec. co: |
| TDS:             | 450    | Si:           | 13.9     | SO4:                                                                                                                                                                                                                                                                             | 26.9  | Ion-bal:               | 1.32   | Total Co: |
| T. Alk.:         | 370    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 429.50 | SPC:      |
| Ca:              | 82.3   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 54.5   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 32.00            | 36.00             | 13.00      | Notch (V- or U-notch) |              |         |
| 10.00            | 19.00             | 25.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 2.00        | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 6.00        | 203        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 6.00        | 254        | Steel    |              | Plain casing          |                                |            |             |
| 6.00             | 18.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |
| 6.00             | 36.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %   | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|-----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130428 | 60           | 34.80              | 8.23             | 0.65       |              |     |       |          |         |         |
| STEP TEST STEP 2 | 20130428 | 60           | 34.80              | 16.32            | 1.34       |              |     |       |          |         |         |
| STEP TEST STEP 3 | 20130428 | 60           | 34.80              | 24.14            | 2.36       |              |     |       |          |         |         |
| STEP TEST STEP 4 | 20130428 | 60           | 34.80              | 30.13            | 3.42       | 100          | 30  |       |          |         |         |
| CONSTANT         | 20130429 | 1440         | 34.80              | 25.09            | 2.11       | 100          | 150 | 987   |          |         |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 36.00              | Electric motor | 20              | 10.00             | CLASS 0       | 5.80                 | 30.00                 |

**Note:** 1. Production borehole.  
2. Install water level monitoring facility in borehole.



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# PUMPING TEST REPORT

Date compiled: 28/03/2014

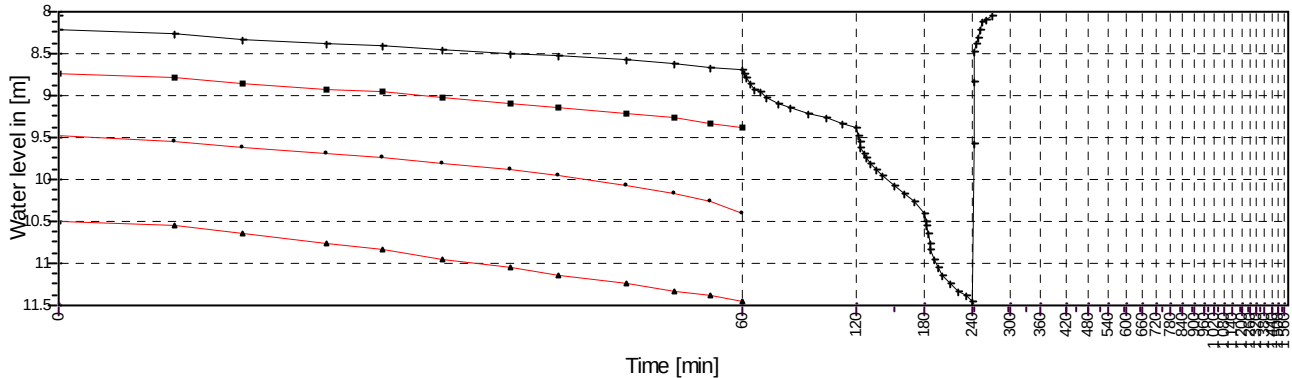
**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0174 Number: SD1-09 Site type: Borehole

Distr./Farm No.: 302 Site Name/Des.: EXCELSIOR

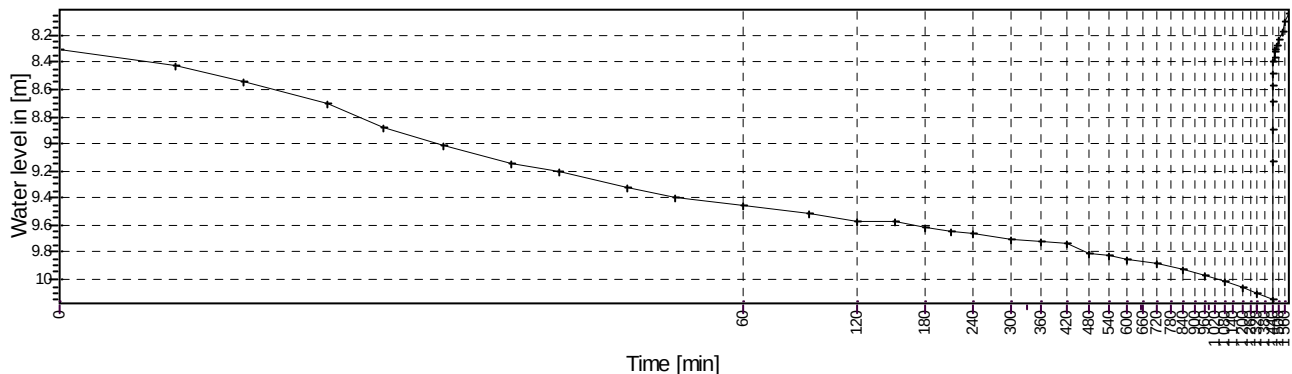
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.255266 | Alt. No. 1:      |  | Diam. [mm]:    | 203   | Water lev. [m]: | 8.04     |
| Longitude [°] | 23.597476 | Alt. No. 2:      |  | Depth [m]:     | 40.30 | Piezometer:     | 0        |
| Altitude [m]: | 1442.32   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.55  | Date WL meas.:  | 20130428 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



| PUMPING TEST: |                    | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|---------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| Rep. Inst.    | Meth. tested       |                     |               |      |             |      |                               |           |                 |
| GOLD          | Step test          | 34.80               | 20130428      | 1330 | 20130428    | 1800 |                               |           |                 |
| GOLD          | Constant rate test | 34.80               | 20130429      | 0900 | 20130430    | 1130 | 987                           |           | 8.33            |

| TESTING DETAILS: |             | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----------------|----------------------------|-------------|---------|-------|
| Description      | Time start. |              |                    |                  |            | %          |                 |                            |             |         |       |
| STEP TEST STEP 1 | 1330        | 60           | 34.80              | 8.23             | 0.65       |            |                 |                            |             |         | 12.66 |
| STEP TEST STEP 2 | 1430        | 60           | 34.80              | 16.32            | 1.34       |            |                 |                            |             |         | 12.18 |
| STEP TEST STEP 3 | 1530        | 60           | 34.80              | 24.14            | 2.36       |            |                 |                            |             |         | 10.23 |
| STEP TEST STEP 4 | 1630        | 60           | 34.80              | 30.13            | 3.42       | 100        | 30              |                            |             |         | 8.81  |
| CONSTANT         | 0900        | 1440         | 34.80              | 25.09            | 2.11       | 100        | 150             | 987                        |             |         | 11.89 |



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Project No.: 11613568



**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0183 Number: SD1-35 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.345005

Reg./BB.:

Topo-set.:

Depth [m]: 28.70

Longitude [°]: 23.583280

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.56

Altitude [m]: 1442.33

Site purp.: Production (water supply)

Diam. [mm]: 254

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

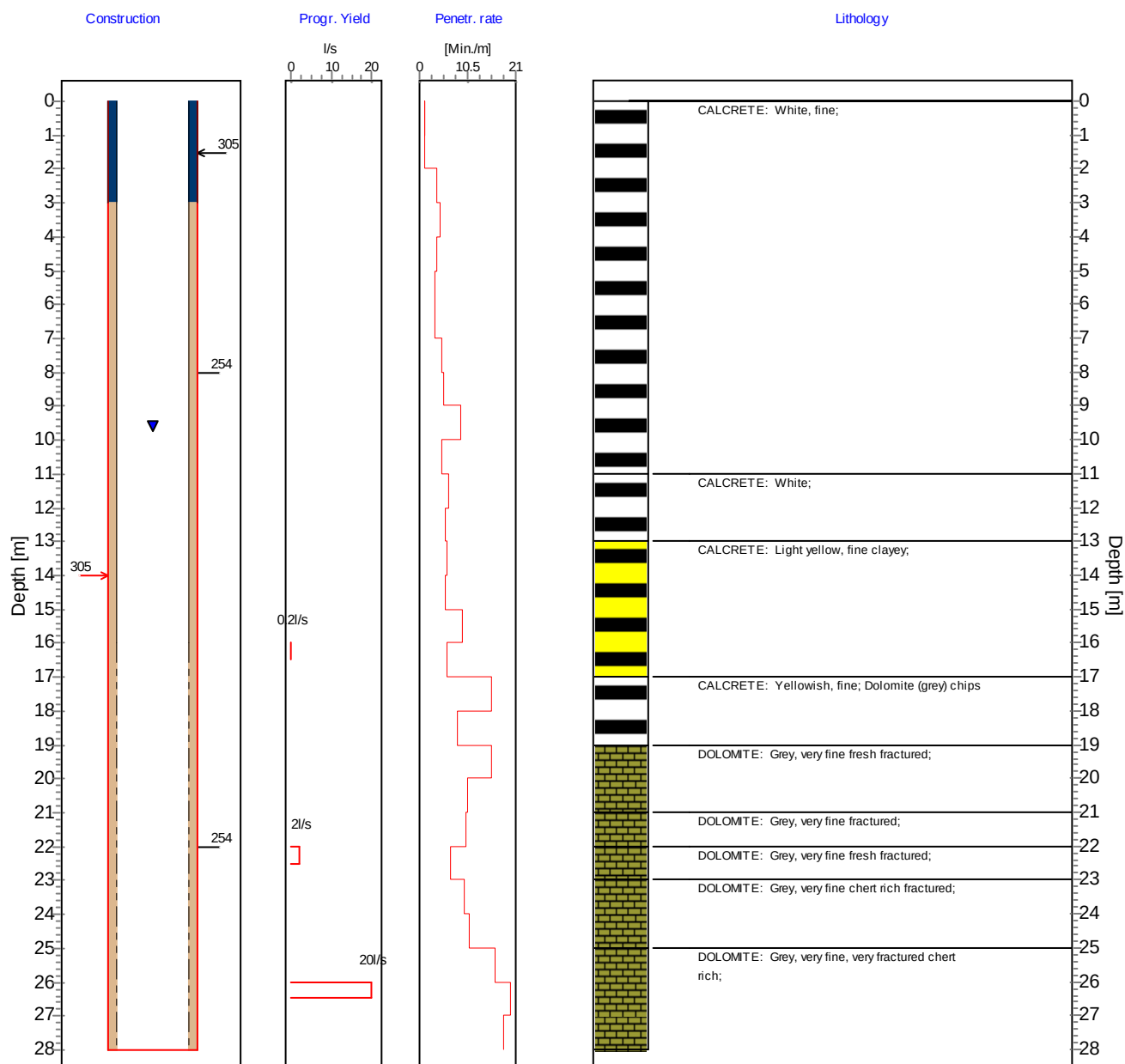
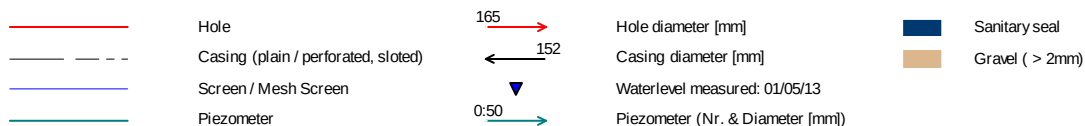
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:

Golder  
Associates

Golder Associates Africa, Pretoria  
P O Box 13776, Hatfield, 00285  
Tel: 012 - 364 4000  
Fax: 012 - 364 4001  
Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0183 Number: SD1-35 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.345005 | Alt. No. 1: |      | Diam. [mm]:   | 254   | Water lev. [m]: | 10.68    |
| Longitude [°]: | 23.583280 | Alt. No. 2: |      | Depth [m]:    | 28.70 | WL status:      | Static   |
| Altitude [m]:  | 1442.33   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.56  | Date WL meas.:  | 20130803 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |  |
|----------------|--|---------------------|--|
| Pump:          |  | Pulley Diam. [mm]:  |  |
| Type of Inst.: |  | Depth to Intk. [m]: |  |
| Manufacturer:  |  |                     |  |
| Engine:        |  | Power Rating [kW]   |  |
| Manufacturer:  |  | Pulley Diam. [mm]:  |  |
| Type of Power: |  |                     |  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                      |       |                        |        |           |
|------------------|--------|---------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-35 | Date sampled: | 20130526 | Depth sampl. [m]:                                                                                                                                                                                                                                                                    | 22.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                               |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.53   | Na:           | 26.5     | Cl:                                                                                                                                                                                                                                                                                  | 64.8  | Langel.:               | 0.28   | E.Coli:   |
| EC: [mS/m]       | 75 †   | K:            | 4.23     | NO3 as N:                                                                                                                                                                                                                                                                            | 4.53  | Aggr-Ind:              | 12.36  | Faec. co: |
| TDS:             | 492 †  | Si:           | 14.1     | SO4:                                                                                                                                                                                                                                                                                 | 55.7  | Ion-bal:               | -0.59  | Total Co: |
| T. Alk.:         | 289    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                                   | 0.148 | CaCO3:                 | 386.54 | SPC:      |
| Ca:              | 93.6   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit   ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit   ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 37.2   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                      |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 26.00            | 26.50             | 20.00      | Notch (V- or U-notch) |              |         |
| 22.00            | 22.50             | 2.00       | Notch (V- or U-notch) |              |         |
| 16.00            | 16.50             | 0.20       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 3.00        | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 16.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 16.00            | 28.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130524 | 60           | 22.80              | 8.13             | 0.17       |            |       |          |         |         |
| STEP TEST STEP 2 | 20130524 | 60           | 22.80              | 16.14            | 0.37       |            |       |          |         |         |
| STEP TEST STEP 3 | 20130524 | 60           | 22.80              | 24.53            | 0.59       |            |       |          |         |         |
| STEP TEST STEP 4 | 20130524 | 60           | 22.80              | 30.22            | 1.55       | 0          | 30    |          |         |         |
| CONSTANT (1)     | 20130524 | 2880         | 22.80              | 30.06            | 1.76       | 100        | 120   |          |         |         |
| CONSTANT (2)     | 20130803 | 4320         | 22.80              | 30.12            | 2.37       | 100        | 60    |          |         |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 26.00              | Electric motor | 24              | 20.00             | CLASS 0       | 8.00                 | 25.00                 |

**Note:** 1. Production borehole.  
2. Install water level monitoring facility in borehole.



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# PUMPING TEST REPORT

Date compiled: 31/03/2014

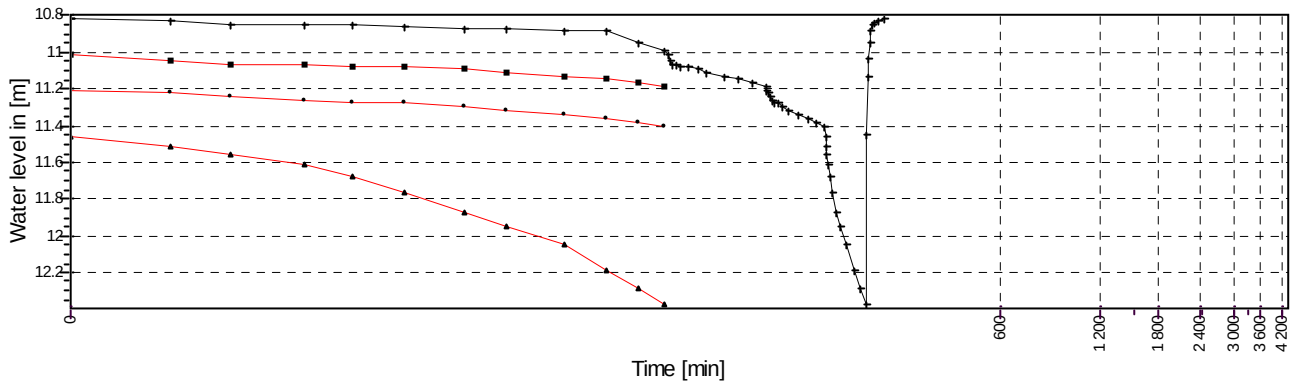
**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0183 Number: SD1-35 Site type: Borehole

Distr./Farm No.: 458 Site Name/Des.: CARTER BLOCK

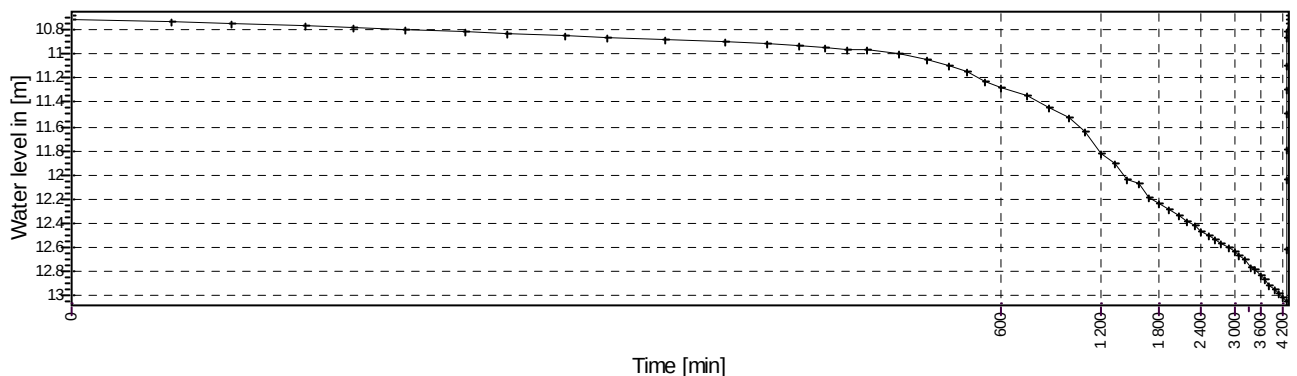
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.345005 | Alt. No. 1:      |  | Diam. [mm]:    | 254   | Water lev. [m]: | 10.68    |
| Longitude [°] | 23.583280 | Alt. No. 2:      |  | Depth [m]:     | 28.70 | Piezometer:     | 0        |
| Altitude [m]: | 1442.33   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.56  | Date WL meas.:  | 20130803 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 22.80               | 20130524      | 0700 | 20130524    | 1130 |                               |           |                 |
| GOLD       | Constant rate test | 22.80               | 20130524      | 1635 | 20130526    | 1835 |                               |           |                 |
| GOLD       | Constant rate test | 22.80               | 20130803      | 1200 | 20130806    | 1300 | 2568                          | 34.9      | 0.83            |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 0700        | 60           | 22.80              | 8.13             | 0.17       |            |     |                 |                            |             |         | 47.82 |
| STEP TEST STEP 2 | 0800        | 60           | 22.80              | 16.14            | 0.37       |            |     |                 |                            |             |         | 43.62 |
| STEP TEST STEP 3 | 0900        | 60           | 22.80              | 24.53            | 0.59       |            |     |                 |                            |             |         | 41.58 |
| STEP TEST STEP 4 | 1000        | 60           | 22.80              | 30.22            | 1.55       | 0          | 30  |                 |                            |             |         | 19.50 |
| CONSTANT (1)     | 1635        | 2880         | 22.80              | 30.06            | 1.76       | 100        | 120 |                 |                            |             |         | 17.08 |
| CONSTANT (2)     | 1200        | 4320         | 22.80              | 30.12            | 2.37       | 100        | 60  | 2568            |                            |             | 34.9    | 12.71 |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 2013/07/30

## BASIC SITE INFORMATION:

Site Identifier: 2823BCX0183 Number: SD1-35

Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Latitude [°] 28.345005

Alt. No. 1:

Diam. [mm]: 254

Water lev. [m]: 10.82

Longitude [°] 23.583280

Alt. No. 2:

Depth [m]: 28.70

Piezometer: 0

Altitude [m]: 1442.33

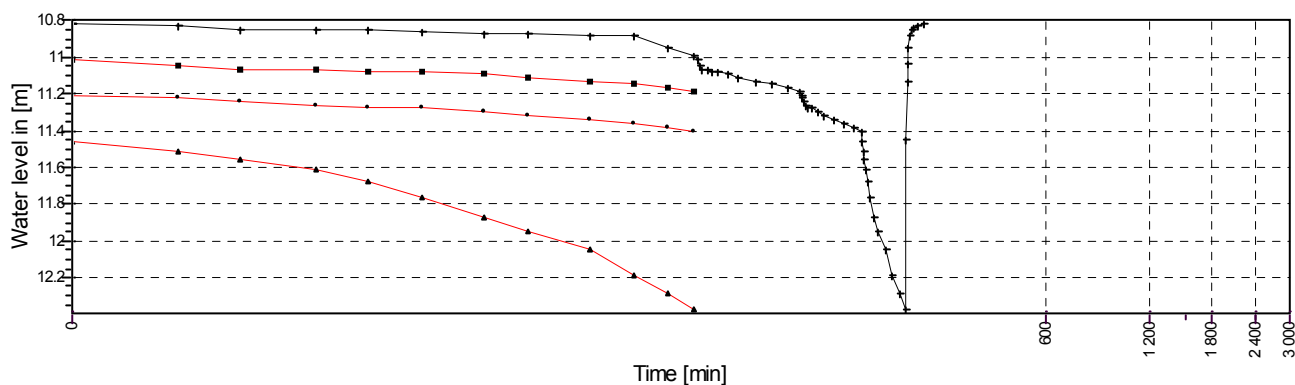
Rep. inst.: GOLD

Col. ht. [mm]: 0.56

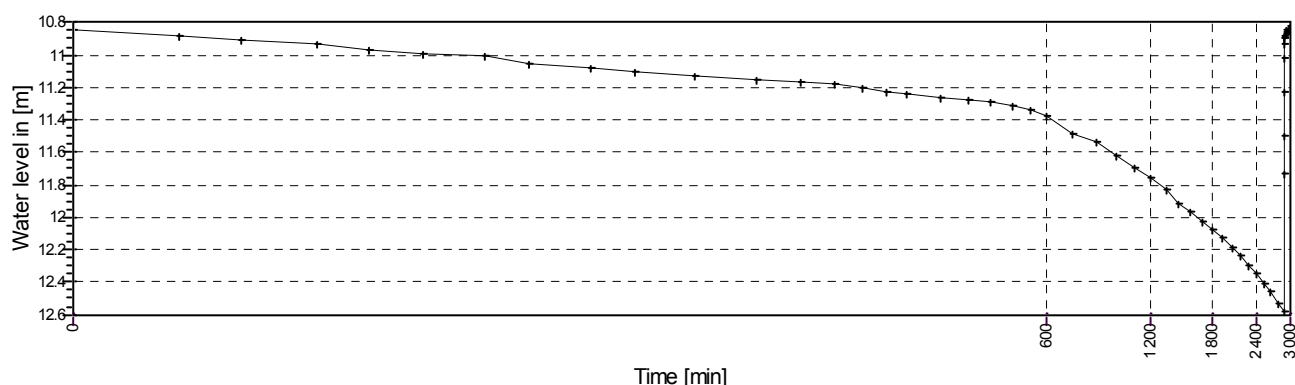
Date WL meas.: 20130524

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 22.80               | 20130524      | 0700 | 20130524    | 1130 |                               |           |                 |
| GOLD       | Constant rate test | 22.80               | 20130524      | 1635 | 20130526    | 1835 |                               |           |                 |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 0700        | 60           | 22.80              | 8.13             | 0.17       |            |     |                 |                            |             |         | 47.82 |
| STEP TEST STEP 2 | 0800        | 60           | 22.80              | 16.14            | 0.37       |            |     |                 |                            |             |         | 43.62 |
| STEP TEST STEP 3 | 0900        | 60           | 22.80              | 24.53            | 0.59       |            |     |                 |                            |             |         | 41.58 |
| STEP TEST STEP 4 | 1000        | 60           | 22.80              | 30.22            | 1.55       |            | 0   | 30              |                            |             |         | 19.50 |
| CONSTANT         | 1635        | 2880         | 22.80              | 30.06            | 1.76       |            | 100 | 120             |                            |             |         | 17.08 |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0212 Number: SD1-35M Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.345440

Reg./BB.:

Topo-set.:

Depth [m]: 30.00

Longitude [°]: 23.582760

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.40

Altitude [m]: 1442.16

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

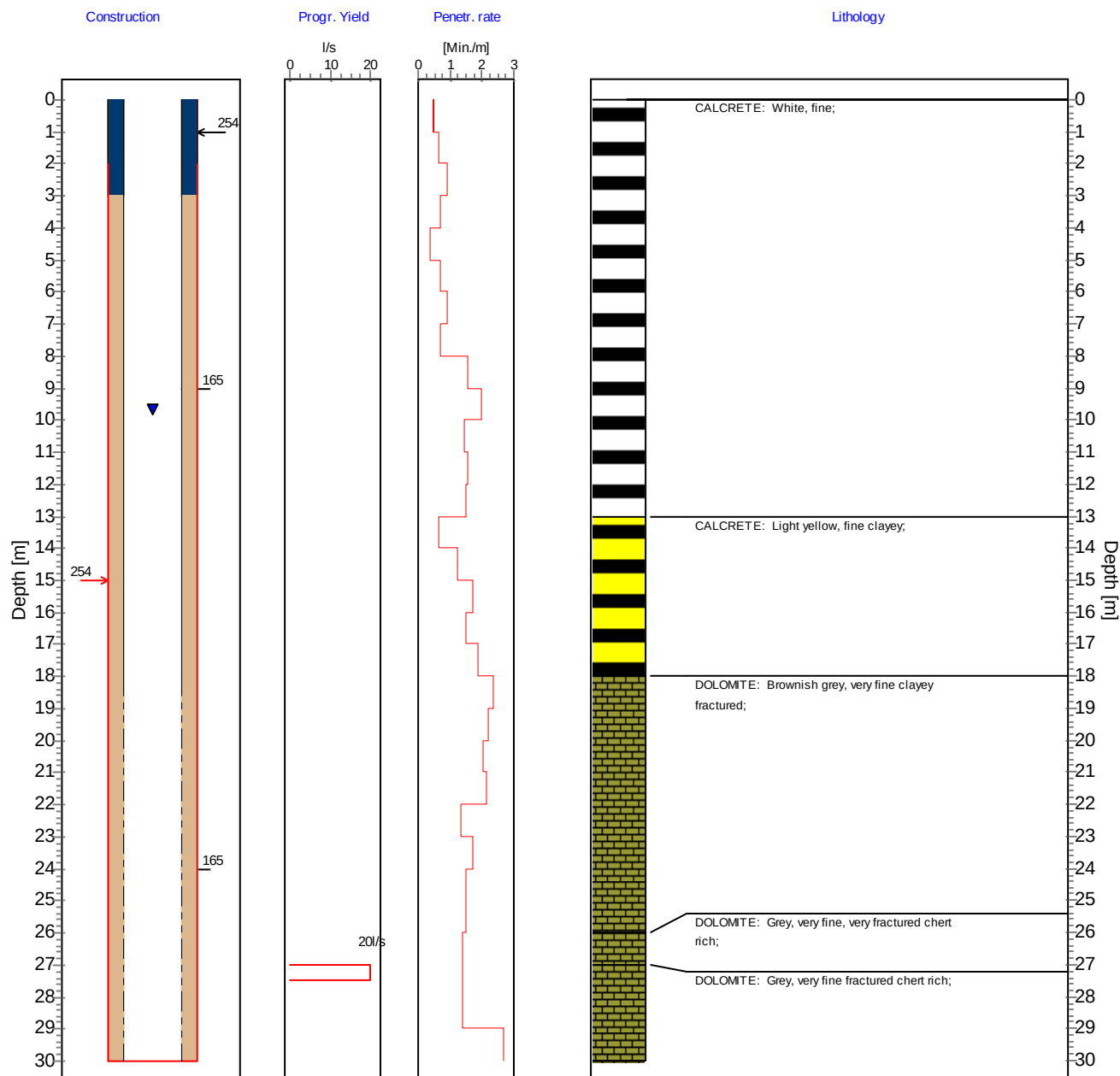
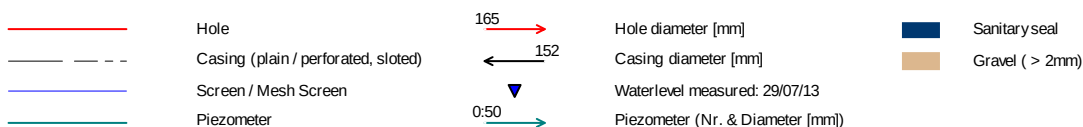
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



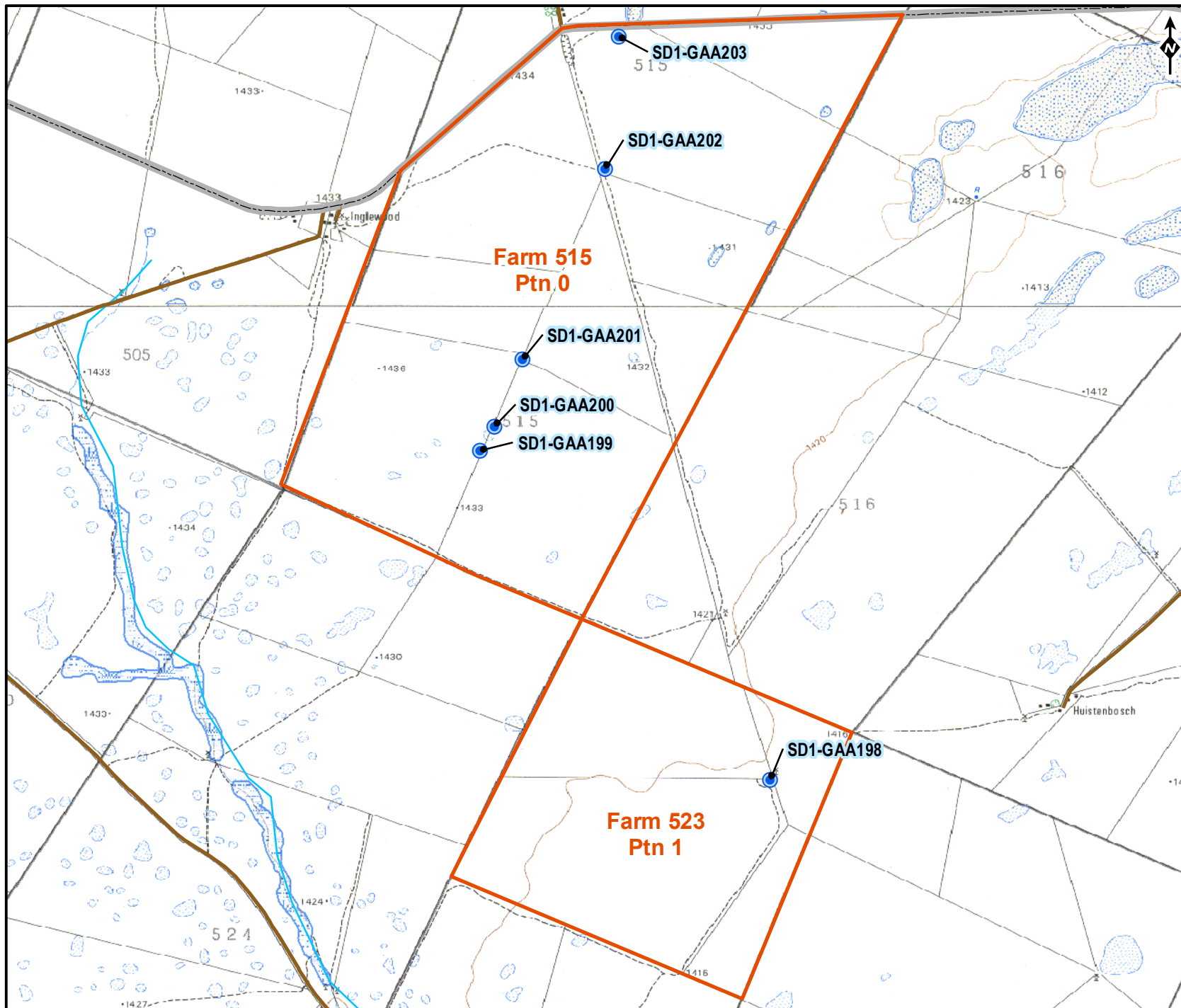
COMMENT:



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Project No.: 11613568

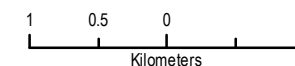


## **2.25 Lucas Burger**



#### LEGEND

- Existing borehole survey
- Farm 515 Ptn 0
- Farm 523 Ptn 1
- Secondary road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**FARM 515 PTN 0**  
**FARM 523 PTN 1**  
**LUCAS BURGER**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:55 000       | A4         |
| GIS MB               | 25/04/2014 |
| CHECK DB             | 25/04/2014 |
| REVIEW FW            | 25/04/2014 |



## LUCAS BURGER - BASIC SITE INFORMATION

| SITE LOCATION    |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier: | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BC00105      | SD1-GAA203 | RE515/0  | FARM 515              | B          | 28.47541967  | 23.574140001  | 1436.60      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BC00106      | SD1-GAA202 | RE515/0  | FARM 515              | B          | 28.48762967  | 23.572870001  | 1435.20      |              | 165        | 61.00           | 17.80        |            |                |                       |                |                 |                   |
| 2823DA00054      | SD1-GAA198 | 523/0    | FARM 523              | B          | 28.54400967  | 23.588090001  | 1422.15      |              | 165        |                 | 7.00         |            |                |                       |                |                 |                   |
| 2823DAX0012      | SD1-GAA199 | RE515/0  | FARM 515              | B          | 28.51367967  | 23.561320001  | 1427.40      | 0.30         | 165        | 73.00           | 17.85        |            |                |                       |                |                 |                   |
| 2823DAX0013      | SD1-GAA200 | RE515/0  | FARM 515              | B          | 28.51136967  | 23.562690001  | 1431.20      | 0.10         | 165        | 73.00           | 21.90        |            |                |                       |                |                 |                   |
| 2823DAX0014      | SD1-GAA201 | RE515/0  | FARM 515              | B          | 28.50519967  | 23.565280001  | 1432.60      | 0.53         | 165        |                 | 28.30        |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>  |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> | 73.00        | 28.30      |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Minimum:</b> | 61.00        | 7.00       |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Average:</b> | 69.00        | 18.57      |                |                       |                |                 |                   |

### SUMMARY:

Site Type:  
B = Borehole

Nr. of sites: 6

Maximum: 73.00 28.30

Minimum: 61.00 7.00

Sum:

Average: 69.00 18.57

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)

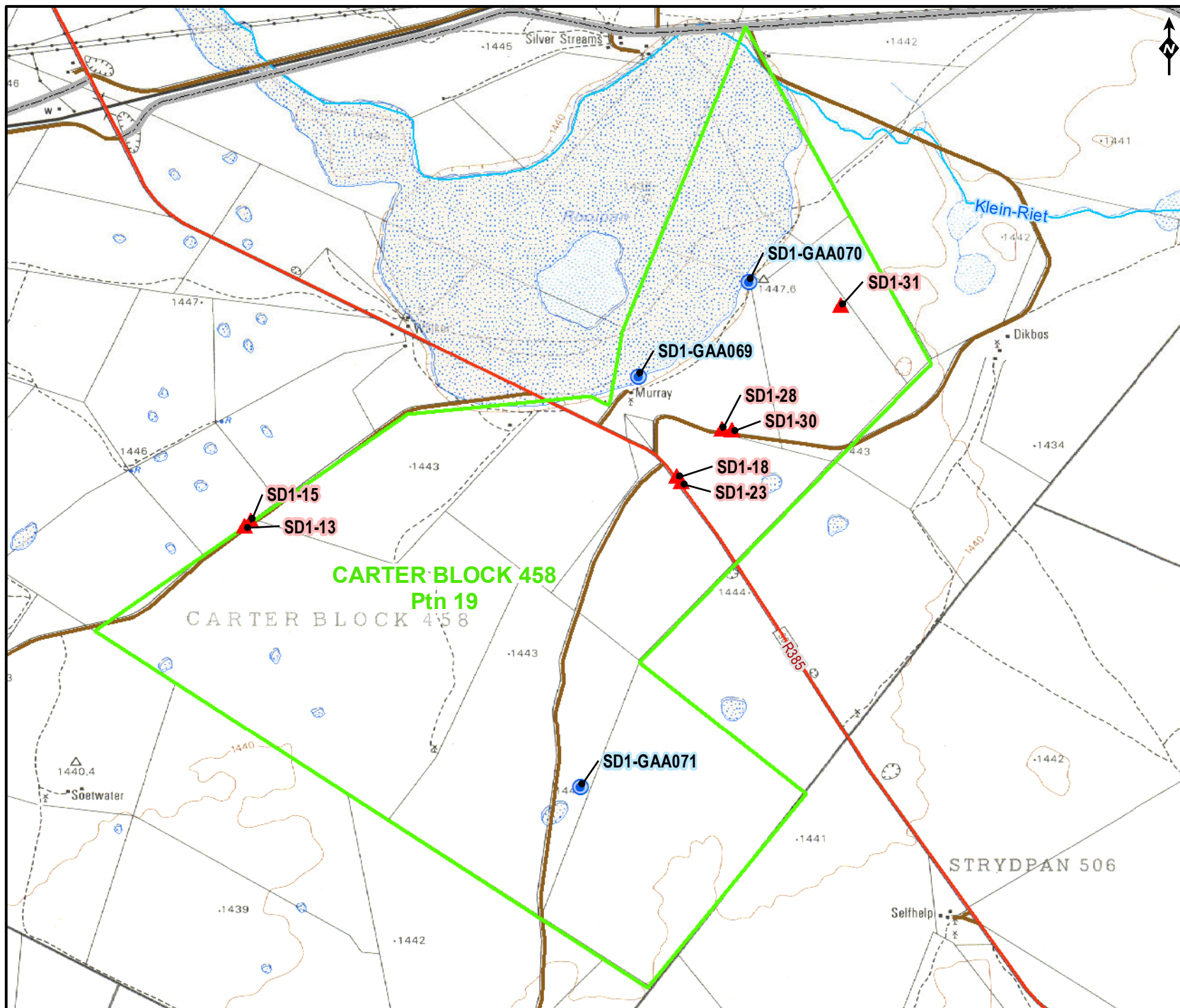


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Project No.: 11613568



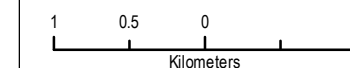


## **2.26 Marika de Jager**



#### LEGEND

- ▲ Newly drilled borehole
- Existing borehole survey
- Carter Block 458 Ptn 19
- Main road
- - - Secondary road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**CARTER BLOCK 458 PTN 19**  
**MARIKA DE JAGER**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:50 000       | A4         |
| GIS MB               | 23/04/2014 |
| CHECK DB             | 23/04/2014 |
| REVIEW FW            | 23/04/2014 |



## MARIKA DE JAGER - BASIC SITE INFORMATION

| SITE LOCATION          |            |          |                          |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------------|------------|----------|--------------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:       | Number:    | District | Site name/Description    | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0067            | SD1-GAA069 | 458/19   | CARTER BLOCK PTN. MURRAY | B          | 28.38105967  | 23.580450001  | 1443.80      |              |            |                 | 12.52        |            |                |                       |                |                 |                   |
| 2823BCX0068            | SD1-GAA070 | 458/19   | CARTER BLOCK PTN. MURRAY | B          | 28.37310967  | 23.589750001  | 1448.70      | 0.28         | 155        | 30.00           | 17.91        |            |                |                       | 0              | 0               |                   |
| 2823BCX0069            | SD1-GAA071 | 458/19   | CARTER BLOCK PTN. MURRAY | B          | 28.41553967  | 23.575590001  | 1439.80      |              | 165        | 30.00           |              |            |                |                       | 0              | 0               |                   |
| <b>SUMMARY:</b>        |            |          |                          |            |              |               |              |              |            | <b>Maximum:</b> | 30.00        | 17.91      |                |                       |                |                 |                   |
|                        |            |          |                          |            |              |               |              |              |            | <b>Minimum:</b> | 30.00        | 12.52      |                |                       |                |                 |                   |
|                        |            |          |                          |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
| <b>Nr. of sites:</b> 3 |            |          |                          |            |              |               |              |              |            | <b>Average:</b> | 30.00        | 15.21      |                |                       |                |                 |                   |

NOTE:  
 "Yield" represents cumulative blow yield  
 The recommended abstraction ("Rec. abs.")  
 is based on a 24 hour duty cycle  
 (based on test pumping result)



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 Project No.: 11613568

## MARIKA DE JAGER - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BCX0067    **Number:** SD1-GAA069    **Site Name:** CARTER BLOCK PTN. MURRAY

| Samp. Nr./Type | Date/Time samp. | pH   | EC    | TDS    | Ca  | Mg    | Na    | K    | Si   | T. Alk. | Cl    | SO4   | NO3 as N | F     |
|----------------|-----------------|------|-------|--------|-----|-------|-------|------|------|---------|-------|-------|----------|-------|
| SD1-GA069      | 20120216 0800   | 7.96 | 217 † | 1600 † | 119 | 111 ‡ | 211 † | 35.3 | 12.7 | 286     | 442 † | 239 † | 5.67     | 0.133 |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source



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Project No.: 11613568

# Borehole Construction and Geological Log

Date compiled: 03/03/2014

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0207 Number: SD1-13 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

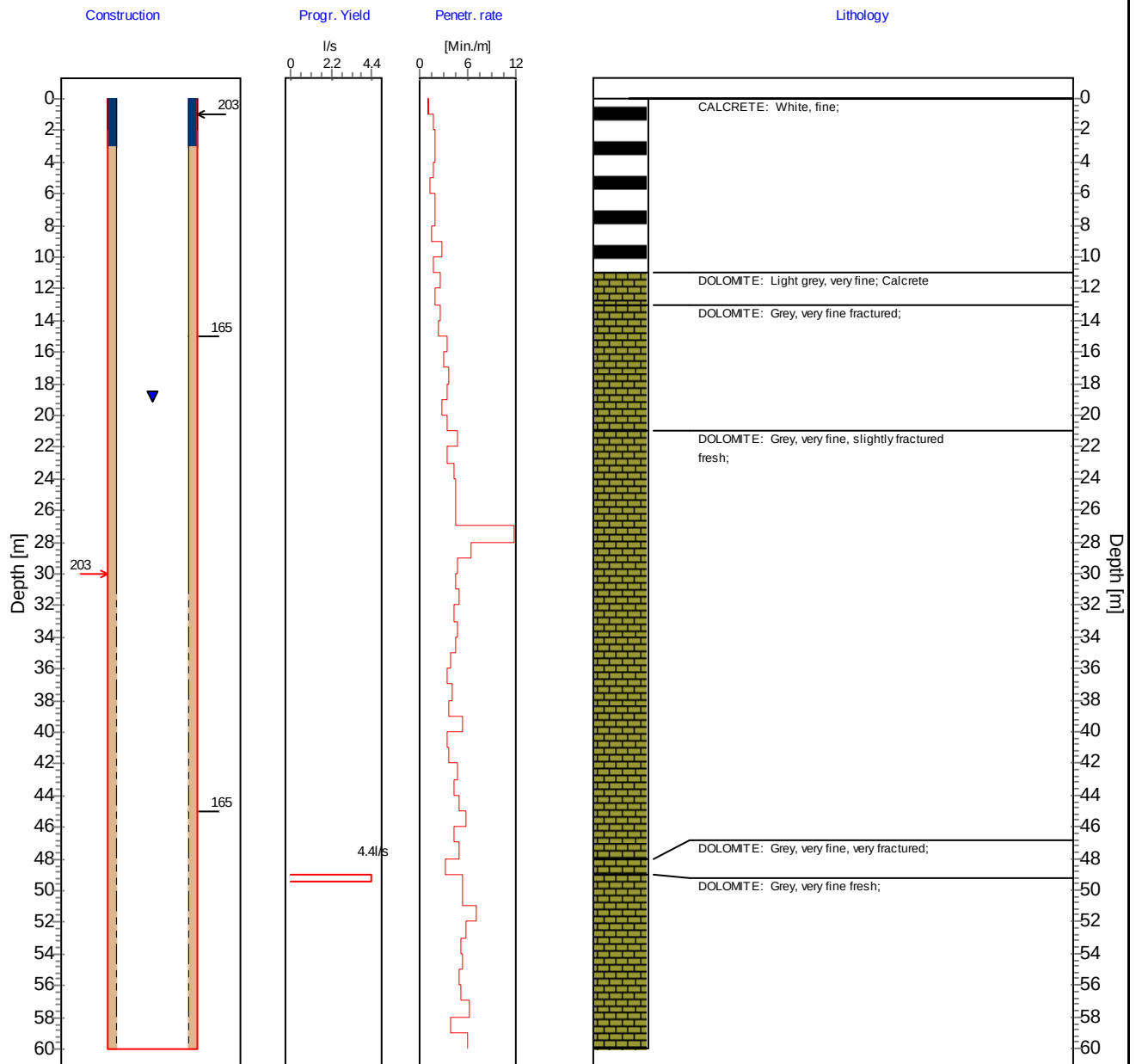
Region Descr.: KGATELOPELE LM

|                                        |           |                                       |                    |
|----------------------------------------|-----------|---------------------------------------|--------------------|
| Latitude [°]: 28.393810                | Reg./BB.: | Topo-set.:                            | Depth [m]: 60.00   |
| Longitude [°]: 23.547370               | G-Nr.:    | Site status: Unused                   | Col. ht. [m]: 0.53 |
| Altitude [m]: 1442.51                  |           | Site purp.: Production (water supply) | Diam. [mm]: 165    |
| Coord. acc.: Accurate to within 1 unit |           | Use applic.: Domestic - all purposes  | Drain. reg.: C92C  |
| Coord. meth.: Altimeter                |           | Equipment: No equipment               | Rep. inst.: GOLD   |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend

|  |                                      |        |                                  |  |                |
|--|--------------------------------------|--------|----------------------------------|--|----------------|
|  | Hole                                 | 165 →  | Hole diameter [mm]               |  | Sanitary seal  |
|  | Casing (plain / perforated, slotted) | ← 152  | Casing diameter [mm]             |  | Gravel (> 2mm) |
|  | Screen / Mesh Screen                 | ▼      | Waterlevel measured: 04/07/13    |  |                |
|  | Piezometer                           | 0:50 → | Piezometer (Nr. & Diameter [mm]) |  |                |



COMMENT:



Golder Associates Africa, Pretoria  
P O Box 13776, Hatfield, 00285  
Tel: 012 - 364 4000  
Fax: 012 - 364 4001  
Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0207 Number: SD1-13 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.393810 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 19.77    |
| Longitude [°]: | 23.547370 | Alt. No. 2:      |  | Depth [m]:    | 60.00 | WL status:      | Static   |
| Altitude [m]:  | 1442.51   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.53  | Date WL meas.:  | 20130801 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| <b>Pump:</b>   |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| <b>Engine:</b> |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-13 | Date sampled: | 20130802 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 58.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.13   | Na:           | 27.5     | Cl:                                                                                                                                                                                                                                                                              | 133   | Langel.:               | 0.14   | E.Coli:   |
| EC: [mS/m]       | 97 †   | K:            | 4.72     | NO3 as N:                                                                                                                                                                                                                                                                        | 3.06  | Aggr-Ind:              | 12.25  | Faec. co: |
| TDS:             | 730 †  | Si:           | 21.6     | SO4:                                                                                                                                                                                                                                                                             | 58.6  | Ion-bal:               | 6.43 † | Total Co: |
| T. Alk.:         | 302    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 573.15 | SPC:      |
| Ca:              | 174 †  | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 33.8   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 49.00            | 49.50             | 4.40       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 2.00        | 203        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 30.00       | 165        | Steel    |              | Plain casing          |                                |            |             |
| 30.00            | 60.00       | 165        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m³/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130801 | 60           | 58.80              | 1.22             | 1.55       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130801 | 60           | 58.80              | 2.55             | 5.16       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130801 | 60           | 58.80              | 5.14             | 14.20      |                |       |          |         |         |
| STEP TEST STEP 4 | 20130801 | 10           | 58.80              | 7.10             | 39.00      | 100            | 100   |          |         |         |
| PUMP INLET       | 20130801 | 20           | 58.80              | 4.80             | 39.03      |                |       |          |         |         |
| CONSTANT         | 20130801 | 1440         | 58.80              | 3.54             | 8.67       | 0              | 100   | 240      |         |         |



Golder Associates Africa, Pretoria  
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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 28/08/2013

## BASIC SITE INFORMATION:

Site Identifier: 2823BCX0207 Number: SD1-13

Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Latitude [°] 28.393810

Alt. No. 1:

Diam. [mm]: 165

Water lev. [m]: 19.77

Longitude [°] 23.547370

Alt. No. 2:

Depth [m]: 60.00

Piezometer: 0

Altitude [m]: 1442.51

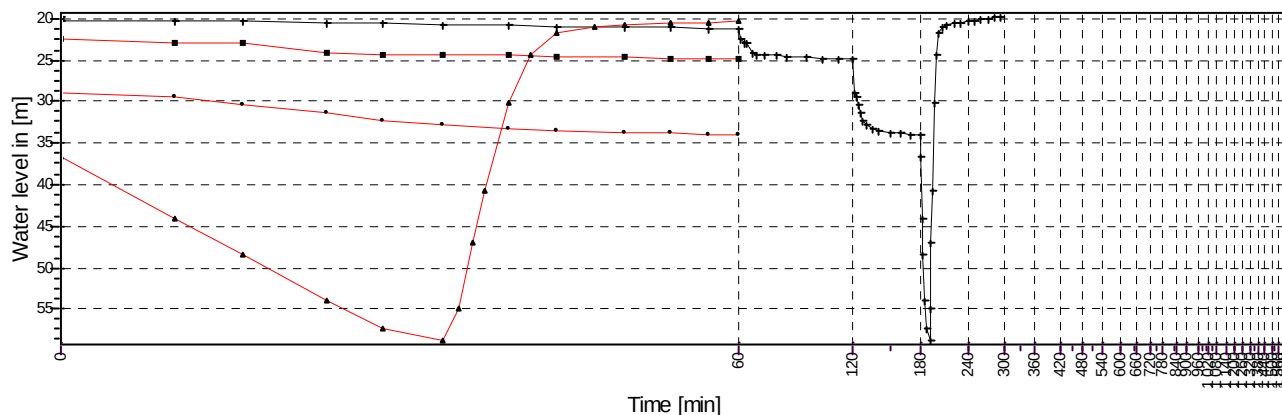
Rep. inst.: GOLD

Col. ht. [mm]: 0.53

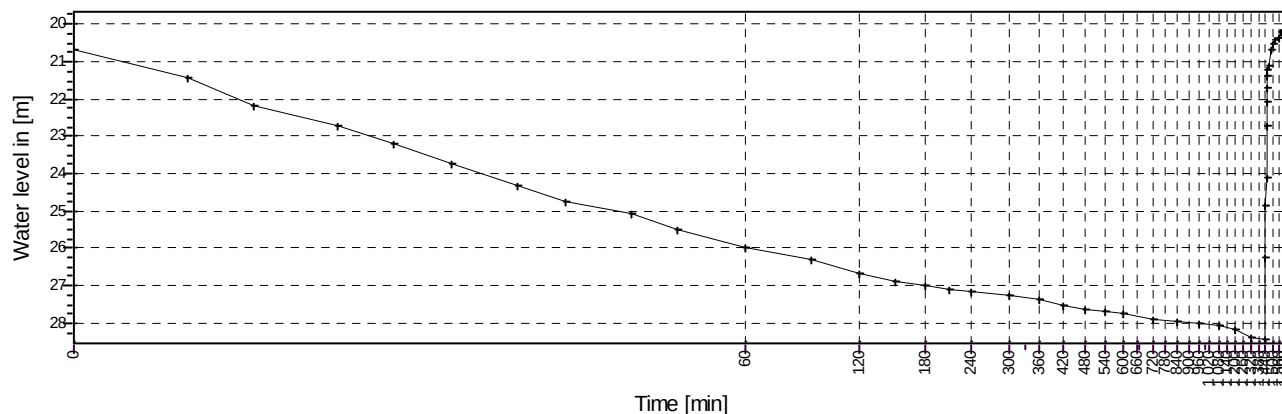
Date WL meas.: 20130801

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 58.80               | 20130801      | 0650 | 20130801    | 1140 |                               |           |                 |
| GOLD       | Constant rate test | 58.80               | 20130801      | 1200 | 20130802    | 1600 |                               |           |                 |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate [l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|-------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 0650        | 60           | 58.80              | 1.22              | 1.55       |            |     |                 |                            |             |         | 0.79 |
| STEP TEST STEP 2 | 0750        | 60           | 58.80              | 2.55              | 5.16       |            |     |                 |                            |             |         | 0.49 |
| STEP TEST STEP 3 | 0850        | 60           | 58.80              | 5.14              | 14.20      |            |     |                 |                            |             |         | 0.36 |
| STEP TEST STEP 4 | 0950        | 10           | 58.80              | 7.10              | 39.00      |            | 100 | 100             |                            |             |         | 0.18 |
| PUMP INLET       | 1140        | 20           | 58.80              | 4.80              | 39.03      |            |     |                 |                            |             |         | 0.12 |
| CONSTANT         | 1200        | 1440         | 58.80              | 3.54              | 8.67       | 0          | 100 | 240             |                            |             |         | 0.41 |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0203 Number: SD1-15 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK PTN. 19

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.393340

Reg./BB.:

Topo-set.:

Depth [m]: 64.00

Longitude [°]: 23.547940

G-Nr.:

Site status: Unused

Col. ht. [m]:

Altitude [m]: 1443.08

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92C

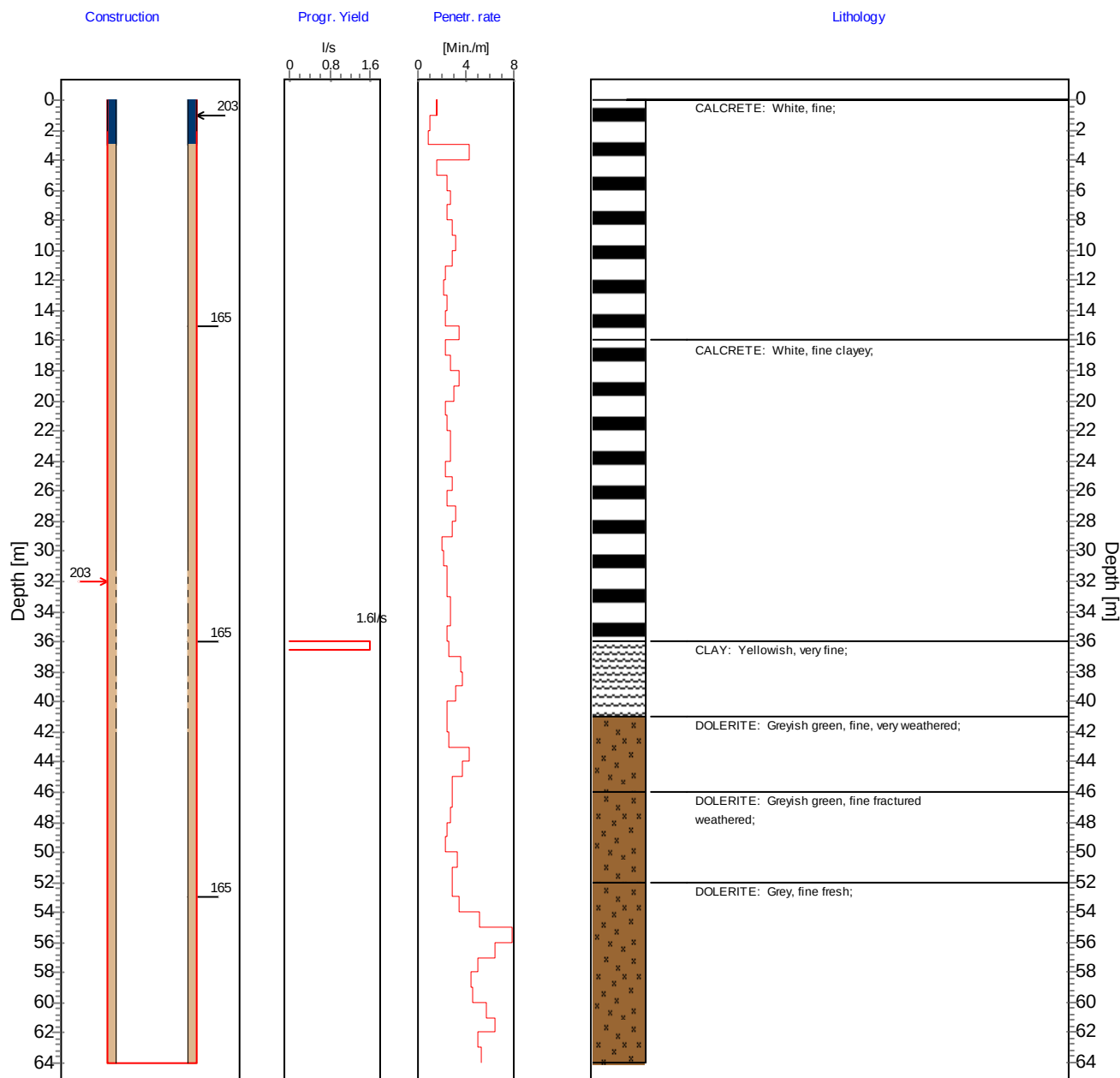
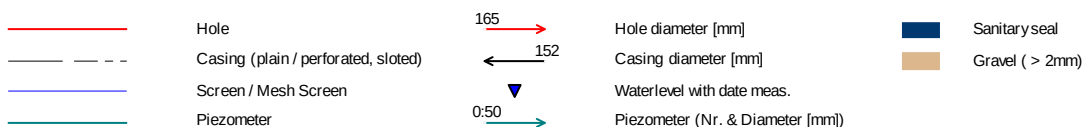
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



Golder Associates Africa, Pretoria  
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 Project No.: 11613568



**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0202 Number: SD1-18 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK PTN. 19

Region Type: Water supply authority

Region Descr.: LGATELOPELE LM

Latitude [°]: 28.389570

Reg./BB.:

Topo-set.:

Depth [m]: 72.00

Longitude [°]: 23.583700

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.44

Altitude [m]: 1443.18

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

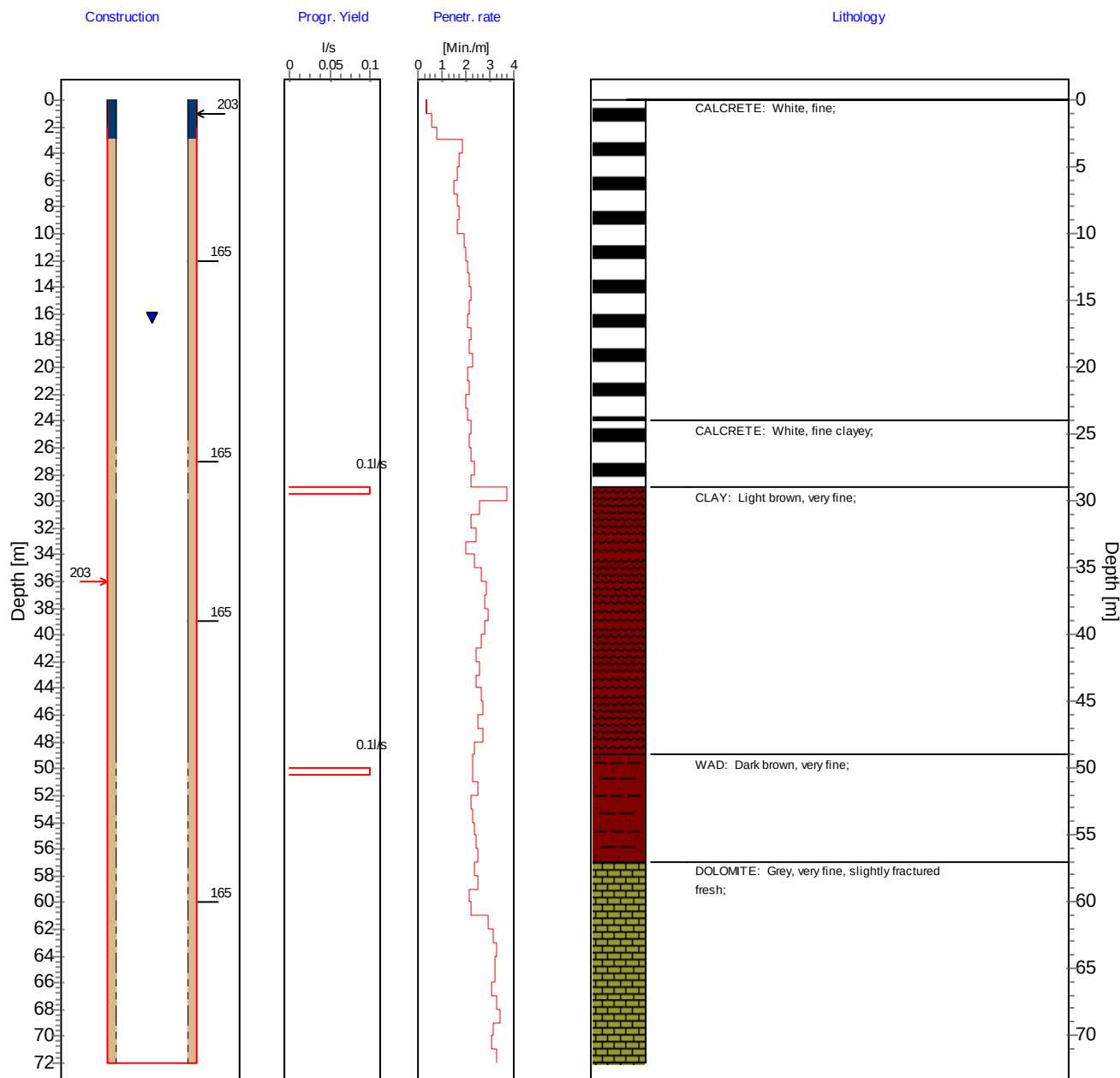
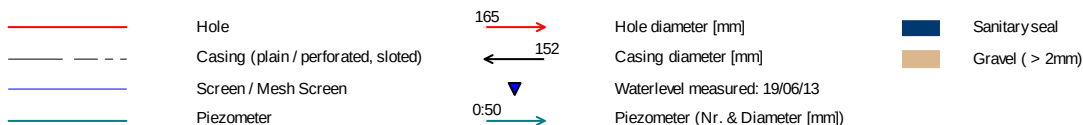
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



Golder Associates Africa, Pretoria  
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 Fax: 012 - 364 4001  
 Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0201 Number: SD1-23 Site type: Borehole

Dist./Farm No.: 458

Site Name/Des.: CARTER BLOCK PTN. 19

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.390050

Reg./BB.:

Topo-set.:

Depth [m]: 76.00

Longitude [°]: 23.584040

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.48

Altitude [m]: 1442.91

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

Coord. meth.: Altimeter

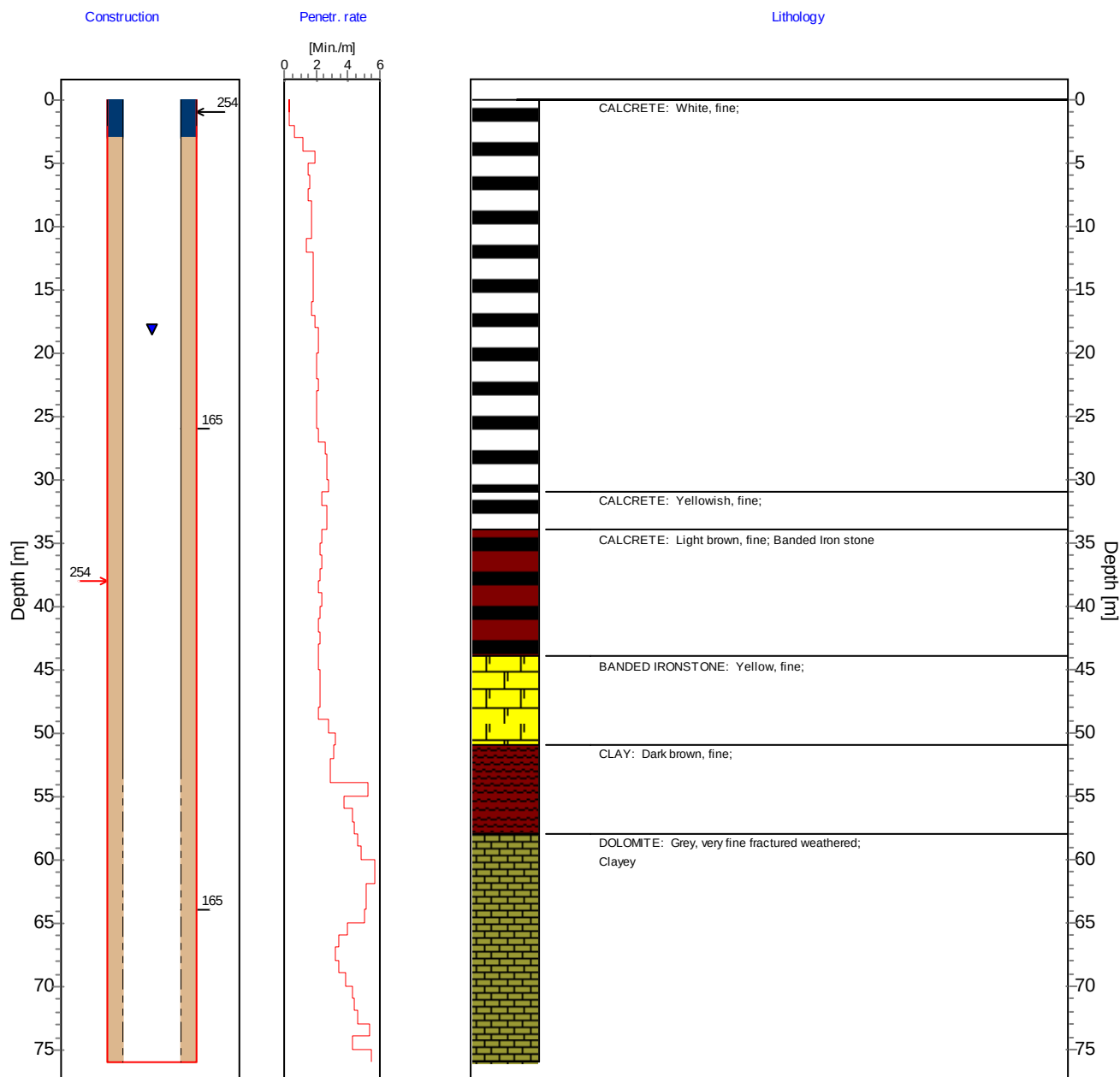
Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend

|  |                                      |        |                                  |  |                |
|--|--------------------------------------|--------|----------------------------------|--|----------------|
|  | Hole                                 | 165 →  | Hole diameter [mm]               |  | Sanitary seal  |
|  | Casing (plain / perforated, slotted) | ← 152  | Casing diameter [mm]             |  | Gravel (> 2mm) |
|  | Screen / Mesh Screen                 |        | Waterlevel measured: 17/06/13    |  |                |
|  | Piezometer                           | 0:50 → | Piezometer (Nr. & Diameter [mm]) |  |                |



COMMENT:

Golder  
Associates

Golder Associates Africa, Pretoria  
 P O Box 13776, Hatfield, 00285  
 Tel: 012 - 364 4000  
 Fax: 012 - 364 4001  
 Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0197 Number: SD1-28 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELEL LM

Latitude [°]: 28.385630

Reg./BB.:

Topo-set.:

Depth [m]: 66.00

Longitude [°]: 23.587450

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.54

Altitude [m]: 1444.43

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

Coord. meth.: Altimeter

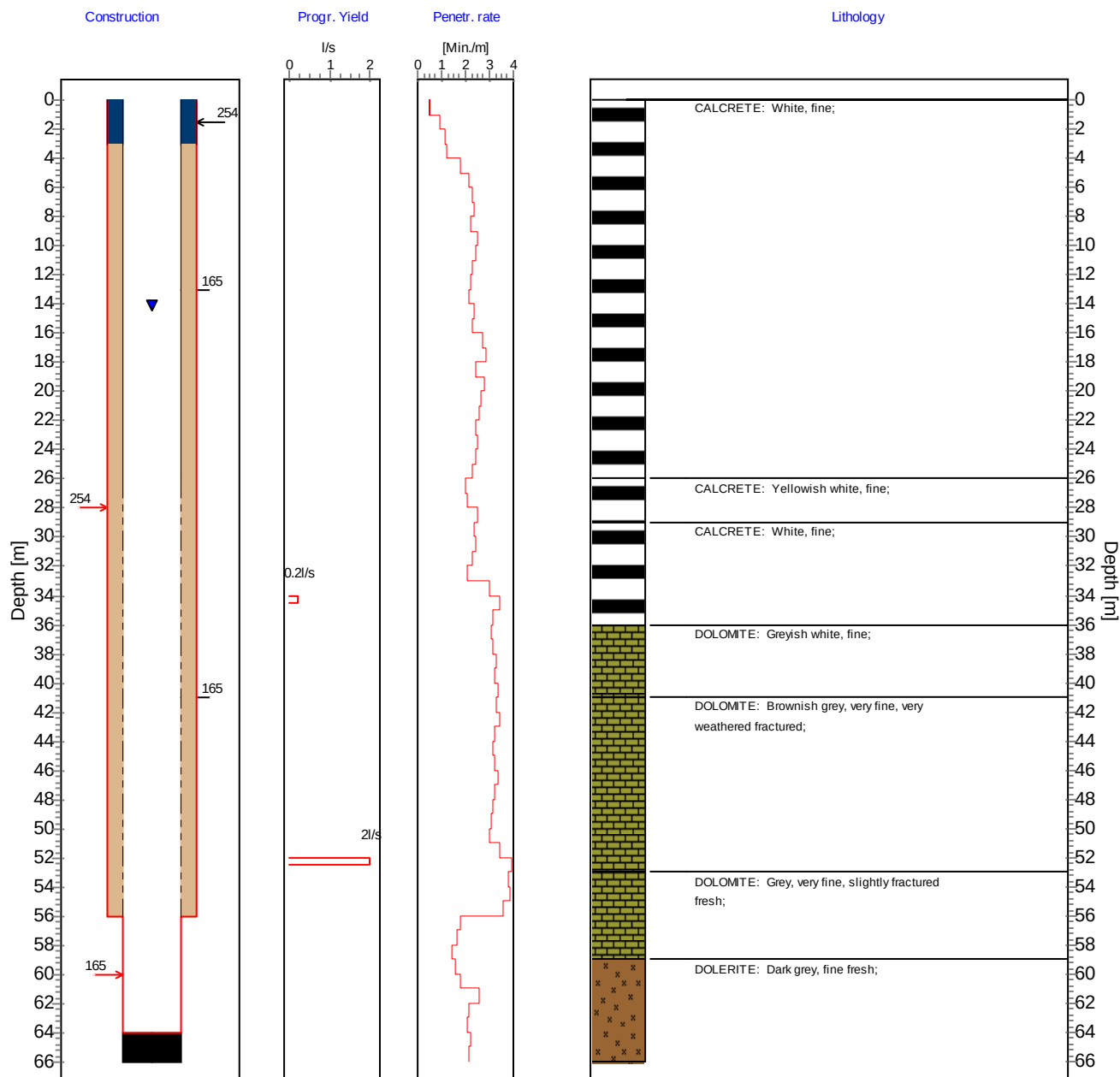
Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend

|  |                                      |        |                                  |  |                |
|--|--------------------------------------|--------|----------------------------------|--|----------------|
|  | Hole                                 | 165 →  | Hole diameter [mm]               |  | Sanitary seal  |
|  | Casing (plain / perforated, slotted) | ← 152  | Casing diameter [mm]             |  | Gravel (> 2mm) |
|  | Screen / Mesh Screen                 |        | Waterlevel measured: 15/06/13    |  | Bottom closed  |
|  | Piezometer                           | 0:50 → | Piezometer (Nr. & Diameter [mm]) |  |                |



COMMENT:



Golder Associates Africa, Pretoria  
 P O Box 13776, Hatfield, 00285  
 Tel: 012 - 364 4000  
 Fax: 012 - 364 4001  
 Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0197 Number: SD1-28 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.385630 | Alt. No. 1: |      | Diam. [mm]:   | 165   | Water lev. [m]: | 15.45    |
| Longitude [°]: | 23.587450 | Alt. No. 2: |      | Depth [m]:    | 66.00 | WL status:      | Static   |
| Altitude [m]:  | 1444.43   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.54  | Date WL meas.:  | 20130623 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| <b>Pump:</b>   |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| <b>Engine:</b> |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-28 | Date sampled: | 20130623 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 64.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.48   | Na:           | 52.3     | Cl:                                                                                                                                                                                                                                                                              | 114   | Langel.:               | 0.09   | E.Coli:   |
| EC: [mS/m]       | 92.8 † | K:            | 8.12     | NO3 as N:                                                                                                                                                                                                                                                                        | 3.23  | Aggr-Ind:              | 12.17  | Faec. co: |
| TDS:             | 652 †  | Si:           | 12       | SO4:                                                                                                                                                                                                                                                                             | 67.1  | Ion-bal:               | 4.94   | Total Co: |
| T. Alk.:         | 241    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 409.58 | SPC:      |
| Ca:              | 81.9   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 49.9   | Mn:           | 0.26 †   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 34.00            | 34.50             | 0.20       | Notch (V- or U-notch) |              |         |
| 52.00            | 52.50             | 2.00       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 3.00        | 254        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 26.00       | 165        | Steel    |              | Plain casing          |                                |            |             |
| 26.00            | 56.00       | 165        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m³/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130623 | 60           | 64.80              | 1.03             | 3.41       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130623 | 60           | 64.80              | 3.22             | 11.64      |                |       |          |         |         |
| STEP TEST STEP 3 | 20130623 | 30           | 64.80              | 5.49             | 49.22      | 0              | 180   |          |         |         |
| PUMP INLET       | 20130623 | 30           | 64.80              | 3.40             | 49.35      |                |       |          |         |         |
| CONSTANT         | 20130624 | 720          | 64.80              | 2.31             | 11.84      | 100            | 360   |          |         |         |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 19/09/2013

## BASIC SITE INFORMATION:

Site Identifier: 2823BCX0197 Number: SD1-28

Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Latitude [°] 28.385630  
Longitude [°] 23.587450  
Altitude [m]: 1444.43

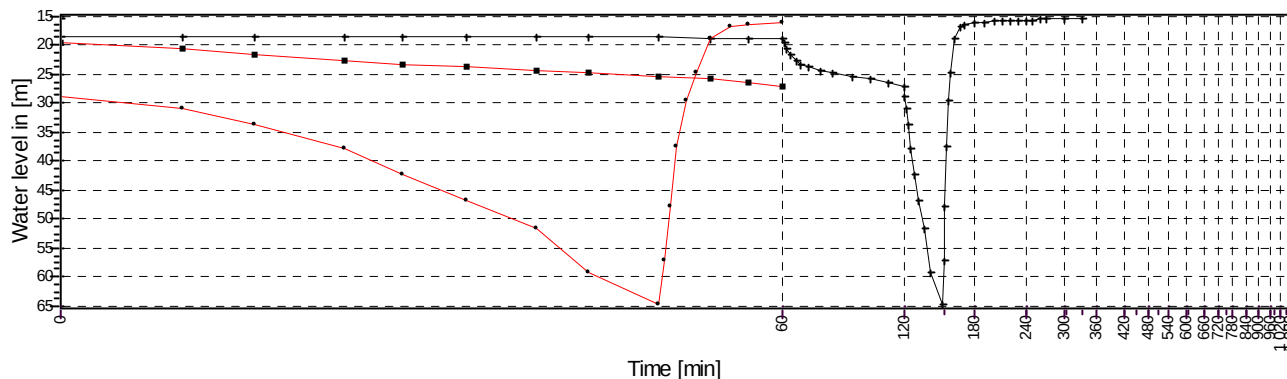
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 165  
Depth [m]: 66.00  
Col. ht. [mm]: 0.54

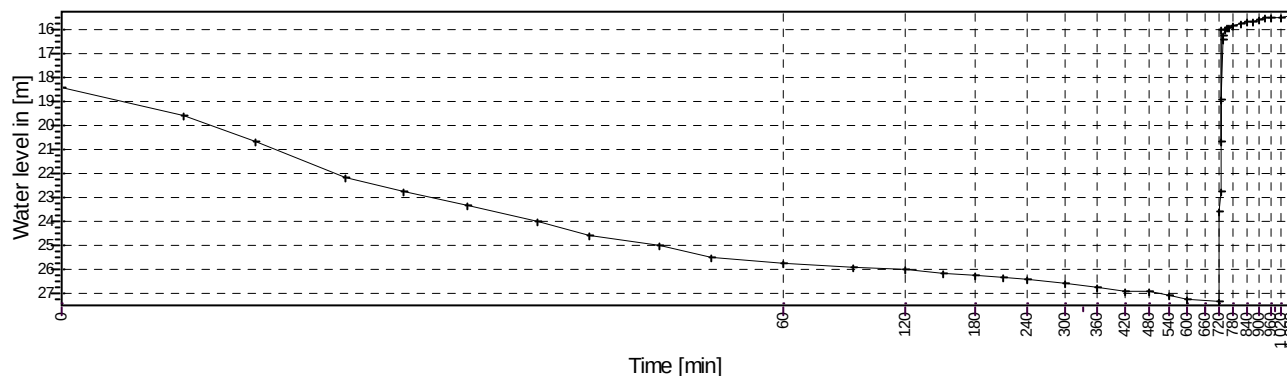
Water lev. [m]: 15.45  
Piezometer: 0  
Date WL meas.: 20130623

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 64.80               | 20130623      | 1600 | 20130623    | 2130 |                               |           |                 |
| GOLD       | Constant rate test | 64.80               | 20130624      | 0800 | 20130625    | 0200 |                               |           |                 |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1600        | 60           | 64.80              | 1.03             | 3.41       |            |     |                 |                            |             |         | 0.30 |
| STEP TEST STEP 2 | 1700        | 60           | 64.80              | 3.22             | 11.64      |            |     |                 |                            |             |         | 0.28 |
| STEP TEST STEP 3 | 1800        | 30           | 64.80              | 5.49             | 49.22      |            | 0   | 180             |                            |             |         | 0.11 |
| PUMP INLET       | 2130        | 30           | 64.80              | 3.40             | 49.35      |            |     |                 |                            |             |         | 0.07 |
| CONSTANT         | 0800        | 720          | 64.80              | 2.31             | 11.84      |            | 100 | 360             |                            |             |         | 0.20 |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0200 Number: SD1-30 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK PTN. 19

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.385750

Reg./BB.:

Topo-set.:

Depth [m]: 71.00

Longitude [°]: 23.588340

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.46

Altitude [m]: 1444.45

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

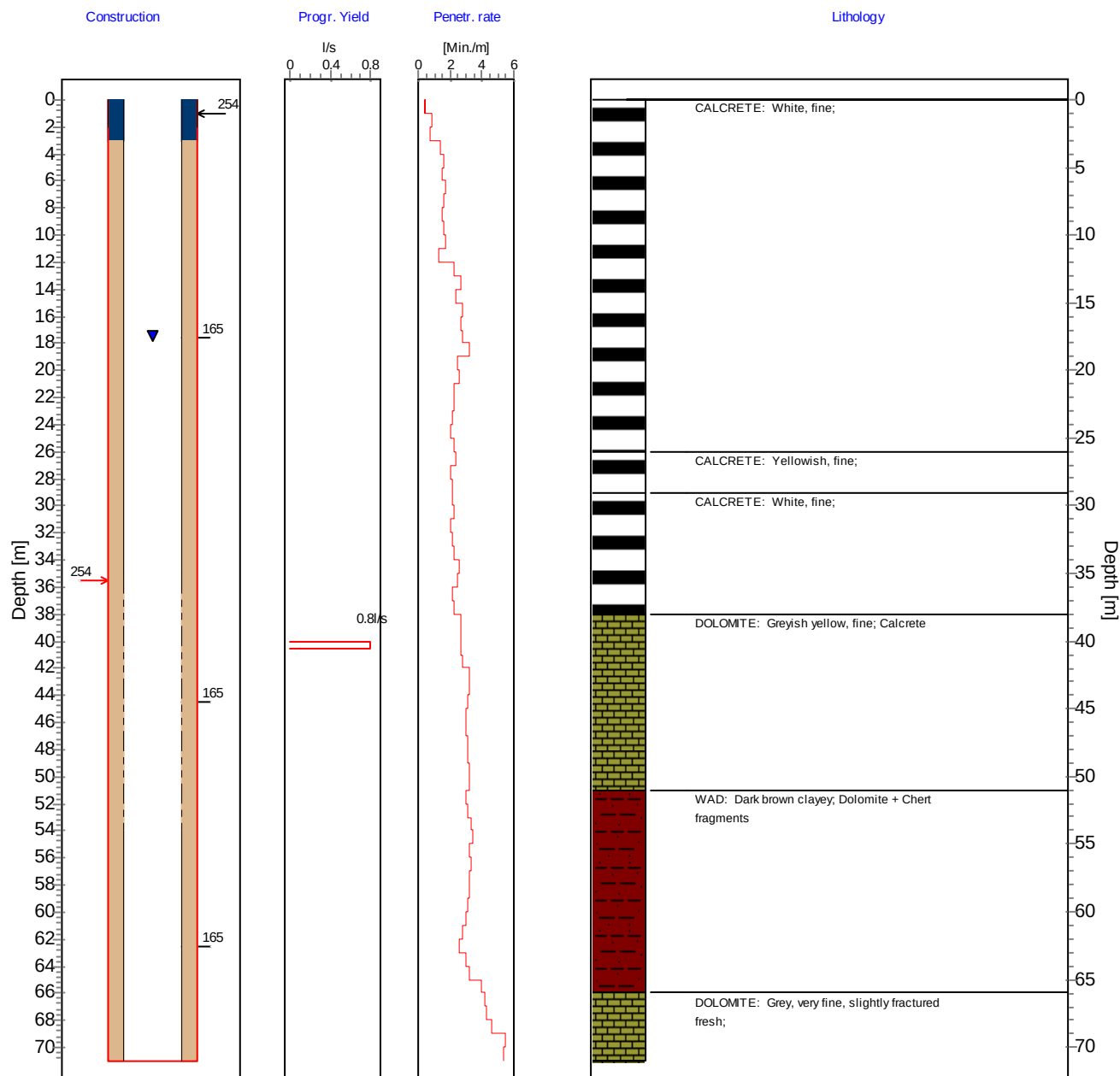
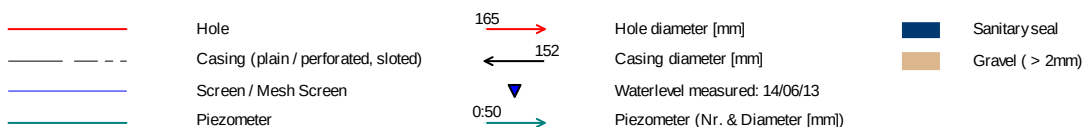
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



Golder Associates Africa, Pretoria  
 P O Box 13776, Hatfield, 00285  
 Tel: 012 - 364 4000  
 Fax: 012 - 364 4001  
 Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0200 Number: SD1-30 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK PTN. 19

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.385740 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 17.42    |
| Longitude [°]: | 23.588350 | Alt. No. 2:      |  | Depth [m]:    | 71.00 | WL status:      | Static   |
| Altitude [m]:  |           | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.46  | Date WL meas.:  | 20130614 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

Pump:

Type of Inst.: Pulley Diam. [mm]:  
Manufacturer: Depth to Intk. [m]:

Engine:

Manufacturer: Power Rating [kW]  
Type of Power: Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: Unused

Purpose: Production (water supply)

Consumer: Non-urban

Application: Domestic - all purposes

### WATER CHEMISTRY:

Sample No.: SD1-30 Date sampled: 20130511 Depth sampl. [m]: 0 Comment:

#### Main Parameters:

|            |       |     |        |           |       |                        |                        |
|------------|-------|-----|--------|-----------|-------|------------------------|------------------------|
| pH:        | 7.6   | Na: | 37     | Cl:       | 77    | Calculated Parameters: | Bacteriol. Parameters: |
| EC: [mS/m] | 83 †  | K:  | 5.9    | NO3 as N: | 4.53  | Langel.:               | E.Coli:                |
| TDS:       | 576 † | Si: | 15     | SO4:      | 66.7  | Aggr-Ind:              | Faec. co:              |
| T. Alk.:   | 305   | Al: | < 0.05 | F:        | 0.116 | Ion-bal:               | Total Co:              |
| Ca:        | 91.5  | Fe: | < 0.05 |           |       | CaCO3:                 | SPC:                   |
| Mg:        | 43.3  | Mn: | < 0.05 |           |       |                        |                        |

Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit ; Value exceeds minimum allowable limit

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 40.00            | 40.50             | 0.80       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 2.00        | 254        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 35.00       | 165        | Steel    |              | Plain casing          |                                |            |             |
| 35.00            | 54.00       | 165        | Steel    |              | Perforated or slotted |                                |            |             |
| 54.00            | 71.00       | 165        | Steel    |              | Plain casing          |                                |            |             |



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Fax: 012 - 364 4001  
Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0204 Number: SD1-31 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK PTN. 19

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.375240

Reg./BB.:

Topo-set.:

Depth [m]: 120.00

Longitude [°]: 23.597440

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.50

Altitude [m]: 1444.41

Site purp.: Production (water supply)

Diam. [mm]: 254

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

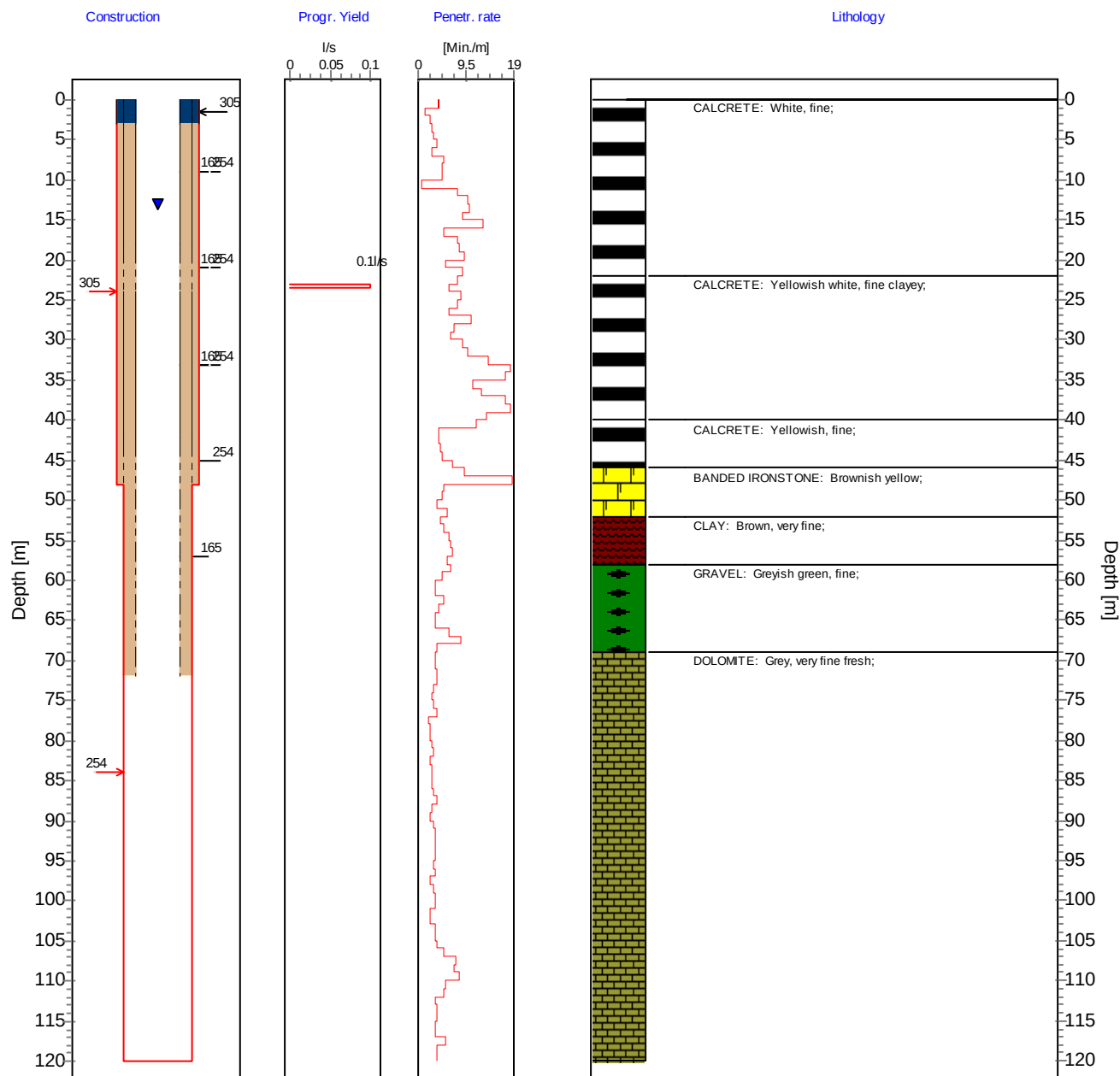
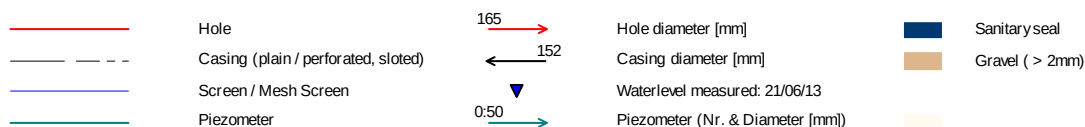
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:

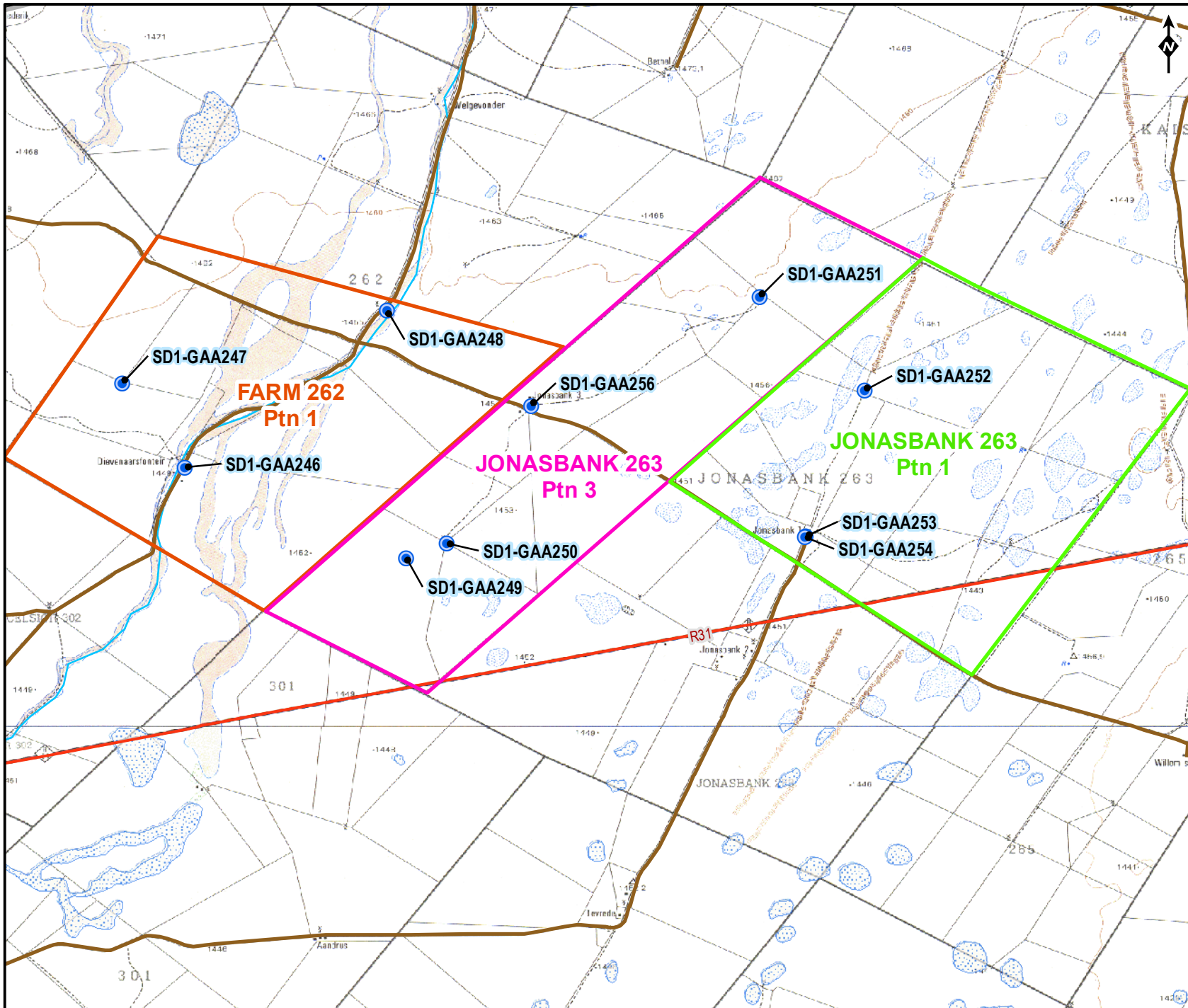
Golder  
Associates

Golder Associates Africa, Pretoria  
P O Box 13776, Hatfield, 00285  
Tel: 012 - 364 4000  
Fax: 012 - 364 4001  
Project No.: 11613568

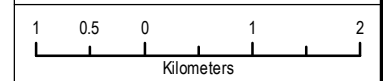




## **2.27 Marthinus Beeslaar**



- LEGEND**
- Existing borehole survey
  - Jonas Bank 263 Ptn 1
  - Jonas Bank 263 Ptn 3
  - Farm 262 Ptn 1
  - Main road
  - Secondary road
  - Other road
  - Rivers
  - Dam
  - Pan
  - Marsh vlei



**RESOURCES/NOTES**  
 Coordinate System: GCS WGS 1984  
 Datum: WGS 1984

**PROJECT**  
 GW ASSESSMENT VGG SCHEME

**TITLE**  
**FARM 262 PTN 1**  
**JONASBANK 263 PTN 1 & 3**  
**MARTINUS BEESLAAR**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:70 000       | A4         |
| GIS MB               | 25/04/2014 |
| CHECK DB             | 25/04/2014 |
| REVIEW FW            | 25/04/2014 |



## MARTHINUS BEESLAAR - BASIC SITE INFORMATION

| SITE LOCATION           |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|-------------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:        | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BA00126             | SD1-GAA252 | 263      | JONASBANK             | B          | 28.21090967  | 23.701940001  | 1455.60      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BA00127             | SD1-GAA253 | 263      | JONASBANK             | B          | 28.22809967  | 23.695090001  | 1454.90      | 0.45         | 165        | 6.90            | 5.10         |            |                |                       |                |                 |                   |
| 2823BA00128             | SD1-GAA254 | 263      | JONASBANK             | B          | 28.22813967  | 23.695010001  | 1454.90      | 0.10         | 165        | 6.40            | 5.10         |            |                |                       |                |                 |                   |
| 2823BA00129             | SD1-GAA251 | 263      | JONASBANK             | B          | 28.19994967  | 23.689680001  | 1465.50      |              | 165        | 5.30            | 5.30         |            |                |                       |                |                 |                   |
| 2823BA00131             | SD1-GAA249 | 263      | JONASBANK             | B          | 28.23058967  | 23.648110001  | 1453.10      |              | 165        | 4.20            | 4.20         |            |                |                       |                |                 |                   |
| 2823BA00132             | SD1-GAA250 | 263      | JONASBANK             | B          | 28.22884967  | 23.652920001  | 1451.70      | 0.10         | 165        | 4.60            | 2.85         |            |                |                       |                |                 |                   |
| 2823BA00134             | SD1-GAA256 | 263      | JONASBANK             | B          | 28.21267967  | 23.662760001  | 1457.50      |              | 165        | 6.00            | 6.00         |            |                |                       |                |                 |                   |
| 2823BAX0014             | SD1-GAA246 | 262      | WELGEVONDEN           | B          | 28.21996967  | 23.622100001  | 1452.50      | 0.20         | 165        |                 | 9.56         |            |                |                       |                |                 |                   |
| 2823BAX0015             | SD1-GAA247 | 262      | WELGEVODEN            | B          | 28.21007967  | 23.614790001  | 1454.00      | 0.15         | 165        |                 | 12.17        |            |                |                       |                |                 |                   |
| 2823BAX0016             | SD1-GAA248 | 262      | WELGEVONDEN           | B          | 28.20156967  | 23.645820001  | 1459.40      |              |            |                 |              |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>         |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> | 6.90         | 12.17      |                |                       |                |                 |                   |
| <b>Nr. of sites:</b> 10 |            |          |                       |            |              |               |              |              |            | <b>Minimum:</b> | 4.20         | 2.85       |                |                       |                |                 |                   |
|                         |            |          |                       |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
|                         |            |          |                       |            |              |               |              |              |            | <b>Average:</b> | 5.57         | 6.29       |                |                       |                |                 |                   |

### SUMMARY:

### Site Type:

B = Borehole

Nr. of sites: 10

Maximum:

6.90 12.17

Minimum:

4.20 2.85

Sum:

Average:

5.57 6.29

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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Project No.: 11613568

# MARTHINUS BEESLAAR - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BA00127    **Number:** SD1-GAA253    **Site Name:** JONASBANK

| Samp. Nr./Type | Date/Time samp. | pH   | EC    | TDS    | Ca  | Mg    | Na   | K    | Si   | Al   | Fe | Mn | Cl  | SO4 | NO3 as N | F     | T. Alk. |
|----------------|-----------------|------|-------|--------|-----|-------|------|------|------|------|----|----|-----|-----|----------|-------|---------|
| SD1-GA253      | 20121112 0800   | 7.95 | 149 † | 1090 † | 103 | 130 ‡ | 72.2 | 3.43 | 26.5 | 0.02 | 0  | 0  | 202 | 122 | 6.68     | 0.236 | 477     |

**Site Identifier:** 2823BA00131    **Number:** SD1-GAA249    **Site Name:** JONASBANK

| Samp. Nr./Type | Date/Time samp. | pH   | EC     | TDS   | Ca   | Mg     | Na   | K    | Si   | Al   | Fe | Mn | Cl   | SO4  | NO3 as N | F     | T. Alk. |
|----------------|-----------------|------|--------|-------|------|--------|------|------|------|------|----|----|------|------|----------|-------|---------|
| SD1-GA249      | 20121112 0800   | 8.15 | 97.5 † | 574 † | 89.2 | 89.6 † | 31.5 | 3.97 | 10.6 | 0.02 | 0  | 0  | 84.3 | 67.8 | 3.28     | 0.248 | 431     |

**Site Identifier:** 2823BAX0014    **Number:** SD1-GAA246    **Site Name:** WELGEVONDEN

| Samp. Nr./Type | Date/Time samp. | pH   | EC     | TDS | Ca   | Mg   | Na   | K   | Si   | Al   | Fe | Mn | Cl   | SO4  | NO3 as N | F     | T. Alk. |
|----------------|-----------------|------|--------|-----|------|------|------|-----|------|------|----|----|------|------|----------|-------|---------|
| SD1-GA246      | 20121122 0800   | 8.08 | 75.9 † | 424 | 72.6 | 69.9 | 28.2 | 9.9 | 14.5 | 0.02 | 0  | 0  | 55.2 | 32.9 | 4.87     | 0.129 | 351     |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source



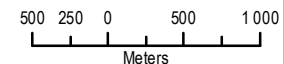
Golder Associates Africa, Pretoria  
P O Box 13776, Hatfield, 00285  
Tel: 012 - 364 4000  
Fax: 012 - 364 4001  
Project No.: 11613568



## 2.28 Piet Austin



-  Existing borehole survey
-  Existing borehole tested
-  Fountain
-  Grootvlei 296 Ptn 0
-  Secondary road
-  Other road
-  Rivers
-  Dam
-  Pan
-  Marsh vlei



Coordinate System: GCS WGS 1984  
Datum: WGS 1984

## GW ASSESSMENT VGG SCHEME

GROOTVLEI 296 PTN 0  
PIET AUSTIN

|                      |    |            |
|----------------------|----|------------|
| PROJECT No. 11613568 |    | REV 0      |
| SCALE 1:50 000       |    | A4         |
| GIS                  | MB | 25/04/2014 |
| CHECK                | DB | 25/04/2014 |
| REVIEW               | FW | 25/04/2014 |



## PIET AUSTIN - BASIC SITE INFORMATION

| SITE LOCATION    |            |                                                     |                          |            |              |               |              |              |            | GEOHYDROLOGY |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------|------------|-----------------------------------------------------|--------------------------|------------|--------------|---------------|--------------|--------------|------------|--------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier: | Number:    | District                                            | Site name/Description    | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]    | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0085      | SD1-GAA094 | 296/0                                               | GROOTVLEI                | B          | 28.38154967  | 23.746950001  | 1409.88      |              | 165        |              |              |            |                |                       |                |                 |                   |
| 2823BCX0086      | SD1-GAA095 | 296/0                                               | GROOTVLEI                | B          | 28.38213967  | 23.747230001  | 1409.87      | 0.34         |            |              | 1.48         |            |                |                       |                |                 |                   |
| 2823BCX0088      | SD1-GAA097 | 296/0                                               | GROOTVLEI FOUNTAIN SMALL | F          | 28.38200967  | 23.747560001  | 1409.81      |              |            |              | 0.10         |            |                |                       |                |                 |                   |
| 2823BCX0089      | SD1-GAA098 | 296/0                                               | GROOTVLEI FOUNTAIN LARGE | F          | 28.37978967  | 23.744550001  | 1409.90      | 0.29         |            |              | 0.45         |            |                |                       |                |                 |                   |
| SUMMARY:         |            | Site Type:<br>B = Borehole<br>F = Fountain / Spring |                          |            |              |               |              |              | Maximum:   |              | 1.48         |            |                |                       |                |                 |                   |
| Nr. of sites:    |            | 4                                                   |                          |            |              |               |              |              | Minimum:   |              | 0.10         |            |                |                       |                |                 |                   |
|                  |            |                                                     |                          |            |              |               |              |              | Sum:       |              |              |            |                |                       |                |                 |                   |
|                  |            |                                                     |                          |            |              |               |              |              | Average:   |              | 0.68         |            |                |                       |                |                 |                   |

NOTE:  
 "Yield" represents cumulative blow yield  
 The recommended abstraction ("Rec. abs.")  
 is based on a 24 hour duty cycle  
 (based on test pumping result)



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 Project No.: 11613568

## PIET AUSTIN - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BCX0088    **Number:** SD1-GAA097    **Site Name:** GROOTVLEI FOUNTAIN SMALL

| Samp. Nr./Type | Date/Time samp. | pH   | EC     | TDS | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|--------|-----|------|------|------|------|------|---------|------|------|----------|-------|
| SD1-GA097      | 20120216 0800   | 7.56 | 71.8 † | 454 | 83.5 | 42.9 | 24.8 | 4.62 | 18.5 | 361     | 45.2 | 35.7 | < 0.3    | 0.185 |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source



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Fax: 012 - 364 4001  
Project No.: 11613568



## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BDX0005 Number: SD1-GAA091 Site type: Borehole

Distr./Farm No.: 296/0 Site Name/Descr.: GROOTVLEI

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.331800 | Alt. No. 1:      |  | Diam. [mm]:   | 150   | Water lev. [m]: | 4.39     |
| Longitude [°]: | 23.783960 | Alt. No. 2:      |  | Depth [m]:    | 30.15 | WL status:      | Static   |
| Altitude [m]:  | 1413.24   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.10  | Date WL meas.:  | 20121015 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                    |                     |       |
|----------------|--------------------|---------------------|-------|
| <b>Pump:</b>   |                    |                     |       |
| Type of Inst.: | Windpump           | Pulley Diam. [mm]:  |       |
| Manufacturer:  | RECIPROCAL CYLINDE | Depth to Intk. [m]: | 18.57 |
| <b>Engine:</b> |                    |                     |       |
| Manufacturer:  |                    | Power Rating [kW]   |       |
| Type of Power: | Wind               | Pulley Diam. [mm]:  |       |

### USE APPLICATION:

|              |                                    |
|--------------|------------------------------------|
| Site Status: | In use                             |
| Purpose:     | Production (water supply)          |
| Consumer:    | Non-urban                          |
| Application: | Agricultural - stock watering only |

### WATER CHEMISTRY:

|                                                                                      |          |               |          |                                                                                                        |        |           |                        |           |     |
|--------------------------------------------------------------------------------------|----------|---------------|----------|--------------------------------------------------------------------------------------------------------|--------|-----------|------------------------|-----------|-----|
| Sample No.:                                                                          | SD1-     | Date sampled: | 20120216 | Depth sampl. [m]:                                                                                      | 0      | Comment:  |                        |           |     |
| Main Parameters:                                                                     |          |               |          | Calculated Parameters:                                                                                 |        |           | Bacteriol. Parameters: |           |     |
| pH:                                                                                  | < 7.97   | Na:           | < 73.1   | Cl:                                                                                                    | < 233  | Langel.:  | 0.80                   | E.Coli:   | < 0 |
| EC: [mS/m]                                                                           | < 153 †  | K:            | < 4.06   | NO3 as N:                                                                                              | < 4.36 | Aggr-Ind: | 12.96                  | Faec. co: | < 0 |
| TDS:                                                                                 | < 1170 † | Si:           | < 27     | SO4:                                                                                                   | < 101  | Ion-bal:  | 0.88                   | Total Co: | < 0 |
| T. Alk.:                                                                             | < 462    | Al:           |          | F:                                                                                                     | < 0.49 | CaCO3:    | 764.59                 | SPC:      | < 0 |
| Ca:                                                                                  | < 83.9   | Fe:           |          | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption |        |           |                        |           |     |
| Mg:                                                                                  | < 135 ‡  | Mn:           |          | † Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit                   |        |           |                        |           |     |
| ! Value exceeds recommended minimum limit    ¡ Value exceeds minimum allowable limit |          |               |          |                                                                                                        |        |           |                        |           |     |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %  | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121015 | 55           | 27.00              | 0.52             | 22.51      | 0.20         | 99 | 60    |          |         |         |
| PUMP INLET       | 20121015 | 5            | 27.00              | 0.38             | 22.61      |              |    |       |          |         |         |



**Golder Associates**

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Fax: 012 - 364 4001  
Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 2012/10/29

**BASIC SITE INFORMATION:** Site Identifier: 2823BDX0005 Number: SD1-GAA091 Site type: Borehole

Distr./Farm No.: 296/0

Site Name/Des.: GROOTVLEI

Latitude [°] 28.331800

Alt. No. 1:

Diam. [mm]: 150

Water lev. [m]: 4.39

Longitude [°] 23.783960

Alt. No. 2:

Depth [m]: 30.15

Piezometer: 0

Altitude [m]: 1413.24

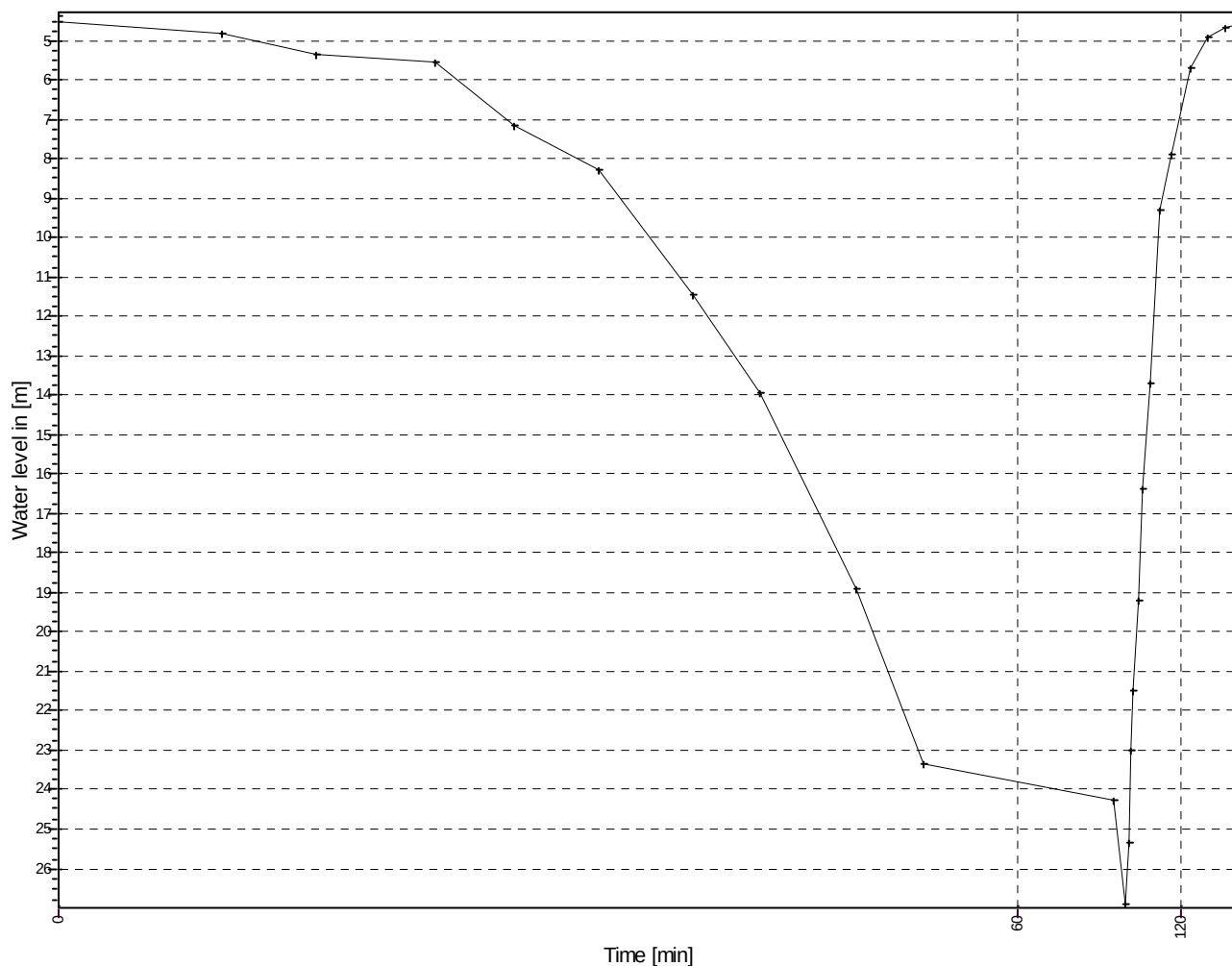
Rep. inst.: GOLD

Col. ht. [mm]: 0.10

Date WL meas.: 20121015

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test    | 27.00               | 20121015      | 0720 | 20121015    | 0955 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 0720        | 55           | 27.00              | 0.52             | 22.51      | 0.20       | 99 | 60              |                            |             |         | 0.02 |
| PUMP INLET       | 0955        | 5            | 27.00              | 0.38             | 22.61      |            |    |                 |                            |             |         | 0.02 |



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BDX0006 Number: SD1-GAA092 Site type: Borehole

Distr./Farm No.: 296/0 Site Name/Descr.: GROOTVLEI

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.342730 | Alt. No. 1:      |  | Diam. [mm]:   | 155   | Water lev. [m]: | 3.37     |
| Longitude [°]: | 23.778070 | Alt. No. 2:      |  | Depth [m]:    | 14.20 | WL status:      | Static   |
| Altitude [m]:  | 1412.12   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.33  | Date WL meas.:  | 20121013 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
 Type of Inst.: Windpump Pulley Diam. [mm]:  
 Manufacturer: RECIPROCAL CYLINDE Depth to Intk. [m]: 12.57

**Engine:**  
 Manufacturer: Power Rating [kW]  
 Type of Power: Wind Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: In use  
 Purpose: Production (water supply)  
 Consumer: Non-urban  
 Application: Agricultural - stock watering only

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                        |       |                        |        |           |   |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|---|
| Sample No.:      | SD1-   | Date sampled: | 20121023 | Depth sampl. [m]:                                                                                                                                                                                                                                                                      | 12.00 | Comment:               |        |           |   |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                                 |       | Bacteriol. Parameters: |        |           |   |
| pH:              | 7.61   | Na:           | 41.1     | Cl:                                                                                                                                                                                                                                                                                    | 97.9  | Langel.:               | 0.43   | E.Coli:   | 0 |
| EC: [mS/m]       | 104 †  | K:            | 2.73     | NO3 as N:                                                                                                                                                                                                                                                                              | 2.21  | Aggr-Ind:              | 12.54  | Faec. co: | 0 |
| TDS:             | 802 †  | Si:           | 22.6     | SO4:                                                                                                                                                                                                                                                                                   | 54.7  | Ion-bal:               | 6.14 † | Total Co: | 0 |
| T. Alk.:         | 401    | Al:           |          | F:                                                                                                                                                                                                                                                                                     | 0.316 | CaCO3:                 | 591.04 | SPC:      | 0 |
| Ca:              | 84.9   | Fe:           |          | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    ¡ Value exceeds minimum allowable limit |       |                        |        |           |   |
| Mg:              | 92.2 † | Mn:           |          |                                                                                                                                                                                                                                                                                        |       |                        |        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121013 | 60           | 12.00              | 0.52             | 5.59       |                |       |          |         |         |
| STEP TEST STEP 2 | 20121013 | 50           | 12.00              | 0.71             | 8.62       | 0.12           | 99    | 120      |         |         |
| PUMP INLET       | 20121013 | 10           | 12.00              | 0.56             | 8.63       |                |       |          |         |         |



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# PUMPING TEST REPORT

Date compiled: 2012/10/16

**BASIC SITE INFORMATION:** Site Identifier: 2823BDX0006 Number: SD1-GAA092 Site type: Borehole

Distr./Farm No.: 296/0

Site Name/Des.: GROOTVLEI

Latitude [°] 28.342730

Alt. No. 1:

Diam. [mm]:

155

Water lev. [m]:

3.37

Longitude [°] 23.778070

Alt. No. 2:

Depth [m]:

14.20

Piezometer:

0

Altitude [m]:

1412.12

Rep. inst.: GOLD

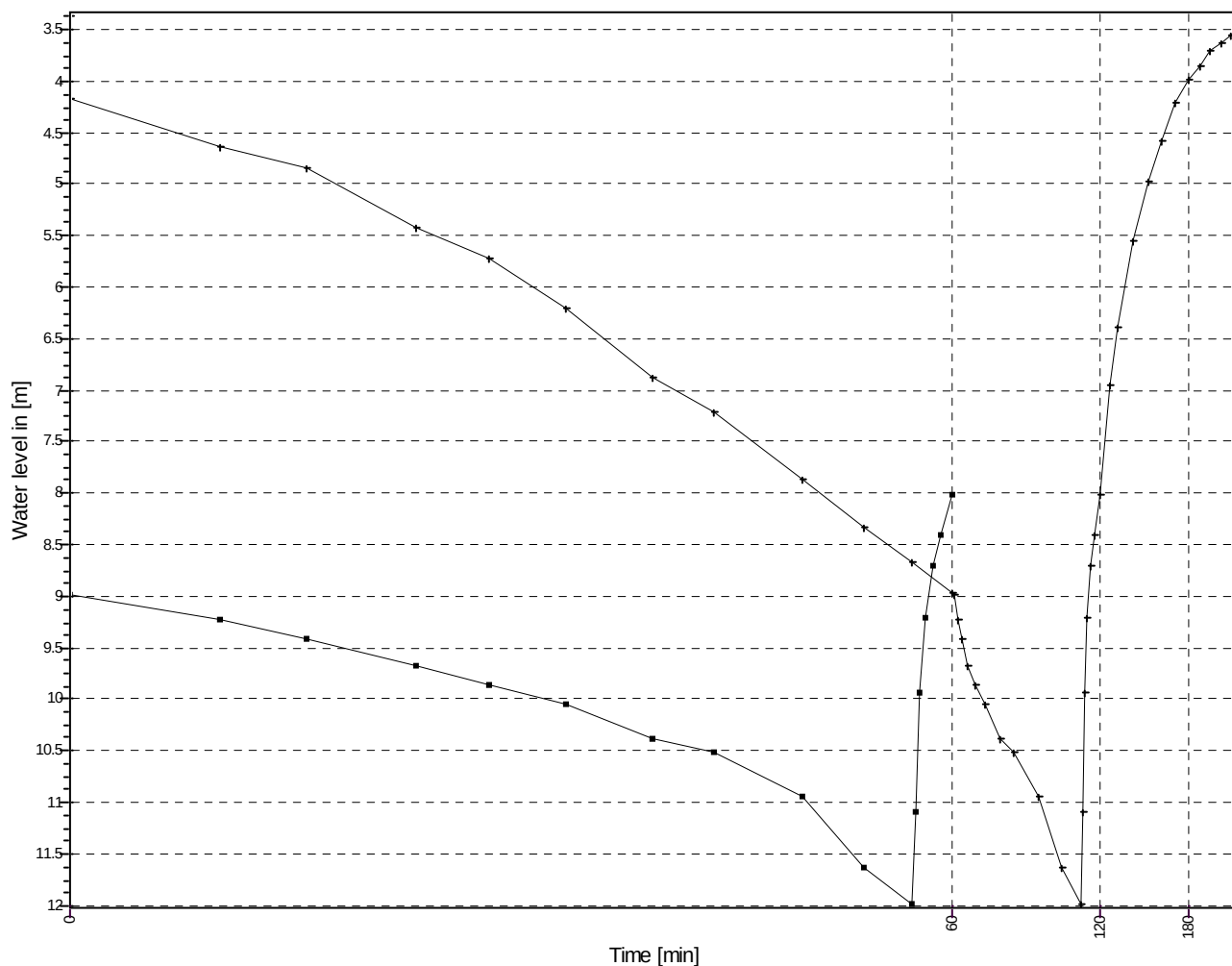
Col. ht. [mm]:

0.33

Date WL meas.: 20121013

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test    | 12.00               | 20121013      | 1540 | 20121013    | 1930 |                               |           |                 |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1540        | 60           | 12.00              | 0.52             | 5.59       |            |    |                 |                            |             |         | 0.09 |
| STEP TEST STEP 2 | 1640        | 50           | 12.00              | 0.71             | 8.62       | 0.12       | 99 | 120             |                            |             |         | 0.08 |
| PUMP INLET       | 1930        | 10           | 12.00              | 0.56             | 8.63       |            |    |                 |                            |             |         | 0.06 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BDX0007 Number: SD1-GAA093 Site type: Borehole

Distr./Farm No.: 296/0 Site Name/Descr.: GROOTVLEI

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.366100 | Alt. No. 1:      |  | Diam. [mm]:   | 155   | Water lev. [m]: | 3.50     |
| Longitude [°]: | 23.765700 | Alt. No. 2:      |  | Depth [m]:    | 17.12 | WL status:      | Static   |
| Altitude [m]:  | 1409.05   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.27  | Date WL meas.:  | 20121013 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
 Type of Inst.: Windpump Pulley Diam. [mm]:  
 Manufacturer: CWS Depth to Intk. [m]: 13.79

**Engine:**  
 Manufacturer: Power Rating [kW]  
 Type of Power: Wind Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: In use  
 Purpose: Production (water supply)  
 Consumer: Non-urban  
 Application: Agricultural - stock watering only

### WATER CHEMISTRY:

|                  |       |               |          |                                                                                                                                                                                                                                                                                        |       |           |                        |           |   |
|------------------|-------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|------------------------|-----------|---|
| Sample No.:      | SD1-  | Date sampled: | 20121025 | Depth sampl. [m]:                                                                                                                                                                                                                                                                      | 14.80 | Comment:  |                        |           |   |
| Main Parameters: |       |               |          | Calculated Parameters:                                                                                                                                                                                                                                                                 |       |           | Bacteriol. Parameters: |           |   |
| pH:              | 8.2   | Na:           | 48.9     | Cl:                                                                                                                                                                                                                                                                                    | 144   | Langel.:  | 1.01                   | E.Coli:   | 0 |
| EC: [mS/m]       | 116 † | K:            | 3.43     | NO3 as N:                                                                                                                                                                                                                                                                              | 2.07  | Aggr-Ind: | 13.13                  | Faec. co: | 0 |
| TDS:             | 926 † | Si:           | 22.9     | SO4:                                                                                                                                                                                                                                                                                   | 69.5  | Ion-bal:  | 4.44                   | Total Co: | 0 |
| T. Alk.:         | 419   | Al:           | 0.05     | F:                                                                                                                                                                                                                                                                                     | 0.399 | CaCO3:    | 657.52                 | SPC:      | 0 |
| Ca:              | 82.2  | Fe:           | 0.05     | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    § Value exceeds minimum allowable limit |       |           |                        |           |   |
| Mg:              | 110 ‡ | Mn:           | 0.05     |                                                                                                                                                                                                                                                                                        |       |           |                        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121013 | 60           | 14.80              | 1.96             | 0.33       |                |       |          |         |         |
| STEP TEST STEP 2 | 20121013 | 60           | 14.80              | 3.56             | 0.78       |                |       |          |         |         |
| STEP TEST STEP 3 | 20121013 | 60           | 14.80              | 6.17             | 1.58       |                |       |          |         |         |
| STEP TEST STEP 4 | 20121013 | 60           | 14.80              | 9.43             | 3.32       | 100            | 50    |          |         |         |
| CONSTANT         | 20121013 | 1440         | 14.80              | 8.01             | 2.59       | 100            | 240   |          |         |         |



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# PUMPING TEST REPORT

Date compiled: 2012/10/29

**BASIC SITE INFORMATION:** Site Identifier: 2823BDX0007 Number: SD1-GAA093 Site type: Borehole

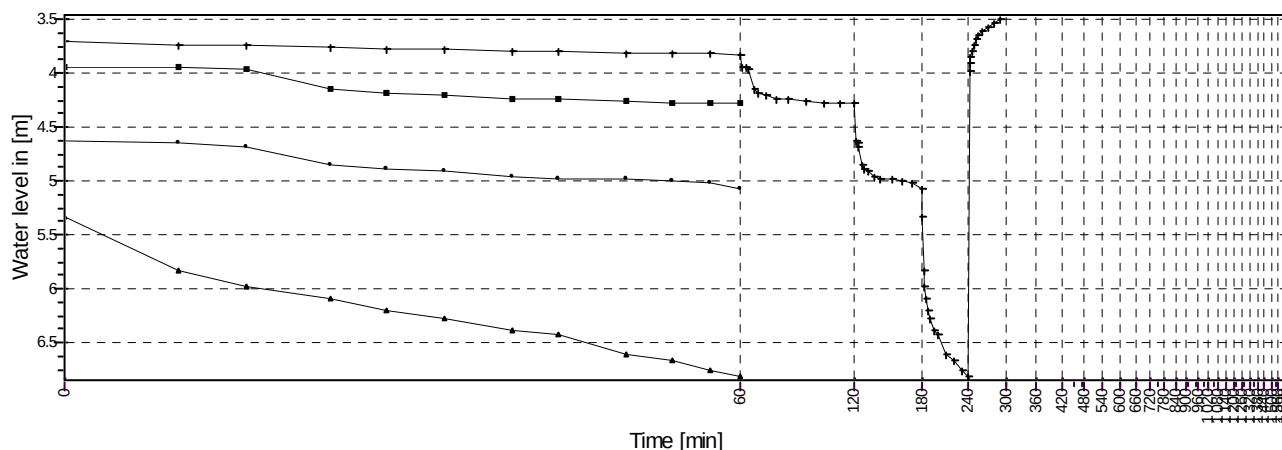
Distr./Farm No.: 296/0

Site Name/Des.: GROOTVLEI

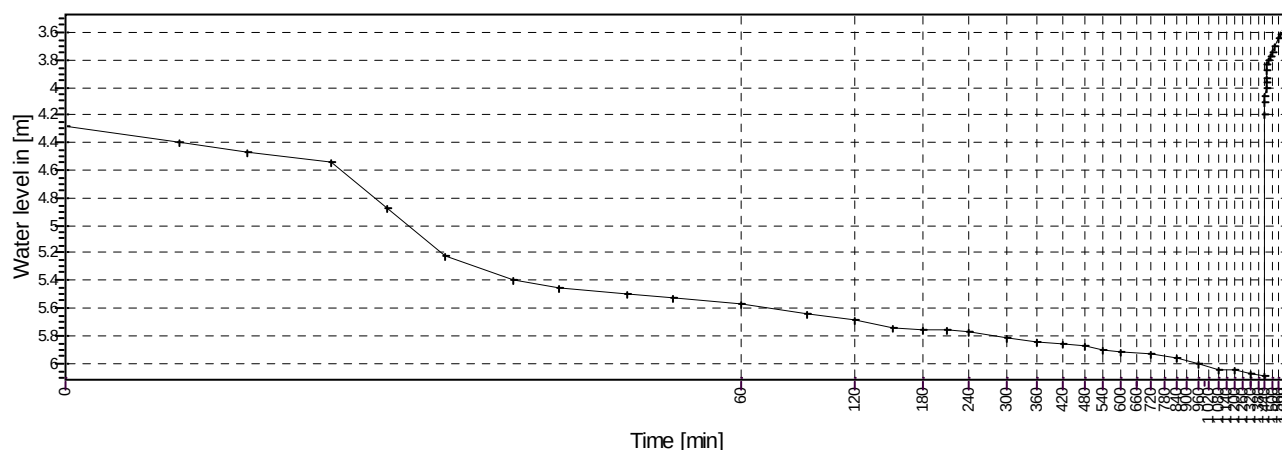
|               |           |                  |                |       |                 |          |
|---------------|-----------|------------------|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.366100 | Alt. No. 1:      | Diam. [mm]:    | 155   | Water lev. [m]: | 3.50     |
| Longitude [°] | 23.765700 | Alt. No. 2:      | Depth [m]:     | 17.12 | Piezometer:     | 0        |
| Altitude [m]: | 1409.05   | Rep. inst.: GOLD | Col. ht. [mm]: | 0.27  | Date WL meas.:  | 20121013 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 14.80               | 20121013      | 1045 | 20121013    | 1535 |                               |           |                 |
| GOLD       | Constant rate test | 14.80               | 20121013      | 1630 | 20121014    | 2030 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1045        | 60           | 14.80              | 1.96             | 0.33       |            |     |                 |                            |             |         | 5.94 |
| STEP TEST STEP 2 | 1145        | 60           | 14.80              | 3.56             | 0.78       |            |     |                 |                            |             |         | 4.56 |
| STEP TEST STEP 3 | 1245        | 60           | 14.80              | 6.17             | 1.58       |            |     |                 |                            |             |         | 3.91 |
| STEP TEST STEP 4 | 1345        | 60           | 14.80              | 9.43             | 3.32       | 100        | 50  |                 |                            |             |         | 2.84 |
| CONSTANT         | 1630        | 1440         | 14.80              | 8.01             | 2.59       | 100        | 240 |                 |                            |             |         | 3.09 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0087 Number: SD1-GAA096 Site type: Borehole

Distr./Farm No.: 296/0 Site Name/Descr.: GROOTVLEI

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.382590 | Alt. No. 1:      |  | Diam. [mm]:   | 165   | Water lev. [m]: | 1.43     |
| Longitude [°]: | 23.747860 | Alt. No. 2:      |  | Depth [m]:    | 28.04 | WL status:      | Static   |
| Altitude [m]:  | 1409.80   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.26  | Date WL meas.:  | 20121009 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
 Type of Inst.: Windpump Pulley Diam. [mm]:  
 Manufacturer: CW5 Depth to Intk. [m]: 15.23

**Engine:**  
 Manufacturer: Power Rating [kW]  
 Type of Power: Wind Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: In use  
 Purpose: Production (water supply)  
 Consumer: Non-urban  
 Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                      |       |           |                        |           |   |
|------------------|--------|---------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|------------------------|-----------|---|
| Sample No.:      | SD1-   | Date sampled: | 20121023 | Depth sampl. [m]:                                                                                                                                                                                                                                                                    | 26.80 | Comment:  |                        |           |   |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                               |       |           | Bacteriol. Parameters: |           |   |
| pH:              | 7.57   | Na:           | 31.8     | Cl:                                                                                                                                                                                                                                                                                  | 55.5  | Langel.:  | 0.39                   | E.Coli:   | 0 |
| EC: [mS/m]       | 85.4 † | K:            | 19       | NO3 as N:                                                                                                                                                                                                                                                                            | 1.48  | Aggr-Ind: | 12.49                  | Faec. co: | 0 |
| TDS:             | 594 †  | Si:           | 21.9     | SO4:                                                                                                                                                                                                                                                                                 | 47.9  | Ion-bal:  | 2.22                   | Total Co: | 0 |
| T. Alk.:         | 388    | Al:           |          | F:                                                                                                                                                                                                                                                                                   | 0.188 | CaCO3:    | 452.20                 | SPC:      | 0 |
| Ca:              | 85.3   | Fe:           |          | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit   ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit   § Value exceeds minimum allowable limit |       |           |                        |           |   |
| Mg:              | 58.2   | Mn:           |          |                                                                                                                                                                                                                                                                                      |       |           |                        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121008 | 60           | 26.80              | 0.63             | 0.26       |                |       |          |         |         |
| STEP TEST STEP 2 | 20121008 | 60           | 26.80              | 2.09             | 4.36       |                |       |          |         |         |
| STEP TEST STEP 3 | 20121008 | 7            | 26.80              | 4.05             | 25.52      | 100            | 120   |          |         |         |
| PUMP INLET       | 20121008 | 13           | 26.80              | 2.63             | 25.52      |                |       |          |         |         |
| CONSTANT         | 20121009 | 720          | 26.80              | 1.80             | 0.78       | 100            | 300   |          |         |         |

# PUMPING TEST REPORT

Date compiled: 2012/10/25

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0087 Number: SD1-GAA096 Site type: Borehole

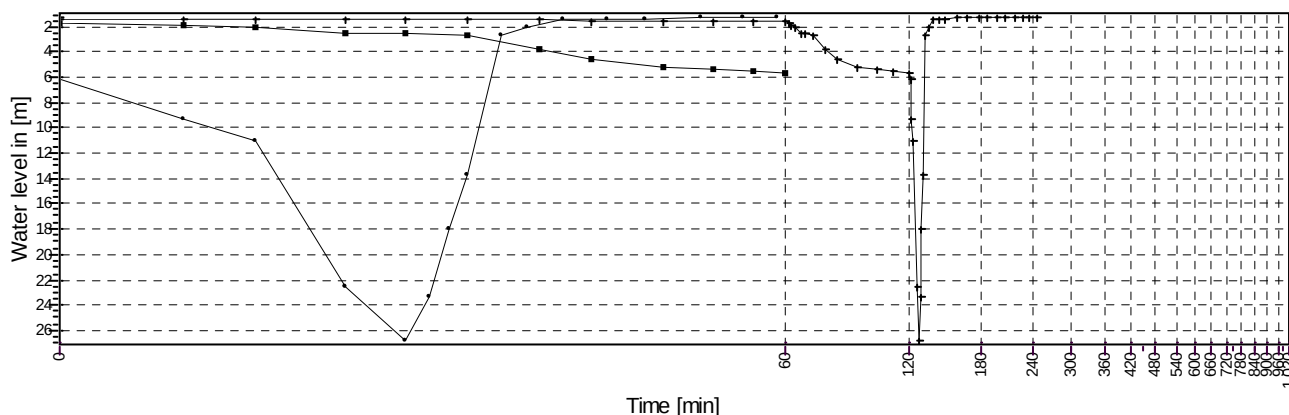
Distr./Farm No.: 296/0

Site Name/Des.: GROOTVLEI

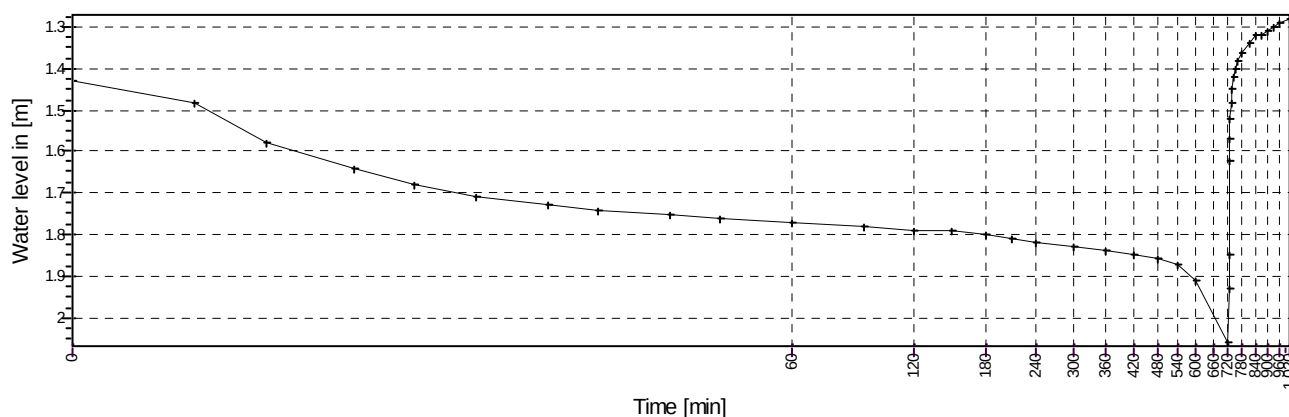
|               |           |                  |                |       |                 |          |
|---------------|-----------|------------------|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.382590 | Alt. No. 1:      | Diam. [mm]:    | 165   | Water lev. [m]: | 1.43     |
| Longitude [°] | 23.747860 | Alt. No. 2:      | Depth [m]:     | 28.04 | Piezometer:     | 0        |
| Altitude [m]: | 1409.80   | Rep. inst.: GOLD | Col. ht. [mm]: | 0.26  | Date WL meas.:  | 20121009 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 26.80               | 20121008      | 1400 | 20121008    | 1807 |                               |           |                 |
| GOLD       | Constant rate test | 26.80               | 20121009      | 0710 | 20121010    | 0010 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1400        | 60           | 26.80              | 0.63             | 0.26       |            |     |                 |                            |             |         | 2.42 |
| STEP TEST STEP 2 | 1500        | 60           | 26.80              | 2.09             | 4.36       |            |     |                 |                            |             |         | 0.48 |
| STEP TEST STEP 3 | 1600        | 7            | 26.80              | 4.05             | 25.52      |            | 100 | 120             |                            |             |         | 0.16 |
| PUMP INLET       | 1807        | 13           | 26.80              | 2.63             | 25.52      |            |     |                 |                            |             |         | 0.10 |
| CONSTANT         | 0710        | 720          | 26.80              | 1.80             | 0.78       |            | 100 | 300             |                            |             |         | 2.31 |



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## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0090 Number: SD1-GAA099 Site type: Borehole

Distr./Farm No.: 296/0 Site Name/Descr.: GROOTVLEI

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.376100 | Alt. No. 1:      |  | Diam. [mm]:   | 155   | Water lev. [m]: | 4.51     |
| Longitude [°]: | 23.734511 | Alt. No. 2:      |  | Depth [m]:    | 35.60 | WL status:      | Static   |
| Altitude [m]:  | 0         | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.15  | Date WL meas.:  | 20121011 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
 Type of Inst.: Windpump  
 Manufacturer: CW5  
 Pulley Diam. [mm]:  
 Depth to Intk. [m]: 12.56

**Engine:**  
 Manufacturer:  
 Type of Power: Wind  
 Power Rating [kW]  
 Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: In use  
 Purpose: Production (water supply)  
 Consumer: Non-urban  
 Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                      |       |           |                        |           |   |
|------------------|--------|---------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|------------------------|-----------|---|
| Sample No.:      | SD1-   | Date sampled: | 20121023 | Depth sampl. [m]:                                                                                                                                                                                                                                                                    | 32.10 | Comment:  |                        |           |   |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                               |       |           | Bacteriol. Parameters: |           |   |
| pH:              | 7.29   | Na:           | 109 †    | Cl:                                                                                                                                                                                                                                                                                  | 255 † | Langel.:  | 0.27                   | E.Coli:   | 0 |
| EC: [mS/m]       | 172 †  | K:            | 12.4     | NO3 as N:                                                                                                                                                                                                                                                                            | 1.34  | Aggr-Ind: | 12.44                  | Faec. co: | 0 |
| TDS:             | 1360 † | Si:           | 30.7     | SO4:                                                                                                                                                                                                                                                                                 | 152   | Ion-bal:  | 3.42                   | Total Co: | 0 |
| T. Alk.:         | 481    | Al:           |          | F:                                                                                                                                                                                                                                                                                   | 0.219 | CaCO3:    | 822.49                 | SPC:      | 0 |
| Ca:              | 117    | Fe:           |          | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit   ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit   ‡ Value exceeds minimum allowable limit |       |           |                        |           |   |
| Mg:              | 129 ‡  | Mn:           |          |                                                                                                                                                                                                                                                                                      |       |           |                        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %  | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121011 | 60           | 32.10              | 0.52             | 15.64      |              |    |       |          |         |         |
| STEP TEST STEP 2 | 20121011 | 10           | 32.10              | 1.00             | 27.69      | 0.21         | 99 | 70    |          |         |         |
| PUMP INLET       | 20121011 | 20           | 32.10              | 0.55             | 27.59      |              |    |       |          |         |         |
| CONSTANT         | 20121011 | 260          | 32.10              | 0.45             | 27.42      | 0.25         | 99 | 300   |          |         |         |
| PUMP INLET       | 20121011 | 300          | 32.10              | 0.12             | 27.42      |              |    |       |          |         |         |

# PUMPING TEST REPORT

Date compiled: 2012/10/16

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0090 Number: SD1-GAA099 Site type: Borehole

Distr./Farm No.: 296/0

Site Name/Des.: GROOTVLEI

Latitude [°] 28.376100

Alt. No. 1:

Diam. [mm]: 155

Water lev. [m]: 4.51

Longitude [°] 23.734511

Alt. No. 2:

Depth [m]: 35.60

Piezometer: 0

Altitude [m]: 0

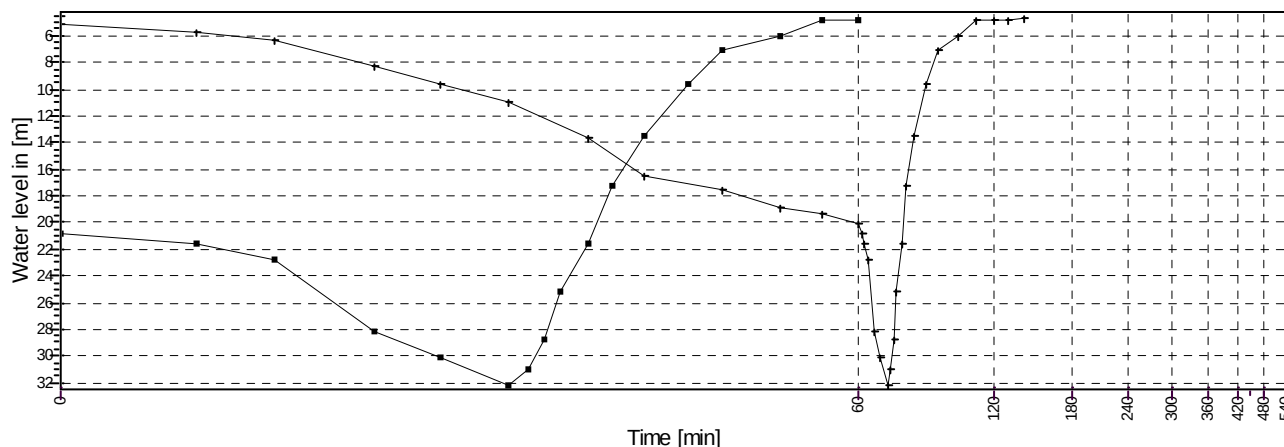
Rep. inst.: GOLD

Col. ht. [mm]: 0.15

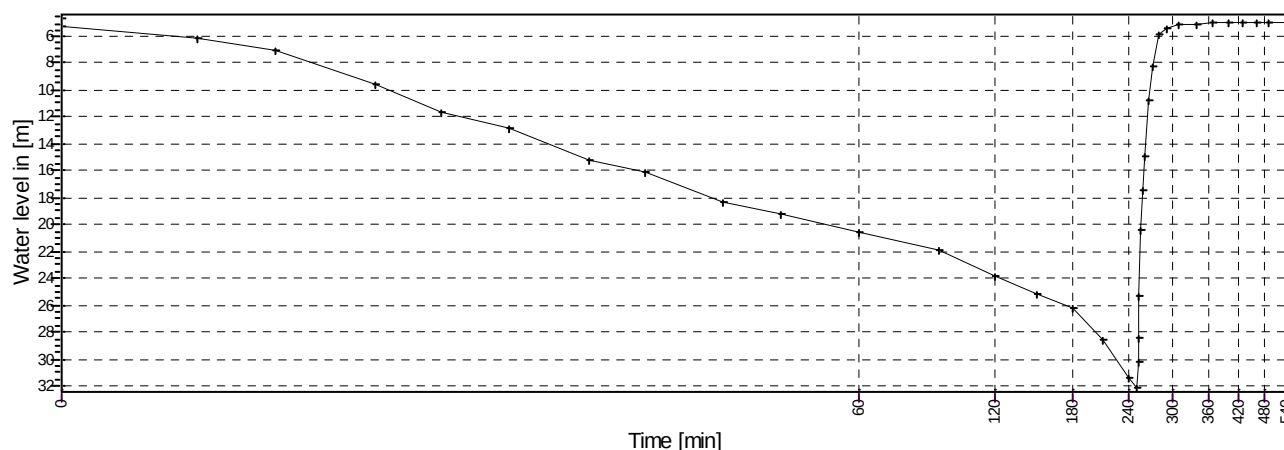
Date WL meas.: 20121011

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m²/d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|------------------|-----------|-----------------|
| GOLD       | Step test          | 32.10               | 20121011      | 0730 | 20121011    | 0950 |                  |           |                 |
| GOLD       | Constant rate test | 32.10               | 20121011      | 1050 | 20121011    | 2000 |                  |           |                 |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m²/d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|---------------|-------------|---------|------|
| STEP TEST STEP 1 | 0730        | 60           | 32.10              | 0.52             | 15.64      |            |    |                 |               |             |         | 0.03 |
| STEP TEST STEP 2 | 0830        | 10           | 32.10              | 1.00             | 27.69      | 0.21       | 99 | 70              |               |             |         | 0.04 |
| PUMP INLET       | 0950        | 20           | 32.10              | 0.55             | 27.59      |            |    |                 |               |             |         | 0.02 |
| CONSTANT         | 1050        | 260          | 32.10              | 0.45             | 27.42      | 0.25       | 99 | 300             |               |             |         | 0.02 |
| PUMP INLET       | 2000        | 300          | 32.10              | 0.12             | 27.42      |            |    |                 |               |             |         | 0.00 |

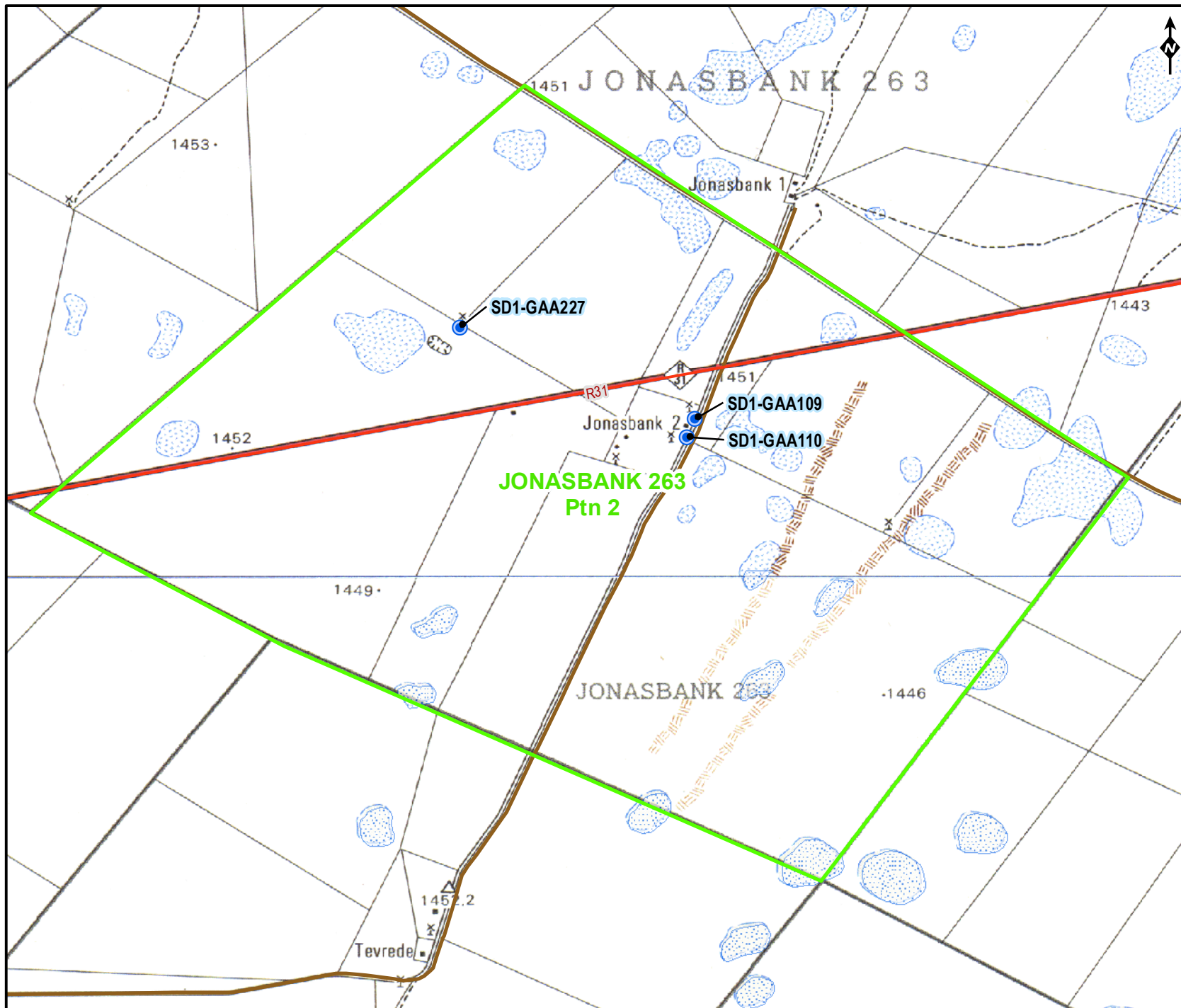


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Project No.: 11613568

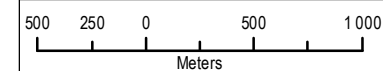


## **2.29    Sakkie van Niekerk**



#### LEGEND

- Existing borehole survey
- JonasBank 263 Ptn 2
- Main road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



**RESOURCES/NOTES**  
Coordinate System: GCS WGS 1984  
Datum: WGS 1984

**PROJECT**  
GW ASSESSMENT VGG SCHEME

**TITLE**  
**JONASBANK 263 PTN 2**  
**SAKKIE VAN NIEKERK**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:35 000       | A4         |
| GIS MB               | 23/04/2014 |
| CHECK DB             | 23/04/2014 |
| REVIEW FW            | 23/04/2014 |



## SAKKIE VAN NIEKERK - BASIC SITE INFORMATION

| SITE LOCATION          |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:       | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BA00120            | SD1-GAA109 | 263/2    | JONAS BANK            | B          | 28.24107967  | 23.689160001  | 1456.40      | 0.34         | 165        |                 | 3.62         |            |                |                       |                |                 |                   |
| 2823BA00121            | SD1-GAA110 | 263/2    | JONAS BANK            | B          | 28.24212967  | 23.688650001  | 1455.70      | 0.10         | 165        |                 | 4.10         |            |                |                       | 0              | 8               |                   |
| 2823BA00125            | SD1-GAA227 | 263      | JONASBANK             | B          | 28.23568967  | 23.675360001  | 1453.20      | 0.17         | 155        | 11.20           | 3.45         |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>        |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> |              | 11.20      | 4.10           |                       |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Minimum:</b> |              | 11.20      | 3.45           |                       |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
| <b>Nr. of sites:</b> 3 |            |          |                       |            |              |               |              |              |            | <b>Average:</b> |              | 11.20      | 3.72           |                       |                |                 |                   |

NOTE:  
 "Yield" represents cumulative blow yield  
 The recommended abstraction ("Rec. abs.")  
 is based on a 24 hour duty cycle  
 (based on test pumping result)



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## SAKKIE VAN NIEKERK - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BA00121 **Number:** SD1-GAA110 **Site Name:** JONAS BANK

| Samp. Nr./Type | Date/Time samp. | pH   | EC    | TDS   | Ca   | Mg   | Na   | K    | Si   | Al | Fe | Mn | Cl   | SO4  | NO3 as N | F     | T. Alk. |
|----------------|-----------------|------|-------|-------|------|------|------|------|------|----|----|----|------|------|----------|-------|---------|
| SD1-GA110      | 20120216 0800   | 7.76 | 104 † | 774 † | 96.9 | 93 † | 36.7 | 2.16 | 21.8 |    |    |    | 86.9 | 54.7 | 1.7      | 0.483 | 455     |

**Site Identifier:** 2823BA00125 **Number:** SD1-GAA227 **Site Name:** JONASBANK

| Samp. Nr./Type | Date/Time samp. | pH  | EC    | TDS   | Ca   | Mg    | Na   | K    | Si   | Al   | Fe | Mn | Cl  | SO4  | NO3 as N | F     | T. Alk. |
|----------------|-----------------|-----|-------|-------|------|-------|------|------|------|------|----|----|-----|------|----------|-------|---------|
| SD1-GA227      | 20121112 0800   | 8.2 | 125 † | 752 † | 95.3 | 111 ‡ | 61.1 | 4.22 | 14.2 | 0.02 | 0  | 0  | 125 | 67.6 | 19.3 †   | 0.302 | 461     |

Chemistry Standard: SABS for human consumption  
 † Value exceeds recommended maximum limit  
 ‡ Value exceeds maximum allowable limit  
 ! Value exceeds recommended minimum limit  
 j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
 EC [mS/m]  
 Nitrate as N

Sample Type Code Explanation:  
 D: Drinking water  
 E: Effluent  
 K: Sewage  
 O: Organic  
 P: Pressed or pellet  
 R: Rock  
 S: Soil  
 X: Other source

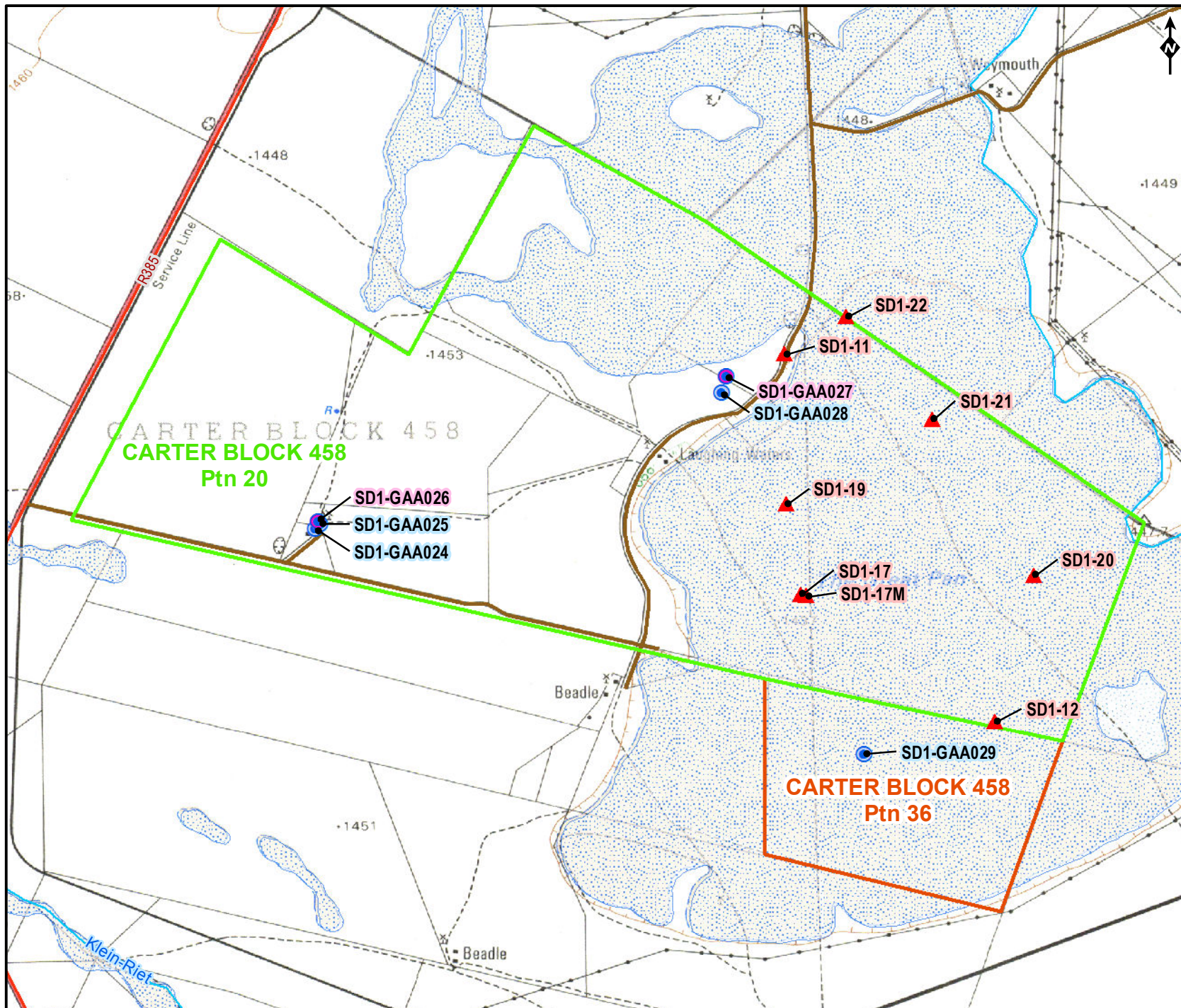


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 Project No.: 11613568



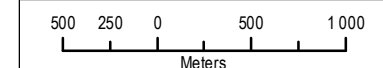
## **2.30 Stefaans Prens**





#### LEGEND

- ▲ Newly drilled borehole
- Existing borehole survey
- Existing borehole tested
- ▭ Carter Block 458 Ptn 20
- ▭ Carter Block 458 Ptn 36
- Main road
- Other road
- Rivers
- Dam
- ▨ Pan
- ▨ Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**CARTER BLOCK 458 PTN 20 & 36  
SERFAANS PRENS**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:40 000       | A4         |
| GIS MB               | 24/04/2014 |
| CHECK DB             | 24/04/2014 |
| REVIEW FW            | 24/04/2014 |





## SERFAANS PRENS - BASIC SITE INFORMATION

| SITE LOCATION          |            |          |                            |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------------|------------|----------|----------------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:       | Number:    | District | Site name/Description      | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BC00001            | SD1-GAA028 | RE458    | CARTER BLOCK PTN. LAUGHING | B          | 28.30239967  | 23.574990001  | 1445.70      | 0.36         | 165        |                 | 12.81        |            |                |                       |                |                 |                   |
| 2823BCX0024            | SD1-GAA024 | RE458    | CARTER BLOCK PTN. LAUGHING | B          | 28.31152967  | 23.547700001  | 1449.50      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BCX0025            | SD1-GAA025 | RE458    | CARTER BLOCK PTN. LAUGHING | B          | 28.31119967  | 23.547970001  | 1449.80      | 0.24         | 165        | 25.00           | 16.19        |            |                |                       |                |                 |                   |
| 2823BCX0028            | SD1-GAA029 | RE458    | CARTER BLOCK PTN. LAUGHING | B          | 28.32665967  | 23.584500001  | 1435.90      | 0.28         | 155        |                 | 2.40         |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>        |            |          |                            |            |              |               |              |              |            | <b>Maximum:</b> | 25.00        | 16.19      |                |                       |                |                 |                   |
| <b>Nr. of sites:</b> 4 |            |          |                            |            |              |               |              |              |            | <b>Minimum:</b> | 25.00        | 2.40       |                |                       |                |                 |                   |
|                        |            |          |                            |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
|                        |            |          |                            |            |              |               |              |              |            | <b>Average:</b> | 25.00        | 10.47      |                |                       |                |                 |                   |

NOTE:  
 "Yield" represents cumulative blow yield  
 The recommended abstraction ("Rec. abs.")  
 is based on a 24 hour duty cycle  
 (based on test pumping result)



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## SERFAANS PRENS - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BC00001 **Number:** SD1-GAA028 **Site Name:** CARTER BLOCK PTN. LAUGHING WATERS

| Samp. Nr./Type | Date/Time samp. | pH   | EC   | TDS | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl | SO4  | NO3 as N | F     |
|----------------|-----------------|------|------|-----|------|------|------|------|------|---------|----|------|----------|-------|
| SD1-GA028      | 20120216 0800   | 7.87 | 58.4 | 426 | 89.5 | 23.4 | 12.8 | 2.58 | 12.3 | 246     | 32 | 41.4 | 3.63     | 0.113 |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0172 Number: SD1-11 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.299879

Reg./BB.:

Topo-set.:

Depth [m]: 61.00

Longitude [°]: 23.579177

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.52

Altitude [m]: 1446.37

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 10 units

Use applic.: Domestic - all purposes

Drain. reg.: C92A

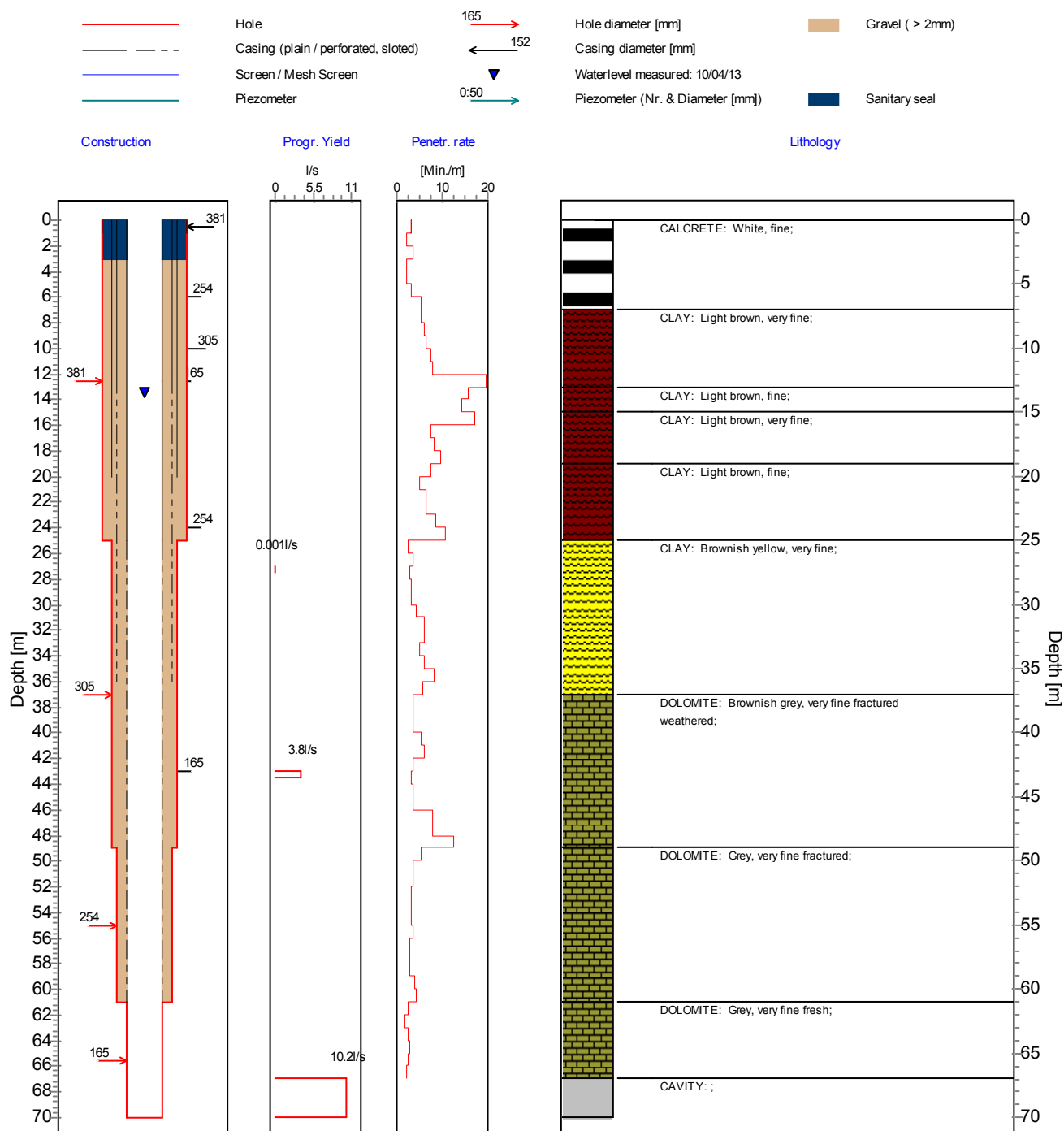
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:


**Golder  
Associates**

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 Fax: 012 - 364 4001  
 Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0172 Number: SD1-11 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.299879 | Alt. No. 1: |      | Diam. [mm]:   | 165   | Water lev. [m]: | 14.61    |
| Longitude [°]: | 23.579177 | Alt. No. 2: |      | Depth [m]:    | 61.00 | WL status:      | Static   |
| Altitude [m]:  | 1444.50   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.52  | Date WL meas.:  | 20130503 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |  |
|----------------|--|---------------------|--|
| Pump:          |  | Pulley Diam. [mm]:  |  |
| Type of Inst.: |  | Depth to Intk. [m]: |  |
| Manufacturer:  |  |                     |  |
| Engine:        |  | Power Rating [kW]   |  |
| Manufacturer:  |  | Pulley Diam. [mm]:  |  |
| Type of Power: |  |                     |  |

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |                        |          |                        |       |           |        |
|------------------|--------|------------------------|----------|------------------------|-------|-----------|--------|
| Sample No.:      | SD1-11 | Date sampled:          | 20130504 | Depth sampl. [m]:      | 58.50 | Comment:  |        |
| Main Parameters: |        | Calculated Parameters: |          | Bacteriol. Parameters: |       |           |        |
| pH:              | 7.6    | Na:                    | 11.7     | Cl:                    | 29.3  | Langel.:  | 0.37   |
| EC: [mS/m]       | 63.7   | K:                     | 2.33     | NO3 as N:              | 3.93  | Aggr-Ind: | 12.43  |
| TDS:             | 462    | Si:                    | 14.8     | SO4:                   | 32.3  | Ion-bal:  | 0.19   |
| T. Alk.:         | 302    | Al:                    | < 0.05   | F:                     | 0.137 | CaCO3:    | 364.41 |
| Ca:              | 90.5   | Fe:                    | < 0.05   |                        |       | SPC:      |        |
| Mg:              | 33.7   | Mn:                    | < 0.05   |                        |       |           |        |

Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption  
 † Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit  
 ! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 67.00            | 70.00             | 10.20      | Notch (V- or U-notch) |              |         |
| 27.00            | 27.50             | 0.00100    | Notch (V- or U-notch) |              | SEEPAGE |
| 43.00            | 43.50             | 3.80       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]: Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|-----------------------------|------------|-------------|
| 0.00             | 1.00        | 381        | Steel    |              | Plain casing          |                             |            |             |
| 0.00             | 12.00       | 254        | Steel    |              | Plain casing          |                             |            |             |
| 0.00             | 20.00       | 305        | Steel    |              | Plain casing          |                             |            |             |
| 0.00             | 25.00       | 165        | Steel    |              | Plain casing          |                             |            |             |
| 12.00            | 36.00       | 254        | Steel    |              | Perforated or slotted |                             |            |             |
| 25.00            | 61.00       | 165        | Steel    |              | Perforated or slotted |                             |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|----------|---------|---------|
| STEP TEST STEP 1 | 20130503 | 60           | 58.50              | 5.13             | 0.13       |                |          |         |         |
| STEP TEST STEP 2 | 20130503 | 60           | 58.50              | 10.10            | 0.43       |                |          |         |         |
| STEP TEST STEP 3 | 20130503 | 60           | 58.50              | 15.13            | 0.80       |                |          |         |         |
| STEP TEST STEP 4 | 20130503 | 60           | 58.50              | 20.14            | 1.41       | 100            | 15       |         |         |
| CONSTANT         | 20130504 | 1440         | 58.50              | 20.08            | 0.73       | 100            | 30       | 3424    |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 54.00              | Electric motor | 20              | 10.00             | CLASS 0       | 5.50                 | 42.00                 |

**Note:** 1. Production borehole.  
2. Install water level monitoring facility in borehole.



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 28/03/2014

## BASIC SITE INFORMATION:

Site Identifier: 2823BCX0172 Number: SD1-11

Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Latitude [°] 28.299879  
Longitude [°] 23.579177  
Altitude [m]: 1444.50

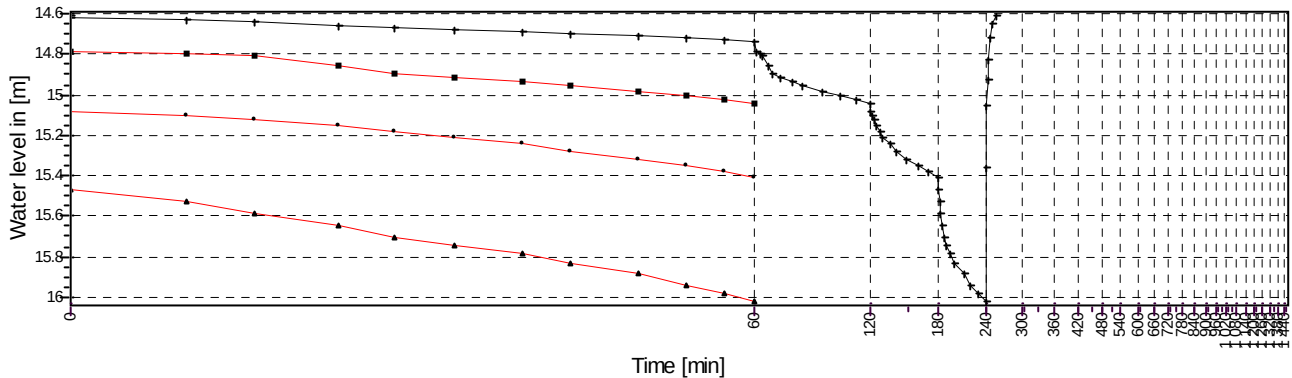
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 165  
Depth [m]: 61.00  
Col. ht. [mm]: 0.52

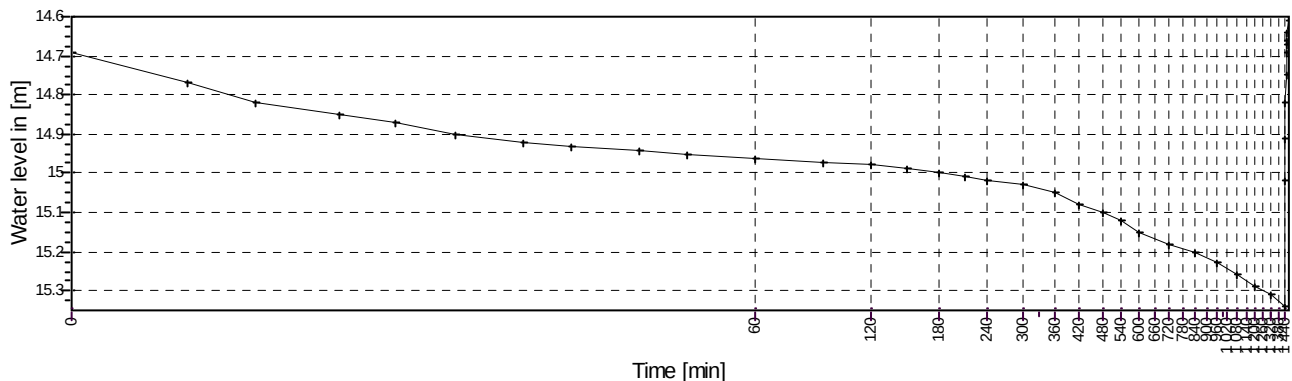
Water lev. [m]: 14.61  
Piezometer: 0  
Date WL meas.: 20130503

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 58.80               | 20130503      | 1210 | 20130503    | 1625 |                               |           |                 |
| GOLD       | Constant rate test | 58.50               | 20130504      | 0700 | 20130505    | 0730 | 3424                          |           | 8.33            |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | % | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|---|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 1210        | 60           | 58.50              | 5.13             | 0.13       |            |   |                 |                            |             |         | 39.46 |
| STEP TEST STEP 2 | 1310        | 60           | 58.50              | 10.10            | 0.43       |            |   |                 |                            |             |         | 23.49 |
| STEP TEST STEP 3 | 1410        | 60           | 58.50              | 15.13            | 0.80       |            |   |                 |                            |             |         | 18.91 |
| STEP TEST STEP 4 | 1510        | 60           | 58.50              | 20.14            | 1.41       | 100        |   | 15              |                            |             |         | 14.28 |
| CONSTANT         | 0700        | 1440         | 58.50              | 20.08            | 0.73       | 100        |   | 30              | 3424                       |             |         | 27.51 |



Golder Associates Africa, Pretoria  
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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0180 Number: SD1-12 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.324592

Reg./BB.:

Topo-set.:

Depth [m]: 110.60

Longitude [°]: 23.593308

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.45

Altitude [m]: 1435.90

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

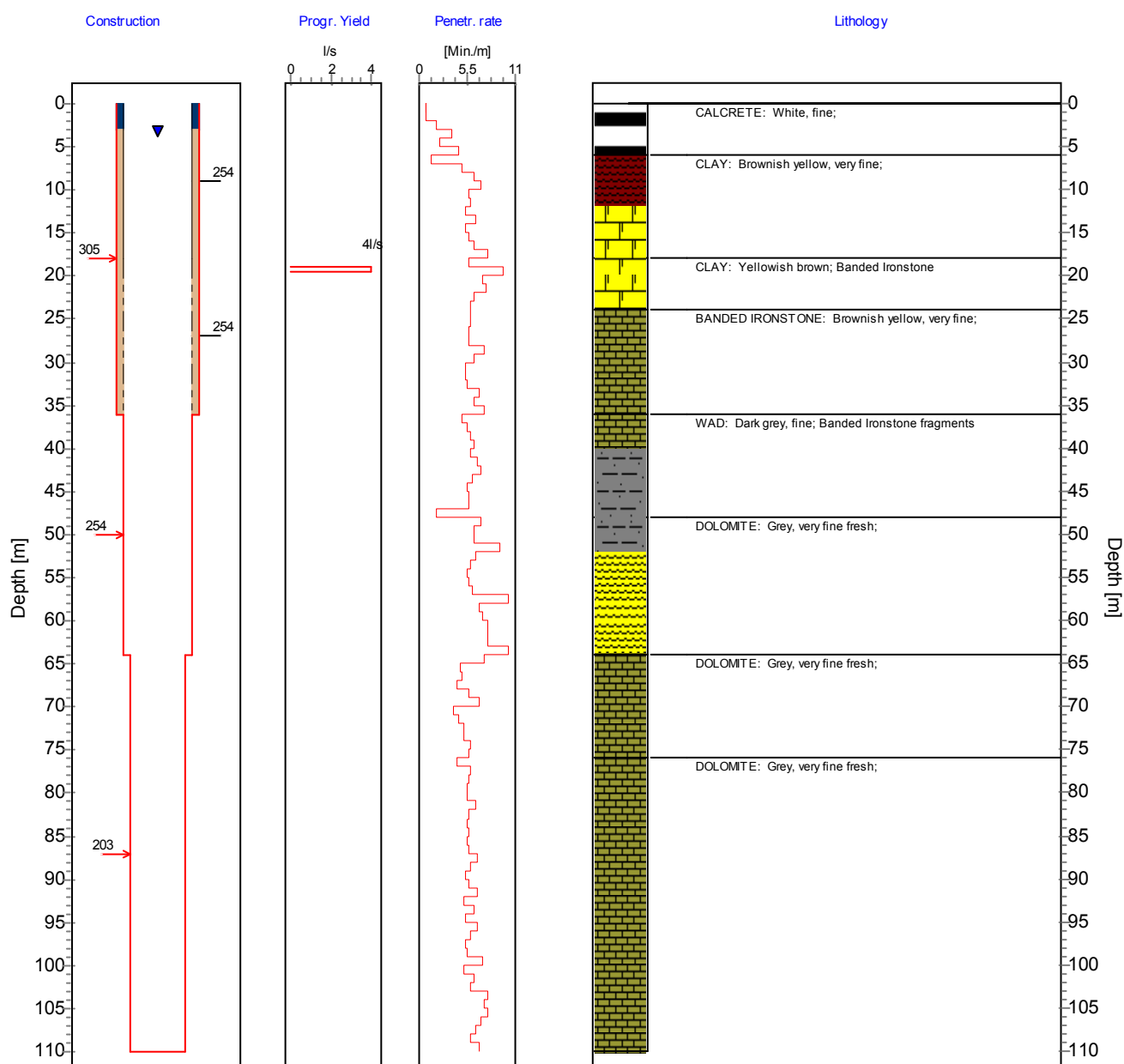
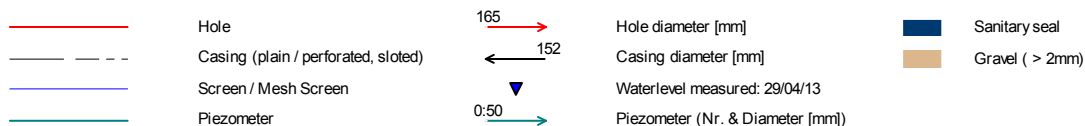
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:

Golder  
Associates
 Golder Associates Africa, Pretoria  
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 Tel: 012 - 364 4000  
 Fax: 012 - 364 4001  
 Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0180 Number: SD1-12 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |                  |  |               |        |                 |          |
|----------------|-----------|------------------|--|---------------|--------|-----------------|----------|
| Latitude [°]:  | 28.324592 | Alt. No. 1:      |  | Diam. [mm]:   | 203    | Water lev. [m]: | 4.32     |
| Longitude [°]: | 23.593308 | Alt. No. 2:      |  | Depth [m]:    | 110.60 | WL status:      | Static   |
| Altitude [m]:  | 1435.90   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.45   | Date WL meas.:  | 20130509 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**

Type of Inst.: Pulley Diam. [mm]:  
Manufacturer: Depth to Intk. [m]:

**Engine:**

Manufacturer: Power Rating [kW]  
Type of Power: Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                        |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-12 | Date sampled: | 20130509 | Depth sampl. [m]:                                                                                                                                                                                                                                                                      | 34.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                                 |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.69   | Na:           | 31.8     | Cl:                                                                                                                                                                                                                                                                                    | 122   | Langel.:               | 0.47   | E.Coli:   |
| EC: [mS/m]       | 92.2 † | K:            | 3.64     | NO3 as N:                                                                                                                                                                                                                                                                              | 6.39  | Aggr-Ind:              | 12.56  | Faec. co: |
| TDS:             | 722 †  | Si:           | 15.5     | SO4:                                                                                                                                                                                                                                                                                   | 94.5  | Ion-bal:               | -2.08  | Total Co: |
| T. Alk.:         | 268    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                                     | 0.158 | CaCO3:                 | 464.94 | SPC:      |
| Ca:              | 112    | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    ; Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 45.1   | Mn:           | 0.11 †   |                                                                                                                                                                                                                                                                                        |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 19.00            | 19.50             | 4.00       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 18.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 18.00            | 36.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] | %   | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|--------------|-----|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130509 | 60           | 34.80              | 2.76             | 3.83       |              |     |       |          |         |         |
| STEP TEST STEP 2 | 20130509 | 60           | 34.80              | 5.21             | 13.26      |              |     |       |          |         |         |
| STEP TEST STEP 3 | 20130509 | 15           | 34.80              | 7.26             | 29.21      | 0.02         | 100 | 180   |          |         |         |
| PUMP INLET       | 20130509 | 25           | 34.80              | 5.34             | 30.48      |              |     |       |          |         |         |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 2013/06/14

## BASIC SITE INFORMATION:

Site Identifier: 2823BCX0180 Number: SD1-12

Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Latitude [°] 28.324592  
Longitude [°] 23.593308  
Altitude [m]: 1435.90

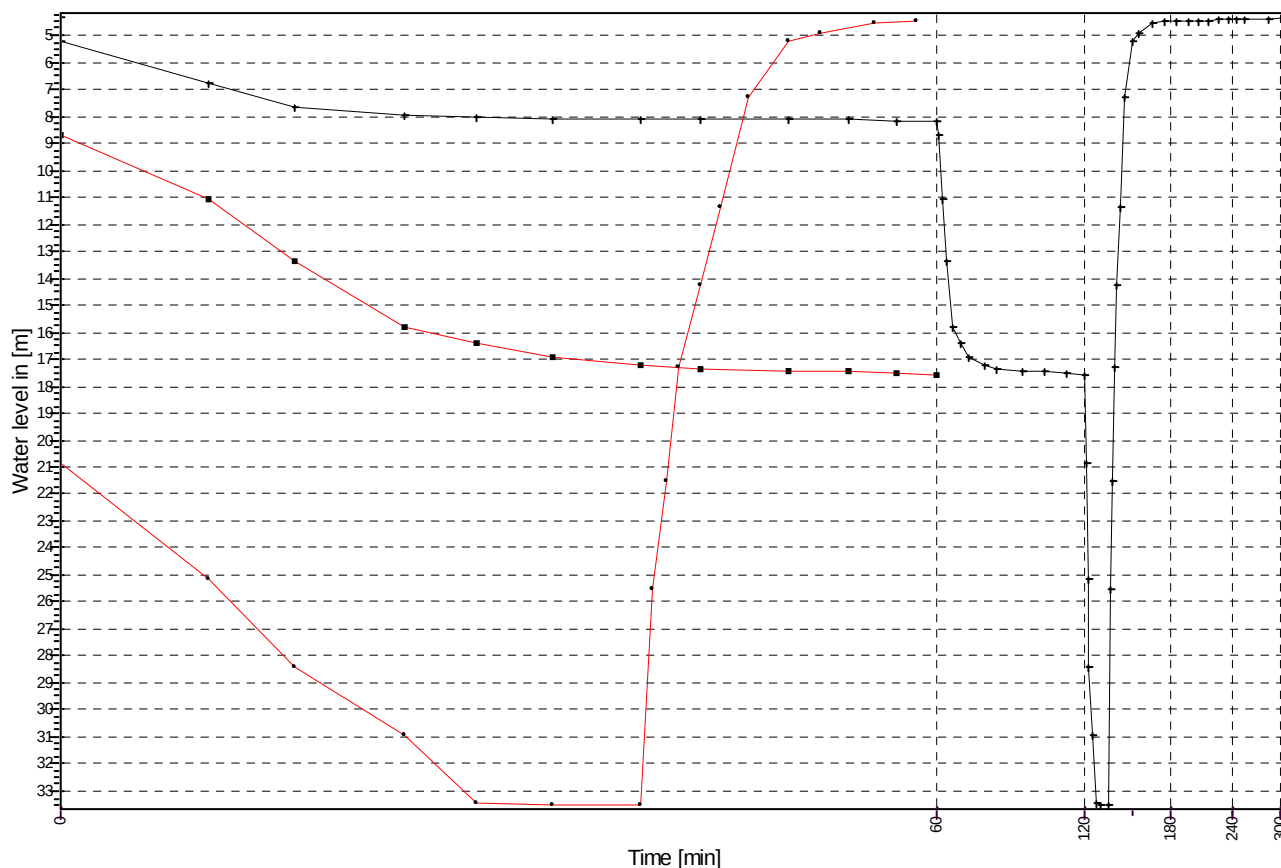
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 203  
Depth [m]: 110.60  
Col. ht. [mm]: 0.45

Water lev. [m]: 4.32  
Piezometer: 0  
Date WL meas.: 20130509

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test    | 34.80               | 20130509      | 1430 | 20130509    | 1945 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1430        | 60           | 34.80              | 2.76             | 3.83       |            |     |                 |                            |             |         | 0.72 |
| STEP TEST STEP 2 | 1530        | 60           | 34.80              | 5.21             | 13.26      |            |     |                 |                            |             |         | 0.39 |
| STEP TEST STEP 3 | 1630        | 15           | 34.80              | 7.26             | 29.21      | 0.02       | 100 | 180             |                            |             |         | 0.25 |
| PUMP INLET       | 1945        | 25           | 34.80              | 5.34             | 30.48      |            |     |                 |                            |             |         | 0.18 |



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Project No.: 11613568



# Borehole Construction and Geological Log

Date compiled: 2013/06/13

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0176 Number: SD1-17 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.316070

Reg./BB.:

Topo-set.:

Depth [m]: 57.60

Longitude [°]: 23.580260

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.50

Altitude [m]: 1435.15

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

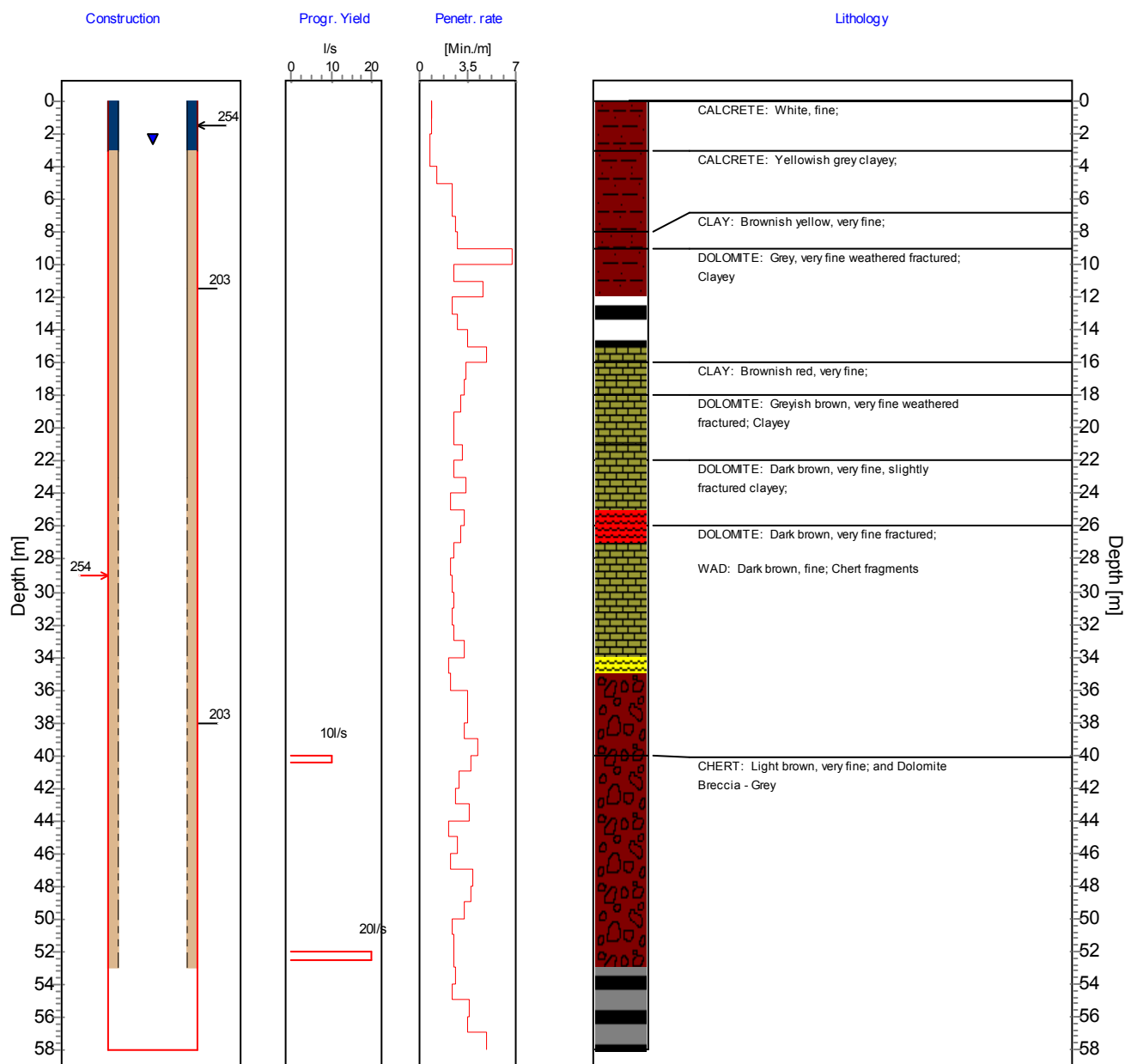
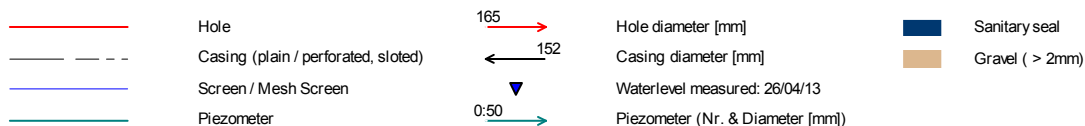
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



**Golder Associates**

Golder Associates Africa, Pretoria  
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Fax: 012 - 364 4001  
Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0176 Number: SD1-17 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.316070 | Alt. No. 1: |      | Diam. [mm]:   | 203   | Water lev. [m]: | 3.44     |
| Longitude [°]: | 23.580260 | Alt. No. 2: |      | Depth [m]:    | 57.60 | WL status:      | Static   |
| Altitude [m]:  | 1435.15   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.50  | Date WL meas.:  | 20130901 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| <b>Pump:</b>   |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| <b>Engine:</b> |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-17 | Date sampled: | 20130917 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 34.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.57   | Na:           | 16.4     | Cl:                                                                                                                                                                                                                                                                              | 41.6  | Langel.:               | 0.32   | E.Coli:   |
| EC: [mS/m]       | 67.1   | K:            | 2.8      | NO3 as N:                                                                                                                                                                                                                                                                        | 3.96  | Aggr-Ind:              | 12.39  | Faec. co: |
| TDS:             | 462    | Si:           | 14.7     | SO4:                                                                                                                                                                                                                                                                             | 41.8  | Ion-bal:               | -0.38  | Total Co: |
| T. Alk.:         | 288    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 362.30 | SPC:      |
| Ca:              | 91.8   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 32.4   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 40.00            | 40.50             | 10.00      | Notch (V- or U-notch) |              |         |
| 52.00            | 52.50             | 20.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 3.00        | 254        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 23.00       | 203        | Steel    |              | Plain casing          |                                |            |             |
| 23.00            | 53.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130507 | 60           | 34.80              | 8.49             | 0.04       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130507 | 60           | 34.80              | 16.50            | 0.08       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130507 | 60           | 34.80              | 24.44            | 0.24       |                |       |          |         |         |
| STEP TEST STEP 4 | 20130507 | 60           | 34.80              | 30.54            | 0.89       | 100            | 10    |          |         |         |
| CONSTANT (1)     | 20130508 | 1440         | 34.80              | 30.02            | 0.74       | 100            | 90    |          |         |         |
| CONSTANT (2)     | 20130901 | 4320         | 34.80              | 30.09            | 1.25       | 100            | 5     | 855      |         |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 42.00              | Electric motor | 12              | 15.00             | CLASS 0       | 5.80                 | 39.00                 |

**Note:** 1. Production borehole.  
2. Install water level monitoring facility in borehole.



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 2013/06/14

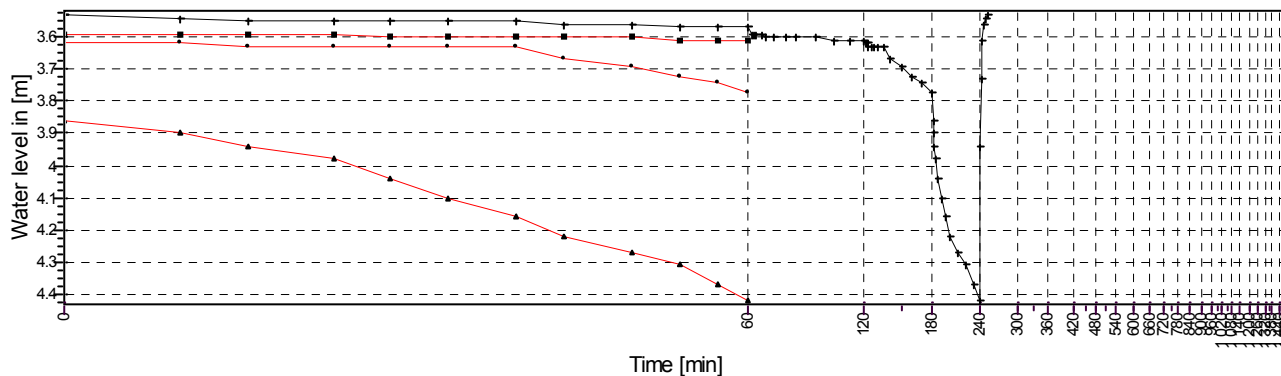
**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0176 Number: SD1-17 Site type: Borehole

Distr./Farm No.: 458 Site Name/Des.: CARTER BLOCK

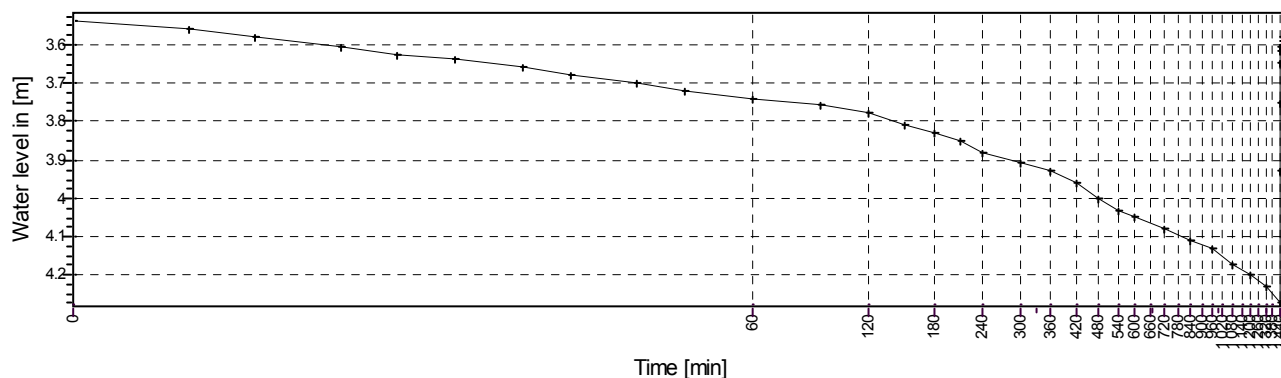
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.316070 | Alt. No. 1:      |  | Diam. [mm]:    | 203   | Water lev. [m]: | 3.53     |
| Longitude [°] | 23.580260 | Alt. No. 2:      |  | Depth [m]:     | 57.60 | Piezometer:     | 0        |
| Altitude [m]: | 1435.15   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.50  | Date WL meas.:  | 20130507 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 34.80               | 20130507      | 1330 | 20130507    | 1740 |                               |           |                 |
| GOLD       | Constant rate test | 34.80               | 20130508      | 0800 | 20130509    | 0930 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 1330        | 60           | 34.80              | 8.49             | 0.04       |            |     |                 |                            |             |         | 212.2 |
| STEP TEST STEP 2 | 1430        | 60           | 34.80              | 16.50            | 0.08       |            |     |                 |                            |             |         | 206.2 |
| STEP TEST STEP 3 | 1530        | 60           | 34.80              | 24.44            | 0.24       |            |     |                 |                            |             |         | 101.8 |
| STEP TEST STEP 4 | 1630        | 60           | 34.80              | 30.54            | 0.89       |            | 100 | 10              |                            |             |         | 34.31 |
| CONSTANT         | 0800        | 1440         | 34.80              | 30.02            | 0.74       |            | 100 | 90              |                            |             |         | 40.57 |



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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0210 Number: SD1-17M Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.316140

Reg./BB.:

Topo-set.:

Depth [m]: 24.00

Longitude [°]: 23.580620

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.49

Altitude [m]: 1436.90

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 10 units

Use applic.: Domestic - all purposes

Drain. reg.: C92A

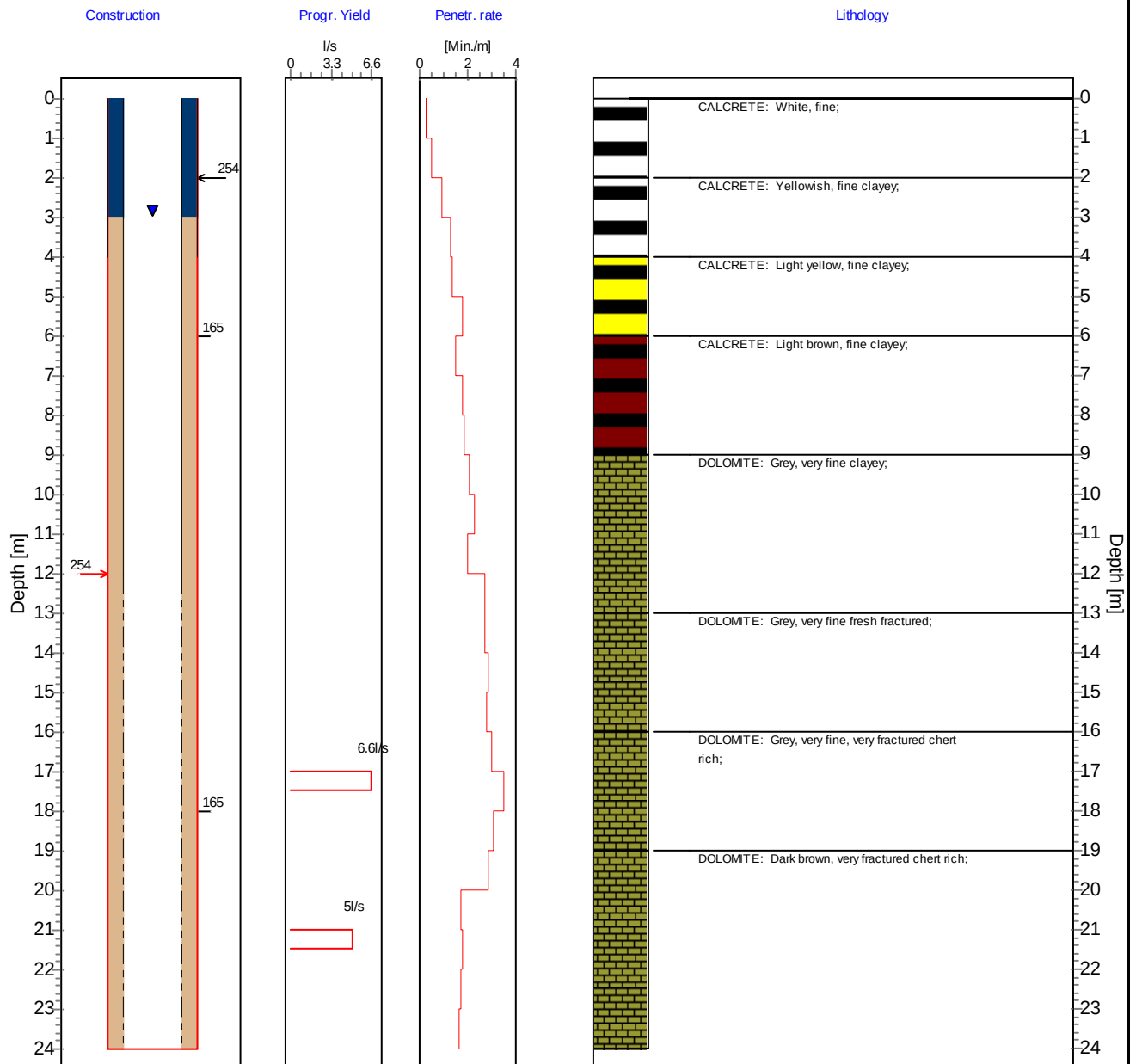
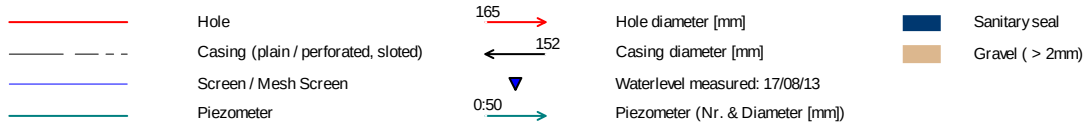
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



Golder Associates Africa, Pretoria  
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Project No.: 11613568

# Borehole Construction and Geological Log

Date compiled: 2013/06/24

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0179 Number: SD1-19 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.310020

Reg./BB.:

Topo-set.:

Depth [m]: 40.22

Longitude [°]: 23.579285

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.50

Altitude [m]: 1434.82

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

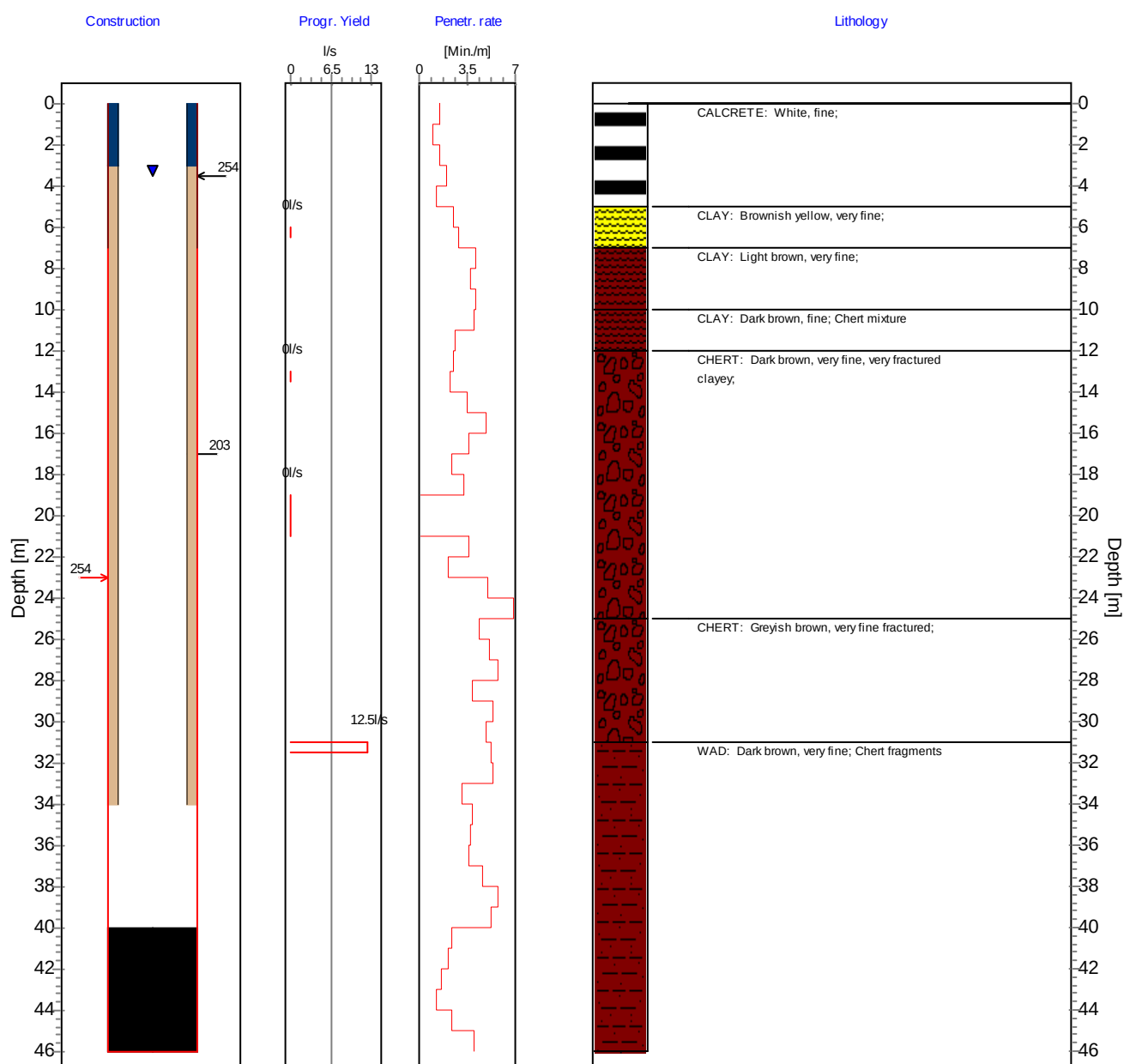
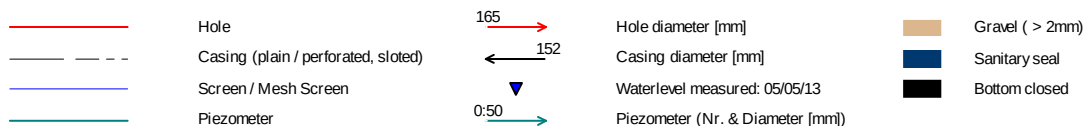
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0179 Number: SD1-19 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.310020 | Alt. No. 1: |      | Diam. [mm]:   | 203   | Water lev. [m]: | 3.24     |
| Longitude [°]: | 23.579285 | Alt. No. 2: |      | Depth [m]:    | 40.22 | WL status:      | Static   |
| Altitude [m]:  | 1434.82   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.50  | Date WL meas.:  | 20130505 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| <b>Pump:</b>   |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| <b>Engine:</b> |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-19 | Date sampled: | 20130506 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 28.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.6    | Na:           | 11.6     | Cl:                                                                                                                                                                                                                                                                              | 30.1  | Langel.:               | 0.36   | E.Coli:   |
| EC: [mS/m]       | 63.9   | K:            | 2.33     | NO3 as N:                                                                                                                                                                                                                                                                        | 3.91  | Aggr-Ind:              | 12.43  | Faec. co: |
| TDS:             | 412    | Si:           | 14.6     | SO4:                                                                                                                                                                                                                                                                             | 33.1  | Ion-bal:               | -0.55  | Total Co: |
| T. Alk.:         | 302    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 360.59 | SPC:      |
| Ca:              | 89.3   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ; Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 33.5   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 6.00             | 6.50              | 0.00       | Notch (V- or U-notch) |              | DAMP    |
| 13.00            | 13.50             | 0.00       | Notch (V- or U-notch) |              |         |
| 19.00            | 21.00             | 0.00       | Notch (V- or U-notch) |              | CAVITY  |
| 31.00            | 31.50             | 12.50      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|------------------|--------------------------------|------------|-------------|
| 0.00             | 7.00        | 254        | Steel    |              | Plain casing     |                                |            |             |
| 0.00             | 34.00       | 203        | Steel    |              | Plain casing     |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|----------|---------|---------|
| STEP TEST STEP 1 | 20130505 | 60           | 28.80              | 8.13             | 0.14       |                |          |         |         |
| STEP TEST STEP 2 | 20130505 | 60           | 28.80              | 16.22            | 0.39       |                |          |         |         |
| STEP TEST STEP 3 | 20130505 | 60           | 28.80              | 24.09            | 0.59       |                |          |         |         |
| STEP TEST STEP 4 | 20130505 | 60           | 28.80              | 30.10            | 0.84       | 100            | 30       |         |         |
| CONSTANT         | 20130506 | 1440         | 28.80              | 25.02            | 0.74       | 100            | 60       | 1290    |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 36.00              | Electric motor | 12              | 15.00             | CLASS 0       | 5.30                 | 18.00                 |

**Note:** 1. Production borehole.  
2. Install water level monitoring facility in borehole.



Golder Associates Africa, Pretoria  
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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 31/03/2014

## BASIC SITE INFORMATION:

Site Identifier: 2823BCX0179 Number: SD1-19

Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Latitude [°] 28.310020  
Longitude [°] 23.579285  
Altitude [m]: 1434.82

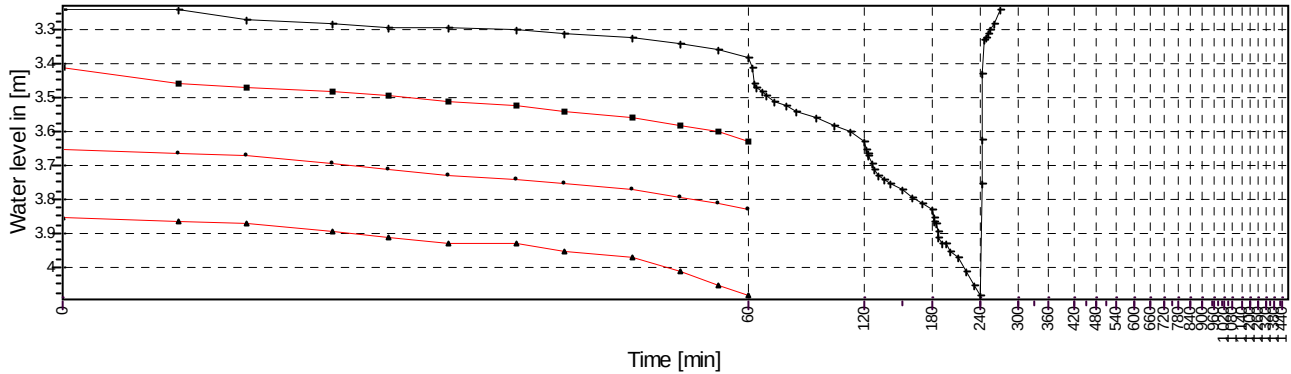
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 203  
Depth [m]: 40.22  
Col. ht. [mm]: 0.50

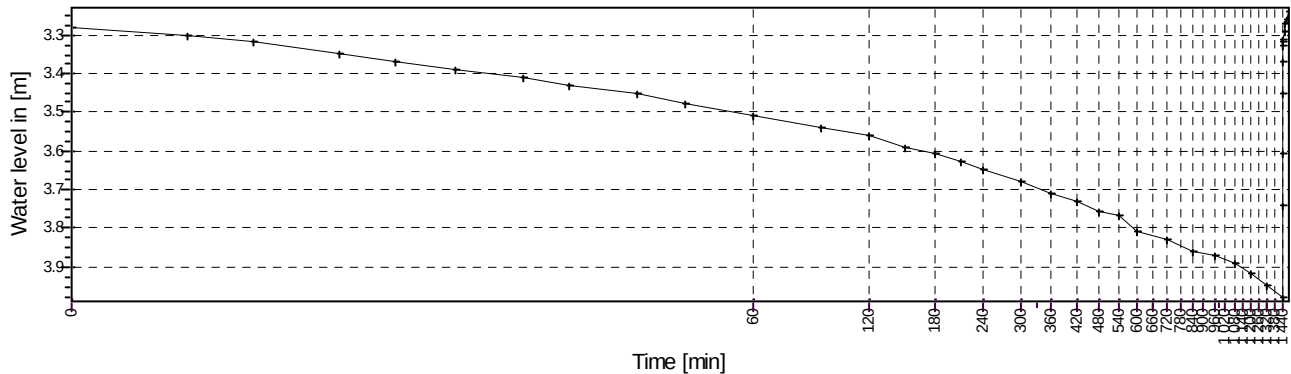
Water lev. [m]: 3.24  
Piezometer: 0  
Date WL meas.: 20130505

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 28.80               | 20130505      | 1300 | 20130505    | 1730 |                               |           |                 |
| GOLD       | Constant rate test | 28.80               | 20130506      | 0800 | 20130507    | 0900 | 1290                          |           | 7.50            |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | % | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|---|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 1300        | 60           | 28.80              | 8.13             | 0.14       |            |   |                 |                            |             |         | 58.07 |
| STEP TEST STEP 2 | 1400        | 60           | 28.80              | 16.22            | 0.39       |            |   |                 |                            |             |         | 41.59 |
| STEP TEST STEP 3 | 1500        | 60           | 28.80              | 24.09            | 0.59       |            |   |                 |                            |             |         | 40.83 |
| STEP TEST STEP 4 | 1600        | 60           | 28.80              | 30.10            | 0.84       | 100        |   | 30              |                            |             |         | 35.83 |
| CONSTANT         | 0800        | 1440         | 28.80              | 25.02            | 0.74       | 100        |   | 60              | 1290                       |             |         | 33.81 |



Golder Associates Africa, Pretoria  
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Fax: 012 - 364 4001  
Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0181 Number: SD1-20 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.314784

Reg./BB.:

Topo-set.:

Depth [m]: 49.40

Longitude [°]: 23.595877

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.54

Altitude [m]: 1435.00

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

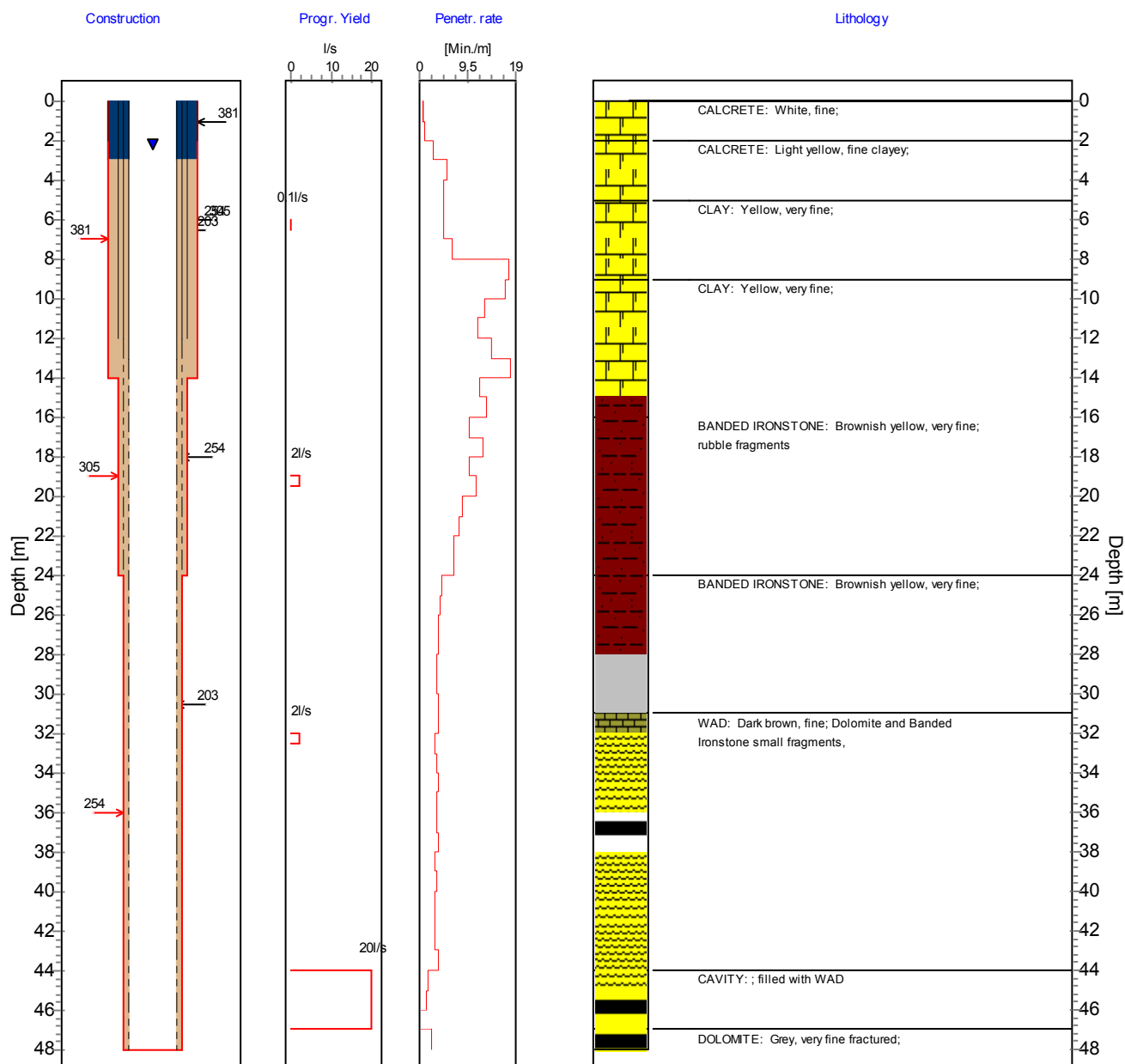
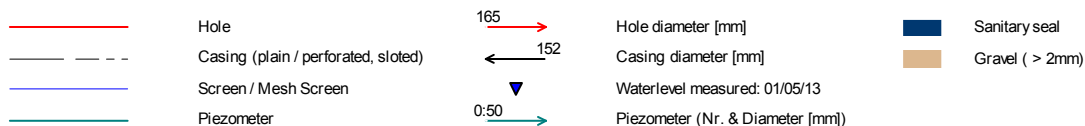
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:


**Golder  
Associates**

 Golder Associates Africa, Pretoria  
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 Tel: 012 - 364 4000  
 Fax: 012 - 364 4001  
 Project No.: 11613568



## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0181 Number: SD1-20 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.314784 | Alt. No. 1: |      | Diam. [mm]:   | 203   | Water lev. [m]: | 4.26     |
| Longitude [°]: | 23.595877 | Alt. No. 2: |      | Depth [m]:    | 49.40 | WL status:      | Static   |
| Altitude [m]:  | 1435.00   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.54  | Date WL meas.:  | 20130510 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| <b>Pump:</b>   |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| <b>Engine:</b> |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-20 | Date sampled: | 20140218 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 46.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.39   | Na:           | 34.1     | Cl:                                                                                                                                                                                                                                                                              | 68.8  | Langel.:               | 0.20   | E.Coli:   |
| EC: [mS/m]       | 80.8 † | K:            | 6        | NO3 as N:                                                                                                                                                                                                                                                                        | 1.73  | Aggr-Ind:              | 12.28  | Faec. co: |
| TDS:             | 580 †  | Si:           |          | SO4:                                                                                                                                                                                                                                                                             | 57    | Ion-bal:               | 4.33   | Total Co: |
| T. Alk.:         | 316    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | 0.13  | CaCO3:                 | 440.36 | SPC:      |
| Ca:              | 97.7   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 47.8   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 6.00             | 6.50              | 0.10       | Notch (V- or U-notch) |              |         |
| 44.00            | 47.00             | 20.00      | Notch (V- or U-notch) |              |         |
| 32.00            | 32.50             | 2.00       | Notch (V- or U-notch) |              |         |
| 19.00            | 19.50             | 2.00       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] to Bot. [m] |       | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]: Length Width |  | Hor. Dist. | Vert. Dist. |
|------------------------------|-------|------------|----------|--------------|-----------------------|-----------------------------|--|------------|-------------|
| 0.00                         | 2.00  | 381        | Steel    |              | Plain casing          |                             |  |            |             |
| 0.00                         | 12.00 | 254        | Steel    |              | Plain casing          |                             |  |            |             |
| 0.00                         | 12.00 | 305        | Steel    |              | Plain casing          |                             |  |            |             |
| 0.00                         | 13.00 | 203        | Steel    |              | Plain casing          |                             |  |            |             |
| 12.00                        | 24.00 | 254        | Steel    |              | Perforated or slotted |                             |  |            |             |
| 13.00                        | 48.00 | 203        | Steel    |              | Perforated or slotted |                             |  |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130510 | 60           | 46.80              | 8.51             | 0.14       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130510 | 60           | 46.80              | 16.76            | 0.29       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130510 | 60           | 46.80              | 24.27            | 0.55       |                |       |          |         |         |
| STEP TEST STEP 4 | 20130510 | 60           | 46.80              | 30.33            | 1.16       | 0 100          | 10    |          |         |         |
| CONSTANT         | 20130510 | 1440         | 46.80              | 30.13            | 0.77       | 100            | 30    | 3082     |         |         |

### RECOMMENDATIONS:

| Prior.                                                                                          | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|-------------------------------------------------------------------------------------------------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1                                                                                               | Mono-type pump | 36.00              | Electric motor | 24              | 20.00             | CLASS 0       | 5.70                 | 43.00                 |
| <b>Note:</b> 1. Production borehole.<br>2. Install water level monitoring facility in borehole. |                |                    |                |                 |                   |               |                      |                       |



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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 31/03/2014

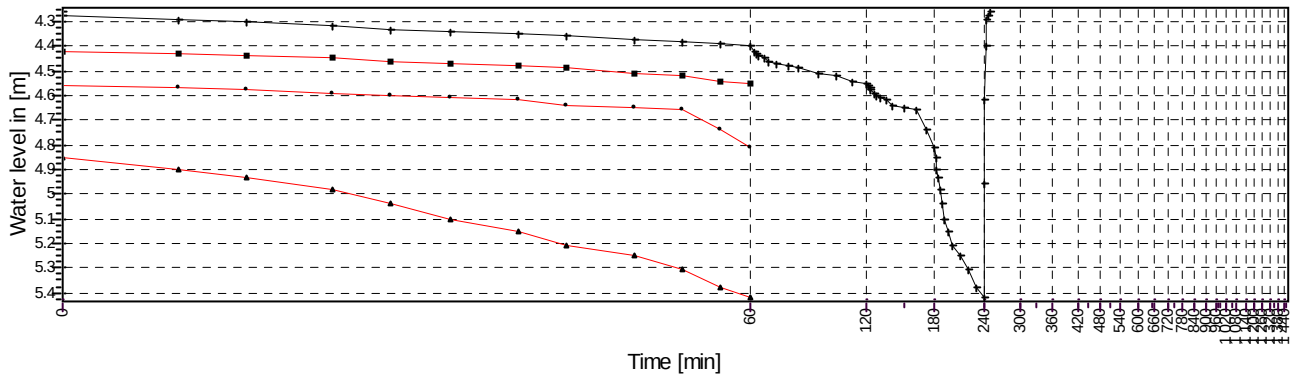
**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0181 Number: SD1-20 Site type: Borehole

Distr./Farm No.: 458 Site Name/Des.: CARTER BLOCK

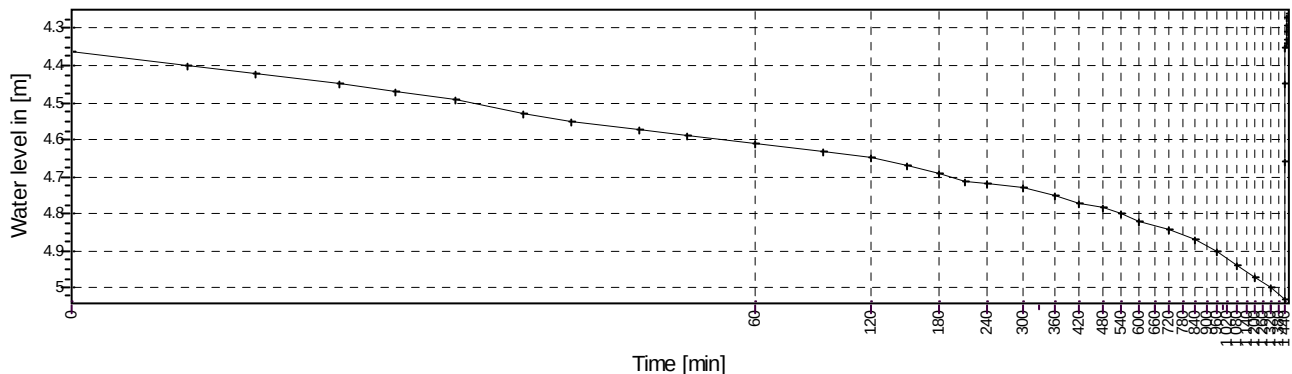
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.314784 | Alt. No. 1:      |  | Diam. [mm]:    | 203   | Water lev. [m]: | 4.26     |
| Longitude [°] | 23.595877 | Alt. No. 2:      |  | Depth [m]:     | 49.40 | Piezometer:     | 0        |
| Altitude [m]: | 1435.00   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.54  | Date WL meas.:  | 20130510 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 46.80               | 20130510      | 1230 | 20130510    | 1640 |                               |           |                 |
| GOLD       | Constant rate test | 46.80               | 20130510      | 1700 | 20130511    | 1730 | 3082                          |           | 0.83            |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 1230        | 60           | 46.80              | 8.51             | 0.14       |            |     |                 |                            |             |         | 60.79 |
| STEP TEST STEP 2 | 1330        | 60           | 46.80              | 16.76            | 0.29       |            |     |                 |                            |             |         | 57.79 |
| STEP TEST STEP 3 | 1430        | 60           | 46.80              | 24.27            | 0.55       |            |     |                 |                            |             |         | 44.13 |
| STEP TEST STEP 4 | 1530        | 60           | 46.80              | 30.33            | 1.16       | 0          | 100 | 10              |                            |             |         | 26.15 |
| CONSTANT         | 1700        | 1440         | 46.80              | 30.13            | 0.77       |            | 100 | 30              | 3082                       |             |         | 39.13 |



Golder Associates Africa, Pretoria  
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Project No.: 11613568

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0173 Number: SD1-21 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.304334

Reg./BB.:

Topo-set.:

Depth [m]: 103.00

Longitude [°]: 23.589058

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.53

Altitude [m]: 1434.86

Site purp.: Production (water supply)

Diam. [mm]: 165

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

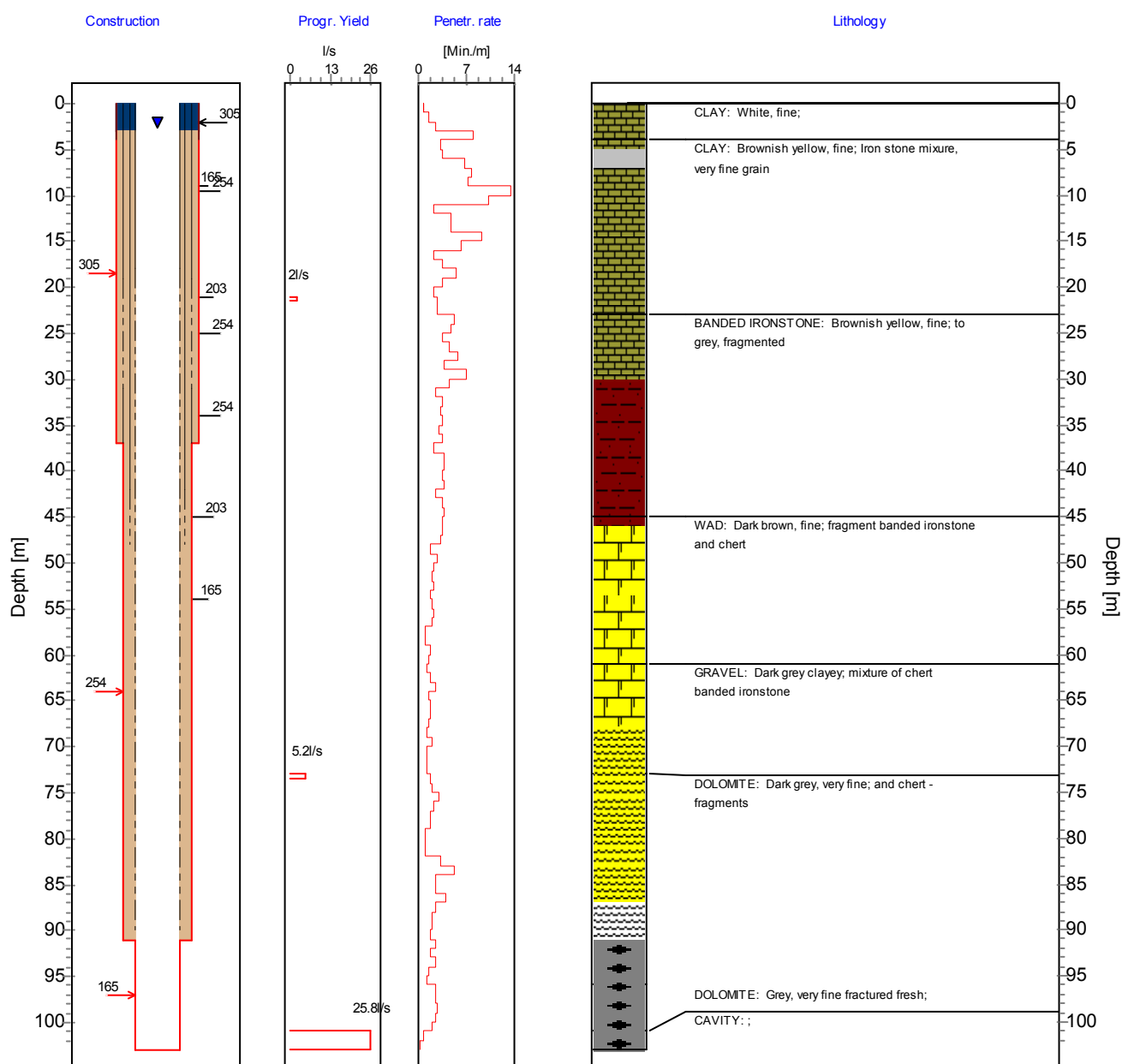
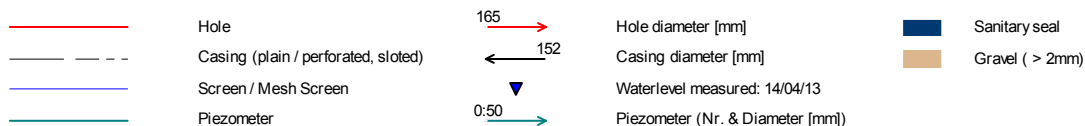
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:

Golder  
Associates
 Golder Associates Africa, Pretoria  
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 Tel: 012 - 364 4000  
 Fax: 012 - 364 4001  
 Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0173 Number: SD1-21 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |             |      |               |        |                 |          |
|----------------|-----------|-------------|------|---------------|--------|-----------------|----------|
| Latitude [°]:  | 28.304334 | Alt. No. 1: |      | Diam. [mm]:   | 165    | Water lev. [m]: | 3.32     |
| Longitude [°]: | 23.589058 | Alt. No. 2: |      | Depth [m]:    | 103.00 | WL status:      | Static   |
| Altitude [m]:  | 1434.86   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.53   | Date WL meas.:  | 20130512 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |  |                     |  |
|----------------|--|---------------------|--|
| Pump:          |  | Pulley Diam. [mm]:  |  |
| Type of Inst.: |  | Depth to Intk. [m]: |  |
| Manufacturer:  |  |                     |  |
| Engine:        |  | Power Rating [kW]   |  |
| Manufacturer:  |  | Pulley Diam. [mm]:  |  |
| Type of Power: |  |                     |  |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | Unused                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-21 | Date sampled: | 20130531 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 82.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.56   | Na:           | 12.5     | Cl:                                                                                                                                                                                                                                                                              | 30.2  | Langel.:               | 0.34   | E.Coli:   |
| EC: [mS/m]       | 67.1   | K:            | 2.41     | NO3 as N:                                                                                                                                                                                                                                                                        | 3.96  | Aggr-Ind:              | 12.42  | Faec. co: |
| TDS:             | 430    | Si:           | 16       | SO4:                                                                                                                                                                                                                                                                             | 25.5  | Ion-bal:               | -0.38  | Total Co: |
| T. Alk.:         | 339    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 389.10 | SPC:      |
| Ca:              | 84.9   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 43.1   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 101.00           | 103.00            | 25.80      | Notch (V- or U-notch) |              |         |
| 73.00            | 73.50             | 5.20       | Notch (V- or U-notch) |              |         |
| 21.00            | 21.50             | 2.00       | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] | to Bot. [m] | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]:<br>Length Width | Hor. Dist. | Vert. Dist. |
|------------------|-------------|------------|----------|--------------|-----------------------|--------------------------------|------------|-------------|
| 0.00             | 4.00        | 305        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 18.00       | 165        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 19.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 0.00             | 42.00       | 203        | Steel    |              | Plain casing          |                                |            |             |
| 18.00            | 90.00       | 165        | Steel    |              | Perforated or slotted |                                |            |             |
| 19.00            | 31.00       | 254        | Steel    |              | Perforated or slotted |                                |            |             |
| 31.00            | 37.00       | 254        | Steel    |              | Plain casing          |                                |            |             |
| 42.00            | 48.00       | 203        | Steel    |              | Perforated or slotted |                                |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130512 | 60           | 82.80              | 5.11             | 0.58       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130512 | 60           | 82.80              | 10.32            | 1.27       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130512 | 60           | 82.80              | 15.12            | 1.91       |                |       |          |         |         |
| STEP TEST STEP 4 | 20130512 | 60           | 82.80              | 21.55            | 2.56       | 100            | 60    |          |         |         |
| CONSTANT         | 20130512 | 1440         | 82.80              | 20.11            | 2.70       | 100            | 150   | 714      |         |         |

### RECOMMENDATIONS:

| Prior. | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|--------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1      | Mono-type pump | 36.00              | Electric motor | 24              | 10.00             | CLASS 0       | 5.50                 | 72.00                 |



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**Note:** 1. Production borehole.  
2. Install water level monitoring facility in borehole.

# PUMPING TEST REPORT

Date compiled: 31/03/2014

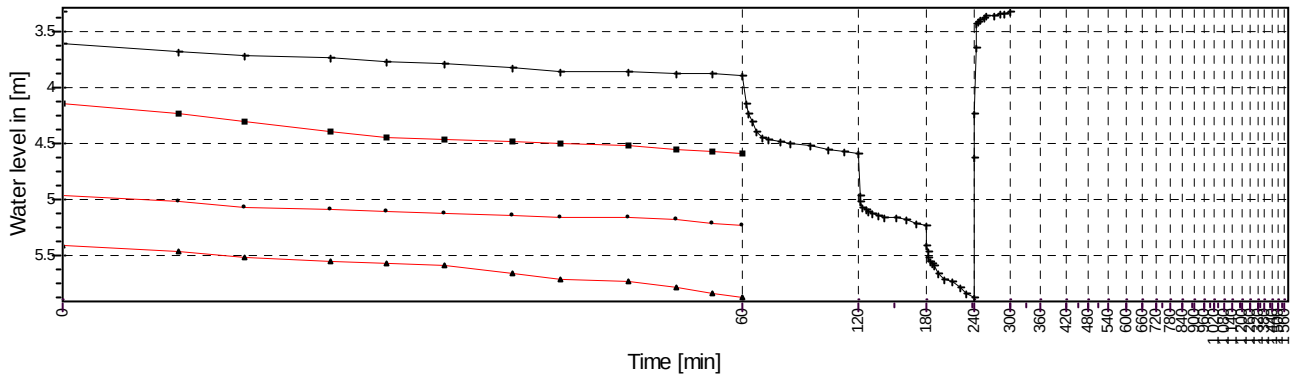
**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0173 Number: SD1-21 Site type: Borehole

Distr./Farm No.: 458 Site Name/Des.: CARTER BLOCK

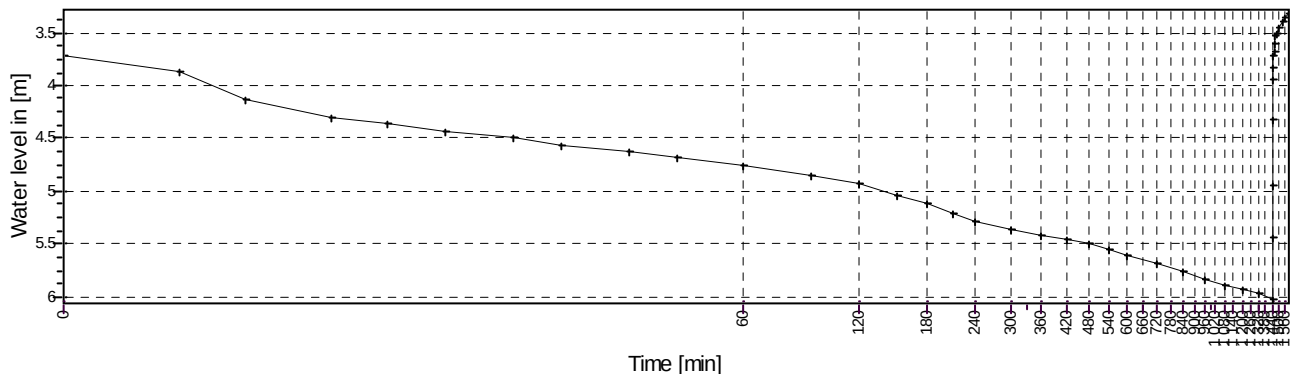
|               |           |                  |  |                |        |                 |          |
|---------------|-----------|------------------|--|----------------|--------|-----------------|----------|
| Latitude [°]  | 28.304334 | Alt. No. 1:      |  | Diam. [mm]:    | 165    | Water lev. [m]: | 3.32     |
| Longitude [°] | 23.589058 | Alt. No. 2:      |  | Depth [m]:     | 103.00 | Piezometer:     | 0        |
| Altitude [m]: | 1434.86   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.53   | Date WL meas.:  | 20130512 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

Multirate Test



Constant Rate Test



| PUMPING TEST: |                    | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|---------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| Rep. Inst.    | Meth. tested       |                     |               |      |             |      |                               |           |                 |
| GOLD          | Step test          | 82.80               | 20130512      | 1200 | 20130512    | 1700 |                               |           |                 |
| GOLD          | Constant rate test | 82.80               | 20130512      | 1730 | 20130513    | 2000 | 714                           |           | 0.42            |

| TESTING DETAILS: |             | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----------------|----------------------------|-------------|---------|------|
| Description      | Time start. |              |                    |                  |            | %          |                 |                            |             |         |      |
| STEP TEST STEP 1 | 1200        | 60           | 82.80              | 5.11             | 0.58       |            |                 |                            |             |         | 8.81 |
| STEP TEST STEP 2 | 1300        | 60           | 82.80              | 10.32            | 1.27       |            |                 |                            |             |         | 8.13 |
| STEP TEST STEP 3 | 1400        | 60           | 82.80              | 15.12            | 1.91       |            |                 |                            |             |         | 7.92 |
| STEP TEST STEP 4 | 1500        | 60           | 82.80              | 21.55            | 2.56       | 100        | 60              |                            |             |         | 8.42 |
| CONSTANT         | 1730        | 1440         | 82.80              | 20.11            | 2.70       | 100        | 150             | 714                        |             |         | 7.45 |



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Project No.: 11613568

# Borehole Construction and Geological Log

Date compiled: 2013/06/13

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0177 Number: SD1-22 Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Region Type: Water supply authority

Region Descr.: KGATELOPELE LM

Latitude [°]: 28.297378

Reg./BB.:

Topo-set.:

Depth [m]: 49.00

Longitude [°]: 23.583311

G-Nr.:

Site status: Unused

Col. ht. [m]: 0.57

Altitude [m]: 1435.87

Site purp.: Production (water supply)

Diam. [mm]: 203

Coord. acc.: Accurate to within 1 unit

Use applic.: Domestic - all purposes

Drain. reg.: C92A

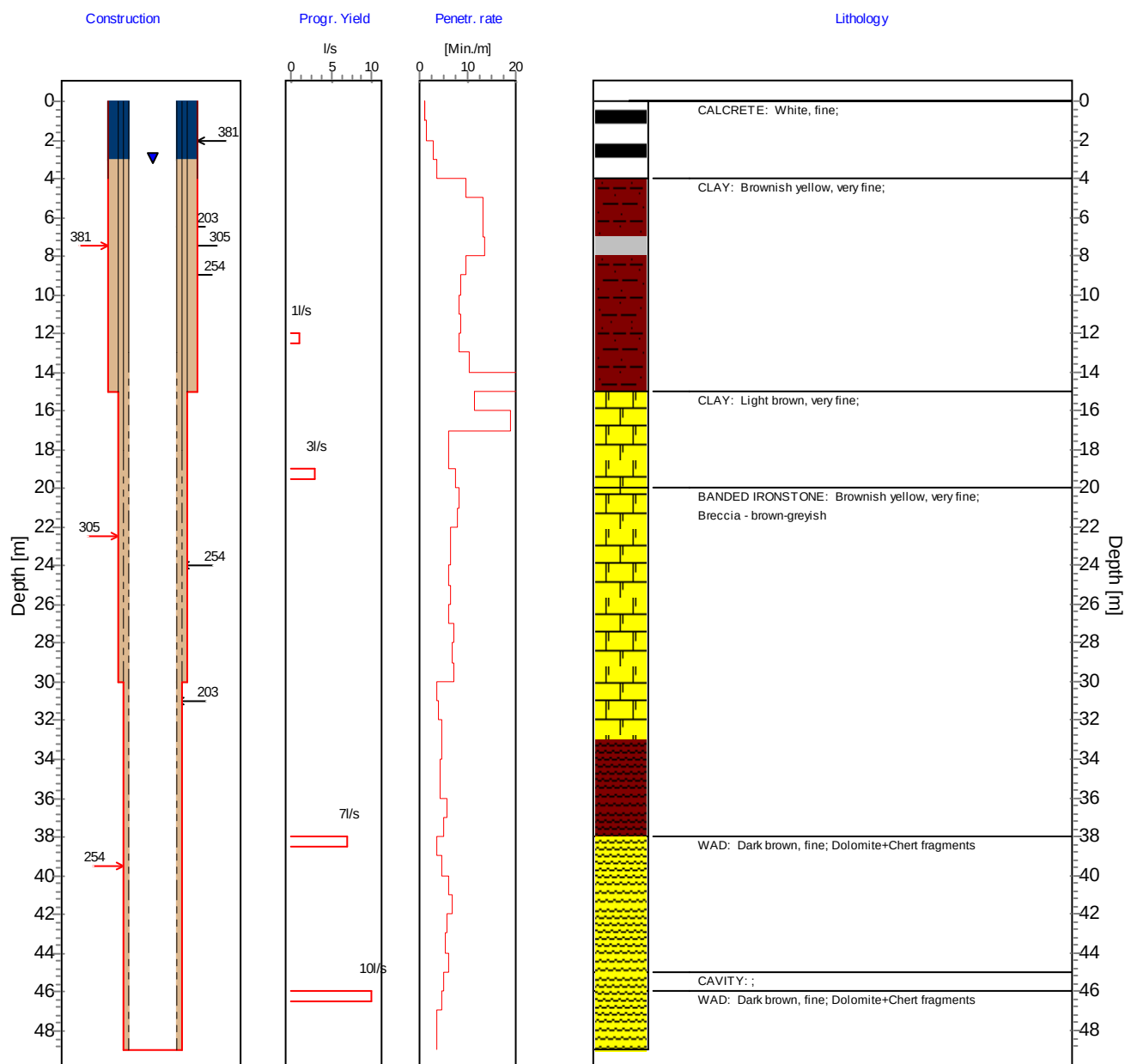
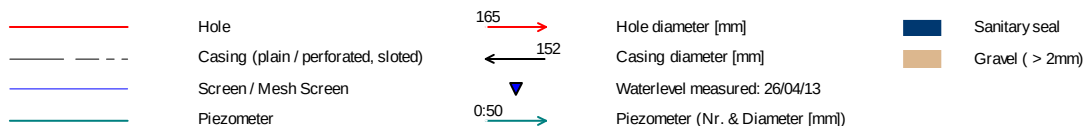
Coord. meth.: Altimeter

Equipment: No equipment

Rep. inst.: GOLD

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Construction and Geohydrological Legend



COMMENT:



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0177 Number: SD1-22 Site type: Borehole

Distr./Farm No.: 458 Site Name/Descr.: CARTER BLOCK

|                |           |             |      |               |       |                 |          |
|----------------|-----------|-------------|------|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.297378 | Alt. No. 1: |      | Diam. [mm]:   | 203   | Water lev. [m]: | 4.24     |
| Longitude [°]: | 23.583311 | Alt. No. 2: |      | Depth [m]:    | 49.00 | WL status:      | Static   |
| Altitude [m]:  | 1435.87   | Rep. inst.: | GOLD | Col. ht. [m]: | 0.57  | Date WL meas.:  | 20130426 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                     |
|----------------|---------------------|
| <b>Pump:</b>   |                     |
| Type of Inst.: | Pulley Diam. [mm]:  |
| Manufacturer:  | Depth to Intk. [m]: |
| <b>Engine:</b> |                     |
| Manufacturer:  | Power Rating [kW]   |
| Type of Power: | Pulley Diam. [mm]:  |

### USE APPLICATION:

Site Status: Unused  
Purpose: Production (water supply)  
Consumer: Non-urban  
Application: Domestic - all purposes

### WATER CHEMISTRY:

|                  |        |               |          |                                                                                                                                                                                                                                                                                  |       |                        |        |           |
|------------------|--------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|
| Sample No.:      | SD1-22 | Date sampled: | 20130515 | Depth sampl. [m]:                                                                                                                                                                                                                                                                | 46.80 | Comment:               |        |           |
| Main Parameters: |        |               |          | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |
| pH:              | 7.49   | Na:           | 11.7     | Cl:                                                                                                                                                                                                                                                                              | 27.5  | Langel.:               | 0.23   | E.Coli:   |
| EC: [mS/m]       | 59.8   | K:            | 2.32     | NO3 as N:                                                                                                                                                                                                                                                                        | 3.38  | Aggr-Ind:              | 12.29  | Faec. co: |
| TDS:             | 376    | Si:           | 14.7     | SO4:                                                                                                                                                                                                                                                                             | 26.6  | Ion-bal:               | 0.17   | Total Co: |
| T. Alk.:         | 292    | Al:           | < 0.05   | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 343.64 | SPC:      |
| Ca:              | 86.3   | Fe:           | < 0.05   | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |
| Mg:              | 31.2   | Mn:           | < 0.05   |                                                                                                                                                                                                                                                                                  |       |                        |        |           |

### AQUIFER INFORMATION:

| Depth to Top [m] | Depth to Bot. [m] | Yield[l/s] | Method meas.          | Aquifer type | Comment |
|------------------|-------------------|------------|-----------------------|--------------|---------|
| 12.00            | 12.50             | 1.00       | Notch (V- or U-notch) |              |         |
| 19.00            | 19.50             | 3.00       | Notch (V- or U-notch) |              |         |
| 38.00            | 38.50             | 7.00       | Notch (V- or U-notch) |              |         |
| 46.00            | 46.50             | 10.00      | Notch (V- or U-notch) |              |         |

### CASING DETAILS:

| Depth to Top [m] to Bot. [m] |       | Diam. [mm] | Material | Thickn. [mm] | Type of openings      | Openings [mm]: Length Width |  | Hor. Dist. | Vert. Dist. |
|------------------------------|-------|------------|----------|--------------|-----------------------|-----------------------------|--|------------|-------------|
| 0.00                         | 4.00  | 381        | Steel    |              | Plain casing          |                             |  |            |             |
| 0.00                         | 13.00 | 203        | Steel    |              | Plain casing          |                             |  |            |             |
| 0.00                         | 15.00 | 305        | Steel    |              | Plain casing          |                             |  |            |             |
| 0.00                         | 18.00 | 254        | Steel    |              | Plain casing          |                             |  |            |             |
| 13.00                        | 49.00 | 203        | Steel    |              | Perforated or slotted |                             |  |            |             |
| 18.00                        | 30.00 | 254        | Steel    |              | Perforated or slotted |                             |  |            |             |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20130514 | 60           | 46.80              | 6.09             | 2.06       |                |       |          |         |         |
| STEP TEST STEP 2 | 20130514 | 60           | 46.80              | 12.09            | 4.93       |                |       |          |         |         |
| STEP TEST STEP 3 | 20130514 | 60           | 46.80              | 18.11            | 6.62       |                |       |          |         |         |
| STEP TEST STEP 4 | 20130514 | 60           | 46.80              | 25.12            | 9.59       | 100            | 7     |          |         |         |
| CONSTANT         | 20130515 | 1440         | 46.80              | 20.04            | 11.59      | 100            | 120   | 681      |         |         |

### RECOMMENDATIONS:

| Prior.                                                                                          | Rec. equipm.   | Depth to intk. [m] | Type of power  | Duty cyc. [hrs] | Disch. rate [l/s] | Water quality | Dyn. water level [m] | Crit. water level [m] |
|-------------------------------------------------------------------------------------------------|----------------|--------------------|----------------|-----------------|-------------------|---------------|----------------------|-----------------------|
| 1                                                                                               | Mono-type pump | 36.00              | Electric motor | 12              | 5.00              | CLASS 0       | 5.40                 | 37.00                 |
| <b>Note:</b> 1. Production borehole.<br>2. Install water level monitoring facility in borehole. |                |                    |                |                 |                   |               |                      |                       |



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# PUMPING TEST REPORT

Date compiled: 31/03/2014

## BASIC SITE INFORMATION:

Site Identifier: 2823BCX0177 Number: SD1-22

Site type: Borehole

Distr./Farm No.: 458

Site Name/Des.: CARTER BLOCK

Latitude [°] 28.297378  
Longitude [°] 23.583311  
Altitude [m]: 1435.87

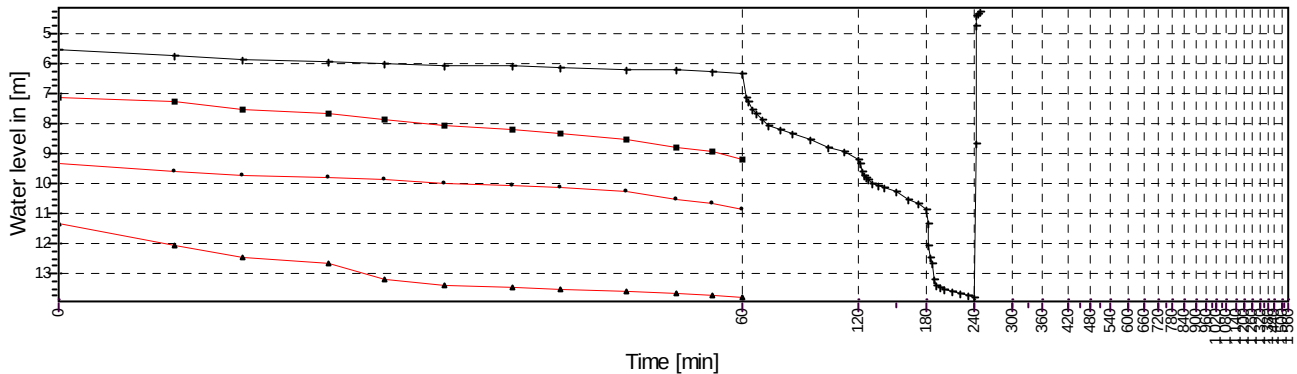
Alt. No. 1:  
Alt. No. 2:  
Rep. inst.: GOLD

Diam. [mm]: 203  
Depth [m]: 49.00  
Col. ht. [mm]: 0.57

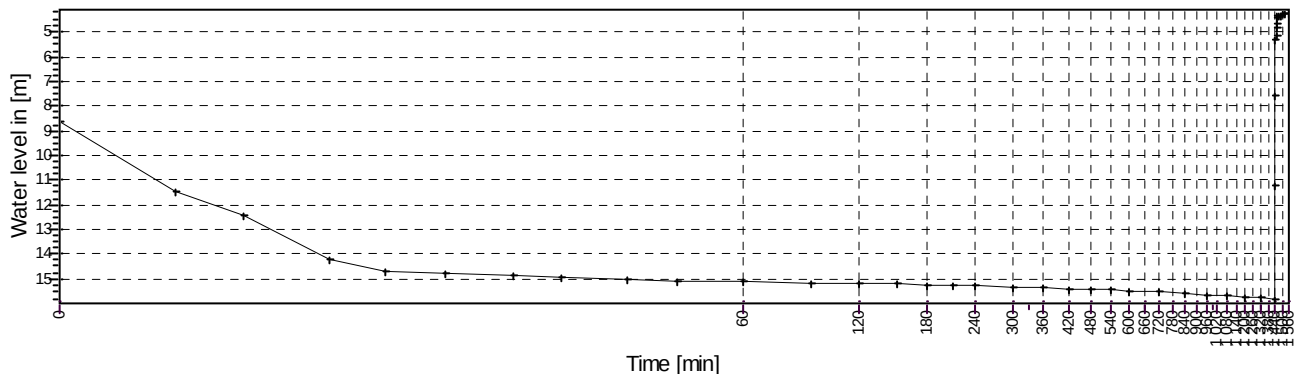
Water lev. [m]: 4.24  
Piezometer: 0  
Date WL meas.: 20130426

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### Multirate Test



### Constant Rate Test



### PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 46.80               | 20130514      | 1100 | 20130514    | 1507 |                               |           |                 |
| GOLD       | Constant rate test | 46.80               | 20130515      | 0840 | 20130516    | 1040 | 681                           |           | 2.50            |

### TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | % | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|---|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1100        | 60           | 46.80              | 6.09             | 2.06       |            |   |                 |                            |             |         | 2.96 |
| STEP TEST STEP 2 | 1200        | 60           | 46.80              | 12.09            | 4.93       |            |   |                 |                            |             |         | 2.45 |
| STEP TEST STEP 3 | 1300        | 60           | 46.80              | 18.11            | 6.62       |            |   |                 |                            |             |         | 2.74 |
| STEP TEST STEP 4 | 1400        | 60           | 46.80              | 25.12            | 9.59       | 100        |   | 7               |                            |             |         | 2.62 |
| CONSTANT         | 0840        | 1440         | 46.80              | 20.04            | 11.59      | 100        |   | 120             | 681                        |             |         | 1.73 |



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0026 Number: SD1-GAA026 Site type: Borehole

Distr./Farm No.: RE458 Site Name/Descr.: CARTER BLOCK PTN. LAUGHING WATERS

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.311030 | Alt. No. 1:      |  | Diam. [mm]:   | 155   | Water lev. [m]: | 16.05    |
| Longitude [°]: | 23.547900 | Alt. No. 2:      |  | Depth [m]:    | 36.35 | WL status:      | Static   |
| Altitude [m]:  | 1446.81   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.28  | Date WL meas.:  | 20121022 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

**Pump:**  
Type of Inst.: No information Pulley Diam. [mm]:  
Manufacturer: Depth to Intk. [m]:

**Engine:**  
Manufacturer: Power Rating [kW]  
Type of Power: No information Pulley Diam. [mm]:

### USE APPLICATION:

Site Status: No information  
Purpose: No information  
Consumer: No information  
Application: No information

### WATER CHEMISTRY:

|                  |        |                        |        |                                                                                                                                                                                                                                                                                  |       |                        |        |           |   |
|------------------|--------|------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|---|
| Sample No.: SD1- |        | Date sampled: 20121025 |        | Depth sampl. [m]: 32.80                                                                                                                                                                                                                                                          |       | Comment:               |        |           |   |
| Main Parameters: |        |                        |        | Calculated Parameters:                                                                                                                                                                                                                                                           |       | Bacteriol. Parameters: |        |           |   |
| pH:              | 7.35   | Na:                    | 12.9   | Cl:                                                                                                                                                                                                                                                                              | 39.1  | Langel.:               | 0.17   | E.Coli:   | 0 |
| EC: [mS/m]       | 71.1 † | K:                     | 1.79   | NO3 as N:                                                                                                                                                                                                                                                                        | 2.79  | Aggr-Ind:              | 12.24  | Faec. co: | 0 |
| TDS:             | 472    | Si:                    | 14.3   | SO4:                                                                                                                                                                                                                                                                             | 60.1  | Ion-bal:               | -1.34  | Total Co: | 0 |
| T. Alk.:         | 299    | Al:                    | < 0.05 | F:                                                                                                                                                                                                                                                                               | < 0.1 | CaCO3:                 | 385.34 | SPC:      | 0 |
| Ca:              | 104    | Fe:                    | < 0.05 | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit ¡ Value exceeds minimum allowable limit |       |                        |        |           |   |
| Mg:              | 30.6   | Mn:                    | < 0.05 |                                                                                                                                                                                                                                                                                  |       |                        |        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate [l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|-------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121022 | 60           | 32.80              | 0.55              | 5.22       |                |       |          |         |         |
| STEP TEST STEP 2 | 20121022 | 15           | 32.80              | 1.00              | 16.75      | 0.10           | 99    | 80       |         |         |
| PUMP INLET       | 20121022 | 25           | 32.80              | 0.69              | 16.75      |                |       |          |         |         |

**RECOMMENDATIONS:** Depth Duty cyc. Disch. rate Dyn. water Crit. water  
Prior. Rec. equipm. to intk. [m] Type of power [hrs] [l/s] Water quality level [m] level [m]

1

0

0

Note: 1. Leeg gepomp met sonkrag.



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# PUMPING TEST REPORT

Date compiled: 2012/11/27

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0026 Number: SD1-GAA026 Site type: Borehole

Distr./Farm No.: RE458

Site Name/Des.: CARTER BLOCK PTN. LAUGHING WATERS

Latitude [°] 28.311030

Alt. No. 1:

Diam. [mm]:

155

Water lev. [m]:

16.05

Longitude [°] 23.547900

Alt. No. 2:

Depth [m]:

36.35

Piezometer:

0

Altitude [m]:

1446.81

Rep. inst.: GOLD

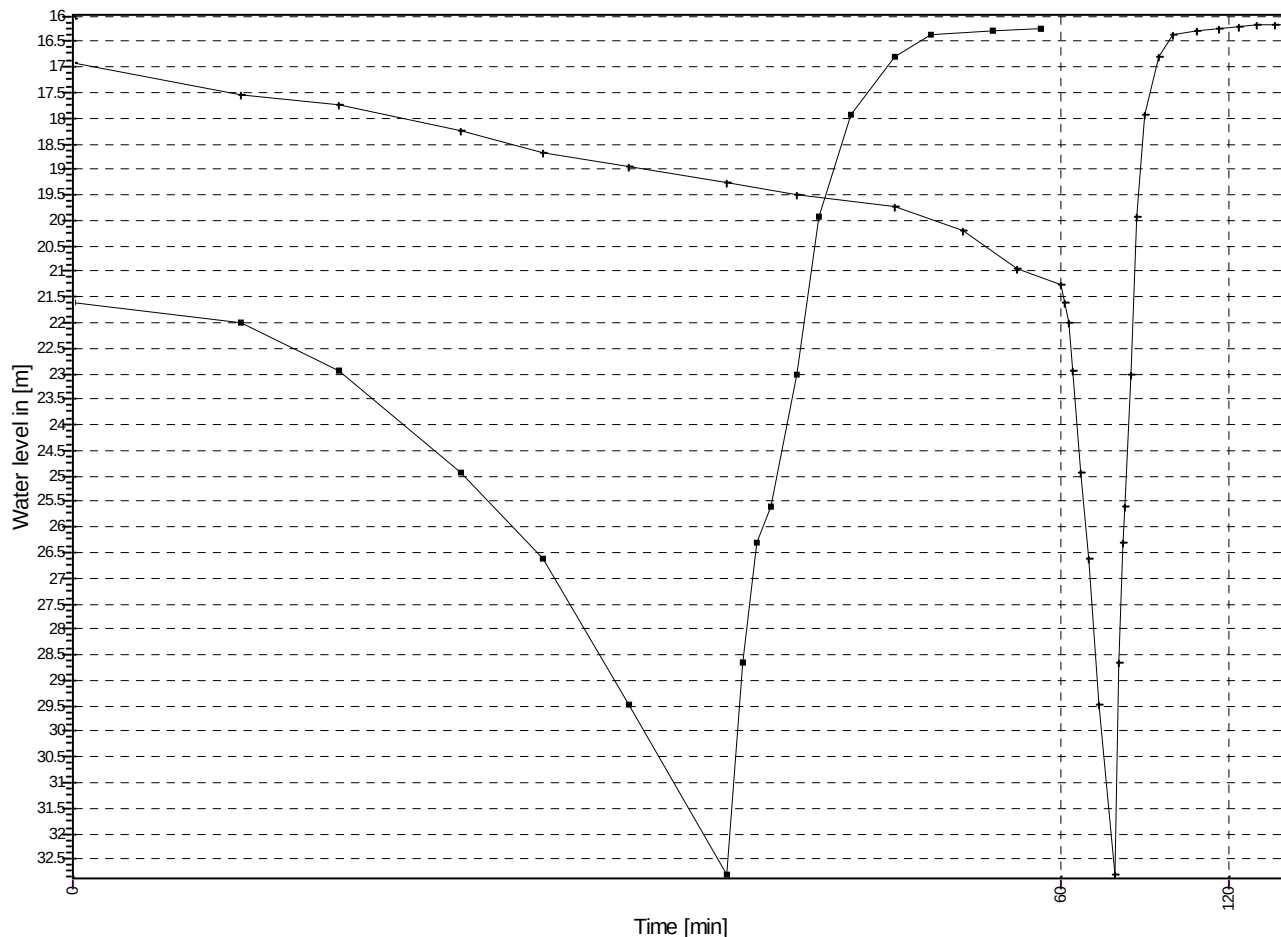
Col. ht. [mm]:

0.28

Date WL meas.: 20121022

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test    | 32.80               | 20121022      | 1325 | 20121022    | 1600 |                               |           |                 |

## TESTING DETAILS:

| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %  | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|----|-----------------|----------------------------|-------------|---------|------|
| STEP TEST STEP 1 | 1325        | 60           | 32.80              | 0.55             | 5.22       |            |    |                 |                            |             |         | 0.11 |
| STEP TEST STEP 2 | 1425        | 15           | 32.80              | 1.00             | 16.75      | 0.10       | 99 | 80              |                            |             |         | 0.06 |
| PUMP INLET       | 1600        | 25           | 32.80              | 0.69             | 16.75      |            |    |                 |                            |             |         | 0.04 |



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Project No.: 11613568

## MANAGEMENT RECOMMENDATIONS

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0027 Number: SD1-GAA027 Site type: Borehole

Distr./Farm No.: RE458 Site Name/Descr.: CARTER BOX PTN. LAUGHING WATERS

|                |           |                  |  |               |       |                 |          |
|----------------|-----------|------------------|--|---------------|-------|-----------------|----------|
| Latitude [°]:  | 28.301310 | Alt. No. 1:      |  | Diam. [mm]:   | 180   | Water lev. [m]: | 14.11    |
| Longitude [°]: | 23.575290 | Alt. No. 2:      |  | Depth [m]:    | 75.20 | WL status:      | Static   |
| Altitude [m]:  | 1445.69   | Rep. inst.: GOLD |  | Col. ht. [m]: | 0.40  | Date WL meas.:  | 20121023 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

### EXISTING EQUIPMENT:

|                |                |                     |       |
|----------------|----------------|---------------------|-------|
| <b>Pump:</b>   |                |                     |       |
| Type of Inst.: | Mono-type pump | Pulley Diam. [mm]:  | 250   |
| Manufacturer:  | MONO H20H      | Depth to Intk. [m]: | 70.80 |
| <b>Engine:</b> |                |                     |       |
| Manufacturer:  | KUBUTA         | Power Rating [kW]   | 7.09  |
| Type of Power: | Diesel engine  | Pulley Diam. [mm]:  | 110   |

### USE APPLICATION:

|              |                           |
|--------------|---------------------------|
| Site Status: | In use                    |
| Purpose:     | Production (water supply) |
| Consumer:    | Non-urban                 |
| Application: | Domestic - all purposes   |

### WATER CHEMISTRY:

|                  |      |               |          |                                                                                                                                                                                                                                                                                        |       |                        |        |           |   |
|------------------|------|---------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|--------|-----------|---|
| Sample No.:      | SD1- | Date sampled: | 20121025 | Depth sampl. [m]:                                                                                                                                                                                                                                                                      | 72.00 | Comment:               |        |           |   |
| Main Parameters: |      |               |          | Calculated Parameters:                                                                                                                                                                                                                                                                 |       | Bacteriol. Parameters: |        |           |   |
| pH:              | 7.79 | Na:           | 14.3     | Cl:                                                                                                                                                                                                                                                                                    | 37.8  | Langel.:               | 0.44   | E.Coli:   | 0 |
| EC: [mS/m]       | 58   | K:            | 2.53     | NO3 as N:                                                                                                                                                                                                                                                                              | 3.9   | Aggr-Ind:              | 12.48  | Faec. co: | 0 |
| TDS:             | 468  | Si:           | 12.3     | SO4:                                                                                                                                                                                                                                                                                   | 52    | Ion-bal:               | 7.34 † | Total Co: | 0 |
| T. Alk.:         | 216  | Al:           | <0.05    | F:                                                                                                                                                                                                                                                                                     | 0.105 | CaCO3:                 | 356.78 | SPC:      | 0 |
| Ca:              | 91.4 | Fe:           | <0.05    | Concentrations in [mg/l]; Bact. param. in counts/100ml; Chemistry Standard: SABS for human consumption<br>† Value exceeds recommended maximum limit    ‡ Value exceeds maximum allowable limit<br>! Value exceeds recommended minimum limit    ¡ Value exceeds minimum allowable limit |       |                        |        |           |   |
| Mg:              | 31.3 | Mn:           | <0.05    |                                                                                                                                                                                                                                                                                        |       |                        |        |           |   |

### TESTING DETAILS:

| Description      | Date     | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recovery [m] % | [min] | T [m²/d] | Storage | Comment |
|------------------|----------|--------------|--------------------|------------------|------------|----------------|-------|----------|---------|---------|
| STEP TEST STEP 1 | 20121023 | 60           | 72.00              | 1.08             | 0.10       |                |       |          |         |         |
| STEP TEST STEP 2 | 20121023 | 60           | 72.00              | 2.55             | 0.12       |                |       |          |         |         |
| STEP TEST STEP 3 | 20121023 | 60           | 72.00              | 4.23             | 0.16       |                |       |          |         |         |
| STEP TEST STEP 4 | 20121023 | 60           | 72.00              | 6.30             | 0.18       | 100            | 3     |          |         |         |
| CONSTANT         | 20121023 | 720          | 72.00              | 6.21             | 0.24       | 100            | 5     |          |         |         |

| RECOMMENDATIONS: |              |              |               |           |             |               |            |             |
|------------------|--------------|--------------|---------------|-----------|-------------|---------------|------------|-------------|
|                  |              | Depth        |               | Duty cyc. | Disch. rate |               | Dyn. water | Crit. water |
| Prior.           | Rec. equipm. | to intk. [m] | Type of power | [hrs]     | [l/s]       | Water quality | level [m]  | level [m]   |
| 1                |              |              |               | 5         | 0           |               |            |             |



**Golder Associates**

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Project No.: 11613568

# PUMPING TEST REPORT

Date compiled: 2012/10/26

**BASIC SITE INFORMATION:** Site Identifier: 2823BCX0027 Number: SD1-GAA027 Site type: Borehole

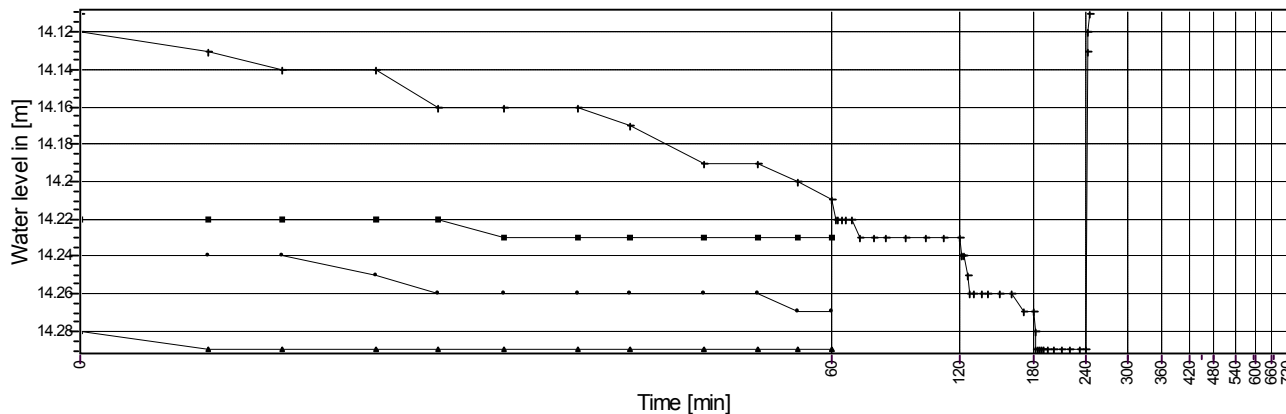
Distr./Farm No.: RE458

Site Name/Des.: CARTER BOX PTN. LAUGHING WATERS

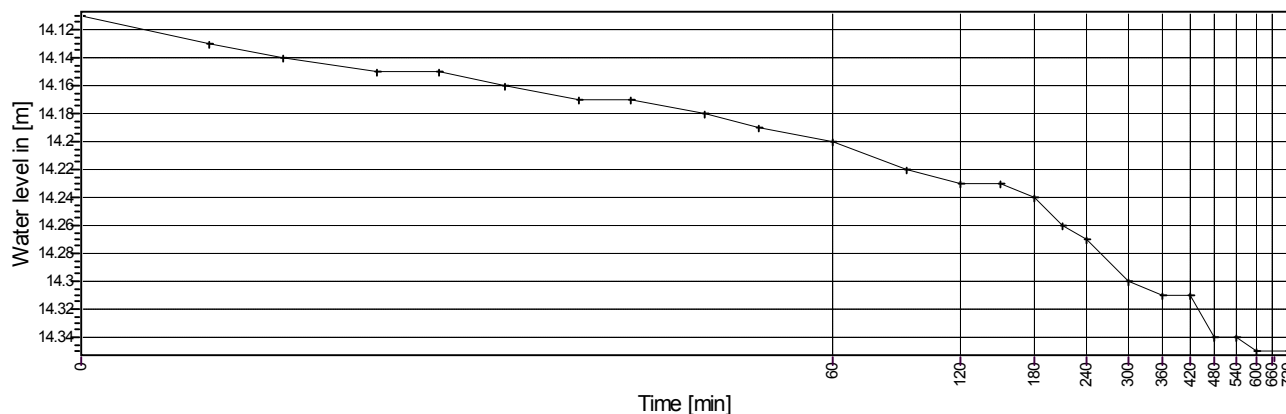
|               |           |                  |  |                |       |                 |          |
|---------------|-----------|------------------|--|----------------|-------|-----------------|----------|
| Latitude [°]  | 28.301310 | Alt. No. 1:      |  | Diam. [mm]:    | 180   | Water lev. [m]: | 14.11    |
| Longitude [°] | 23.575290 | Alt. No. 2:      |  | Depth [m]:     | 75.20 | Piezometer:     | 0        |
| Altitude [m]: | 1445.69   | Rep. inst.: GOLD |  | Col. ht. [mm]: | 0.40  | Date WL meas.:  | 20121023 |

Coordinate System: Geographic Decimal Degrees (Longitude/Latitude), Hartebeesthoek94 (WGS 84)

## Multirate Test



## Constant Rate Test



## PUMPING TEST:

| Rep. Inst. | Meth. tested       | Depth to intake [m] | Starting Date | Time | Ending Date | Time | Transmis. [m <sup>2</sup> /d] | Storativ. | Rec. abs. [l/s] |
|------------|--------------------|---------------------|---------------|------|-------------|------|-------------------------------|-----------|-----------------|
| GOLD       | Step test          | 72.00               | 20121023      | 1100 | 20121023    | 1503 |                               |           |                 |
| GOLD       | Constant rate test | 72.00               | 20121023      | 1800 | 20121024    | 0605 |                               |           |                 |

## TESTING DETAILS:

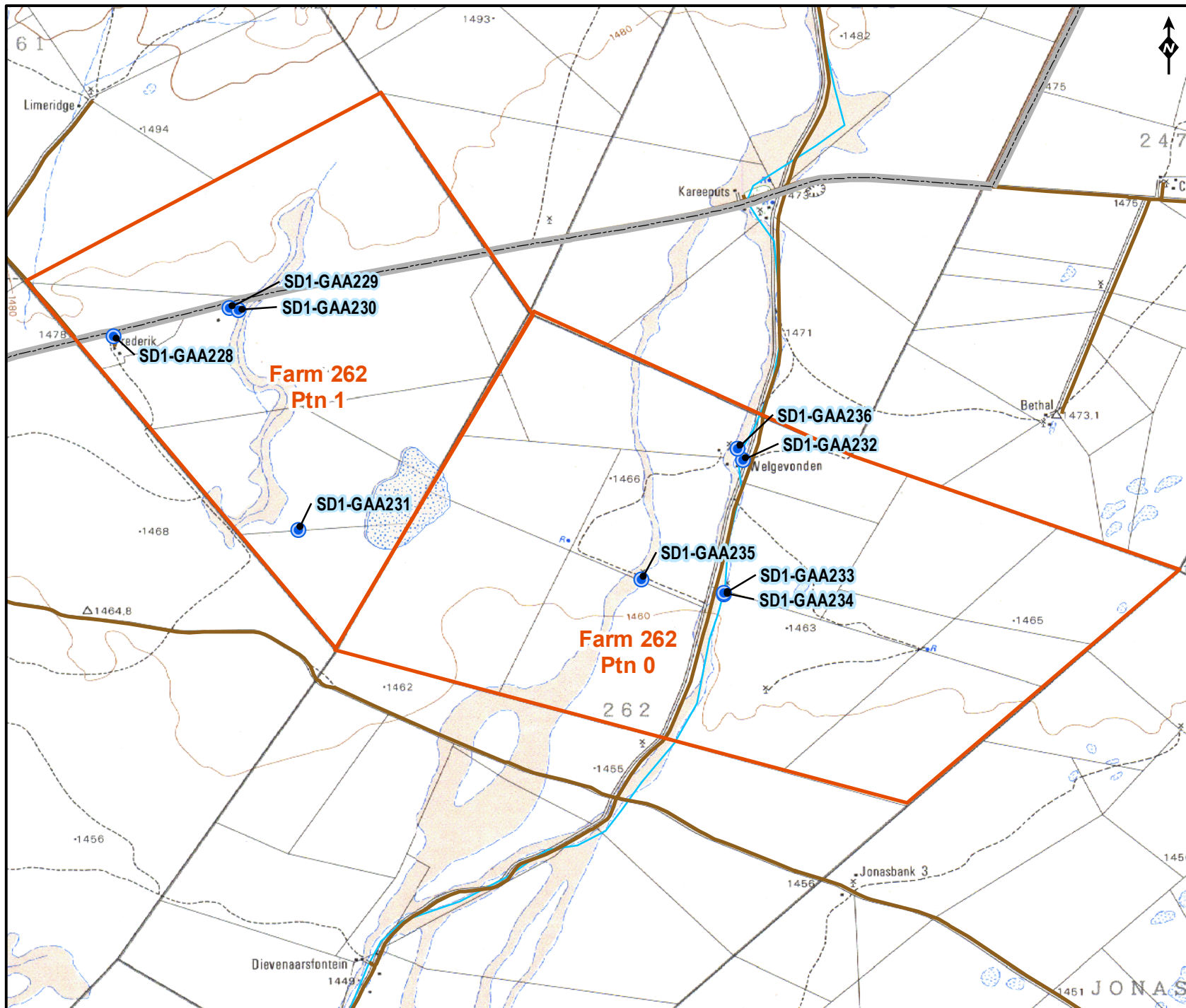
| Description      | Time start. | Durat. [min] | Depth to intk. [m] | Disch. rate[l/s] | Drawd. [m] | Recov. [m] | %   | Rec. Dur. [min] | Trans. [m <sup>2</sup> /d] | Perm. [m/d] | Storat. | Q/st  |
|------------------|-------------|--------------|--------------------|------------------|------------|------------|-----|-----------------|----------------------------|-------------|---------|-------|
| STEP TEST STEP 1 | 1100        | 60           | 72.00              | 1.08             | 0.10       |            |     |                 |                            |             |         | 10.80 |
| STEP TEST STEP 2 | 1200        | 60           | 72.00              | 2.55             | 0.12       |            |     |                 |                            |             |         | 21.25 |
| STEP TEST STEP 3 | 1300        | 60           | 72.00              | 4.23             | 0.16       |            |     |                 |                            |             |         | 26.44 |
| STEP TEST STEP 4 | 1400        | 60           | 72.00              | 6.30             | 0.18       |            | 100 | 3               |                            |             |         | 35.00 |
| CONSTANT         | 1800        | 720          | 72.00              | 6.21             | 0.24       |            | 100 | 5               |                            |             |         | 25.88 |



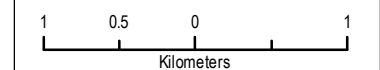
Golder Associates Africa, Pretoria  
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Fax: 012 - 364 4001  
Project No.: 11613568



## 2.31 Theuns Cloete



- LEGEND**
- Existing borehole survey
  - ▭ Farm 262 Ptn 0 & 1
  - Secondary road
  - Other road
  - Rivers
  - Dam
  - Pan
  - Marsh vlei



**RESOURCES/NOTES**  
 Coordinate System: GCS WGS 1984  
 Datum: WGS 1984

**PROJECT**  
 GW ASSESSMENT VGG SCHEME

**TITLE**  
**FARM 262 PTN 0 & 1**  
**THEUNS CLOETE**

|                      |            |
|----------------------|------------|
| PROJECT No. 11613568 | REV 0      |
| SCALE 1:50 000       | A4         |
| GIS MB               | 24/04/2014 |
| CHECK DB             | 24/04/2014 |
| REVIEW FW            | 24/04/2014 |



## THEUNS CLOETE - BASIC SITE INFORMATION

| SITE LOCATION          |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:       | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BAX0003            | SD1-GAA228 | 261      | FREDERIK              | B          | 28.16641967  | 23.600160001  | 1477.60      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BAX0004            | SD1-GAA229 | 261      | FREDERIK              | B          | 28.16403967  | 23.609900001  | 1474.00      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BAX0005            | SD1-GAA230 | 261      | FREDERIK              | B          | 28.16419967  | 23.610690001  | 1473.40      |              |            |                 |              |            |                |                       |                |                 |                   |
| 2823BAX0006            | SD1-GAA231 | 261      | FREDERIK              | B          | 28.18273967  | 23.615730001  | 1464.90      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BAX0007            | SD1-GAA232 | 262      | WELGEVONDEN           | B          | 28.17684967  | 23.653050001  | 1468.80      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BAX0008            | SD1-GAA233 | 262      | WELGEVONDEN           | B          | 28.18809967  | 23.651490001  | 1465.20      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BAX0009            | SD1-GAA234 | 262      | WELGEVONDEN           | B          | 28.18804967  | 23.651500001  | 1465.10      | 0.33         | 165        |                 | 3.76         |            |                |                       |                |                 |                   |
| 2823BAX0010            | SD1-GAA235 | 262      | WELGEVONDEN           | B          | 28.18691967  | 23.644540001  | 1464.60      |              | 165        |                 |              |            |                |                       |                |                 |                   |
| 2823BAX0011            | SD1-GAA236 | 262      | WELGEVONDEN           | B          | 28.17585967  | 23.652590001  | 1470.10      | 0.60         | 165        |                 | 2.19         |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>        |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> |              |            |                | 3.76                  |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Minimum:</b> |              |            |                | 2.19                  |                |                 |                   |
| <b>Nr. of sites:</b> 9 |            |          |                       |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Average:</b> |              |            |                | 2.97                  |                |                 |                   |

### SUMMARY:

Site Type:  
B = Borehole

Nr. of sites: 9

Maximum: 3.76

Minimum: 2.19

Sum:

Average: 2.97

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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Project No.: 11613568



## THEUNS CLOETE - TIME DEPENDENT CHEMISTRY REPORT

Site Identifier: 2823BAX0007 Number: SD1-GAA232 Site Name: WELGEVONDEN

| Samp. Nr./Type | Date/Time samp. | pH   | EC   | TDS | Ca   | Mg   | Na  | K    | Si   | Al   | Fe | Mn | Cl   | SO4 | NO3 as N | F     | T. Alk. |
|----------------|-----------------|------|------|-----|------|------|-----|------|------|------|----|----|------|-----|----------|-------|---------|
| SD1-GA232      | 20121112 0800   | 8.16 | 60.6 | 430 | 78.1 | 50.2 | 8.9 | 1.36 | 11.9 | 0.02 | 0  | 0  | 21.7 | 14  | 2.62     | < 0.1 | 334     |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

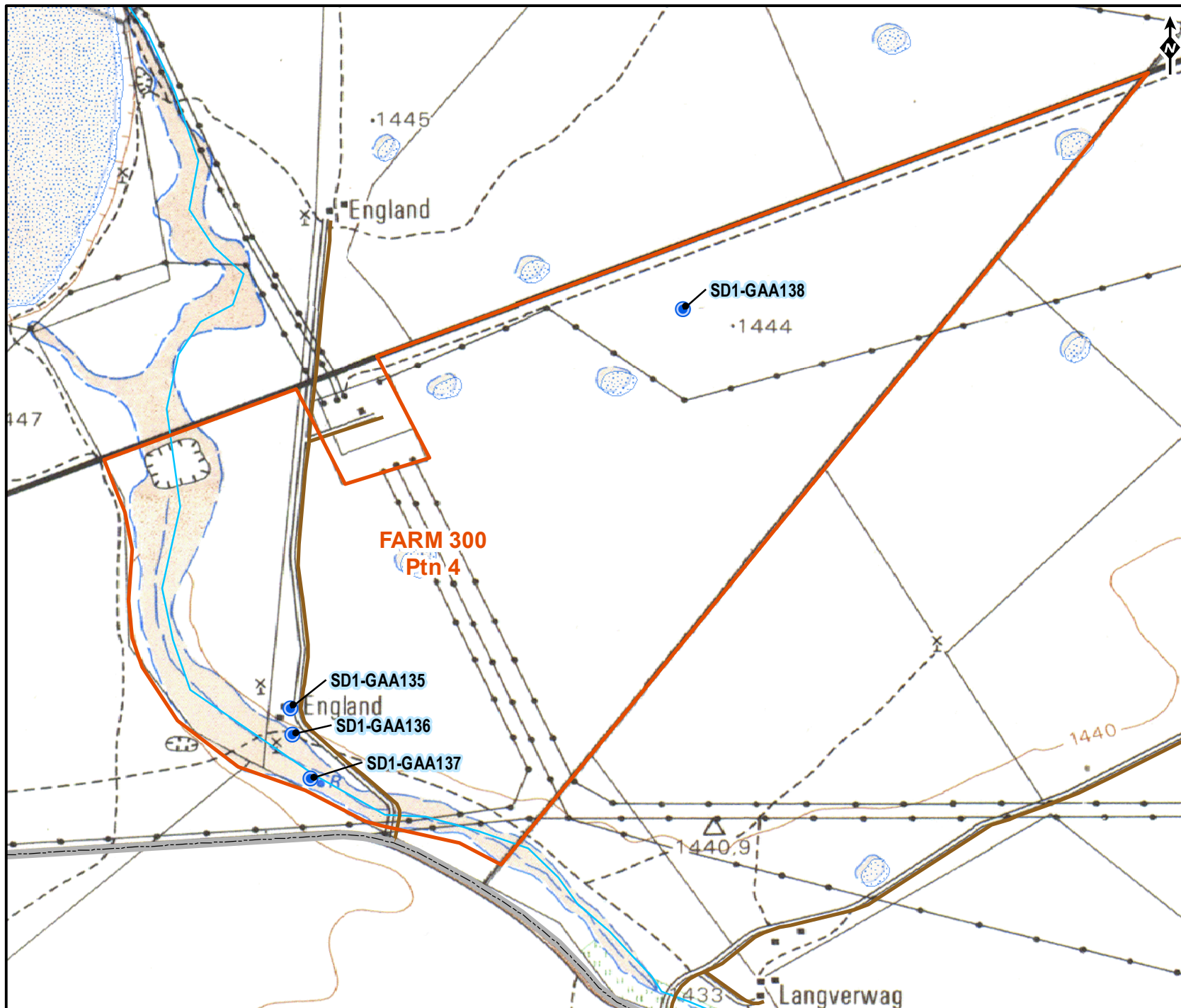
Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
P: Pressed or pellet  
R: Rock  
S: Soil  
X: Other source



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Project No.: 11613568

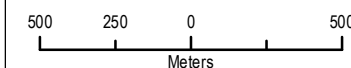


## **2.32 Theuns Vermeulen**



#### LEGEND

- Existing borehole survey
- Farm 300 Ptn 4
- Secondary road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei



#### RESOURCES/NOTES

Coordinate System: GCS WGS 1984  
Datum: WGS 1984

#### PROJECT

GW ASSESSMENT VGG SCHEME

#### TITLE

**FARM 300 PTN 4  
THEUNS VERMEULEN**

|                      |    |            |
|----------------------|----|------------|
| PROJECT No. 11613568 |    | REV 0      |
| SCALE 1:25 000       |    | A4         |
| GIS                  | MB | 24/04/2014 |
| CHECK                | DB | 24/04/2014 |
| REVIEW               | FW | 24/04/2014 |



## THEUNS VERMEULEN - BASIC SITE INFORMATION

| SITE LOCATION    |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier: | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BCX0108      | SD1-GAA135 | RE300/4  | ENGELAND              | B          | 28.34428967  | 23.620280001  | 1444.60      |              | 165        | 30.00           |              |            |                |                       |                |                 |                   |
| 2823BCX0109      | SD1-GAA136 | RE300/4  | ENGELAND              | B          | 28.34540967  | 23.620380001  | 1438.20      |              | 165        | 25.00           |              |            |                |                       |                |                 |                   |
| 2823BCX0110      | SD1-GAA137 | RE300/4  | ENGELAND              | B          | 28.34725967  | 23.621140001  | 1438.50      |              | 165        | 30.78           |              |            |                |                       | 0              | 8               |                   |
| 2823BCX0111      | SD1-GAA138 | RE300/4  | ENGELAND              | B          | 28.32753967  | 23.636770001  | 1446.30      |              | 165        | 40.00           |              | 1.00       |                |                       |                |                 |                   |
| <b>SUMMARY:</b>  |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> | 40.00        | 1.00       |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Minimum:</b> | 25.00        | 1.00       |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Sum:</b>     |              | 1.00       |                |                       |                |                 |                   |
|                  |            |          |                       |            |              |               |              |              |            | <b>Average:</b> | 31.45        | 1.00       |                |                       |                |                 |                   |

### SUMMARY:

Site Type:  
B = Borehole

Nr. of sites: 4

Maximum:

40.00

1.00

Minimum:

25.00

1.00

Sum:

1.00

Average:

31.45

1.00

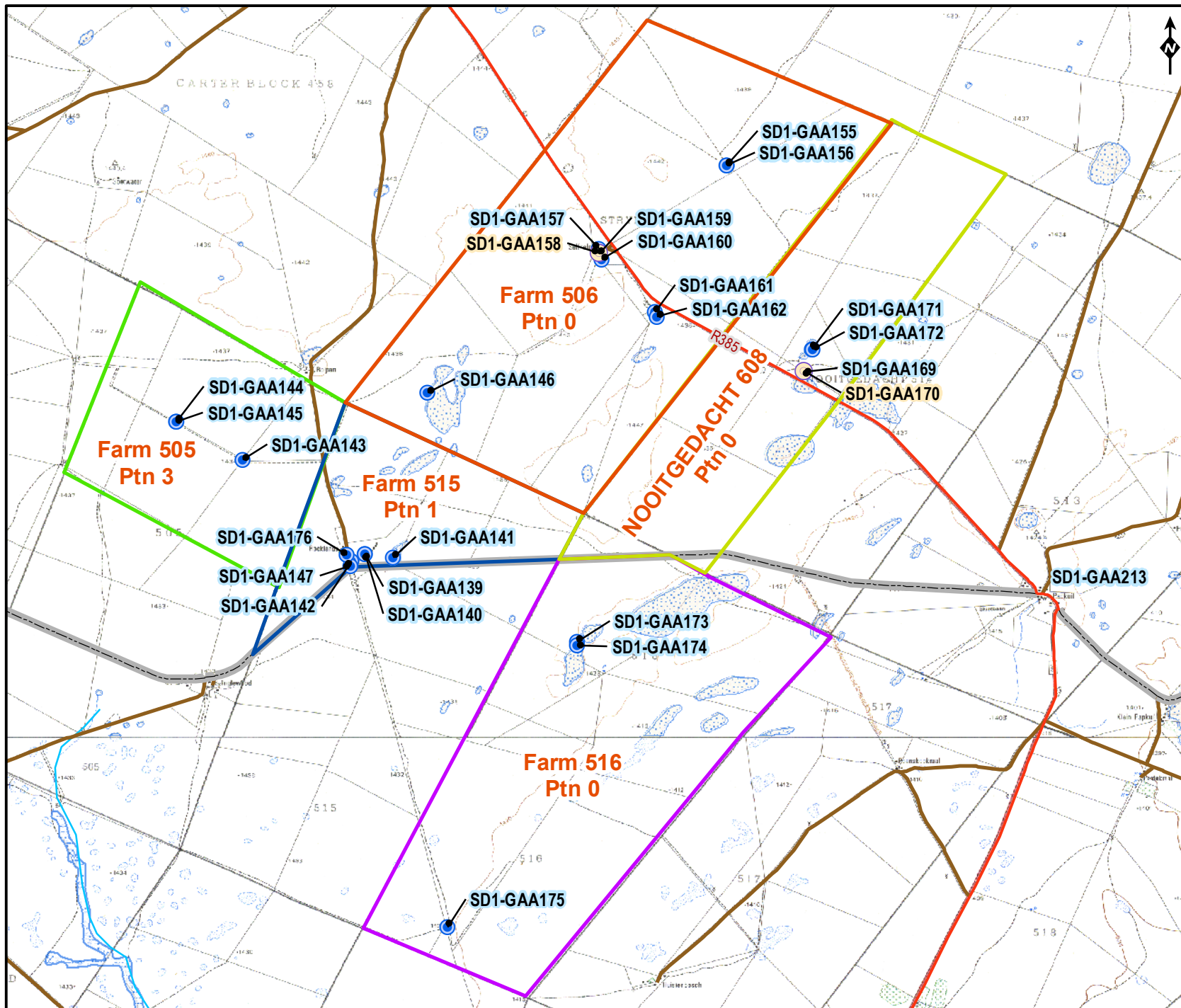
NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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Project No.: 11613568



### 2.33 Thinus van der Spuy



**LEGEND**

- Existing borehole survey
- Dug well
- Farm 505 Ptn 3
- Farm 506 Ptn 0
- Farm 515 Ptn 1
- Farm 516 Ptn 0
- Nootgedacht 608 Ptn 0
- Main road
- Secondary road
- Other road
- Rivers
- Dam
- Pan
- Marsh vlei

2 1 0 2  
Kilometers

|                                                                                                                                   |       |            |
|-----------------------------------------------------------------------------------------------------------------------------------|-------|------------|
| <b>RESOURCES/NOTES</b>                                                                                                            |       |            |
| Coordinate System: GCS WGS 1984                                                                                                   |       |            |
| Datum: WGS 1984                                                                                                                   |       |            |
| <b>PROJECT</b>                                                                                                                    |       |            |
| GW ASSESSMENT VGG SCHEME                                                                                                          |       |            |
| <b>TITLE</b>                                                                                                                      |       |            |
| FARM 505 PTN 3, FARM 506 PTN 0                                                                                                    |       |            |
| FARM 515 PTN 1, FARM 516 PTN 0                                                                                                    |       |            |
| NOOTGEDACHT 608 PTN 0                                                                                                             |       |            |
| THINUS VAN DER SPUY                                                                                                               |       |            |
| PROJECT No. 11613568                                                                                                              | REV 0 |            |
| SCALE 1:90 000                                                                                                                    | A4    |            |
| GIS                                                                                                                               | MB    | 25/04/2014 |
| CHECK                                                                                                                             | DB    | 25/04/2014 |
| REVIEW                                                                                                                            | FW    | 25/04/2014 |
|  Golder Associates<br>Pretoria, South Africa |       |            |

# **THINUS VAN DER SPUY - BASIC SITE INFORMATION**

| SITE LOCATION    |            |          |                          |            |              |               |              |              |            | GEOHYDROLOGY |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------|------------|----------|--------------------------|------------|--------------|---------------|--------------|--------------|------------|--------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier: | Number:    | District | Site name/Description    | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]    | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BC00066      | SD1-GAA213 | RE513/1  | PAPKUIL                  | B          | 28.47893967  | 23.673680001  | 1422.10      | 0.14         | 165        | 15.24        | 1.62         |            |                |                       |                |                 |                   |
| 2823BC00096      | SD1-GAA143 | 505/3    | INGLEWOOD PTN. ROCKLANDS | B          | 28.45833967  | 23.552530001  | 1434.70      |              | 165        | 55.00        | 29.15        |            |                |                       |                |                 |                   |
| 2823BC00102      | SD1-GAA142 | 515/1    | ROCKLANDS                | B          | 28.47363967  | 23.568890001  | 1437.60      |              | 165        |              | 11.74        |            |                |                       |                |                 |                   |
| 2823BC00103      | SD1-GAA139 | 515/1    | ROCKLANDS                | B          | 28.47251967  | 23.570990001  | 1434.60      |              | 165        | 27.00        | 9.30         |            |                |                       |                |                 |                   |
| 2823BCX0112      | SD1-GAA140 | 515/1    | ROCKLANDS                | B          | 28.47252967  | 23.571020001  | 1434.70      |              | 165        |              | 9.06         |            |                |                       |                |                 |                   |
| 2823BCX0113      | SD1-GAA144 | 505/3    | INGLEWOOD                | B          | 28.45258967  | 23.542540001  | 1434.40      |              |            |              |              |            |                |                       |                |                 |                   |
| 2823BCX0114      | SD1-GAA145 | 505/3    | INGLEWOOD PTN. ROCKLANDS | B          | 28.45258967  | 23.542460001  | 1434.20      |              |            | 18.44        |              |            |                |                       |                |                 |                   |
| 2823BCX0115      | SD1-GAA146 | 506/0    | STRYDPAN                 | B          | 28.44825967  | 23.580520001  | 1435.00      |              | 165        |              |              |            |                |                       |                |                 |                   |
| 2823BCX0116      | SD1-GAA147 | 515/1    | ROCKLANDS                | B          | 28.47433967  | 23.568810001  | 1438.50      |              | 165        | 8.66         |              |            |                |                       |                |                 |                   |
| 2823BCX0117      | SD1-GAA155 | 506/0    | STRYDPAN PTN. SELFHELP   | B          | 28.41386967  | 23.625670001  | 1439.70      |              | 165        |              |              |            |                |                       |                |                 |                   |
| 2823BCX0118      | SD1-GAA156 | 506/0    | STRYDPAN PTN. SELFHELP   | B          | 28.41382967  | 23.625590001  | 1439.70      | 165          |            |              |              |            |                |                       |                |                 |                   |
| 2823BCX0119      | SD1-GAA157 | 506/0    | STRYDPAN PTN. SELFHELP   | B          | 28.42649967  | 23.606320001  | 1437.40      | 0.36         | 165        |              | 5.12         |            |                |                       |                |                 |                   |
| 2823BCX0120      | SD1-GAA158 | 506/0    | STRYDPAN PTN. SELFHELP   | D          | 28.42705967  | 23.606380001  | 1435.70      |              |            | 4.81         |              |            |                |                       |                |                 |                   |
| 2823BCX0121      | SD1-GAA159 | 506/0    | STRYDPAN PTN. SELFHELP   | B          | 28.42725967  | 23.606360001  | 1435.80      |              | 165        |              |              | 4.00       |                |                       |                |                 |                   |
| 2823BCX0122      | SD1-GAA160 | 506/0    | STRYDPAN PTN. SELFHELP   | B          | 28.42806967  | 23.606820001  | 1437.30      | 165          |            |              |              |            |                |                       |                |                 |                   |
| 2823BCX0123      | SD1-GAA161 | 506/0    | STRYDPAN PTN. SELFHELP   | B          | 28.43603967  | 23.614790001  | 1437.00      |              | 165        |              |              |            |                |                       |                |                 |                   |
| 2823BCX0124      | SD1-GAA162 | 506/0    | STRYDPAN PTN. SELFHELP   | B          | 28.43663967  | 23.615140001  | 1436.90      | 165          |            |              |              |            |                |                       |                |                 |                   |
| 2823BCX0125      | SD1-GAA169 | 514/2    | NOOITGEDACHT             | B          | 28.44509967  | 23.637440001  | 1428.00      |              | 155        |              |              | 4.00       |                |                       |                |                 |                   |
| 2823BCX0126      | SD1-GAA170 | 514/2    | NOOITGEDACHT             | D          | 28.44497967  | 23.637250001  | 1428.10      |              |            |              |              |            |                |                       |                |                 |                   |
| 2823BCX0127      | SD1-GAA171 | 608/0    | NOOITGEDACHT             | B          | 28.44158967  | 23.638480001  | 1427.50      |              | 165        |              |              | 4.26       |                |                       |                |                 |                   |
| 2823BCX0128      | SD1-GAA172 | 608/0    | NOOITGEDACHT             | B          | 28.44157967  | 23.638680001  | 1427.70      | 0.18         | 165        |              |              |            |                |                       |                |                 |                   |
| 2823BCX0129      | SD1-GAA173 | RE516/0  | SWARTDAM                 | B          | 28.48581967  | 23.602990001  | 1418.90      |              | 0.18       | 165          |              | 10.89      |                |                       |                |                 |                   |
| 2823BCX0130      | SD1-GAA174 | RE516/0  | SWARTDAM                 | B          | 28.48642967  | 23.603090001  | 1419.70      | 165          |            |              |              |            |                |                       |                |                 |                   |
| 2823BCX0131      | SD1-GAA176 | 515/1    | ROCKLANDS                | B          | 28.47271967  | 23.568290001  | 1439.30      |              | 165        |              | 9.61         |            |                |                       |                |                 |                   |
| 2823DAX0011      | SD1-GAA175 | RE516/0  | SWARTDAM                 | B          | 28.52898967  | 23.583410001  | 1421.20      |              | 165        |              |              |            |                |                       |                |                 |                   |
| SUMMARY:         |            |          |                          |            |              |               |              |              |            | Maximum:     | 55.00        | 29.15      |                |                       |                |                 |                   |
| Nr. of sites: 25 |            |          |                          |            |              |               |              |              |            | Minimum:     | 15.24        | 1.62       |                |                       |                |                 |                   |
|                  |            |          |                          |            |              |               |              |              |            | Sum:         |              |            |                |                       |                |                 |                   |
|                  |            |          |                          |            |              |               |              |              |            | Average:     | 32.41        | 9.74       |                |                       |                |                 |                   |

Site Type:  
B = Borehole  
D = Dug well

NOTE:  
"Yield" represents cumulative blow yield  
The recommended abstraction ("Rec. abs.")  
is based on a 24 hour duty cycle  
(based on test pumping result)



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## THINUS VAN DER SPUY - TIME DEPENDENT CHEMISTRY REPORT

**Site Identifier:** 2823BCX0121 **Number:** SD1-GAA159 **Site Name:** STRYDPAN PTN. SELFHELP

| Samp. Nr./Type | Date/Time samp. | pH   | EC    | TDS    | Ca  | Mg     | Na   | K    | Si   | T. Alk. | Cl  | SO4 | NO3 as N | F     |
|----------------|-----------------|------|-------|--------|-----|--------|------|------|------|---------|-----|-----|----------|-------|
| SD1-GA159      | 20120216 0800   | 7.69 | 168 † | 1280 † | 138 | 79.7 † | 80.7 | 87.2 | 16.1 | 431     | 188 | 114 | 34.3 ‡   | 0.161 |

**Site Identifier:** 2823BCX0130 **Number:** SD1-GAA174 **Site Name:** SWARTDAM

| Samp. Nr./Type | Date/Time samp. | pH   | EC   | TDS   | Ca  | Mg | Na   | K    | Si   | T. Alk. | Cl   | SO4  | NO3 as N | F     |
|----------------|-----------------|------|------|-------|-----|----|------|------|------|---------|------|------|----------|-------|
| SD1-GA174      | 20120216 0800   | 7.47 | 85 † | 546 † | 115 | 67 | 18.6 | 1.63 | 24.5 | 420     | 37.3 | 53.8 | < 0.3    | 0.351 |

Chemistry Standard: SABS for human consumption  
 † Value exceeds recommended maximum limit  
 ‡ Value exceeds maximum allowable limit  
 ! Value exceeds recommended minimum limit  
 j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
 EC [mS/m]  
 Nitrate as N

Sample Type Code Explanation:  
 D: Drinking water  
 E: Effluent  
 K: Sewage  
 O: Organic  
 P: Pressed or pellet  
 R: Rock  
 S: Soil  
 X: Other source

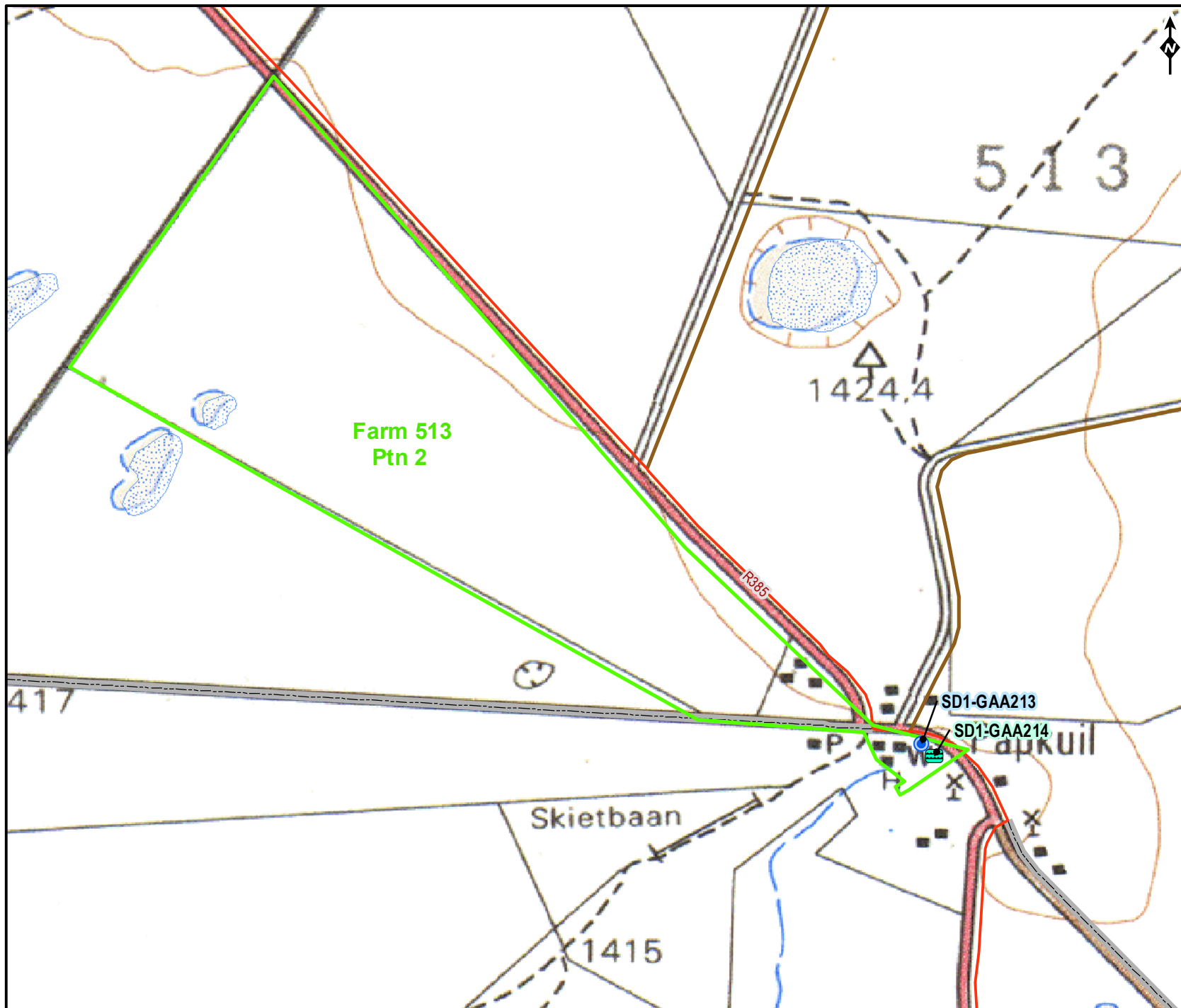


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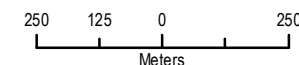




## 2.34 Vaughn Marais



- LEGEND**
- Existing borehole survey
  - Fountain
  - Farm 513 Ptn 2
  - Main road
  - - - Secondary road
  - Other road
  - Rivers
  - Dam
  - Pan
  - Marsh vlei



**RESOURCES/NOTES**  
 Coordinate System: GCS WGS 1984  
 Datum: WGS 1984

**PROJECT**  
 GW ASSESSMENT VGG SCHEME

**TITLE**  
**FARM 513 PTN 2**  
**VAUGHN MARIAS**

|                      |    |            |
|----------------------|----|------------|
| PROJECT No. 11613568 |    | REV 0      |
| SCALE 1:15 000       |    | A4         |
| GIS                  | MB | 24/04/2014 |
| CHECK                | DB | 24/04/2014 |
| REVIEW               | FW | 24/04/2014 |



## VAUGHN MARIAS - BASIC SITE INFORMATION

| SITE LOCATION          |            |          |                       |            |              |               |              |              |            | GEOHYDROLOGY    |              |            |                | MANAGEMENT RECOMMEND. |                |                 |                   |
|------------------------|------------|----------|-----------------------|------------|--------------|---------------|--------------|--------------|------------|-----------------|--------------|------------|----------------|-----------------------|----------------|-----------------|-------------------|
| Site Identifier:       | Number:    | District | Site name/Description | Site type: | Latitude [°] | Longitude [°] | Altitude [m] | Col. ht. [m] | Diam. [mm] | Depth [m]       | Water l. [m] | Yield[l/s] | Rec. abs.[l/s] | Depth to Intk. [m]    | Dis. rate[l/s] | Duty c. [hrs/d] | Daily abs. [m³/d] |
| 2823BC00065            | SD1-GAA214 | 513/2    | PAPKUIL               | F          | 28.47926967  | 23.674000001  | 1420.20      |              |            |                 | 0.56         |            |                |                       |                |                 |                   |
| 2823BC00066            | SD1-GAA213 | RE513/1  | PAPKUIL               | B          | 28.47893967  | 23.673680001  | 1422.10      |              | 165        | 15.24           | 1.62         |            |                |                       |                |                 |                   |
| <b>SUMMARY:</b>        |            |          |                       |            |              |               |              |              |            | <b>Maximum:</b> | 15.24        | 1.62       |                |                       |                |                 |                   |
| <b>Nr. of sites:</b> 2 |            |          |                       |            |              |               |              |              |            | <b>Minimum:</b> | 15.24        | 0.56       |                |                       |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Sum:</b>     |              |            |                |                       |                |                 |                   |
|                        |            |          |                       |            |              |               |              |              |            | <b>Average:</b> | 15.24        | 1.09       |                |                       |                |                 |                   |

NOTE:  
 "Yield" represents cumulative blow yield  
 The recommended abstraction ("Rec. abs.")  
 is based on a 24 hour duty cycle  
 (based on test pumping result)



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## VAUGHN MARIAS - TIME DEPENDENT CHEMISTRY REPORT

Site Identifier: 2823BC00065 Number: SD1-GAA214 Site Name: PAPKUIL

| Samp. Nr./Type | Date/Time samp. | pH   | EC | TDS | Ca   | Mg   | Na   | K    | Si   | T. Alk. | Cl | SO4  | NO3 as N | F     |
|----------------|-----------------|------|----|-----|------|------|------|------|------|---------|----|------|----------|-------|
| SD1-GA214      | 20120328 1630   | 7.63 | 66 | 466 | 80.5 | 35.5 | 21.1 | 9.43 | 16.2 | 306     | 43 | 32.5 | 0.85     | 0.152 |

Chemistry Standard: SABS for human consumption  
† Value exceeds recommended maximum limit  
‡ Value exceeds maximum allowable limit  
! Value exceeds recommended minimum limit  
j Value exceeds minimum allowable limit

Concentrations in [mg/l] where applicable  
EC [mS/m]  
Nitrate as N

Sample Type Code Explanation:  
D: Drinking water  
E: Effluent  
K: Sewage  
O: Organic  
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