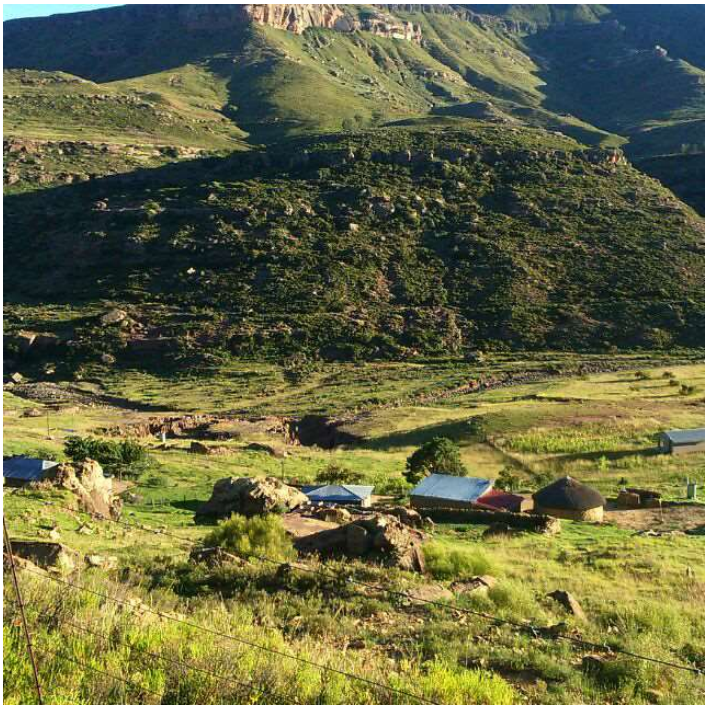
Hydrogeological Desk Study Telle River Bulk Water Supply Scheme

Report Prepared for

GIBB

Report Number 597187



Report Prepared by

srk consulting

April 2023

Hydrogeological Desk Study Telle River Bulk Water Supply Scheme

GIBB

SRK Consulting (South Africa) (Pty) Ltd.
Suite No. 2
2 Sinclair Avenue
Bonnie Doon
East London 5241
South Africa

e-mail: eastlondon@srk.co.za
website: www.srk.co.za

Tel: +27 (0) 43 748 6292
Fax:+27 (0) 86 480 9383

SRK Project Number 597187

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Compiled by:

Eunice Goossens (Pr. Sci. Nat.)
Principal Hydrogeologist

Email: egoossens@srk.co.za

Peer Reviewed by:

Ismail Mahomed (Pr. Sci. Nat.)
Partner

Author:

Eunice Goossens; GIS analyses Richard Nel

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Disclaimer

Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. The opinions in this Report are provided in response to a specific request from the Client to do so. SRK has exercised all due care in reviewing the obtained information. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

List of Abbreviations

DWS	-	Department of Water and Sanitation
SLM	-	Senqu Local Municipality
m amsl	-	metres above mean sea level
m bgl	-	metres below ground level
L/s	-	litres per second
mg/L	-	milligrams per litre

1 Introduction and Scope of Report

GIBB appointed SRK Consulting (South Africa) (Pty) Ltd. (hereafter SRK) end of March 2023 to provide Professional Hydrogeological Services for the Telle River Bulk Water Supply scheme, inclusive of a desk study and a water resources assessment of Wards 1 to 6 (Study Area) in Senqu Local Municipality. The Study Area includes Wards 1 to 6 (Figure 1); although it is likely that the primary area will be wards 2 to 6. Ward 5 is a large ward, but the communities forming part of the project are located towards the northern portion of the ward.

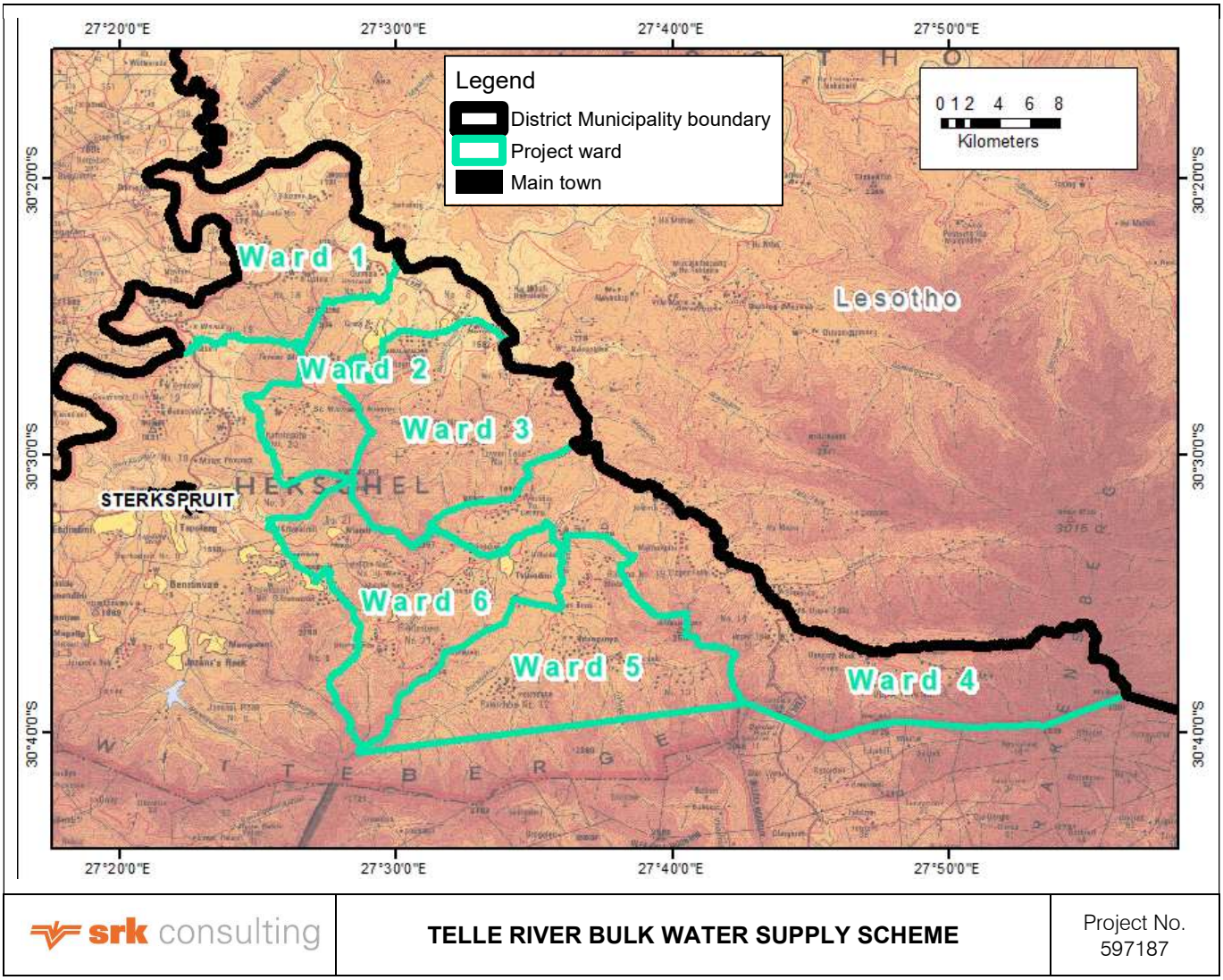

Figure 1: Project Location

2 Background and Brief

The Client, GIBB, appointed by the municipality to supply water to the six project wards. The possibility of groundwater as well as surface water are considered. No demand volumes were supplied to SRK.

No formal scope of work was provided by the Client only the requirement of a hydrogeological desk study whereby all existing information are collated, and recommendations made. SRK recommended the following approach:

- A technical report compiling the desk study results (mapping of high expected high groundwater potential zones).
- Maps produced in ArcGIS and showing the **Groundwater Development Potential (GDP)**

This report is for inclusion in a Situation Assessment Report for a potential regional water supply scheme centred on the Telle River (a tributary of the Orange River, which runs between SA and Lesotho). This project is current in the information gathering stage.

3 Project Objectives

The primary objective for this phase is to determine the expected groundwater potential for the six project wards and indicate expected high groundwater potential zones.

3.1 Reporting Standard

This Report has been prepared to the standard of the *"Minimum Standards and Guidelines for Groundwater Resource Development for the Community Water Supply and Sanitation Programme"*, of the Department of Water Affairs, and is aimed for internal distribution (the Client) and is not aimed for distribution to the public domain.

3.2 Project team

Eunice Goossens, a principal hydrogeologist, managed the project and Ismail Mahomed, partner at the Johannesburg office, did the peer review. Richard Nel compiled the GIS maps.

4 Project Results

4.1 Locality and Topography

The Study Area is located along the borders of the Eastern Cape with the Free State and Lesotho in the Senqu Local Municipality of the Joe Gqabi District Municipality. Sterkspruit town is to the west of the Study Area that is mapped on the 3027 AD, BC, CB and DA 1:50 000 topo-cadastral maps. Refer to **Figure 3** for the topographical information of the project area.

The altitude within the project area increases in height from ~ 1 320 m amsl (metres above mean sea level) in the north (along the Orange River) to ~ 3 000 m amsl in the south.

The Orange River forms the north-eastern boundary of the Study Area, with the Telle River the eastern boundary and the Kormspruit is on the western boundary. The river and streams originate in the south flowing northwards, joining the Orange River. The project area is situated in D12A, D12B, D18K and D18L quaternary catchment regions (Figure 4-2).

The drainage regions are depicted by Department of Water and Sanitation (Refer to the 1: 2 000 000; "Water Management areas of the Republic of South Africa" Map, 2000; Map Author Directorate Catchment Management, DWAF, GIS and Cartographic: Helena Fourie).

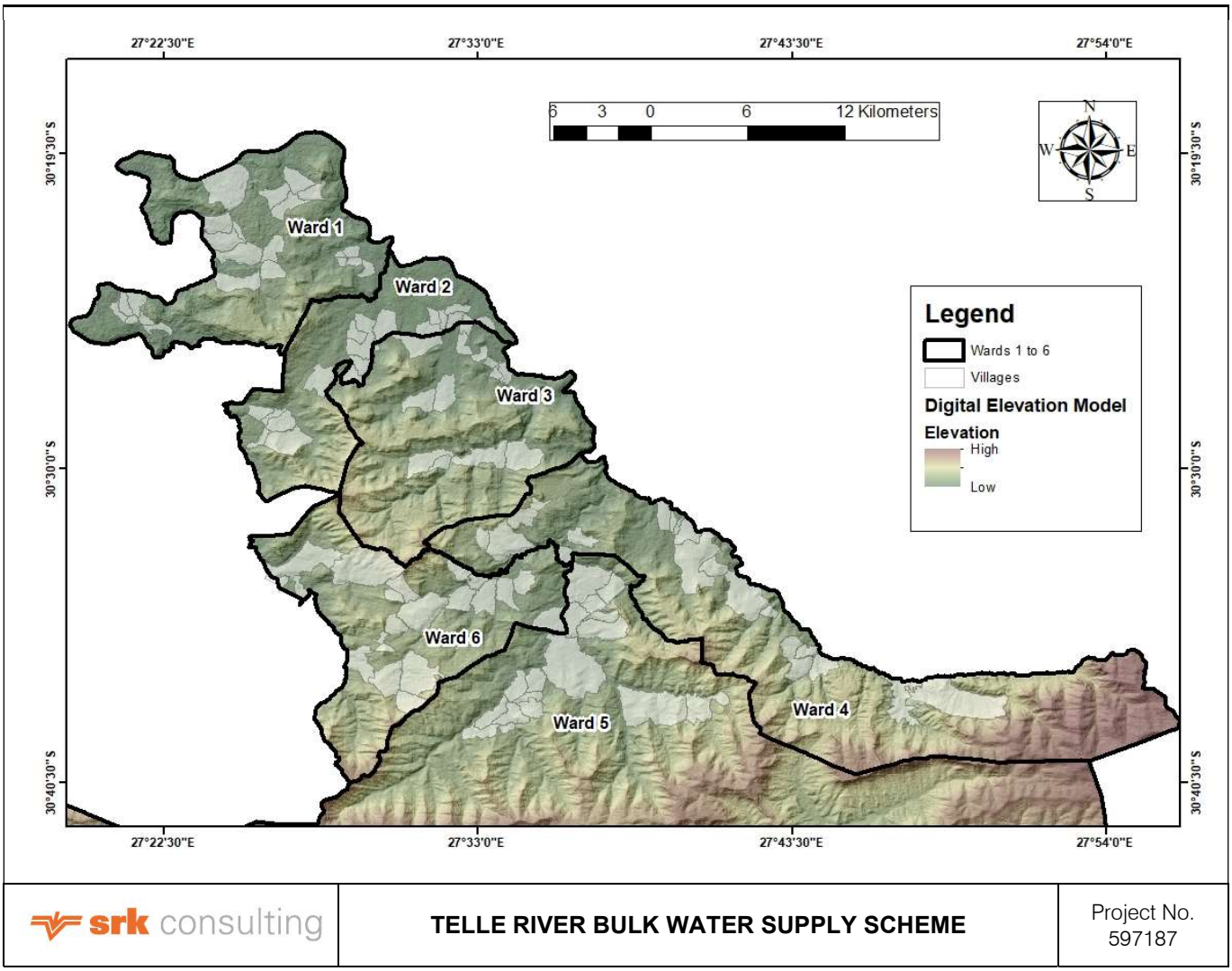

Figure 2: Digital Elevation Model

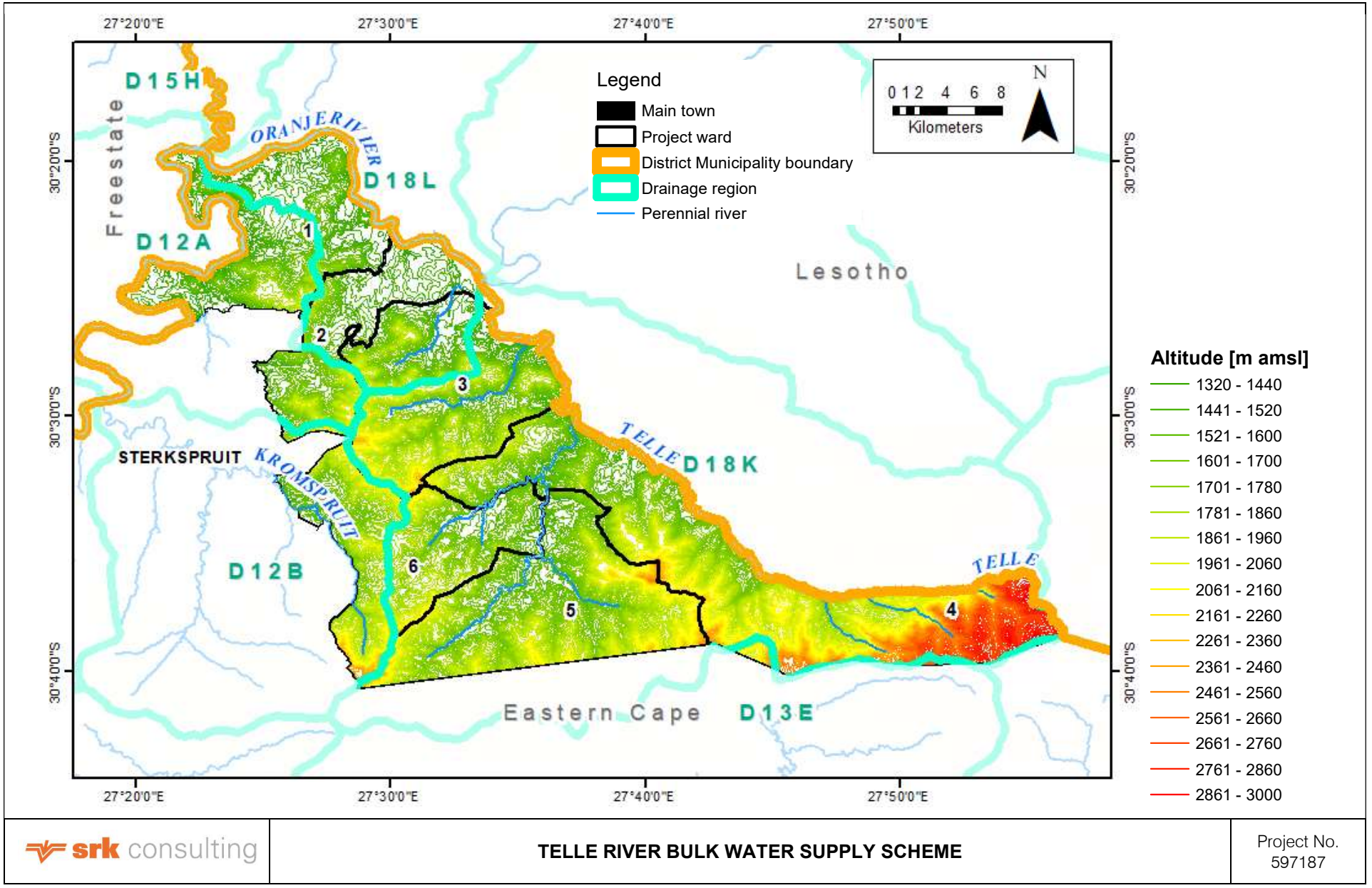

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Figure 3: Topography and Quaternary Regions

4.2 Rainfall

Sterkspruit and surrounding areas have an average annual rainfall of 950 mm, with the highest rainfall expected from October to January (Figure 4).

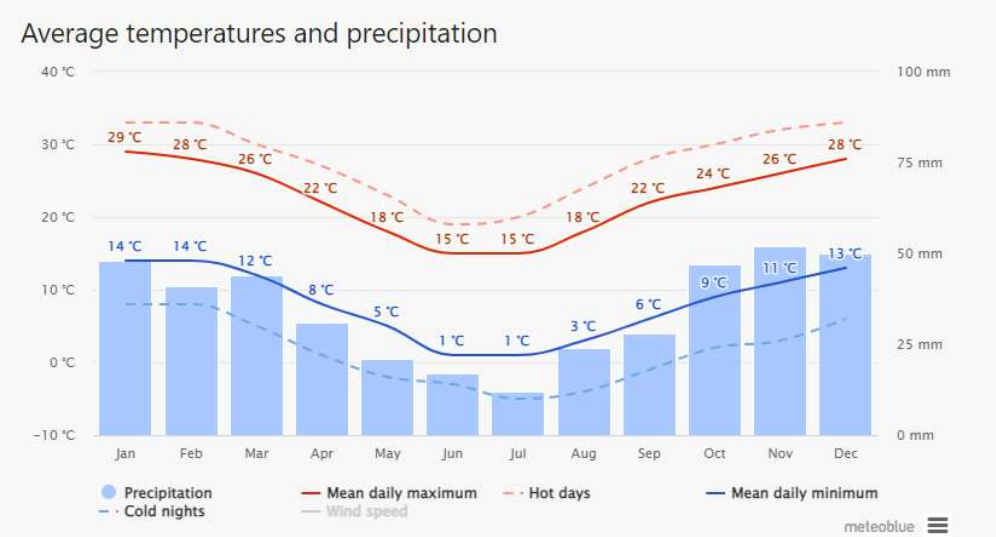

Figure 4: Average monthly rainfall

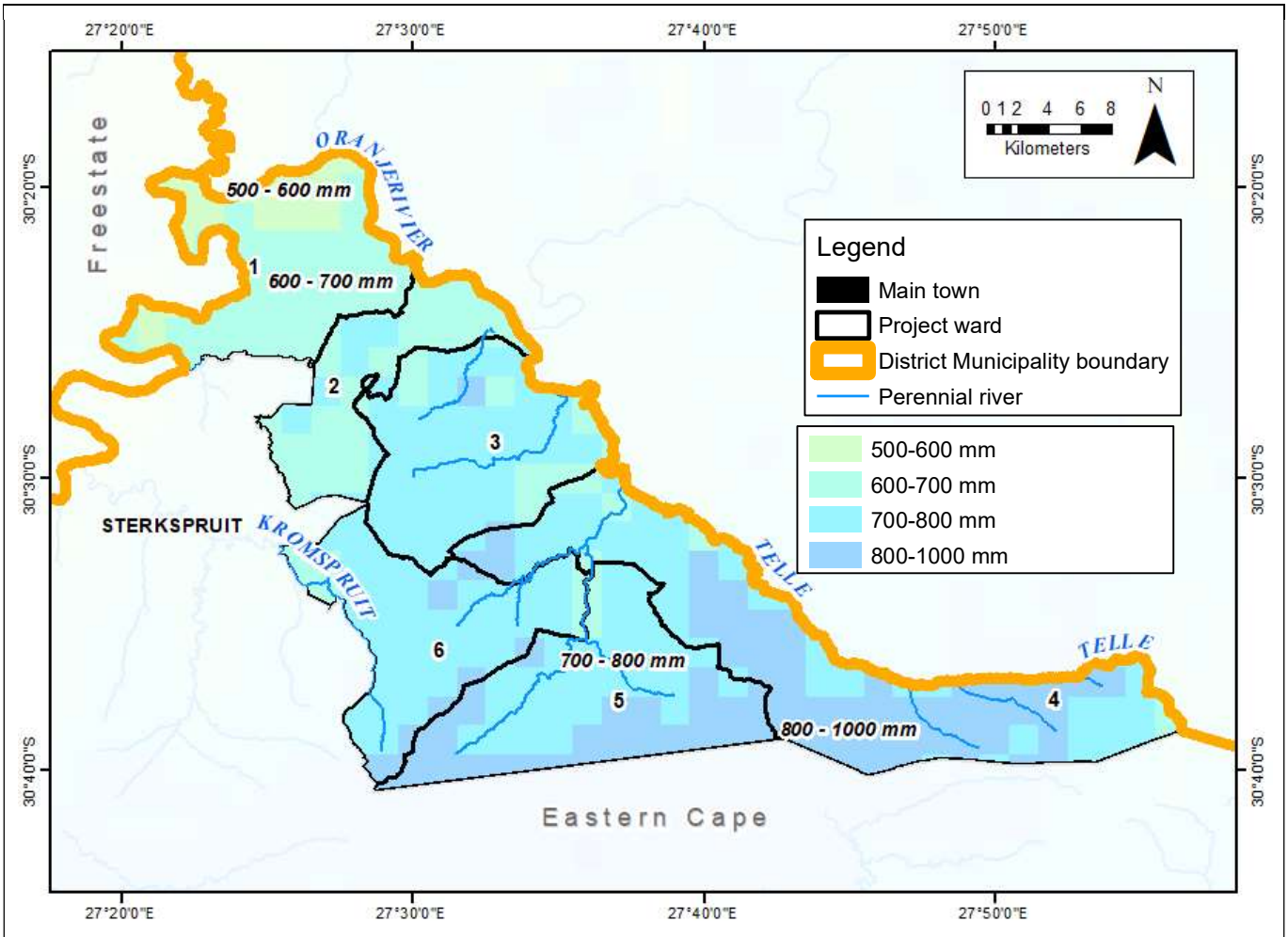

Figure 5: Mean Annual Precipitation

4.3 Geology

The greater portion of the Study Area is underlain by the Elliot Formation with the northern parts underlain by the Molteno Formation and the southern area and portions in the centre by the Drakensberg Group.

The Elliot Formation consists of red and greenish grey **mudstone** with subordinate **sandstone**. The Molteno Formation consists of alternating **sandstone** (pebbly in places) with olive **mudstone** and dark grey shale. The Drakensberg group comprise **basaltic lava**, with minor **sandstone**, **tuff** and **agglomerate** in the lower part of the succession in places

The sedimentary rocks are intruded by multiple dolerite dykes and sills. The strike direction of the dykes vary from northwest-southeast and northeast-southwest. Patches alluvium is mapped along the Orange River and other rivers. See **Figure 6** for a map showing the regional geology of Study Area.

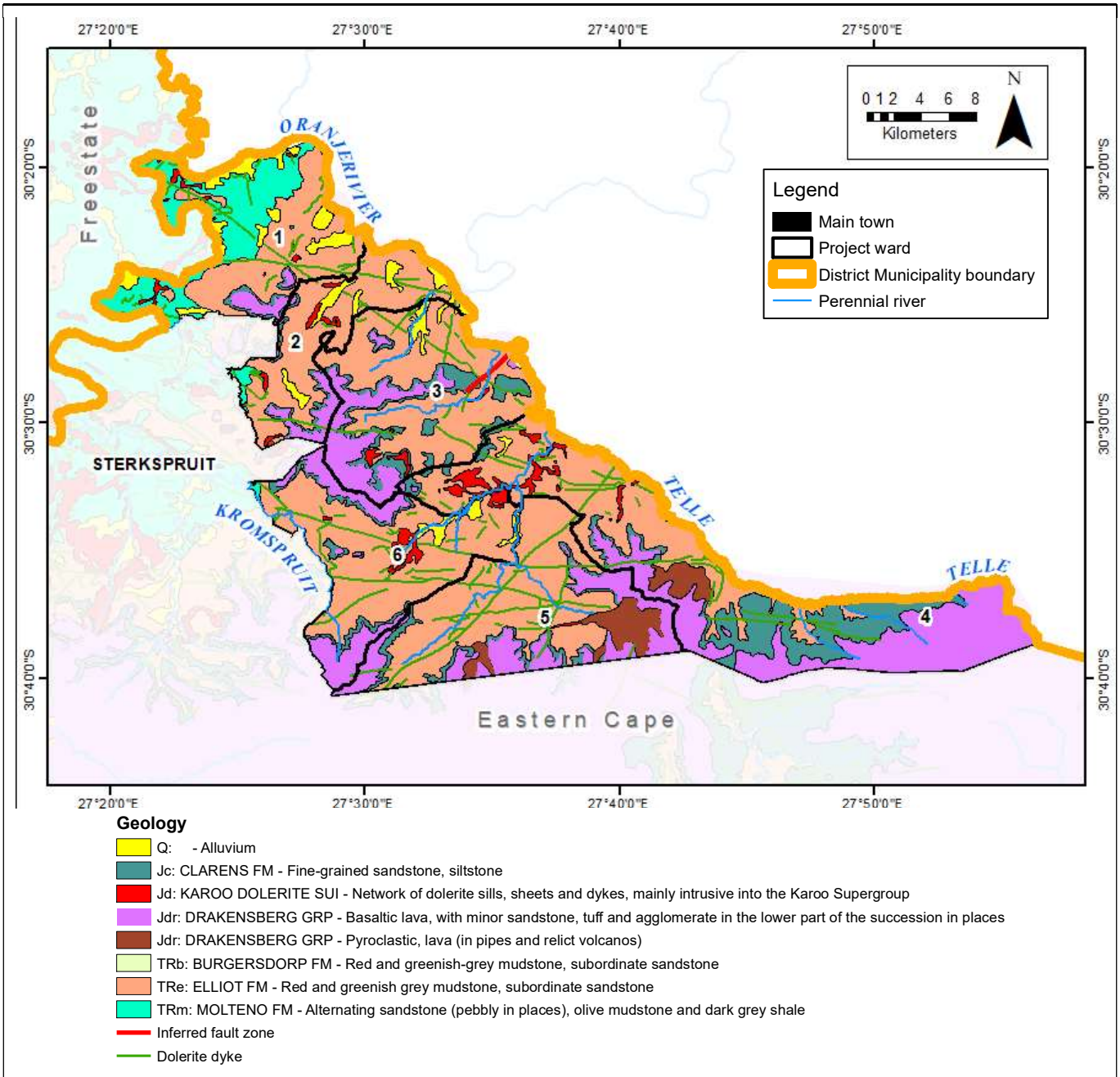

Figure 6: Regional Geology

4.4 General Hydrogeology

The following key information sources were consulted:

- Vegter, J.R., Seymour A., 1995. Groundwater Resources of the Republic of South Africa – Two Map sheets and explanatory brochure. DWAF.
- Parsons, R., Conrad, J., WRC Report No KV 116/98, "Explanatory Notes for the Aquifer Classification Map of South Africa".
- Groundwater Resource Assessment Phase 2 (GRA 2), DWS, 2003.
- Department of Water Affairs and Forestry. Hydrogeological Map Series of the Republic of South Africa. Completed in 2002.

Overall, the Project Area has moderate groundwater potential of 20 – 30 % reported by Vegter and Seymore (1995). These percentages indicate the probability of drilling a successful borehole (yield > 2 L/s). In their Hydrogeological Map Series, an expected borehole yield of 0.1 – 0.5 L/s was reported.

DWS initiated a project in 2003, referred to as the Groundwater Resource Assessment Phase 2 (GRA 2). The main aim of the project was the quantification of the groundwater resources of South Africa on a national scale. The project included the quantification of recharge, storage and sustainable yield of the aquifer systems throughout South Africa. The overall expected average groundwater exploitation potential (AGEP) in the project area is 15 000 to 25 000 m^3/km^2/annum (0.47 to 0.80 L/s). According to the GRA2 the expected Electrical Conductivity will be below 70 mS/m i.e. indicating acceptable water quality.

Based on the Aquifer Classification Map, the aquifer is classified as a minor aquifer region, therefore being a moderately yielding aquifer system of variable water quality. These aquifers can be fractured or fractured rocks which do not have a high permeability, or other formations with variable permeability. The aquifer extent may be limited and water quality variable. These aquifers seldom produce large quantities of water.

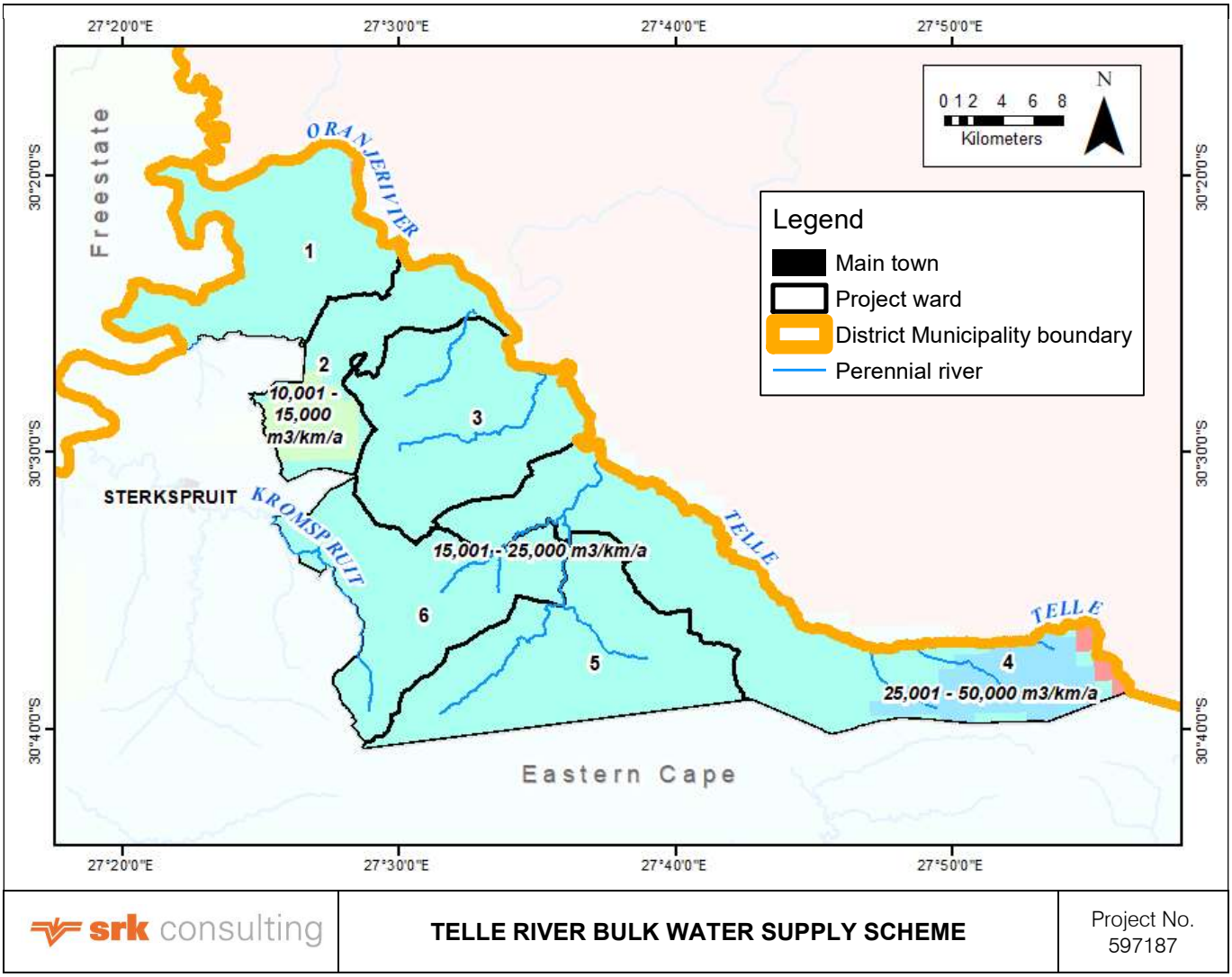

Figure 7: Average Groundwater Exploitation Potential

4.5 Existing reports and Borehole Dataset (NGA)

4.5.1 SRK Projects Completed

SRK completed a total of nine projects in the Study Area with two projects supplying multiple villages / wards and the remaining projects included a police station, schools and individual villages. A total of 49 boreholes and 10 springs formed part of the nine projects. A combined list of project results is shown in **Table 2** located in **Appendix A**.

The first regional water supply project (Project no. 558728) was undertaken for Lukhozi Consulting Engineers in 2020 and included the supply of groundwater to Ward 1. The following results were found:

- Hydrocensus – 11 boreholes and 10 springs were verified.
- From the spring investigation, it was recommended to protect and construct three springs, i.e. MFI-SP-1 (0.25 L/s), MDA-SP-1 (0.71 L/s) and MOD-SP-1 (1.00 L/s). Total yield from the springs recommended to be utilised was 1.96 L/s
- Three existing boreholes were yield tested.
- 14 Geophysical traverses were completed.
- 13 new boreholes were drilled and five constructed for abstraction purposes..
- Two existing and four newly drilled boreholes were recommended at a combined yield of 7.4 L/s for a 24-hour pumping yield.
- A Water Use License Application (WULA) for the two springs and six boreholes (2 existing and 4 new) was submitted to the DWS and approved.

Figure 8 shows Wards 1 to 6, the villages inside these wards and, geology, as well as the project undertaken for Ward 1 in 2020.

The second regional water supply project (Project no. 563853) was completed in December 2020 under ROMH Consulting. The following results were found:

- Six wards, i.e. Wards 2, 7, 10, 11, 12 and 17 formed part of the project with Ward 2 overlapping with this project.
- 16 villages formed part of the project – 3 villages located in Ward 2.
- Hydrocensus – 73 sites (boreholes and springs) were verified, comprising 15 boreholes and five springs in Ward 2.
- Yield testing of existing boreholes – 5 were tested in Ward 2.
- Geophysical Investigation – 5 traverses completed.
- Drilling of 5 boreholes – all located in Ward 2.
- Combined airlift yield from two boreholes was 9 L/s.
- Combined recommended abstraction rate was 1.1 L/s for a 24-hour pumping period;
- The water quality was found to have high arsenic content with expected Chronic Health Risk.

4.5.2 KVSA Projects Completed – sourced from DWS

The following reports were obtained from the DWS:

- KV120, Khulani VSA Groundwater Consultants, Herchel Water Supply Project – Existing Boreholes and spring investigation, J.U. du Plooy, G.P. Nel, April 1999. The results were as follows:
    - 13 Villages formed part of the project;
    - 27 boreholes were verified;
    - 14 boreholes were yield tested;
    - A combined recommended yield of 10 L/s for a 24-hour pumping period was found;
    - 14 springs were verified;
    - 11 spring yields could be measured, and one spring (combined yield from multiples springs – stream) was found to be 4.0 L/s the remaining 10 springs had an average yield of 0.4 L/s.
    - The water quality results were found to be Marginal.
- KV118, Khulani VSA Groundwater Consultants, Herchel Water Supply Project – Phase 2, J.U. du Plooy, G.P. Nel, September 2000. The work included the following:
    - Geophysical Investigation
    - Drilling of 40 boreholes;
    - Combined airlift yield of 79.05 L/s;
    - 22 boreholes were yield tested;
    - Combined recommended abstraction rate was 8.19 L/s for a 24 hour pumping period;
    - The water quality was found overall to be good, with some high turbidity readings;
- KV119, Khulani VSA Groundwater Consultants, Herchel Water Supply Project – Phase 3, Villages Mfinci, Blikana, Penhoek 1, Penhoek 2 and Musong, M.E, Gqweta, J. Coetzer, March 2002. The following results were found:
    - 23 boreholes were drilled;
    - Combined airlift yield of 66.3 L/s;
    - 17 boreholes were yield tested;
    - Combined recommended abstraction rate was 12.53 L/s for a 24-hour pumping period;
    - The water quality was found overall to be good, with some high Iron and Fluoride concentrations were found but still within limits;

Refer to the **Table 3**, **Table 4** and **Table 5** located in **Appendix A** for the results from the three projects discussed above.

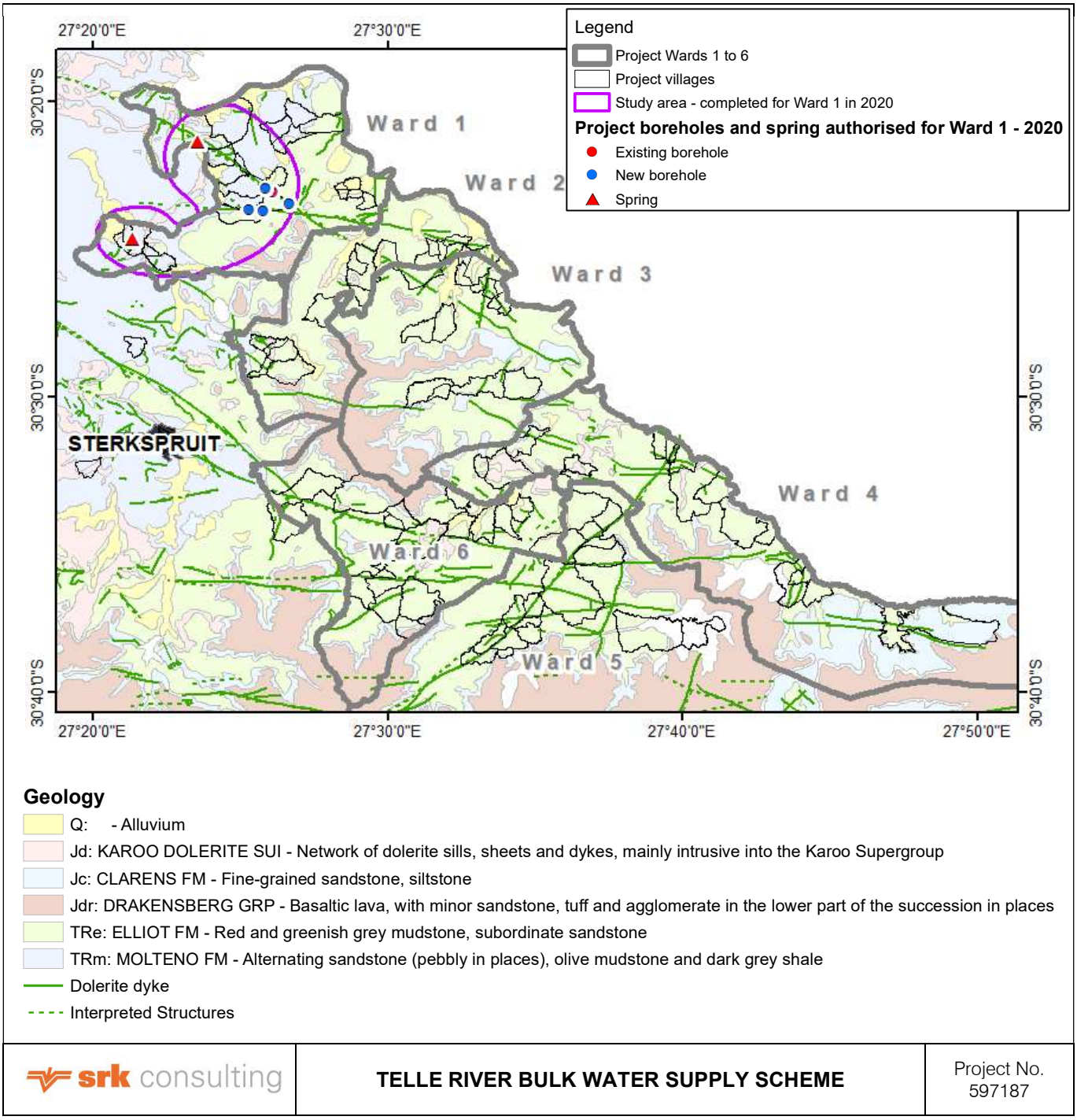

Figure 8: Wards 1 to 6, Geology and results from Ward 1

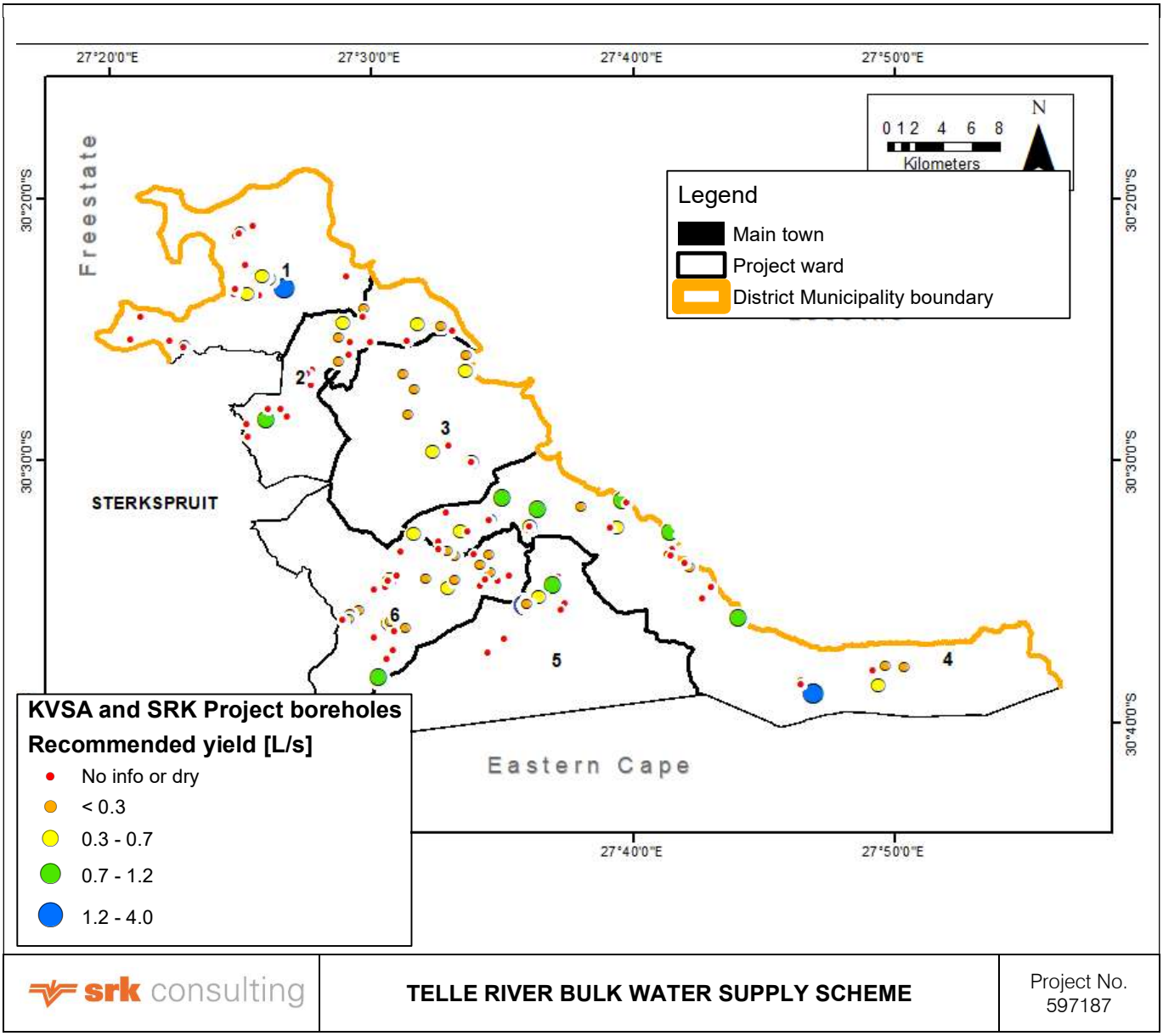

Figure 9: Results from previous projects

4.5.3 NGA Database

The National Groundwater Archive (NGA) is a database maintained by the Department of Water and Sanitation. The following was found on the database:

- 201 boreholes were reported;
- The borehole information dated from 1930 up to 2019;
- The groundwater level average was 65 m bgl;
- The average borehole depth was 80 m with the deepest borehole being 200 m;
- The average water strike depth was reported as 50 m with the deepest water strike at 105 m; and
- The average reported yield was 1.0 L/s and the maximum was 3.97 L/s.

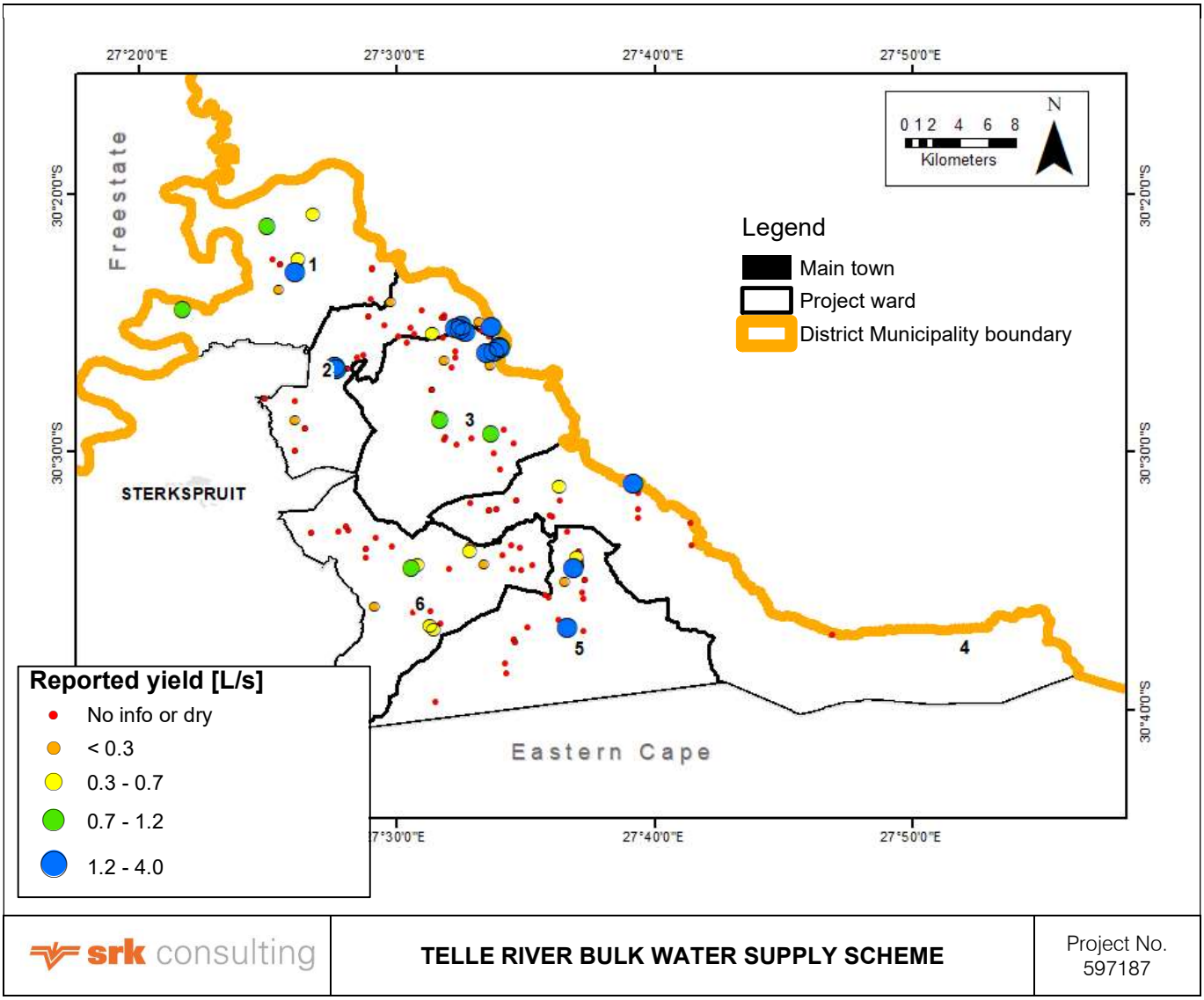

Figure 10: NGA Results

4.5.4 Conclusions from Completed Projects and NGA dataset

From the results of the twelve previously completed projects the following was found:

- The average airlift yield was 3.0 L/s with the highest being 22 L/s in Ward 1;
- The average borehole depth was 75 m with the maximum depth being 200 m bgl;
- The groundwater levels ranged from 10 to 60 m;
- Groundwater strikes commenced from 30 m up to 90 m in depth;
- The average recommended pumping rate was 0.5 L/s and the maximum was 4.9 L/s; and
- The average water quality was Marginal with sites showing elevated Arsenic and Nitrate.

4.6 Catchment Zones

The quaternary catchment zones divined by DWS have been refined to delineate the groundwater recharge to proposed target zones. The larger the delineated area the higher the expected groundwater recharge volume will be.

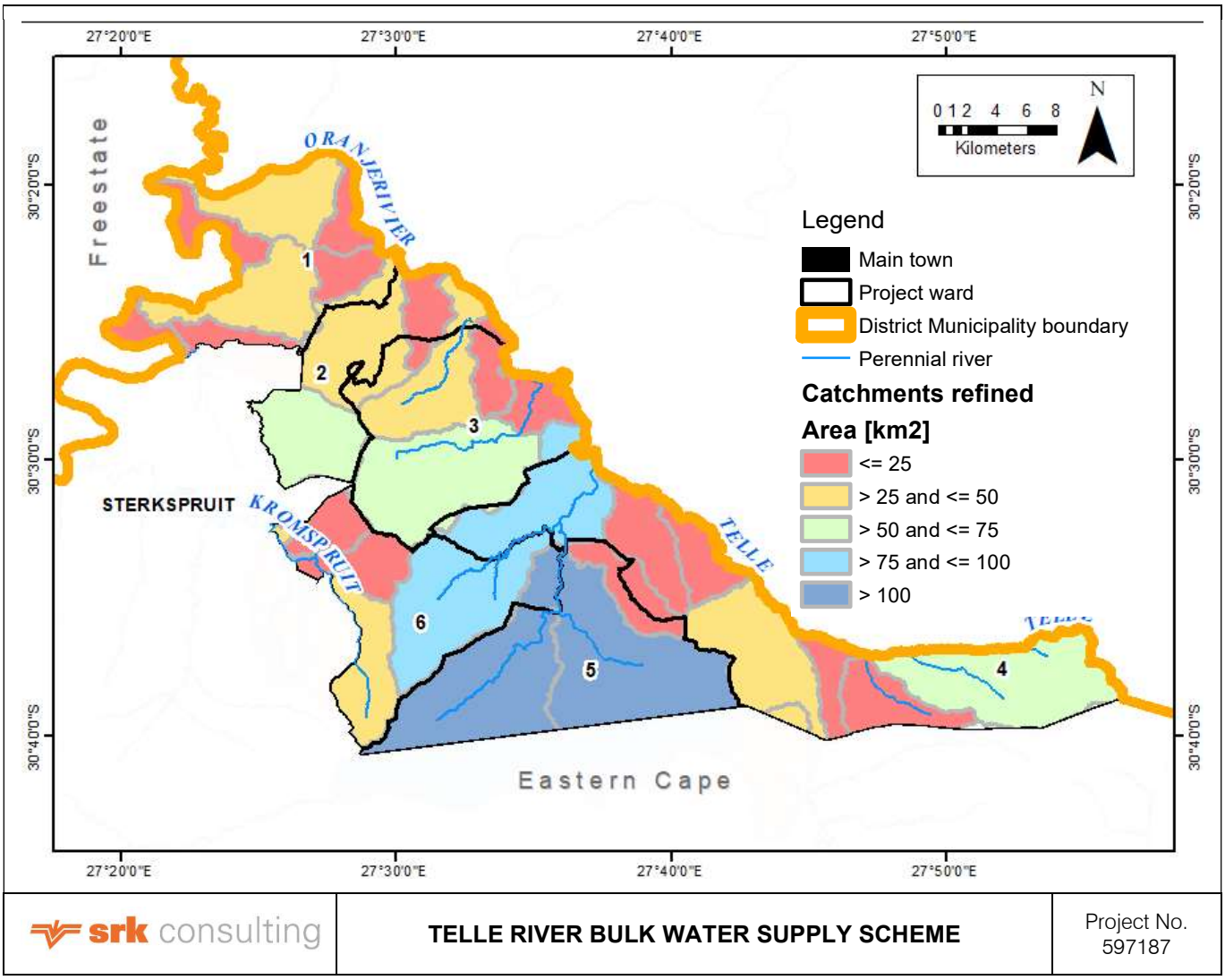

Figure 11: Refined Catchment Zones

4.7 Groundwater Exploitation Potential

A map was produced showing the expected groundwater potential using various inputs inclusive of the following:

- Geology;
- Linear geological structures such as dykes;
- Historic borehole yields; and
- Excluding slopes exceeding 15 degrees.

The darker blue areas on the map show expected high groundwater potential zones.

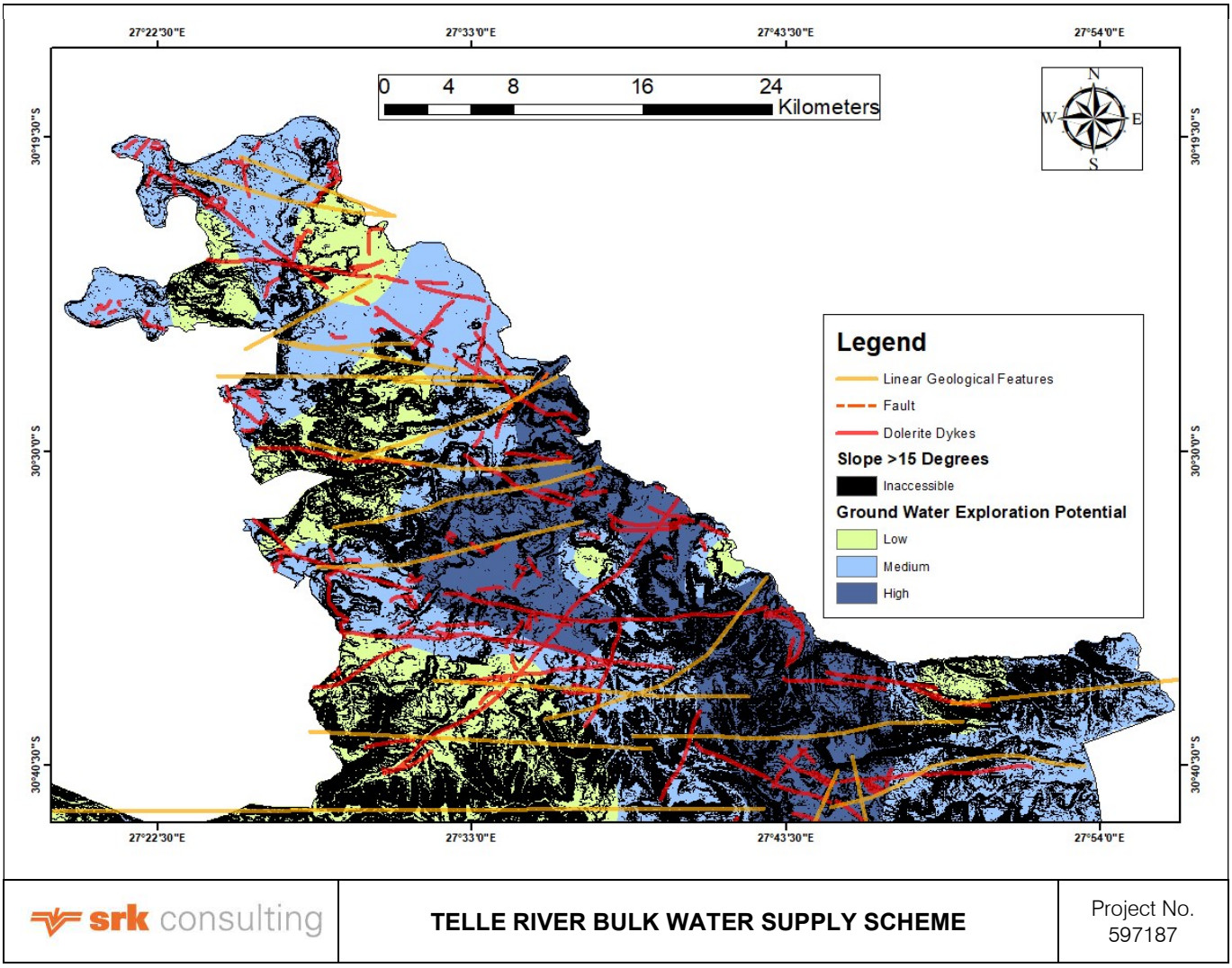

Figure 12: Groundwater Exploitation Potential

4.8 Regional Target Zones – High Groundwater Potential Zones

The envisaged high groundwater potential zones were verified using satellite imagery. Based on the previously completed projects by SRK within the Study Area, the regional dolerite dykes were found to deliver high yielding boreholes along rivers where high groundwater recharge is expected. These dykes form preferred flow paths with expected high groundwater potential. The criteria for the target selections therefore included geological targets such as dolerite dykes and dolerite sill contact zones with the sedimentary rocks.

Groundwater recharge to these geological targets is crucial, as the structure could be dry if not fed with water from a catchment area. Therefore, topographically high lying geological targets will most likely be dry and low-lying areas along well-developed drainage patterns would have an expected higher groundwater recharge.

The last criteria included in the target selection is accessibility. Dense vegetation as well as steep topography limits access to certain geological targets. From the aster images analysed, slopes exceeding 15 degrees were also excluded from target zone selection. These areas will still need to be verified on site for accessibility purposes.

A total of 32 drill target zones were identified. **Refer to Table 1** for a list of the target zones central coordinates. **NOTE**: These coordinates are not drilling positions, merely the centre point of areas where further hydrogeological investigation could be considered for groundwater development.

See **Figure 13** for a map showing the proposed drill target zones within the Study Area.

Table 1: Drill Target Zones Central Coordinates

No	Latitude	Longitude	Comment	Priority
1	-30.628093	27.785924	Dolerite dyke - access not visible from the satellite image	3 - Low
2	-30.639663	27.831874	Dolerite dyke - topography is very high, with expected low recharge. Area looks very bushy	3 - Low
3	-30.599137	27.733508	Multiple dykes	1 - High
4	-30.593800	27.729576	Two dykes	1 - High
5	-30.588262	27.725532	Two dykes	1 - High
6	-30.545431	27.688501	Dyke, intersecting the Telle River as well. Existing borehole, rec at 1.0L/s	1 - High
7	-30.535968	27.657484	Dyke, intersecting the Telle River as well. Existing borehole rec at 0.8L/s	1 - High
8	-30.530872	27.605019	Dyke intersecting the Blikana River - existing borehole plots in zone	1 - High
9	-30.526691	27.606553	Dyke intersecting the Blikana River	1 - High
10	-30.523428	27.584074	Dyke - looks topographically high - existing borehole plots in the zone	2 - Medium
11	-30.500651	27.565189	Dyke - 3 borehole previously drilled - 1 borehole had a rec. yield of 0.44 L/s	2 - Medium
12	-30.491681	27.554883	Dyke	1 - High
13	-30.497960	27.548358	Dyke - access to be determine - could be topographically high	2 - Medium
14	-30.607814	27.588473	2 dykes intersecting at the Pelandaba River	1 - High
15	-30.592722	27.599415	Multiple dykes at the intersection of the Blikana and Pelandab Rivers - existing borehole rec at 3.5L/s	1 - High
16	-30.619766	27.490331	Dyke - topography and access to be confirmed	2 - Medium
17	-30.620640	27.625358	Prominent dyke	1 - High
18	-30.578404	27.530478	Prominent dyke - confirmation of an existing borehole will be required	1 - High
19	-30.576708	27.559602	Dyke - is not too visible on satellite image	3 - Low
20	-30.584338	27.559968	Prominent dyke - but access could be problematic	2 - Medium
21	-30.553546	27.442122	Two dykes	1 - High
22	-30.467664	27.432927	Dolerite sill and dykes - not prominently defined	3 - Low
23	-30.464869	27.414776	Dyke - access to be confirmed	1 - High
24	-30.416106	27.490058	Dyke intersecting 3 non-perennial rivers	1 - High
25	-30.441443	27.529932	Dyke	1 - High
26	-30.413918	27.543664	Dyke - land ownership to be confirmed	1 - High
27	-30.418121	27.557674	Dykes - covered by alluvium - land ownership to be confirmed	2 - Medium
28	-30.402369	27.493901	Dyke	1 - High
29	-30.376533	27.499781	Dyke / Sill - could be to high from the river	2 - Medium
30	-30.402649	27.356208	Weathering along the Orange River	2 - Medium
31	-30.333212	27.409905	Weathering along the Orange River	3 - Low
32	-30.345608	27.391288	Dolerite sill - check accessibility	3 - Low

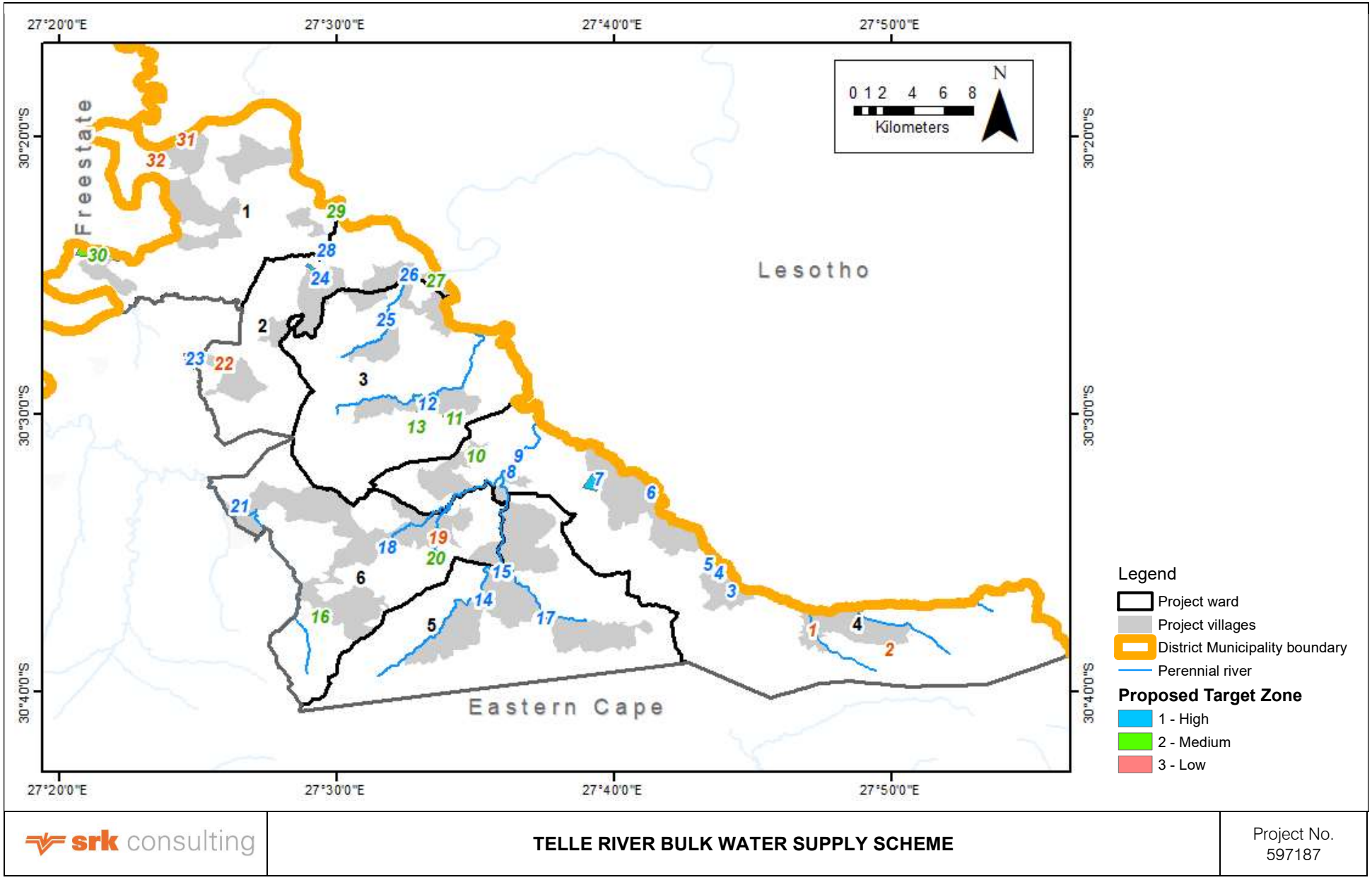

Figure 13: Proposed drill target zones

5 Conclusions

From the desk study completed the following can be concluded:

- The Study Area is mainly underlain by mudstones, sandstones intruded by basaltic lava. Multiple dolerite dykes intruded these formations and will be the main drilling targets.
- The expected average airlift yield is 3.0 L/s with the highest being 22 L/s;
- The average borehole depth is 75 m with the maximum depth being 200 m bgl;
- The groundwater levels range from 10 to 30 m;
- Groundwater strikes can be expected from 30 m up to 90 m;
- The average recommended yield is 0.5 L/s and the maximum was 4.9 L/s; and
- The overall reported average water quality is Marginal with sites showing elevated Arsenic and Nitrate in Ward 1.
- A Groundwater Exploitation Map was prepared, taking into consideration of the following:
    - Geology;
    - Linear geological structures such as dykes;
    - Historic borehole yields; and
    - Excluding slopes exceeding 15 degrees.
- A total of 32 drilling target zones based on the above criteria were identified, and of these 18 are high priority zones.

6 Recommendations

From the above conclusions, it is recommended to continue with the following activities to supply the Study Area with water:

- Phase 2:
    - Undertake a hydrocensus to determine the current status of existing boreholes, such as the equipment and if the borehole is destroyed or not;
    - Spring yield and water quality measurements;
    - Reporting and recommendations on boreholes to be included in a yield and water quality testing program;
- Phase 3:
    - Yield and water quality testing of existing boreholes – to be able to determine possible available supply from existing boreholes;
    - Borehole management recommendations and reporting.
- Phase 4:
    - Verification of the 32 target zones on site, to determine accessibility and expected groundwater potential for each site;
    - Geophysical investigation on identified target zones:
        - The drilling targets will include the dolerite dykes;

- Drilling of boreholes – number to be determined by the demand for the Study Area;
- Yield and water quality testing of newly drilled boreholes;
- Borehole management recommendations and reporting.

- Phase 5:
  - Water use license application of selected production sites, i.e. boreholes and springs.

Prepared by	**Reviewed by**
SRK Consulting - Certified Electronic Signature srk consulting 597187/45042/Report 1704-4728-8291-GOOS-28/04/2023 This signature has been printed digitally. The Author has given permission for its use for this document. The details are stored in the SRK Signature Database	SRK Consulting - Certified Electronic Signature srk consulting 597187/45046/Other 1318-319-2583-MAHO-02/05/2023 This signature has been printed digitally. The Author has given permission for its use for this document. The details are stored in the SRK Signature Database
Eunice Goossens (Pr. Sci. Nat.)	Ismail Mahomed
Principal Hydrogeologist	Partner

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

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Appendix A: Existing datasets

Table 2: SRK Project boreholes

Project no.	Date	Site type	Borehole Number	Latitude	Longitude	Depth (mbgl)	Airlift Yield (L/s)	Strike Depths (mbgl)	Rec Yield (L/s 24 hr cycle)	Static Water Level (mbgl)	Water Quality Class	Constituents of Concern
354368	Oct-05	Borehole	EC/D18/003	-30.43706	27.47730	80.00	3.60	6, 11	0.31	7.09	Marginal	Turbidity, Total Coliforms, Iron, E-Coli
354368	Oct-05	Borehole	EC/D18/004	-30.43722	27.47741	63.00	1.60	21, 41	0.7	9.58	Marginal	Turbidity, Fluoride, E-Coli
362758	Aug-06	Borehole	EC/D18/006	-30.57312	27.61933	80.00	Dry					
362758	Aug-06	Borehole	EC/D18/007	-30.57331	27.61940	60.00	0.20					
362758	Aug-06	Borehole	EC/D18/008	-30.53298	27.54760	98.00	Dry					
362758	Aug-06	Borehole	EC/D18/009	-30.59052	27.62319	50.00	0.01					
362758	Aug-06	Borehole	EC/D18/010	-30.59469	27.62093	150.00	Dry					
362758	Aug-06	Borehole	EC/D18/011	-30.63096	27.66610	78.00	Dry					
362758	Aug-06	Borehole	EC/D18/012	-30.63145	27.66574	80.00	Dry					
428471	Jan-11	Borehole	EC/D18/264	30.38131	27.48406	80.00	3.30	34, 36				
428471	Feb-11	Borehole	EC/D18/265	30.41228	27.48184	80.00	6.60	14, 23, 44, 59				
428471	Feb-11	Borehole	EC/D18/266	30.41421	27.54423	60.00	0.50	20, 47				
428471	Feb-11	Borehole	EC/D18/266B	30.41424	27.54419	60.00	Dry	31.00				
428471	Feb-11	Borehole	EC/D18/267	30.61325	27.58460	80.00	5.00	49-50, 60, 64				
428471	Feb-11	Borehole	EC/D18/268	30.37493	27.42015	80.00	Dry					
520859	Aug-17	Borehole	EC-D18-0298	-30.57636	27.58088	60.00	Dry					
520859	Aug-17	Borehole	EC-D18-0299	-30.57317	27.58769	137.00	0.30	102.00				
529088	Aug-18	Borehole	BH1	-30.44165	27.46246	47.00	0.33	20-30		5.36	(1) Acute Health Risk (2) Chronic Health Risk	(1) E-Coli (2) Fluoride, Total Iron
529919	May-18	Borehole	EC-T34-0602	-30.62515	28.57420	87.00	0.50	22.00	0.05	5.1	Operational Risk	Turbidity
529919	May-18	Borehole	EC-T34-0603	-30.62131	28.57665	83.00	Dry					
529919	May-18	Borehole	EC-T34-0604	-30.62684	28.57563	60.00	0.10	18.00			(1) Aesthetic Risk (2) Operational Risk	(1) Manganese (2) Standard Plate count
529919	May-18	Borehole	ZB-BH	-30.62238	27.57432	72.27			0.26	5.01	Operational Risk	Turbidity
558728	Jun-20	Spring	MFI-SP-1	-30.39365	27.40895				0.25		(1) Acute Health Risk (2) Operational Risk (3) Aesthetic Risk	(1) E-coli, Faecal Coliforms (2) Total Coliforms (3) Total Iron, Turbidity
558728	Jun-20	Spring	MAY-SP-1	-30.38757	27.43786				0.06		(1) Acute Health Risk (2) Operational Risk (3) Aesthetic Risk	(1) E-coli, Faecal Coliforms (2) Total Coliforms (3) Total Iron, Turbidity
558728	Jun-20	Spring	MAY-SP-2	-30.39506	27.43137				0.02		(1) Operational Risk	(1) Total Coliforms, Turbidity
558728	Jun-20	Spring	DOL-SP-1	-30.38148	27.43001							

Project no.	Date	Site type	Borehole Number	Latitude	Longitude	Depth (mbgl)	Airlift Yield (L/s)	Strike Depths (mbgl)	Rec Yield (L/s 24 hr cycle)	Static Water Level (mbgl)	Water Quality Class	Constituents of Concern
558728	Jun-20	Spring	MDA-SP-1	-30.35551	27.39299				0.71		(1) Acute Health Risk (2) Operational Risk (3) Aesthetic Risk	(1) E-coli, Faecal Coliforms (2) Total Coliforms, Turbidity (3) Total Iron
558728	Jun-20	Spring	MDA-SP-2	-30.37324	27.41908				0.03		(1) Acute Health (2) Operational Risk (3) Aesthetic Risk	(1) E-coli, Faecal Coliforms, Nitrate (2) Total Coliforms (3) Total Iron, Turbidity
558728	Jun-20	Spring	MDA-SP-3	-30.36751	27.41309				0.02		(1) Acute Health (2) Operational Risk	(1) E-coli, Faecal Coliforms, Nitrate (2) Total Coliforms
558728	Jun-20	Spring	MBO-SP-1	-30.35596	27.41111				0.09		(1) Operational Risk (2) Aesthetic Risk	(1) Total Coliforms, Turbidity (2) Total Iron
558728	Jun-20	Spring	MOD-SP-1	-30.41109	27.35622				1.00		(1) Acute Health Risk (2) Operational Risk	(1) E-coli, Faecal Coliforms (2) Total Coliforms, Turbidity
558728	Jun-20	Spring	MRI-SP-1	-30.41288	27.35045						(1) Acute Health Risk(2) Operational Risk	(1) Faecal Coliforms(2) Total Coliforms, Turbidity
558728	Jun-20	Borehole	EC-D18-113	-30.35436	27.41586	97.00			0.20	33.60		
558728	Jun-20	Borehole	MBO-BH-1	-30.35616	27.41330	3.00			----	3.00	(1) Acute Health Risk (2) Operational Risk (3) Aesthetic Risk	(1) E-coli, Faecal Coliforms (2) Total Coliforms (3) Total Iron, Turbidity
558728	Jun-20	Borehole	BH-10102	-30.38397	27.43408	60.00			0.52	9.38	No Risk	None
558728	Jun-20	Borehole	BH10319	-30.39444	27.42045	60.00			0.38	0.66	(1) Chronic Health Risk (2) Operational Risk	(1) Arsenic (2) Total Coliforms, Turbidity
558728	Jun-20	Borehole	MOD-BH-1	-30.40758	27.35342	36.00			----	1.00		
558728	Jun-20	Borehole	BH-10101	-30.42329	27.37148	30.00			----	1.58	(1) Acute Health Risk (2) Chronic Health Risk (3) Operational Risk (4) Aesthetic Risk	(1) E-coli, Faecal Coliforms (2) Total Iron (3) Total Coliforms (4) Turbidity, Colour
558728	Jun-20	Borehole	EC-D12-0331	-30.38180	27.43017	80.00	3.14	30, 52, 66,	0.50	3.58	(1) Operational Risk (2) Aesthetic Risk	(1) Total Coliforms (2) Total Iron, Turbidity
558728	Jun-20	Borehole	EC-D12-0332	-30.39455	27.42890	80.00	22.00	6, 31, 42, 45, 59, 64	4.90	6.09	(1) Acute Health Risk (2) Operational Risk (3) Aesthetic Risk	(1) E-coli, Faecal Coliforms (2) Total Coliforms (3) Total Iron
558728	Jun-20	Borehole	EC-D12-0333	-30.42672	27.38082	90.00	0.40	48, 66, ,	0.13	8.89	(1) Chronic Health Risk (2) Operational Risk (3) Aesthetic Risk	(1) Arsenic, Fluoride (2) Total Coliforms (3) Total Iron, Turbidity
558728	Jun-20	Borehole	EC-D12-0334	-30.42707	27.38065	60.00	0.00					
558728	Jun-20	Borehole	EC-D12-0335	-30.42207	27.34678	80.00	0.00					

Project no.	Date	Site type	Borehole Number	Latitude	Longitude	Depth (mbgl)	Airlift Yield (L/s)	Strike Depths (mbgl)	Rec Yield (L/s 24 hr cycle)	Static Water Level (mbgl)	Water Quality Class	Constituents of Concern
558728	Jun-20	Borehole	EC-D12-0380	-30.39281	27.41259	80.00	0.00					
558728	Jun-20	Borehole	EC-D12-0381	-30.39309	27.41257	80.00	2.50					
558728	Jun-20	Borehole	EC-D12-0382	-30.39385	27.42078	100.00	2.50	18, 39, 46, 67	0.30	10.67	(1) Chronic Health Risk (2) Operational Risk	(1) Arsenic (2) Total Coliforms
558728	Jun-20	Borehole	EC-D12-0383	-30.39008	27.41387	80.00	0.00					
558728	Jun-20	Borehole	EC-D12-0384	-30.39029	27.41365	80.00	5.50					
558728	Jun-20	Borehole	EC-D12-0385	-30.39059	27.44401	105.00	5.50	87, 90, 94,	1.70	36.82	(1) Aesthetic Risk (2) Operational Risk	(1) Total Iron (2) Turbidity
558728	Jun-20	Borehole	EC-D18-0320	-30.35025	27.42441	60.00						
558728	Jun-20	Borehole	EC-D18-0321	-30.35460	27.41588	80.00						
552983	Sep-19	Borehole	BH-1	-30.59214	27.59671							
563853	Nov-20	Borehole	EC/D12/0400	-30.48406	27.42178	60.00	Dry					
563853	Nov-20	Borehole	EC/D12/0401	-30.47614	27.42049	90.00	3.60	67, 72, 78,		66.96		
563853	Nov-20	Borehole	EC/D12/0402	-30.46697	27.44263	80.00	Dry					
563853	Nov-20	Borehole	EC/D12/0403	-30.47138	27.44670	80.00	Dry					
563853	Nov-20	Borehole	EC/D12/0404	-30.47370	27.43292	131.00	5.50	25, 35, 63, 75	1.1	48.16	Chronic Health; Operational	Arsenic; Total Coliforms
563853	Nov-20	Borehole	BH/R/KL	-30.45148	27.46158					5.95		
563853	Nov-20	Borehole	EC/D12/0272	-30.46708	27.43426					9.59		

Table 3: Results from report KV118

Village Name	Borehole Number	Latitude	Longitude	Borehole Depth [m]	Airlift Yield [L/s]	Dept to Water Strikes	Rec Yield [L/s]	Pump Depth [m}	Water Quality
Makumsha	505-0060	30.587056	27.711139	97	6.00	19, 66			
Makumsha	505-0061	30.579750	27.716722	118	0.20	22			
Makumsha	505-0062	30.565028	27.700167	120	0.30	35			
Makumsha	505-0063	30.556000	27.691667	120	0.30	11, 20			
Makumsha	505-0064	30.559167	27.688528	74	Dry	n/a			
Makumsha	505-0072	30.568333	27.702194	120	0.30	24, 60	0.30	62.50	Marginal - Fe, F
Bebeza	505-0073	30.525639	27.659972	120	5.50	5, 39, 63, 100	0.80	62.50	Good
Bebeza	505-0074	30.542417	27.656778	80	6.00	21, 67	0.41	63.60	Good
Bebeza	505-0075	30.542667	27.652444	130	0.30	34			
Bebeza	505-0076	30.545861	27.690222	120	3.00	96	1.00	93.60	Good, slightly high F values
Upper Tele	505-0091	30.589250	27.819556	74	2.00	45, 47	0.12	55.60	Marginal - Fe, Turbidity
Upper Tele	505-0092	30.600472	27.733972	80	15.00	28, 44, 54, 63, 65, 72	1.20	69.50	Good
Nomlhangana	505-0093	30.633361	27.819556	120	Dry	n/a			
Nomlhangana	505-0094	30.630722	27.827111	120	0.50	32	0.20	51.60	Good
eTyindini	505-0065	30.557972	27.547778	80	5.00	30	0.10	66.50	Good
eTyindini	505-0066	30.580750	27.548361	120	2.50	40, 79	0.45	75.60	Good - Slightly high Fe< Na
eTyindini	505-0067	30.575083	27.533583	120	1.00	19, 35	0.20	69.60	Good
eTyindini	505-0081	30.560472	27.552611	100	0.80	26, 39	0.20	62.60	Good/Marginal - Turbidity
eTyindini	505-0086	30.578444	27.030028	98	9.20	11, 22, 35, 39, 67, 90	1.03	75.60	Marginal - Floride
Hillside	505-0077	30.559472	27.565861	76	0.20	28			
Hillside	505-0078	30.579306	27.569528	120	0.20	104	<0.1	69.50	Unaccpetable - High
Hillside	505-0079	30.571333	27.575389	70	8.00	32	0.30	54.40	Marginal - Turbidity, Fe
Hillside	505-0080	30.575528	27.572528	110	Dry	n/a			
Majubas Nek	505-0082	30.575556	27.511389	98	6.00	34, 61, 68	0.39	98.50	Good (Marginal Turbidity)
Majubas Nek	505-0083	30.580139	27.509472	80	Dry	n/a			
Majubas Nek	505-0084	30.573056	27.516250	90	Dry	n/a			
Majubas Nek	505-0087	30.581583	27.501722	80	Dry	n/a			
Majubas Nek	505-0097	30.575278	27.509139	100	Dry	n/a			
Rietfontein	505-0085	30.601111	27.485250	134	0.40	74, 84	0.10	54.00	Good
Rietfontein	505-0088	30.601028	27.482417	200	0.20	51, 128			
Rietfontein	505-0089	30.612694	27.502083	127	Dry	n/a			
Rietfontein	505-0096	30.601417	27.482167	119	0.15	22			
Belfontein	505-0068	30.626139	27.509639	98	Dry	n/a			
Belfontein	505-0069	30.608583	27.514722	98	0.30	11, 36, 40	<0.05	69.50	Good (Slightly High Fe)
Belfontein	505-0070	30.602667	27.512000	130	0.80	86, 118	0.10	80.00	Good
Belfontein	505-0090	30.620000	27.514000				<0.1	65.30	No Sample taken (Low Yield)
Belfontein	505-0091	30.620000	27.514000	120	0.30	7			
Belfontein	505-0095	30.603111	27.510694	120	1.60	18, 20, 26	0.60	69.50	Good
Rooiwal/Gcina	505-0098	30.421917	27.478361	100	1.50	41	0.30	50.00	Good - Slightly high Turbidity
Rooiwal/Gcina	505-0099	30.408250	27.494361	60	Dry	n/a			
Rooiwal/Gcina	505-0100	30.402750	27.494861	100	1.20	38, 40, 42	0.25	68.60	Good - Slightly high Turbidity

Table 4: Results from report KV119

Boreholes	Latitude	Longitude	Depth [m]	Airlift Yield [L/s]	Dept to water strikes [m]	Recommended yield 1/s 24hr	Pump Depth	Water Quality
505-0203	30.544750	27.556361	150	0.80	120	0.50	119.00	
505-0204	30.545083	27.561361	180	0.80	120, 159			
505-0205	30.537306	27.575722	120	1.30	22, 35	0.16	100.00	
505-0206	30.537500	27.575556	52	0.90	34			
505-0207	30.523806	27.583583	96	3.50	25, 50, 76	0.75	77.00	
505-0192	30.540778	27.599972	114	1.85	21, 37, 101	0.70	65.00	Class 0
505-0194	30.541722	27.600889	102	0.20	29			
505-0195	30.541611	27.600972	102	2.00	29, 41, 77	0.50	50.00	Class 0
505-193	30.531028	27.605611	72	8.20	12, 25, 56	1.20	60.00	Class 1
505-189	30.591389	27.598833	78	1.10	31,43	0.45	57.50	Class 1
505-190	30.586528	27.606306	120	2.95	27, 89, 103	0.60	100.00	Class 1
505-191	30.579389	27.615611	109	>12.00	52, 100, 106	0.92	100.00	Class 1
505-196	30.591972	27.597139	72	>18.00	27, 30, 40	3.50	40.00	Class 0

Boreholes	Latitude	Longitude	Depth [m]	Airlift Yield [L/s]	Dept to water strikes [m]	Recommended yield 1/s 24hr	Pump Depth	Water Quality
505-0197	30.591389	27.598833	120	1.30	41, 94	0.13	60.00	Class 1
505-0198	30.489778	27.549417	12	0.10	12			
505-0199	30.489861	27.549361	120	0.20	6, 57			
505-0200	30.490528	27.548917	108	0.80	24	0.10	42.00	Class 1
505-0201	30.494222	27.539194	84	3.20	13, 35, 67	0.40	66.00	Class 1
505-0202	30.500361	27.562222	120	0.00	Dry			
505-0209	30.500639	27.564306	92	3.00	14			
505-0210	30.500639	27.563750	50	5.10	12, 22, 31	0.44	45.00	Class 1
505-0208	30.595556	27.491611	132	0.70	24, 46	0.20	60.00	Class 1
505-0211	30.597861	27.485750	132	1.20	24	0.20	60.00	Class 2

Table 5: Results from report KV120

Site & demand	Village	Site Type	BH/Spring	Number	Latitude	Longitude	Water Quality	Recommended Yield (24)	General Comments
Rooiwal (1.0 L/s) Gcina (9.0 L/s)	Rooiwaal	Borehole	R 001	505-0001	30.445000	27.460833	1 (NA)	<0.01	Calibration test done
	Rooiwaal	Borehole	R 002	505-0002	30.445556	27.461667	0	<0.01	Calibration test done
	Rooiwaal	Borehole	R 003	n/a	30.432222	27.485556		n/a	Not to be tested
	Rooiwaal	Borehole	R 004	n/a	30.423889	27.486667		n/a	No casing - Not to be tested
	Rooiwaal	Borehole	T23864	505-0004	30.411944	27.481667	2 (Fe)	0.69	Strong smell of sulfur
	Rooiwaal	Borehole	Not available	n/a	30.381111	27.483889		n/a	Outside village boundary
	Rooiwaal	Borehole	R 005	n/a	30.382222	27.483889		n/a	Outside village boundary
	Rooiwaal	Borehole	T23834	505-0003	30.436667	27.478611	3 (Feacal)	0.06	Working - head need reparation
	Rooiwaal	Borehole	R 006	505-0005	30.443889	27.459167		n/a	Pump stuck in borehole
Magalagaleni (5.1 L/s)	Magalagaleni	Borehole	T23915	n/a	30.424167	27.499722			Handpump removed/hole full stones
	Magalagaleni	Borehole	T23900	505-0006	30.423056	27.522778	1 (Fe)	<0.1	Low yield - no constant rate test done
	Magalagaleni	Spring	MAG 1	505S0020	30.444722	27.519722	3 (Fe)	0.10	Existing scheme - Weir & pipeline needs slight repairs
Sitoromo (4.0 L/s)	Sitoromo	Borehole	M1	505-0007	30.412778	27.529444		0.56	Handpump at old windmill broken
Hohobeng (5.3 L/s)	Hohobeng	Borehole	T23812	505-0008	30.454444	27.527222	3	0.22	Windmill shaft removed - wheel to repair
	Hohobeng	Spring	HOH1	505s0021	30.470833	27.523056	2	0.30	Weir in flow channel of two springs
Lower Tele (5.5 L/s)	Lower Tele	Borehole	LT1 (23856)	505-0009	30.442778	27.560278	3	0.31	Handpump and old windmill/pump broken
	Lower Tele	Borehole	LT2 (23882)	505-0011	30.433056	27.560278	3	0.08	Handpump and old windmill/pump broken
	Lower Tele	Borehole	LT3	n/a	30.416389	27.551667		n/a	Equipment removed
	Lower Tele	Borehole	T23974	505-0010	30.414444	27.543889	2	0.23	Handpump in working condition
Bebeza (1.0 L/s)	Bebeza	Borehole	T23945	505-0019	30.525833	27.662778			Handpump on old windmill/pump working but stuck in hole.
	Bebeza	Spring	BEBSP 1	505s0022	30.529167	27.632778	2	0.20	Existing scheme. Cement tank with a pipeline to tanks in village
Upper Tele (6.1 L/s)	Upper Tele	Spring	Tel 2	505s0023	30.474167	27.725278	2	0.40	Spring already utilized/Gravit flow
	Upper Tele	Borehole	T23965	505-0012	30.560000	27.691111	2	<0.1	Low yield, Handpump recommended
Danger's Hoek (0.9 L/s)	Danger's Hoek	Spring	DANSP-1		30.639444	27.774167			Combination of two spring (each Yielding 0.1)
	Danger's Hoek	Spring	DANSP-2		30.642222	27.773889			Natural state of flow
	Danger's Hoek	Spring	DANSP-3	505s0024	30.648889	27.781389	3 (Fe)	4.00	Combination of a network of springs.
Nomhlangana (1.8 L/s)	Nomhlangana	Spring	NOM 1	505s0025	30.631667	27.838889		0.30	Spring already utilized/Gravity flow
	Nomhlangana	Spring	NOM 2	505s0026	30.642778	27.822778		0.50	Spring already utilized/Gravity flow
Hillside (1.9 L/s)	Hillside	Borehole	HIL 1	505-0013	30.566111	27.568889	3 (CaC03)	0.01	No recovery after calibration test. Handpump recommended

Site & demand	Village	Site Type	BH/Spring	Number	Latitude	Longitude	Water Quality	Recommended Yield (24)	General Comments
	Hillside	Borehole	HIL 2	505-0014	30.560278	27.574167	2 (Fe)	0.10	No constant done due to low yield, handpump recommended
eTyinindini (1.4 L/s)	eTyinindini	Borehole	T23943	505-0015	30.575000	27.534444	3	0.01	No recovery after calibration test. Handpump recommended.
	eTyinindini	Borehole	TYN 2	505-0016	30.550833	27.543333		n/a	Pump stuck in borehole, release mechanism broken.
	eTyinindini	Spring	TYN 1	505s0027	30.546667	27.527222	2	0.50	Unprotected. Pipeline running from a small stream not at position of origin.
	eTyinindini	Spring	TYN 3	n/a	30.557778	27.518889		n/a	Still in natural state, not measured.
Rietfontein (5.0L/s)	Rietfontein	Borehole	T23961	505-0017	30.575833	27.553056	2	0.01	Obstruction at 35m. Borehole has to be redrilled.
Belfontein (2.8 L/s)	Belfontein	Borehole	T23942	505-0018	30.606667	27.521389	3	0.01	No recovery after calibration test. Handpump recommended
	Belfontein	Spring	BEL 1	n/a	30.607500	27.522500		0.10	Stone reservoir build, yield not measured (estimated). Not to be utilized.
	Belfontein	Spring	BEL 2	505s0029	30.637778	27.504444	2	0.80	Still in natural state, good position to protect and gravitate to village.
Majuba's Nek (6.5 L/s)	Majuba's Nek	Borehole	T23938B		30.575833	27.510556		n/a	Equipment destroyed, hole filled with soil.
	Majuba's Nek	Borehole	T23938C		30.556389	27.543333		n/a	Equipment removed from borehole-could not be tested due to access problem.
	Majuba's Nek	Spring	MAJSP1	505s0028	30.546667	27.527222	2	0.40	Pipeline from origin of spring to four tanks in the village. System needs reparation.

Table 6: NGA Borehole dataset

Borehole number	Other number	Latitude	Longitude	Date	Groundwater Level [m]	Reported Yield [L/s]	Depth [m]	Water Strike Depth [m bgl]
3027DA00002	93871	-30.661480	27.525720	2-May-1966			136.86	136.86
3027DA00005	90565	-30.642530	27.571000	25-Feb-1966	19.20		35.97	23.78
3027DA00036	T23963C	-30.636700	27.570440	13-Jan-1994			73.45	
EC/D18/0080		-30.622660	27.576440	10-Sep-2013			55.00	
EC/D18/0079		-30.622570	27.576450	9-Sep-2013	12.13		100.00	
EC/D18/0014		-30.621290	27.576120	2-Dec-2009			120.00	
EC/D18/0015		-30.620950	27.575790	3-Dec-2009			148.00	
EC/D18/0066		-30.618300	27.782350	2-Mar-2013	2.10		60.00	20.00
EC/D18/0312	BH-10066	-30.615490	27.620890	15-Mar-2015			59.63	
3027DA00030	T23943	-30.614750	27.523500	28-Oct-1971	6.10	0.32	70.10	27.43
3027DA00022	T23913B	-30.614480	27.522670	10-May-1966	12.19	0.25	76.20	54.86
3027DA00020	T23901	-30.614070	27.610200	25-Feb-1966	19.20	3.79	79.86	57.91
EC/D18/0311	BH-10062	-30.613610	27.610550	10-Mar-2015	21.20		58.40	
EC/D18/0267		-30.613220	27.584590	8-Feb-2011			80.00	
3027DA00029	T23942	-30.612250	27.521280	4-Oct-1971	15.24	0.51	91.44	30.78
3027DA00006	108379	-30.611970	27.525730	4-Oct-1971	15.24		91.44	30.79
3027DA00003	108378	-30.611960	27.525740	15-Sep-1971	42.67		79.25	48.77
3027DA00004	96210	-30.611950	27.525750	10-May-1966	12.19		76.20	54.86
23943	108380	-30.610590	27.528780	28-Oct-1971	6.09		70.10	21.34
3027DA00034	T23961	-30.608370	27.604890	19-Jan-1994	3.51		45.10	
EC/D18/0310	BH-505-0095	-30.603100	27.510780	22-Mar-2015	6.36		115.34	
EC/D18/0285	T23913	-30.602360	27.522380	20-Apr-1966			70.50	
3027CB00078	T23941	-30.600620	27.485510	15-Sep-1971	42.67	0.25	79.25	48.77
EC/D18/0010		-30.594690	27.620930	26-Aug-2006			150.00	
3027DA00068	3027DA00068	-30.593390	27.598510		0.00		0.00	
EC/D18/0315		-30.592230	27.595970	7-Nov-2019	7.00		60.00	
23883	88111	-30.590870	27.619890	12-Feb-1964			91.44	
3027DA00033	T23946C	-30.584320	27.607930	7-Feb-1973	65.84	0.17	83.00	73.15
3027DA00008	89177	-30.582860	27.621600	5-May-1964	14.02		84.43	62.18
3027DA00019	3027DA00019	-30.582850	27.621590	13-Mar-1964	9.14		60.96	43.89
3027DA00007	108374	-30.582840	27.621580	21-Mar-1972			106.68	48.77
EC/D18/0298		-30.576360	27.580880				60.00	
EC/D18/0098		-30.575400	27.575490	14-Nov-2013			114.00	
3027DA00041	T23883B	-30.575310	27.613780	5-May-1964	14.02	1.26	84.43	62.18
3027DA00026	T23938B	-30.575180	27.509100	15-Mar-1972	12.19	0.76	95.71	27.43
3027DA00025	3027DA00025	-30.575170	27.509100	9-Feb-1972	24.38		103.63	45.72
3027DA00025	T23938	-30.575170	27.509100	9-Feb-1972	24.38		103.63	45.72
505-0015		-30.575000	27.534440	1-Apr-1999	13.69		65.00	
EC/D18/0007		-30.573310	27.619140	12-Aug-2006			60.00	
3027DA00024	T23937B	-30.573280	27.619070	25-Apr-1972	18.29		106.68	18.29
3027DA00021	T23912	-30.573270	27.556260	24-Mar-1966	15.24	0.25	91.44	82.30
3027DA00023	T23937	-30.573270	27.619070	21-Mar-1972	48.77		106.68	106.68
EC/D18/0299		-30.573170	27.587690				70.00	
EC/D18/0006		-30.573120	27.619330	11-Aug-2006			80.00	
EC/D18/0074		-30.573070	27.614860	8-Sep-2013			130.00	
3027DA00027	T23938C	-30.573000	27.513520	26-Apr-1972	10.67	0.51	93.27	27.43
EC/D12/0282	T23937C	-30.570590	27.619640	15-Jun-1972			99.10	
EC/D12/0353	T23902	-30.567980	27.480640	11-Oct-1965			85.00	
3027DA00040	T23884	-30.567810	27.616000	13-Mar-1964	9.14	0.50	60.96	43.89
EC/D18/0093	505-0013	-30.566110	27.568880	1-Apr-1999	18.20		61.24	
EC/D18/0286	T23946A	-30.564170	27.617600	7-Aug-1972			99.00	
T23883		-30.564160	27.617500	12-Feb-1964			85.00	
3027DA00012	T23887	-30.563750	27.546830	14-May-1964	21.34	0.47	76.20	35.00

Borehole number	Other number	Latitude	Longitude	Date	Groundwater Level [m]	Reported Yield [L/s]	Depth [m]	Water Strike Depth [m bgl]
3027CB00020	113014	-30.562820	27.480450	25-Apr-1972	10.67		93.27	27.43
3027CB00019	90566	-30.562810	27.480440	25-Oct-1965			91.44	91.44
3027DA00028	T23939C	-30.561420	27.546830	13-Oct-1972	10.67	0.09	30.48	24.38
3027DA00035	T23962B	-30.561420	27.579890	14-Jan-1994			70.60	
23938	108375	-30.561140	27.497110	9-Feb-1972	24.38		103.63	45.72
505-0014		-30.560270	27.574160	1-Apr-1994			69.40	
505-0012		-30.560000	27.691110	1-Apr-1999			63.05	
EC/D12/0355	T23902B	-30.554780	27.486560	25-Oct-1965			85.00	
EC/D12/0279		-30.552320	27.444990	10-Apr-2015			66.00	
EC/D12/0280		-30.552290	27.445010	11-Apr-2015			84.00	
EC/D18/0069		-30.551550	27.610490	4-Sep-2013			124.40	
EC/D12/0235		-30.550890	27.462500	11-Sep-2013			80.00	
EC/D12/0234		-30.550300	27.468980	4-Sep-2013			70.00	
EC/D12/233A		-30.548220	27.467290	1-Sep-2013			120.00	
EC/D12/233B		-30.548170	27.467210	3-Sep-2013			40.00	
EC/D18/0305	BH505-0076	-30.545820	27.690230	1-Jul-2015			120.48	
EC/D18/0306	BH2	-30.542430	27.656770	1-Jul-2015			80.40	
EC/D18/0308	BH-10051	-30.541570	27.600970	27-Feb-2015			102.10	
EC/D18/0307	BH-10052	-30.540780	27.599680	27-Feb-2015			108.60	
3027DA00017	T23872	-30.537850	27.560210	28-Jan-1964			91.44	
3027DA00013	88147	-30.537840	27.560200	24-Feb-1964			69.79	69.79
3027DA00014	113003	-30.537820	27.560180	23-Feb-1972	15.24		47.24	21.34
3027DA00015	108376	-30.537810	27.560170	9-Feb-1972			150.00	
3027DA00045	3027DA00045	-30.536940	27.564440				42.00	
3027DA00045	T23939	-30.536940	27.564440				42.00	
EC/D18/0118		-30.536830	27.656780	14-Apr-2015	22.95		132.00	
EC/D18/0008		-30.532980	27.547600	11-Aug-2006			98.00	
EC/D18/0309	BH-10050	-30.531100	27.605630	6-Mar-2015	4.26		48.80	
EC/D18/0302	T23939B	-30.531000	27.577700	23-Mar-1972			44.00	
T23872B		-30.530830	27.577500	24-Feb-1964			65.00	
3027DA00018	3027DA00018	-30.526420	27.656280	12-Oct-1972	13.72		97.84	54.86
3027DA00037	T23965	-30.524750	27.653500	11-Jan-1994	3.27		69.00	
3027DA00039	T23811	-30.521980	27.604610	22-Sep-1944	3.35	0.38	59.13	45.00
3027DA00031	T23945	-30.521630	27.653900	16-Jun-1972	45.72		106.68	48.77
3027DA00032	T23945C	-30.520450	27.652390	12-Oct-1972	13.72	1.89	97.84	54.86
3027DA00038	T23966B	-30.511140	27.566830	3-Feb-1994	38.44		73.33	
3027DA00080	3027DA00080	-30.500860	27.563500	1-Jan-2004	6.94		50.00	50.00
EC/D12/0346	T23606	-30.499030	27.434720	17-Jan-1983			75.00	
T23817		-30.498880	27.434720	2-Nov-1944			85.00	
3027BC00076	3027BC00076	-30.494480	27.538780	1-Jan-2004	2.55		84.00	67.00
EC/D18/0112		-30.494000	27.576260	28-Mar-2015			102.00	
EC/D18/0076		-30.491740	27.530940	7-Sep-2013			100.00	
3027BC00074	505-0200	-30.490870	27.548500	1-Jan-2004	0.08		108.00	24.00
3027BC00075	3027BC00075	-30.490300	27.559040	1-Jan-2004	11.30		120.00	94.00
EC/D18/0075		-30.490190	27.531390	6-Sep-2013			35.00	
3027BC00017	T23969	-30.488410	27.560690	3-Feb-1994			38.63	
3027BC00016	T23968	-30.488100	27.560730	28-Jan-1994			53.64	
3027BC00015	T23967B	-30.488090	27.560720	2-Feb-1994	4.70	1.00	57.27	57.27
EC/D18/0111		-30.485420	27.569220	27-Mar-2015			80.00	
EC/D12/0347	T23906	-30.484650	27.441010	1-Jul-1966			66.80	
T23865		-30.484440	27.440830	17-Aug-1962			70.00	
T23871		-30.484440	27.440830	14-Oct-1963			85.00	
3027BC00020	T23972	-30.479780	27.527970	15-Feb-1994	2.20		74.40	
3027BC00019	T23971	-30.479770	27.527960	11-Feb-1994	5.47		77.00	

Borehole number	Other number	Latitude	Longitude	Date	Groundwater Level [m]	Reported Yield [L/s]	Depth [m]	Water Strike Depth [m bgl]
3027BC00018	T23970	-30.479750	27.527940	9-Feb-1994		0.81	52.89	52.89
3027AD00071	T23878	-30.479480	27.433780	16-Aug-1963	9.45	0.15	36.58	16.15
EC/D18/0296	T23956	-30.474950	27.526190	25-Jan-1983			67.00	
T23880		-30.474720	27.526110	5-Dec-1962			73.00	
EC/D12/0272		-30.467010	27.434220	17-Mar-2015			84.00	30.00
EC/D12/0274		-30.464870	27.414740	19-Mar-2015	7.73		102.00	
EC/D12/0273		-30.464750	27.414390	18-Mar-2015			48.00	
3027BC00005	93862	-30.459300	27.522940	26-Oct-1966	27.43		76.20	54.86
3027BC00010	15634	-30.459290	27.522950	15-Nov-1930			60.66	60.66
3027BC00008	72480	-30.459280	27.522960	12-Nov-1959			85.34	85.34
3027BC00009	79890	-30.459270	27.522970	23-Jul-1962	7.93		76.20	43.59
3027BC00007	90564	-30.459260	27.522980	6-Oct-1965	6.09		84.73	54.86
3027BC00006	3027BC00006	-30.459250	27.522990	11-Oct-1966	6.09		64.92	24.38
3027AD00063	T23843	-30.447530	27.463500	2-Apr-1957	9.14	0.15	76.20	52.00
3027AD00065	T23864	-30.446420	27.459890	12-Jul-1962	6.10	3.79	60.96	49.00
3027AD00027	3027AD00027	-30.445870	27.468540	12-Jul-1962	6.09		60.96	49.00
3027AD00028	49854	-30.445860	27.468550	8-Apr-1953	23.77		35.97	29.57
3027AD00032	50694	-30.445850	27.468560	17-Apr-1953	16.46		36.27	33.53
3027AD00029	3027AD00029	-30.445840	27.468570	2-Apr-1957	9.14		76.20	27.43
3027AD00026	62054	-30.445830	27.468580	12-Apr-1957	6.71		76.20	51.00
EC/D18/0083	505-0001	-30.445550	27.460830	1-Apr-1999	2.70		36.50	
EC/D18/0084		-30.445550	27.461660	1-Apr-1999	6.30		40.19	
3027BC00054	3027BC00054	-30.445020	27.535720	1-Jan-2004			120.00	90.00
3027BC00055	3027BC00055	-30.444740	27.560160	1-Jan-2004			69.00	55.00
3027AD00061	T23834	-30.444660	27.459230	17-Apr-1953	16.46	3.79	43.29	33.53
3027AD00055	T23815	-30.444250	27.560300	5-Dec-1944	15.24	0.15	48.46	46.94
EC/D18/0110		-30.442950	27.559360				96.00	
505-0009		-30.442770	27.560270	1-Apr-1999	6.00		29.12	
3027BC00057	3027BC00057	-30.441420	27.530160	1-Jan-2004			123.00	60.00
3027AD00057	T23819	-30.441110	27.530110	12-Mar-1948	41.76	0.01	76.20	41.76
3027BC00064	3027BC00064	-30.438640	27.474330	1-Jan-2004			123.00	17.00
EC/D18/0304	BH505-0036	-30.438350	27.538450				84.40	
505-0003		-30.436660	27.478610	1-Apr-1999	14.58		28.40	
3027BC00023	T23856	-30.435870	27.557670	25-Nov-1959	18.90	1.89	64.62	54.86
3027BC00026	T23601	-30.435870	27.559890	5-Feb-1949	13.72	0.32	58.22	58.22
3027BC00001	T23886	-30.435590	27.562110	13-Mar-1964	3.66	3.79	38.40	32.31
3027BC00071	3027BC00071	-30.434740	27.538220	1-Jan-2004			123.00	83.00
3027BC00025	T23882	-30.433090	27.565440	14-May-1963	22.25	0.63	53.04	48.77
3027BC00014	T23921	-30.432530	27.566000	18-May-1970		1.26	79.25	60.96
3027BC00027	T23619	-30.432250	27.565720	18-Feb-1967	25.00	3.25	44.20	44.20
3027BC00066	3027BC00066	-30.429200	27.506550	1-Jan-2004			123.00	
3027BC00067	3027BC00067	-30.425300	27.530440	1-Jan-2004			123.00	110.00
EC/D18/0071		-30.424830	27.501130	5-Sep-2013			41.33	
3027BC00073	3027BC00073	-30.424750	27.559610	1-Jan-2004			122.00	
3027BC00011	T23900	-30.423360	27.523230	6-Oct-1965	6.10	0.58	87.73	54.86
3027BC00044	3027BC00044	-30.423260	27.511480	1-Jan-2004	6.90		123.00	47.00
3027BC00013	T23915	-30.422810	27.543500	11-Oct-1966	6.10	3.79	64.92	21.34
3027BC00072	3027BC00072	-30.421140	27.554880	1-Jan-2004	14.00		123.00	48.00
EC/D18/0297	T23900	-30.420690	27.523610	6-Oct-1965	6.09		91.74	54.00
3027BC00022	T23812	-30.420590	27.540440	8-Nov-1944	9.14	1.26	56.03	42.67
3027BC00024	T23866	-30.420310	27.537110	23-Jul-1962	7.92	1.42	76.20	43.59
3027BC00069	3027BC00069	-30.420020	27.535440	1-Jan-2004			105.00	80.00
3027BC00056	3027BC00056	-30.419200	27.560720	1-Jan-2004			123.00	75.00
3027AD00056	T23818	-30.419110	27.560520	21-May-1948	6.40	1.89	60.96	50.90

Borehole number	Other number	Latitude	Longitude	Date	Groundwater Level [m]	Reported Yield [L/s]	Depth [m]	Water Strike Depth [m bgl]
3027BC00028	T23973	-30.418890	27.509440				79.00	
3027BC00012	T23914	-30.418370	27.541280	26-Oct-1966	27.43	2.27	76.20	54.86
3027AD00091	3027AD00091	-30.418000	27.492360	1-Jan-2004			123.00	90.00
3027BC00021	T23804	-30.416140	27.552390	29-May-1944	21.03	0.06	79.25	70.10
3027BC00070	3027BC00070	-30.414740	27.543480	1-Jan-2004			123.00	53.00
505-0010		-30.414440	27.543880	1-Apr-1999			74.65	
EC/D18/0266		-30.414210	27.544230	3-Feb-2011			60.00	20.47
EC/D18/0089	505-0007	-30.412770	27.529440	1-Apr-1999	30.65		52.40	
EC/D18/0078A		-30.412650	27.530570	2-Sep-2013			60.00	
EC/D18/0265		-30.412280	27.481840	2-Feb-2011			80.00	59.00
505-0004		-30.411940	27.481660	1-Apr-1999	3.16		42.00	
EC/D18/0078B		-30.411390	27.531010	3-Sep-2013			130.00	
3027AD00051	T23911	-30.407980	27.361240	27-Jul-1966	6.10	0.76	37.19	31.39
3027BC00068	3027BC00068	-30.407800	27.516540	1-Jan-2004			120.00	90.00
3027AD00059	T23829	-30.403090	27.495720	14-May-1948	6.10	0.02	76.20	12.50
3027AD0E844	T23890B	-30.400830	27.483880	24-Feb-1969	15.24		53.79	
3027AD00049	T23907	-30.394720	27.423050	23-Aug-1966	10.67	0.25	64.31	59.44
3027AD00060	T23833	-30.383610	27.433330	19-Mar-1953	10.06	3.79	64.62	57.91
3027AD00054	T23936	-30.381420	27.435720	26-Mar-1973	7.62	0.16	106.68	27.43
EC/D18/0264		-30.381310	27.484060	27-Jan-2011			80.00	36.00
EC/D18/0001		-30.380940	27.484390	19-Mar-2004			76.40	
3027AD00070	T23876B	-30.380320	27.433780	28-Jan-1983	28.00	0.02	60.50	45.00
3027AD00048	97071	-30.378950	27.434640	27-Sep-1966	21.34		93.27	59.44
3027AD00045	84760	-30.378940	27.434630	14-Jan-1964	8.84		60.96	35.05
3027AD00046	103247	-30.378930	27.434620	2-Jun-1970	30.48		91.44	64.01
3027AD00044	49853	-30.378920	27.434610	19-Mar-1953	10.06		64.61	57.91
3027AD00041	93866	-30.378910	27.434660	12-Sep-1966			91.44	91.44
EC/D18/0116		-30.378060	27.424510	10-Apr-2015			66.00	
EC/D18/0115		-30.378020	27.424550	9-Apr-2014			72.00	
EC/D18/0114		-30.377970	27.424560	8-Apr-2015			120.00	
3027AD00058	T23822	-30.377520	27.435720	16-Jun-1948	15.24	0.25	76.20	67.06
3027AD00078	3027AD00078	-30.377220	27.436110				66.00	
3027AD00050	T23908B	-30.375290	27.436020	27-Sep-1966	21.34	0.32	91.44	56.39
3027AD00086	T23908	-30.375000	27.436380				85.00	
EC/D18/0268		-30.374930	27.420150	14-Feb-2011			80.00	
EC/D18/0113		-30.354410	27.415930	30-Mar-2015	32.97		108.00	
3027AD00052	T23923	-30.354160	27.415550	2-Jun-1970	30.48	0.76	91.44	64.01
EC/D18/0120		-30.352710	27.418190	19-Apr-2015			66.00	
EC/D12/0120		-30.352070	27.418190	19-Apr-2015			66.00	
3027AD00069	T23876	-30.346380	27.445550	14-Jan-1964	8.84	0.63	60.96	35.97