

DEPARTMENT: WATER AFFAIRS

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THE CLASSIFICATION OF SIGNIFICANT WATER RESOURCES IN THE OLIFANTS-DOORN WATER MANAGEMENT AREA

OLIFANTS-DOORN WMA CLASSIFICATION PHASE 3A – GROUNDWATER TECHNICAL REPORT

APRIL 2012

This report should be read in conjunction with the final project report:

Department of Water Affairs, South Africa, April 2012. Final project report for the Classification of significant water resources in the Olifants-Doorn WMA. Belcher A and Grobler D, April 2012. Report number: RDM/WMA17/00/CON/CLA/0111.

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1. INTRODUCTION

Groundwater is an important component of the hydrological resources of the Olifants -Doorn Water Management Area (WMA) (Map 1, Appendix A). Geological and hydrogeological conditions vary considerably. The main implication of this variability across the WMA is that groundwater quantity and quality also varies significantly. In certain areas groundwater is an important component of the total water resources budget, whilst in other regions its occurrence is very limited. Consequently the role groundwater plays in the socio-economic and ecological sectors also varies.

There is no shortage of literature on the Olifants-Doorn WMA. Good information regarding groundwater is contained within the Internal Strategic Perspective for the Olifants-Doorn WMA (DWAF, 2005a). It discusses the geohydrological setting in some detail, even at the tertiary catchment sub-area level. Although a Catchment Management Strategy has not been finalised for the Olifants-Doorn WMA the draft version provides useful information. In addition the development of the National Water Resources Classification System (NWRCS) was developed and tested in the Olifants-Doorn WMA (DWAF, 2007). A list of literature with specific reference to groundwater resource classification includes: Parsons and Associates (2000); GEOSS (2003); SRK (2006); GEOSS (2006); Southern Waters (2006); DWAF (2007) and C.A.P.E. (2009).

This report addresses the actual classification of groundwater resources. A lot of spatial variability exists with regard to groundwater especially as for 78% of the WMA the groundwater occurs within a fractured rock aquifer setting. However this variability is lost to a degree as the groundwater classification is per Quaternary Catchment. It is acknowledged that the groundwater flow is controlled to a large extent by the geological and hydrogeological conditions and not by the surface topography. Quaternary Catchments are defined according to topographical variation and features. Nonetheless the analysis has been completed on a Quaternary Catchment basis as this facilitates and simplifies the integration of the classification process with the other disciplines.

2. TERMS OF REFERENCE

The Terms of Reference for this specialist study have been to address the groundwater component of Water Resources Classification of the Olifants-Doorn WMA. The 7-step classification process is to be followed and the latest available data is to be used.

3. GROUNDWATER SETTING

3.1 Geology

Map 2 (Appendix A) and Table 1 summarises the geology of the Olifants-Doorn WMA. The geological description is taken mainly from SRK (2006). The nature and composition

(lithology) of each of the different stratigraphic units is considered. Hydrogeological characteristics, with regard to the permeability of the unit and its classification as an aquifer, aquitard or aquiclude, are also included. The geology of the Olifants-Doorn WMA is dominated by metamorphic rocks of the Nama Group in the north and sedimentary rocks of the Cape Supergroup in the southern and south-western parts. In the northern and north-eastern parts, the rocks of the pre-Cape Van Rhynsdorp Group, the sedimentary rocks of the lower Karoo Supergroup as well as intrusive Karoo dolerites are dominant. Various metamorphic rocks (i.e. quartzites, granulite and schists), augen gneisses as well as mafic gneisses of the Garies and Bitterfontein Subgroups (Okiep Group) are overlain by sediments of the Nama Group in the north-western portion of the WMA near Nuwerus. Tertiary to Recent sediments occurs along the major river courses and extensively along the coast (including north-west of the town of Graafwater).

The main characteristics of each of the main aquifers as well as the status quo of groundwater abstraction and exploitation potential in the Olifants-Doring WMA, are summarised in Table 1.

	Lithos	tratigraphic Unit	Era	Characteristics	Hydrogeological Significance	
	Sai	ndveld Group	Cenzoic			
1	Karoo E	Dolerite (north-east)	Mesozoic		Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow.	
Group		Beaufort Group	Mesozoic	6000m alternating arenaceous and argillaceous sediments	Localised significance as aquifer systems.	
Karoo Group		Ecca Group	Paleozoic	Dark grey shale and inter-bedded sandstone	Middle to upper thin sandstone strata may have greater hydrogeological significance	
Х		Dwyka Group		Tillite	Aquiclude	
		Wittenberg Group		Alternating sand-stone and shale	Marginal hydrogeological significance	
		Bokkeveld Group		Alternating sand-stone and shale	Little significance, else regolith aquifer	
Cape Supergroup Table Mountain Group	Nardouw Subgroup		1100m to 810m alternating sand-stone and shale with lenses of quartzite	Top aquifer of TMG-2. Confined above by lowermost shale unit of Bokkeveld Group		
	n Grou	Cederberg Shale Formation	Paleozoic	oic 50m to 120m shale	Top confining layer for lower aquifer system (TMG-1)	
ape	intai	Pakhuis Formation		40m		
C. C.	le Mou	Peninsula Formation		1800m to 2150m sandstone	Major fractured rock/secondary aquifer system Middle aquifer (TMG-1)	
	Tab	Graafwater Formation		Sandstone		
	Piekenierskloof Formation		Formation fo		Conglomeratic base, followed by 800m coarse sandstone	Basal aquifer unit (TMG-1)
	Kliŗ	bheuvel Group	Paleozoic	Lower conglomeratic formation and an upper mudstone formation of approx 2000m	Aquitard of limited hydrogeological significance	
		hynsdorp Group north-west)	Paleozoic	A sucession of shallow sediments deposited on a tidal plain	Impermeable aquiclude	
1	Malmesl	oury Group (south)	Namibian		Impermeable aquiclude	

Table 1.Stratigraphy of the Olifants-Doorn WMA (SRK, 2006)

3.2 Groundwater

With regard to the geohydrological setting (Map 3, Appendix A) the description that follows is based on the 1:500 000 Hydrogeological Map Series of Department of Water Affairs (DWA). The four aquifer types and associated extent (expressed as a percentage) within the Olifants-Doorn WMA are:

- Fractured (78 %)
- Intergranular and fractured (20 %)
- Intergranular (1 %)
- Karst (1 %).

The percentage of the total WMA for each aquifer type and associated sub-divisions is given in Table 2. The total area of the WMA is approximately 56 742 km^2 .

Table 2. Iquiter types and		
Aquifer type and yield	Total Area (km ²)	% of Area of WMA
Fractured 0.0 - 0.1 ℓ/s	947.6	1.7
Fractured 0.1 - 0.5 ℓ/s	18584.0	32.8
Fractured 0.5 - 2.0 ℓ/s	18414.5	32.5
Fractured 2.0 - 5.0 ℓ/s	5975.9	10.5
Fractured > $5.0 \ell/s$	188.9	0.3
Intergranular 0.1 - 0.5 ℓ/s	267.1	0.5
Intergranular 2.0 - 5.0 ℓ/s	198.5	0.4
Intergranular> 5.0 ℓ/s	157.7	0.3
Intergranular and fractured 0.0 - 0.1 ℓ/s	1227.1	2.2
Intergranular and fractured 0.1 - 0.5 ℓ/s	9685.2	17.1
Intergranular and fractured 0.5 - 2.0 ℓ/s	335.8	0.6
Karst 0.5 - 2.0 ℓ/s	482.9	0.9
Karst > 5.0 ℓ/s	276.8	0.5

 Table 2.Aquifer types and percentage of the O-D WMA

This table reflects that fractured aquifers are widely distributed across the WMA with the most typical borehole yield being between 0.1 ℓ /s and 2.0 ℓ /s.

3.3 Recharge

Groundwater recharge (Map 4, Appendix A) is an important component of hydrogeological characterisation as it has a major influence on groundwater quantity (especially if aquifer transmissivity and storage is favourable) and groundwater quality. Across the Olifants-Doorn WMA groundwater recharge ranges from 0 mm/a to 245 mm/a. The highest groundwater recharge occurs in the Upper Olifants sub-area, especially in the Winterhoek mountain area. Significant recharge also occurs in the Koue Bokkeveld, eastern Doring, and easternSandveld sub-areas. For the remaining areas groundwater recharge is quite limited.

3.4 Groundwater / Surface water interaction

Regarding groundwater/surface water interaction (Map 5, Appendix A) the range in contribution of groundwater supplying river base flow is from 0.0 to 20.4 Mm³/a (per Quaternary Catchment). The highest base flow contribution areas are the same as areas of highest groundwater recharge. It must be noted, however, that in the other areas groundwater still plays a significant role in maintaining river base flow, although on a much smaller scale, i.e. smaller volumes and more limited in extent.

3.5 Groundwater quality (EC)

Groundwater quality (Map 6, Appendix A) varies greatly across the WMA and this is a function of many factors but mainly geology and recharge. The groundwater quality is good in the Koue Bokkeveld, Olifants, eastern Sandveld and western Doring sub-areas. Groundwater quality (as indicated by Electrical Conductivity (EC)) is very poor in the western part of the Knersvlakte sub-area.

3.6 Groundwater dependent ecosystems

Based on national scale mapping of Groundwater Dependent Ecosystems (GDEs) (Map 7, Appendix A) in the Sandveld sub-area groundwater plays a significant role in sustaining ecosystems, whilst there are many river riparian zones throughout the WMA where the probability of GDEs occurring is high.

3.7 Groundwater importance (ecological and socio-economic)

Groundwater importance varies across the WMA. If groundwater importance is categorised according to:

- a) socio-economic importance and
- b) ecological importance,

then all groundwater components mentioned above need to be taken into account as well as groundwater use by the private, commercial and municipal sectors. Groundwater importance is relevant to this project as, when defining target management classes, as it is important to know whether groundwater needs to be considered and to what degree or whether it does not need to be taken into account at all.

4. CLASSIFICATION

4.1 Introduction

The classification of water resources includes consideration of all components of the hydrological system (surface water, wetlands, estuaries and groundwater) as well as the outcome of the catchment visioning process. The class of a resource is to be set by water

resource managers, technical specialists and stakeholders in a catchment. In addition to water-related technical issues, consideration is also given to social and economic factors during the catchment visioning and public participation processes.

There is a seven-step process (Table 3) for determining the class of water resource, before which the Geohydrological Response Units (GRUs) need to be defined and then classified. However, for the scale of the project and for the practical implementation of the target management classes, it is proposed quaternary catchments are the GRUs. Once this classification per quaternary catchment is completed, discussion with the project team will be held on the linkage between groundwater and surface water nodes will take place. The methodology for identifying these nodes is well described in the report by DWAF (2007).

Steps	Description
1	Delineate the units of analysis & describe the status quo of the water resource
2	Link the socio-economic & ecological value & condition of the water resource
3	Quantify the ecological water requirements & changes in non-water quality
	ecosystem goods, services & attributes
4	Determine an ecologically sustainable base configuration scenario
5	Evaluate scenarios within the IWRM process
6	Evaluate scenarios with stakeholders
7	Gazette the class configuration

Table 3. Seven steps for determining the class of a water resource

To determine the class of a water resource, reference conditions must be identified and present status assessed (referred to as the present ecological status (PES)). Assigned to each unit is a single PES, comprising classification according to:

- sustainable use, level(s) of stress and
- level of usage or contamination.

The level of stress is based on the volume of groundwater abstracted compared to the volume recharged.

Once the single PES has been assigned to each resource unit, then the groundwater resource category can be determined (Table 4).

Cat	Present Status Category (PES)	Desired Status Category*	Water Resource Category	Management Class*
Α	Unmodified natural	Highly sensitive systems, negligible risk allowed	Natural	Excellent
В	Largely natural	Sensitive systems, small risk allowed	Good	Good
С	Moderately modified	Moderately sensitive systems, moderate risk allowed	Fair	Fair
D	Largely modified	Resilient systems, large risk allowed	Poor	
E	Seriously modified			
F	Critically modified			

Table 4. Terminology and classes used during the classification process.

* only considered during public participation and catchment visioning processes

For this project the groundwater classification categories assigned per Quaternary Catchment are listed in Table 5. The classes are:

- **Excellent** (Class 1): where the water resource is minimally used and the overall ecological condition is minimally altered from its pre-development condition;
- **Good** (Class 2): where the water resource is used moderately and the overall ecological condition is moderately altered from its pre-development condition;
- Fair (Class 3): where the water resource is heavily used and the overall ecological condition is significantly altered from its pre-development condition.

Class	Where the water resource is:	Where the pre-development ecological condition is:
1	Minimally used	Minimally altered
2	Moderately used	Moderately altered
3	Significantly used	Significantly altered

Table 5. Management Classes and descriptions

SRK (2006) completed a Reserve determination study for the entire O-D WMA, excluding catchments G30, E10 and F60. Regarding the Sandveld Table 6 lists the classes defined for the G30 catchments.

Catchment	Recharge	Groundwater	Ratio of	Stress	Present	Water
		Usage	usage/Area	Index	Status	Resource
	(Mm ³ /a)	(Mm^3/a)	$(Mm^3/ha/a)$	(%)	Category	Category
G30B	15.62	0.49	8	3.1	А	Natural
G30C	8.48	2.78	79	32.8	С	Good
G30D	12.38	4.00	75	32.3	С	Good
G30E	4.45	2.90	82	65.2	D	Fair
G30F	13.80	14.03	180	101.7	F	Poor
G30G	11.06	6.74	104	60.9	D	Fair

Table 6. Groundwater usage and classification of six of the Sandveld catchments.

The E10 Quaternary Catchments have been classified however at the time of writing this report the E10 report had not yet been released by the Water Research Commission.

Regarding the catchments that had not been studied in detail before the following approach was taken:

- The classification process as outlined in the GRDM training manual (FETWater, 2004) was used to complete the classification of the Quaternary Catchments that have not been classified (i.e. F60).
- Following the GRDM approach all the previous classifications were checked.

4.2 Methodology

The basis used for the groundwater classification was to calculate the groundwater stress index. The groundwater stress index takes into account groundwater abstraction and groundwater recharge (i.e. abstraction/recharge). Table 7 lists the groundwater stress index classes and then also the linkage to Present Status Category (FETWater, 2004).

Stress Index (abstraction / recharge)	Description	Present Status Category (PES)
< 0.05	Unstressed or low levels of	А
0.05 - 0.20	stress	В
0.20 - 0.40	Madamata lanala a fatuara	С
0.40 - 0.65	- Moderate levels of stress	D
0.65 - 0.95	Stressed	Е
> 0.95	Critically stressed	F

Table 7: Groundwater stress index classes

The groundwater recharge values were obtained from the Groundwater Resources Assessment Phase II project (GRAII) per Quaternary Catchment. The groundwater abstraction values were also obtained from the GRAII project work (DWAF, 2005).

Once the single PES has been assigned to each resource unit, then the groundwater resource category was determined (Table 4).

A summary page has been generated per Quaternary Catchment (Appendix B). This Quaternary Catchment summary page includes:

- The catchment identity;
- The Present Status Category (A F);
- The Desired Water Resource Category (A-F);
- The management class (Excellent/Good/Fair);
- The catchment size (km²);
- The total amount of groundwater recharge occurring annually (Mm³/a);
- The volume of groundwater abstracted annually (Mm³/a)(the sub-division of that groundwater use is also included (i.e. rural use; mining; agriculture irrigation; agriculture livestock; industry and aquaculture;
- The groundwater balance (i.e. recharge abstraction) (Mm³/a);
- The groundwater stress index (abstraction / recharge);
- The surface water EWR low flow requirement (Mm³/a);
- The volume of groundwater remaining for allocation (i.e. use) (Mm³/a);
- An indication if a Groundwater Reserve has been calculated;
- The aquifer type and yield for the catchment;
- The groundwater quality for the catchment; and
- The geological setting of the catchment.

Included in the summary page there is a short discussion on:

- the risk to groundwater,
- assumptions and constraints;
- the levels of confidence associated with the classification;
- the implications of using more/less water;
- a brief discussion regarding groundwater "hot spots"; and
- relevant previous work.

It is anticipated that as more work is completed within the WMA various components of the Classification algorithm will become more accurate and improved. The Water Resources Classification System is dynamic and as management interventions are carried out the classification categories need to be recalculated and improvements can be assessed and documented.

5. RESULTS

The summary of each Quaternary catchment is provided in Appendix B. It is acknowledged that with regard to groundwater classification the approach is somewhat subjective, however the GRDM process has been followed (FETWater, 2004). The "Groundwater Stress Index" does not take into account environmental requirements. To address this issue in this project the surface water low flow Ecological Water Requirements (EWR) were taken into account. The EWR were obtained through a detailed and iterative process to ensure optimal functioning of the WMA. Thus for each Quaternary Catchment the additional groundwater available for use (i.e. for allocation) was calculated by using the following equation (all units in Mm³/a):

Groundwater available for use = Recharge – (Total Use + surface water EWRlow flow requirement)

The Tables listed in Section 4 were then used for obtaining the applicable classes. The Quaternary Catchment that are already in a deficit (after taking surface water low flow EWR into account) are listed belowin ascending order:

Quat.	Gwater available for use
Catch.	$(-ve = a \text{ deficit } (Mm^3/a))$
E21H	-7.37
E21G	-4.53
E32E	-2.70
E32B	-2.56
G30F	-1.28
E23F	-1.15
E24G	-1.04
E23K	-0.59
E24E	-0.37
E22G	-0.29
E24H	-0.27

E23J	-0.25
E24K	-0.08
E31C	-0.08
E31G	-0.07
E33A	-0.06
E31D	-0.05
E31H	-0.04
E31E	-0.03
E31F	-0.03.

Thus of the 88 Quaternary Catchments in the Olifants-Doorn WMA there are 20 in a state of insufficient groundwater being available to meet the surface water EWR low flow requirements. The information above must be taken into account when considering groundwater use license applications. However it is very important that temporal variability with regard to climatic conditions and spatial variability with regard to geohydrological settings are carefully considered as part of the groundwater use license applications. The Quaternary summaries are included in Appendix C.

6. DISCUSSION

A process has been followed whereby the groundwater stress index and groundwater availability was calculated for each Quaternary Catchment. The main data used was from the DWAF (2005) work, however if more recent work was completed this was included in the analysis. The agriculture use of groundwater was also assessed using Google Earth to estimate the extent of irrigated areas. In some catchments groundwater abstraction was reported for irrigation, yet there were no evidence of any agricultural activity in the catchment. In these situations the classifications were adjusted. It is acknowledged that the approach followed is somewhat subjective, however it still provides a useful guidance regarding the geohydrological conditions within each catchment and highlights the catchments where groundwater is being over-abstracted.

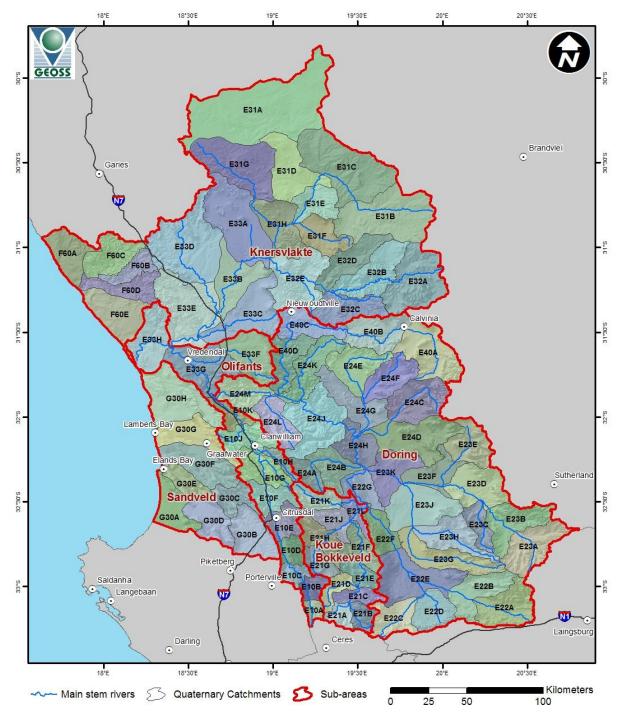
7. CAPACITY BUILDING

Ms C. Lasher graduated from the University of the Western Cape (UWC) in 2007 with a BSc (Hon) in geohydrology and then graduated in 2012 with a MSc in geohydrology also from the UWC. She was involved in the GRDM work and particularly the resource classification work associated with this project. This is a new component of geohydrology to her. She played an active role in the public participation meetings as specialist input was required on groundwater issues. Her knowledge of the Olifants-Doorn WMA has increased along with her experience.

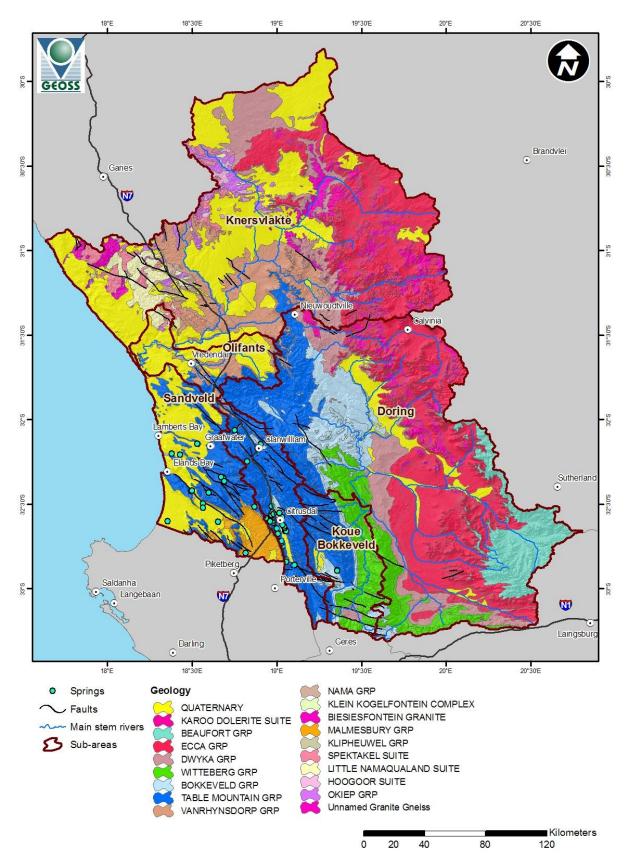
8. REFERENCES

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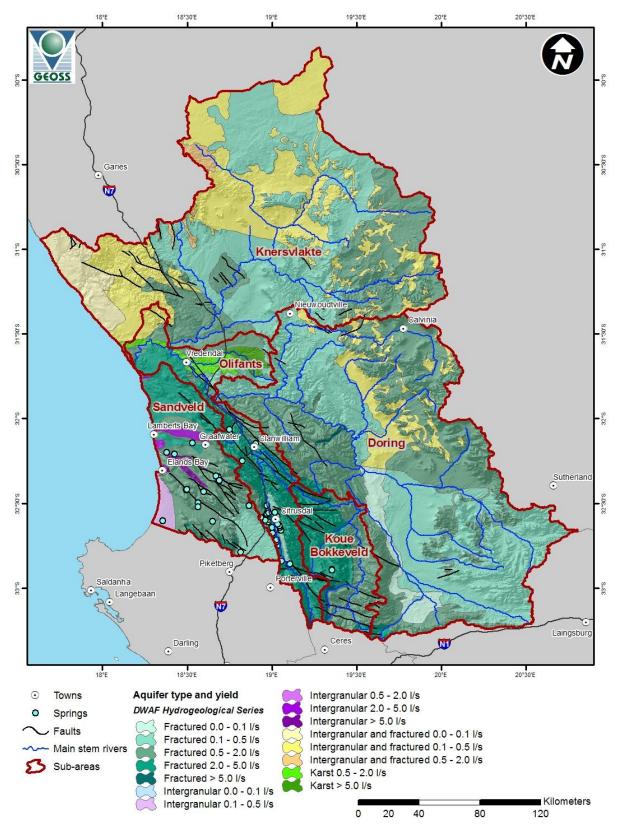
9. APPENDIX A: MAPS



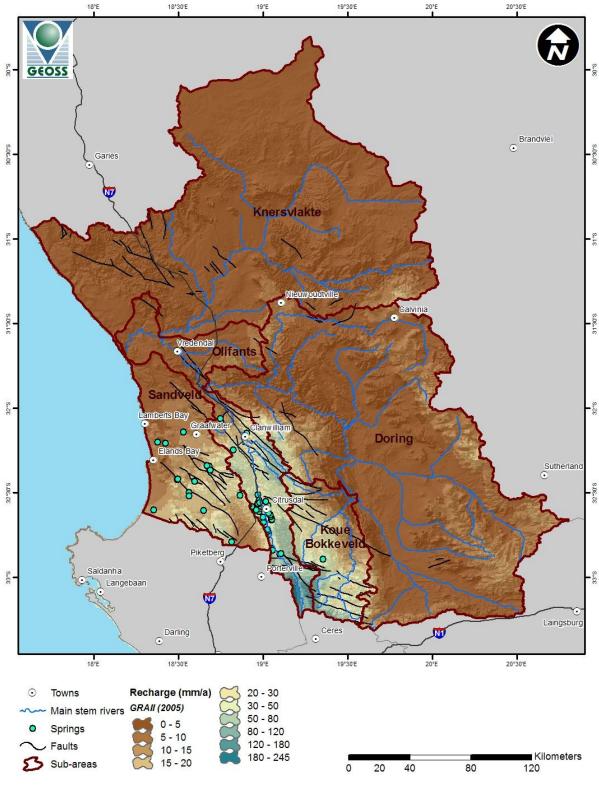
Map 1. Quaternary catchment and sub-areas within the Olifants-Doorn Water Management Area



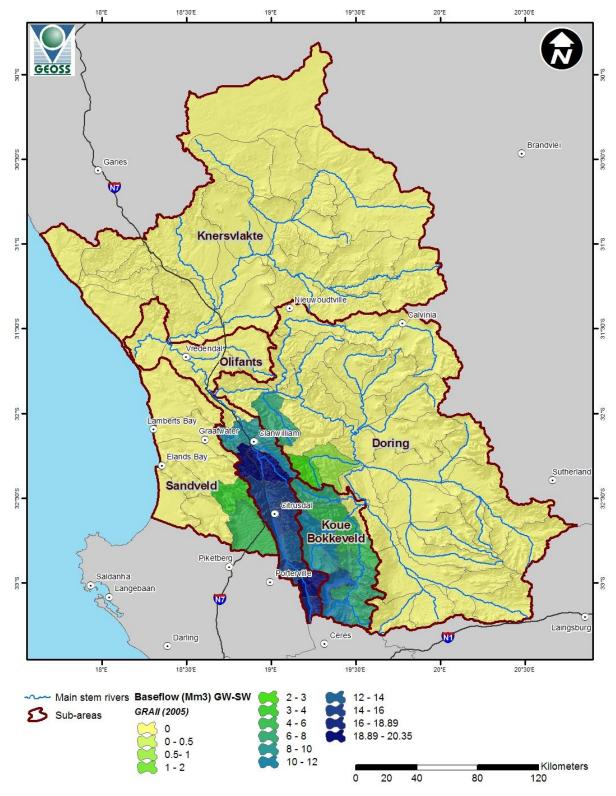
Map 2. Geological setting of the O-D WMA (Council for Geoscience geological map 1:1 000 000 scale)



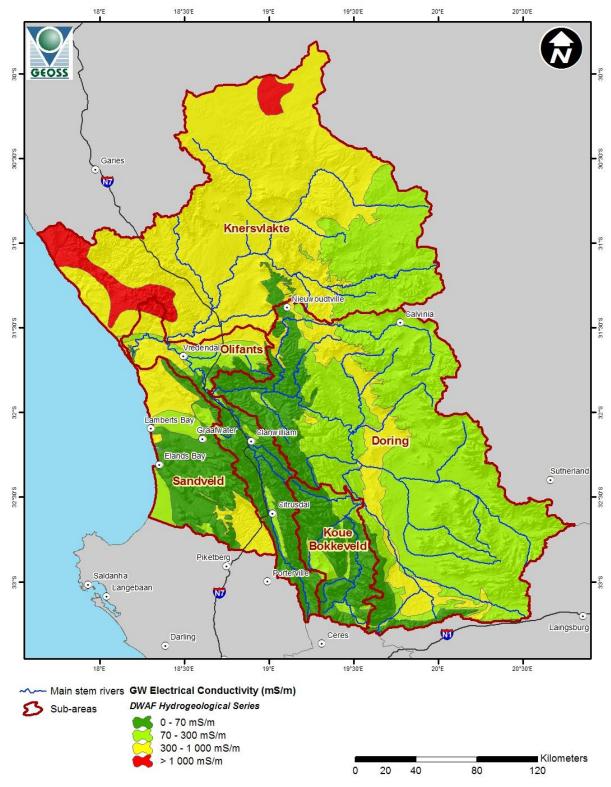
Map 3. Aquifer types and yields (DWAF Hydrogeological maps series 1:500 000 scale)



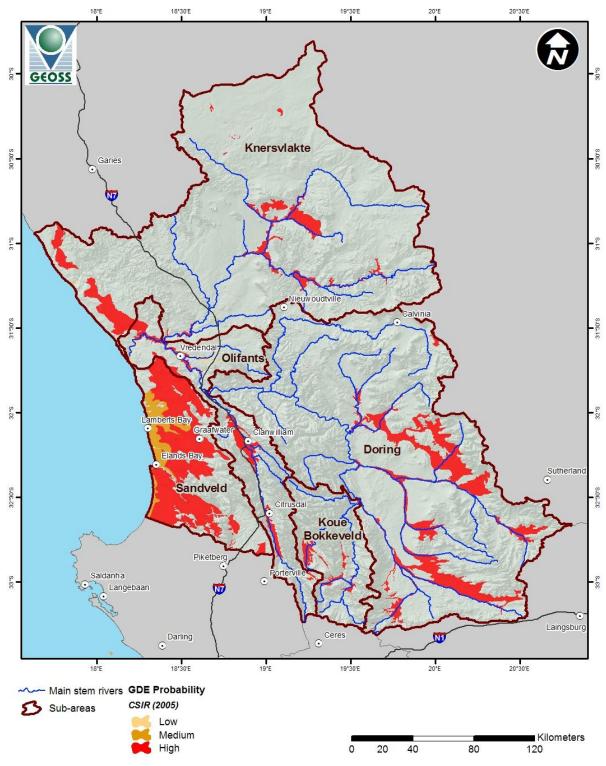
Map 4 Groundwater recharge map (mm/a) (DWAF 2005. Groundwater Resource Assessment Phase II)



Map 5 Groundwater contribution to river base flow (DWAF 2005. Groundwater Resource Assessment Phase II)



Map 6 Groundwater quality as indicated by Electrical Conductivity (EC) (DWAF Hydrogeological maps series 1:500 000 scale)



Map 7 Groundwater dependent ecosystems (CSIR, 2005)

10. APPENDIX B: QUATERNARY CATCHMENT SUMMARIES

Present Status Cate	gory(A-F):		В	
Desired Water Rese	ource Catego	ry (A-F):	В	
Management Class	(Excellent,	/Good/Fair):	Good	
Area:	134 km ²			~
Recharge:	17.5895 Mm	n³/a		~~~~ \$
Total Use:	3.452 Mm ³ /	/a		
Rural:	0.000		0.0000	Chi I
AgIrrig:	3.444	9	0.0000	ALA L
AgLive:	0.007	6 Aquaculture:	0.0000	
Water Balance:	14.138 Mm ³	/a		A MART
Stress Index:	0.2 Un	stressed or low levels o	f stress	KMZ KJ
EWR low flow requ	iirement:	5.44 Mr	m³/a	Nie dwoudtville Calvinia
Groundwater availa	able for use:	8.70	Mm³/a (adequate)	Wedenbale Company
GW Reserve compl	leted (Y/N):	Y		1 KANGA
Aquifer type and yi	eld	% of Area		Lamberts Bay
Fractured > 5.0 l/s		21		Elands Bay
Fractured 2.0 - 5.0 l/	s	79		Scientis alis Stor Ar
Groundwater Qual	ity (EC)	% of Area	1	and the first
0 - 70 mS/m		100		THE TEN
Geology		% of Area	Hydrological signil	icance
BOKKEVELD GR	P	14.48	Little significance, el	
TABLE MOUNTA		85.29	· ·	0 1
TABLE MOUNTA	IIN GILL	65.29	major fractured fock	/secondary aquifer system.
Risk to groundwate	211	point source con	*	ent intensive agriculture - poss. non- er plays an important role is providing ively using isotopes.
Assumptions and constraints:		Most of the agric	ultural activity is irriga	ited from groundwater.
Level of confidence	2	Low		
Implications of using more/less water:	ng	Groundwater mo	onitoring network nec	essary
Discussion on "ho	t spots":	In summer groun winter.	ndwater levels are drav	vn down significantly, however these recover each
Relevant previous	work:	-		

Quaternary Catchment: E10A

Quaternary Catchn	nent:	E10B		
Present Status Cate	egory (A-F):		В	
Desired Water Res	ource Categ	ory (A-F):	В	
Management Class	(Exceller	nt/Good/Fair):	Good	
Area:	202 km ²			
Recharge:	20.6085 M	m³/a		
Total Use:	3.729 Mm	-		
Rural:	0.00			0.0000
AgIrrig: AgLive:	3.71 0.00		· ·	0.0000 0.0000
Water Balance:	16.88 Mm ³	1	~	0.0000
Stress Index:		nstressed or low levels	of stress	
EWR low flow requ		6.78 N	5	
Groundwater availa			Mm³/a (ade	equate)
GW Reserve comp			, u (uu	
Aquifer type and yi		% of Are	a	
Fractured $> 5.0 $ l/s		0.24		
Fractured 2.0 - 5.0 l/	s	99.76		
Groundwater Qual		% of Ar	ea	
0 - 70 mS/m		91.85		
70 - 300 mS/m		8.15		
Geology		% of Area	Hydrolo	gical signi
BOKKEVELD GR	P	18.61	Little sig	nificance, e
TABLE MOUNTA	IN GRP	81.4	Major fr	actured roc
Risk to groundwate	er:	In the north-ea mainly fruit.	stern portic	on of the ca
Assumptions and constraints:		Most of the agr	icultural ac	tivity is irrig
Level of confidence	21	low		
Implications of usi more/less water:	ng	Groundwater n	10nitoring 1	1etwork ne
Discussion on "ho	t spots":	The boreholes excellent. Mon groundwater re	itoring data	
Relevant previous	work:	-		

Quaternary Catchm	nent: E	10C		
Present Status Cate	gory (A-F):		А	
Desired Water Reso		y (A-F):	А	
Management Class	(Excellent/	Good/Fair):	Excellent	
Area:	192 km ²			
Recharge:	14.3015 Mm ³	/a		
Total Use:	0.342 Mm ³ /a	a		
Rural:	0.0000	0	0.00	000
AgIrrig:	0.3346	9	0.00	
AgLive:	0.0079	1	: 0.00	000
Water Balance:	13.959 Mm ³ /	'a		
Stress Index:	0.02 Uns.	tressed or low levels	of stress	
EWR low flow requ	irement:	5.66 M	m³/a	
Groundwater availa	ble for use:	8.30 (ac	dequate)	
GW Reserve comple	eted (Y/N):	Y		
Aquifer type and yie	eld	% of Area		
Fractured 2.0 - 5.0 1/s		100		
Fractured 2.0 - 5.0 1/8	>	100		
Groundwater Quali	ty (EC)	% of Area	a	
0 - 70 mS/m		100		
Geology		% of Area	Hydrological	significa
TABLE MOUNTA	IN GRP	99.98	Major fracture	ed rock/
Risk to groundwate	er:	A pristine catchr	nent - no agricul	ltural ac
Assumptions and constraints:		Groundwater is	a completely nat	tural unii
Level of confidence	v.	low		
Implications of usin	ng	No monitoring t	equired - unless	for regi

Discussion on "hot spots": No hot spots

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Relevant previous work:

more/less water:

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Quaternary Catchmen		
Present Status Catego	ory (A-F):	С
Desired Water Resour	rce Category (A-F):	В
Management Class	(Excellent/Good/Fair):	Fair
Area: 2	35 km²	
Recharge: 1	3.6855 Mm³/a	-
Total Use: 3 Rural:	5.576 Mm³/a 0.0000 <i>Mining:</i>	0.0000
AgIrrig:	0.0000 <i>Mining:</i> 3.5719 <i>Industry:</i>	0.0000
AgLive:	0.0037 Aquaculture:	
Water Balance: 1	0.11 Mm³/a	and the s
Stress Index: 0.	.26 Moderate levels of stress	CAL MASSING
EWR low flow require	ement: 5.74 Mm	
Groundwater available	<i>e for use:</i> 4.37 (ade	equate)
GW Reserve complete	ed (Y/N): Y	Viedendal*
Aquifer type and yield	1 % of Area	Lamberts Bay
Fractured 0.1 - 0.5 l/s	15.97	Graafwatera Clanvilliam
Fractured 0.5 - 2.0 l/s	0.37	Elands Bay
Fractured 2.0 - 5.0 l/s	83.66	Cirusda"
Groundwater Quality	(EC) % of Area	
0 - 70 mS/m	83.17	REAL
70 - 300 mS/m	15.99	
300 - 1 000 mS/m	0.84	
Geology	% of Area	Hydrological significance
QUATERNARY	15.44	
TABLE MOUNTAIN	GRP 84.56	Major fractured rock/secondary aquifer system.
Risk to groundwater:		ous catchment, however intense agriculture in the western e north/south valley). Thus non-point source contamination
Assumptions and constraints:	Most of the agricu	ultural activity is irrigated from groundwater.
Level of confidence:	low	
Implications of using more/less water:		
Discussion on "hot sp	However the grou	l be required to assess the status of groundwater monitoring in the area. bundwater contribution to base flow is very important and agricultural bt impact this contribution.
Relevant previous wor		•

Quaternary Catchment: E10D

Quaternary Catchn	ment: H	E10E		
Present Status Cate	egory (A-F):		А	
Desired Water Rese	ource Catego	ory (A-F):	А	
Management Class	e (Excellent	/Good/Fair):	Excellent	
Area:	366 km²			
Recharge:	14.681 Mm ³			
Total Use: Rural:	0.27 Mm ³ /			0000
Kurai: AgIrrig:	0.000	8).0000).0440
AgLive:	0.000	~		0.0000
Water Balance:	14.411 Mm ³	³/a		
Stress Index:	0.02 Un	istressed or low levels of	f stress	
EWR low flow requ	uirement:	7.35 Mi	n³/a	
Groundwater availa	able for use:	7.06Mn	n³/a(adequate	2)
GW Reserve compl	leted (Y/N):	Y		
Aquifer type and yi	ield	% of Area		
Fractured 0.1 - 0.5 l/		3.03		
Fractured 0.1 - 0.5 l/	s	14.86		
Fractured 0.5 - 2.0 l/	s	5.07		
Fractured 2.0 - 5.0 l/	s	77.04		
Groundwater Qual	ity (EC)	% of Area	1	
0 - 70 mS/m		81.77		
70 - 300 mS/m		14.83		
300 - 1 000 mS/m		3.4		
Geology		% of Area	Hydrologic	al signifi
QUATERNARY		11.53		
BOKKEVELD GR	ЪЪ	4.25	Little signif	icance, els
TABLE MOUNTA	IN GRP	84.22	Major fract	ured rock/
MALMESBURY G	RP	0	Impermeab	
Risk to groundwate	er:	Citrusdal is withi the bulk of the in from non-point	rigation wate	er is from t
Assumptions and constraints:		Most of the agric	ultural activi	ty is irrigat
Level of confidence	e:	low		
Implications of usi more/less water:	ing	The catchment b network is neces		e water stro
Discussion on "ho	t spots":	No known hot s	pots of over-	abstraction
Relevant previous	work:	-		

Quaternary Catchment:	L 101,	
Present Status Category (A-	F):	С
Desired Water Resource Ca	tegory (A-F):	В
Management Class (Exa	ellent/Good/Fair):	Good
Area: 386 km	2	
Recharge: 14.6025	Mm³/a	ß
Total Use: 4.896 N	Im³/a	~~~}
	0.0000 Mining:	0.0000
0 0	4.8899 Industry:	0.0000
8).0059 Aquaculture:	e: 0.0000
Water Balance: 9.707 N		and that
Stress Index: 0.34	Moderate levels of stress	
EWR low flow requirement.		Nieuwoudtvillg*
Groundwater available for u		3 (adequate)
GW Reserve completed (Y/	N): Y	Viedendare
Aquifer type and yield	% of Area	Lamberts Bay
Fractured 0.1 - 0.5 l/s	12.33	Grafwatere Clahwilliam
Fractured 0.5 - 2.0 l/s	21.66	And the the
Fractured 2.0 - 5.0 l/s	66.01	Citrus and
Groundwater Quality (EC)	% of Area	a the second sec
0 - 70 mS/m	87.66	RELE
70 - 300 mS/m	12.34	
300 - 1 000 mS/m	0	
Geology	% of Area	Hydrological significance
QUATERNARY	3.37	
BOKKEVELD GRP	7.44	Little significance, else regolith aquifer
TABLE MOUNTAIN GRP	89.19	Major fractured rock/secondary aquifer system.
Risk to groundwater:		ainous catchment - however intense agriculture along the Surface water and groundwater is used intensively.
Assumptions and constraints:	There is significa	ant groundwater abstraction.
Level of confidence:	low	
Implications of using more/less water:		has a PES of C and this needs to be managed to a B, as groundwater ole in supplying base flow to the Olifants River. This contribution is er.
Discussion on "hot spots":	monitored, as it i	spots of over-abstraction, however this catchment needs to be carefully is important. If a monitoring network is not in place - one needs to be adwater allocations need to be adhered to or even revised.
Relevant previous work:	-	

Quaternary Catchri	nent:	E10 G				
Present Status Cate	egory (A-F):		А			
Desired Water Res	ource Categ	ory (A-F):	А			
Management Class	(Excellen	t/Good/Fair):	Excellent			
Area:	508 km ²					1
Recharge:	19.3352 Mr	m³/a				~?
Total Use:	0.104 Mm ³	/a			M	{
Rural:	0.00		0.0000		5	-51
AgIrrig:	0.08	2	0.0000		3	12
AgLive:	0.00	1	e: 0.0000		A	Th
Water Balance:	19.231 Mm			\sim	st y	22
Stress Index:	0.01 U	nstressed or low levels	of stress	V	and	35 (
EWR low flow requ	irement:	4.21 M	lm³/a	1	Nieuwo	udtville
Groundwater availa	able for use:	15.02N	/Im³/a(adequate)		Vredendal®	17
GW Reserve comp	leted (Y/N):	Y Y			Vredendal	21×
<i>Aquifer type and yi</i>	ield	% of Area	a	Lam	berts Bay Graafwater	XS
Fractured 0.5 - 2.0 l/	s	1.8			Elands Bay	Glanwillia
Fractured 2.0 - 5.0 l/	s	98.2			Citr	usdal .
Groundwater Qual	ity (EC)	% of Are	ea		Sun	th
0 - 70 mS/m		100				H
Geology		% of Area	Hydrological sig	mificance		
BOKKEVELD GR	P	0.33	Little significance	, else regolith aqu	ifer	
TABLE MOUNTA	IN GRP	99.67	Major fractured r	ock/secondary aq	uifer system.	
Risk to groundwate	er:		mal of groundwater tchment. This is a r			
Assumptions and constraints:		Very little grour	ndwater use. Water	is obtained from	the Clanwilliam	Dam.
Level of confidence	e:	low				
Implications of usi more/less water:	ng	No major conce	erns regarding grour	ndwater in this cat	chment.	
Discussion on "ho	t spots":	No hot spots				
Relevant previous	work:	-				

Quaternary Catchm	ent: EIVH		
Present Status Cate	gory (A-F):	В	
Desired Water Reso	ource Category (A-F):	А	
Management Class	(Excellent/Good/Fair):	Excellent	
Area: Recharge:	162 km² 9.0796 Mm³/a		
Total Use: Rural: AgIrrig: AgLive:	1.036 Mm³/a 0.0000 Mining: 1.0340 Industry: 0.0025 Aquacultu	0.0000 0.0000 ure: 0.0000	
Water Balance:	8.043 Mm ³ /a		(ra has
Stress Index:	0.11 Unstressed or low level	5	Kand S &
EWR low flow requ		Mm ³ /a	Nieuwoudtville*
Groundwater availa	<i>ble for use:</i> 6.53N	Mm³/a (minimal)	Viedendal*
GW Reserve comple	eted (Y/N): Y		KXV
Aquifer type and yie	eld % of Ar	rea	Lamberts Bay Clanwilliam Graafwater*
Fractured 0.5 - 2.0 1/s	s 25.79		Elands Bay
Fractured 2.0 - 5.0 l/s	5 74.21		Citrusdai
Groundwater Quali	ty (EC) % of A	rea	- march
0 - 70 mS/m	100		The second se
Geology	% of Area	a Hydrological sign	vificance
TABLE MOUNTA	IN GRP 10	0 Major fractured ro	ck/secondary aquifer system.
Risk to groundwate	r: Very rugged ca may be an ove		roundwater usethe use given here
Assumptions and constraints:	Very little grou	undwater used and this	s catchment needs to be kept as natu
Level of confidence	: low		
Implications of usin more/less water:	ng The class of the	he catchment needs to	be improved to an A.
Discussion on "hot	spots": No known ho	ot spots.	
Relevant previous w	vork: -		

Quaternary Catchment: E10H

Quaternary Catchment:	E10J	
Present Status Category (A-F):		С
Desired Water Resource Catego	ory (A-F):	С
Management Class (Excellen	t/Good/Fair):	Fair
Area: 468 km² Recharge: 8.738 Mm³	/a	
Total Use: 1.946 Mm³ Rural: 0.00 Aglrrig: 1.78 AgLive: 0.00 Water Balance: 6.792 Mm³	00 Mining: 88 Industry: 71 Aquaculture:	0.0000 0.1500 c. 0.0000
Stress Index: 0.22 M	oderate levels of stress	Less String
EWR low flow requirement:	1.63 Mm	
Groundwater available for use:	5.16Mm ³	n ³ /a (adequate)
GW Reserve completed (Y/N):	Υ	
Aquifer type and yield	% of Area	Lamberts Day
Fractured 0.5 - 2.0 l/s	0.07	Graawaters Clanvilliam
Fractured 0.5 - 2.0 l/s	35.02	Christian Child Christ
Fractured 2.0 - 5.0 l/s	64.91	South the the
Groundwater Quality (EC)	% of Area	a
0 - 70 mS/m	83.42	
70 - 300 mS/m	7.91	
70 - 300 mS/m	8.67	
Geology	% of Area	Hydrological significance
BOKKEVELD GRP	7.56	Little significance, else regolith aquifer
TABLE MOUNTAIN GRP	92.44	Major fractured rock/secondary aquifer system.
Risk to groundwater:		used extensively in this catchment. It is at risk from over- non-point source contamination. Clanwilliam is within this
Assumptions and constraints:	The groundwater	er use needs to be carefully monitored within this catchment.
Level of confidence:	low	
Implications of using more/less water:	This catchment ne	needs to be carefully monitored.
Discussion on "hot spots":	monitored, as it is	pots of over-abstraction, however this catchment needs to be carefully is important. If a monitoring network is not in place - one needs to be adwater allocations need to be adhered to or even revised.
Relevant previous work:	-	

Quaternary Catchn	nent: I	E10K		
Present Status Cate	gory (A-F):		А	
Desired Water Res	ource Catego	ory (A-F):	А	
Management Class	(Excellent	/Good/Fair):	Excellent	
Area:	235 km²			A
Recharge:	2.1529 Mm	³/a		
Total Use:	0.095 Mm ³	-		T S
Rural:	0.000	0	0.0000	and r
AgIrrig: AgLive:	0.091	9	0.0000 e: 0.0000	A.A.L
Mater Balance:	2.057 Mm ³	1	. 0.0000	and the
	,		<i>C</i> ,	122 MARTA
Stress Index:		nstressed or low levels	oj siress	Kain Baker
EWR low flow requ		0.36	3/ /	Nieuwoudtvilla Calvinia
Groundwater availa			³ /a (minimal)	viedendai*
GW Reserve compl	eted (Y/N):	Y		1 X XA GA
Aquifer type and yi	eld	% of Area	1	Lamberts Bay
Fractured 0.5 - 2.0 l/	s	47.36		Elands Bay
Fractured 2.0 - 5.0 l/	s	52.64		Citrusdali
Groundwater Qual	itv (EC)	% of Are	a	South the
0 - 70 mS/m		85.26		424
70 - 300 mS/m		14.74		VELSEL
,				
Geology		% of Area	Hydrological sign	ificance
TABLE MOUNTA	IN GRP	80.45	Major fractured roo	ck/secondary aquifer system.
VANRHYNSDOR	P GRP	19.55	Impermeable aquic	lude
Risk to groundwate	e r:	There is more ag data suggests.	griculture in this catcl	hment than the groundwater abstraction
Assumptions and constraints:			ver is within the catch is from the river.	nment and the assumption is that the bulk of
Level of confidence	27	low		
Implications of using more/less water:	ng	Groundwater m	ost likley has a signifi	icant role to play in the summer months.
Discussion on "ho	t spots":	No known hot s	spots of over-abstract	tion are known.
Relevant previous	votk:	-		

Quaternary Catchment:	EZIA
Present Status Category (A-F):	D
Desired Water Resource Catego	ory (A-F): C
Management Class (Excellen	nt/Good/Fair): Fair
Area: 190 km ²	A
Recharge: 10.7001 Mr	m³/a
Total Use: 5.359 Mm ³	
<i>Rural:</i> 0.01	
AgIrrig: 5.33 AgLive: 0.00	
Water Balance: 5.341 Mm ³	
	Inderate levels of stress
EWR low flow requirement:	1.48 Mm ³ /a
Groundwater available for use:	Calvina
GW Reserve completed (Y/N):	Viedendaal*
Aquifer type and yield	% of Area
Fractured $> 5.0 $ l/s	12.08 Elands Bay
Fractured 0.5 - 2.0 l/s	84.3
Fractured 2.0 - 5.0 l/s	3.62
Groundwater Quality (EC)	% of Area
0 - 70 mS/m	79.7
70 - 300 mS/m	20.3
Geology	% of Area Hydrological significance
DWYKA GRP	28.18 Aquiclude
WITTEBERG GRP	52.57 Marginal hydrogeological significance
BOKKEVELD GRP	11.74 Little significance, else regolith aquifer
TABLE MOUNTAIN GRP	7.47 Major fractured rock/secondary aquifer system.
Risk to groundwater:	There is a lot of agriculture in this catchment (above the Gydo Pass). Groundwater levels are shallow and at risk from non-point based contamination.
Assumptions and constraints:	Groundwater abstraction is high in the summer months
Level of confidence:	medium
Implications of using more/less water:	The TMG aquifers in this catchments are high yielding and of excellent quality
Discussion on "hot spots":	From monitoring work in the area, the groundwater resources are not being impacted by agricultural activity. However the classification of the catchment needs to be improved. A few dedicated monitoring sites are necessary as the PES is a D. The volumes of groundwater being abstracted also need to be verified and if necessary allocations adjusted.
Relevant previous work:	SRK, 2006

Quaternary Catchment: E21A

Quaternary Catchment:	E21B	
Present Status Category (A-F):		В
Desired Water Resource Category (A-F):		В
Management Class (Excellent/Good/Fair):		Good
Area: 223 km² Recharge: 7.7935 Mm	n³/a	6
Total Use: 1.348 Mm Rural: 0.00	10 Mining:	0.0000
AgIrrig: 1.33 AgLive: 0.00)78 Aquaculture:	2: 0.0000
Water Balance: 6.446 Mm ³		and the
	nstressed or low levels o	
EWR low flow requirement:	0.012 M	my I same
Groundwater available for use:		Calvinia *
<i>GW Reserve completed (Y/N)</i> <i>Aquifer type and yield</i>	: N % of Area	a viedentais
Fractured 0.5 - 2.0 1/s	75.86	Lamberts Bay
Fractured 2.0 - 5.0 l/s	24.14	Elands Bay
Groundwater Quality (EC)	% of Area	ctrusdi *
0 - 70 mS/m	67.7	- All
70 - 300 mS/m	8.32	HE TEM
70 - 300 mS/m	9.76	
70 - 300 mS/m	14.22	
Geology	% of Area	Hydrological significance
DWYKA GRP	11.94	Aquiclude
WITTEBERG GRP	52.5	Marginal hydrogeological significance
BOKKEVELD GRP	35.21	Little significance, else regolith aquifer
TABLE MOUNTAIN GRP	0.32	Major fractured rock/secondary aquifer system.
Risk to groundwater:	must be followed	ivitity is limited in this rugged catchment . Best practices ed in the agricultural sector - as groundwater levels are an in places and can easily be impacted.
Assumptions and constraints:	Groundwater use	se is limited
Level of confidence:	medium	
Implications of using more/less water:	Groundwater is le encouraged.	limited in this large catchment, however land owner monitoring should be
Discussion on "hot spots":	Monitoring recorvery good quality	ords indicate no over-abstraction areas - aquifers are high yielding and ty.
Relevant previous work:	SRK, 2006	

Quaternary Catchment:	E21C			
Present Status Category (A	- <i>F):</i>	В		
Desired Water Resource C	ategory (A-F):	В		
Management Class (Ex	ccellent/Good/Fair):	Good		
Area: 233 kr	n ²			
<i>Recharge:</i> 7.1742	2 Mm³/a			
	Mm³/a			
Rural:	0.0000 <i>Mining:</i>	0.0000		
AgIrrig: AgLive:	1.2480Industry:0.0081Aquacultur	0.0000 ore: 0.0000		
0	Mm³/a	<i>ie.</i> 0.0000	$\wedge \circ$	
			12	1
Stress Index: 0.18	Unstressed or low levels	2	the	1
EWR low flow requiremen		Mm³/a		,
Groundwater available for	<i>use:</i> 5.85M	ſm³/a(minimal)	2	1
GW Reserve completed (Y	-			
Aquifer type and yield	% of Area	a.	Lamberts	B
Fractured 0.5 - 2.0 l/s	100		Eland	5
Groundwater Quality (EC)) % of Are	'ea		
0 - 70 mS/m	100		2	
Geology	% of Area	Hydrological sign	ificance	
DWYKA GRP	0.97	7 Aquiclude		
WITTEBERG GRP	96.36	6 Marginal hydrogeo	ogical significance	
BOKKEVELD GRP	2.68	B Little significance,	lse regolith aquifer	
Risk to groundwater:	must be followed	tivtity is limited in this red in the agricultural s es and can easily be im	ector - as groundwat	
Assumptions and constraints:	Groundwater u	ise is limited		
Level of confidence:	medium			
Implications of using more/less water:	Groundwater is encouraged.	s limited in this large c	ıtchment, however l	land o
Discussion on "hot spots"	 Monitoring recovery good quali 	ords indicate no over- ity.	ıbstraction areas - ac	iquifers
Relevant previous work:	SRK, 2006			

Quaternary Catchment:	E21D		
Present Status Category (A-F):		D	
Desired Water Resource Category (A-F):		С	
Management Class (Exceller	nt/Good/Fair):	Fair	
<i>Area:</i> 242 km ²			
<i>Recharge:</i> 13.7246 M	m³/a	S	
Total Use: 7.386 Mm	-		
Rural: 0.00 AgIrrig: 7.3	0	0.0000	
AgLive: 0.00	9		
Water Balance: 6.338 Mm	1	story	
Stress Index: 0.54 A	Aoderate levels of stress	Con Labore	
EWR low flow requirement:	1.884 M	Im ³ /a	
Groundwater available for use: 4.45Mm ³ ,		Nieuwoudtvillis Calvina S	
<i>GW Reserve completed (Y/N):</i> N		Viedenda i *	
Aquifer type and yield	% of Area	LE FALLE	
Fractured > 5.0 l/s	32.14	Lamberts Bay Graafwater® Clafwilliam	
Fractured 0.5 - 2.0 l/s	24.2	Elands Bay	
Fractured 2.0 - 5.0 l/s	43.66	Citrisda"	
Groundwater Quality (EC)	% of Area		
0 - 70 mS/m	82.78	ATT I	
70 - 300 mS/m	4.33		
70 - 300 mS/m	12.89		
Geology	% of Area	Hydrological significance	
WITTEBERG GRP	12.21	Marginal hydrogeological significance	
BOKKEVELD GRP	47.17	Little significance, else regolith aquifer	
TABLE MOUNTAIN GRP	40.62	Major fractured rock/secondary aquifer system.	
Risk to groundwater:	also a lot of shalle	agricultural activity within this catchment (>50%). There are ow surface water dams, however groundwater is used nmer. The groundwater is generally shallow and the risk n-point source	
Assumptions and constraints:	Extensive ground	dwater use in summer	
Level of confidence:	medium		
Implications of using more/less water:	Generally the TMG aquifers are high yielding and good quality. However there should be monitoring by the land owners to ensure sustainable groundwater use. Some DWA monitoring within the catchment will be good to have.		
Discussion on "hot spots":	There are no known hot spots as the groundwater levels recover each year and the water quality remains good.		
Relevant previous work:	SRK, 2006		

Ouaternary Catchment: E21D

Quaternary Catchment:		
Present Status Category (A-F):		D
Desired Water Resource Catego	ory (A-F):	С
Management Class (Excellent	t/Good/Fair):	Fair
<i>Area:</i> 293 km ²		A
<i>Recharge:</i> 6.1869 Mm	·	
Total Use: 2.69 Mm ³ / Pumph 0.00		
Rural: 0.00 AgIrrig: 2.67	0	0.0000
AgLive: 0.01	2	32 3
Water Balance: 3.497 Mm ³	/a	many that
Stress Index: 0.43 M	oderate levels of stress	
EWR low flow requirement:	0.09 Mr	
Groundwater available for use:	3.41Mm	n ³ /a (adequate)
GW Reserve completed (Y/N):	Ν	VYTOOTIGA IS
Aquifer type and yield	% of Area	Graafwater
Fractured 0.5 - 2.0 l/s	66.46	Elands Bay
Fractured 2.0 - 5.0 l/s	33.54	Circuised in Alfred Alfred
Groundwater Quality (EC)	% of Area	
0 - 70 mS/m	91.17	HER IS A
70 - 300 mS/m	8.83	
Geology	% of Area	Hydrological significance
WITTEBERG GRP	66.98	Marginal hydrogeological significance
BOKKEVELD GRP	9.36	Little significance, else regolith aquifer
TABLE MOUNTAIN GRP	23.67	Major fractured rock/secondary aquifer system.
Risk to groundwater:	the catchment, the	vity is limited to the river valley - with the large dams within he groundwater use figure may be an over-estimate s extensive use of groundwater in summer. Groundwater non-point sourc
Assumptions and constraints:	Extensive ground	dwater use in summer
Level of confidence:	medium	
Implications of using more/less water:	As the class of th	is cathement is to be improved land owners and DWA need to monitor.
Discussion on "hot spots":	There are no kno quality remains g	own hot spots as the groundwater levels recover each year and the water good.
Relevant previous work:	SRK, 2006	

Quaternary Catchment: E21E

Quaternary Catchr	nent:	EZIF	
Present Status Cate	egory (A-F):		В
Desired Water Res	ource Categ	ory (A-F):	В
Management Class	e (Excellen	t/Good/Fair):	Good
Area:	379 km²		
Recharge:	5.0851 Mm	3/a	-3
Total Use:	0.544 Mm ³	/a	Mar }
Rural:	0.00	00 Mining:	0.0000
AgIrrig:	0.53	04 Industry:	0.0000
AgLive:	0.01	32 Aquaculture	re: 0.0000
Water Balance:	4.542 Mm ³	/a	and the
Stress Index:	0.11 U	nstressed or low levels	s of stress
EWR low flow requ	uirement:	0.15 M	Mm ³ /a Nieuwoudtvilli
Groundwater availa	able for use:	4.39Mr	Im ³ /a (minimal)
GW Reserve comp.	leted (Y/N):	N	Viedenija i *
Aquifer type and y	ield	% of Area	Lamberts Bay 70 1
Fractured 0.5 - 2.0 l/	s	80.59	Grabhvatore Elands Bay
Fractured 2.0 - 5.0 l/	s	19.41	clining a
Groundwater Qual	ity (EC)	% of Are	ea contractions
0 - 70 mS/m		93.5	
70 - 300 mS/m		6.5	William
Geology		% of Area	Hydrological significance
DWYKA GRP		1.48	3 Aquiclude
WITTEBERG GRI	р	81.56	Marginal hydrogeological significance
BOKKEVELD GF	tР	3.95	Little significance, else regolith aquifer
TABLE MOUNTA	IN GRP	13.01	Major fractured rock/secondary aquifer system.
Risk to groundwat	er:		ttle agricultural activity in this catchment. It should probably atchment. No risk to groundwater.
Assumptions and constraints:		Groundwaterco	ontributes significantly to river base flow.
Level of confidence	e:	medium	
Implications of usi more/less water:	ng	Some further co	onsultation is required but this is probably an A class aquifer.
Discussion on "ho	t spots":	No hot spots.	
Relevant previous	work:	SRK, 2006	

Quaternary Catchment:	E21G
Present Status Category (A-F):	F
Desired Water Resource Catego	<i>rry (A-F):</i> D
Management Class (Excellent	/Good/Fair): Fair
Area: 266 km² Recharge: 9.6261 Mm	a/a
Total Use: 12.088 Mm Rural: 0.011 AgIrrig: 12.066 AgLive: 0.009 Water Balance: -2.462 Mm ⁴	No Mining: 0.0000 81 Industry: 0.0000 92 Aquaculture: 0.0000
Stress Index: 1.26 Cr	itically stressed
EWR low flow requirement:	2.07 Mm ³ /a
Groundwater available for use:	-4.53Mm ³ /a (none)
GW Reserve completed (Y/N):	N
Aquifer type and yield	% of Area
Fractured 2.0 - 5.0 l/s	100
Groundwater Quality (EC)	% of Area
0 - 70 mS/m	31.9
70 - 300 mS/m	68.1
Geology	% of Area Hydrological significance
QUATERNARY	24.07
BOKKEVELD GRP	38.79 Little significance, else regolith aquifer
TABLE MOUNTAIN GRP	37.15 Major fractured rock/secondary aquifer system.
Risk to groundwater:	There is extensive agriculture in this catchment. Indications are the groundwater is not being used sustainably. Water levels are likely to be dropping and groundwater quality deteriorating. Groundwater supply at risk.
Assumptions and constraints:	Groundwater use exceeds recharge and levels are dropping.
Level of confidence:	medium
Implications of using more/less water:	Groundwater use needs to be assessed with a hydrocensus and a monitoring network established. It will be necessary to introduce compulsory licensing if the groundwater use is not sustainable after the land owners are informed of the situation.
Discussion on "hot spots":	Likely to be several hot spots - where groundwater levels are dropping and possibly water quality deteriorating.
Relevant previous work:	SRK, 2006

Quaternary Catchri	ent: E21H		
Present Status Cate	gory (A-F):	F	
Desired Water Reso	ource Category (A-F):	D	
Management Class	(Excellent/Good/Fair):	Fair	
Area:	404 km ²		
Recharge:	11.8491 Mm³/a		
Total Use:	2.561 Mm ³ /a		
Rural:	0.0000 Minin	0	0000
AgIrrig:	2.5496 Indust		0000
AgLive:	*	<i>culture:</i> 0.0	0000
Water Balance:	9.288 Mm ³ /a		
Stress Index:	0.22 Moderate levels of	stress	
EWR low flow requ	irement: 10	6.656	
Groundwater availa	ble for use: -7	7.37 Mm³/a (none)	
GW Reserve comple	eted (Y/N): N	[
Aquifer type and yie	eld % of	Area	
Fractured 2.0 - 5.0 1/s	s 10	00	
Groundwater Quali	ty (EC) % o.	of Area	
0 - 70 mS/m	98	8.48	
70 - 300 mS/m	1	.52	
Geology		rea Hudrologica	

Geology	% of Area	Hydrological significance
QUATERNARY	0.23	
TABLE MOUNTAIN GRP	99.77	Major fractured rock/secondary aquifer system.
Risk to groundwater:	0	nited - groundwater contribution to baseflow important. ality could be impacted through agricultural activities.
Assumptions and constraints:	Groundwater is	shallow and contributes to baseflow.
Level of confidence:	medium	
Implications of using more/less water:	This class of the	catchment can be improved a level.
Discussion on "hot spots":	Unlikley.	
Relevant previous work:	SRK, 2006	

Quaternary Catch	ment:	E21J		
Present Status Ca	tegory (A-F));	А	
Desired Water Re	source Categ	gory (A-F):	А	
Management Clas	s (Excelle	ent/Good/Fair):	Excellent	
Area:	317 km ²			
Recharge:	5.5 Mm ³ /	a		
Total Use:	0.006 Mm	-		
Rural:		0000 Mining:		.0000
AgIrrig:		0000 Industry: 0062 Aquacultu		.0000 .0000
AgLive: Water Balance:	5.494 Mm	1	<i>re:</i> 0	.0000
			<i>. </i>	
Stress Index:		Unstressed or low level	5	
EWR low flow req			Mm ³ /a	
Groundwater avai			√lm³∕a (adequa	e)
GW Reserve comp	oleted (Y/N)): N		
Aquifer type and y	vield	% of Are	a	
Fractured 0.5 - 2.0 l	/s	10.87		
Fractured 2.0 - 5.0 l	/s	89.13		
Groundwater Qua	lity (EC)	% of At	ea	
0 - 70 mS/m		76.78		
70 - 300 mS/m		23.22		
Geology		% of Area	Hydrologic	al signi
WITTEBERG GR	P	14.08	8 Marginal hy	drogeolo
BOKKEVELD G	RP	17.95	5 Little signifi	cance, e
TABLE MOUNT.	AIN GRP	67.97	7 Major fractu	red rocl
Risk to groundwa	ter:	None		
Assumptions and constraints:		Essentially no	groundwater us	e in the
Level of confidence	ce:	medium		
Implications of us more/less water:	sing	Groundwater	vill provide bas	eflow.
Discussion on "he	ot spots":	None		
Relevant previous	work:	SRK, 2006		

Quaternary Catch	ment:	E21K	
Present Status Cal	tegory (A-F):	В
Desired Water Re	source Cate	egory (A-F):	А
Management Clas	s (Excell	lent/Good/Fair):	Excellent
Area:	330 km ²		
Recharge:	6.3447 M	lm³/a	
Total Use:	0.4 Mm ³	/a	
Rural:	0.0	0000 Mining:	0.0000
AgIrrig:		3953 Industry:	0.0000
AgLive:	0.0	0050 Aquacultur	re: 0.0000
Water Balance:	5.944 Mn	n³/a	
Stress Index:	0.06	Unstressed or low levels	of stress
EWR low flow req	uirement:	0.184	Mm³/a
Groundwater avai	lable for use	<i>e:</i> 5.76M	m³/a (adequate)
GW Reserve comp	oleted (Y/N	<i>l):</i> N	
Aquifer type and y	vield	% of Are	а
Fractured 0.5 - 2.0 l	/s	11.45	
Fractured 2.0 - 5.0 l	/s	88.55	
Groundwater Qua	lity (EC)	% of Are	ea
0 - 70 mS/m		82.21	
70 - 300 mS/m		17.79	
Geology		% of Area	Hydrological sign
WITTEBERG GR	Р	16.03	Marginal hydrogec
BOKKEVELD G	RP	6.87	Little significance,
TABLE MOUNT.	AIN GRP	77.1	Major fractured ro
Risk to groundwa	ter:	Groundwater u	se is very low and thi
Assumptions and constraints:		Essentially no g	groundwater use in the
Level of confident	ce:	medium	
Implications of us more/less water:	ing	Groundwater w	vill provide baseflow.
Discussion on "he	ot spots":	None	
Relevant previous	work:	SRK, 2006	

Quaternary Catch	ment:	E21L			
Present Status Cat	egory (A-F)):		А	
Desired Water Res	source Cate	gory (A-F):	А	
Management Class	s (Excelle	ent/Good/H	Fair):	Excell	ent
Area:	195 km²				
Recharge:	0.5102 M	m³/a			
Total Use:	0.004 Mn	-			
Rural:			Mining:		0.0000
AgIrrig: AgLive:			Industry: Aquaculture.		0.0000 0.0000
0			≁1quacuuure.		0.0000
Water Balance:	0.507 Mn	,	, , ,	<i>C</i> .	
Stress Index:		Unstressed a	or low levels o	,	
EWR low flow req			0.14 Mr		
Groundwater avail	lable for use	*	0.37 Mi	m³/a (min	imal)
GW Reserve comp	leted (Y/N):)	Ν		
Aquifer type and y	ield		% of Area		
Fractured 0.0 - 0.1 l/	/s		2.17		
Fractured 0.5 - 2.0 l/	/s		97.83		
Groundwater Qual	lity (EC)		% of Area	ı	
0 - 70 mS/m			14.12		
70 - 300 mS/m			83.85		
300 - 1 000 mS/m			2.02		
Geology		%	of Area	Hydrolo	gical sign
DWYKA GRP			7.73	Aquiclud	e
WITTEBERG GR	Р		90.72	Margina	l hydrogeol
BOKKEVELD GI	RP		1.56	-	nificance, e
Risk to groundwat	ter:	None			
Assumptions and constraints:		Essen	tially no gr	oundwate	r use in the
Level of confidenc	re:	low			
Implications of use more/less water:	ing	Grou	ndwater wi	ll provide	baseflow.
Discussion on "ho	ot spots":	None			
Relevant previous	work:	SRK,	2006		

Quaternary Catch	nent: E22A	
Present Status Cate	egory (A-F):	А
Desired Water Res	ource Category (A-F):	А
Management Class	(Excellent/Good/Fair):	Excellent
Area:	750 km ²	
Recharge:	3.5276 Mm ³ /a	5
Total Use:	0.03 Mm ³ /a	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Rural:	0.0020 <i>Mining:</i>	0.0000
AgIrrig: AgLive:	0.0217 Industry: 0.0062 Aquacultur	ne: 0.0000
Mater Balance:	3.498 Mm ³ /a	ne. 0.0000
Stress Index:	0.01 Unstressed or low levels	is of stores
EWR low flow requ		Mm ³ /a
Groundwater avail		[m ³ /a (minimal) Nieuwoudtville
		Cardina (
<i>GW Reserve comp.</i> <i>Aquifer type and y</i>		Vindenda 1*
		Lamberts Bay
Fractured 0.1 - 0.5 l/		Graafwatere Clanwilliam
Fractured 0.5 - 2.0 1/		Cityuadi a
Groundwater Qual		ea complete the
0 - 70 mS/m	0.67	
0 - 70 mS/m	3.15	RIT
70 - 300 mS/m	84.54	
300 - 1 000 mS/m	11.65	
Geology	% of Area	Hydrological significance
QUATERNARY	2.3	3
BEAUFORT GRP	16.21	Localised significance as aquifer systems.
ECCA GRP	50.07	7 Middle to upper thin sandstone strata may have greater hydrogeological significance
DWYKA GRP	22.05	8
WITTEBERG GR	9.15	5 Marginal hydrogeological significance
Risk to groundwat	er: None	
Assumptions and constraints:	Essentially no g	groundwater use in the catchment.
Level of confidence	e: low	
Implications of use more/less water:	<i>ng</i> Groundwater w	will provide some baseflow.
Discussion on "ho	t spots": None	
Relevant previous	work: SRK, 2006	

Quaternary Catchn	nent:	E 22B	
Present Status Cate	egory (A-F):		А
Desired Water Res		ory (A-F):	А
Management Class	(Excellen	t/Good/Fair):	Excellent
Area: Recharge:	638 km² 2.6987 Mm	1 ³ /a	
Total Use: Rural: AgIrrig: AgLive:	0.022 Mm ³ 0.00 0.00 0.02	00 Mining: 00 Industry:	0.0000 0.0000 z: 0.0000
Water Balance:	2.677 Mm ³	- -	e. 0.0000
Stress Index:		nstressed or low levels	of stress
EWR low flow requ			Mm³/a
Groundwater availa			m³/a (minimal)
GW Reserve comp	leted (Y/N):		
Aquifer type and yi		% of Are.	a
Fractured 0.1 - 0.5 l/		88.32	
Fractured 0.5 - 2.0 l/	s	11.68	
Groundwater Qual	ity (EC)	% of Are	ea
0 - 70 mS/m		6.17	
70 - 300 mS/m		82.19	
300 - 1 000 mS/m		11.64	
Geology		% of Area	Hydrological signi
QUATERNARY		8.56	
BEAUFORT GRP		23.97	Localised significant
ECCA GRP		44.22	
DWYKA GRP		11.79	significance Aquiclude
WITTEBERG GRI)	11.48	Marginal hydrogeol
Risk to groundwate	er:	None	
Assumptions and constraints:		Essentially no g	roundwater use in the
Level of confidence	27	low	
Implications of usi more/less water:	ng	Groundwater w	rill provide some basef
Discussion on "ho	t spots":	None	
Relevant previous	work:	SRK, 2006	

Quaternary Catchn	nent:	E22C				
Present Status Cate	egory (A-F):		А			
Desired Water Rese	ource Categoi	ry (A-F):	А			
Management Class	(Excellent/	Good/Fair):	Excellent			
Area:	490 km ²					
Recharge:	3.8245 Mm ³ /					~
Total Use: Rural:	0.209 Mm ³ /		0.00	00	M	
Kural: AgIrrig:	0.0170	0	0.00		t -	-
AgLive:	0.017	9			z	26
Water Balance:	3.615 Mm³/a	a		~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	R
Stress Index:	0.05 Uns	stressed or low levels	of stress	12	AN	N
EWR low flow requ	irement:	0.332 N	√lm³/a	fre	ZIM.	oudtville
Groundwater availa	able for use:	3.28Mn	m³/a (minimal)		V L	A
GW Reserve compl	eted (Y/N):	Ν			Vredendal	255
Aquifer type and yi	eld	% of Area	1	Lamber	erts Bay	SE
Fractured 0.0 - 0.1 1/	s	18.64			Graafwater *	y Clahy
Fractured 0.1 - 0.5 1/	s	0.26		Lia	12t	2 mil
Fractured 0.1 - 0.5 1/	s	0.47			An	trusdale
Fractured 0.5 - 2.0 1/	s	60.12				-
Fractured 2.0 - 5.0 1/	s	20.51				
Groundwater Quah	ity (EC)	% of Area	а			
) - 70 mS/m		66.38				
70 - 300 mS/m		0.05				
70 - 300 mS/m		18.89				
300 - 1 000 mS/m		14.67				
Geology		% of Area	Hydrological s	significance		
ECCA GRP		3.06	Middle to uppe	r thin sandstor	ne strata may	have g
DWYKA GRP		13.04	significance Aquiclude		2	
WITTEBERG GRE)	52.8	Marginal hydro	geological sigr	nificance	
BOKKEVELD GR	Р	29.27	Little significan			
TABLE MOUNTA	IN GRP	1.77	Major fractured	ł rock/second:	ary aquifer sy	stem.
Risk to groundwate	e r:	None				
Assumptions and constraints:		Essentially no gr	roundwater use ir	1 the catchmen	nt.	
Level of confidence	2	medium				
Implications of usin more/less water:	ng	Groundwater wi	ill provide baseflo)w.		
Discussion on "hou	t spots":	None				
Relevant previous v	work:	SRK, 2006				

Quaternary Catchr	nent:	E22D	
Present Status Cate	egory (A-F):		А
Desired Water Res	ource Categ	ory (A-F):	А
Management Class	e (Excellen	t/Good/Fair):	Excellent
Area:	496 km ²		
Recharge:	1.038 Mm ³	/a	6
Total Use:	0.017 Mm ³	-	
Rural: AgIrrig:	0.00		0.0000
AgLive:	0.01		N - 7 (
Water Balance:	1.021 Mm ³	/a	1 them
Stress Index:	0.02 U	nstressed or low levels	s of stress
EWR low flow requ	virement:	0.26 M	Mm ³ /a
Groundwater avail	able for use:	0.76 Mr	Mm ³ /a(minimal)
GW Reserve comp.	leted (Y/N).	: N	Videoplane Comp
Aquifer type and y	ield	% of Area	
Fractured 0.0 - 0.1 l/	s	43.35	Lamberts Bay Graafwatere Clanyvilliam
Fractured 0.1 - 0.5 l/	s	1.43	Elands Baya
Fractured 0.1 - 0.5 l/	s	5.57	Cirrisola
Fractured 0.5 - 2.0 l/	s	48.26	a matter and a
Fractured 2.0 - 5.0 l/	s	1.39	YES S
Groundwater Qual	ity (EC)	% of Area	ea a a a a a a a a a a a a a a a a a a
0 - 70 mS/m		21.32	
70 - 300 mS/m		23.7	
300 - 1 000 mS/m		54.98	
Geology		% of Area	Hydrological significance
ECCA GRP		14.07	7 Middle to upper thin sandstone strata may have greater hydrogeological significance
DWYKA GRP		39.58	
WITTEBERG GRI)	45.77	7 Marginal hydrogeological significance
BOKKEVELD GF	P	0.53	B Little significance, else regolith aquifer
Risk to groundwat	er:	None	
Assumptions and constraints:		Essentially no gr	groundwater use in the catchment.
Level of confidence	e:	medium	
Implications of usi more/less water:	ng	Groundwater wi	vill provide baseflow.
Discussion on "ho	t spots":	None	
Relevant previous	work:	SRK, 2006	

Area: 1013 km² Recharge: 2.2736 Mm³/a Recharge: 2.2736 Mm³/a Total Use: 0.12 Mm³/a Roul: 0.0000 Mining: 0.0000 Addrig: 0.0000 Marter Balance: 2.154 Mm³/a Groundwater available for use: 0.37Mm³/a (minimal) Groundwater available for use: 0.37Mm³/a (minimal) Adquifer type and yield '9 of Area Fractured 0.0 - 0.11/s 17.68 Fractured 0.1 - 0.51/s 0.45 Fractured 0.5 - 2.01/s 0.77 Fractured 0.5 - 2.01/s 29.01 Groundwater Quality (EC) 's of Area 0.300 mS/m 18.47 70 - 300 mS/m 42.97 800 - 1000 mS/m 29.61 Groundwater Quality (EC) 's of Area QUATERNARY 0.99 BEAUFORT GRP 0.23 Localised significance as aquifer systems. ECCA GRP 51.79 Midle to upper thin sandstone strata may have greater hydrogeological significance DWYKA GRP 16.61 Aquiclude WYTTEBERG GRP 30.30 Marginal hydrogeological significances BOKKEVELD GRP 0.03 Little significance, else regolith aquifer Rikk to groundwater: None - a very large catchment Assumptions and Constraints: Eccel of confidence: Iw Implications of using Brow Fraoured conditions (low rainfall/deep groundwater levels/limited presence of groundwater - so low groundwater contribution to baseflow. Discussion on "hot spots". None	Quaternary Catchm	ent:	E22E					
Management Class(fixed) (Food) (Fair):ExcellentArea:1013 km²2.2736 km²/aReacharge:2.2736 km²/aRoma:0.0000Minarg:Outol Use:0.28 km²/aRoma:0.0000Minarg:Quarter Balance:2.154 Mm²/aQi Jav:0.0846Inditary:0.0000Water Balance:2.154 Mm²/aStress Index:0.05Outrousd ar law leads of stressEWR low flow requirement:1.78 Mm²/aGroundwater available for use:0.371 m²/a (minimal)Groundwater available for use:0.371 m²/a (minimal)Groundwater available for use:0.03Groundwater Quarter available for use:0.03Groundwater Quarter available for use:0.045"arcured 0.1 - 0.51/s5.2.0"arcured 0.1 - 0.51/s5.2.0"arcured 0.5 - 2.01/s0.7"arcured 0.5 - 2.01/s0.61"arcured 0.5 - 2.01/s0.61"arcured 0.5 - 2.01/s2.0.1"arcured 0.5 - 2.01/s0.2.61"arcured 0.5 - 2.01/s0.03Do ms/m8.95"arcured 0.5 - 2.01/s0.03Data arcure available for use of the stressBecore arcure available for use of the stress"arcured 0.5 - 2.01/s0.03Becore arcure available for use of the stress"arcured 0.5 - 2.01/s1.641"arcured 0.5 - 2.01/s1.641"arcured 0.5 - 2.01/s0.63Becore arcure available for use of the stress"arcure arcure availabl	Present Status Cate	gory (A-F):		А				
rate 1013 km² Recharge: 2.2736 Mm²/a Recharge: 2.2736 Mm²/a Koul: 0.0000 Algine: 0.0000 Agline: 0.0000 Agline: 0.0000 Agline: 0.0354 Marter Balance: 2.154 Mm²/a Stress Index: 0.05 Untrested or law level of stres: EWR low flow requirement: 1.78 Mm²/a Groundwater available for use: 0.37Mm²/a (minimal) GW Reserve completed (Y/N): N Aquifier type and yield % of Area Fractured 0.1 - 0.51/s 0.45 incrured 0.1 - 0.51/s 0.45 incrured 0.5 - 2.01/s 0.77 Fractured 0.5 - 2.01/s 0.77 Fractured 0.5 - 2.01/s 0.77 Fractured 0.5 - 2.01/s 0.77 Stress Index: 0.6 of Area Ov 300 mS/m 42.97 800 - 1000 mS/m 29.01 Groundwater Quality (BC) % of Area PUTOBERG GRP 0.25 Localised significance as aquifer systems. ECCA GRP 51.79 Mid	Desired Water Reso	ource Catego	ory (A-F):	А				
Recharge:2.2736 Mm³/a Total Vor:2.2736 Mm³/a For ADD Mm³/aTotal Vor:0.12 Mm³/a0.0000Rand:0.0000 Minig:0.0000Affrig:0.0844 Industry:0.0000Affrig:0.0854 Aquacallane:0.0000Affrig:0.0554 Aquacallane:0.0000Water Balance:2.154 Mm³/aGroundwater available for use:0.37Mm³/a (minimal)Groundwater available for use:0.37Mm³/a (minimal)GW Reserve completed (V/N):NAquifer type and yield% of AreaFractured 0.1 - 0.51/s0.45"metured 0.5 - 2.01/s0.210"metured 0.5 - 2.01/s0.201Groundwater Quality (EC)% of AreaToroms/m8.9570 - 300 ms/m42.97Storo ons/m42.97Storo ons/m29.61Geology% of AreaQUATERNARY0.99BEAUFORT GRP0.23DOWTKA GRP0.23DWYKA GRP0.61Midle to upper thin sandstone strata may have greater hydrogeological significanceBOWTKA GRP0.30Mitter groundwater:Midle to upper thin sandstone strata may have greater hydrogeological significanceWYTTEBERG GRP0.33Mitter groundwater:Midle to upper thin sandstone strata may have greater hydrogeological significanceBOWTKA GRP0.30Mitter groundwater:Midle to upper thin sandstone strata may have greater hydrogeological significanceBOWTKA GRP0.30Mitter groundwater:Midle to up	Management Class	(Excellent	/Good/Fair):	Excellent				
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Rand:0.0000Mining:0.00004gIrrig:0.00446Industry:0.00004gIrrig:0.0034Aquaculture:0.0000Water Balance:2.154 Mm ³ /a0.0000Water Balance:2.154 Mm ³ /a0.0000Water Balance:1.78 Mm ³ /a0.0000Groundwater available for use:0.371 m ³ /a (minimal)GW Reserve completed (Y/N):NAquifer type and yield% of Area"ractured 0.0 - 0.11/s17.68"ractured 0.1 - 0.51/s0.45"ractured 0.1 - 0.51/s52.09"ractured 0.5 - 2.01/s29.01Groundwater Quality (EC)% of Area"ractured 0.5 - 2.01/s29.01Groundwater Quality (EC)% of Area0.300 mS/m8.9520 - 300 mS/m29.61Geology% of AreaBIAUPORT GRP0.23Localised significanceQUATERNARY0.99BIAUPORT GRP3.036Marginal hydrogeological significanceDWYKA GRP0.03Litcle significance, else regolith aquiferRisk to groundwater:Issertially no groundwater use in the catchment.Aguifus to ansing more avery large-catchment:Aguifus to ansing more/less water:Issertially no groundwater use in the catchment.Discussion on "hot spots":None	Recharge:	2.2736 Mm ³	³/a	5				
Aghrig:0.0846 $hadray:$ 0.0000 $Mater Balance:$ 2.154 Mm²/a0.0000Water Balance:2.154 Mm²/aGroundwater:0.03Untrasted or law levels of stressEWR low flow requirement:1.78 Mm²/aGroundwater available for use:0.37 Mm²/a (minimal)GW Reserve completed (Y/N):NAquifer type and yield% of AreaTractured 0.0 - 0.11/s17.68Tractured 0.1 - 0.51/s0.45Tractured 0.1 - 0.51/s0.45Tractured 0.1 - 0.51/s52.09Fractured 0.1 - 0.51/s52.09Groundwater Quality (EC)% of AreaGroundwater Quality (EC)% of AreaOn - 300 mS/m8.950 300 mS/m29.01Goodong/m29.61Ou - 1000 mS/m29.61Goodong/m29.61Goodong/m29.61Goodong/m29.61GOOdong/m29.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61GOOdong/m20.61 <th>Total Use:</th> <th>0.12 Mm³/a</th> <th>a</th> <th>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</th>	Total Use:	0.12 Mm ³ /a	a	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
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And the second secon	GW Reserve comple	eted (Y/N):	N	Viedendai*				
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more/less water: groundwater) - so low groundwater contribution to baseflow. Discussion on "hot spots": None	Level of confidence	:	low					
-	Implications of usin more/less water:	ng						
Relevant previous work: SRK, 2006	Discussion on "hot	spots":	None					
	Relevant previous w	vork:	SRK, 2006					

Quaternary Catch	ment:	E22F	
Present Status Cate	egory (A-F):		А
Desired Water Res	ource Catego	ory (A-F):	А
Management Class	e (Excellen	t/Good/Fair):	Excellent
Area:	400 km ²		
Recharge:	0.4846 Mm	³ /a	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Total Use: Rural: AgIrrig: AgLive:	0.012 Mm ³ 0.00 0.00 0.01	00 Mining: 00 Industry:	0.0000 0.0000 re: 0.0000
Water Balance:	0.472 Mm ³	*	
Stress Index:	0.02 U	nstressed or low levels	of stress
EWR low flow requ	uirement:	0.21 M	
Groundwater avail	able for use:	0.26 M	Im ³ /a (adequate)
GW Reserve comp.	leted (Y/N):	N	Viedentias *
Aquifer type and y	ield	% of Area	a Lamberts Bay
Fractured 0.0 - 0.1 l/	s	34.74	Elanderis Day Graftwaters Canwilliam
Fractured 0.1 - 0.5 l/	s	10.34	Elanos Days
Fractured 0.5 - 2.0 l/	s	54.92	Citrusdar
Groundwater Qual	ity (EC)	% of Are	ea a a a a a a a a a a a a a a a a a a
0 - 70 mS/m		15.7	West
70 - 300 mS/m		10.03	
70 - 300 mS/m		39.65	
300 - 1 000 mS/m		34.63	
Geology		% of Area	Hydrological significance
ECCA GRP		12.77	Middle to upper thin sandstone strata may have greater hydrogeological significance
DWYKA GRP		40.12	Aquiclude
WITTEBERG GR	Р	47.13	Marginal hydrogeological significance
Risk to groundwat	er:	None	
Assumptions and constraints:		Essentially no g	groundwater use in the catchment.
Level of confidence	e:	low	
Implications of use more/less water:	ng		conditions (low rainfall/deep groundwater levels/limited presence of so low groundwater contribution to baseflow.
Discussion on "ho	t spots":	None	
Relevant previous	work:	SRK, 2006	

Quaternary Catchr	nent: E22G	
Present Status Cate	gory (A-F):	А
Desired Water Res	ource Category (A-F):	А
Management Class	(Excellent/Good/Fair):	Excellent
Area:	367 km ²	
Recharge:	0.141 Mm³/a	5
Total Use:	0.004 Mm ³ /a	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Rural:	0.0000 <i>Mining:</i> 0.0000 <i>Industry:</i>	0.0000
AgIrrig: AgLive:	0.0000 <i>Industry:</i> 0.0036 <i>Aquaculture</i>	
Water Balance:	0.137 Mm ³ /a	A the the
Stress Index:	0.03 Unstressed or low levels	Is of stress
EWR low flow requ	<i>irement:</i> 0.43 M	Mm ³ /a
Groundwater availa	-0.29M	Mm ³ /a (none)
GW Reserve comp	eted (Y/N): N	Wedendal*
Aquifer type and y	eld % of Area	ea TXXXX
Fractured 0.0 - 0.1 l/	s 35.54	Lamberts Bay
Fractured 0.1 - 0.5 l/	s 0.12	Elands Bay
Fractured 0.5 - 2.0 l/	s 64.34	Cirrusdale Cir
Groundwater Qual	ty (EC) % of Are.	rea
70 - 300 mS/m	0.09	Horsen S
70 - 300 mS/m	64.69	man
300 - 1 000 mS/m	35.22	
Geology	% of Area	Hydrological significance
QUATERNARY	0.68	
ECCA GRP	0.21	
DWYKA GRP		significance 5 Aquiclude
WITTEBERG GRI		*
BOKKEVELD GR	P 0.67	7 Little significance, else regolith aquifer
Risk to groundwate	er: None	
Assumptions and constraints:	Essentially no gr	groundwater use in the catchment.
Level of confidence	e low	
Implications of usi more/less water:	0	conditions (low rainfall/deep groundwater levels/limited presence of - so low groundwater contribution to baseflow.
Discussion on "ho	spots": None	
Relevant previous	<i>vork:</i> SRK, 2006	

Quaternary Catchi	ment: E2.	3A	
Present Status Cat	egory (A-F):		А
Desired Water Res	ource Category ((A-F):	А
Management Clas	s (Excellent/Goo	od/Fair):	Excellent
Area:	762 km ²		
Recharge:	$6.0995 \text{ Mm}^3/a$		
Total Use:	0.059 Mm³/a		
R <i>ural:</i>	0.0000	Mining:	0.0000
AgIrrig:	0.0585	Industry:	0.0000
AgLive:	0.0001	Aquaculture:	0.0000
Water Balance:	6.041 Mm³/a		
Stress Index:	0.01 Unstress	sed or low levels of s	tress
EWR low flow req	uirement:	1.048 Mm	n³/a
Groundwater avail	able for use:	4.99Mm ³ /	/a (adequate)
GW Reserve comp	leted (Y/N):	Ν	
Aquifer type and y	ield	% of Area	
Fractured 0.1 - 0.5 l/	's	100	
Groundwater Qua	lity (EC)	% of Area	
70 - 300 mS/m		100	
Geology		% of Area H	Iydrological signific
BEAUFORT GRP		99.77 I	Localised significance
Risk to groundwat	er: N	one - the most ea	astern catchment of th

Assumptions and constraints:	Essentially no groundwater use in the catchment.
Level of confidence:	low
Implications of using more/less water:	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwatercontribution to baseflow.
Discussion on "hot spots":	None
Relevant previous work:	SRK, 2006

Quaternary Catchmo	ent: E	E23B		
Present Status Categ	gory (A-F):		А	
Desired Water Resor	urce Catego	ry (A-F):	А	
Management Class	(Excellent)	Good/Fair):	Excellent	
Area:	705 km²			<u>~</u>
Recharge:	4.265 Mm ³ /	a		5
Total Use:	0 Mm ³ /a			[
Rural:	0.000		0.0000	and I
AgIrrig: AgI ing	0.000		0.0000 e: 0.0000	And
AgLive: Water Balance:	4.265 Mm ³ /	1	e. 0.0000	and the
			- Codenar	122 May 13
		stressed or low levels		Neuwoudrylis
EWR low flow requi		0.97 N		Nieuwoudtville * Calvinia *
Groundwater availab			m³/a (adequate)	viedendal*
GW Reserve comple	ted (Y/N):	Ν		KANT
Aquifer type and yie	ld	% of Area	3	Lamberts Bay Graafwater & Clahwilliam
Fractured 0.1 - 0.5 l/s		83.98		Elands Bay a
Fractured 0.5 - 2.0 l/s		2.32		Cityusda * Charles
Fractured 0.5 - 2.0 l/s		13.7		and the fine
Groundwater Quality	y (EC)	% of Are	2a	The second
70 - 300 mS/m		100		
Geology		% of Area	Hydrological sign	ificance
BEAUFORT GRP		73.11	Localised significat	nce as aquifer systems.
ECCA GRP		26.74	Middle to upper th significance	in sandstone strata may have greater hydrogeolog
Risk to groundwater	rr	None	0	
Assumptions and constraints:		Essentially no g	roundwater use in the	e catchment.
Level of confidence:		low		
Implications of using more/less water:	g			l/deep groundwater levels/limited presence of contribution to baseflow.
Discussion on "hot s	spots":	None		
Relevant previous w	ork:	SRK, 2006		

Recharge: 1.8446 Mm³/a Total Use: 0 Mm³/a Runal: 0.0000 Mining: 0.0000 Aglrrig: 0.0000 Industry: 0.0000 Aglire: 0.0003 Aquaculture: 0.0000 Mater Balance: 1.844 Mm³/a Stress Index: 0 Unstressed or low levels of stress EWR low flow requirement: 0.437 Mm³/a Groundwater available for use: 1.41Mm³/a (minimal) GW Reserve completed (Y/N): N N Aquifer type and yield % of Area Fractured 0.1 - 0.5 1/s 67.76 Fractured 0.5 - 2.0 1/s 32.24 Groundwater Quality (EC) % of Area 70 - 300 mS/m 100 Geology % of Area BEAUFORT GRP 20.45 Localised significance ECCA GRP 79.58 Middle to upper thin s significance Risk to groundwater: None None Assumptions and constraints: Essentially no groundwater use in the cal constraints: Level of confidence: low Infavourable conditions (low rainfall/de groundwater) - so low groundwater cont Discussion on "hot spots": <th>Quaternary Catch</th> <th>nent: E</th> <th>E23C</th> <th></th> <th></th>	Quaternary Catch	nent: E	E23C		
Management Class (Excellent/Good/Fair): Excellent Area: 318 km² Recharge: 1.8446 Mm³/a Total Use: 0 Mm³/a Rural: 0.0000 Management Class 0 Mm³/a Recharge: 1.8446 Mm³/a Rural: 0.0000 Management: 0.0000 Aglire: 0.0003 Aquaculture: 0.0000 Water Balance: 1.844 Mm³/a Stress Index: 0 Unstressed or low levels of stress EWR low flow requirement: 0.437 Mm³/a Groundwater available for use: 1.41Mm³/a (minimal) GW Reserve completed (Y/N): N Aquifer type and yield % of Area Fractured 0.1 - 0.51/s 67.76 Fractured 0.5 - 2.01/s 32.24 Groundwater Quality (EC) % of Area 70 - 300 mS/m 100 Geology % of Area BEAUFORT GRP 20.45 Localised significance EXEk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the cat constraints: <t< td=""><td>Present Status Cat</td><td>egory (A-F):</td><td></td><td>А</td><td></td></t<>	Present Status Cat	egory (A-F):		А	
Area: 318 km² Recharge: 1.8446 Mm³/a Total Use: 0 Mm³/a Rural: 0.0000 Industry: 0.0000 Aglrig: 0.0003 Aquaculture: 0.0000 Aglrig: 0.0003 Aquaculture: 0.0000 Aglrig: 0.0003 Aquaculture: 0.0000 Aglive: 0.0003 Aquaculture: 0.0000 Water Balance: 1.844 Mm³/a Stress Index: 0 Unstressed or low levels of stress EWR low flow requirement: 0.437 Mm³/a Groundwater available for use: 1.41 Mm³/a (minimal) GW Reserve completed (Y/N): N N Aquifer type and yield % of Area Fractured 0.1 - 0.5 l/s 67.76 Fractured 0.5 - 2.0 l/s 32.24 Groundwater Quality (EC) % of Area Hydrological significance 70 - 300 mS/m 100 Geology % of Area BEAUFORT GRP 20.45 Localised significance ECCA GRP 79.58 Middle to upper thin significance Risk to groundwater: None None Assumptions and constraints: Level of	Desired Water Res	ource Catego	vry (A-F):	А	
Recharge:1.8446 Mm³/aTotal Use:0 Mm³/aRunal:0.0000Mining:0.0000Aglrrig:0.0000Industry:0.0000Aglrig:0.0003Aquaculture:0.0000Mater Balance:1.844 Mm³/aStress Index:0Unstressed or low levels of stressEWR low flow requirement:0.437 Mm³/aGoundwater available for use:1.411Mm³/a (minimal)GW Reserve completed (Y/N):NAquifer type and yield% of AreaFractured 0.1 - 0.51/s67.76Fractured 0.5 - 2.01/s32.24Groundwater Quality (EC)% of Area70 - 300 mS/m100Geology% of AreaECCA GRP20.45Localised significanceRisk to groundwater:NoneAssumptions and constraints:Essentially no groundwater use in the constraints:Level of confidence:lowImplications of using more/less water:Constraints:Level of confidence:lowImplications of using more/less water:Unfavourable conditions (low rainfall/more/less water:OutputStress':None	Management Class	s (Excellent,	/Good/Fair):	Exceller	ıt
Total Use:0 Mm³/aRunal:0.0000Mining:0.0000Aglrrig:0.0000Industry:0.0000Aglirig:0.0003Aquaculture:0.0000Water Balance:1.844 Mm³/aStress Index:0Unstressed or low levels of stressEWR low flow requirement:0.437 Mm³/aGroundwater available for use:1.41Mm³/a (minimal)GW Reserve completed (Y/N):NAquifer type and yield% of AreaFractured 0.1 - 0.51/s67.76Fractured 0.5 - 2.01/s32.24Groundwater Quality (EC)% of Area70 - 300 mS/m100Geology% of AreaHydrological significanceECCA GRP20.45Localised significanceRisk to groundwater:NoneAssumptions and constraints:Essentially no groundwater use in the originality of confidence:Level of confidence:IowImplications of using more/less water:Unfavourable conditions (low rainfall/ groundwater) - so low groundwater conditionsDiscussion on "hot spots":None	Area:				
Rural:0.0000Mining:0.0000Aglrrig:0.0000Industry:0.0000AgLive:0.0003Aquaculture:0.0000Water Balance:1.844 Mm³/aStress Index:0Unstressed or low levels of stressEWR low flow requirement:0.437 Mm³/aGroundwater available for use:1.41 Mm³/a (minimal)GW Reserve completed (Y/N):NAquifer type and yield% of AreaFractured 0.1 - 0.5 l/s67.76Fractured 0.5 - 2.0 l/s32.24Groundwater Quality (EC)% of Area70 - 300 mS/m100Geology% of AreaECCA GRP79.58Middle to upper thin significanceRisk to groundwater:NoneAssumptions and constraints:Essentially no groundwater use in the constraints:Level of confidence:lowImplications of using more/less water:GovDiscussion on "hot spots":None	Recharge:	1.8446 Mm ³	'/a		
Aglrrig:0.0000Industry:0.0000AgLive:0.0003Aquaculture:0.0000Water Balance:1.844 Mm³/aStress Index:0Unstressed or low levels of stressEWR low flow requirement:0.437 Mm³/aGroundwater available for use:1.411Mm³/a (minimal)GW Reserve completed (Y/N):NAquifer type and yield% of AreaFractured 0.1 - 0.51/s67.76Fractured 0.5 - 2.01/s32.24Groundwater Quality (EC)% of Area70 - 300 mS/m100Geology% of AreaBEAUFORT GRP20.45ECCA GRP79.58Middle to upper thin significanceRisk to groundwater:NoneAssumptions and constraints:Essentially no groundwater use in the constraints:Level of confidence:lowImplications of using more/less water:NoneDiscussion on "hot spots":None		-	M		0.0000
AgLive: 0.0003 Aquaculture: 0.0000 Water Balance: 1.844 Mm³/a Stress Index: 0 Unstressed or low levels of stress EWR low flow requirement: 0.437 Mm³/a Groundwater available for use: 1.41 Mm³/a (minimal) GW Reserve completed (Y/N): N Aquifer type and yield % of Area Fractured 0.1 - 0.51/s 67.76 Fractured 0.5 - 2.01/s 32.24 Groundwater Quality (EC) % of Area 70 - 300 mS/m 100 Geology % of Area BEAUFORT GRP 20.45 ECCA GRP 79.58 Middle to upper thin significance Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: On further or on work and constraints: Level of confidence: low Implications of using more/less water: None			0		
Water Balance: 1.844 Mm³/a Stress Index: 0 Unstressed or low levels of stress EWR low flow requirement: 0.437 Mm³/a Groundwater available for use: 1.41 Mm³/a (minimal) GW Reserve completed (Y/N): N Aquifer type and yield % of Area Fractured 0.1 - 0.51/s 67.76 Fractured 0.5 - 2.01/s 32.24 Groundwater Quality (EC) % of Area 70 - 300 mS/m 100 Geology % of Area BEAUFORT GRP 20.45 ECCA GRP 79.58 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/groundwater) - so low groundwater constraints	0 0		~	v:	
Stress Index: 0 Unstressed or low levels of stress EWR low flow requirement: 0.437 Mm³/a Groundwater available for use: 1.41Mm³/a (minimal) GW Reserve completed (Y/N): N Aquifer type and yield % of Area Fractured 0.1 - 0.5 l/s 67.76 Fractured 0.5 - 2.0 l/s 32.24 Groundwater Quality (EC) % of Area 70 - 300 mS/m 100 Geology % of Area BEAUFORT GRP 20.45 ECCA GRP 79.58 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/groundwater) - so low groundwater constraints:	0		1		
EWR low flow requirement: 0.437 Mm³/a Groundwater available for use: 1.41 Mm³/a (minimal) GW Reserve completed (Y/N): N Aquifer type and yield % of Area Fractured 0.1 - 0.5 l/s 67.76 Fractured 0.5 - 2.0 l/s 32.24 Groundwater Quality (EC) % of Area 70 - 300 mS/m 100 Geology % of Area BEAUFORT GRP 20.45 ECCA GRP 79.58 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/groundwater) - so low groundwater constraints				of stress	
Groundwater available for use:1.41Mm³/a (minimal)GW Reserve completed (Y/N):NAquifer type and yield% of AreaFractured 0.1 - 0.51/s67.76Fractured 0.5 - 2.01/s32.24Groundwater Quality (EC)% of Area70 - 300 mS/m100Geology% of AreaHydrological significanceECCA GRP20.45K to groundwater:NoneAssumptions and constraints:Essentially no groundwater use in the constraints:Level of confidence:lowImplications of using more/less water:Unfavourable conditions (low rainfall/groundwater constraints)Discussion on "hot spots":None		• • • •		5	
GW Reserve completed (Y/N): N Aquifer type and yield % of Area Fractured 0.1 - 0.5 l/s 67.76 Fractured 0.5 - 2.0 l/s 32.24 Groundwater Quality (EC) % of Area 70 - 300 mS/m 100 Geology % of Area BEAUFORT GRP 20.45 Localised significance ECCA GRP 79.58 Middle to upper thin significance Risk to groundwater: None Sesentially no groundwater use in the carbon constraints: Level of confidence: low Unfavourable conditions (low rainfall/c groundwater) - so low groundwater constraints. Discussion on "hot spots": None					1al)
Fractured 0.1 - 0.5 l/s 67.76 Fractured 0.5 - 2.0 l/s 32.24 Groundwater Quality (EC) % of Area 70 - 300 mS/m 100 Geology % of Area BEAUFORT GRP 20.45 ECCA GRP 79.58 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the carbon constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/d groundwater) - so low groundwater constraints	GW Reserve comp	leted (Y/N):		`	-
Fractured 0.5 - 2.0 l/s 32.24 Groundwater Quality (EC) % of Area 70 - 300 mS/m 100 Geology % of Area BEAUFORT GRP 20.45 ECCA GRP 79.58 Middle to upper thin significance Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/or groundwater) - so low groundwater core Discussion on "hot spots": None	Aquifer type and y	ield	% of Are:	a	
Fractured 0.5 - 2.0 l/s 32.24 Groundwater Quality (EC) % of Area 70 - 300 mS/m 100 Geology % of Area BEAUFORT GRP 20.45 ECCA GRP 79.58 Middle to upper thir significance Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/ groundwater) - so low groundwater constraints:			67.76		
Groundwater Quality (EC) % of Area 70 - 300 mS/m 100 Geology % of Area BEAUFORT GRP 20.45 ECCA GRP 79.58 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/groundwater) - so low groundwater constraints: Discussion on "hot spots": None			0.000		
70 - 300 mS/m 100 Geology % of Area Hydrological significance BEAUFORT GRP 20.45 Localised significance ECCA GRP 79.58 Middle to upper thir significance Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/groundwater constraints) Discussion on "hot spots": None					
Geology% of AreaHydrological significanceBEAUFORT GRP20.45Localised significanceECCA GRP79.58Middle to upper thin significanceRisk to groundwater:NoneAssumptions and constraints:Essentially no groundwater use in the constraints:Level of confidence:lowImplications of using more/less water:Unfavourable conditions (low rainfall/ groundwater con Discussion on "hot spots":None	Groundwater Qual	lity (EC)	% of Are	ea.	
BEAUFORT GRP 20.45 Localised significance ECCA GRP 79.58 Middle to upper thin significance Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/groundwater constraints) Discussion on "hot spots": None	70 - 300 mS/m		100		
ECCA GRP 79.58 Middle to upper thin s significance Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the case Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/d groundwater) - so low groundwater cont Discussion on "hot spots": None	Geology		% of Area	Hydrolog	ical signi
significance Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the carbon constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/c groundwater) - so low groundwater con Discussion on "hot spots": None	BEAUFORT GRP		20.45	Localised	significan
Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/or groundwater) - so low groundwater cor Discussion on "hot spots": None	ECCA GRP		79.58		11
Assumptions and constraints: Essentially no groundwater use in the or constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/groundwater) - so low groundwater co Discussion on "hot spots": None			NT	significanc	е
constraints: Level of confidence: low Implications of using more/less water: groundwater) - so low groundwater con Discussion on "hot spots":	Risk to groundwat	er:	None		
Implications of using more/less water:Unfavourable conditions (low rainfall/o groundwater) - so low groundwater corDiscussion on "hot spots":None	Assumptions and constraints:		Essentially no g	roundwater	use in the
more/less water: groundwater) - so low groundwater cor Discussion on "hot spots": None	Level of confidenc	e:	low		
-	Implications of use more/less water:	ing			
Belevant previous work: SDV 2004	Discussion on "ho	ot spots":	None		
ACIEVAIL DIEVIOUS WOLK. SINN. 2000	Relevant previous	work:	SRK, 2006		

Quaternary Catch	ment:	E23D	
Present Status Cat	tegory (A-F):		А
Desired Water Res	source Categ	ory (A-F):	А
Management Clas	s (Excellen	nt/Good/Fair):	Excellent
Area: Recharge:	750 km² 3.2592 Mm	n³/a	
Total Use: Rural: AgIrrig: AgLive:	0.052 Mm ³ 0.00 0.04 0.00	000 Mining: 126 Industry:	0.0000 0.0000 : 0.0000
Water Balance:	3.208 Mm ³	°/a	
Stress Index:	0.02 U	Instressed or low levels	of stress
EWR low flow req	uirement:	1.031 N	/Im³/a
Groundwater avail	lable for use:	2.13Mr	n³/a(minimal)
GW Reserve comp	pleted (Y/N).	: N	
Aquifer type and y	vield	% of Area	
Fractured 0.1 - 0.5 l	/s	36.88	
Fractured 0.5 - 2.0 l	/s	0.19	
Fractured 0.5 - 2.0 l	/s	61.54	
Fractured 2.0 - 5.0 l	/s	1.39	
Groundwater Qua	lity (EC)	% of Are.	a
70 - 300 mS/m		100	
Geology		% of Area	Hydrological sign
QUATERNARY		15.3	
Karoo dolerite Suit	æ	1.54	Fractured contact z
BEAUFORT GRP		17.23	barriers to flow. Localised significan
ECCA GRP		65.74	Middle to upper this
Risk to groundwar	ter:	None	Similance
Assumptions and constraints:		Essentially no gr	coundwater use in the
Level of confidence	ce:	low	
Implications of us more/less water:	ing		onditions (low rainfall to low groundwater c
Discussion on "he	ot spots":	None	
Relevant previous	work:	SRK, 2006	

Quaternary Catch	ment:	E 23E	
Present Status Cat	egory (A-F):		В
Desired Water Res		ory (A-F):	А
Management Clas	s (Excellen	t/Good/Fair):	Excellent
Area: Recharge:	564 km² 4.5617 Mm	³ /a	
Total Use: Rural: AgIrrig: AgLive:	0.338 Mm ³ 0.00 0.33 0.00	00 Mining: 29 Industry: 56 Aquacultur	0.0000 0.0000 v: 0.0000
Water Balance:	4.223 Mm ³	/a	
Stress Index:		nstressed or low levels	of stress
EWR low flow req			Mm ³ /a
Groundwater avail	lable for use:	3.62 M	lm³/a(minimal)
GW Reserve comp	leted (Y/N):	N	
Aquifer type and y	ield	% of Area	2
Fractured 0.5 - 2.0 l,	/s	94.95	
Fractured 2.0 - 5.0 l	/s	1.18	
Intergranular and fra 0.5 l/s	actured 0.1 -	1.42	
Intergranular and fra 0.5 l/s	actured 0.1 -	2.45	
Groundwater Qua	lity (EC)	% of Are	?a
70 - 300 mS/m		100	
Geology		% of Area	Hydrological sign
QUATERNARY		0.32	
Karoo dolerite Suit	e	3.72	
BEAUFORT GRP		40.95	barriers to flow. Localised significan
ECCA GRP		54.65	
Risk to groundwat	ter:	The agricultural catchment.	significance use of groundwater is
Assumptions and constraints:		Essentially no g	roundwater use in the
Level of confidence	e:	low	
Implications of us more/less water:	ing		onditions (low rainfall so low groundwater co
Discussion on "ho	ot spots":	None	
Relevant previous	work:	SRK, 2006	

Quaternary Catchr	ment:	E 23F		
Present Status Cate	egory (A-F):		А	
Desired Water Res	ource Categ	ory (A-F):	А	
Management Class	s (Excellen	t/Good/Fair):	Excellent	
Area:	473 km²			
Recharge:	0.4311 Mm	1 ³ /a		
Total Use:	1.071 Mm ³			
Rural: AgIrrig:	0.00			.0000
Agirrig: AgLive:	0.00			.0000
Water Balance:	-0.64 Mm ³	1	Ŷ	
Stress Index:		nstressed or low levels	of stress	
EWR low flow requ			Mm³/a	
Groundwater avail			[m ³ /a(none)	
GW Reserve comp			,()	
Aquifer type and y		% of Area	2	
Fractured 0.1 - 0.5 1/		21.23		
Fractured 0.5 - 2.0 l/	s	74.19		
Intergranular and fra 0.5 l/s	ctured 0.1 -	4.59		
Groundwater Qual	ity (EC)	% of Are	a	
70 - 300 mS/m		100		
Geology		% of Area	Hydrologic	al signit
QUATERNARY		23.41		
Karoo dolerite Suite	2	10.86	Fractured co	
ECCA GRP		65.75	barriers to fl Middle to u significance	
Risk to groundwat	er:	The groundwate National park is	er use is likely	
Assumptions and constraints:		Essentially no g	roundwater us	e in the c
Level of confidence	e:	low		
Implications of usi more/less water:	ing	Unfavourable co groundwater) -		
Discussion on "ho	t spots":	None		
Relevant previous	work:	SRK, 2006		

Quaternary Catchm	ent: E	23G					
Present Status Categ	gory (A-F):		А				
esired Water Reso	urce Category	v (A-F):	А				
nagement Class	(Excellent/0	Good/Fair):	Excellent				
a:	747 km ²						
charge:	1.7226 Mm ³ /	a				1	3
al Use:	0.027 Mm ³ /a					M	5
al:	0.0010			0.0000		for	~
rrig: _ive:	0.0000 0.0261	9		.0000		3 12	2
er Balance:	1.696 Mm ³ /a	*	. 0.	.0000	2	AH	3~
s Index:	,	tressed or low levels	of stress		Day	2 25	57
s muex: R low flow requi		0.8 Mn	5		Acres	2	L.
n low llow requi undwater availai			n³/a (minima)	D	(T	Nieuwoudtville	Calvin
Reserve comple		0.90 M	in , a (iiiiiiiiia	+)	Vredenda	and the	2mg
-		% of Area			2	XX	2 La
fer type and yie					Lamberts Bay Graafw	vaters	St
tured 0.1 - 0.5 l/s		87.4			Elands Bay	Clahwilli	
ured 0.5 - 2.0 l/s		3.08)	Citrusdal	file
ured 0.5 - 2.0 l/s		9.52			\square	~ H	125
ndwater Qualit	y (EC)	% of Are.	a			12	722
600 mS/m		100				t	LIE
logy		% of Area	Hydrologica	al signific.	ance		
UFORT GRP		15.21	Localised sig	gnificance a	as aquifer system	ns.	
CA GRP		84.82	Middle to up significance	pper thin sa	andstone strata r	may have greate	er hydr
k to groundwater	r:	None	-				
umptions and straints:		Essentially no gr	oundwater use	e in the cat	chment.		
el of confidence:		low					
plications of using ore/less water:		Unfavourable co groundwater) - s					presen
cussion on "hot	spots":	None					
levant previous w	ork:	SRK, 2006					

Quaternary Catch	ment:	E23H	
Present Status Cal	tegory (A-F):		А
Desired Water Rea	source Catego	ory (A-F):	А
Management Clas	s (Excellen	t/Good/Fair):	Excellent
Area:	660 km ²		<u>A</u>
Recharge:	2.9601 Mm	³ /a	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Total Use:	0.023 Mm ³		
Rural:	0.00		0.0000
AgIrrig:	0.00	2	0.0000
AgLive:	0.02	1	rre: 0.0000
Water Balance:	2.937 Mm ³		122 Martin
Stress Index:		nstressed or low levels	Mind I S. Mark
EWR low flow req			Mm ³ /a
Groundwater avai	lable for use:		Mm ³ /a(minimal)
GW Reserve comp			A A A A A A A A A A A A A A A A A A A
Aquifer type and y	vield	% of Area	Ca Lamberts Bay Graafwatere Clanwilliam
Fractured 0.1 - 0.5 l	/s	71.8	Elands Bay
Fractured 0.5 - 2.0 l	/s	3.63	Cirrisda"
Fractured 0.5 - 2.0 l	/s	24.57	and the for the second
Groundwater Qua	lity (EC)	% of Are	rea The sea
70 - 300 mS/m		100	Valandia
Geology		% of Area	Hydrological significance
QUATERNARY		0)
BEAUFORT GRF	,	10.98	8 Localised significance as aquifer systems.
ECCA GRP		89.04	4 Middle to upper thin sandstone strata may have greater hydrogeological significance
Risk to groundwa	ter:	None	agundance
Assumptions and constraints:		Essentially no g	groundwater use in the catchment.
Level of confidence	ce:	low	
Implications of us more/less water:	ing		conditions (low rainfall/deep groundwater levels/limited presence of so low groundwatercontribution to baseflow.
Discussion on "he	ot spots":	None	
Relevant previous	work:	SRK, 2006	

Quaternary Catchment:	E 23J	
Present Status Category (A-F):		F
Desired Water Resource Catego	ory (A-F):	D
Management Class (Excellen	t/Good/Fair):	Fair
Area: 895 km ²		
Recharge: 0.7403 Mm	³ /a	
Total Use: 0.031 Mm ³	-	- 13
Rural: 0.00	0	0.0000
AgIrrig:0.00AgLive:0.03	9	0.0000
Water Balance: 0.709 Mm ³		
	nstressed or low levels of	former A Harry
EWR low flow requirement:	0.958 M	
Groundwater available for use:		$m^3/a(none)$
GW Reserve completed (Y/N):		Nieuwoudtvillie Calvinia
Aquifer type and yield	% of Area	Wedendars - Standard
Fractured 0.0 - 0.1 l/s	0.3	Lamberts Bay
Fractured 0.1 - 0.5 l/s	90.17	Grahwatere Ciahwilliam
Fractured 0.5 - 2.0 l/s	9.52	Christel a
Groundwater Quality (EC)	% of Area	
70 - 300 mS/m	99.66	
300 - 1 000 mS/m	0.34	Valand
Geology	% of Area	Hydrological significance
QUATERNARY	6.05	
BEAUFORT GRP	0.26	Localised significance as aquifer systems.
ECCA GRP		Middle to upper thin sandstone strata may have greater hydrogeological significance
DWYKA GRP		Aquiclude
Risk to groundwater:	None	
Assumptions and constraints:	Essentially no gro	oundwater use in the catchment.
Level of confidence:	low	
Implications of using more/less water:		nditions (low rainfall/deep groundwater levels/limited presence of o low groundwatercontribution to baseflow.
Discussion on "hot spots":	None	
Relevant previous work:	SRK, 2006	

Quaternary Catchment:	
Present Status Category (A-F)	: В
Desired Water Resource Cate	gory (A-F): D
Management Class (Excelle	nt/Good/Fair): Fair
<i>Area:</i> 572 km ²	4
Recharge: 0.0199 Mr	n³/a
Total Use: 0.002 Mn	
	000 Mining: 0.0000 000 Industry: 0.0000
0 0	000 Industry. 0.0000
Water Balance: 0.017 Mm	3/a
Stress Index: 0.13	Unstressed or low levels of stress
EWR low flow requirement:	0.612 Mm ³ /a
Groundwater available for use	
GW Reserve completed (Y/N)): N
Aquifer type and yield	% of Area
Fractured 0.0 - 0.1 l/s	30.15 Elands Bays
Fractured 0.1 - 0.5 l/s	25.68
Fractured 0.5 - 2.0 l/s	30.21
Intergranular and fractured 0.1 -	0.5 l/s 13.96
Groundwater Quality (EC)	% of Area
70 - 300 mS/m	55.57
300 - 1 000 mS/m	44.43
Geology	% of Area Hydrological significance
QUATERNARY	5.88
Karoo dolerite Suite	3.41 Fractured contact zones and metamorphic aureoles serve as aquifers. Also
ECCA GRP	barriers to flow. 45.65 Middle to upper thin sandstone strata may have greater hydrogeological
DWYKA GRP	significance 45.07 Aquiclude
Risk to groundwater:	The agricultural use of groundwater is over-estimated - this is a Class A catchment. Limited use in the western part of the catchment on the river.
Assumptions and constraints:	Essentially no groundwater use in the catchment.
Level of confidence:	low
Implications of using more/less water:	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwater contribution to baseflow.
Discussion on "hot spots":	None
Relevant previous work:	SRK, 2006

Quaternary Catch	ment:	E24	A	
Present Status Car	tegory (A-l	F):		А
Desired Water Rea	source Cat	egory (A	l <i>-F):</i>	А
Management Clas	s (Excel	llent/Good	d/Fair):	Excellent
Area:	255 km²			
Recharge:	4.8767 N	/Im³/a		
Total Use: Rural:	0.046 M		M: ·	0.00
Kurai: AgIrrig:		.0070 .0350	Mining: Industry:	0.00
AgLive:		.0039	Aquaculture:	
Water Balance:	4.831 M	m³/a	-	
Stress Index:	0.01	Unstress	ed or low levels o	f stress
EWR low flow req	uirement:		0.468 M	m³/a
Groundwater avai	lable for us	se:	4.36Mm	³ /a(adequate)
GW Reserve comp	oleted (Y/l	N):	Ν	
Aquifer type and y	vield		% of Area	
Fractured 0.5 - 2.0 l	/s		59.18	
Fractured 2.0 - 5.0 l	/s		40.82	
Groundwater Qua	lity (EC)		% of Area	
0 - 70 mS/m			92.9	
70 - 300 mS/m			7.1	
Geology			% of Area	Hydrological s
WITTEBERG GR	P		0.04	Marginal hydro
BOKKEVELD G	RP		14.39	Little significan
TABLE MOUNT	AIN GRP		85.57	Major fractured
Risk to groundwa	ter:	No	one	
Assumptions and constraints:		Ess	sentially no gro	oundwater use ir
Level of confidence	ce:	low	7	
Implications of us more/less water:	ing	TM	IG aquifers co	ntribute to river
Discussion on "he	ot spots":	No	one	
Relevant previous	work:	SR	K, 2006	

Quaternary Catch	ment:	E24B	
Present Status Cat	egory (A-F):		А
Desired Water Res			А
Management Clas	s (Excellen	t/Good/Fair):	Excellent
Area: Recharge:	468 km² 2.693 Mm³	/a	
Total Use: Rural: AgIrrig: AgLive:	0.061 Mm ² 0.00 0.05 0.00	20 <i>Mining:</i> 16 <i>Industry:</i>	0.0000 0.0000 c 0.0000
Water Balance:	2.632 Mm ³	/a	
Stress Index:	0.02 U	nstressed or low levels	of stress
EWR low flow req	uirement:	0.857 N	/Im³/a
- Groundwater avail	lable for use:	1.77 M	m³/a(minimal)
GW Reserve comp	oleted (Y/N)		
Aquifer type and y	rield	% of Area	1
Fractured 0.0 - 0.1 l,	/s	0.79	
Fractured 0.5 - 2.0 l,	/s	98.61	
Fractured 2.0 - 5.0 l,	/s	0.6	
Groundwater Qua	lity (EC)	% of Are.	a
0 - 70 mS/m		1.35	
70 - 300 mS/m		97.9	
300 - 1 000 mS/m		0.75	
Geology		% of Area	Hydrological sign
DWYKA GRP		0.61	Aquiclude
WITTEBERG GR	Р	60.11	Marginal hydrogeol
BOKKEVELD GI	RP	39.25	Little significance, e
TABLE MOUNT	AIN GRP	0.04	Major fractured roc
Risk to groundwal	ter:	None	
Assumptions and constraints:		Essentially no gr	coundwater use in the
Level of confidence	re:	low	
Implications of us. more/less water:	ing	TMG aquifers c	ontribute to river bas
Discussion on "ho	ot spots":	None	
Relevant previous	work:	SRK, 2006	

Quaternary Catchri	nent:	E24C	
Present Status Cate	gory (A-F):		В
Desired Water Reso	ource Catego	ory (A-F):	А
Management Class	(Excellent	t/Good/Fair):	Excellent
Area: Recharge:	784 km² 2.5331 Mm	³ /a	
Total Use:	0.243 Mm ³	/a	
Rural:	0.000	0	0.0000
AgIrrig: AgLive:	0.243	9	0.0000 e: 0.0000
Water Balance:	2.29 Mm ³ /a	1	. 0.0000
Stress Index:		nstressed or low levels	of stress
EWR low flow requ		0.75 M	
Groundwater availa			n³/a (adequate)
GW Reserve comple	eted (Y/N):		· · /
Aquifer type and yi	eld	% of Area	1
Fractured 0.5 - 2.0 1/s	3	74.0)4
Intergranular and frac	ctured 0.1 - 0.	.5 l/s 25.9	06
Groundwater Quali	ty (EC)	% of Are.	а
70 - 300 mS/m		96.85	
300 - 1 000 mS/m		3.15	
Geology		% of Area	Hydrological sign
QUATERNARY		1.74	- 0
Karoo dolerite Suite		23.08	Fractured contact z
BEAUFORT GRP		1 22	barriers to flow. Localised significan
ECCA GRP		72.16	Middle to upper thi
			significance
DWYKA GRP		1.65	Aquiclude
Risk to groundwate	er:	The agricultural catchment.	use of groundwater is
Assumptions and constraints:		Limited grounds	water use in the catch
Level of confidence	<i>*</i>	low	
Implications of usin more/less water:	ng		onditions (low rainfall so low groundwaterco
Discussion on "hot	spots":	None	
Relevant previous v	vork:	SRK, 2006	
increase previous v		0.00, 2000	

Quaternary Catchment:	E24D	
Present Status Category(A	1 <i>-F):</i>	Λ
Desired Water Resource	Category (A-F):	А
Management Class (E	xcellent/Good/Fair):	Excellent
Area: 997 k	2 m ²	
0	Mm³/a	ß
Total Use: 0 Mm Rural:	-	0.0000
Kurai: AgIrrig:	0.0000 <i>Mining:</i> 0.0000 <i>Industry:</i>	0.0000
AgLive:	0.0000 Aquaculture	re: 0.0000
Water Balance: 1.665	Mm ³ /a	A thing
Stress Index: 0	Unstressed or low levels	of stress
EWR low flow requirement	<i>nt:</i> 0.96 M	Im ³ /a
Groundwater available for	<i>use:</i> 0.71Mn	Im ³ /a (adequate)
GW Reserve completed (<i>Y/N):</i> N	Viedenda i ®
Aquifer type and yield	% of Area	
Fractured 0.1 - 0.5 l/s	3.6	
Fractured 0.5 - 2.0 l/s	50.73	Elands Bay
Intergranular& fractured 0.1 0.5 l/s	- 1.43	Citrusda #
Intergranular and fractured 0.5 l/s		
Intergranular and fractured 0.5 l/s		he for the second
Intergranular and fractured 0.5 l/s Intergranular and fractured		
0.5 l/s <i>Groundwater Quality (EC</i>	C) % of Area	ea
70 - 300 mS/m	3.64	
70 - 300 mS/m	66.3	
300 - 1 000 mS/m	30.06	
Geology	% of Area	Hydrological significance
QUATERNARY	17.38	
Karoo dolerite Suite	18.47	Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow.
BEAUFORT GRP	1.83	
ECCA GRP	41.92	significance
DWYKA GRP		Aquiclude
BOKKEVELD GRP	3.33	Little significance, else regolith aquifer
Risk to groundwater:	None - a large ca	catchment
Assumptions and constraints:	Essentially no gr	groundwater use in the catchment.
Level of confidence:	low	
Implications of using more/less water:		conditions (low rainfall/deep groundwater levels/limited presence of so low groundwatercontribution to baseflow.
Discussion on "hot spots	": None	
Relevant previous work:	SRK, 2006	

Quaternary Catchri	ent:	E24	E	
Present Status Cate	gory (A-F):		А
Desired Water Reso	ource Cate	egory (A	-F):	А
Management Class	(Exceli	lent/Good	'/ Fair):	Excellent
Area:	671 km²			
Recharge:	1.2469 M	lm³/a		
Total Use:	0.039 Mi	-		
Rural:		0000	Mining:	0.0000
AgIrrig: AgLive:		0390 0000	Industry: Aquaculture:	0.0000 0.0000
Water Balance:	1.208 Mr		2 191001011.	0.0000
Stress Index:			1 1 1	(stores
		Unstressed	d or low levels oj	
EWR low flow requ			1.576 M	
Groundwater availa				m³/a (none)
GW Reserve comple	eted (Y/N	v):	Ν	
Aquifer type and yie	eld		% of Area	
Fractured 0.1 - 0.5 1/s	;		34.28	
Fractured 0.5 - 2.0 l/s	;		25.08	
Intergranular and frac	tured 0.1 -	- 0.5 l/s	40.64	
Groundwater Quali	tv (EC)		% of Area	
70 - 300 mS/m	5()		22.93	
70 - 300 mS/m			27.89	
300 - 1 000 mS/m			49.18	
Geology			% of Area	Hydrological sign
QUATERNARY			34.98	
Karoo dolerite Suite				Fractured contact z
ECCA GRP				barriers to flow. Middle to upper the
				significance
DWYKA GRP	D			Aquiclude
BOKKEVELD GR	Р		19.45	Little significance, o
Risk to groundwate	T:	Nor	ne	
Assumptions and				
		Esse	entially no gro	oundwater use in the
constraints:		Esse	entially no gro	oundwater use in the
constraints: Level of confidence		Esse		oundwater use in the
Level of confidence Implications of usin	y.	low Unf	avourable cor	nditions (low rainfall
Level of confidence Implications of usin more/less water:	: 1g	low Unf g r ou	avourable cor andwater) - so	
Level of confidence Implications of usin	: 1g	low Unf	avourable cor andwater) - so	nditions (low rainfall

Quaternary Catchr	nent:	E24F	
Present Status Cate	egory (A-F):		А
Desired Water Res	ource Categ	ory (A-F):	А
Management Class	e (Excellen	t/Good/Fair):	Excellent
Area:	582 km²		
Recharge:	1.7163 Mrr		~
Total Use: Rural:	0.004 Mm ² 0.00	-	0.0000
AgIrrig:	0.00	0	0.0000
AgLive:	0.00	000 Aquaculture	re: 0.0000
Water Balance:	1.712 Mm ³	/a	A for the
Stress Index:	0 U	nstressed or low levels	s of stress
EWR low flow requ	virement:	1.07 M	vIm ³ /a
Groundwater availa	able for use:	0.64Mr	Im ³ /a (adequate)
GW Reserve comp	leted (Y/N).	: N	Viedendals Charles
Aquifer type and y	ield	% of Area	
Fractured 0.1 - 0.5 l/	s	0.79	
Fractured 0.5 - 2.0 l/	s	68.67	Elands Bay
Intergranular and fra	ctured 0.1 - 0	0.5 l/s 30.54	Cirrusdais
Groundwater Qual	ity (EC)	% of Are.	rea
70 - 300 mS/m		0.85	HERST STOR
70 - 300 mS/m		76.46	
300 - 1 000 mS/m		22.69	
Geology		% of Area	Hydrological significance
QUATERNARY		21.53	3
Karoo dolerite Suite	2	18.44	Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow.
ECCA GRP		58.84	
DWYKA GRP		0.72	2 Aquiclude
BOKKEVELD GR	P	0.49	D Little significance, else regolith aquifer
Risk to groundwate	er:	None	
Assumptions and constraints:		Essentially no gr	groundwater use in the catchment.
Level of confidence	e:	low	
Implications of usi more/less water:	ng		conditions (low rainfall/deep groundwater levels/limited presence of so low groundwatercontribution to baseflow.
Discussion on "ho	t spots":	None	
Relevant previous	work:	SRK, 2006	

Quaternary Catch	ment:	E24G		
Present Status Cat	egory (A-F):		А	
Desired Water Res	ource Categ	ory (A-F):	А	
Management Class	s (Excellen	nt/Good/Fair):	Excelle	nt
Area:	633 km²			
Recharge:	0.1209 Mm	n³/a		
Total Use:	0 Mm ³ /a	Minima		0.0000
Rural: AgIrrig:	0.00	8		0.0000
AgLive:	0.00	~	%:	0.0000
Water Balance:	0.121 Mm ³	³ /a		
Stress Index:	0 U	Instressed or low levels	of stress	
EWR low flow req	uirement:	1.16 M	m³/a	
Groundwater avail	able for use:	-1.04M	lm³/a (none	e)
GW Reserve comp	leted (Y/N).	: N		
Aquifer type and y	ield	% of Area	1	
Fractured 0.1 - 0.5 l	's	80.79		
Fractured 0.5 - 2.0 l		4.93		
Intergranular and fra				
Ū.				
Groundwater Qua	ity (EC)	% of Area	ı	
70 - 300 mS/m		5.05		
70 - 300 mS/m		80.18		
300 - 1 000 mS/m		14.77		
Geology		% of Area	Hydrolog	gical sign
QUATERNARY		19.87		
Karoo dolerite Suit	2	0.71		d contact z
ECCA GRP		6.72		o upper thi
DWYKA GRP		3.24	significano Aquiclude	
BOKKEVELD GI	ХР	69.46	-	nificance, e
Risk to groundwat	er:	None		
Assumptions and constraints:		Essentially no g	roundwater	use in the
Level of confidence	e:	low		
Implications of us more/less water:	ing	Unfavourable co groundwater) -		
Discussion on "ho	t spots":	None		
Relevant previous	work:	SRK, 2006		

Quaternary Catchment:	E24H	
Present Status Category (A-F):		А
Desired Water Resource Categ	ory (A-F):	А
Management Class (Excellen	t/Good/Fair):	Excellent
<i>Area:</i> 483 km ²		1
Recharge: 0.3017 Mm		
Total Use: 0.008 Mm ² Rural: 0.00		0.0000
AgIrrig: 0.00	ů.	0.0000
AgLive: 0.00		
Water Balance: 0.294 Mm ³	/a	and them?
Stress Index: 0.03 U	nstressed or low levels of	of stress
EWR low flow requirement:	0.56 Mn	m³/a
Groundwater available for use:	-0.27 Mi	Im ³ /a(none)
GW Reserve completed (Y/N).	N N	Vietaenda1*
Aquifer type and yield	% of Area	Lamberts Bay
Fractured 0.0 - 0.1 l/s	1.99	Graafwatere Elands Bay
Fractured 0.1 - 0.5 l/s	38.59	At the sites
Fractured $> 5.0 $ l/s	1.18	Cliriusdal®
Fractured 0.5 - 2.0 l/s	37.16	
Intergranular and fractured 0.1 - 0	0.5 l/s 21.08	REAL
Groundwater Quality (EC)	% of Area	3
70 - 300 mS/m	77.16	
300 - 1 000 mS/m	22.84	
Geology	% of Area	Hydrological significance
QUATERNARY	6.6	
DWYKA GRP	20.2	Aquiclude
WITTEBERG GRP	8.07	Marginal hydrogeological significance
BOKKEVELD GRP	65.14	Little significance, else regolith aquifer
Risk to groundwater:	None	
Assumptions and constraints:	Essentially no gro	oundwater use in the catchment.
Level of confidence:	low	
Implications of using more/less water:		nditions (low rainfall/deep groundwater levels/limited presence of o low groundwatercontribution to baseflow.
Discussion on "hot spots":	None	
Relevant previous work:	SRK, 2006	

Quaternary Catchment:	E24J	
Present Status Category (A-	F):	С
Desired Water Resource Ca	tegory (A-F):	В
Management Class (Exa	ellent/Good/Fair):	Good
<i>Area:</i> 1078 kr		
Recharge: 5.7537		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
<i>Total Use:</i> 1.456 M <i>Rural:</i> (lm ³ /a).0000 <i>Mining:</i>	0.0000
	1.4461 <i>Industry:</i>	0.0000
AgLive: ().0095 Aquacultur	re: 0.0000
Water Balance: 4.298 N	Im³/a	and the
Stress Index: 0.25	Moderate levels of stress	122 May 75
EWR low flow requirement.		
Groundwater available for u	se: 3.06M	m ³ /a (adequate)
GW Reserve completed (Y/	N): N	viedenda is
Aquifer type and yield	% of Area	
Fractured 0.1 - 0.5 l/s	29.27	Lamberts Bay Clanwilliam Graafwaters Elands Bay
Fractured $> 5.0 $ l/s	5.01	Marthal han
Fractured 0.5 - 2.0 l/s	65.73	Circledate Contraction
Groundwater Quality (EC)	% of Are	ea a a a a a a a a a a a a a a a a a a
0 - 70 mS/m	29.99	HT I
70 - 300 mS/m	66.84	~
300 - 1 000 mS/m	3.18	
Geology	% of Area	Hydrological significance
DWYKA GRP	0.29	Aquiclude
WITTEBERG GRP	1.24	Marginal hydrogeological significance
BOKKEVELD GRP	68.93	Little significance, else regolith aquifer
TABLE MOUNTAIN GRP	29.54	Major fractured rock/secondary aquifer system.
Risk to groundwater:	The agricultural a Class B catchi	l use of groundwater is probably over-estimated - this is more ment.
Assumptions and constraints:		in the west is probably more dryland farming, some centre pivots adjacent roundwater probably used mainly in summer.
Level of confidence:	low	
Implications of using more/less water:		conditions (low rainfall/deep groundwater levels/limited presence of so low groundwatercontribution to baseflow.
Discussion on "hot spots":	None	
Relevant previous work:	SRK, 2006	

Quaternary Catch	ment: I	E24K	
Present Status Cat	egory (A-F):		А
Desired Water Res	source Catego	ory (A-F):	А
Management Clas	s (Excellent	t/Good/Fair):	Excellent
Area:	652 km ²	2.1	
Recharge:	0.6656 Mm	°/a	
<i>Total Use:</i> Rural:	0 Mm³/a	00 Mining:	0.0000
AgIrrig:	0.00	0	0.0000
AgLive:	0.00	00 Aquaculture:	0.0000
Water Balance:	0.666 Mm ³ ,	/a	
Stress Index:	0 U	nstressed or low levels o	f stress
EWR low flow req		0.75 Mr	
Groundwater avail	lable for use:	-0.08Mr	m³/a(none)
GW Reserve comp	leted (Y/N):	Ν	
Aquifer type and y	ield	% of Area	
Fractured 0.1 - 0.5 l,	/s	95.32	
Fractured 0.5 - 2.0 l	/s	0.38	
Fractured 0.5 - 2.0 l	/s	4.27	
Intergranular and fra 0.5 l/s	actured 0.1 -	0.02	
Groundwater Qua	lity (EC)	% of Area	l
0 - 70 mS/m		48.28	
70 - 300 mS/m		0.37	
70 - 300 mS/m		22.91	
300 - 1 000 mS/m		28.44	
Geology		% of Area	Hydrological sign
Karoo dolerite Suit	e	0.7	Fractured contact
ECCA GRP		1.85	barriers to flow. Middle to upper th
DWYKA GRP		27 43	significance Aquiclude
BOKKEVELD GI	RP	21.45	Little significance,
TABLE MOUNT		48.19	Major fractured ro
Risk to groundwal	ter:	None	
Assumptions and constraints:		Essentially no gro	oundwater use in th
Level of confidence	e:	low	
Implications of us more/less water:	ing		nditions (low rainfa o low groundwaterc
Discussion on "he	ot spots":	None	
Relevant previous	work:	SRK, 2006	

Quaternary Catchri	nent:	524L		
Present Status Cate	gory (A-F):		С	
Desired Water Res	ource Catego	ory (A-F):	В	
Management Class	(Excellent	t/Good/Fair):	Good	
Area: Recharge:	516 km² 6.6738 Mm	³ /a		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Total Use: Rural: AgIrrig: AgLive:	2.43 Mm ³ / 0.00 2.00 0.00	00 Mining: 90 Industry: 78 Aquaculture	0.0000 0.0000 : 0.0000	555
Water Balance:	4.244 Mm ³			Very I Marsh
Stress Index: EWR low flow requ Groundwater avail:	virement:	oderate levels of stress 1.014 M 3.23Mr	Im³/a n³/a (adequate)	Nieuwbultvillis* Calvinia Vredenijaji*
GW Reserve comp	leted (Y/N):	Ν		The shares
Aquifer type and y	eld	% of Area		Lamberts Bay
Fractured 0.1 - 0.5 l/	s	0.92		Graafwatere Elands Bay
Fractured 0.5 - 2.0 l/	s	99.08		Citrusdatis City
Groundwater Qual	ity (EC)	% of Are.	a	South the
0 - 70 mS/m		89.53		YP2 CM
70 - 300 mS/m		10.47		Verene
Geology		% of Area	Hydrological signif	icance
BOKKEVELD GR	P	12.27	Little significance, els	e regolith aquifer
TABLE MOUNTA	IN GRP	87.73	Major fractured rock	/secondary aquifer system.
Risk to groundwate	er:	Very limited		
Assumptions and constraints:		A few centre piv	ots in the catchment -	groundwater probably used extensively in summer
Level of confidence	27	low		
Implications of usi more/less water:	ng			
Discussion on "ho	t spots":	None		
Relevant previous	work:	SRK, 2006		

Quaternary Catchment: E24L

Quaternary Catchn	nent:	E24M	1								
Present Status Cate	gory (A-	F):		А							
Desired Water Reso	ource Ca	tegory (A-F):	А							
Management Class	(Exce	ellent/Good/F	Fair):	Excellent							
Area:	529 km ²	2								r	5
Recharge:	2.7315 1						P.	_	~	~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Total Use: Rural:	0.004 M		M::		0.0000		{				2
Kurai: AgIrrig:			Mining: Industry:).0000		K	~	\sim	-35	25
AgLive:			Aquaculture.		0.0000		ST	52	2	Là	La
Water Balance:	2.728 M	lm³/a				na	son?	2	/	14	1th
Stress Index:	0	Unstressed o	r low levels o	of stress		1 hol	man-	1	3	2m	and a
EWR low flow requ	irement:	,	0.71 M	m³/a		1-	Nie Nie	euwou	dtvil	dtville	aroning -
Groundwater availa	ble for u	se:	2.02Mn	n³/a(minimal)	X	125	r	~	47	Calv
GW Reserve completed (Y/N):		N):	Ν			Vře	edendal*			255	JAV
Aquifer type and yi	eld		% of Area			Lamberts B	Bay Graafwater	for	2	5	53
Fractured 0.1 - 0.5 l/s	5		53.12			Elands I		Y	CI	Clanwilliam	Clanwilliam
Fractured 0.5 - 2.0 1/s	8		46.88				18	Citrus	dan	J. F	1. Fr
Groundwater Quali	ty (EC)		% of Area	2		2	[]~~	~	~	th	HE!
0 - 70 mS/m			94.1							H	The
70 - 300 mS/m			2.55							V	build
70 - 300 mS/m			3.35								
Geology		%	of Area	Hydrologic	cal signit	ficance					
BOKKEVELD GR	Р		2.01	Little signif	icance, el	se regolith aq	quifer				
TABLE MOUNTA	IN GRP		95.48	Major fract	ured rock	/secondary a	aquifer s	systen	n.	ı.	1.
VANRHYNSDORI	P GRP		2.51	Impermeab	ole aquiclu	ıde					
Risk to groundwate	er:	None									
Assumptions and constraints:		Essen	tially no gr	oundwater u	se in the o	catchment.					
Level of confidence	v	mediu	m								
Implications of usin more/less water:	ng					deep ground atribution to l			ir	imited	imited prese
Discussion on "hot	spots":	None									
Relevant previous v	vork:	SRK, 2	2006								

Quaternary Catch	ment:	E31A	
Present Status Ca	tegory (A-F):		А
Desired Water Re	source Catego	ory (A-F):	А
Management Clas	ss (Excellent	t/Good/Fair):	Excellent
Area:	2865 km²	- /	
Recharge:	0.0233 Mm	3/a	
Total Use: Rural:	0 Mm³/a	00 Mining:	0.0
AgIrrig:	0.00	8	0.0
AgLive:	0.00	00 Aquacultur	e: 0.0
Water Balance:	0.023 Mm ³	/a	
Stress Index:	0 U	nstressed or low levels	of stress
EWR low flow req	quirement:	0.021	Mm³/a
Groundwater avai	ilable for use:	0.00 N	[m³/a (none)
GW Reserve com	oleted (Y/N):	Ν	
Aquifer type and	vield	% of Area	2
Fractured 0.1 - 0.5 I	/s	49.	5
Intergranular and fr	actured 0.1 - 0.	.5 l/s 49.4	42
Intergranular and fr	actured 0.5 - 2	.0 l/s 1.0	7
Groundwater Qua	dity (EC)	% of Are	'a
300 - 1 000 mS/m		88.11	
> 1 000 mS/m		11.89	
Geology		% of Area	Hydrologica
QUATERNARY		55.39	
Karoo dolerite Sui	te	1.39	Fractured cos
ECCA GRP		8.61	barriers to flo Middle to up significance
DWYKA GRP		33.33	Aquiclude
SPEKTAKEL Sui	te	0.21	
HOOGOOR Suite	2	0.15	
OKIEP GRP		0.68	
Unnamed Granite	Gneiss	0.06	
Risk to groundwa	ter:	None (the most	northern catch
Assumptions and constraints:		Essentially no g	roundwater use
Level of confident	ce:	low	
Implications of us more/less water:	sing	Unfavourable c groundwater) -	
Discussion on "h	ot spots":	None	
Relevant previous	work:	SRK, 2006	

		-		
Present Status Cal		() () () () () () () () () ()		A
Desired Water Re				A
Management Clas		ellent/Good/Fair):		Excellent
Area:	1476 kr			
Recharge:	0.6397			
Total Use: Rural:	0 Mm ³	/a).0000 <i>Mining</i>	7 •	0.0000
AgIrrig:		0.0000 Industr	·	0.0000
AgLive:	(0.0000 Aquac	ulture:	0.0000
Water Balance:	0.64 Mr	m³/a		
Stress Index:	0	Unstressed or low l	levels of st	ress
EWR low flow req	uirement:	. 0.0	088 Mm	³ /a
Groundwater avai	ilable for u	se: 0.5	55 Mm³/	/a(minimal)
GW Reserve comp	pleted (Y/	(N): N		
Aquifer type and y	vield	% of	Area	
Fractured 0.1 - 0.5 l	/s	23.	79	
Fractured 0.5 - 2.0 l	l/s	64.	47	
Intergranular and fr	actured 0.1	- 0.5 l/s 11.	76	
Groundwater Qua	ulity (EC)	% 01	Area	
70 - 300 mS/m		76	.11	
300 - 1 000 mS/m		23	.89	
Geology		% of A	rea H	ydrological signii
QUATERNARY			7.98	
Karoo dolerite Sui	te	11		ractured contact zo
ECCA GRP		79	9.95 M	rriers to flow. fiddle to upper thir gnificance
Risk to groundwa	ter:	None	315	mineance
Assumptions and constraints:		Essentially	no groui	ndwater use in the
Level of confident	ce:	low		
Implications of us more/less water:	sing			itions (low rainfall/ ow groundwatercom
Discussion on "he	ot spots":	None		
Relevant previous	work:	SRK, 2006		
r		,		

Quaternary Catchment: E31B

Present Status Ca			А	
Desired Water Re	Ű		А	
Management Clas		t/Good/Fair):	Excellent	
Area:	1572 km ²	2 /		
Recharge:	0.0117 Mm	°/a		
Total Use: Rural:	0 Mm³/a	00 Mining:	ſ	0.0000
Kurai: AgIrrig:	0.000	8		.0000
AgLive:	0.000			0.0000
Water Balance:	0.012 Mm ³ /	/a		
Stress Index:	0 U	nstressed or low levels	of stress	
EWR low flow red		0.093 N	5	
Groundwater avai		-0.08 (r		
GW Reserve com	pleted (Y/N):	N	,	
Aquifer type and		% of Area		
Fractured 0.1 - 0.5 l		69.9		
Fractured 0.5 - 2.0 I		11.7		
Intergranular and fi				
Groundwater Qua	ulity (EC)	% of Area	a	
70 - 300 mS/m		10.14		
300 - 1 000 mS/m		89.86		
Geology		% of Area	Hydrologic	al signifi
QUATERNARY		7.8		
Karoo dolerite Sui	te	13.69	Fractured co	
ECCA GRP		63.41	barriers to fl Middle to u	
			significance	per unit
DWYKA GRP			Aquiclude	
Unnamed Granite	Gneiss	4.77		
Risk to groundwa	ter:	None		
Assumptions and constraints:		Essentially no gr	oundwater us	e in the c
Level of confident	ce:	low		
Implications of us more/less water:	sing	Unfavourable co groundwater) - s		
Discussion on "h	ot spots":	None		
Relevant previous		SRK, 2006		

Quaternary Catchment: E31C

Quaternary Catchr	nent:	E31D	
Present Status Cate	egory (A-F):	A	1
Desired Water Res	ource Categ	<i>gory (A-F):</i> A	1
Management Class	s (Exceller	nt/Good/Fair): I	Excellent
Area:	839 km²		
Recharge:	0.0001 Mn	n³/a	
Total Use:	0 Mm ³ /a		
Rural:	0.0000	Mining:	0.0000
AgIrrig:	0.0000	Industry:	0.0000
AgLive:	0.0000	Aquaculture:	0.0000
Water Balance:	$0 \mathrm{Mm^3/a}$		
Stress Index:	0 U	Instressed or low levels of str	ess
EWR low flow requ	uirement:	0.049 Mm ³	/a
Groundwater avail	able for use:	-0.05 Mm ³ /	'a (none)
GW Reserve comp.	leted (Y/N)	: Y	
Aquifer type and y		% of Area	ı
Fractured 0.1 - 0.5 1/		35	
Intergranular and fra	ctured 0.1 - (0.5 l/s 65	
Groundwater Qual	ity (EC)	% of Are	ea
300 - 1 000 mS/m		100	

Geology	% of Area	Hydrological significance
QUATERNARY	51.76	
Karoo dolerite Suite	3.4	Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow.
ECCA GRP	24.86	Middle to upper thin sandstone strata may have greater hydrogeological significance
DWYKA GRP	10.41	Aquiclude
OKIEP GRP	0.03	
Unnamed Granite Gneiss	9.55	
Risk to groundwater:	None	
Assumptions and constraints:	Essentially no gr	oundwater use in the catchment.
Level of confidence:	low	
Implications of using more/less water:		nditions (low rainfall/deep groundwater levels/limited presence of 0 low groundwatercontribution to baseflow.
Discussion on "hot spots":	None	
Relevant previous work:	SRK, 2006	

Quaternary Catchment:	EJIE	
Present Status Category (A-F));	А
Desired Water Resource Cate	gory (A-F):	А
Management Class (Excelle	ent/Good/Fair):	Excellent
<i>Area:</i> 478 km ²		5
Recharge: 0.0001 Mr	m³/a	~~~~ {
Total Use: 0 Mm ³ /a		
Rural: 0.0000	Mining:	0.0000
AgIrrig: 0.0000 AgLive: 0.0000	Industry: Aquaculture.	2: 0.0000
Water Balance: 0 Mm ³ /a	z-iquaauure.	
	T	Cardo Martin
	Unstressed or low levels of	and I among a
EWR low flow requirement:	0.029 N	VIII"/a
Groundwater available for use		Im ³ /a(none)
GW Reserve completed (Y/N)): Y	1 Kotal
Aquifer type and yield	% of 1	Area Lamberts Bay Graatwatera Chanwilliam
Fractured 0.1 - 0.5 l/s	38.	.98 Elands Bay
Intergranular and fractured 0.1 -	0.5 l/s 61.	.02 Schrisseda *
Groundwater Quality (EC)	% of	(Area
300 - 1 000 mS/m		
500 - 1 000 m3/ m	10	Which
Geology	% of Area	Hydrological significance
QUATERNARY	10.77	
Karoo dolerite Suite	20.67	Fractured contact zones and metamorphic aureoles serve as aquifers. Also
ECCA GRP	17.66	barriers to flow. Middle to upper thin sandstone strata may have greater hydrogeological
DWYKA GRP	21.12	significance Aquiclude
Unnamed Granite Gneiss	29.78	
Risk to groundwater:	None	
Assumptions and constraints:	Essentially no gr	roundwater use in the catchment.
Level of confidence:	medium	
Implications of using more/less water:		onditions (low rainfall/deep groundwater levels/limited presence of so low groundwatercontribution to baseflow.
Discussion on "hot spots":	None	
Relevant previous work:	SRK, 2006	

Quaternary Catchment: E31E

Quaternary Catchn	nent: L	.31F			
Present Status Cate	gory(A-F):		А		
Desired Water Reso	ource Catego.	ry (A-F):	А		
Management Class	(Excellent/	Good/Fair):	Excellent		
Area:	525 km²				
Recharge:	0.0006 Mm ³	/a			
Total Use:	0 Mm ³ /a				r
Rural:	0.0000	Mining:	0.0000		3
AgIrrig:	0.0000	Industry:	0.0000		X
AgLive:	0.0000	Aquaculture:	0.0000		R
Water Balance:	0.001 Mm ³ /			nas	25
Stress Index:		stressed or low levels o	t stress	1 fortas	2
EWR low flow requ		0.029		1-4	Nieuwoud
Groundwater availa	able for use:	-0.03 M	m³/a (none)	\checkmark	Lor
GW Reserve comple	eted (Y/N):	Ν		Vredend	1all
Aquifer type and yi	eld	% of A	rea	}	K
Fractured 0.1 - 0.5 l/s	s	45.0	58	Lamberts Bay Graafy Elands Bay	water &
Fractured 0.5 - 2.0 1/s	s	4.7	6	Elands Bay	The
Intergranular and frac	ctured 0.1 - 0.5	5 l/s 49.	56	L	Citrusd
Groundwater Quali	ity (EC)	% of	Area	~	- AL
70 - 300 mS/m		40.0			
300 - 1 000 mS/m		59.9	91		
Geology		% of Area	Hydrological sig	nificance	
QUATERNARY		44.37			
Karoo dolerite Suite		10.94		zones and metamo	o r phic au
ECCA GRP		30.85		nin sandstone strat	ta may ha
DWYKA GRP		13.15	significance Aquiclude		
Unnamed Granite G	neiss	0.7			
Risk to groundwate	er:	None			
Assumptions and constraints:		Essentially no gro	oundwater use in the	e catchment.	
Level of confidence	ar -	medium			
Implications of usin more/less water:	ng		nditions (low rainfal) low groundwaterce		
Discussion on "hot	t spots":	None			
Relevant previous v	vork:	SRK, 2006			

Quaternary Catch	nent:	E31	G		
Present Status Cat	egory (A-F	<i>):</i>		А	
Desired Water Res	ource Cate	egory (A	-F):	А	
Management Class	s (Excel	lent/Good	l/Fair):	Excelle	nt
Area:	1238 km				
Recharge:	0.0039 N				
<i>Total Use:</i> Rural:	0.003 M	m³/a	Minimu		0.0000
Kurai: AgIrrig:	0.0000 0.0000		Mining: Industry:		0.0000 0.0000
AgLive:	0.0027		Aquaculture:	•	0.0000
Water Balance:	0.001 Mr	m³/a			
Stress Index:	0.69	Unstresse	d or low levels o	of stress	
EWR low flow req	uirement:		0.073 N	ſm³/a	
Groundwater avail	able for us	e:	-0.07 M	lm³/a(none	2)
GW Reserve comp	leted (Y/N	v) :	Ν		
Aquifer type and y	ield		% of 1	Area	
Fractured 0.1 - 0.5 l/	's		39.	04	
Intergranular and fra	ctured 0.1	- 0.5 l/s	46.	05	
Intergranular and fra	ctured 0.5	- 2.0 l/s	14.	91	
Groundwater Qual	lity (EC)		% of	Area	
300 - 1 000 mS/m			10	00	
Geology			% of Area	Hydrolo	gical sign
QUATERNARY			24.1		
ECCA GRP			24.29	Middle t	o upper th
DWYKA GRP			14	significar Aquiclud	
SPEKTAKEL Suit	e		8.07	1 quicidu	
LITTLE NAMAQ		Suite	1.6		
HOOGOOR Suite		oune	5.1		
OKIEP GRP			22.84		
		_			_
Risk to groundwat	er:		e agricultural (chment.	use of grou	indwater is
Assumptions and constraints:		Lim	nited groundw	vater use in	the catch
Level of confidenc	е:	mec	lium		
Implications of use more/less water:	ing		favourable co undwater) - se		
Discussion on "ho	ot spots":	Nor	ne		
Relevant previous	work	SB P	<, 2006		
Relevant previous	WOIK.	SIL	x , 2000		

Quaternary Catchine	ent:	23111	
Present Status Categ	gory (A-F):		F
Desired Water Resor	urce Catego	ory (A-F):	D
Management Class	(Excellent	/Good/Fair):	Fair
Area:	726 km ²		
Recharge:	0.0046 Mm ³		6
	0.001 Mm³	a Mining:	0.0000
AgIrrig:	0.0000	Industry:	0.0000
AgLive:	0.0012	Aquaculture:	
Water Balance:	0.003 Mm ³ /	'a	A harry
Stress Index:	0.26 Me	oderate levels of stress	Contra Contra
EWR low flow requi	irement:	0.043 N	Mm ³ /a
Groundwater availab	ble for use:	-0.04 M	Im ³ /a (none) Nieuwoudtvills * Calvinia *
GW Reserve complete	eted (Y/N):	Ν	Viedenda i*
Aquifer type and yie	ld	% of 1	Area
Fractured 0.1 - 0.5 l/s		30.	.23 Lamberts Bay Graatwaters Clanvillam
Intergranular and fract	tured 0.1 - 0.	5 l/s 69.	
Groundwater Quality	y (EC)	% of	Area
70 - 300 mS/m		0.0	
300 - 1 000 mS/m		99.	.96
Geology		% of Area	Hydrological significance
QUATERNARY		48.35	
ECCA GRP		2.33	Middle to upper thin sandstone strata may have greater hydrogeological
DWYKA GRP		12.58	significance Aquiclude
VANRHYNSDORP	GRP	15.46	Impermeable aquiclude
SPEKTAKEL Suite		0.78	
HOOGOOR Suite		1.67	
OKIEP GRP		5.36	
Unnamed Granite Gr	neiss	13.48	
Risk to groundwater	er.	Very low	
Assumptions and constraints:		Limited groundw	water use in the catchment.
Level of confidence:		medium	
Implications of using more/less water:	g		onditions (low rainfall/deep groundwater levels/limited presence of so low groundwatercontribution to baseflow.
Discussion on "hot s	spots":	None	
Relevant previous w	ork:	SRK, 2006	

Quaternary Catch	ment:	E32A		
Present Status Cat	egory (A-F):		А	
Desired Water Res	ource Categ	ory (A-F):	А	
Management Class	s (Excellen	t/Good/Fair):	Excellent	
Area:	1118 km²			
Recharge:	4.2423 Mm	n³/a		
Total Use:	2.159 Mm ³	•		
Rural:	0.0000	Mining: In dustra		0.0000
AgIrrig: AgLive:	2.1590 0.0000	Industry: Aquaculturi		0.0000
Water Balance:	2.083 Mm ³	*	. 0	
Stress Index:		nstressed or low levels	of stress	
EWR low flow req			Mm³/a	
Groundwater avail			[m³/a (adequa	te)
GW Reserve comp	leted (Y/N).	· N	× 1	,
Aquifer type and y	ield	% of	Area	
Fractured 0.5 - 2.0 l	/s	6	8.2	
Intergranular and fra	actured 0.1 - 0	0.5 l/s 3	1.8	
Groundwater Qua	lity (EC)	% 01	f Area	
70 - 300 mS/m		1	00	
Geology		% of Area	Hydrologi	cal sign
Karoo dolerite Suit	e	33.92	Fractured of	
ECCA GRP		65.84	barriers to f Middle to u significance	upper thi
Risk to groundwat	er:	The agricultural catchment.	use of ground	lwater is
Assumptions and constraints:		Limited ground	water use in th	ie catchn
Level of confidence	e:	medium		
Implications of us more/less water:	ing	Unfavourable co groundwater) - s		
Discussion on "ho	ot spots":	None		
Relevant previous	work:	SRK, 2006		

Present Status Cutegory (A-F):FDescription Water Resource Category (A-F):DManagement Class(Exadinat/Gody/Erit):Fai:Area:(Exadinat/Gody/Erit):Fai:Area:(2)(Exadinat/Gody/Erit):Management Class(Exadinat/Gody/Erit):Fai:Area:(2)(Exadinat/Gody/Erit):Management Class(Exadination):(0)Maring:(0)(0)Alphacathar:(0)(0)Alphacathar:(0)(0)Alphacathar:(0)(0)Alphacathar:(2)(0)Conducater available for use:(2)(1)Conducater available for use:(2)(1)Fractured 0.1 - 0.51/s8.61(1)Fractured 0.1 - 0.51/s9.076Sou on MS/m9.076Sou on MS/m9.24CologySol AlexaFractured 0.1 - 0.51/s8.61Fractured 0.1 -	Quaternary Catchment:	EJZD	
Management Class(Fixed/Food/Fair);FairArray:828 km²Array:828 km²Array:11/14 Mm²/aDial Use:33770Banki00000Agling:0.0000Agling:33770Inhatory:0.0000Agling:33770Allance:220 Mm²/aCondowner available for use:-2.56 Mm²/aGroundwater available for use:-2.56 Mm²/a(none)Groundwater available for use:-2.56 Mm²/a(none)Fractured 0.1 - 0.51/s8.61Pactured 0.1 - 0.51/s14.5Condowner Quality (EC)*of AreaOu otoo ms/m9.076Stort Mark Karea15.14Fractured 0.1 - 0.51/s14.5Condowner Quality (EC)*of AreaDu otoo ms/m9.24Mark Carea7.7Mark Carea7.8Aguitude:15.14Fractured to the upper thin sandstone strata may have greater hydrogeologicalSegnificance15.14Particle Carea7.88Aguitude:Mark Mark Acue of groundwater is over-estimated - this appears 16Carea (Fractioner Mark Chreat (Fractioner Chreat (Frac	Present Status Category (A-F):		F
Area: 828 km² Recharge: 1.1174 Mm³/a Total Use: 3.377 Mm³/a Bornd: 0.0000 Agiring: 3.370 Jamach 0.0000 Agiring: 3.370 Jamach 0.0000 Water Balance: -226 Mm³/a Erress Indax: 3.02 Criticallytoresod EWR low flow requirement: 0.297 Mm³/a Groundwater available for use: -2.56 Mm³/a(none) CW Reserve completed (Y/N): N Aguifer type and yield % of Area Yoo 300 mS/m 90.76 300 - 1 000 mS/m 92.4 Cology % of Area Yoo fArea Myriodical significance Caroondwater Quality (EC) % of Area Yoo 300 mS/m 90.76 300 - 1 000 mS/m 92.4 Cacogy % of Area To adjoinerie Suite 15.14 Fractured contact cones and metamorphic aureoles serve as aquifers. Also barriers to flow. ECCA GRP 7.88 Aquidude Mist ogroundwater tress index so high?	Desired Water Resource Categ	ory (A-F):	D
Recharge: 1.1174 Mm²/a Rund: 0.0000 Mining: 0.0000 Agling: 3.377 Mm²/a Rund: 0.0000 Aluna: 0.0000 Agline: 0.0000 Aguaultare: 0.0000 Agline: 0.0000 Aguaultare: 0.0000 Agline: 0.022 Crinkullytrested EWR low flow requirement: 0.297 Mm³/a Groundwater available for use: -2.26 Mm³/a Groundwater available for use: -2.26 Mm³/a Fractured 0.1 - 0.5 1/s 8.61 Fractured 0.1 - 0.5 1/s 8.61 Fractured 0.1 - 0.5 1/s 14.5 Groundwater Quality (EC) % of Area 70 - 300 mS/m 90.76 300 - 1 000 mS/m 92.4 Geology % of Area You for thy flow logical significance Karoo dolerite Suite 15.14 Fractured 0.1 - 0.5 1/s 2.8 Quity (EC) % of Area You for thy flow logical significance 3.6 Karoo dolerite Suite 15.14 Fractured contact zones and metamorphic aureoles serve as aquifers. Also Barificance <th>Management Class (Excellen</th> <th>t/Good/Fair):</th> <th>Fair</th>	Management Class (Excellen	t/Good/Fair):	Fair
Total Use:3.377 Mm³/aRunk:0.0000Mining:0.0000Agling:3.3770Indutity:0.0000Agling:0.0000Aguaulture:0.0000Water Balance:-2.26 Mm³/aStress Index:3.02CriticallystresedEWR low flow requirement:0.297 Mm³/aGroundwater available for use:-2.56 Mm³/a(none)OW Reserve completed (Y/N):NAguifer type and yield% of AreaFractured 0.1 - 0.51/s8.61Fractured 0.1 - 0.51/s14.5Groundwater Quality (EC)% of Area70 - 300 mS/m9.24Ceology% of AreaMy On S/m9.24Ceology% of AreaMiddle to upper thin sandstone strata may have greater hydrogeologicalSignificanceSignificanceDWKA GRP7.88AquidudeMiddle to groundwater is over-estimated - this appears a Cass A catchment. This must be assessed in more detail. Why is the Cassion on "Inot spots":New Point Significance:Sumptions and Constraints:Evel of confidence:medicalMater of confidence:Mater of confidence:	<i>Area:</i> 828 km ²		
Rand: 0.0000 Mining: 0.0000 Agl.in: 0.0000 Agnaachure: 0.0000 Water Balance: -2.26 Mm³/a	Recharge: 1.1174 Mm	n³/a	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Aging:3.3770Indity:0.0000Aguaculture:0.0000Waters Blance:2.26 Mm³/a!Stress Index:3.02CriticallystressedEWR low flow requirement:0.297 Mm³/aGroundwater available for use:-2.56 Mm³/a(none).GW Reserve completed (V/N):NAquifer type and yield% of AreaFractured 0.1 - 0.51/s8.61Fractured 0.1 - 0.51/s14.5Groundwater Quality (EC)% of Area70 - 300 mS/m90.76300 - 1 000 mS/m9.24Geology% of AreaMulde to upper thin sandstone strate may have greater hydrogeological significanceDWYKA GRP7.88AquieludeKik to groundwaterThe agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the Egroundwater stress index so high?Level of confidence:mediumLevel of confidence:mediumMick to groundwater stress index so high?Level of confidence:mediumIndications of using implications of using: implications of using: implications of using: implications on using: implications of using: implications on using: <b< th=""><th></th><th></th><th></th></b<>			
Agila:0.000Aquacular:0.000Water Balance:2.26 Mm'/aStress Index:3.02CriticallystresselEWEN:3.02CriticallystresselEWEN:3.02CriticallystresselEWEN:0.297 Mm'/aGroundwater available for use:-2.56 Mm'/a(none)GW Reserve completed (V/N):NAquifer type and yield% of AreaFractured 0.1 - 0.51/s8.61Fractured 0.1 - 0.51/s14.5Goundwater Quality (EC)% of Area70 - 300 mS/m90.76300 - 1 000 mS/m9.24Ceology% of AreaMarcine Contact zones and metamorphic aureoles serve as aquifers. Also barries to flow.ECCA GRP7.88AquicludeKaroo dolerite Suite15.14Crace of groundwater groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the Barries to flow.DWYKA GRP7.88AquicludeKik to groundwater is constraines:Level of confidence:mediumMinited groundwater use in the catchment. Groundwater stress index so high?Level of confidence:mediumMinited groundwater use in the catchment. Groundwater stress index so high?Level of confidence:mediumMinited provumble conditions (low rainfall/deep groundwater levels/limited presence of groundwater. groundwater. or so low groundwater constrained.Level of confidence:mediumMinited prosence?joo were groundwater. groundwater. </th <th></th> <th>0</th> <th>Sand I</th>		0	Sand I
Water Balance:2.26 Mm ³ /aStress Index:3.02CriticallystressedEWR low flow requirement:0.297 Mm ³ /aGroundwater available for use:-2.56 Mm ³ /a(none).GW Reserve completed (Y/N):NAquifer type and yield% of AreaFractured 0.1 - 0.51/s8.61Fractured 0.1 - 0.51/s14.5Goundwater Quality (EC)% of Area70 - 300 mS/m9.076300 - 1 000 mS/m9.24Ceclogy% of AreaMyrole Rate:15.14Fractured 0.1 - 0.51/s14.5Condowater Quality (EC)% of Area70 - 300 mS/m9.076300 - 1 000 mS/m9.24Ceclogy% of AreaMyrole Bulket15.14Fractured Contact zones and metamorphic aureoles serve as aquifers. Also Barriers to flow.ECCA GRP7.88AquidudeMixet A generalization of the support this analysione strata may have greater hydrogeological significance:Mixet A generalization of the support this must be assessed in more detail. Why is the agent alse so high?Mixet A generalizations of groundwater is over-estimated - this appears a Chass A catchment: This must be assessed in more detail. Why is the ageneralizet so high?Cevel of confidence:mediumMixet of confidence:<	0 0	~	
EWR low flow requirement: 0.27 Mm ³ /a Groundwater available for use: -2.56 Mm ³ /a(none). GW Reserve completed (Y/N): N Aquifer type and yield % of Area Fractured 0.1 - 0.51/s 8.61 Fractured 0.1 - 0.51/s 76.89 Intergranular and fractured 0.1 - 0.51/s 14.5 Groundwater Quality (EC) % of Area 70 - 300 mS/m 90.76 300 - 1 000 mS/m 9.24 Geology % of Area Karoo dolerite Suite 15.14 Fractured 0.7 70 Middle to groundwater is ones and metamorphic aureoles serve as aquifers. Also barriers to flow. ECCA GRP 7.88 Quivika GRP 7.88 Aquiclude Risk to groundwater: The agricultural use of groundwater is over-estimated - this appears a groundwater stress index so high? Assumptions and confidence: medium Level of confidence: medium Implications of using media conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwater contribution to baseflow. Discussion on "hot spots": None	Ŭ.		A thing
Groundwater available for use: -2.56 Mm³/a(none) GW Reserve completed (Y/N): N Aquifer type and yield % of Area Fractured 0.1 - 0.51/s 8.61 Fractured 0.5 - 2.01/s 76.89 Intergranular and fractured 0.1 - 0.51/s 14.5 Groundwater Quality (EC) % of Area 70 - 300 mS/m 90.76 300 - 1 000 mS/m 9.24 Geology % of Area Karoo dolerite Suite 15.14 Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow. ECCA GRP 77 DWYKA GRP 7.88 Aquiclude Aquiclude Risk to groundwater: The agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high? Assumptions and constraints: Limited groundwater use in the catchment. Level of confidence: nedium Implications of using more/less water: Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwater levels/limited presence of groundwater so low groundwater levels/limited presence of groundwater so low groundwater levels/limited presence of groundwater) - so low groundwater levels/limited presence of ground	Stress Index: 3.02 C	riticallystressed	Con Maria
Groundwater available for use: -2.56 Mm³/a(none) GW Reserve completed (Y/N): N Aquifer type and yield % of Area Fractured 0.1 - 0.51/s 8.61 Fractured 0.5 - 2.01/s 76.89 Intergranular and fractured 0.1 - 0.51/s 14.5 Groundwater Quality (EC) % of Area 70 - 300 mS/m 90.76 300 - 1 000 mS/m 9.24 Geology % of Area Hydrological significance Karoo dolerite Suite 15.14 Fractured on Prace 15.14 Fractured on Wide to upper thin sandstone strata may have greater hydrogeological significance DWYKA GRP 7.88 Assumptions and constraints: Limited groundwater use in the catchment. Level of confidence: medium Implications of using more/less water: Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwater levels/limited presence of groundwater points on baseflow.	EWR low flow requirement:	0.297 N	
Aquifer type and yield % of Area Fractured 0.1 - 0.51/s 8.61 Fractured 0.5 - 2.01/s 76.89 Intergranular and fractured 0.1 - 0.51/s 14.5 Groundwater Quality (EC) % of Area 70 - 300 mS/m 90.76 300 - 1 000 mS/m 9.24 Geology % of Area Karoo dolerite Suite 15.14 Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow. ECCA GRP 77 Middle to upper thin sandstone strata may have greater hydrogeological significance DWYKA GRP 7.88 Assumptions and constraints: Limited groundwater stress index so high? Assumptions and constraints: Limited groundwater use in the catchment. Implications of using more/less water: Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwater contribution to baseflow. Discussion on "hot spots": None	Groundwater available for use:	-2.56 M	
Fractured 0.1 - 0.51/s 8.61 Fractured 0.5 - 2.01/s 76.89 Intergranular and fractured 0.1 - 0.51/s 14.5 Groundwater Quality (EC) % of Area 70 - 300 mS/m 90.76 300 - 1 000 mS/m 9.24 Geology % of Area Karoo dolerite Suite 15.14 Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow. ECCA GRP 77 Middle to upper thin sandstone strata may have greater hydrogeological significance DWYKA GRP 7.88 Aquiclude Risk to groundwater: The agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high? Assumptions and constraints: Limited groundwater use in the catchment. Level of confidence: medium Implications of using more/less water: Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwatercontribution to baseflow. Discussion on "hot spots": None	GW Reserve completed (Y/N).	: N	Viedendal*
Fractured 0.1 - 0.51/s 8.61 Fractured 0.5 - 2.01/s 76.89 Intergranular and fractured 0.1 - 0.51/s 14.5 Groundwater Quality (EC) % of Area 70 - 300 mS/m 90.76 300 - 1 000 mS/m 9.24 Geology % of Area Hydrological significance Karoo dolerite Suite 15.14 Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow. ECCA GRP 77 DWYKA GRP 7.88 Aquiclude The agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high? Assumptions and constraints: Limited groundwater use in the catchment. Level of confidence: medium Implications of using more/less water: Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwater contribution to baseflow. Discussion on "hot spots": None	Aquifer type and yield	% of A	
Fractured 0.5 - 2.01/s 76.89 Intergranular and fractured 0.1 - 0.51/s 14.5 Groundwater Quality (EC) % of Area 70 - 300 mS/m 90.76 300 - 1 000 mS/m 9.24 Geology % of Area Karoo dolerite Suite 15.14 Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow. ECCA GRP 77 Middle to upper thin sandstone strata may have greater hydrogeological significance DWYKA GRP 7.88 Assumptions and constraints: The agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high? Level of confidence: medium Implications of using more/less water: Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwater contribution to baseflow. Discussion on "hot spots": None	Fractured 0.1 - 0.5 l/s	8.0	Graafwater Clahwilliam
Intergranular and fractured 0.1 - 0.5 l/s 14.5 Groundwater Quality (EC) % of Area 70 - 300 mS/m 90.76 300 - 1 000 mS/m 9.24 Geology % of Area Hydrological significance Karoo dolerite Suite 15.14 Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow. ECCA GRP 77 DWYKA GRP 7.88 Risk to groundwater: The agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high? Assumptions and constraints: Limited groundwater use in the catchment. Level of confidence: medium Implications of using more/less water: Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwater contribution to baseflow. Discussion on "hot spots": None	Fractured 0.5 - 2.0 l/s	76.	
70 - 300 mS/m 90.76 300 - 1 000 mS/m 9.24 Geology % of Area Hydrological significance Karoo dolerite Suite 15.14 Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow. ECCA GRP 77 Middle to upper thin sandstone strata may have greater hydrogeological significance DWYKA GRP 7.88 Aquiclude Risk to groundwater: The agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high? Assumptions and constraints: Limited groundwater use in the catchment. Implications of using more/less water: Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwater contribution to baseflow. Discussion on "hot spots": None	Intergranular and fractured 0.1 - 0	0.5 l/s 14	
300 - 1 000 mS/m 9.24 Geology % of Area Hydrological significance Karoo dolerite Suite 15.14 Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow. ECCA GRP 77 Middle to upper thin sandstone strata may have greater hydrogeological significance DWYKA GRP 7.88 Aquiclude Risk to groundwater: The agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high? Assumptions and constraints: Limited groundwater use in the catchment. Inplications of using more/less water: Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwater contribution to baseflow. Discussion on "hot spots": None	Groundwater Quality (EC)	% of	of Area
Geology% of AreaHydrological significanceKaroo dolerite Suite15.14Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow.ECCA GRP77Middle to upper thin sandstone strata may have greater hydrogeological significanceDWYKA GRP7.88AquicludeRisk to groundwater:The agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high?Assumptions and constraints:Limited groundwater use in the catchment.Inplications of using more/less water:Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwater contribution to baseflow.Discussion on "hot spots":None	70 - 300 mS/m	90.	0.76
Karoo dolerite Suite15.14Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow.ECCA GRP77Middle to upper thin sandstone strata may have greater hydrogeological significanceDWYKA GRP7.88Aquiclude <i>Risk to groundwater:</i> The agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high?Assumptions and constraints:Limited groundwater use in the catchment.Level of confidence:mediumImplications of using more/less water:Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwatercontribution to baseflow.Discussion on "hot spots":None	300 - 1 000 mS/m	9.2	0.24
ECCA GRP77Middle to upper thin sandstone strata may have greater hydrogeological significanceDWYKA GRP7.88AquicludeRisk to groundwater:The agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high?Assumptions and constraints:Limited groundwater use in the catchment.Level of confidence:mediumImplications of using more/less water:Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwatercontribution to baseflow.Discussion on "hot spots":None	Geology	% of Area	Hydrological significance
ECCA GRP77Middle to upper thin sandstone strata may have greater hydrogeological significanceDWYKA GRP7.88AquicludeRisk to groundwater:The agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high?Assumptions and constraints:Limited groundwater use in the catchment.Level of confidence:mediumImplications of using more/less water:Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwatercontribution to baseflow.Discussion on "hot spots":None	Karoo dolerite Suite	15.14	
DWYKA GRP7.88AquicludeRisk to groundwater:The agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high?Assumptions and constraints:Limited groundwater use in the catchment.Level of confidence:mediumImplications of using more/less water:Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwatercontribution to baseflow.Discussion on "hot spots":None	ECCA GRP	77	Middle to upper thin sandstone strata may have greater hydrogeological
Risk to groundwater:The agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high?Assumptions and constraints:Limited groundwater use in the catchment.Level of confidence:mediumImplications of using more/less water:Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwatercontribution to baseflow.Discussion on "hot spots":None	DWYKA GRP	7.88	0
Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high?Assumptions and constraints:Limited groundwater use in the catchment.Level of confidence:mediumImplications of using more/less water:Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwatercontribution to baseflow.Discussion on "hot spots":None			
constraints:Level of confidence:mediumImplications of using more/less water:Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwatercontribution to baseflow.Discussion on "hot spots":None	Risk to groundwater:	Class A catchme	ent. This must be assessed in more detail. Why is the
Implications of using more/less water:Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwatercontribution to baseflow.Discussion on "hot spots":None		Limited groundw	lwater use in the catchment.
more/less water:groundwater) - so low groundwatercontribution to baseflow.Discussion on "hot spots":None	Level of confidence:	medium	
Relevant previous work: SRK, 2006	Discussion on "hot spots":	None	
	Relevant previous work:	SRK, 2006	

Quaternary Catch	ment:	E 32C		
Present Status Cal	tegory (A-F):		А	
Desired Water Rea	source Catego	ory (A-F):	А	
Management Clas	e s (Excellent	t/Good/Fair):	Exceller	ıt
Area: Recharge:	638 km² 1.9643 Mm	³ /a		
Total Use: Rural: AgIrrig: AgLive:	0 Mm³/a 0.0000 0.0000 0.0000	Mining: Industry: Aquaculture	2:	0.0000 0.0000 0.0000
Water Balance:	1.964 Mm ³	/a		
Stress Index:	0 U	nstressed or low levels	of stress	
EWR low flow req	uirement:	0.228 N	Mm³/a	
Groundwater avai	lable for use:	1.74Mr	m³/a (minim	1al)
GW Reserve comp	pleted (Y/N):	Ν		
Aquifer type and y	vield	% of	Area	
Fractured 0.1 - 0.5 l	/s	37	.52	
Fractured 0.5 - 2.0 l	/s	47	.32	
Intergranular and fr	actured 0.1 - 0	.5 l/s 15	.16	
Groundwater Qua	lity (EC)	% 01	f Area	
70 - 300 mS/m		60	0.86	
300 - 1 000 mS/m		39	.14	
Geology		% of Area	Hydrolog	gical sign
Karoo dolerite Suit	te	16.7		d contact z
ECCA GRP		44.62	barriers to Middle to significant	o upper thi
DWYKA GRP		37.79	Aquiclude	
VANRHYNSDOF	RP GRP	0.9	Imperme	eable aquic
Risk to groundwa	ter:	None		
Assumptions and constraints:		Essentially no g	roundwater	use in the
Level of confidence	ce:	low		
Implications of us more/less water:	ing	Unfavourable co groundwater) - s		
Discussion on "he	ot spots":	None	~	
Relevant previous	work:	SRK, 2006		

Quaternary Catchr	ment:	E 32D	
Present Status Cat	egory (A-F):		А
Desired Water Res	ource Catego	ory (A-F):	А
Management Class	s (Excellent	t/Good/Fair):	Excellent
Area: Recharge:	616 km² 0.3491 Mm	³ /a	
Total Use: Rural: AgIrrig: AgLive:	0 Mm³/a 0.0000 0.0000 0.0000	Mining: Industry: Aquaculture.	0.0000 0.0000 : 0.0000
Water Balance:	0.349 Mm ³	/a	
Stress Index:	0 U	nstressed or low levels o	of stress
EWR low flow req	uirement:	0.22 Mr	m³/a
Groundwater avail	able for use:	0.13Mn	n³/a(minimal)
GW Reserve comp	leted (Y/N):	Ν	
Aquifer type and y	ield	% of 1	4 <i>rea</i>
Fractured 0.1 - 0.5 l/	's	23.	12
Fractured 0.5 - 2.0 l/	's	51.	82
Intergranular and fra	ictured 0.1 - 0	.5 l/s 25.	06
Groundwater Qual	lity (EC)	% of	Area
70 - 300 mS/m		79.	03
300 - 1 000 mS/m		20.	97
Geology		% of Area	Hydrological sign
Karoo dolerite Suit	e	26.03	Fractured contact
ECCA GRP		54.72	barriers to flow. Middle to upper th
DWYKA GRP		12.93	significance Aquiclude
VANRHYNSDOR	P GRP	6.32	Impermeable aqui
Risk to groundwat	er:	None	
Assumptions and constraints:		Essentially no gr	oundwater use in the
Level of confidenc	е:	low	
Implications of use more/less water:	ing		nditions (low rainfall o low groundwaterco
Discussion on "ho	ot spots":	None	
Relevant previous	work:	SRK, 2006	

Quaternary Catchri	ent: E	32E	
Present Status Cate	gory (A-F):		F
Desired Water Reso	ource Categoi	ry (A-F):	D
Management Class	(Excellent/	Good/Fair):	Fair
Area:	1001 km ²		
Recharge:	1.2983 Mm ³	/a	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Total Use:	3.636 Mm ³ /	a	M
Rural:	0.0000	Mining:	0.0000
AgIrrig: AgLive:	3.6360 0.0000	Industry: Aquaculture	2: 0.0000
Water Balance:	-2.338 Mm ³ /		a thing
Stress Index:			Con I Prode
		<i>tically stressed</i> 0.358 N	Vimila
EWR low flow requ Groundwater availa			Nieuwoudtville*
			Am ³ /a (none)
GW Reserve comple	eted (Y/N):	Ν	Trents
Aquifer type and yie	eld	% of 1	Lamberts Bay
Fractured 0.1 - 0.5 1/s	3	95.	.53 Graafwatere Clarwilliam
Intergranular and frac	ctured 0.1 - 0.5	5 l/s 4.4	47 Christie Hard
Groundwater Quali	ty (EC)	% of	f Area
0 - 70 mS/m		17.	.29
70 - 300 mS/m		6.0	69
300 - 1 000 mS/m		76.	.02
Geology		% of Area	Hydrological significance
QUATERNARY		2.22	
Karoo dolerite Suite		1.89	Fractured contact zones and metamorphic aureoles serve as aquifers. Also barriers to flow.
ECCA GRP		2.59	Middle to upper thin sandstone strata may have greater hydrogeological significance
DWYKA GRP		26.74	Aquiclude
TABLE MOUNTA	IN GRP	16.63	Major fractured rock/secondary aquifer system.
VANRHYNSDORI	P GRP	47.6	Impermeable aquiclude
Unnamed Granite G	neiss	2.34	
Risk to groundwate	er:	Groundwater ab	agricultural activity in the west - including centre pivots. straction is > recharge, so groundwater levels are likely to l groundwater quality worsening.
Assumptions and constraints:		Significant grour	ndwater use in the west of the catchment
Level of confidence	*	low	
Implications of usin more/less water:	ng	groundwater) - s	onditions (low rainfall/deep groundwater levels/limited presence of so low groundwatercontribution to baseflow.Groundwater monitoring ied out by land owners and DWA
Discussion on "hot	spots":	There are possib	bly hot spots.
Relevant previous v	vork:	SRK, 2006	

Quaternary Catchm	ent:	E33A					
Present Status Cate	gory (A-F):		А				
Desired Water Reso	ource Catego	ory (A-F):	А				
Management Class	(Excellen	t/Good/Fair):	Excelle	ent			
Area:	1355 km²						
Recharge:	0.058 Mm ³	/a					-5
Total Use:	0.033 Mm ³					M	{
Rural:	0.0030	Mining:		0.0000		the second	A
AgIrrig: AgLive:	0.0000 0.0302	Industry: Aquaculturi	·	0.0000 0.0000			12
Water Balance:	0.025 Mm ³	*	•	0.0000		5	423
stress Index:		/ a Instressed or low levels	of stress		S	5	t
EWR low flow requ		0.083 I	5		Ve	my	RU
Groundwater availa			/m / a Im³/a (nor	ne)		Nieuwo	udtville
GW Reserve comple			, (01	,	X	edendal*	FZC
Aquifer type and yie		% of	Area			K	XX
Fractured 0.1 - 0.5 l/s		35	.99		Lamberts E	Graafwater	Clahwilliam
Intergranular and frac	tured 0.1 - 0	0.5 l/s 64	.01		Elands	Bay	2h
Groundwater Qualit	ty (EC)	% 01	f Area			Scin	*iffber
0 - 70 mS/m		0.	23				25
300 - 1 000 mS/m		99	.77				12
Geology		% of Area	Hydrole	ogical signi	ficance		
QUATERNARY		63.91					
TABLE MOUNTAI	IN GRP	0.01	Major f	ractured roc	k/secondary a	quife r syste	m.
VANRHYNSDORF	P GRP	16.56	Imperm	neable aquicl	ude		
SPEKTAKEL Suite		7.14		*			
LITTLE NAMAQU	ALAND Su	ite 0.06					
HOOGOOR Suite		6.04					
OKIEP GRP		6.28					
Risk to groundwate	r:	The groundwate index is too higl				ne calculated	l stress
Assumptions and constraints:		Groundwater us	e is very lit	ttle.			
Level of confidence	e -	low					
Implications of usin more/less water:	ng	Unfavourable co groundwater) - s			10		limited pre
Discussion on "hot	spots":	None					
Relevant previous w	vork:	SRK, 2006					

Quaternary Catchr	ment:	E33B		
Present Status Cat	egory (A-F)	e -	А	
Desired Water Res	source Cate	gory (A-F):	А	
Management Class	s (Excelle	nt/Good/Fair):	Excellen	t
Area:	702 km ²			
Recharge:	0.0844 M	m³/a		
Total Use:	0.021 Mn	n³/a		
Rural:	0.0000	Mining:		0.0000
AgIrrig:	0.0000	Industry:		0.0000
AgLive:	0.0209	Aquacultur	e:	0.0000
Water Balance:	0.064 Mm	·		
Stress Index:	0.25	Unstressed or low levels	of stress	
EWR low flow req	uirement:	0.062	Mm³/a	
Groundwater avail	lable for use	• 0.00 N	[m³/a(none)	
GW Reserve comp	leted (Y/N): N		
Aquifer type and y	rield	% of	Area	
Fractured 0.1 - 0.5 l/	/s	45	5.66	
Fractured 0.5 - 2.0 l/	/s	54	.34	
Groundwater Qual	lity (EC)	% 0	f Area	
0 - 70 mS/m		0	.55	
,				
300 - 1 000 mS/m			0.45	
Geology		% of Area	Hydrolog	ical signif
QUATERNARY		41.39		
TABLE MOUNTA	AIN GRP	0.98	Major fra	ctured rock
VANRHYNSDOR	RP GRP	57.64	Imperme	able aquiclu
Risk to groundwat	ter:	The groundwat index is too hig		
Assumptions and constraints:		Groundwater u	se is very littl	2.
Level of confidenc	re:	low		
Implications of use more/less water:	ing	Unfavourable c groundwater) -		
Discussion on "ho	ot spots":	None		
Relevant previous	work:	SRK, 2006		

Quaternary Catchn	nent:	E33C		
Present Status Cate	egory (A-F	7):	А	
Desired Water Rese	ource Cat	egory (A-F):	А	
Management Class	(Excel	llent/Good/Fair):	Excellent	
Area:	980 km ²			
Recharge:	1.5792 N	Im³/a		
Total Use:	0.027 M	-	0.0000	
Rural: AgIrrig:	0.0010 0.0000	Mining: Industry:	0.0000 0.0000	
AgLive:	0.0263	Aquaculture		
Water Balance:	1.552 Mi	m³/a		S
Stress Index:	0.02	Unstressed or low levels	of stress	Ved
EWR low flow requ	iirement:	0 Mm^3	e/a	1
Groundwater availa	able for us	e: 1.55 M	m³/a (adequate)	
GW Reserve compl	leted (Y/I	V): N		
Aquifer type and yi	eld	% of	Area	Lamberts
Fractured 0.1 - 0.5 l/	s	69	0.57	Eland
Fractured 0.5 - 2.0 l/	s	30	0.43	
Groundwater Qual	ity (EC)	% 01	f Area	
0 - 70 mS/m		4.	.18	
300 - 1 000 mS/m		95	5.82	
Geology		% of Area	Hydrological sig	nificance
QUATERNARY		36.5		
TABLE MOUNTA	IN GRP	3.01	Major fractured r	ock/secondar
VANRHYNSDOR	P GRP	60.49	Impermeable aqu	clude
Risk to groundwate	er:	None		
Assumptions and constraints:		Essentially no g	roundwater use in th	e catchment.
Level of confidence	e:	low		
Implications of usin more/less water:	ng		onditions (low rainfa so low groundwaterc	
Discussion on "ho	t spots":	None		
Relevant previous v	work:	SRK, 2006		

Quaternary Catchm	ent:	E33D)					
Present Status Categ	gory (A-F)	:		С				
Desired Water Reso):	В				
Management Class	(Excelle	nt/Good/F	air):	Good				
Area:	1559 km²							
Recharge:	0.2322 Mr							
<i>Total Use:</i> Rural:	0.049 Mm 0.0000	-	Aining:		0.0000		5	
AgIrrig:	0.0000		ndustry:		0.0000		Z	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
AgLive:	0.0487		1 <i>quaculture:</i>		0.0000			3
Water Balance:	0.184 Mm	³ /a				~	-	1 fr
Stress Index:	0.21 <i>N</i>	Moderate leve	els of stress			(r	7	No
EWR low flow requi	irement:		0.138 M	lm³/a		the	21	R
Groundwater availa	ble for use	:	0.05Mm	n³/a (mini	mal)	/	N.	Nieuwoudtville
GW Reserve comple	eted (Y/N)):	Ν				Vredendal®	me
Aquifer type and yie	eld		% of A	Area				KJ
Fractured 0.1 - 0.5 l/s	;		70.	63		Lambert	Graafwate	re Crecia
Fractured 0.5 - 2.0 l/s	;		6.9	98		Elan	ids Bay	J.S.
Intergranular and frac	tured 0.1 -	0.5 l/s	14.	96			L	Citrusdal®
Intergranular and frac			7.4	14			45	my
Groundwater Qualit	ty (EC)		% of.	Area				L
300 - 1 000 mS/m			10	0				
Geology		%			ogical sign	ificance		
QUATERNARY			36.71	1.0	5 - 8			
VANRHYNSDORP	GRP		36.66	Impern	neable aquic	lude		
NAMA GRP	5.0		5.12	mpen	aquit			
SPEKTAKEL Suite			5.05					
LITTLE NAMAQU		uite	3.29					
HOOGOOR Suite	11111110	unt	1.32					
OKIEP GRP			1.52					
Risk to groundwate.	<i>r:</i>	Very lo)W					
Assumptions and constraints:		Groun	dwater use	e is very li	ttle.			
Level of confidence.	:	low						
Implications of usin more/less water:	ng					deep ground		
Discussion on "hot	spots":	None						
Relevant previous w	vork:	SRK, 2	2006					

Quaternary Catchm	<i>ent:</i> E.	33E					
Present Status Categ	gory (A-F):		С				
Desired Water Reso	ource Category	v (A-F):	В				
Management Class	(Excellent/O	Good/Fair):	Good				
Area:	1282 km²						
Recharge:	0.5992 Mm ³ /s						
Total Use: Rural:	0.169 Mm³/a 0.0010	Mining:		0.0000			M
AgIrrig:	0.0010	Industry:		0.0000			5
AgLive:	0.0398	Aquaculture	:	0.0000			3
Water Balance:	0.43 Mm³/a				A	5	2
Stress Index:	0.28 Mode	erate levels of stress			12	Á	
EWR low flow requ	irement:	0.06 M	m³/a		the		
Groundwater availa	ble for use:	0.37 M	m³/a (adec	juate)			
GW Reserve comple	eted (Y/N):	Ν			V	redendal *	r
Aquifer type and yie	eld	% of .	Area		Lamberts		~
Fractured 0.1 - 0.5 l/s	;	6.5	84		Elands	Graafwater	S
Fractured 0.5 - 2.0 l/s	3	75	5.4		Elands	Dayo	~
Intergranular and frac	tured 0.1 - 0.5	l/s 17.	.16			Az	Citru
Karst 0.5 - 2.0 l/s		0.	59			~	Z
Groundwater Qualit	ty (EC)	% of	Area				
70 - 300 mS/m		0.	62				
300 - 1 000 mS/m		83	.23				
> 1 000 mS/m		16	.15				
Geology		% of Area	Hydrolo	ogical sign	ificance		
QUATERNARY		37.69					
VANRHYNSDORP	' GRP	40.68	Imperm	eable aqui	lude		
NAMA GRP		8.19		-			
SPEKTAKEL Suite		3.52					
LITTLE NAMAQU	ALAND Suite	7.2					
OKIEP GRP		2.72					
Risk to groundwate		Lutzville is in the south. Groundy				is ground	water
Assumptions and constraints:		Groundwater us	e in the so	uth of the	catchment.		
Level of confidence	:	low					
Implications of usin more/less water:		Unfavourable co groundwater) - s					
Discussion on "hot	spots":	None					
Relevant previous w	vork:	SRK, 2006					

Quaternary Catchment:	E 33F		
Present Status Category (A-F):		А	
Desired Water Resource Categ		А	
Management Class (Excellen	t/Good/Fair):	Excellent(to be finalize	ęd)
Area: 725 km² Recharge: 3.5663 Mm	1 ³ /a		
Total Use: 0.073 Mm Rural: 0.0050 AgIrrig: 0.0000 AgLine: 0.0132	b /a Mining: Industry: Aquaculture:	0.0552 0.0000 0.0000	
<i>Water Balance:</i> 3.493 Mm ³		0.0000	
Stress Index: 0.02 U	nstressed or low levels of		CC
EWR low flow requirement:	0.05 Mn		L-
Groundwater available for use:		n³/a (adequate)	K
GW Reserve completed (Y/N)	Y		VA
Aquifer type and yield	% of A	rea	Lamberts Ba
Fractured 0.1 - 0.5 l/s	33.4	19	Elands
Fractured 0.5 - 2.0 l/s	26.2	23	
Karst 0.5 - 2.0 l/s	2.1	8	
Karst > 5.0 l/s	38.0	19	
Groundwater Quality (EC)	% of 1	Area	
0 - 70 mS/m	23.9	17	
70 - 300 mS/m	40.3	38	
300 - 1 000 mS/m	35.0	55	
Geology	% of Area	Hydrological signific	icance
QUATERNARY	64.7		
TABLE MOUNTAIN GRP	21.32	Major fractured rock/	/secondary aquif
VANRHYNSDORP GRP	13.98	Impermeable aquicluc	de
Risk to groundwater:	None		
Assumptions and constraints:	Essentially no gro	oundwater use in the cat	tchment.
Level of confidence:	low		
Implications of using more/less water:		nditions (low rainfall/de b low groundwatercontr	
Discussion on "hot spots":	None		
Relevant previous work:	SRK, 2006		

Quaternary Catchn	<i>ent:</i> E3	33G						
Present Status Cate	gory (A-F):		D					
Desired Water Reso	ource Category	(A-F):	С					
Management Class	(Excellent/G	lood/Fair):	Fair					
Area:	894 km²							
Recharge:	2.2859 Mm ³ /a							3
Total Use:	1.302 Mm ³ /a					r		}
Rural:	0.0000	Mining:		0.9830		5-	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~
AgIrrig:	0.0000 0.0209	Industry:		0.0300 0.0000		N	2 2	
AgLive: Water Balance:	0.0209 0.984 Mm ³ /a	Aquaculture	i.	0.0000		~	22	3~~
	,				5	-	2 25	372
Stress Index:		rate levels of stress	/		Ve	1mm	13	2 3 2
EWR low flow requ		0 Mm ³			1	T Nie	uwoudtville	Calvinia
Groundwater availa		0.98 M:	m³/a (adeq	juate)	7	redendal	12	Junth }
GW Reserve comple	eted (Y/N):	Ν				77	3	ALY'
Aquifer type and yie	eld	% of .	Area		Lamberts		225	32hrs
Fractured 0.1 - 0.5 l/s	3	12	.17		Elands	Graafwater s Bay	Clanwill	anghang
Fractured 0.5 - 2.0 1/s	3	21	.5			12	Citrusdal®	the s
Fractured 2.0 - 5.0 1/s	3	26	.35			Sr	2H	2 LTC
Karst 0.5 - 2.0 l/s		39).9				L'	C KG
Karst > 5.0 l/s		0.	08				t	12D
Groundwater Quali	ty (EC)	% of	[•] Area					
0 - 70 mS/m		25	5.3					
70 - 300 mS/m		49.	.92					
300 - 1 000 mS/m		24	.78					
Geology		% of Area	Hydrolo	ogical signi	ficance			
QUATERNARY		42.23						
TABLE MOUNTA	IN GRP	19.14	Major fr	ractured roc	k/secondary	aquifer s	ystem.	
VANRHYNSDORI	P GRP	38.64	Imperm	eable aquicl	ude			
Risk to groundwate		Vredendal is in t are doing excelle				could be	e dropping.	DWA
Assumptions and constraints:	(Groundwater is	used throu	ighout the ye	ear.			
Level of confidence	* I	ow						
Implications of usin more/less water:		Unfavourable co groundwater) - s						presence of
Discussion on "hot	spots": 1	None						
Relevant previous v	vork: S	SRK, 2006						

Quaternary Catchme	ent:	E33H				
Present Status Categ	ory (A-F):		В			
Desired Water Resou	urce Categor	y (A-F):	А			
Management Class		Good/Fair):	Excellent			
Area:	719 km²					
Recharge:	0.7588 Mm ³ /	a				
Total Use:	0.044 Mm ³ /a	a				
	0.0250	Mining:	0.0			M
0 0	0.0000	Industry:	0.00			fra
0	0.0188	Aquaculture.	: 0.00	000		3
	0.715 Mm ³ /a		<i>C</i> .		7	AZ
		tressed or low levels of		<	Vry	22
EWR low flow requi		0.01 Mr			Very	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Groundwater availab			m³/a (minimal)		1	Nieuwoudtville
GW Reserve complet	ted (Y/N):	Y			X	Filt
Aquifer type and yiel	ld	% of 1	Area		7	Vredendal
Fractured 0.5 - 2.0 l/s		21.	.78		Lamberts Bay	- John .
Fractured 2.0 - 5.0 l/s		33	3.7		Elands Bay	fwatere Clah
Intergranular and fract	ured 0.1 - 0.5	l/s 32.	.58)	AT
Karst 0.5 - 2.0 l/s		11.	.95		2	Citrusdàl®
Groundwater Quality	v (EC)	% of	[•] Area			7
0 - 70 mS/m		2.8	85			
70 - 300 mS/m		11.	.95			
300 - 1 000 mS/m			.33			
$> 1\ 000\ mS/m$.86			
Geology			Hydrologica	l significan	nce	
QUATERNARY		72.14	_, orogrou			
TABLE MOUNTAIN	NGRP	2.94	Major fractur	ed rock/sec	condary acui	fer system
VANRHYNSDORP		2.94	Impermeable		conciary aqui	ici systemi.
	UNI		impermeable	aquicitude		
SPEKTAKEL Suite		5.62				
LITTLE NAMAQUA	ALAND Suite					
OKIEP GRP		1.39				
Risk to groundwater	;	None				
Assumptions and constraints:		Limited groundv	vater use in the o	catchment.		
Level of confidence:		low				
Implications of using more/less water:		Unfavourable co groundwater) - s				
Discussion on "hot s	spots":	None				
Relevant previous we	ork:	SRK, 2006				

Quaternary Catch	ment:	C40A			
Present Status Cat	egory (A-F):		С		
Desired Water Res	source Categ	ory (A-F):	В		
Management Clas	s (Excellen	t/Good/Fair):	Good		
Area:	941 km²				6
Recharge:	4.6549 Mm	n³/a			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Total Use:	1.722 Mm ³	-			
Rural:	0.0000	Mining:		0.0000	C 25 /
AgIrrig: AgLive:	1.7217 0.0000	Industry: Aquacultur	····	0.0000 0.0000	and the
Water Balance:	2.933 Mm ³	*	с.	0.0000	and that
		·			CA MAYIN
Stress Index:		loderate levels of stres.			K A Bar
EWR low flow req		0.9 M		``	Calvinia
Groundwater avail	able for use:	2.03 N	1m³/a (ade	quate)	Viedendai *
GW Reserve comp	leted (Y/N).	: N			K X X Y Z
Aquifer type and y	ield	% of Area			Lamberts Bay Graafwater
Fractured 0.5 - 2.0 l,	/s	8	6.92		Elands Baye
Intergranular and fra	actured 0.1 - 0	0.5 l/s 1.	3.08		Citrusdals
Groundwater Qua	lity (EC)	% 0	of Area		- All
70 - 300 mS/m		1	100		HELL
Geology		% of Area	Hydrol	logical sign	nificance
Karoo dolerite Suit	e	15.07		ed contact to flow.	zones and metamorphic aureoles serve as aquifers. Als
ECCA GRP		84.61		to upper th	in sandstone strata may have greater hydrogeological
Risk to groundwat	ter:	The groundwat index is too hig		obably ove	r-estimated. The calculated stress
Assumptions and constraints:		Limited ground	lwater use i	in the catch	ment.
Level of confidence	e:	medium			
Implications of us more/less water:	ing				/deep groundwater levels/limited presence of ntribution to baseflow.
Discussion on "he	ot spots":	None			
Relevant previous	work:	SRK, 2006			

Quaternary Catchm	<i>ent:</i> E40D	
Present Status Categ	gory (A-F):	С
Desired Water Reso	urce Category (A-F):	В
Management Class	(Excellent/Good/Fair):	Good
Area:	707 km ²	
Recharge:	3.4478 Mm ³ /a	-8
Total Use:	0.933 Mm³/a	March }
Rural:	0.0000 <i>Mining</i> :	g: 0.0000
AgIrrig:	0.3479 Industry	
AgLive:	0.0000 Aquacu	<i>ulture:</i> 0.0000
Water Balance:	2.515 Mm ³ /a	man besal
Stress Index:	0.27 Moderate levels of si	stress
EWR low flow requi	irement: 0.6	68 Mm ³ /a
Groundwater availa	<i>ble for use:</i> 1.8	84 Mm ³ /a (adequate)
GW Reserve comple	eted (Y/N): N	Wedendare
Aquifer type and yie	eld %	% of Area
Fractured 0.1 - 0.5 l/s		0.17 Granwaters Clanwilliam
Fractured 0.5 - 2.0 l/s		71.31
Intergranular and frac	tured 0.1 - 0.5 l/s	28.52
Groundwater Qualit	ty (EC) %	% of Area
70 - 300 mS/m		99.81
300 - 1 000 mS/m		0.19
Geology	% of A	Area Hydrological significance
Karoo dolerite Suite	32.47	· · · · · · · · · · · · · · · · · · ·
ECCA GRP	67.49	 barriers to flow. Middle to upper thin sandstone strata may have greater hydrogeological significance
Risk to groundwate.		s in the eastern portion of this catchment. Possibility of er levels being over-abstracted and groundwater levels dropping
Assumptions and constraints:	Limited grou	bundwater use in the catchment.
Level of confidence.	medium	
Implications of usin more/less water:		ble conditions (low rainfall/deep groundwater levels/limited presence of er) - so low groundwatercontribution to baseflow.
Discussion on "hot	0	· · · · ·
Relevant previous w	<i>rork:</i> SRK, 2006	

Quaternary Catchri	nent:	E40)C		
Present Status Cate	egory (A	-F):		А	
Desired Water Reso			4 <i>-F):</i>	А	
Management Class	(Ex	xellent/Goo	d/Fair):	Excelle	ent
Area:	530 km	n^2			
Recharge:	2.845 N	/lm³/a			
Total Use:		/Im³/a			
Rural:	0.0000		Mining:		0.0000
AgIrrig: AgLive:	0.0000		Industry: Aquaculture:		0.0000 0.0000
Water Balance:	2.751 N	/m³/a	2 19mmmmm10.		0.0000
Stress Index:	0.03		ed or low levels o	ferross	
EWR low flow requ Groundwater availa			0.11 Mr 2.64Mm		unte)
				n³/a (adeq	uatej
GW Reserve comple	leted (Y)	⁄ N):	Ν		
Aquifer type and yie	eld		% of A	Area	
Fractured 0.1 - 0.5 1/s	s		79.	63	
Fractured 0.5 - 2.0 1/s	s		5.0)7	
Intergranular and frac	ctured 0.	1 - 0.5 l/s	15	.3	
Groundwater Quali	ty (EC)		% of		
0 - 70 mS/m			34.	95	
70 - 300 mS/m			20.	19	
300 - 1 000 mS/m			44.	85	
Geology			% of Area	Hydrolo	ogical sign
Karoo dolerite Suite	2		16.49		ed contact
ECCA GRP			5.59	barriers t Middle 1	to flow. to upper th
				significat	nce
DWYKA GRP			39.87	Aquicluc	le
BOKKEVELD GR	Р		1.1	Little sig	gnificance,
TABLE MOUNTA	IN GRP		32.56	Major fi	ractured ro
VANRHYNSDORI	P GRP		4.39	Imperm	eable aqui
Risk to groundwate	er:	No	one		
Assumptions and constraints:		Lir	nited groundw	vater use ir	n the catch
Level of confidence		lov	V		
Implications of usit			nfavourable co	nditions (1	ow r ainfall
more/less water:	3		oundwater) - se		
Discussion on "hot	t spots":	No	one		
Relevant previous v	work:	SR	K, 2006		

Quaternary Catchm	ent: H	E40D		
Present Status Cate	gory (A-F):		А	
Desired Water Reso	ource Catego	ory (A-F):	А	
Management Class	(Excellent	/Good/Fair):	Excellen	t
Area:	544 km ²			
Recharge:	2.4849 Mm	3/a		
Total Use:	0.002 Mm ³			
Rural:	0.0000	Mining:		0.0000
AgIrrig: AgLive:	0.0000 0.0015	Industry: Aquaculture		0.0000 0.0000
Water Balance:	2.483 Mm ³ /	1	·•	0.0000
			<i>C</i> ,	
Stress Index:		istressed or low levels	5	
EWR low flow requ		0.996 1	,	
Groundwater availa			m³/a (adequ	ate)
GW Reserve comple	eted (Y/N):	Ν		
Aquifer type and yie	eld	% of	Area	
Fractured 0.1 - 0.5 l/s	3	1	00	
Groundwater Quali	ty (EC)	% 2	f Area	
-	ly (EC)	,		
0 - 70 mS/m		70	.03	
70 - 300 mS/m		6.	52	
300 - 1 000 mS/m		23	.44	
Geology		% of Area	Hydrolog	rical signi
DWYKA GRP		5.41	Aquiclude	
BOKKEVELD GR	Р	5.57	Little sign	nificance, el
TABLE MOUNTAI	IN GRP	74.99	Major fra	ctured rocl
VANRHYNSDORF	P GRP	14.04	,	able aquich
Risk to groundwate	er:	None		
Assumptions and		Essentially no g	roundwater u	1se in the c
<i>constraints:</i>		1		
Level of confidence		low		
Implications of usin more/less water:	ng	Unfavourable co groundwater) - s		
Discussion on "hot	spots":	None	Ŭ	
Relevant previous w	vork:	SRK, 2006		

Quaternary Catchm	ent: FO	50A		
Present Status Cate	gory (A-F):		А	
Desired Water Reso	ource Category	v (A-F):	А	
Management Class	(Excellent/C	Good/Fair):	Excellent	
Area:	572 km²			
Recharge:	0.4399 Mm ³ /a	a		
Total Use:	0.009 Mm ³ /a			
Rural:	0.0000	Mining:	0.0000	
AgIrrig: AgLive:	0.0000 0.0089	Industry: Aquaculture:	0.0000	
Mater Balance:	0.431 Mm ³ /a	*	0.0000	
Stress Index:		ressed or low levels o	f strace	
		0.02 Mt		
EWR low flow requi			n³/a n³/a(adequate)	
Groundwater availa GW Reserve comple		0.41 Mf	n / alaucyuale)	
Aquifer type and yie		** % of z	Area	
Intergranular and frac		,	/	
Intergranular and frac				
-				
Groundwater Qualit	ty (EC)	% of		
300 - 1 000 mS/m		14.	91	
> 1 000 mS/m		84.	75	
Geology		% of Area	Hydrological sig	mif
QUATERNARY		73.32		
Biesiesfontein Grani	te	13.11		
SPEKTAKEL Suite		10.26		
LITTLE NAMAQU	ALAND Suite	1.68		
OKIEP GRP		0.44		
Risk to groundwate	r:	None		
Assumptions and constraints:		Essentially no gr	oundwater use in th	ie ca
Level of confidence	:	low		
				,
Implications of usin more/less water:			nditions (low rainfa o low groundwaterc	
Implications of usin more/less water: Discussion on "hot			nditions (low rainfa o low groundwaterc	

Relevant previous work:

Recharge: 0.4776 Mm³/a Total Use: 0.0000 Mining: 0.0000 Raral: 0.0000 Industry: 0.0000 Aglirig: 0.0103 Aquaculture: 0.0000 Aglirie: 0.0103 Aquaculture: 0.0000 Water Balance: 0.433 Mm³/a	Quaternary Catchn	nent: Fo	50B		
Desired Water Resource Category (A-F): A Management Class (Excellent/Good/Fair): Excellent Area: 320 km² Excellent Recharge: 0.4776 Mm³/a Excellent Total Use: 0.044 Mm³/a Excellent Raral: 0.0000 Mining: 0.0000 Aglring: 0.0000 Industry: 0.0000 Aglering: 0.0103 Aquaculture: 0.0000 Aglering: 0.0103 Aquaculture: 0.0000 Water Balance: 0.433 Mm³/a EWR low flow requirement: 0.018 Mm³/a Groundwater available for use: 0.42 Mm³/a (minimal) GW Reserve completed (Y/N): N Aquifer type and yield % of Area intergranular and fractured 0.1 - 0.5 1/s 87.33 Groundwater Quality (EC) % of Area 665 intergranular and fractured 0.1 - 0.5 1/s 87.33 Groundwater Quality (EC) % of Area Hydrological signi intergranular and fractured 0.1 - 0.5 1/s 87.33 Groundwater Quality (EC) % of Area Hydrological signi intergranular and fractured 0.1 - 0.5 1/s 87.33 Gool - 1 000 mS/m 85.22<	Present Status Cate	egory (A-F):		В	
Management Class (Excellent/ Good/ Fair): Excellent Area: 320 km² Recharge: 0.4776 Mm³/a Total Use: 0.444 Mm³/a Rarak: 0.0000 Mining: 0.0000 Aglirig: 0.0000 Industry: 0.0000 Aglirig: 0.0103 Aquaculture: 0.0000 Aglirie: 0.013 Aquaculture: 0.0000 Water Balance: 0.433 Mm³/a Stress Index: 0.09 Unstressed or low levels of stress EWR low flow requirement: 0.018 Mm³/a Groundwater available for use: 0.422 Mm³/a (minimal) GW Reserve completed (Y/N): N N Aquifer type and yield % of Area intergranular and fractured 0.0 - 0.1 l/s 12.67 intergranular and fractured 0.1 - 0.5 l/s 87.33 Groundwater Quality (EC) % of Area 665 NAMA GRP 1.46 None 14.78 Eesiesfontein Granite 4.25 SPEKTAKEL Suite 24.3 LITTLE NAMAQUALAND Suite 61.36 OKIEP GRP 1.99 Risk to groundwater: None Assumptions and confidence: Iow Iumite			<i>(А-F):</i>		
Area: 320 km² Recharge: 0.4776 Mm³/a Total Use: 0.044 Mm³/a Raral: 0.0000 Industry: 0.0000 AgIrrig: 0.0103 Aquaculture: 0.0000 AgLive: 0.0103 Aquaculture: 0.0000 Water Balance: 0.433 Mm³/a Stress Index: 0.09 Unstressed or low levels of stress EWR low flow requirement: 0.018 Mm³/a Groundwater available for use: 0.42 Mm³/a (minimal) GW Reserve completed (Y/N): N N Aquifer type and yield % of Area intergranular and fractured 0.0 - 0.1 l/s 12.67 intergranular and fractured 0.1 - 0.5 l/s 87.33 Groundwater Quality (EC) % of Area 800 - 1 000 mS/m 85.22 > 1 000 mS/m 85.22 > 1 000 mS/m 4.25 SPEKTAKEL Suite 24.3 LITTLE NAMAQUALAND Suite 61.36 OKIEP GRP 1.99 Risk to groundwater: None Assumptions and constraints: Limited groundwater use in the catchn constraints: Level of confidence: Iow				Excellent	
Total Use: 0.044 Mm³/a Raral: 0.0000 Mining: 0.0000 Aglirig: 0.0000 Industry: 0.0000 Aglirig: 0.0103 Aquaculture: 0.0000 Water Balance: 0.433 Mm³/a Stress Index: 0.09 Unstressed or low levels of stress EWR low flow requirement: 0.018 Mm³/a Groundwater available for use: 0.42 Mm³/a (minimal) GW Reserve completed (Y/N): N N Aquifer type and yield % of Area Intergranular and fractured 0.1 - 0.5 1/s 87.33 Groundwater Quality (EC) % of Area 800 - 1 000 mS/m 85.22 1000 mS/m 85.22 1000 mS/m 14.78 Geology % of Area Hydrological sign. QuATERNARY 6.65 NAMA GRP 1.46 Biesiesfontein Granite 4.25 SPEKTAKEL Suite 24.3 11111E NAMAQUALAND Suite 61.36 OKIEP GRP 1.99 Kisk to groundwater: None Assumptions and constraints: Limited groundwater use in the catchn constraints: Level of confidence: low Infavourable conditions (low rainfal/ groundwater) - so low groundwateror or strainfal/ groundwater) - so low grou	Area:				
Raral: 0.0000 Mining: 0.0000 Ag[rrig: 0.0000 Industry: 0.0000 Ag[Live: 0.0103 Aquaculture: 0.0000 Water Balance: 0.433 Mm³/a	Recharge:	0.4776 Mm ³ /a	a		
AgIrrig:0.0000Industry:0.0000AgLive:0.0103Aquaculture:0.0000Water Balance:0.433 Mm³/a	Total Use:	0.044 Mm³/a			
AgLiw: 0.0103 Aquaculture: 0.0000 Water Balance: 0.433 Mm³/a Stress Index: 0.09 Unstressed or low levels of stress EWR low flow requirement: 0.018 Mm³/a Groundwater available for use: 0.42 Mm³/a (minimal) GW Reserve completed (Y/N): N N Aquifer type and yield % of Area intergranular and fractured 0.0 - 0.1 l/s 12.67 intergranular and fractured 0.1 - 0.5 l/s 87.33 Groundwater Quality (EC) % of Area 800 - 1 000 mS/m 85.22 > 1 000 mS/m 6.65 NAMA GRP 1.4.78 QUATERNARY 6.65 NAMA GRP 1.46 Biesiesfontein Granite 4.25 SPEKTAKEL Suite 24.3 LITTLE NAMAQUALAND Suite 61.36 OKIEP GRP 1.99 Risk to groundwater: None Assumptions and constraints: Limited groundwater use in the catchme constraints: Level of confidence: low Implications of using more/less water: Solow groundwater) - so low groundwatercord	Rural:	0.0000	Mining:	0.0	000
Water Balance: 0.433 Mm³/a Stress Index: 0.09 Unstressed or low levels of stress EWR low flow requirement: 0.018 Mm³/a Groundwater available for use: 0.42 Mm³/a (minimal) GW Reserve completed (Y/N): N Aquifer type and yield % of Area intergranular and fractured 0.0 - 0.1 l/s 12.67 intergranular and fractured 0.1 - 0.5 l/s 87.33 Groundwater Quality (EC) % of Area >000 - 1 000 mS/m 85.22 > 1 000 mS/m 44.78 Geology % of Area QUATERNARY 6.65 NAMA GRP 1.46 Biesiesfontein Granite 4.25 SPEKTAKEL Suite 24.3 LITTLE NAMAQUALAND Suite 61.36 OKIEP GRP 1.99 Risk to groundwater: None Assumptions and constraints: Limited groundwater use in the catchme constraints: Level of confidence: low Implications of using more/less water: Sol ow groundwater) - so low groundwatercont	AgIrrig:		~		
Stress Index: 0.09 Unstressed or low levels of stress EWR low flow requirement: 0.018 Mm³/a Groundwater available for use: 0.42 Mm³/a (minimal) GW Reserve completed (Y/N): N Aquifer type and yield % of Area intergranular and fractured 0.0 - 0.1 l/s 12.67 intergranular and fractured 0.1 - 0.5 l/s 87.33 Groundwater Quality (EC) % of Area >000 - 1 000 mS/m 85.22 >1 000 mS/m 44.78 Geology % of Area QUATERNARY 6.65 NAMA GRP 1.46 Biesiesfontein Granite 4.25 SPEKTAKEL Suite 24.3 LITTLE NAMAQUALAND Suite 61.36 OKIEP GRP 1.99 Risk to groundwater: None Assumptions and constraints: Limited groundwater use in the catchme constraints: Level of confidence: low Implications of using more/less water: Ow	0		Aquaculture:	0.0	000
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LITTLE NAMAQUALAND Suite 61.36 OKIEP GRP 1.99 Risk to groundwater: None Assumptions and constraints: Limited groundwater use in the catchme constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/de groundwater) - so low groundwatercontrol					
OKIEP GRP 1.99 Risk to groundwater: None Assumptions and constraints: Limited groundwater use in the catchme constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/d groundwater) - so low groundwatercont					
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constraints: Level of confidence: low Implications of using Unfavourable conditions (low rainfall/c more/less water: groundwater) - so low groundwatercont	Risk to groundwate	er:	None		
Implications of using more/less water: Unfavourable conditions (low rainfall/d groundwater) - so low groundwatercont	Assumptions and constraints:		Limited groundwa	ater use in the	catchme
more/less water: groundwater) - so low groundwatercon	Level of confidence	e:	low		
	Implications of usi more/less water:				
Discussion on "hot spots": None	Discussion on "ho	t spots":	None		

Relevant previous work:

Area: 622 km² Recharge: 0.9391 Mm³/a Fotal Use: 0.023 Mm³/a Karal: 0.0000 Industry: 0.0000 Aglirig: 0.0000 Industry: 0.0000 Aglirig: 0.0194 Aquaculture: 0.0000 Water Balance: 0.916 Mm³/a	Quaternary Catchr	ment: F	⁷ 60C		
Management Class (Excellent/Good/Fair): Excellent Mea: 622 km² Excellent Recharge: 0.9391 Mm³/a 0.0000 Fotal Use: 0.023 Mm³/a 0.0000 Agard: 0.0040 Mining: 0.0000 Agard: 0.0040 Mining: 0.0000 Agard: 0.0194 Aquaculture: 0.0000 Agard: 0.0194 Aquaculture: 0.0000 Water Balance: 0.916 Mm³/a Stress Index: 0.02 Unstressed or low levels of stress EWR low flow requirement: 0.0390 Mm³/a Groundwater available for use: 0.88 Mm³/a (minimal) GW Reserve completed (Y/N): Y Y Aquifer type and yield % of Area Intergranular and fractured 0.0 - 0.1 l/s 19.16 19.16 19.16 Intergranular and fractured 0.1 - 0.5 l/s 80.84 Stread Stread Groundwater Quality (EC) % of Area Hydrological signit QUATERNARY 20.56 KLEIN KOGELFONTEIN* Suite 0.87 Biesiesfontein Granite 22.08 SPEKTAKEL Suite 0.5 OKIEP GRP 7	Present Status Cate	egory (A-F):		А	
Maximum 622 km² Recharge: 0.9391 Mm³/a Fotal Use: 0.023 Mm³/a Karal: 0.0040 Mining: 0.0000 Aglrig: 0.0000 Industry: 0.0000 Aglrig: 0.0194 Aquaculture: 0.0000 Water Balance: 0.916 Mm³/a Stress Index: 0.02 Water Balance: 0.916 Mm³/a Stress Index: 0.02 WR tow flow requirement: 0.039 Mm³/a Groundwater available for use: 0.88 Mm³/a (minimal) SW Reserve completed (Y/N): Y Y Aquifer type and yield % of Area Intergranular and fractured 0.1 - 0.5 1/s 80.84 Stress Stress Groundwater Quality (EC) % of Area Mydrological sign 00 - 1 000 mS/m 81.97 1 000 mS/m 81.97 > 1 0000 mS/m 81.97 1 000 mS/m 81.91 > 1 000 mS/m 81.93 Stress Stress Geology % of Area Hydrological sign QUATERNARY 20.56 KLEIN KOGELFONTEIN* Suite 0.87 Biesiesfontein Granite 22.08 SPEKTA	Desired Water Res	ource Catego	ry (A-F):	А	
Recharge: 0.9391 Mm³/a Fotal Use: 0.023 Mm³/a Kiral: 0.0040 Mining: 0.0000 Aglirig: 0.0000 Industry: 0.0000 Aglirig: 0.0194 Aquaculture: 0.0000 Water Balance: 0.916 Mm³/a Stress Index: 0.02 Unstressed or low levels of stress EWR tow flow requirement: 0.039 Mm³/a Groundwater available for use: 0.88 Mm³/a (minimal) GW Reserve completed (Y/N): Y Aquifer type and yield % of Area Intergranular and fractured 0.1 - 0.5 l/s 80.84 Groundwater Quality (EC) % of Area 00 - 1 000 mS/m 81.97 > 1 000 mS/m 81.97 SpektTAKEL Suite 22.08 SpektTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 0.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Livfavourable conditions (low rain	Management Class	(Excellent)	/Good/Fair):	Excel	llent
Note0.023 Mm³/aGaral:0.0040Mining:0.0000Aglarie:0.0194Aquaculture:0.0000Aglaire:0.0194Aquaculture:0.0000Water Balance:0.916 Mm³/aStressStressStress Index:0.02Unstressed or low levels of stressEWR low flow requirement:0.039 Mm³/aGroundwater available for use:0.888 Mm³/a (minimal)GW Reserve completed (Y/N):YAquifer type and yield% of Areantergranular and fractured 0.0 - 0.1 l/s19.16ntergranular and fractured 0.1 - 0.5 l/s80.84Groundwater Quality (EC)% of Area00 - 1 000 mS/m81.97> 1 000 mS/m18.03Geology% of AreaQUATERNARY20.56KLEIN KOGELFONTEIN* Suite0.87Biesiesfontein Granite22.08SPEKTAKEL Suite27.54LITTLE NAMAQUALAND Suite20.66HOOGOOR Suite0.5OKIEP GRP7.63Risk to groundwater:NoneAssumptions and constraints:Essentially no groundwater use in the constraints:Level of confidence:lowVinplications of using more/less water:groundwater) - so low groundwatercorDiscussion on "hot spots":None	Area: Recharge:		/a		
Aglrig: 0.0000 Industry: 0.0000 Aglzive: 0.0194 Aquaculture: 0.0000 Water Balance: 0.916 Mm³/a Stress Index: 0.02 Unstressed or low levels of stress EWR low flow requirement: 0.039 Mm³/a Groundwater available for use: 0.88 Mm³/a (minimal) GW Reserve completed (Y/N): Y Aquifer type and yield % of Area Intergranular and fractured 0.0 - 0.1 l/s 19.16 Intergranular and fractured 0.1 - 0.5 l/s 80.84 Groundwater Quality (EC) % of Area 00 - 1 000 mS/m 81.97 >1 000 mS/m 18.03 Geology % of Area QUATERNARY 20.56 KLEIN KOGELFONTEIN* Suite 0.87 Biesiesfontein Granite 22.08 SPEKTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Cevel of confidence: low Mufavourable cond	Total Use:				
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Water Balance: 0.916 Mm³/a Stress Index: 0.02 Unstressed or low levels of stress EWR low flow requirement: 0.039 Mm³/a Groundwater available for use: 0.88 Mm³/a (minimal) GW Reserve completed (Y/N): Y Aquifer type and yield % of Area Intergranular and fractured 0.0 - 0.1 l/s 19.16 Intergranular and fractured 0.1 - 0.5 l/s 80.84 Groundwater Quality (EC) % of Area 00 - 1 000 mS/m 81.97 > 1 000 mS/m 81.97 > 1 000 mS/m 81.97 > 1 000 mS/m 80.84 Geology % of Area QUATERNARY 20.56 KLEIN KOGELFONTEIN* Suite 0.87 Biesiesfontein Granite 22.08 SPEKTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: Iow Assumptions and constraints: Level of confidence: Level of confidence: Iow Implications of using more/less water: Groundwater) - so low groundwatercon	AgIrrig: AgI ine:			472.	
Stress Index: 0.02 Unstressed or low levels of stress EWR low flow requirement: 0.039 Mm³/a Groundwater available for use: 0.88 Mm³/a (minimal) GW Reserve completed (Y/N): Y Aquifer type and yield % of Area Intergranular and fractured 0.0 - 0.1 l/s 19.16 Intergranular and fractured 0.1 - 0.5 l/s 80.84 Groundwater Quality (EC) % of Area 00 - 1 000 mS/m 81.97 > 1 000 mS/m 81.97 > 1 000 mS/m 81.03 Geology % of Area QUATERNARY 20.56 KLEIN KOGELFONTEIN* Suite 0.87 Biesiesfontein Granite 22.08 SPEKTAKEL Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: None	~		*	10:	0.0000
EWR low flow requirement: 0.039 Mm³/a Groundwater available for use: 0.88 Mm³/a (minimal) GW Reserve completed (Y/N): Y Aquifer type and yield % of Area Intergranular and fractured 0.0 - 0.1 l/s 19.16 Intergranular and fractured 0.1 - 0.5 l/s 80.84 Groundwater Quality (EC) % of Area 00 - 1 000 mS/m 81.97 > 1 000 mS/m 18.03 Geology % of Area QUATERNARY 20.56 KLEIN KOGELFONTEIN* Suite 0.87 Biesiesfontein Granite 22.08 SPEKTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: groundwater) - so low groundwatercom Discussion on "hot spots": None				s of strass	
Groundwater available for use: 0.88 Mm³/a (minimal) GW Reserve completed (Y/N): Y Aquifer type and yield % of Area Intergranular and fractured 0.0 - 0.1 l/s 19.16 Intergranular and fractured 0.1 - 0.5 l/s 80.84 Groundwater Quality (EC) % of Area 00 - 1 000 mS/m 81.97 > 1 000 mS/m 81.97 > 1 000 mS/m 80.84 Geology % of Area QUATERNARY 20.56 KLEIN KOGELFONTEIN* Suite 0.87 Biesiesfontein Granite 22.08 SPEKTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Vmplications of using more/less water: groundwater) - so low groundwater constrainfall/or Discussion on "hot spots": None				~	
GW Reserve completed (Y/N): Y Aquifer type and yield % of Area Intergranular and fractured 0.0 - 0.1 l/s 19.16 Intergranular and fractured 0.1 - 0.5 l/s 80.84 Groundwater Quality (EC) % of Area 00 - 1 000 mS/m 81.97 > 1 000 mS/m 18.03 Geology % of Area QUATERNARY 20.56 KLEIN KOGELFONTEIN* Suite 0.87 Biesiesfontein Granite 22.08 SPEKTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Lurfavourable conditions (low rainfall/igroundwater on provide the conditions (low rainfall/igroundwater) - so low groundwater on provide the conditions (low rainfall/igroundwater) - so low groundwater on provide the conditions (low rainfall/igroundwater) - so low groundwater on provide the conditions (low rainfall/igroundwater) - so low groundwater on provide the conditions (low rainfall/igroundwater) - so low groundwater on provide the conditions (low rainfall/igroundwater) - so low groundwater on provide the conditions (low rainfall/igroundwater) - so low groundwater on provide the conditions (low rainfall/igroundwater) - so low groundwater on provide the conditions (low rainfall/igroundwater) - so low groundwater on provide the con	-				nimal)
Aquifer type and yield % of Area Intergranular and fractured 0.0 - 0.1 l/s 19.16 Intergranular and fractured 0.1 - 0.5 l/s 80.84 Groundwater Quality (EC) % of Area 00 - 1 000 mS/m 81.97 > 1 000 mS/m 18.03 Geology % of Area QUATERNARY 20.56 KLEIN KOGELFONTEIN* Suite 0.87 Biesiesfontein Granite 22.08 SPEKTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/more/less water: Discussion on "hot spots": None				/ a (111	
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ntergranular and fractured 0.1 - 0.5 l/s 80.84 Groundwater Quality (EC) % of Area 00 - 1 000 mS/m 81.97 > 1 000 mS/m 18.03 Geology % of Area QUATERNARY 20.56 KLEIN KOGELFONTEIN* Suite 0.87 Biesiesfontein Granite 22.08 SPEKTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Liver of confidence: Level of confidence: low Curplications of using more/less water: Unfavourable conditions (low rainfall/more/less water: Discussion on "hot spots": None					
Groundwater Quality (EC) % of Area 00 - 1 000 mS/m 81.97 > 1 000 mS/m 18.03 Geology % of Area QUATERNARY 20.56 KLEIN KOGELFONTEIN* Suite 0.87 Biesiesfontein Granite 22.08 SPEKTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/more/less water: Discussion on "hot spots": None	0				
00 - 1 000 mS/m 81.97 > 1 000 mS/m 18.03 Geology % of Area Hydrological sign QUATERNARY 20.56 KLEIN KOGELFONTEIN* Suite 0.87 Biesiesfontein Granite 22.08 SPEKTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: groundwater) - so low groundwater conditions (low rainfall, groundwater) - so low groundwater cond	Intergranular and fra	ctured 0.1 - 0.5	51/s 8	0.84	
1 000 mS/m 18.03 Geology % of Area Hydrological sign QUATERNARY 20.56 KLEIN KOGELFONTEIN* Suite 0.87 Biesiesfontein Granite 22.08 SPEKTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Liver I of confidence: Level of confidence: Iow Implications of using more/less water: Unfavourable conditions (low rainfall, groundwater) - so low groundwater constraints:	Groundwater Qual	ity (EC)	%	of Area	
Geology% of AreaHydrological signQUATERNARY20.56KLEIN KOGELFONTEIN* Suite0.87Biesiesfontein Granite22.08SPEKTAKEL Suite27.54LITTLE NAMAQUALAND Suite20.66HOOGOOR Suite0.5OKIEP GRP7.63Risk to groundwater:NoneAssumptions and constraints:Essentially no groundwater use in the constraints:Level of confidence:lowImplications of using more/less water:Unfavourable conditions (low rainfall, groundwater) - so low groundwater constraints:Discussion on "hot spots":None	300 - 1 000 mS/m		8	1.97	
QUATERNARY 20.56 KLEIN KOGELFONTEIN* Suite 0.87 Biesiesfontein Granite 22.08 SPEKTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/groundwatercond) Discussion on "hot spots": None	> 1 000 mS/m		1	8.03	
KLEIN KOGELFONTEIN* Suite 0.87 Biesiesisfontein Granite 22.08 SPEKTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/or groundwater) - so low groundwatercon Discussion on "hot spots": None	Geology		% of Area	a Hydro	logical sign
Biesiesfontein Granite 22.08 SPEKTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/groundwater) - so low groundwatercor Discussion on "hot spots": None	QUATERNARY		20.56		
SPEKTAKEL Suite 27.54 LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/ groundwater) - so low groundwater conditions Discussion on "hot spots": None	KLEIN KOGELFO	ONTEIN* Sui	ite 0.87		
LITTLE NAMAQUALAND Suite 20.66 HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/groundwater) - so low groundwater constraints: Discussion on "hot spots": None	Biesiesfontein Gran	ite	22.08		
HOOGOOR Suite 0.5 OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/groundwater) - so low groundwatercom Discussion on "hot spots": None	SPEKTAKEL Suite	2	27.54		
OKIEP GRP 7.63 Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/groundwater) - so low groundwater corr Discussion on "hot spots": None	LITTLE NAMAQU	JALAND Suit	te 20.66		
Risk to groundwater: None Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/groundwater) - so low groundwatercom Discussion on "hot spots": None	HOOGOOR Suite		0.5		
Assumptions and constraints: Essentially no groundwater use in the constraints: Level of confidence: low Implications of using more/less water: Unfavourable conditions (low rainfall/groundwater) - so low groundwatercor Discussion on "hot spots": None	OKIEP GRP		7.63		
constraints: Level of confidence: low Implications of using more/less water: Discussion on "hot spots":	Risk to groundwate	er:	None		
Implications of using nore/less water: Unfavourable conditions (low rainfall/groundwater) - so low groundwatercon Discussion on "hot spots": None	Assumptions and constraints:		Essentially no	groundwat	er use in the
more/less water: groundwater) - so low groundwatercom Discussion on "hot spots": None	Level of confidence	e:	low		
	Implications of usi more/less water:	ing			
	Discussion on "ho	t spots":	None		
	Relevant previous				

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Quaternary Catchn	nent: I	F60D			
Present Status Cate	gory(A-F):		А		
Desired Water Reso	ource Catego	ory (A-F):	А		
Management Class	(Excellent	t/Good/Fair):	Excelle	nt	
Area: Recharge:	481 km² 0.4966 Mm	1 ³ /a			
Total Use: Rural:	0.016 Mm³ 0.0000	Mining:		0.0000	
AgIrrig: AgLive:	0.0000 0.0164	Industry: Aquacult	ure:	0.0000 0.0000	
Water Balance:	0.48 Mm ³ /	а			
Stress Index:	0.03 U	nstressed or low leve	els of stress		
EWR low flow requ			2 Mm³/a		
Groundwater availa	able for use:	0.45	Mm³/a (mini	mal)	
GW Reserve compl	eted (Y/N):	N			
Aquifer type and yi	eld	%	of Area		
Fractured 0.5 - 2.0 1/s	s		9.2		
Intergranular and fractured 0.0 - 0.1 l/s		.1 l/s	24.16		
Intergranular and frac	ctured 0.1 - 0	.5 l/s	66.64		
Groundwater Quali	ity (EC)	%	of Area		
300 - 1 000 mS/m			55.99		
> 1 000 mS/m			44.01		
Geology		% of Are	ea Hydrolo	ogical sign	nifi
QUATERNARY		32.54			
NAMA GRP		2.21			
Biesiesfontein Grani	ite	10.23			
SPEKTAKEL Suite		12.22			
LITTLE NAMAQU	JALAND Su	ite 41.72			
OKIEP GRP		1.09			
Risk to groundwate	er:	None			
Assumptions and constraints:		Essentially no	groundwater	use in the	с
Level of confidence		low			
Implications of usin more/less water:	ng	Unfavourable groundwater)			
Discussion on "hot	t spots":	None			
Relevant previous v	work:				

Quaternary Catchment	, F	60E			
Present Status Category	7 (A-F):		А		
Desired Water Resource		1 <i>-F):</i>	А		
	(Excellent/Good		Excellent		
Area: 795	5 km²				
Recharge: 0.7	'1 Mm³/a				
	27 Mm³/a				
	0000	Mining:	0.000		
0 0	0000 0274	Industry: Aquaculture	0.000 : 0.000		
-	583 Mm ³ /a	Глунаннине	. 0.000	0	
		1 1 1 1	<i>C</i> ,		
Stress Index: 0.0		ed or low levels	2		p
EWR low flow requiren		0.005 N			s f
Groundwater available .			m³/a (minimal)	V	an
GW Reserve completed	(Y/N):	Ν			· 1
Aquifer type and yield		% of .	Area		
Fractured 0.5 - 2.0 l/s		1	.8		75°
Fractured 2.0 - 5.0 l/s		0.	66	Lami	berts Bay
ntergranular and fracture	d 0.0 - 0.1 l/s	48	.41	F	Elands Bay
ntergranular and fracture	ed 0.1 - 0.5 l/s	47.	.07		12
Karst 0.5 - 2.0 l/s			05		SR
Groundwater Quality (1	EC)	% of	^c Area		
- 70 mS/m	-/)		
0 - 300 mS/m			07		
0 - 300 mS/m			.89		
-					
> 1 000 mS/m			.88		
Geology			Hydrological s	significance	
QUATERNARY		88.15			
TABLE MOUNTAIN C	GRP	0.21	Major fractured	d rock/seconda	ry aquifer sy
VANRHYNSDORP GF	t Ρ	1.32	Impermeable a	quiclude	
Biesiesfontein Granite		0.18			
SPEKTAKEL Suite		0.81			
LITTLE NAMAQUAL	AND Suite	7.99			
OKIEP GRP		0.61			
Risk to groundwater:	No	one			
Assumptions and constraints:	Ess	sentially no gr	oundwater use in	the catchment.	
Level of confidence:	low	7			
			onditions (low rain	ufall/deep grou	ndwater leve
Implications of using more/less water:			o low groundwate		
Implications of using	gro	oundwater) - s			

Quaternary Catchr	nent:	G30A		
Present Status Cate	egory (A-F));	С	
Desired Water Res	ource Cate	gory (A-F):	В	
Management Class	e (Excelle	ent/Good/Fair):	Good	
Area:	761 km ²			
Recharge:	10.7313 N	Im³/a		
Total Use:	2.769 Mn	•		
Rural:	0.0040	Mining:		0.0000
AgIrrig: AgLive:	2.6167 0.1487	Industry: Aquacultur	re:	0.0000 0.0000
Mater Balance:	7.962 Mr	*		0.0000
Stress Index:			c	
		Moderate levels of stress		
EWR low flow requ			lm³/a lm³/a (aday	anata)
Groundwater availa			1m³/a (adeo	Juate)
GW Reserve comp			f Area	
Aquifer type and yn Fractured 0.1 - 0.5 l/			.44	
Fractured 0.1 - 0.3 1/			44 7.98	
Fractured 2.0 - 5.0 1/			2.52	
Intergranular 0.0 - 0.			1.39 2.50	
Intergranular 0.1 - 0.			3.58	
Intergranular> 5.0 l/	s	t	0.01	
Groundwater Qual	ity (EC)	% 0	of Area	
0 - 70 mS/m		2	9.86	
70 - 300 mS/m		6	9.87	
Geology		% of Area	Hydrole	ogical sign
QUATERNARY		88.61		
TABLE MOUNTA	IN GRP	9.03	Major f	ractured ro
MALMESBURY G	RP	0.31	Impern	neable aqui
Risk to groundwate	er:	Groundwater s rainfall	table curren	tly howeve
Assumptions and constraints:		None - really -	the area is b	being studie
Level of confidence	e:	low		
Implications of usi more/less water:	ng	Unfavourable c groundwater) -		
Discussion on "ho	t spots":	None		
Relevant previous	work:	GEOSS, 2006		

Quaternary Catchmo	ent: G	30B		
Present Status Categ	gory(A-F):		А	
Desired Water Reso	urce Categoi	у (A-F):	А	
Management Class	(Excellent/	Good/Fair):	Excellen	ıt
Area: Recharge:	658 km² 15.62 Mm³/a	1		
Total Use: Rural: Aglirig: AgLive:	0.49 Mm³/a 0.0070 0.3585 0.1245	Mining: Industry: Aquaculture	ÿ	0.0000 0.0000 0.0000
Water Balance:	15.13 Mm ³ /a			
Stress Index:	0.03 Uns	tressed or low levels	~	
EWR low flow requi		1.49 M		
Groundwater availal	ble for use:	13.64M	lm³/a (adequ	uate)
GW Reserve comple	ted (Y/N):	Y		
Aquifer type and yie	ld	% of .	Area	
Fractured 0.1 - 0.5 l/s		89	.75	
Fractured 0.5 - 2.0 l/s		7.	96	
Fractured 2.0 - 5.0 l/s		2.	29	
Groundwater Qualit	y (EC)	% of	^c Area	
0 - 70 mS/m		12	.33	
300 - 1 000 mS/m		87	.67	
Geology		% of Area	Hydrolog	zical signifi
QUATERNARY		11.95		
TABLE MOUNTAI	N GRP	10.38	Major fra	ctured rock,
KLIPHEUWEL GR	Р	1.31	Aquitard o	of limited hy
MALMESBURY GR	Р	76.35	Imperme	able aquiclu
Risk to groundwater	r.	None		
Assumptions and constraints:		Essentially no gr	oundwater u	use in the ca
Level of confidence:	,	high		
Implications of using more/less water:	g	TMG aquifers c	ontribute to	river baseflo
Discussion on "hot	spots":	None		
Relevant previous w	ork:	GEOSS, 2006		

Quaternary Catchr	ment: (G30C			
Present Status Cate	egory (A-F):		С		
Desired Water Res	ource Catego	ory (A-F):	С		
Management Class	(Excellent	/Good/Fair):	Good		
Area:	351 km²				
Recharge:	8.48 Mm ³ /a				
Total Use:	2.78 Mm ³ /	a			
Rural:	0.0000	Mining:		0.0000	
AgIrrig:	2.7698 0.0102	Industry: Aquacultur	· ·	0.0000 0.0000	
AgLive: Water Balance:	5.7 Mm ³ /a	гчунинний	r.	0.0000	
Stress Index:		oderate levels of stress			
EWR low flow requ		1.98 N			
Groundwater availa			m³/a (adeq	juate)	
GW Reserve comp	leted (Y/N):	Y			
Aquifer type and y	eld	% of	'Area		
Fractured 0.1 - 0.5 l/	S		11		
Fractured 0.5 - 2.0 l/	s	:	89		
Croundwater Qual	ity (EC)	9/- 0	f Area		
Groundwater Qual	uy (EC)				
0 - 70 mS/m		84	1.33		
70 - 300 mS/m		0	.44		
300 - 1 000 mS/m		15	5.23		
Geology		% of Area	Hydrol	logical signi	ific
QUATERNARY		1.27			
TABLE MOUNTA	IN GRP	93.28	Major f	fractured roc	k/
KLIPHEUWEL G	RP	1.75	Aquitarc	d of limited l	hyd
MALMESBURY G	RP	3.71	Impern	neable aquicl	lud
Risk to groundwate	e r:	Groundwater o	ver-abstrac	tion can occ	u
Assumptions and constraints:		Good rainfall / quite rapidly.	recharge ir	n this area, b	ut
Level of confidence	27	high			
Implications of usi more/less water:	ng	Over-abstractio	n must be a	avoided - an	
Discussion on "ho	t spots":	None			

Quaternary Catchment:	G30D
Present Status Category (A-F):	<i>:</i> C
Desired Water Resource Categ	gory (A-F): B
Management Class (Exceller	nt/Good/Fair): Good
<i>Area:</i> 534 km ²	
Recharge: 12.38 Mm	. ³ /a
Total Use: 4 Mm³/a Rural: 0.0000	
AgIrrig: 3.8936	Mining: 0.0000 Industry: 0.0000
<i>AgLive:</i> 0.1064	Aquaculture: 0.0000
Water Balance: 8.38 Mm ³ /	/a
Stress Index: 0.32 M	Moderate levels of stress
EWR low flow requirement:	1.27 Mm ³ /a
Groundwater available for use.	Nieuwoudtvilla® K
GW Reserve completed (Y/N)): Y
Aquifer type and yield	% of Area
Fractured 0.1 - 0.5 l/s	8.46 Lamberts Bay
Fractured 0.5 - 2.0 l/s	80.22 Elands Bay
Fractured 2.0 - 5.0 l/s	11.32
Groundwater Quality (EC)	% of Area
0 - 70 mS/m	83.75
70 - 300 mS/m	8.77
300 - 1 000 mS/m	7.48
Geology	% of Area Hydrological significance
QUATERNARY	59.32
TABLE MOUNTAIN GRP	22.6 Major fractured rock/secondary aquifer system.
MALMESBURY GRP	18.07 Impermeable aquiclude
Risk to groundwater:	Groundwater is used extensively, however the aquifers are high yielding. The risk is quite high that over-abstraction can occur. Groundwater quality can also deteriorate.
Assumptions and constraints:	None - really - the area is being studied in detail.
Level of confidence:	high
Implications of using more/less water:	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwatercontribution to baseflow.
Discussion on "hot spots":	None - but needs to be monitored carefully
Relevant previous work:	GEOSS, 2006

Quaternary Catchm	nent:	530E								
Present Status Cate	gory (A-F):		D							
Desired Water Reso	ource Catego	ory (A-F):	С							
Management Class	(Excellent	/Good/Fair):	Fair							
Area:	352 km²									
Recharge:	4.45 Mm ³ /a	ı					1	3		
Total Use:	2.9 Mm ³ /a					M	~~	3		
Rural:	0.0000 2.8328	Mining: Industry:		0.0000 0.0000		5	N	~		
AgIrrig: AgLive:	0.0672	Aquaculture.		0.0000		and the second s	15	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
Water Balance:	1.55 Mm ³ /a	*				R	24	3~	3	
Stress Index:	0.65 M	oderate levels of stress			S	A	1.25	57	2	
EWR low flow requ		0.6 Mm	³ /a		Ye	mg (R	43	3	
- Groundwater availa	ble for use:	0.95Mn	n³/a(minimal))		Nieu	woudtville	Calvinia	5	
GW Reserve comple	eted (Y/N):	Y			, S	edendal®	255	2 th	2)	
Aquifer type and yie	eld	% of 1	Area			LA	St	NY	E	
Fractured 0.1 - 0.5 l/s	3	0.0	53			Graafwater	Clahwil	líam D-	152}	
Fractured 0.5 - 2.0 1/s	Fractured 0.5 - 2.0 l/s		68		Elands	Bay	f.f.	Jul 8	-	
Intergranular> 5.0 l/s	Intergranular> 5.0 l/s		59			An	itrusdal®	242	535	3
Groundwater Quali	ty (EC)	% of	Area			~	-th	SE	S	5
0 - 70 mS/m		99	.3				1	ATT	DE	3
70 - 300 mS/m		0.	7							
Geology		% of Area	Hydrologi	ical sign	ificance					
QUATERNARY		42.16								
TABLE MOUNTA	IN GRP	54.5	Major fract	tured roc	ck/secondary	y aquife r	system.			
KLIPHEUWEL GR	P	3.35	Aquitard of	f limited	hydrogeolog	gical signi	ficance			
Risk to groundwate	er:	Groundwater is The risk is quite can also deterior	high that ove							
Assumptions and constraints:		None - really - th	ie area is bein	ng studied	d in detail.					
Level of confidence	v.	high								
Implications of usin more/less water:	ng	Unfavourable co groundwater) - s sustainVelorenvl	o low ground					· ·		
Discussion on "hot	spots":	Yes - in the prox	imity of Velo	orenvlei						
Relevant previous w	vork:	GEOSS, 2006								

Quaternary Catchment:	G30F
Present Status Category (A-F):	<i>:</i> F
Desired Water Resource Categ	gory (A-F): D
Management Class (Exceller	nt/Good/Fair): Fair
Area: 780 km ²	
Recharge: 13.8 Mm ³ /	/a 🏠
Total Use: 14.03 Mm	1 ³ /a
Rural: 0.0120	Mining: 0.0000
<i>AgIrrig:</i> 14.0018	Industry: 0.0000
<i>AgLive:</i> 0.0162	Aquaculture: 0.0000
Water Balance: -0.23 Mm ³	3/a
Stress Index: 1.02 C	Critically stressed
EWR low flow requirement:	1.049 Mm ³ /a
Groundwater available for use:	: -1.28Mm ³ /a (none)
GW Reserve completed (Y/N)): Y Vietendal*
Aquifer type and yield	% of Area
Fractured 0.5 - 2.0 l/s	75.77 Graftwater Clahwilliam
Fractured 2.0 - 5.0 l/s	5.52 Elands Baye
Intergranular 2.0 - 5.0 l/s	0.19
Intergranular> 5.0 l/s	18.07
Groundwater Quality (EC)	% of Area
0 - 70 mS/m	99.26
300 - 1 000 mS/m	0.2
Geology	% of Area Hydrological significance
QUATERNARY	34.62
TABLE MOUNTAIN GRP	64.87 Major fractured rock/secondary aquifer system.
Risk to groundwater:	Groundwater is being over-abstracted. Ecosystems impacted. Groundwater quality worsening in places.
Assumptions and constraints:	None - really - the area is being studied in detail.
Level of confidence:	high
Implications of using more/less water:	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so low groundwatercontribution to baseflow.
Discussion on "hot spots":	Yes
Relevant previous work:	GEOSS, 2006

Quaternary Catchment: G30F

Quaternary Catchr	ment:	G30G					
Present Status Cate	egory (A-F):		D				
Desired Water Res	ource Categ	ory (A-F):	С				
Management Class	s (Excellen	ıt/Good/Fair):	Fair				
Area:	647 km ²						
Recharge:	11.06 Mm ³	3/a					4
Total Use:	6.74 Mm ³					and	2
Rural:	0.0090	Mining:		0.0000		M.	3
AgIrrig: AgLive:	6.7206 0.0104	Industry: Aquacultur	···	0.0810 0.0000		4-51	~
Water Balance:	4.32 Mm ³ /	1	2.	0.0000		3.12	2
Stress Index:	,	'a Ioderate levels of stress			6 m	A HE	F
		5	Mm³/a		Cry	Lh?	y
EWR low flow requ Groundwater avail			,	unato)	Acres	m A 1	4L
			lm³/a (adeq	uatej	(M	Nieuwoudtville	C.
GW Reserve comp.					Vredend	and 42	and
Aquifer type and y	ield	% of	'Area		5	XX	2
Fractured 0.5 - 2.0 l/	's	32	2.86		Lamberts Bay	valuere and	S
Fractured 2.0 - 5.0 l/	's	38	8.38		Elands Bay	Clahwilli	am >
Intergranular 2.0 - 5.	0 l/s	28	3.73		}	Alt	re
Groundwater Qual	lity (EC)	% 0.	f Area		4	- The	Y
0 - 70 mS/m		4	7.8			t	F
70 - 300 mS/m		4	5.9			V	a.
300 - 1 000 mS/m		6	.18				
Geology		% of Area	Hydrolo	gical sign	ificance		
QUATERNARY		57.74					
TABLE MOUNTA	AIN GRP	42	Major fr	actured roc	k/secondary aquif	fer system.	
Risk to groundwat	er:	Groundwater le	vsl are drop	ping and w	vater quality worse	ning in places	
Assumptions and constraints:		None - really - t	he area is b	eing studied	l in detail.		
Level of confidence	e:	high					
Implications of usi more/less water:	ing				deep groundwater ntribution to basef		pres
Discussion on "ho	ot spots":	Yes					
Relevant previous	work:	GEOSS, 2006					

Ouaternary Catchment: G30G

Quaternary Catchm	ent: C	G30H				
Present Status Categ	gory (A-F):		А			
Desired Water Reso	urce Catego	ory (A-F):	А			
Management Class	(Excellent	/Good/Fair):	Excelle	ent		
Area:	1077 km ²					
Recharge:	4.5224 Mm	3/a				~
Total Use:	0.035 Mm ³			0.0000		
Rural: AgIrrig:	0.0000 0.0000	Mining: Industry:		0.0000		X
AgLive:	0.0353	Aquacultur	?:	0.0000		22
Water Balance:	4.487 Mm ³ /	'a			1 miles	2)
Stress Index:	0.01 Ur	istressed or low levels	of stress		Vert	2/3
EWR low flow requi	irement:	0.589 1	√lm³/a		17	Nieuwoudtville
Groundwater availa	ble for use:	3.90 M	m³/a (min	imal)	Vredend	al.
GW Reserve comple	eted (Y/N):	Y			1 M	53
Aquifer type and yie	d	% of	Area		Lamberts Bay Graafy	water?
Fractured 0.5 - 2.0 l/s			6		Elands Bay	Ciar
Fractured 2.0 - 5.0 l/s		9	03		L	Citrusdal®
Intergranular 2.0 - 5.0	l/s	0.	.97		25	and
Groundwater Qualit	ty (EC)	% 01	f Area			L
0 - 70 mS/m		20	0.17			
70 - 300 mS/m		14	.26			
300 - 1 000 mS/m		65	.54			
Geology		% of Area	Hydrole	ogical sign	ificance	
QUATERNARY		60.63				
TABLE MOUNTAI	N GRP	38.85	Major f	ractured roc	k/secondary aqu	ifer system.
VANRHYNSDORP	GRP	0.08	Imperm	neable aquic	ude	
Risk to groundwater	r:	None				
Assumptions and constraints:		Essentially no g	coundwater	r use in the	catchment.	
Level of confidence:		low				
Implications of usin more/less water:	g				deep groundwate	
Discussion on "hot	spots":	None				
Relevant previous w	ork:	GEOSS, 2006				

11. APPENDIX C: QUATERNARY SUMMARIES

QUAT	Present Class	Desired_ status_ category	Manage't Class	Area_ (km2)	Recharge (Mm3/a)	Total_ Usage (Mm3/a)	Water_ Balance (Mm3/a)	EWR Low Flow (Mm3/a)	GW Available for use (Mm3/a)	GW Avail 4Use
E10A	В	В	Good	134	17.5895	3.452	14.138	5.44	8.70	Adequate
E10B	В	В	Good	202	20.6085	3.729	16.880	6.78	10.10	Adequate
E10C	A	А	Excellent	192	14.3015	0.343	13.959	5.66	8.30	Adequate
E10D	C	В	Fair	235	13.6855	3.576	10.110	5.74	4.37	Adequate
E10E	A	AB	Excellent	366 386	14.6810	0.270	14.411	7.35	7.06	Adequate
E10F E10G	C A	A	Good Excellent	508	14.6025 19.3352	4.896 0.104	9.707 19.231	5.13 4.21	4.58 15.02	Adequate Adequate
E10G	В	А	Excellent	162	9.0796	1.037	8.043	1.51	6.53	Minimal
E10I	C	C	Fair	468	8.7380	1.946	6.792	1.63	5.16	Adequate
E10K	Ă	A	Excellent	235	2.1529	0.095	2.058	0.36	1.70	Minimal
E21A	D	С	Fair	190	10.7001	5.359	5.341	1.48	3.86	Adequate
E21B	В	В	Good	223	7.7935	1.348	6.446	0.012	6.43	Minimal
E21C	В	В	Good	233	7.1742	1.256	5.918	0.07	5.85	Minimal
E21D	D	С	Fair	242	13.7246	7.387	6.338	1.884	4.45	Adequate
E21E	D	С	Fair	293	6.1869	2.690	3.497	0.09	3.41	Adequate
E21F	В	В	Good	379	5.0851	0.544	4.542	0.15	4.39	Minimal
E21G	F	D	Fair	266	9.6261	12.088	-2.462	2.07	-4.53	None
E21H	F	D	Fair	404	11.8491	2.561	9.288	16.656	-7.37	None
E21J	А	А	Excellent	317	5.5000	0.006	5.494	0.321	5.17	Adequate
E21K	В	А	Excellent	330	6.3447	0.400	5.944	0.184	5.76	Adequate
E21L	А	А	Excellent	195	0.5102	0.004	0.507	0.14	0.37	Minimal
E22A	А	А	Excellent	750	3.5276	0.030	3.498	0.39	3.11	Minimal
E22B	А	А	Excellent	638	2.6987	0.022	2.677	0.432	2.24	Minimal
E22C	А	А	Excellent	490	3.8245	0.209	3.615	0.332	3.28	Minimal
E22D	A	A	Excellent	496	1.0380	0.017	1.021	0.26	0.76	Minimal
E22E E22F	A	A	Excellent Excellent	1013 400	2.2736	0.120 0.012	2.154	1.78 0.21	0.37 0.26	Minimal
E22F E22G	F	D	Fair	367	0.4846 0.1410	0.012	0.473 0.137	0.21	-0.29	Adequate None
E22G E23A	А	A	Excellent	762	6.0995	0.004	6.041	1.048	4.99	Adequate
E23B	A	A	Excellent	702	4.2650	0.000	4.265	0.97	3.30	Adequate
E23C	A	A	Excellent	318	1.8446	0.000	1.844	0.437	1.41	Minimal
E23D	A	A	Excellent	750	3.2592	0.052	3.208	1.031	2.18	Minimal
E23E	B	A	Excellent	564	4.5617	0.339	4.223	0.604	3.62	Minimal
E23F	F	D	Fair	473	0.4311	1.071	-0.640	0.506	-1.15	None
E23G	А	А	Excellent	747	1.7226	0.027	1.696	0.8	0.90	Minimal
E23H	А	А	Excellent	660	2.9601	0.023	2.937	0.907	2.03	Minimal
E23J	F	D	Fair	895	0.7403	0.031	0.709	0.958	-0.25	None
E23K	В	D	Fair	572	0.0199	0.003	0.017	0.612	-0.59	None
E24A	А	А	Excellent	255	4.8767	0.046	4.831	0.468	4.36	Adequate
E24B	А	А	Excellent	468	2.6930	0.061	2.632	0.857	1.77	Minimal
E24C	В	А	Excellent	784	2.5331	0.243	2.290	0.75	1.54	Adequate
E24D	А	А	Excellent	997	1.6650	0.000	1.665	0.96	0.71	Adequate
E24E	А	А	Excellent	671	1.2469	0.039	1.208	1.576	-0.37	None
E24F	А	А	Excellent	582	1.7163	0.004	1.712	1.07	0.64	Adequate
E24G	A	A	Excellent	633	0.1209	0.000	0.121	1.16	-1.04	None
E24H E24J	A C	A B	Excellent Good	483 1078	0.3017 5.7537	0.008	0.294 4.298	0.56	-0.27 3.06	None Adequate
E24J E24K	A	A	Excellent	652	0.6656	1.456 0.000	4.298	0.75	-0.08	None
E24K E24L	С	В	Good	516	6.6738	2.430	4.244	1.014	3.23	Adequate
E24L E24M	A	A	Excellent	529	2.7315	0.004	2.728	0.71	2.02	Minimal
E31A	A	A	Excellent	2865	0.0233	0.004	0.023	0.021	0.00	None
E31B	A	A	Excellent	1476	0.6397	0.000	0.640	0.021	0.55	Minimal
E31C	A	A	Excellent	1572	0.0117	0.000	0.012	0.093	-0.08	None
E31D	А	A	Excellent	839	0.0001	0.000	0.000	0.049	-0.05	None
E31E	А	A	Excellent	478	0.0001	0.000	0.000	0.029	-0.03	None
E31F	А	А	Excellent	525	0.0006	0.000	0.001	0.029	-0.03	None
E31G	А	А	Excellent	1238	0.0039	0.003	0.001	0.073	-0.07	None
E31H	F	D	Fair	726	0.0046	0.001	0.003	0.043	-0.04	None
E32A	А	А	Excellent	1118	4.2423	2.159	2.083	0.401	1.68	Adequate
E32B	F	D	Fair	828	1.1174	3.377	-2.260	0.297	-2.56	None
E32C	А	А	Excellent	638	1.9643	0.000	1.964	0.228	1.74	Minimal
E32D	А	А	Excellent	616	0.3491	0.000	0.349	0.22	0.13	Minimal
E32E	F	D	Fair	1001	1.2983	3.636	-2.338	0.358	-2.70	None
E33A E33B	A A	A A	Excellent Excellent	1355 702	0.0580 0.0844	0.033 0.021	0.025 0.064	0.083 0.062	-0.06 0.00	None None

E33C	А	А	Excellent	980	1.5792	0.027	1.552	0	1.55	Adequate
E33D	С	В	Good	1559	0.2322	0.049	0.184	0.138	0.05	Minimal
E33E	С	В	Good	1282	0.5992	0.169	0.430	0.06	0.37	Adequate
E33F	А	А	Excellent	725	3.5663	0.073	3.493	0.05	3.44	None
E33G	D	С	Fair	894	2.2859	1.302	0.984	0	0.98	Adequate
E33H	В	А	Excellent	719	0.7588	0.044	0.715	0.01	0.71	Minimal
E40A	С	В	Good	941	4.6549	1.722	2.933	0.9	2.03	Adequate
E40B	С	В	Good	707	3.4478	0.933	2.515	0.68	1.84	Adequate
E40C	А	А	Excellent	530	2.8450	0.094	2.751	0.11	2.64	Adequate
E40D	А	А	Excellent	544	2.4849	0.002	2.483	0.996	1.49	Minimal
F60A	А	А	Excellent	572	0.4399	0.009	0.431	0.02	0.41	None
F60B	В	А	Excellent	320	0.4776	0.045	0.433	0.018	0.42	Minimal
F60C	А	А	Excellent	622	0.9391	0.023	0.916	0.039	0.88	Minimal
F60D	А	А	Excellent	481	0.4966	0.016	0.480	0.032	0.45	Minimal
F60E	А	А	Excellent	795	0.7100	0.027	0.683	0.005	0.68	Minimal
G30A	С	В	Good	761	10.7313	2.769	7.962	0.82	7.14	Adequate
G30B	А	А	Excellent	658	15.6200	0.490	15.130	1.49	13.64	Adequate
G30C	С	С	Good	351	8.4800	2.780	5.700	1.98	3.72	Adequate
G30D	С	В	Good	534	12.3800	4.000	8.380	1.27	7.11	Adequate
G30E	D	С	Fair	352	4.4500	2.900	1.550	0.6	0.95	Minimal
G30F	F	D	Fair	780	13.8000	14.030	-0.230	1.049	-1.28	None
G30G	D	С	Fair	647	11.0600	6.740	4.320	0.413	3.91	Adequate
G30H	А	А	Excellent	1077	4.5224	0.035	4.487	0.589	3.90	Minimal

QUAT	GW_Risk	Assumptions	Confi- dence	Implications	HotSpot Discussion
E10A	In central southern portion of catchment intensive agriculture - poss. non-point source contamination risk. Gwater plays an important role is providing baseflow. CSIR studiedthe area intensively using isotopes.	Most of the agricultural activity is irrigated from groundwater.	low	Groundwater monitoring network necessary	In summer groundwater levels are drawn down significantly, however these recover each winter.
E10B	In the north-eastern portion of the eatchment there is intensive agriculture, mainly fruit.	Most of the agricultural activity is irrigated from groundwater.	low	Groundwater monitoring network necessary	The boreholes in this area are typically very high yielding and the groundwater quality is excellent. Monitoring data in the area does not show any signs of significant impact on groundwater resources.
E10C	A pristine catchment - no agricultural activity.	Groundwater is a completely natural unimpacted state	low	No monitoring required - unless for regional purposes	No hot spots
E10D	Also a mountainous catchment, however intense agriculture in the western portion (along the north/south valley). Thus non-point source contamination risk.	Most of the agricultural activity is irrigated from groundwater.	low		Further work will be required to assess the status of groundwater monitoring in the area. However the groundwater contribution to base flow is very important and agricultural activities must not impact this contribution.
E10E	Citrusdal is within this catchment. Groundwater is used in summer however the bulk of the irrigation water is from the Olifants R. Groundwater is at risk from non- point source contamination sources.	Most of the agricultural activity is irrigated from the Olifants River.	low	The catchment becomes quite water stressed in summer. A groundwater monitoring network is necessary.	No known hot spots of over-abstraction.
E10F	Mainly a mountainous catchment - however intense agriculture along the Olifants River. Surface water and groundwater is used intensively.	There is significant groundwater abstraction.	low	The catchment has a PES of C and this needs to be managed to a B, as groundwater plays a crucial role in supplying base flow to the Olifants River. This contribution is crucial in summer.	No known hot spots of over-abstraction, however this catchment needs to be carefully monitored, as it is important. If a monitoring network is not in place - one needs to be installed. Groundwater allocations need to be adhered to or even revised.
E10G	The risk is minimal of groundwater being impacted. The Clanwilliam Dam is within this catchment. This is a rugged and mountainous catchment.	Very little groundwater use. Water is obtained from the Clanwilliam Dam.	low	No major concerns regarding groundwater in this catchment.	No hot spots
E10H	Very rugged catchment - very little groundwater use the use given here may be an over-estimation.	Very little groundwater used and this catchment needs to be kept as natural as possible.	low	The class of the catchment needs to be improved to an A.	No known hot spots.
E10J	Groundwater is used extensively in this catchment. It is at risk from over-abstraction and non-point source contamination. Clanwilliam is within this catchment.	The groundwater use needs to be carefully monitored within this catchment.	low	This catchment needs to be carefully monitored.	No known hot spots of over-abstraction, however this catchment needs to be carefully monitored, as it is important. If a monitoring network is not in place - one needs to be installed. Groundwater allocations need to be adhered to or even revised.
E10K	There is more agriculture in this catchment than the groundwater abstraction data suggests.	The Olifants River is within the catchment and the assumption is that the bulk of the irrigation water is from the river.	low	Groundwater most likley has a significant role to play in the summer months.	No known hot spots of over-abstraction are known.
E21A	There is a lot of agriculture in this catchment (above the Gydo Pass). Groundwater levels are shallow and at risk from non-point based contamination.	Groundwater abstraction is high in the summer months	medium	The TMG aquifers in this catchments are high yielding and of excellent quality	From monitoring work in the area, the groundwater resources are not being impacted by agricultural activity. However the classification of the eatchment needs to be improved. A few dedicated monitoring sites are necessary as the PES is a D. The volumes of groundwater being abstracted also need to be verified and if necessary allocations adjusted.
E21B	Agricultural activity is limited in this rugged catchment . Best practices must be followed in the agricultural sector - as groundwater levels are shallow / artesian in places and can easily be impacted.	Groundwater use is limited	medium	Groundwater is limited in this large catchment, however land owner monitoring should be encouraged.	Monitoring records indicate no over- abstraction areas - aquifers are high yielding and very good quality.
E21C	Agricultural activity is limited in this rugged catchment . Best practices must be followed in the agricultural sector - as groundwater levels are shallow in places and can easily be impacted.	Groundwater use is limited	medium	Groundwater is limited in this large catchment, however land owner monitoring should be encouraged.	Monitoring records indicate no over- abstraction areas - aquifers are high yielding and very good quality.
E21D	There is a lot of agricultural activity within this catchment (>50%). There are also a lot of shallow surface water dams, however groundwater is used extensively in summer. The groundwater is generally shallow and the risk with be from non-point source contamination.	Extensive groundwater use in summer	medium	Generally the TMG aquifers are high yielding and good quality. However there should be monitoring by the land owners to ensure sustainable groundwater use. Some DWA monitoring within the catchment will be good to have.	There are no known hot spots as the groundwater levels recover each year and the water quality remains good.
E21E	Agricultural activity is limited to the river valley - with the large dams within the catchment, the groundwater use figure may be an over-estimate otherwise there is extensive use of groundwater in summer. Groundwater will be at risk to non-point source contamination.	Extensive groundwater use in summer	medium	As the class of this catchment is to be improved land owners and DWA need to monitor.	There are no known hot spots as the groundwater levels recover each year and the water quality remains good.
E21F	There is very little agricultural activity in this catchment. It should probably be an A class catchment. No risk to groundwater.	Groundwater contributes significantly to river base flow.	medium	Some further consultation is required but this is probably an A class aquifer.	No hot spots.
E21G	There is extensive agriculture in this catchment. Indications are the groundwater is not being used sustainably. Water levels are likley to be dropping and groundwater quality deteriorating. Groundwater supply at risk.	Groundwater use exceeds recharge and levels are dropping.	medium	Groundwater use needs to be assessed with a hydrocensus and a monitoring network established. It will be necessary to introduce compulsory licensing if the groundwater use is not sustainable after the land owners are informed of the situation.	Likely to be several hot spots - where groundwater levels are dropping and possibly water quality deteriorating.
E21H	Agriculture is limited - groundwater contribution to baseflow important. Groundwater quality could be impacted through agricultural activities.	Groundwater is shallow and contributes to baseflow.	medium	This class of the catchment can be imporved a level.	Unlikely.
E21J	None	Essentially no groundwater use in the	medium	Groundwater will provide baseflow.	None

1	l l	catchment.	1	1	
E21K	Groundwater use is very low and this is very close to Class A	Essentially no groundwater use in the catchment.	medium	Groundwater will provide baseflow.	None
E21L	None	Essentially no groundwater use in the catchment.	low	Groundwater will provide baseflow.	None
E22A	None	Essentially no groundwater use in the catchment.	low	Groundwater will provide some baseflow.	None
E22B	None	Essentially no groundwater use in the catchment.	low	Groundwater will provide some baseflow.	None
E22C	None	Essentially no groundwater use in the catchment.	medium	Groundwater will provide baseflow.	None
E22D	None	Essentially no groundwater use in the catchment.	medium	Groundwater will provide baseflow.	None
E22E	None - a very large catchment	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E22F	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E22G	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E23A	None - the most eastern catchment of the WMA	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E23B	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E23C	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E23D	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E23E	The agricultural use of groundwater is over-estimated - this is a Class A catchment.	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E23F	The groundwater use is likely to be completely wrong - the Tankwa Karoo National park is in this catchment - likley to be no groundwater use.	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E23G	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E23H	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E23J	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E23K	The agricultural use of groundwater is over-estimated - this is a Class A catchment. Limited use in the western part of the catchment on the river.	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E24A	None	Essentially no groundwater use in the catchment.	low	TMG aquifers contribute to river baseflow	None
E24B	None	Essentially no groundwater use in the catchment.	low	TMG aquifers contribute to river baseflow	None
E24C	The agricultural use of groundwater is over-estimated - this is a Class A catchment.	Limited groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E24D	None - a large catchment	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None

E24E	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E24F	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E24G	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E24H	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E24J	The agricultural use of groundwater is probably over- estimated - this is more a Class B catchment.	The agriculture in the west is probably more dryland farming, some centre pivots adjacent to the river - groundwater probably used mainly in summer.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E24K	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E24L	Very limited	A few centre pivots in the catchment - groundwater probably used extensively in summer	low		None
E24M	None	Essentially no groundwater use in the catchment.	medium	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E31A	None (the most northern catchment of the study area)	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E31B	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E31C	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E31D	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E31E	None	Essentially no groundwater use in the catchment.	medium	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E31F	None	Essentially no groundwater use in the catchment.	medium	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E31G	The agricultural use of groundwater is over-estimated - this is a Class A catchment.	Limited groundwater use in the catchment.	medium	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E31H	Very low	Limited groundwater use in the catchment.	medium	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E32A	The agricultural use of groundwater is over-estimated - this is a Class A catchment.	Limited groundwater use in the catchment.	medium	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E32B	The agricultural use of groundwater is over-estimated - this appears a Class A catchment. This must be assessed in more detail. Why is the groundwater stress index so high?	Limited groundwater use in the catchment.	medium	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E32C	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E32D	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None

E32E	There is a lot of agricultural activity in the west - including centre pivots. Groundwater abstraction is >recharge, so groundwater levels are likely to be dropping and groundwater quality worsening.	Significant groundwater use in the west of the catchment	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.Groundwater monitoring needs to be carried out by land owners and DWA	There are possibly hot spots.
E33A	The groundwater use is probably over-estimated. The calculated stress index is too high. This needs to be checked.	Groundwater use is very little.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E33B	The groundwater use is probably over-estimated. The calculated stress index is too high. This needs to be checked.	Groundwater use is very little.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E33C	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E33D	Very low	Groundwater use is very little.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E33E	Lutzville is in the south of this catchment. There is groundwater use in the south. Groundwater could be over-abstracted.	Groundwater use in the south of the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E33F	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E33G	Vredendal is in this catchment. Groundwater levels could be dropping. DWA are doing excellent monitoring in this area.	Groundwater is used throughout the year.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E33H	None	Limited groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E40A	The groundwater use is probably over-estimated. The calculated stress index is too high.	Limited groundwater use in the catchment.	medium	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E40B	Calvinia lies in the eastern portion of this catchment. Possibility of groundwater levels being over-abstracted and groundwater levels dropping	Limited groundwater use in the catchment.	medium	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E40C	None	Limited groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
E40D	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
F60A	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
F60B	None	Limited groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
F60C	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
F60D	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
F60E	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
G30A	Groundwater stable currently however can easily be impacted in times of low rainfall	None - really - the area is being studied in some detail.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None
G30B	None	Essentially no groundwater use in the catchment.	high	TMG aquifers contribute to river baseflow	None

G30C	Groundwater over-abstraction can occur. Monitoring is important.	Good rainfall / recharge in this area, but with low rainfall the water balance can change quite rapidly.	high	Over-abstraction must be avoided - an important recharge area.	None
G30D	Groundwater is used extensively, however the aquifers are high yielding. The risk is quite high that over- abstraction can occur. Groundwater quality can also deteriorate.	None - really - the area is being studied in detail.	high	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None - but needs to be monitored carefully
G30E	Groundwater is used extensively; however the aquifers are high yielding. The risk is quite high that over- abstraction can occur. Groundwater quality can also deteriorate.	None - really - the area is being studied in detail.	high	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow. However groundwater does sustain Velorenvlei.	Yes - in the proximity of Velorenvlei
G30F	Groundwater is being over-abstracted. Ecosystems impacted. Groundwater quality worsening in places.	None - really - the area is being studied in detail.	high	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	Yes
G30G	Groundwater levsl are dropping and water quality worsening in places	None - really - the area is being studied in detail.	high	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	Yes
G30H	None	Essentially no groundwater use in the catchment.	low	Unfavourable conditions (low rainfall/deep groundwater levels/limited presence of groundwater) - so no groundwater contribution to baseflow.	None

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