DEPARTMENT OF WATER AND SANITATION

NO. 655 **10 MAY 2019**

NATIONAL WATER ACT, 1998
(ACT NO.36 OF 1998)

PROPOSED CLASSES OF WATER RESOURCE AND RESOURCE QUALITY OBJECTIVES FOR THE BERG CATCHMENT

I, Gugile Nkwinti, in my capacity as Minister of Water and Sanitation and duly authorised in terms of Section 13(4) of the National Water Act, 1998 (Act No. 36 of 1998) hereby publish, the notice for the proposed classes of water resources and the proposed resource quality objectives for the Berg Catchment.

Any person who wishes to submit written comments with regard to the proposed classes of water resources and the proposed resource quality objectives should submit the comments within 60 days from the date of publication of this Notice to:

Director: Water Resource Classification
Attention: Ms Lebogang Matlala
Department of Water and Sanitation
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MR NKWINTI GE (MP)
MINISTER OF WATER AND SANITATION
DATE: 22/02/2019

SCHEDULE

DESCRIPTION OF THE WATER RESOURCE

The proposed water resource classes and resource quality objectives are determined for all or part of every significant water resource as set out below:

Water Management Area:	Berg-Olifants Water Management Area
Drainage Region:	G1, G2 Secondary Drainage Region and G40A Quaternary Drainage Region
River(s):	The Berg River is the largest river in the study area, which also includes a number of smaller catchments within the City of Cape Town Metropolitan area such as the Diep, Kuils, Eerste, Lourens, Sir Lowry's, Steenbras, as well as various small catchments on the Cape Peninsula and along the West Coast.

A. PROPOSED WATER RESOURCE CLASSES AS REQUIRED IN TERMS OF SECTION 13(4)(a)(i)(aa) OF THE NATIONAL WATER ACT, 1998

i. The proposed water resource classes for the Berg Catchment are listed in Table 1 according to the overall class per integrated unit of analysis (IUA), indicated in Figure 1.

ii. IUAs are classified as either Class I: indicating high environmental protection and minimal utilisation; Class II indicating moderate protection and moderate utilisation; and Class III indicating sustainable minimal protection and high utilisation.

iii. Table 1 provides the IUA, the recommended water resource class and its respective catchment configuration. The catchment configuration consists of a number of biophysical nodes representing river reaches or river resource units (RUs). The target ecological category (TEC) to be achieved or maintained for each RU in the IUA is provided.

iv. It is important to note that additional existing geographically defined areas of specific ecological importance for water resources such as protected areas (e.g. Table Mountain National Park), critical biodiversity areas (CBAs), national freshwater environmental protection areas (NFEPAs) and the strategic water source areas (SWSA) should also be considered in terms of the recommended resource classes as these would indicate areas of specific importance that should be managed in a higher resource class (e.g. Class I) than would be the case for the average of all resource units across the IUA (e.g. in a Class II).

B. RESOURCE QUALITY OBJECTIVES OF WATER RESOURCES AS REQUIRED IN TERMS OF SECTION 13(4)(a)(i)(bb) OF THE NATIONAL WATER ACT, 1998

i. Resource Quality Objectives (RQOs) are defined for prioritised RUs for each IUA in terms of water quantity, habitat and biota, and water quality. Prioritised RUs are indicated in Figure 1.

ii. Table 2 to Table 10 provide the RQOs for RIVERS in priority RUs.

iii. Table 11 to Table 17 provide the RQOs for ESTUARIES in priority RUs.

iv. Table 18 provides the RQOs for DAMS in priority RUs

v. Table 19 provides the RQOs for GROUNDWATER in priority RUs.

vi. RQOs will apply from the date signed off as determined in terms of Section 13(1) of the National Water Act, 1998, unless otherwise specified by the Minister.

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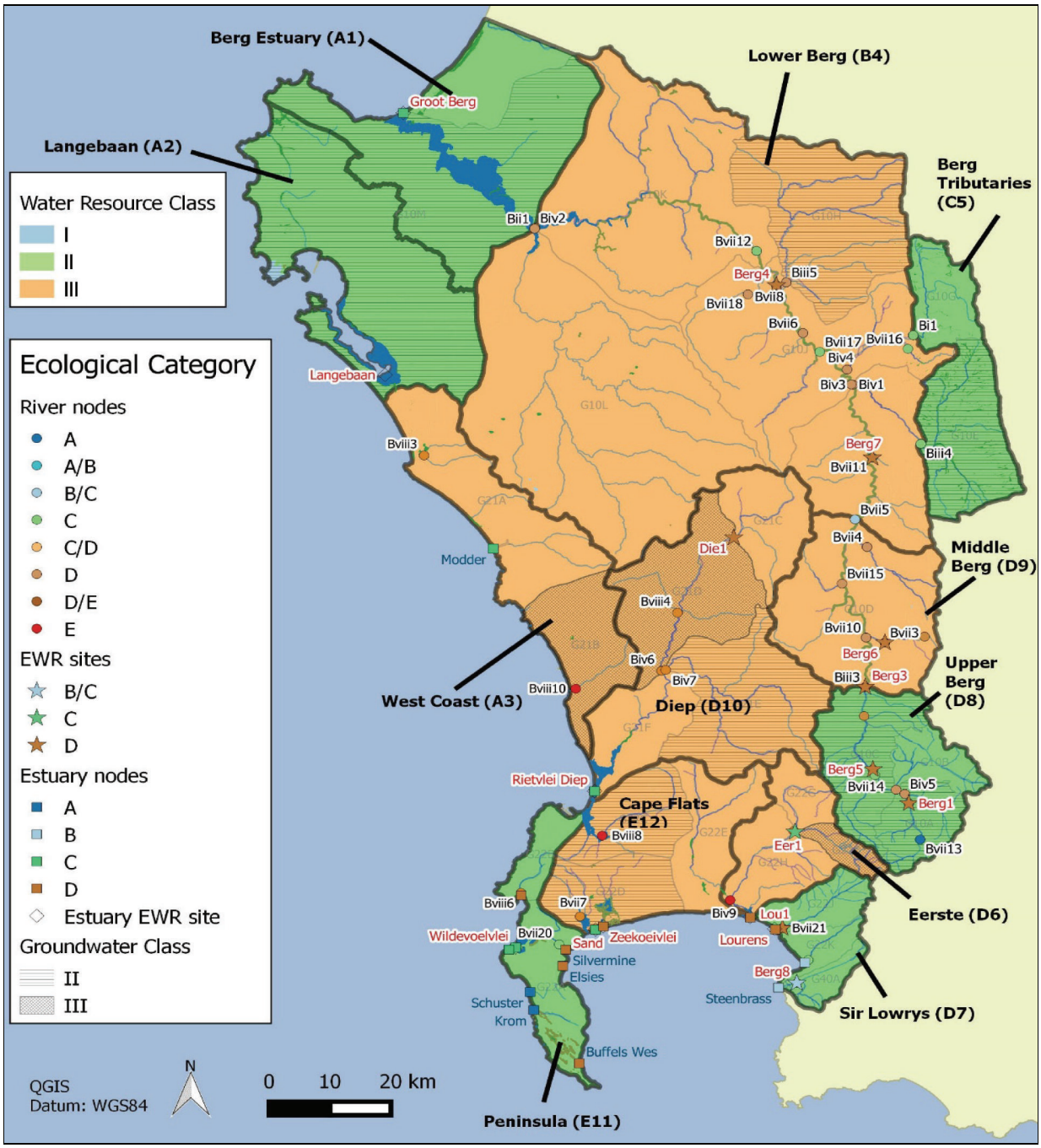

Figure 1: Proposed Water Resource Classes for the Berg Catchment

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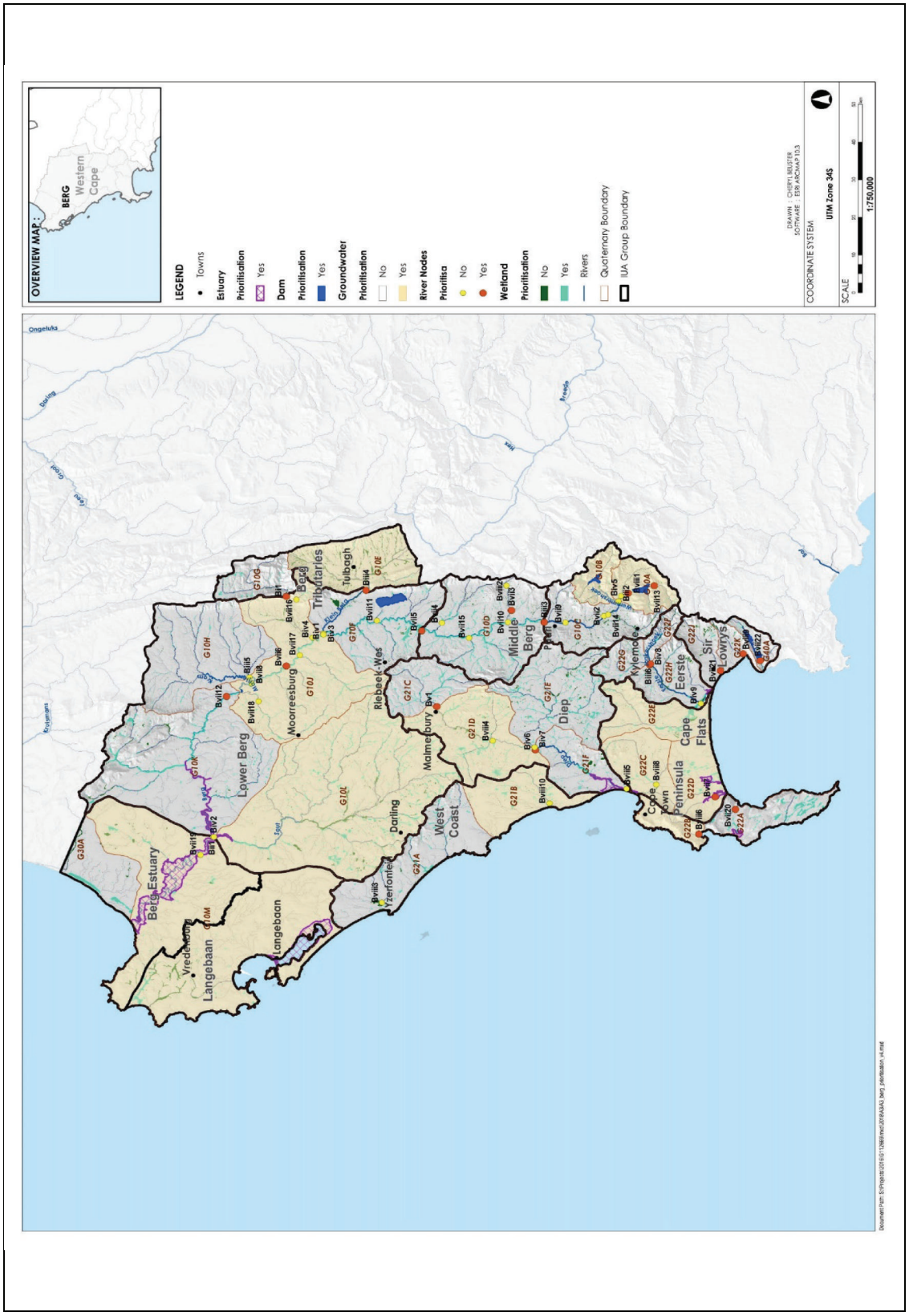

Figure 2: Proposed Priority Resource Units for the Berg Catchment

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Table 1: Summary of recommended Water Resource Classes for each IUA and the Target Ecological Category (TEC) for priority biophysical river and estuary nodes

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	% nMAR*
A1 Berg Estuary	II	**G10M**	**A1-E01**	**Berg (Groot)**	**Bxi1**	**C**	**52**
A2 Langebaan	II	**G10M**	**A2-E04**	**Langebaan**	**Bxi3**	**A**	**N/A**
D8 Upper Berg	II	G10A	D8-R01	Berg	Bvii13	A	98
		G10A	D8-R02	Berg	Bviii1	C	27
		G10C	D8-R03	Berg	Biii3	D	53
D9 Middle Berg	III	G10C	D9-R04	Pombers	Bviii11	C	366
		G10D	D9-R05	Kromme	Bvii3	D	89
		G10D	D9-R06	Berg	Bvii5	D	49
C5 Berg Tributaries	II	G10E	C5-R07	Klein Berg	Biii4	C	82
		G10G	C5-R08	Vier-en-Twintig	Bi1	B/C	23
B4 Lower Berg	III	G10J	B4-R09	Berg	Bvii6	D	52
		G10K	B4-R10	Berg	Bvii12	D	51
D10 Diep	III	G21D	D10-R11	Diep	Bv1	D	66
		G21D	D10-R12	Diep	Biv6	D	68
		G21F	**D10-E03**	**Rietvlei/ Diep**	**Bxi7**	**C**	**78**
E11 Peninsula	II	G22B	E11-R13	Hout Bay	Bviii6	D	97
		G22A	E11-R14	Silvermine	Bvii20	C	98
		G22A	**E11-E04**	**Wildevöelvlei**	**Bxi14**	**C**	**107**
E12 Cape Flats	III	G22D	E12-R15	Keysers	Bvii7	D	93
		G22K	**E12-E05**	**Zandvlei**	**Bxi9**	**C**	93
		G22K	**E12-E05**	**Zeekoevlei**	**Bxi9**	**D**	**N/A**
D6 Eerste	III	G22F	D6-R16	Eerste (Jonkershoek)	Biii6	C	**93**
		G22G	D6-R17	Klippies	Biv8	D	77
		G22H	**D6-E06**	**Eerste**	**Bxi3**	**D**	90
D7 Sir Lowry's	II	G22J	D7-R18	Lourens	Bvii21	D	**114**
		G22K	D7-R19	Sir Lowry's Pass*	Bviii9	C	84
		G40A	D7-R20	Steenbras	Bvii22	B/C	81
		G22J	**D7-E07**	**Lourens**	**Bxi4**	**D**	**85**

*Note: This is based on the estimated/simulated flow requirement in the system to meet downstream TECs as well as with current demands. Note that this will differ from the minimum flow requirement to meet the EWR at any given node. In some cases, the flow is above 100% of natural due to the impact of releases to meet downstream demands.

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Table 2: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis D8 Upper Berg

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
D8 Upper Berg	II	G10A	D8-R01	Berg River	Bvii13	A	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in an A category	Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep Maintenance flows (million cubic metres) Low: 3.209, 2.041, 1.149, 0.771, 0.640, 0.695, 1.107, 2.328, 3.706, 4.569, 4.707, 4.255 Maintenance flows (million cubic metres) High: 0.440, 0.073, 0.000, 0.000, 0.000, 0.000, 0.000, 2.022, 3.153, 4.160, 0.664, 1.327
							Quality	Nutrients	Phosphate (PO_4-P)	River nutrient levels must be maintained in an oligotrophic condition.	≤ 0.025 milligrams per litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 30 milliSiemens/metre EC (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	5.0 ≤ pH ≤ 7.0 (5th and 95th percentiles)
									Dissolved oxygen		DO ≥ 8 milligrams per litre (5th percentile)
								Toxins	N/A	Unimpacted catchment, no concerns about toxic substances	N/A
								Pathogens	E coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation	95%tile ≤ 130 cfu/100ml E coli / Faecal coliforms
							Habitat	Geomorphology	D50	Sand particle size	0.860 > D50 > 0.275
								Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 62% = C category
									Exotic species	Marginal zone cover abundance	No exotic plant species.
									Terrestrial woody species		No terrestrial woody species.
									Indigenous riparian woody species		Cover 5-25%.
									Non-woody indigenous species		Cover 25-50%.
									Reeds		No reeds
									Exotic species	Lower zone cover abundance	Cover < 5%.
									Terrestrial woody species		Cover < 10%.

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
									Indigenous riparian woody species		Cover 25-60%
									Non-woody indigenous species		Cover 25-50%
									Reeds		No reeds
									Exotic species	Upper zone cover abundance	Cover < 10%.
									Terrestrial woody species		Cover </= 15%.
									Indigenous riparian woody species		Cover 25-50%
									Non-woody indigenous species		Cover 40-70%.
							Biota	Fish	FRAI score	Fish condition	> 80% = B category
									Number of indigenous fish species.	Indigenous species richness	Three species present: *Sandelia capensis, Galaxia zebratus* and *Pseudobarbus burgi*
									Sandelia capensis		FROC = 5
									Galaxias zebratus		FROC = 5
									Pseudobarbus burgi		FROC = 5
									Exotic fish species		No increase in the number of exotic fish present: *Onchorhyncus mykiss* (FROC = 5)
								Invertebrates	MIRAI score	Macroinvertebrate condition	> 78 % = B/C category
									SASS5 and ASPT score	SASS scores	SASS5 score >180, ASPT ≥ 7.2.
									Number of families	Diversity of invertebrate community	>/= 23 families, at an abundance of A to C.
D8 Upper Berg	II	G10A	D8-R02	Berg River	Bviii1	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a C category	Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep Maintenance flows (million cubic metres) Low: 2.143, 1.293, 1.071, 0.803, 0.726, 0.803, 1.296, 2.679, 4.147, 4.285, 4.285, 3.888 Maintenance flows (million cubic metres) High: 0.000, 0.544, 0.544, 0.000, 0.000, 0.000, 0.778, 0.000, 4.666, 10.109, 0.000, 0.000
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams per litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 30 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important	4.5 ≥ pH ≤ 7.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
									Dissolved oxygen	for the maintenance of ecosystem health.	DO ≥ 8 milligrams per litre (5th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	≤ 130 counts/100ml (95th percentile)
							Habitat	Geomorphology	D50	Sand particle size	0.521 > D50 > 0.319
								Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 62% = C category
									Exotic species	Marginal zone cover abundance	No exotic plant species.
									Terrestrial woody species		No terrestrial woody species.
									Indigenous riparian woody species		Cover < 10%.
									Non-woody indigenous species		Cover 50-75%.
									Reeds		No reeds
									Exotic species	Lower zone cover abundance	Cover < 5%.
									Terrestrial woody species		Cover < 10%.
									Indigenous riparian woody species		Cover 50-75%.
									Non-woody indigenous species		Cover 25-50%.
									Reeds		No reeds
							Biota	Fish	FRAI score	Fish condition	> 62% = C category
									Number of indigenous fish species.	Indigenous species richness	One species present: *Sandelia capensis*
									Sandelia capensis		FROC = 5
									Exotic fish species		No increase in the number of exotic fish present: *Micropterus dolomieu* (FROC = 5)
								Invertebrates	MIRAI score	Macroinvertebrate condition	> 62%= C category
									SASS5 and ASPT score	SASS scores	SASS5 score >134, ASPT ≥ 6.1.
									Number of families	Diversity of invertebrate community	>/= 21 families, at an abundance of A to C.

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
											Months		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
											Maintenance flows (million cubic metres)	Low	5.803	2.080	1.612	1.612	1.456	1.612	4.368	8.382	9.776	10.102	10.102	8.112
												High	0.000	0.000	0.000	1.721	0.000	0.000	4.454	0.000	10.525	10.525	0.000	0.000
D8 Upper Berg	II	G10C	D8-R03	Berg River	Biii3	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a D category														
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)													
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)													
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre (95th percentile)													
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≤ pH ≤ 8.5 (5th and 95th percentiles)													
									Water temperature		2°C difference from ambient water temperature													
									Dissolved oxygen		DO ≥ 6 milligrams per litre (5th percentile)													
								Toxins	Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95th percentile)													
									Atrazine		≤ 0.079 milligrams per litre (95th percentile)													
									Endusulfan		≤ 0.0013 milligrams per litre (95th percentile)													
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation.	≤ 4000 counts/100ml (95th percentile)													
							Habitat	Geomorphology	D16, D50, D84	Sediment particle size														
								Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 38% = D/E category													
							Biota	Fish	FRAI score	Fish condition	> 58% C/D category													

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Table 3: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis D9 Middle Berg

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
D9 Middle Berg	III	G10C	D9-R04	Pombers River	Bviii11	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a C category	Maintenance flows (million cubic metres) — Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep Low: 8.464, 4.928, 3.100, 2.589, 2.677, 2.572, 3.544, 4.752, 7.862, 10.082, 12.024, 11.405 High: 1.615, 0.000, 0.000, 0.000, 0.000, 0.000, 1.615, 4.153, 4.153, 21.48, 8.076, 0.000
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams/litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 0.70 milligrams/litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 30 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≤ pH ≤ 8.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature
									Dissolved oxygen		DO ≥ 8 milligrams litre (5th percentile)
								Toxins	Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95th percentile)
									Atrazine		≤ 0.079 milligrams per litre (95th percentile)
									Endusulfan		≤ 0.0013 milligrams per litre (95th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 600 counts/100ml (95th percentile)
							Habitat	Geomorphology	GAI score -	Geomorphological condition	> 38% D/E category
								Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 22% = E category
							Biota	Invertebrates	MIRAI score	Macroinvertebrate condition	> 80% = B category
D9 Middle Berg	III	G10D	D9-R05	Kromme River	Bvii3	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a D category.	Maintenance flows (million cubic metres) — Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep Low: 0.141, 0.110, 0.061, 0.031, 0.022, 0.023, 0.034, 0.068, 0.110, 0.155, 0.187, 0.163 High: 0.086, 0.016, 0.000, 0.000, 0.000, 0.000, 0.000, 0.189, 0.319, 0.156, 0.556, 0.156
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river in an mesotrophic condition.	≤ 0.075 milligrams per litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams per litre (50th percentile)

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Salts	Electrical conductivity (EC)	Salt concentrations must be maintained in an Ideal category.	≤ 30 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≤ pH ≤ 8.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature
									Dissolved oxygen		DO ≥ 8 milligrams per litre (5th percentile)
								Toxins	Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95th percentile)
									Atrazine		≤ 0.079 milligrams per litre (95th percentile)
									Endusulfan		≤ 0.0013 milligrams per litre (95th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation.	≤ 2500 counts/100ml (95th percentile)
							Habitat	Geomorphology	GAI score -	Geomorphological condition	> 38% = D/E category
								Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 18% = F category
							Biota	Fish	FRAI score	Fish condition	> 22% = E category
								Invertebrates	MIRAI score	Macroinvertebrate condition	> 78% = B/C category
D9 Middle Berg	III	G10D	D9-R06	Berg River	Bvii5	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a D category	Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep Maintenance flows (million cubic metres) Low: 14.246, 5.200, 2.648, 2.621, 2.342, 2.585, 10.152, 20.701, 24.388, 25.280, 25.299, 20.262 Maintenance flows (million cubic metres) High: 0.000, 0.000, 0.000, 2.199, 0.000, 0.000, 5.692, 0.000, 13.45, 37.63, 0.000, 0.000
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a eutrophic or better condition.	≤ 0.125 milligrams/litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 3.00 milligrams/litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present state levels.	95%tile ≤ 55 milliSiemens/metre EC
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≤ pH ≤ 8.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Toxins	Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95th percentile)
									Atrazine		≤ 0.079 milligrams per litre (95th percentile)

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
									Endosulfan		≤ 0.0013 milligrams per litre (95th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation.	95%tile ≤ 2500 cfu/100ml Escherichia coli
							Habitat	Geomorphology	D50	Sand particle size	0.714 > D50 > 0.251
								Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 52% = D category
									Exotic species	Marginal zone cover abundance	No exotic plant species.
									Terrestrial woody species		No terrestrial woody species.
									Indigenous riparian woody species		Cover 50-75%.
									Non-woody indigenous species		Cover 15-25%.
									Reeds		No reeds
									Exotic species	Lower zone cover abundance	Cover < 5%.
									Terrestrial woody species		Cover < 10%.
									Indigenous riparian woody species		Cover 50-75%.
									Non-woody indigenous species		Cover 15-25%.
									Reeds		No reeds
									Exotic species	Upper zone cover abundance	Cover < 10%.
									Terrestrial woody species		Cover </= 15%.
									Indigenous riparian woody species		Cover 50-75%.
									Non-woody indigenous species		Cover 10-20%
							Biota	Fish	FRAI score	Fish condition	> 52% = D category
								Invertebrates	Exotic fish species	Indigenous species richness	No increase in the number of exotic fish present: *Cyprinus carpio* (FROC = 5), *Tilapia sparrmanii, Clarias gariepinus, Gambusia affinis*
									MIRAI score	Macroinvertebrate condition	> 62% = C category
									SASS5 and ASPT score	SASS scores	SASS5 score >90, ASPT ≥ 4.6.
									Number of families	Diversity of invertebrate community	>/= 18 families, at an abundance of A to C.

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Table 4: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis C5 Berg Tributaries

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
C5 Berg Tributaries	II	G10E	C5-R07	Klein Berg River	Biii4	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a C category	Maintenance flows (million cubic metres) — Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep Low: 1.422, 1.110, 0.754, 0.398, 0.305, 0.291, 0.338, 0.618, 1.002, 1.391, 1.744, 1.619 High: 0.638, 0.141, 0.000, 0.000, 0.000, 0.000, 0.000, 0.802, 1.516, 0.831, 2.913, 0.831
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≤ pH ≤ 8.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Toxins	Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95th percentile)
									Atrazine		≤ 0.079 milligrams per litre (95th percentile)
									Endusulfan		≤ 0.0013 milligrams per litre (95th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation.	≤ 2500 counts/100ml (95th percentile)
							Habitat	Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 62% = C category
							Biota	Fish	FRAI score	Fish condition	> 58% = C/D category
C5 Berg Tributaries	II	G10G	C5-R08	Vier-en-Twintig	Bi1	B/C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a B/C category	Maintenance flows (million cubic metres) — Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep Low: 2.050, 1.631, 1.115, 0.731, 0.563, 0.573, 0.674, 1.128, 1.811, 2.358, 2.620, 2.470 High: 0.646, 0.217, 0.000, 0.000, 0.000, 0.000, 0.000, 1.298, 2.510, 3.886, 0.748, 1.497

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at an oligotrophic condition.	≤ 0.025 milligrams per litre PO4-P
									Total inorganic nitrogen (TIN)		≤ 0.70 milligrams per litre TIN
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained in an Ideal category for aquatic ecosystems	≤ 30 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	4.5 ≤ pH ≤ 7.0 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature
									Dissolved oxygen		≥ 8 milligrams per litre (5th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for full contact recreation.	≤ 130 counts/100ml (95th percentile)
							Habitat	Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 88% = A/B category
							Biota	Fish	FRAI score	Fish condition	> 88% = A/B category
								Invertebrates	MIRAI score	Macroinvertebrate condition	> 82% = B category

Table 5: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis B4 Lower Berg

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Months		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
											Maintenance flows (million cubic metres)	Low	26.184	15.280	9.579	8.000	8.272	7.947	10.951	14.684	24.346	31.158	37.184	1.619
												High	2.496	0.000	0.000	0.000	0.000	0.000	2.496	6.418	6.418	33.196	12.479	0.831
B4 Lower Berg	III	G10J	B4-R09	Berg River	Bvii6	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a D category														
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)												
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)												

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≤ pH ≤ 8.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Toxins	Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95th percentile)
									Endusulfan		≤ 0.0013 milligrams per litre (95th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 1000 counts/100ml (95th percentile)
							Habitat	Geomorphology	GAI score -	Geomorphological condition	> 68% = B/C category
								Riparian vegetation	D50	Sand particle size	0.576 > D50 > 0.349
									VEGRAI level 3 score.	Vegetation condition	> 42% = D category
									Exotic species	Marginal zone cover abundance	No exotic plant species.
									Terrestrial woody species		No terrestrial woody species.
									Indigenous riparian woody species		Cover 30-50%.
									Non-woody indigenous species		Cover 30-50%.
									Reeds		Cover 30-50%.
									Exotic species	Lower zone cover abundance	Cover < 5%.
									Terrestrial woody species		Cover < 10%.
									Indigenous riparian woody species		Cover 50-75%.
									Non-woody indigenous species		Cover 5-10%.
									Reeds		No reeds
									Exotic species	Upper zone cover abundance	Cover < 10%.
									Terrestrial woody species		Cover </= 15%.
									Indigenous riparian woody species		Cover 30-50%.
									Non-woody indigenous species		Cover 30-50%.

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							Biota	Fish	FRAI score	Fish condition	> 18% = F category
								Invertebrates	Exotic fish species	Indigenous species richness	No increase in the number of exotic fish present: *Cyprinus carpio, Oreochromis mossambicus, Tilapia sparrmanii, Micropterus punctulatus, Clarias gariepinus* and *Gambusia affinis*.
									MIRAI score	Macroinvertebrate condition	> 42% = D category
									SASS5 and ASPT score	SASS scores	SASS5 score >80, ASPT ≥ 5.0
									Number of families	Diversity of invertebrate community	>/= 15 families, at an abundance of A to C.
B4 Lower Berg	III	G10K	B4-R10	Berg River	Bvii12	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a D category	Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep Maintenance flows (million cubic metres) Low: 17.1, 10.1, 6.56, 5.58, 5.73, 5.55, 7.43, 9.88, 15.9, 20.4, 24.4, 23.0 Maintenance flows (million cubic metres) High: 2.760, 0.000, 0.000, 0.000, 0.000, 0.000, 2.760, 0.000, 16.380, 6.480, 37.175, 0.000
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at an mesotrophic condition.	≤ 0.075 milligrams/litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≤ pH ≤ 8.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Toxins	Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95th percentile)
									Endusulfan		≤ 0.0013 milligrams per litre (95th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation.	≤ 2500 counts/100ml (95th percentile)
							Habitat Habitat	Geomorphology	GAI score -	Geomorphological condition	> 68% = B/C category
								Riparian vegetation	D50	Sand particle size	0.860 > D50 > 0.275
									VEGRAI level 3 score.	Vegetation condition	> 42% = D category
									Exotic species	Marginal zone cover	No exotic plant species.

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Geomorphology Riparian vegetation	Terrestrial woody species	abundance	No terrestrial woody species.
									Indigenous riparian woody species		Cover 30-50%
									Non-woody indigenous species		Cover 50-75%.
									Reeds		Cover 15-25%.
								Fish	FRAI score	Fish condition	85% (B category)
								Invertebrates Fish	Exotic fish species	Indigenous species richness	No increase in the number of exotic fish present: *Cyprinus carpio, Oreochromis mossambicus, Tilapia sparrmanii, Micropterus punctulatus, Clarias gariepinus* and *Gambusia affinis*.
									MIRAI score	Macroinvertebrate condition	81.4% (B/C category)
									SASS5 and ASPT score	SASS scores	SASS5 score >85, ASPT ≥ 4.2.
									Number of families	Diversity of invertebrate community	>/= 19 families, at an abundance of A to C.

Table 6: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis D10 Diep

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Months		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
											Maintenance flows (million cubic metres)	Low	0.079	0.053	0.029	0.020	0.017	0.015	0.021	0.043	0.090	0.130	0.157	0.106
												High	0.026	0.003	0.000	0.000	0.000	0.000	0.000	0.116	0.294	0.120	0.473	0.120
D10 Diep	III	G21D	D10-R11	Diep River	Bv1	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a D category														
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)												
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)												
								Salts	Electrical conductivity (EC)	Diep River is naturally saline and should be maintained in its current status.	≤ 450 milliSiemens/metre (95th percentile)												
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)												
									Water temperature		2°C difference from ambient water temperature												
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)												

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Toxins	Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95th percentile)
									Endusulfan		≤ 0.0013 milligrams per litre (95th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation.	≤ 2500 counts/100ml (95th percentile)
D10 Diep	III	G21D	D10-R12	Diep River	Biv6	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a D category	

Months		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Maintenance flows (million cubic metres)	Low	0.176	0.118	0.062	0.043	0.037	0.033	0.043	0.083	0.171	0.237	0.280	0.226
	High	0.077	0.006	0.000	0.000	0.000	0.000	0.000	0.207	0.535	0.809	0.146	0.293

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							Quality	Nutrients	Phosphate (PO_4-P)	River nutrient levels must be improved to eutrophic conditions.	≤ 0.125 milligrams/litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 2.5 milligrams/litre (50th percentile)
								Salts	Electrical conductivity (EC)	Diep River is naturally saline and should be maintained in its current status.	≤ 350 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≤ pH ≤ 8.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Toxins	Atrazine	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95th percentile)
									Endusulfan		≤ 0.0013 milligrams per litre (95th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation.	≤ 2500 counts/100ml (95th percentile)
							Habitat	Geomorphology	GAI score	Geomorphological condition	> 22% = E category
								Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 18% = F category
							Biota	Fish	FRAI score	Fish condition	> 22% = E category
								Invertebrates	MIRAI score	Macroinvertebrate condition	> 22% = E category

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Table 7: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis E11 Peninsula

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
E11 Peninsula	II	G22B	E11-R13	Hout Bay	Bviii6	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a D category	Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep Maintenance flows (million cubic metres) Low: 0.132, 0.071, 0.038, 0.029, 0.026, 0.025, 0.037, 0.070, 0.142, 0.221, 0.252, 0.204 Maintenance flows (million cubic metres) High: 0.037, 0.003, 0.000, 0.000, 0.000, 0.000, 0.000, 0.121, 0.302, 0.543, 0.094, 0.188
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river in a eutrophic or better condition.	≤ 0.125 milligrams per litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 2.50 milligrams per litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 55 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≥ pH ≤ 8.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature
									Dissolved oxygen		≥ 6 milligrams per litre (5th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 4000 counts/100ml (95th percentile)
							Habitat	Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 22% = E category
							Biota	Fish	FRAI score	Fish condition	> 18% = E/F category
								Invertebrates	MIRAI score	Macroinvertebrate condition	> 42% = D category
E11 Peninsula	II	G22A	E11-R14	Silvermine River	Bvii20	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a C category	Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep Maintenance flows (million cubic metres) Low: 0.167, 0.105, 0.053, 0.035, 0.029, 0.027, 0.037, 0.069, 0.138, 0.235, 0.287, 0.233 Maintenance flows (million cubic metres) High: 0.017, 0.002, 0.000, 0.000, 0.000, 0.000, 0.000, 0.036, 0.088, 0.053, 0.191, 0.053
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be	≤ 0.075 milligrams/litre (50th percentile)

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
									Total inorganic nitrogen (TIN)	maintained in the river at a mesotrophic or better condition.	≤ 1.75 milligrams/litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at levels that do not adversely affect aquatic ecosystems	≤ 350 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≤ pH ≤ 8.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Ideal category for intermediate contact recreation. In the long term the aim should be to improve the river to an Acceptable category for full contact recreation.	≤ 1000 counts/100ml (95th percentile)
							Habitat	Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 62% = C category
							Biota	Fish	FRAI score	Fish condition	> 82% = B category
								Invertebrates	MIRAI score	Macroinvertebrate condition	> 62% = C category

Table 8: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis E12 Cape Flats

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
E12 Cape Flats	III	G22D	E12-R15	Keysers River	Bvii7	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a D category	Months		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
											Maintenance flows (million cubic metres)	Low	0.038	0.024	0.014	0.011	0.009	0.009	0.012	0.019	0.035	0.056	0.066	0.054
												High	0.012	0.001	0.000	0.000	0.000	0.000	0.000	0.027	0.068	0.139	0.026	0.051
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a eutrophic or better condition.	≤ 0.125 milligrams/litre (50th percentile)													
									Total inorganic nitrogen (TIN)		≤ 3.0 milligrams/litre (50th percentile)													

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 85 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≤ pH ≤ 8.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in a Tolerable category for intermediate contact recreation. In the long term the aim should be to improve the river to an Acceptable, and then Ideal category for intermediate contact recreation.	≤ 4000 counts/100ml (95th percentile)
							Habitat	Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 38% = D/E category
							Biota	Fish	FRAI score	Fish condition	> 62% = C category

Table 9: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis D6 Eerste

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
											Months		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
											Maintenance flows (million cubic metres)	Low	0.639	0.543	0.349	0.200	0.142	0.126	0.186	0.335	0.522	0.645	0.714	0.693
												High	0.245	0.067	0.000	0.000	0.000	0.000	0.000	0.454	0.747	1.052	0.206	0.412
D6 Eerste	III	G22F	D6-R16	Jonkershoek River	Biii6	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a C category														
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)													
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)													
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 55 milliSiemens/metre (95th percentile)													

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≤ pH ≤ 8.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Toxins	Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95th percentile)
									Atrazine		≤ 0.079 milligrams per litre (95th percentile)
									Endusulfan		≤ 0.0013 milligrams per litre (95th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation. In the long term the aim should be to improve the river to an Ideal category for intermediate contact recreation.	≤ 2500 counts/100ml (95th percentile)
							Habitat	Geomorphology	GAI score	Geomorphological condition	> 62% = C category
								Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 62% = C category
							Biota	Fish	FRAI score	Fish condition	> 42% = D category
								Invertebrates	MIRAI score	Macroinvertebrate condition	> 62% = C category
D6 Eerste	III	G22G	D6-R17	Klippies River	Biv8	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a D category	Maintenance flows (million cubic metres) — Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep Low: 0.164, 0.156, 0.135, 0.091, 0.064, 0.054, 0.058, 0.077, 0.111, 0.133, 0.153, 0.163 High: 0.146, 0.066, 0.000, 0.000, 0.000, 0.000, 0.000, 0.081, 0.182, 0.100, 0.291, 0.100
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a eutrophic or better condition.	≤ 0.125 milligrams/litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 3.0 milligrams/litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 55 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≤ pH ≤ 8.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Toxins	Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95th percentile)
									Atrazine		≤ 0.079 milligrams per litre (95th percentile)

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
									Endusulfan		≤ 0.0013 milligrams per litre (95th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in a Tolerable category for intermediate contact recreation. In the long term the aim should be to improve the river to an Acceptable, and then Ideal category for intermediate contact recreation.	≤ 4000 counts/100ml (95th percentile)
							Habitat	Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 22% = E category
							Biota	Fish	FRAI score	Fish condition	> 18% = D/E category
								Invertebrates	MIRAI score	Macroinvertebrate condition	> 62% = C category

Table 10: Resource Quality Objectives for RIVERS in priority Resource Units in the Integrated Unit of Analysis D7 Sir Lowrys

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric												
											Months		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
											Maintenance flows (million cubic metres)	Low	0.523	0.448	0.277	0.151	0.108	0.100	0.141	0.254	0.410	0.520	0.592	0.568
												High	0.355	0.083	0.000	0.000	0.000	0.000	0.000	0.563	1.007	1.463	0.297	0.593
D7 Sir Lowry's	II	G22J	D7-R18	Lourens River	Bvii21	D	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a D category														
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)												
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)												
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 55 milliSiemens/metre (95th percentile)												
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≤ pH ≤ 8.5 (5th and 95th percentiles)												
									Water temperature		2°C difference from ambient water temperature												
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)												
								Toxins	Ammonia	Toxicity levels must not pose a	≤ 0.073 milligrams per litre (95th percentile)												

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
									Atrazine	threat to aquatic ecosystems.	≤ 0.079 milligrams per litre (95th percentile)
									Endosulfan		≤ 0.0013 milligrams per litre (95th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation. In the long term the aim should be to improve the river to an Ideal category for intermediate contact recreation.	≤ 2500 counts/100ml (95th percentile)
							Habitat	Geomorphology	GAI score	Geomorphological condition	> 42% = D category
								Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 42% = D category
							Biota	Fish	FRAI score	Fish condition	> 22 % = E category
								Invertebrates	MIRAI score	Macroinvertebrate condition	> 42% = D category
D7 Sir Lowry's	II	G22J	D7-R19	Sir Lowry's Pass River	Bviii9	C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a C category	Maintenance flows (million cubic metres) — Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep Low: 1.077, 0.959, 0.599, 0.301, 0.204, 0.186, 0.257, 0.459, 0.755, 0.984, 1.141, 1.145 High: 0.380, 0.086, 0.000, 0.000, 0.000, 0.000, 0.000, 0.420, 0.787, 1.211, 0.263, 0.525
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a mesotrophic or better condition.	≤ 0.075 milligrams/litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 1.75 milligrams/litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 55 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	6.5 ≤ pH ≤ 8.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Toxins	Ammonia	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.073 milligrams per litre (95th percentile)
									Atrazine		≤ 0.079 milligrams per litre (95th percentile)
									Endosulfan		≤ 0.0013 milligrams per litre (95th percentile)

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation. In the long term the aim should be to improve the river to an Ideal category for intermediate contact recreation.	≤ 2500 counts/100ml (95th percentile)
							Habitat	Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 42% = D category
							Biota	Fish	FRAI score	Fish condition	> 42% = D category
								Invertebrates	MIRAI score	Macroinvertebrate condition	> 62% = C category
D7 Sir Lowry's	II	G40A	D7-R20	Steenbras River	Bvii22	B/C	Quantity	Low flows High flows	Maintenance low flows Maintenance high flows	Flows sufficient to maintain the river in a B/C category	Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep Maintenance flows (million cubic metres) Low: 0.427, 0.323, 0.235, 0.180, 0.149, 0.144, 0.173, 0.247, 0.384, 0.506, 0.582, 0.502 Maintenance flows (million cubic metres) High: 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.077, 0.077, 0.307, 0.307, 0.077
							Quality	Nutrients	Phosphate (PO_4-P)	Nutrient levels must be maintained in the river at a oligotrophic condition.	≤ 0.025 milligrams/litre (50th percentile)
									Total inorganic nitrogen (TIN)		≤ 0.70 milligrams/litre (50th percentile)
								Salts	Electrical conductivity (EC)	Salt concentrations need to be maintained at present day levels.	≤ 55 milliSiemens/metre (95th percentile)
								System variables	pH range	pH, temperature, and dissolved oxygen are important for the maintenance of ecosystem health.	5.0 ≤ pH ≤ 7.5 (5th and 95th percentiles)
									Water temperature		2°C difference from ambient water temperature
									Dissolved oxygen		≥ 6 milligrams litre (5th percentile)
								Toxins	Iron	Toxicity levels must not pose a threat to aquatic ecosystems.	≤ 0.1 milligrams per litre (95th percentile)
									Manganese		≤ 0.18 milligrams per litre (95th percentile)
								Pathogens	Escherichia coli	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation.	≤ 165 counts/100ml (95th percentile)
							Habitat	Geomorphology	GAI score	Geomorphological condition	> 82% = B category

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Riparian vegetation	VEGRAI level 3 score.	Vegetation condition	> 78% = B/C category
							Biota	Fish	FRAI score	Fish condition	> 52% = D category
								Invertebrates	MIRAI score	Macroinvertebrate condition	> 92% = A category

Table 11: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis A1 Berg Estuary

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
A1 Berg Estuary	II	G10M	A1-E01	Berg (Groot) Estuary	Bxi1	C	Quantity	Surface flow	Flow	River inflow should never drop below 0.6 $m^3.s^{-1}$ and should not below 1 $m^3.s^{-1}$ for longer than 4 months; Flood frequency Should not increase/decrease by more than 10% from 2004 baseline conditions	Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Annual MMR/MAR (% Natural): 31.21 (46%), 12.55 (36%), 3.92 (25%), 1.61 (19%), 1.50 (23%), 1.66 (20%), 9.13 (36%), 22.18 (26%), 64.25 (42%), 123.35 (61%), 137.15 (68%), 78.34 (63%), 486.86 (52%)
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	Estuary (low flows < 1 $m^3.s^{-1}$, summer): DIN <300 µg/l; DRP <100 µg/l in Zones A and B, DIN <80 µg/l ; DRP <30 µg/l in Zones C and D
											Estuary (high flows > 5 $m^3.s^{-1}$, winter): DIN <800 µg/l; DRP <60 µg/l in Zones A-D
									DIP		River inflow (< 1 $m^3.s^{-1}$, summer): DIN <80 µg/l; DRP <20 µg/l
											River inflow (>5 $m^3.s^{-1}$, winter): DIN <800 µg/l; DRP <60 µg/l
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Salinity <20 for longer than 3 months at 20 km upstream from the mouth; Salinity <1 ppt above 40 km upstream of the mouth; Salinity of Salinity everywhere in estuary <35; Groundwater salinity on floodplain <45; TDS of river inflow <3500 mg/l
								System variables	Temperature	System variables not to exceed TPCs for biota	"River inflow: 7 < pH < 8.5
									pH		Estuary: 7 < pH < 8.5 "
									Dissolved oxygen		"River inflow: DO >4 mg/l
									Secchi depth		Estuary DO >4 mg/l"
								Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for contact recreation	Zones A and B <1.0 m during low flow (< 1$m^3.s^{-1}$)
									Escherichia coli		≤185 Enterococci/100 ml) (90th percentile, hazen system)
							Habitat	Hydrodynamics	Mouth state	Habitat health adequate for	Permanently open

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
									Tidal variation	microalgae, macrophytes, invertebrates, fish, birds and recreational use	<10% change from present state
								Sediments	Sediment characteristics, Channel shape/size		Bathymetry and sediment MdØ change <10% from baseline
							Biota	Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Phytoplankton biomass and composition suitable for invertebrates, fish, birds and recreational use	Blue-green algae <10% of phytoplankton cell counts, Benthic microphytobenthic < 40 mg/m^2 chlorophyll a, The frequency of dinoflagellates < 5% of the total phytoplankton counts
								Macrophytes	Extent, distribution and richness of macrophytes	Macrophyte cover and composition suitable for invertebrates, fish, birds and recreational use	Maintain the present distribution (2003-2005) and abundance of the different plant community types and estuarine habitats (intertidal mudflats with *Zostera capensis* 206 ha, intertidal salt marsh 499 ha, open pan 1159 ha, halophytic floodplain 1521 ha, xeric floodplain 919.1 ha, reeds and sedges 586.6 ha and sedge pan 292.5 ha), Prevent an increase in mats of macroalgae in the lower intertidal reaches, Reduce the area covered by water hyacinth (*Eicchornia crassipes*) in the upper reaches by 50% compared to the present state (2003-2005), Prevent an increase in size of the open pan dry areas (1159 ha in 2003-2005), Prevent a decrease in size of the sedge pan areas (293 ha in 2003-2005). *Juncus maritimus*, and waterblommetjies *Aponogeton distachyos* are present, Prevent the spread of invasive aliens in the riparian zone (e.g. *Acacia mearnsii* and *Eucalyptus camaldulensis*), Maintain intact reed and sedge stands along the banks of the estuary by ensuring that salinity is not greater than 20 ppt for 3 months at 20 km from the month during summer, Prevent an increase in bare ground in the halophytic and xeric floodplain habitats by maintaining the present-day flooding patterns
								Invertebrates	Macrofauna community composition, abundance and richness	Abundance and community composition of Invertebrates suitable for fish, birds	Retain present species richness, distribution of species and mix (low species abundance, high dominance) in Zones A to the middle reaches of Zone C. One or two species will always be present at high densities compared to others (e.g. *Pseudodiaptomus hessei, Grandidierella sp.)* in these Zones (A to C), Indicator species such as *Capitella capitata*, should not dominate benthic species at any site, *Callianassa kraussi* and *Upogebia africana* distribution patterns remain similar to present state.

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Fish	Fish community composition, abundance and richness	Abundance and community composition of fish community suitable for birds	Retain the full complement of estuarine resident (7 species) and estuary associated marine (5 species) present in the estuary with population sizes sufficient to ensure their persistence in perpetuity, Ensure that exotic freshwater species do not increase to levels where they can exclude any more indigenous species through predation or competitive interactions, Maintain recruitment of adult and juvenile fish at present levels. This requires maintaining sufficient flow for freshwater plume (temperature, salinity and olfactory gradient) entering the sea. This implies that there should be a significant number of 0 -1-year-old fish and no missing year classes.
								Birds	Avifauna community composition, abundance and richness	Health avifauna community contributing to conservation of avifauna species in SA	Retain at least 90% of the baseline species richness, abundance and diversity of the bird community determined using regression slope based on a 3-year running average

Table 12: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis A2 Langebaan

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
A2 Langebaan	II	G10M	A2-E02	Langebaan	Bxi3	A	Quality	Nutrients	NO_3	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	NO_3 <1.3 mg.l^{-1}
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Salinity at the head of the lagoon <40; Rest of the lagoon 34 < Salinity < 36
								System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	>4 mg.l^{-1}
									Secchi depth		Sechii depth >1 m
								Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation	≤185 Enterococci/100 ml) (90th percentile, hazen system)
									Escherichia coli		≤500 E. coli/100 ml (90th percentile, hazen system)

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							Habitat	Hydrodynamics	Tidal amplitude	Habitat health adequate for microalgae, macrophytes, invertebrates, fish, birds and recreational use	Tidal amplitude should not change more than 10% from present state (2017)
								Sediments	Sediment characteristics, Channel shape/size		Bathymetry and sediment MdØ change <10% from baseline
							Biota	Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Phytoplankton biomass and composition suitable for invertebrates, fish, birds and recreational use	Maintain low phytoplankton biomass (chlorophyll- a < 20 µg/ℓ) and a diversity of phytoplankton groups.
								Macrophytes	Extent, distribution and richness of macrophytes	Macrophyte cover and composition suitable for invertebrates, fish, birds and recreational use	Maintain the distribution and area cover of macrophyte habitats particularly the salt marsh and seagrass. Maintain the large groundwater fed rush habitat.
								Invertebrates	Macrofauna community composition, abundance and richness	Abundance and community composition of Invertebrates suitable for fish, birds	In terms of Invertebrates Langebaan lagoon is currently in an A category. The invertebrate communities are in good health with species richness, abundances and composition scoring highly.
								Fish	Fish community composition, abundance and richness	Abundance and community composition of fish community suitable for birds	The fish community should include healthy populations of exploited fish species, specifically the harders, white stumpnose, blacktail, elf and smooth hound shark juveniles should all be present in beach seine net sampling surveys (at least 10 hauls in 3 different sites) of the nearshore areas. Adults of these species should remain the main components in the catches of line and net fisheries in the lagoon, and catch rates should remain stable or increase.
								Birds	Avifauna community composition, abundance and richness	Health avifauna community contributing to conservation of avifauna species in SA	Retain at least 90% of the baseline species richness, abundance and diversity of the bird community determined using regression slope based on a 3-year running average.

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Table 13: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis D10 Diep

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
D10 Diep	III	G21F	D10-E03	Rietvlei/Diep	Bviii5	D	Quantity	Surface flow	Flow	Freshwater inflow adequate to maintain water quality and habitat suitable for flora and fauna	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
											MMR/MAR (% Nat)	80 %	80 %	80 %	93 %	100 %	100 %	80 %	80 %	80 %	80 %	80 %	80 %	80 %
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	River inflow: <800 µg.l^{-1}													
											Lower estuary (Milnerton lagoon): <1000 µg.l^{-1}													
									DIP		River inflow: <60 µg.l^{-1}													
											Lower estuary (Milnerton lagoon): <500 µg.l^{-1}													
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity in lower estuary (Milnerton lagoon) = 20, maximum = 35													
								System variables	Dissolved oxygen	System variables (temperature, pH, dissolved oxygen, suspended solids and turbidity) not to exceed TPCs for biota	>4 mg.l^{-1}													
								Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation	≤185 Enterococci/100 ml) (90th percentile, hazen system)													
									Escherichia coli		≤500 E. coli/100 ml (90th percentile, hazen system)													
							Habitat	Hydrodynamics	Mouth state	Habitat health adequate for microalgae, macrophytes, invertebrates, fish, birds and recreational use	Permanently open													
									Tidal variation		<10% change from present state													
								Sediments	Sediment characteristics, Channel shape/size		Bathymetry and sediment MdØ change <10% from baseline													
							Biota	Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Phytoplankton biomass and composition suitable for invertebrates, fish, birds and recreational use	Maintain low phytoplankton biomass (chlorophyll- a < 50 µg/ℓ) and a diversity of phytoplankton groups.													

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Macrophytes	Extent, distribution and richness of macrophytes	Macrophyte cover and composition suitable for invertebrates, fish, birds and recreational use	Maintain the distribution and area cover of macrophyte habitats particularly the salt marsh
								Invertebrates	Macrofauna community composition, abundance and richness	Abundance and community composition of Invertebrates suitable for fish, birds	Restore and maintain species richness, distribution of species and mix (low species abundance, high dominance); Indicator species such as *Capitella capitata*, should not dominate benthic species at any site; *Callianassa kraussi* and *Upogebia africana* distribution patterns similar to reference state.
								Fish	Fish community composition, abundance and richness	Abundance and community composition of fish community suitable for birds	Restore and maintain the full complement of estuarine resident and estuary associated marine present in the estuary with population sizes sufficient to ensure their persistence in perpetuity; Ensure that exotic freshwater species do not increase to levels where they can exclude any more indigenous species through predation or competitive interactions; Maintain recruitment of adult and juvenile fish at present levels.
								Birds	Avifauna community composition, abundance and richness	Health avifauna community contributing to conservation of avifauna species in SA	Retain at least 90% of the baseline species richness, abundance and diversity of the bird community determined using regression slope based on a 3-year running average.

Table 14: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis E11 Peninsula

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
E11 Peninsula	II	G22A	E11-E04	Wildevöelvlei	Bxi14	D	Quantity	Surface flow	Flow	Freshwater inflow does not exceed requirements for maintaining water quality and habitat suitable for flora and fauna	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
											MMR/MAR (% Nat)	120 %	120 %	120 %	120 %	120 %	120 %	120 %	120 %	120 %	120 %	120 %	120 %	120 %
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	River inflow: <1000 µg.l^{-1}													
											Wildevoelvlei: <1000 µg.l^{-1}; Lower Estuary (backshore lagoon): <200 µg.l^{-1}													
									DIP		Wastewater inlow: <500 µg.l^{-1}													
											Wildevoelvlei: <500 µg.l^{-1}; Lower estuary (backshore lagoon): <50 µg.l^{-1}													

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity in lower estuary (backshore lagoon) >10, maximum = 35, average salinity in Wildevoelvlei > 2
								System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	>4 $mg.l^{-1}$
								Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml) (90th percentile, hazen system)
									Escherichia coli		≤500 E. coli/100 ml (90th percentile, hazen system)
							Habitat	Hydrodynamics	Mouth state	Habitat health adequate for microalgae, macrophytes, invertebrates, fish, birds and recreational use	Mouth should remain open >70% of the time
									Tidal variation		<10% change from present state
								Sediments	Sediment characteristics, Channel shape/size		Bathymetry and sediment MdØ change <10% from baseline
							Biota	Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Phytoplankton biomass and composition suitable for invertebrates, fish, birds and recreational use	Improvement from current hypereutrophic state where toxic cyanobacteria are common and flow to the sea
								Macrophytes	Extent, distribution and richness of macrophytes	Macrophyte cover and composition suitable for invertebrates, fish, birds and recreational use	Retain present species richness, distribution of species and mix (low species abundance, high dominance); Maintain the fringing vegetation around the vleis as this is important for bank stabilisation and nutrient uptake; Improve connectivity between the sea, channel and lower vlei; Control the spread of invasive floating aquatic macrophyte species present in the vleis e.g. water fern.
								Invertebrates	Macrofauna community composition, abundance and richness	Abundance and community composition of Invertebrates suitable for fish, birds	Move from a D category to a C category. The estuary should have a viable population of Callichirus kraussi in the backwater lagoon (10/m2). In addition, the invertebrate community should include 2 other estuarine species in the canal. At least three marine invertebrate species present near the mouth.

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Fish	Fish community composition, abundance and richness	Abundance and community composition of fish community suitable for birds	Maintain fish assemblage that includes at least two species of mullet, *Liza richardsonii* and either/both *Mugil cephalus* and *Pseudomyxus capensis*. Substantial seasonal fluctuations in abundance of these mullet species are expected to occur, but mullet should remain more abundant than the alien freshwater species currently inhabiting the vleis.
								Birds	Avifauna community composition, abundance and richness	Health avifauna community contributing to conservation of avifauna species in SA	Retain at least 90% of the baseline species richness, abundance and diversity of the bird community determined using regression slope based on a 3-year running average.

Table 15: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis E12 Cape Flats

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
E12 Cape Flats	III	G22K	E12-E05	Zandvlei	Bxi9	D	Quantity	Surface flow	Flow	Freshwater inflow adequate to maintain water quality and habitat suitable for flora and fauna.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
											MMR/MAR (% Nat)	74 %	64 %	69 %	68 %	61 %	66 %	68 %	76 %	81 %	87 %	88 %	85 %	84 %
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	River inflow: <1000 µg.l-1													
											Estuary: <150 µg.l-1													
									DIP		River inflow: <300 µg.l-1													
											Estuary: <100 µg.l-1													
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	15 < Average salinity <35													
								System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	>4 mg.l-1													
								Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation.	≤185 Enterococci/100 ml) (90th percentile, hazen system)													
									Escherichia coli		≤500 E. coli/100 ml (90th percentile, hazen system)													
							Habitat	Hydrodynamics	Mouth state	Habitat health adequate for	Mouth should remain open >20% of the time													

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Sediments	Sediment characteristics, Channel shape/size	microalgae, macrophytes, invertebrates, fish, birds and recreational use	Bathymetry and sediment MdØ change <10% from baseline
							Biota	Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Phytoplankton biomass and composition suitable for invertebrates, fish, birds and recreational use	Maintain low phytoplankton biomass (chlorophyll- a < 20 µg/ℓ) and a diversity of phytoplankton groups.
								Macrophytes	Extent, distribution and richness of macrophytes	Macrophyte cover and composition suitable for invertebrates, fish, birds and recreational use	Maintain and/or restore distribution and area cover of macrophyte habitats particularly salt marsh
								Invertebrates	Macrofauna community composition, abundance and richness	Abundance and community composition of Invertebrates suitable for fish, birds	Restore and maintain species richness, distribution of species and mix (low species abundance, high dominance); Indicator species such as *Capitella capitata*, should not dominate benthic species at any site; *Callianassa kraussi* and *Upogebia africana* distribution patterns similar to reference state.
								Fish	Fish community composition, abundance and richness	Abundance and community composition of fish community suitable for birds	Restore and maintain the full complement of estuarine resident and estuary associated marine present in the estuary with population sizes sufficient to ensure their persistence in perpetuity; Ensure that exotic freshwater species do not increase to levels where they can exclude any more indigenous species through predation or competitive interactions; Maintain recruitment of adult and juvenile fish at present levels.
								Birds	Avifauna community composition, abundance and richness	Health avifauna community contributing to conservation of avifauna species in SA	Retain at least 90% of the baseline species richness, abundance and diversity of the bird community determined using regression slope based on a 3-year running average.
E12 Cape Flats	III	G22K	E12-E05	Zeekoevlei	Bxi20	D	Quantity	Surface flow	Flow	Freshwater inflow adequate to maintain water quality and habitat suitable for flora and fauna	Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Annual MMR/MAR (% Nat): 120 %, 120 %, 120 %, 120 %, 120 %, 120 %, 120 %, 120 %, 120 %, 120 %, 120 %, 120 %, 120 %
									Escherichia coli		
							Quality	Nutrients	DIN	Inorganic nutrient	River inflow: <1000 µg.l-1

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
										concentrations not to exceed TPCs for macrophytes and microalgae	Lower estuary: <1000 µg.l-1
									DIP		River inflow: <500 µg.l-1
											Lower estuary: <500 µg.l-1
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity in lower >10, maximum = 35
								System variables	Dissolved oxygen	System variables (temperature, pH, turbidity, dissolved oxygen, suspended solids and turbidity) not to exceed TPCs for biota	>4 $mg.l^{-1}$
								Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation	≤185 Enterococci/100 ml) (90th percentile, hazen system)
									Escherichia coli		≤500 E. coli/100 ml (90th percentile, hazen system)
							Habitat	Hydrodynamics	Mouth state	Habitat health adequate for microalgae, macrophytes, invertebrates, fish, birds and recreational use	Mouth should remain open >30% of the time
							Biota	Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Phytoplankton biomass and composition suitable for invertebrates, fish, birds and recreational use	Phytoplankton biomass (measured as chlorophyll-a) <100 µg/ℓ) and a diversity of phytoplankton groups.
								Macrophytes	Extent, distribution and richness of macrophytes	Macrophyte cover and composition suitable for invertebrates, fish, birds and recreational use	Maintain and/or restore distribution and area cover of macrophyte habitats particularly salt marsh
								Invertebrates	Macrofauna community composition, abundance and richness	Abundance and community composition of Invertebrates suitable for fish, birds	Restore and maintain species richness, distribution of species and mix (low species abundance, high dominance); Indicator species such as *Capitella capitata*, should not dominate benthic species at any site; *Callianassa kraussi* and *Upogebia africana* distribution patterns similar to reference state.

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Fish	Fish community composition, abundance and richness	Abundance and community composition of fish community suitable for birds	Restore and maintain the full complement of estuarine resident and estuary associated marine present in the estuary with population sizes sufficient to ensure their persistence in perpetuity; Ensure that exotic freshwater species do not increase to levels where they can exclude any more indigenous species through predation or competitive interactions; Maintain recruitment of adult and juvenile fish at present levels.
								Birds	Avifauna community composition, abundance and richness	Health avifauna community contributing to conservation of avifauna species in SA	Retain at least 90% of the baseline species richness, abundance and diversity of the bird community determined using regression slope based on a 3-year running average.

Table 16: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis D6 Eerste

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
D6 Eerste	III	G22H	D6-E06	Eerste Estuary	Bxi3	D	Quantity	Surface flow	Flow	Freshwater inflow adequate to maintain water quality and habitat suitable for flora and fauna	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
											MMR/MAR (% Nat)	120 %	120 %	120 %	120 %	120 %	120 %	120 %	120 %	120 %	120 %	120 %	120 %	120 %
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	River inflow: <1000 µg.l^{-1}													
											Lower estuary: <1000 µg.l^{-1}													
									DIP		River inflow: <500 µg.l^{-1}													
											Lower estuary: <500 µg.l^{-1}													
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity in lower >10, maximum = 35													
								System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	>4 mg.l-^{1}													
								Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	≤185 Enterococci/100 ml) (90th percentile, hazen system)													
									Escherichia coli		≤500 E. coli/100 ml (90th percentile, hazen system)													
							Habitat	Hydrodynamics	Mouth state	Habitat health adequate for	Permanently open													

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
									Tidal variation	microalgae, macrophytes, invertebrates, fish, birds and recreational use	<10% change from present state
							Biota	Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Phytoplankton biomass and composition suitable for invertebrates, fish, birds and recreational use	Maintain low phytoplankton biomass (chlorophyll- a < 20 µg/ℓ) and a diversity of phytoplankton groups.
								Macrophytes	Extent, distribution and richness of macrophytes	Macrophyte cover and composition suitable for invertebrates, fish, birds and recreational use	Restore and maintain the distribution and area cover of macrophyte habitats particularly salt marsh
								Invertebrates	Macrofauna community composition, abundance and richness	Abundance and community composition of Invertebrates suitable for fish, birds	Restore and maintain species richness, distribution of species and mix (low species abundance, high dominance); Indicator species such as Capitella capitata, should not dominate benthic species at any site; Callianassa kraussi and Upogebia africana distribution patterns similar to reference state.
								Fish	Fish community composition, abundance and richness	Abundance and community composition of fish community suitable for birds	Restore and maintain the full complement of estuarine resident and estuary associated marine present in the estuary with population sizes sufficient to ensure their persistence in perpetuity; Ensure that exotic freshwater species do not increase to levels where they can exclude any more indigenous species through predation or competitive interactions; Maintain recruitment of adult and juvenile fish at present levels.
								Birds	Avifauna community composition, abundance and richness	Health avifauna community contributing to conservation of avifauna species in SA	Retain at least 90% of the baseline species richness, abundance and diversity of the bird community determined using regression slope based on a 3-year running average.

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Table 17: Resource Quality Objectives for ESTUARIES in priority Resource Units in the Integrated Unit of Analysis D7 Sir Lowry's

IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
D7 Sir Lowry's	II	G22J	D7-E07	Lourens Estuary	Bxi4	D	Quantity	Surface flow	Flow	Freshwater inflow adequate to maintain water quality and habitat suitable for flora and fauna	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
											MMR/MAR (% Nat)	83 %	56 %	27 %	16 %	10 %	18 %	35 %	49 %	78 %	89 %	90 %	88 %	76 %
							Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	River inflow: <350 µg.l^{-1}													
											Lower estuary: <300 µg.l^{-1}													
									DIP		River inflow: <80 µg.l^{-1}													
											Lower estuary: <80 µg.l^{-1}													
								Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Average salinity in lower estuary >15, maximum = 35													
								System variables	Dissolved oxygen	System variables not to exceed TPCs for biota	>4 mg.l^{-1}													
								Pathogens	Enterococci	Concentrations of waterborne pathogens should be maintained in an Acceptable category for intermediate contact recreation	≤185 Enterococci/100 ml) (90th percentile, hazen system)													
									Escherichia coli		≤500 E. coli/100 ml (90th percentile, hazen system)													
							Habitat	Hydrodynamics	Mouth state	Habitat health adequate for microalgae, macrophytes, invertebrates, fish, birds and recreational use	Permanently open													
									Tidal variation		<10% change from present state													
								Sediments	Sediment characteristics, Channel shape/size		Bathymetry and sediment MdØ change <10% from baseline													
							Biota	Microalgae	Biomass and community composition of phytoplankton and benthic microalgae community	Phytoplankton biomass and composition suitable for invertebrates, fish, birds and recreational use	Maintain low phytoplankton biomass (chlorophyll- a < 20 µg/ℓ) and a diversity of phytoplankton groups.													
								Macrophytes	Extent, distribution and richness of macrophytes	Macrophyte cover and composition suitable for invertebrates, fish, birds and recreational use	Restore and maintain the distribution and area cover of macrophyte habitats particularly salt marsh													

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IUA	Class	Quaternary Catchment	RU	Resource Name	Biophysical Node Name	TEC	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
								Invertebrates	Macrofauna community composition, abundance and richness	Abundance and community composition of Invertebrates suitable for fish, birds	Restore and maintain species richness, distribution of species and mix (low species abundance, high dominance); Indicator species such as Capitella capitata, should not dominate benthic species at any site; Callianassa kraussi and Upogebia africana distribution patterns similar to reference state.
								Fish	Fish community composition, abundance and richness	Abundance and community composition of fish community suitable for birds	Restore and maintain the full complement of estuarine resident and estuary associated marine present in the estuary with population sizes sufficient to ensure their persistence in perpetuity; Ensure that exotic freshwater species do not increase to levels where they can exclude any more indigenous species through predation or competitive interactions; Maintain recruitment of adult and juvenile fish at present levels.
								Birds	Avifauna community composition, abundance and richness	Health avifauna community contributing to conservation of avifauna species in SA	Retain at least 90% of the baseline species richness, abundance and diversity of the bird community determined using regression slope based on a 3-year running average.

Table 18: Resource Quality Objectives for DAMS in priority Resource Units in the Berg Catchment

IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric													
D8 Upper Berg	II	G10A	D8-D01	Berg Dam	Quantity	Low flows	Dam level Flow releases: Berg EWR1 in G10A nMAR = 141.68 million m3/a pMAR: 126.00 million m3/a REC = C category	During the dry season dam levels must be sufficient for releases for irrigation and human use and protection of ecosystem function downstream. Water intake temperature to be managed.	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
									Maintenance low flows (million cubic metres)	2.143	1.293	1.071	0.803	0.726	0.803	1.296	2.679	4.147	4.285	4.285	3.888	29.177
						High flows		During the wet season high flow ecological releases are made according to the decision-support system.	Maintenance high flows (million cubic metres)	0.000	0.544	0.544	0.000	0.000	0.000	0.778	0.000	4.666	10.109	0.000	0.000	11.839
					Quality	Nutrients	Ortho-phosphate (PO_4-P)	The system must be maintained in a mesotrophic (moderately enriched) state or better to protect against nuisance algal blooms and excessive water treatment costs.	≤ 0.015 milligrams/litre (50th percentile)													
							Total inorganic nitrogen (TIN)1		≤ 0.07 milligrams/litre (50th percentile)													

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IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						Salts	Electrical conductivity	Salt levels must be maintained at concentrations where they do not impact negatively on the ecosystem, are maintained in an Ideal category for domestic and irrigation water supply.	≤ 30 milliSiemens/metre (95th percentile)
						System variables	pH	The water in the dam is naturally acidic and it should be maintained within the historical range.	5.5 ≥ pH ≤ 7.5 (5th and 95th percentiles)
						Pathogens	E coli	The dam must be maintained in a state that is in an Ideal category for full contact recreation to protect its domestic water supply purpose.	≤ 130 counts/100ml (95th percentile)
D8 Upper Berg	II	G10B	D8-D02	Wemmershoek Dam	Quantity	Low flows	Dam levels	Dam levels must be sufficient for urban and industrial use water supply, and to supply some irrigators.	% of dam volume. No EWR site
					Quality	Nutrients	Ortho-phosphate (PO_4-P) Total inorganic nitrogen (TIN)	The reservoir is currently in a Natural state and should be kept in an oligotrophic state. for supply to the City of Cape Town and Paarl. As a key domestic water supply reservoir this status should be maintained and protected.	≤ 0.005 milligrams/litre (50th percentile)
							Ortho-phosphate (PO_4-P) Total inorganic nitrogen (TIN)	The reservoir is currently in a Natural state and should be kept in an oligotrophic state. for supply to the City of Cape Town and Paarl. As a key domestic water supply reservoir this status should be maintained and protected.	≤ 0.50 milligrams/litre (50th percentile)
B4 Lower Berg	II	G10F	B4-D03	Voelvlei Dam	Quantity	Low flows	Dam levels	Dam levels must be sufficient for urban and industrial use water supply via the two WTWs, and releases to Berg River for human and irrigation use.	% of dam volume. No EWR site
					Quality	Nutrients	Ortho-phosphate (PO_4-P)	The reservoir is currently in an Eutrophic state and should be	≤ 0.025 milligrams/litre (50th percentile)

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IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
							Total inorganic nitrogen (TIN)	improved to a mesotrophic state or better to protect the water supply to the City of Cape Town and Swartland towns against harmful algal blooms and taste & odour problems in treated domestic water.	≤ 0.70 milligrams/litre (50th percentile)
						Salts	Electrical conductivity	Salt levels must be maintained at concentrations where they do not impact negatively on the ecosystem, and are in an Ideal category for domestic water use and for irrigation water use.	≤ 30 milliSiemens/metre (95th percentile)
						Pathogens	E coli, Faecal coliforms	The system must be maintained in a state that is in an Acceptable category for intermediate contact recreation	≤ 2000 counts/100ml (95th percentile)
B4 Lower Berg	II	G10K	B4-D04	Misverstand Weir	Quantity	Low flows	Dam levels	Water levels in the weir must be sufficient for supply for human use via the Withoogte WTW.	% of dam volume
					Quality	Nutrients	Ortho-phosphate (PO_4-P) Total inorganic nitrogen (TIN)	The reservoir is currently in a Eutrophic state and should be in the short term be maintained in its current state or better. The long-term objective should be to improve the nutrient status to a mesotrophic state or better to protect the water supply to the West Coast towns.	≤ 0.025 milligrams/litre (50th percentile)
							Ortho-phosphate (PO_4-P) Total inorganic nitrogen (TIN)		≤ 2.5 milligrams/litre (50th percentile)
						Salts	Electrical conductivity	Salt levels must be maintained at concentrations where they do not impact negatively on the ecosystem, and are in an Ideal category for domestic and industrial water use, and for irrigation water use.	≤ 70 milliSiemens/metre (95th percentile)
						Pathogens	E. coli	The reservoir must be maintained in a state that is safe for domestic water use (with treatment) and for intermediate contact recreation as the dam is a popular recreation venue.	≤ 1000 counts/100 ml (95th percentile)
							Faecal coliforms		≤ 1000 counts/100 ml (95th percentile)

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IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
D7 Sir Lowry's	II	G40A	D7-D05	Upper Steenbras Dam	Quantity	Low flows	Dam levels	Dam levels must be sufficient for releases to the Lower Steenbras Dam for urban and industrial use and protection of ecosystem functioning downstream of the Lower Steenbras Dam, hydropower energy generation via the Steenbras Pumped Storage Scheme as well as for water supply to the Western Cape Water Supply System (City of Cape Town) via the Faure WTW.	% of dam volume
					Quality	Nutrients	Ortho-phosphate (PO_4-P) Total inorganic nitrogen (TIN)	The system must be maintained in a mesotrophic state or better.	≤ 0.015 milligrams/litre (50th percentile)
							Ortho-phosphate (PO_4-P) Total inorganic nitrogen (TIN)		≤ 0.07 milligrams/litre (50th percentile)
						Salts	Electrical conductivity	Salt levels must be maintained at concentrations where they do not impact negatively on the ecosystem, and are in an Ideal category for domestic and industrial water use, and for hydropower generation.	≤ 30 milliSiemens/metre (95th percentile)
						Pathogens	E. coli	The system must be maintained in a state that is safe for municipal use (with treatment).	≤ 130 counts/100 ml (95th percentile)
							Faecal coliforms		≤ 130 counts/100 ml (95th percentile)
D7 Sir Lowry's	II	G40A	D7-D06	Lower Steenbras Dam	Quantity	Low flows	Dam level Spills from dam. Flow releases: Berg EWR8 in G40A below Lower Steenbras Dam nMAR = 54.88 million m3/a	Dam levels must remain sufficient to provide for supply to the Western Cape Water Supply System (City of Cape Town) via the Steenbras WTW, and low flows to the lower Steenbras River and estuary for the protection of ecosystem functioning downstream.	

Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
Maintenance low flows (million cubic metres)	0.427	0.323	0.235	0.180	0.149	0.144	0.173	0.247	0.384	0.506	0.582	0.502	3.852

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IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric
						High flows		High flow ecological releases should be made during the wet season to meet flood requirements, but within the constraints of the existing outlet structure, and utilising spills where possible.	Maintenance high flows (million cubic metres) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.077 0.077 0.307 0.307 0.077 0.845
					Quality	Nutrients	Ortho-phosphate (PO_4-P)	The reservoir must be maintained in a mesotrophic state or better.	≤ 0.015 milligrams/litre (50th percentile)
							Total inorganic nitrogen (TIN)	Salt levels must be maintained at concentrations where they do not impact negatively on the ecosystem, and are in an Ideal category for domestic and industrial water use.	≤ 0.07 milligrams/litre (50th percentile)
						Salts	Electrical conductivity		≤ 30 milliSiemens/metre (95th percentile)
						Pathogens	E. coli	The reservoir must be maintained in a state that is safe for contact recreation.	≤ 130 counts/100 ml (95th percentile)
							Faecal coliforms		≤ 130 counts/100 ml (95th percentile)

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Table 19: Resource Quality Objectives for GROUNDWATER in priority Resource Units in the Berg Catchment

IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
D8 Upper Berg	II	G10A	4-Paarl-Upper Berg	Groundwater (all)	Quantity	Abstraction	Seasonal abstraction: water level recovers from abstraction impact during wet season, under consideration of climate change and drought cycles. Permanent abstraction: water level decline stabilises under consideration of aquifer response time.	Groundwater use should be sustainable for all users and the environment	n/a
						Low flow in river	Compliance with the low flow requirements in the river (as per riverine RQO)	Maintain (groundwater component of) the low flow requirements in the river	Maintenance low flow requirements: 29.177 Mm3/a (34.39 %MAR) at G1H076 (Bvii13); 27.421 Mm3/a (19.35 %MAR) at G1H077 (Bviii1)
					Quality	Nutrients	NO_3 (as N)	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	< 3.3 mg/l
						Salts	EC		< 70 mS/m
						System variable	pH		5.2 – 8.4
						Pathogens	E-coli		0 counts / 100 ml
						Pathogens	Total Coliform		<10 counts / 100ml
		G10B	4-Paarl-Upper Berg	Groundwater (all)	Quantity	Discharge	Relative water levels between groundwater and suface water (in mamsl)	The natural gradient between groundwater and surface water should be maintained	n/a
					Quantity	Discharge	Buffer zones	No groundwater abstraction around wetland and river FEPAs in accordance with the implementation manual for FEPAs.	250m
					Quality	Nutrients	NO_3 (as N)	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	< 3.3 mg/l
						Salts	EC		< 70 mS/m
						System variable	pH		5.2 – 8.4
						Pathogens	E-coli		0 counts / 100 ml
						Pathogens	Total Coliform		<10 counts / 100ml
C5 Berg Tributaries	II	G10E	5-Tulbagh Valley	Groundwater (all)	Quantity	Abstraction	Seasonal abstraction: water level recovers from abstraction impact during wet season, under consideration of climate change and drought cycles. Permanent abstraction: water level decline stabilises under consideration of aquifer response time.	Groundwater use should be sustainable for all users and the environment	n/a

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IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
					Quantity	Discharge	Buffer zones	No groundwater abstraction around wetland and river FEPAs in accordance with the implementation manual for FEPAs.	250m
					Quality	Pathogens	E-coli	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	0 counts / 100 ml
						Pathogens	Total Coliform		<10 counts / 100ml
					Quality	Nutrients	NO3 (as N)	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	n/a
						System variable	pH		n/a
						Salts	EC		n/a
B4 Lower Berg	III	G10J	6-24 Rivers	Groundwater (all)	Quantity	Discharge	Relative water levels between groundwater and suface water (in mamsl)	The natural gradient between groundwater and surface water should be maintained	n/a
							Buffer zones	No groundwater abstraction around wetland and river FEPAs in accordance with the implementation manual for FEPAs.	250m
						Low flow in river	Compliance with the low flow requirements in the river (as per riverine RQO)	Maintain (groundwater component of) the low flow requirements in the river	Maintenance low flow requirements: 114.338 Mm3/a (13.28 %MAR) at G1H013 (Bvii6)
					Quality	System variable	pH	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	5.2 – 8.1
						Pathogens	E-coli		0 counts / 100 ml
						Pathogens	Total Coliform		<10 counts / 100ml
				Groundwater (Cenozoic coastal sand)	Quality	Nutrients	NO3 (as N)		< 6.9 mg/l
						Salts	EC		< 942 mS/m
				Groundwater (Basement)	Quality	Nutrients	NO3 (as N)		<11.0 mg/l
						Salts	EC		< 875 mS/m

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IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
A1 Berg Estuary and A2 Langebaan	II	G10M	8-West Coast		Quantity	Abstraction	Seasonal abstraction: water level recovers from abstraction impact during wet season, under consideration of climate change and drought cycles. Permanent abstraction: water level decline stabilises under consideration of aquifer response time.	Groundwater use should be sustainable for all users and the environment	n/a
						Groundwater level	Water level	Minimum water level in abstraction boreholes within 2.5km from the ocean to avoid saline intrusion	>1 mamsl
						Discharge	Relative water levels between groundwater and suface water (in mamsl)	The natural gradient between groundwater and surface water should be maintained	n/a
							Buffer zones	No groundwater abstraction around wetland and river FEPAs in accordance with the implementation manual for FEPAs.	250m
							Compliance with the groundwater flow requirements to the Langebaan Lagoon	Compliance to the groundwater flow requirements to the Langebaan Lagoon, as per estuary RQO requirement	Groundwater inflow not <10% of present day (2017) rate
							Compliance with the groundwater flow requirements to the Langebaan Lagoon	Compliance to the groundwater flow requirements to the Langebaan Lagoon, as per estuary RQO requirement	Ground water level not <10% below present day (2017) level
		G10M	8-West Coast	Groundwater (Cenozoic coastal sand)	Quality	Nutrients	NO3 (as N)	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	< 11.0 mg/l
						System variable	pH		7.1 - 8.4
						Salts	EC		< 520 mS/m
				Groundwater	Quality	Nutrients	NO3 (as N)	Groundwater should be fit for	< 11.0 mg/l

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IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
				(Basement)		Salts	EC	domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	< 1571 mS/m
				Groundwater (all)	Quality	Salts	PO_4	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	< 0.3 mg/l
						Pathogens	E-coli		0 counts / 100 ml
						Pathogens	Total Coliform		<10 counts / 100ml
N/A		G10L	8-West Coast	Groundwater (all)	Quantity	Abstraction	Seasonal abstraction: water level recovers from abstraction impact during wet season, under consideration of climate change and drought cycles. Permanent abstraction: water level decline stabilises under consideration of aquifer response time.	Groundwater use should be sustainable for all users and the environment	n/a
						Discharge	Relative water levels between groundwater and suface water (in mamsl)	The natural gradient between groundwater and surface water should be maintained	n/a
							Buffer zones	No groundwater abstraction around wetland and river FEPAs in accordance with the implementation manual for FEPAs.	250m
				Groundwater (Cenozoic coastal sand)	Quality	Nutrients	NO3 (as N)	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	< 8.2 mg/l
						Salts	EC		< 520 mS/m
				Groundwater (Basement)		Nutrients	NO3 (as N)	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	< 11.0 mg/l
						Salts	EC		< 899 mS/m
				Groundwater (all)		Salts	PO_4		< 0.3 mg/l
						System variable	pH		6.7 - 8.3
						Pathogens	E-coli		0 counts / 100 ml
							Total Coliform		<10 counts / 100ml

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IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
A3 West Coast	III	G21B	9-Atlantis	Groundwater (all)	Quantity	Abstraction	Seasonal abstraction: water level recovers from abstraction impact during wet season, under consideration of climate change and drought cycles. Permanent abstraction: water level decline stabilises under consideration of aquifer response time.	Groundwater use should be sustainable for all users and the environment	n/a
						Groundwater level	Water level	Minimum water level in abstraction boreholes within 2.5km from the ocean to avoid saline intrusion	>1 mamsl
						Discharge	Relative water levels between groundwater and suface water (in mamsl)	The natural gradient between groundwater and surface water should be maintained	n/a
							Buffer zones	No groundwater abstraction around wetland and river FEPAs in accordance with the implementation manual for FEPAs.	250m
				Groundwater (Cenozoic coastal sand)	Quality	Nutrients	NO3 (as N)	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	< 2.3 mg/l
						Salts	EC		< 287 mS/m
				Groundwater (Basement)		Nutrients	NO3 (as N)	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	< 10.4 mg/l
						Salts	EC		< 1052 mS/m
				Groundwater (all)		System variable	pH		6.7 – 8.3
						Pathogens	E-coli		0 counts / 100 ml
						Pathogens	Total Coliform		<10 counts / 100ml
D10 Diep	III	G21D	10-Malmesbury	Groundwater (all)	Quantity	Abstraction	Seasonal abstraction: water level recovers from abstraction impact during wet season, under consideration of climate change and drought cycles. Permanent abstraction: water level decline stabilises under consideration of aquifer response time.	Groundwater use should be sustainable for all users and the environment	n/a

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IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
						Discharge	Buffer zones	No groundwater abstraction around wetland and river FEPAs in accordance with the implementation manual for FEPAs.	250m
						Low flow in river	Compliance with the low flow requirements in the river (as per riverine RQO)	Maintain (groundwater component of) the low flow requirements in the river	Maintenance low flow requirements: 0.578 (6.22 %MAR) at node Biv6 (no gauge)
				Superficial aquifers	Quantity	Discharge	Relative water levels between groundwater and suface water (in mamsl)	The natural gradient between groundwater and surface water should be maintained	n/a
				Groundwater (Cenozoic coastal sand)	Quality	Nutrients	NO3 (as N)	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	< 7.1 mg/l
						Salts	EC		< 358 mS/m
				Groundwater (Basement)		Nutrients	NO3 (as N)		< 6.4 mg/l
						Salts	EC		< 617 mS/m
						System variable	pH		6.3 – 8.6
				Groundwater (all)		Pathogens	E-coli		0 counts / 100 ml
						Pathogens	Total Coliform		<10 counts / 100ml
E12 Cape Flats	III	G22C, G22D, G22E	2-Cape Flats	Groundwater (all)	Quantity	Groundwater level	Water level	Minimum water level in abstraction boreholes within 2.5km from the ocean to avoid saline intrusion	>1 mamsl
						Discharge	Buffer zones	No groundwater abstraction around wetland and river FEPAs in accordance with the implementation manual for FEPAs.	250m
						Low flow in river	Compliance with the lowflow requirements in the river	Maintain (groundwater component of) the low flow requirements in the river, as per surface water RQO requirement	Maintenance low flow: 0.348 Mm3/a (7.74 %MAR) at Bvii7 (no gauge)

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IUA	Class	Quaternary Catchment	RU	Resource Name	Component	Sub Component	Indicator/ Measure	RQO Narrative	RQO Numeric
				Superficial aquifers	Quantity	Discharge	Relative water levels between groundwater and suface water (in mamsl)	The natural gradient between groundwater and surface water should be maintained	n/a
				Groundwater (Cenozoic coastal sand)	Quality	Nutrients	NO3 (as N)	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	< 9.2 mg/l
						System variable	pH		6.6 – 8.4
						Salts	EC		< 180 mS/m
				Groundwater (Basement)		Nutrients	NO3 (as N)		< 11.0 mg/l
						Salts	EC		< 953 mS/m
				Groundwater (all)		Pathogens	E-coli		0 counts / 100 ml
							Total Coliform		<10 counts / 100ml

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