



Drinking Water Quality Management Plan (DWQMP) Annual Report

1 July 2021 to 30 June 2022

Central Highlands Regional Council

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Glossary of terms

ADWG	Australian Drinking Water Guidelines (2018). Published by the National Health and Medical Research Council of Australia
CCP	Critical Control Point
CFU/100mL	Colony Forming Units per 100 millilitres
CHRC	Central Highlands Regional Council
DWQMP	Drinking Water Quality Management Plan
<i>E. coli</i>	<i>Escherichia coli</i> , a bacterium that is considered to indicate the presence of faecal contamination and is a potential health risk
LOR	Limit of Reporting
mg/L	Milligrams per litre
ML	Megalitre
µg/L	Micrograms per litre
NTU	Nephelometric Turbidity Units
ND	Not Detected
PFAS	Per-fluoroalkyl and poly-fluoroalkyl substances
pH	Power of Hydrogen
QHFSS	Queensland Health Forensic and Scientific Services
R. raciborskii and Cylindro	<i>Raphidiopsis (formerly Cylindrospermopsis) raciborskii</i> , a freshwater cyanobacteria known to produce the toxin cylindrospermopsin and a potential health risk
RMIP	Risk Management Improvement Program
THM	Trihalomethanes
WTP	Water Treatment Plant
>	Greater than
≥	Greater than or equal to
<	Less than

1 Introduction

This report documents the performance of Central Highlands Regional Council's drinking water service.

It details performance of the water quality and the implementation of actions detailed in the Drinking Water Quality Management Plan (DWQMP) required under the *Water Supply (Safety and Reliability) Act 2008* (the Act).

The report assists the regulator to determine compliance with the current approved DWQMP and provides a public report on the council's management of drinking water.

2 Summary of Schemes Operated

This report relates to the drinking water supply schemes that the Central Highlands Regional Council owned and operated from 1 July 2021 to 30 June 2022.

Table 1 lists the water supply scheme, water source, water treatment process, population and drinking water treatment capacity for the water supply schemes covered in this report.

Table 1 – Summary of water supply schemes

Scheme Name	Communities Supplied	Water Source	Treatment Processes	Population Served [#]	Treatment Capacity ML/day
Anakie	Anakie	May Creek Bore	Disinfection	100	0.4
Bauhinia	Bauhinia Downs	Artesian Bore	Disinfection	25	0.1
Blackwater	Blackwater	Mackenzie River	Coagulation, Filtration, pH correction, Fluoridation and Disinfection	4669	15
	Bluff			234	
Capella	Capella	Capella Creek / Mackenzie River	Coagulation, Filtration and Disinfection	987	0.9
Comet	Comet	Comet River	Coagulation, Filtration, pH correction and Disinfection	147	0.3
Dingo	Dingo	Springton Creek / Dingo Creek	Coagulation, Filtration, and Disinfection	145	0.4
Duaringa	Duaringa	Dawson River	Coagulation, Filtration and Disinfection	196	0.7
Emerald	Emerald	Nogoa River	Coagulation, Filtration, pH correction, Fluoridation and Disinfection	14356	38
Rolleston	Rolleston	Comet River / Sub-artesian Bores	Coagulation, Filtration, and Disinfection	255	0.3
Sapphire / Rubyvale	Sapphire / Rubyvale	Retreat Creek Bores	Fluoridation and Disinfection	1048	2.1
Springsure	Springsure	Shallow Basalt / Deeper Sandstone Bores	Aeration and Disinfection	744	2
Tieri	Tieri	Mackenzie River	Coagulation, Filtration, pH correction, Fluoridation and Disinfection	725	3.6

[#] Available populations at July 2022 sourced @

<https://www.qgso.qld.gov.au/statistics/theme/population/population-estimates/regions>.

3 DWQMP Implementation

The DWQMP describes the operating strategies, operating limits and approaches to water quality monitoring and the overall management of risks to water quality.

Specific changes or improvements to the drinking water services provided by council have occurred with the implementation of a risk management improvement program (RMIP).

3.1 Progress in implementing the risk management improvement program

A summary of that progress and descriptions of the progress made towards the completion of specific tasks can be found in Appendix C. As per section 14 of the overarching volume of the DWQMP the items have been prioritised as short, medium and long-term actions. Short-term actions are intended to be undertaken as soon as possible and completed within 12 months, medium-term actions are intended to be completed within 12-24 months, and long-term actions will be introduced as items in future council budgets to secure capital funding.

3.2 Revisions made to the operational monitoring program to maintain compliance with the water quality criteria in verification monitoring

The operational monitoring program was updated this reporting period and parameters expanded in some locations. Critical limits were reviewed for consistency where possible and as stated in the plan “the critical limits generally do not change, other than to improve processes” and their associated risks.

Additional testing was added to verification monitoring, frequency and sample points updated.

3.3 Amendments made to the DWQMP

Following completion of CHRC’s DWQMP review in November 2021, an application for approval to amend the DWQMP was made in December 2021.

A notice of decision from the regulator was received in February 2022, advising CHRC’s application for amendment had been approved.

4 Verification Monitoring - Water Quality Information and Summary

Appendix A provides an overview of the results from the water quality monitoring program for the reporting period of 1 July 2021 to 30 June 2022. The water quality monitoring program was generally carried out as per Section 13 of the approved Central Highlands Regional Council overarching volume of the DWQMP. A small number of samples were collected but did not arrive at Queensland Government Forensic and Scientific Services laboratory for analysis, due to loss of eskies by the courier company engaged for delivery.

The internal database and results in Appendix A are considered complete in so much as all the sample results have been recorded and included. This continues the maturing of our data management as previously identified and completed in the risk management improvement program.

Drinking water results were compared against the water quality criteria, i.e., the health guideline values in the current Australian Drinking Water Guidelines (ADWG), as well as the standards in the former *Public Health Regulation 2005 and the current Public Health Regulation 2018*.

Aesthetic exceedances like pH, sodium and dissolved solids in Springsure and Rolleston, colour, turbidity and iron in Bauhinia and total hardness in Anakie, Sapphire and Rubyvale were recorded. Actions and projects are being considered to make improvements in some of these areas.

Seasonal monitoring of heavy metals and pesticides was undertaken in both the raw and/or treated water in surface schemes with a potential risk.

R. raciborskii levels were seasonally monitored in surface water schemes with a recognised risk. The DWQMP trigger level for cylindrospermopsin toxin testing was reached for Capella and Rolleston schemes and microcystins in Duaringa. While levels of the toxin varied in the raw water no detection was made in the treated water throughout the blue green algae blooms.

In 2021, Queensland Health adopted an interim guideline value of 0.80 mg/L for chlorates. As a result, all service providers using liquid sodium hypochlorite were required to undertake investigative sampling. Council commenced sampling in November 2021, details of analysis results are discussed in the next section of this report.

Following advice from the regulator as part of the DWQMP review, council were advised to undertake radiological monitoring. Quarterly monitoring commenced on bore schemes as the higher priority, with progression to surface schemes to occur over time.

Appendix A (Tables 4.1 to 4.14) contain a summary of the results of the water quality monitoring program for all of council's water supply schemes. Most physicochemical drinking water quality results from the standard monitoring program met the recommended values in the ADWG. Note: these results do not include dual samples sent to the external laboratory which were all compliant.

Appendix B (Tables 5.1 to 5.12) contain a summary of the results of the reticulation *E. coli* verification monitoring program for all council water supply schemes. While all samples taken tested negative for *E. coli*, a number of schemes did have recorded result/s for coliforms. Council observe, monitor, resample and investigate as required positive coliform occurrences.

5 Incidents Reported to the Regulator

This financial year there were four incidents where the regulator was notified under sections 102 or 102A of the Act. These notifications did not involve the detection of *E. coli* – an organism that may not directly represent a hazard to human health but indicates the presence of recent faecal contamination.

As shown in table 2 the notifications were related to a high turbidity event in Duaringa and chlorate exceedances in Comet, Bluff and Rolleston.

5.1 Non-compliances with water quality criteria and corrective and preventive actions undertaken

As mentioned in the previous section, Queensland Health adopted an interim guideline value of 0.80 mg/L for chlorates in 2021. As a result, all service providers using liquid sodium hypochlorite were required to undertake investigative sampling. Council commenced sampling in November 2021 and subsequently reported three locations exceeding the Queensland Health interim guideline value - Comet, Bluff and Rolleston.

5.2 Prescribed incidents or events reported to the regulator and corrective and preventive actions undertaken

The Duaringa incident in table 2 below required council to issue a 'boil water alert' to the public as a precautionary measure due to high turbidity water. The boil water alert was lifted once sampling and subsequent results indicated water quality was back in compliance.

Table 2 – Non-compliance and prescribed incidents or events reported to the regulator

Incident date	Scheme	Parameter	Level reported	Health Value	Corrective and Preventive actions
6/12/2021	Comet	Chlorates	Max 2.18 mg/L	0.80 mg/L	A total of 5 chlorate exceedances in the drinking water at Comet were experienced in the reporting year. Dual storage was implemented on site at the WTP, and smaller batches of sodium hypochlorite delivered. Ongoing monitoring continues to determine the optimum future supply frequency and volume. DWI-481-21-09283
7/12/2021	Bluff	Chlorates	Max 1.12 mg/L	0.80 mg/L	Following 2 chlorate exceedances in Bluff, dose rates were adjusted whilst not compromising effective disinfection. Storage and replenishment procedures were reviewed. Ongoing monitoring continues to ensure water quality is maintained. DWI-481-21-09288
8/2/2022	Rolleston	Chlorates	Max 1.31 mg/L	0.80 mg/L	There were 3 chlorate exceedances in Rolleston during the year. Operations were amended to cease top up procedures, reverting to usage of stand-alone drums on site. DWI-481-22-09481

Incident date	Scheme	Parameter	Level reported	Health Value	Corrective and Preventive actions
7/03/2022	Duaringa	Turbidity	N/A	N/A	Following manual sludge removal at the Duaringa WTP, a valve was inadvertently left open which drained the clarifiers, stopped water production and resulted in running out the town water supply. Draining the network caused elevated turbidity and a <u>boil water alert</u> was put in place for 4 days. Sampling and testing occurred to monitor water quality, and extensive flushing was undertaken to ensure clean water throughout the network. DWI-481-22-09509

6 Customer Complaints

Council is required to report on the number of complaints, general details of complaints, and the responses undertaken. Table 3 provides an overview of the customer complaints relating to drinking water quality during this period plus adds some context by including the complaints per 1000 customers.

Table 3 – Customer complaints about water quality (including per 1000 customers)

Scheme	Health Concern	Dirty water	Taste and Odour	Other	Total
Anakie					0
Bauhinia		1 (40.0)			1 (40.0)
Blackwater/Bluff			1 (0.2)		1 (0.2)
Capella	1 (1.01)				1 (1.01)
Comet			1 (6.8)		1 (6.8)
Dingo					0
Duaringa			1 (5.1)		1 (5.1)
Emerald		21 (1.5)	1 (0.07)	1 (0.07)	23 (1.6)
Rolleston					0
Sapphire/Rubyvale					0
Springsure					0
Tieri		3 (4.1)			3 (4.1)
Total	1 (0.04)	25 (1.06)	4 (0.17)	1 (0.04)	31 (1.31)

* Complaints with multiple categories or multiple complaints for a same event in the system have all been counted as individual complaints for this report. Within the system there are 31 applicable records that total the 31 complaints.

The two graphs overleaf show the breakdown of customer complaints by month in Figure 1 and by scheme in Figure 2. There is a general spread of water quality complaints through the whole reporting period. As expected, there is a higher frequency of complaints for the schemes that service larger communities.

Figure 1 – Monthly complaints about water quality

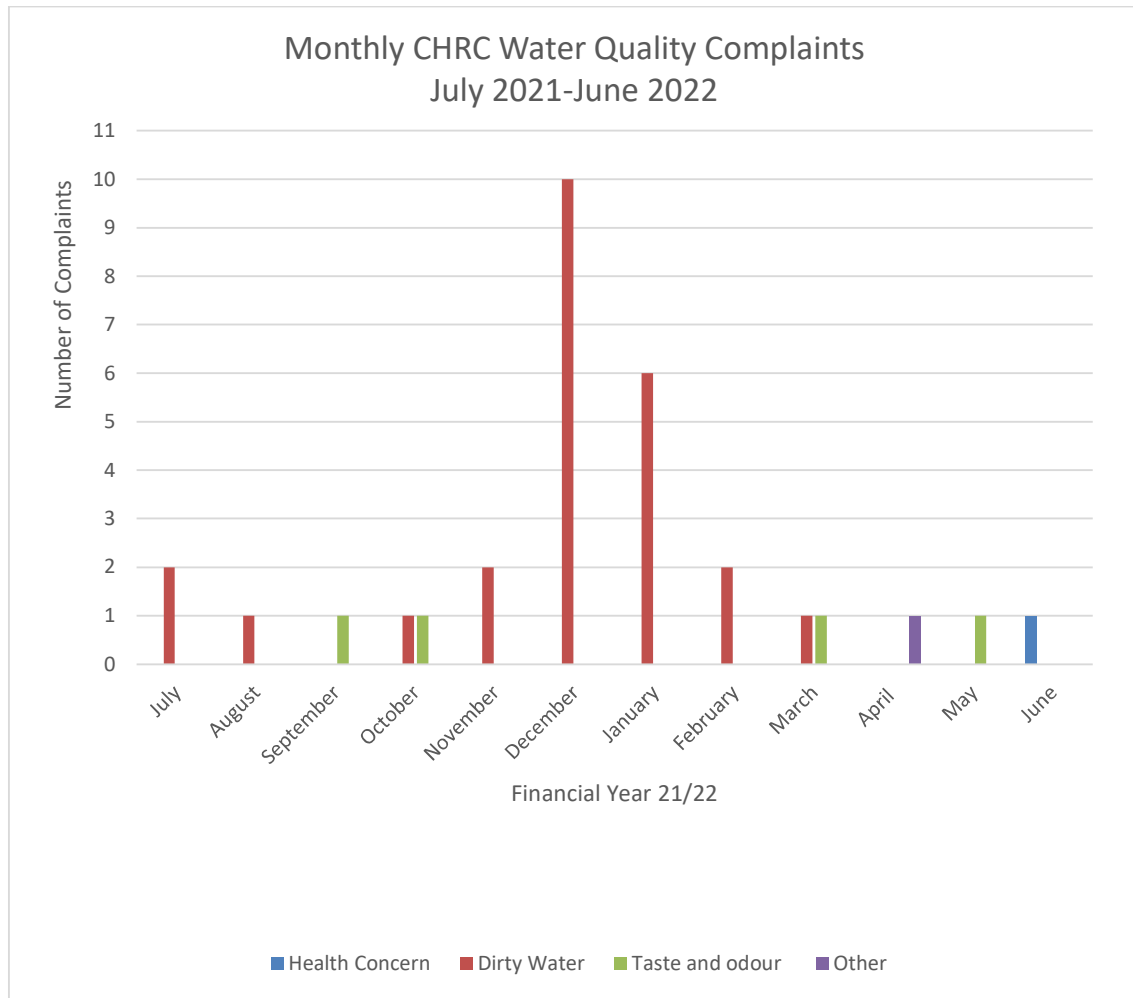
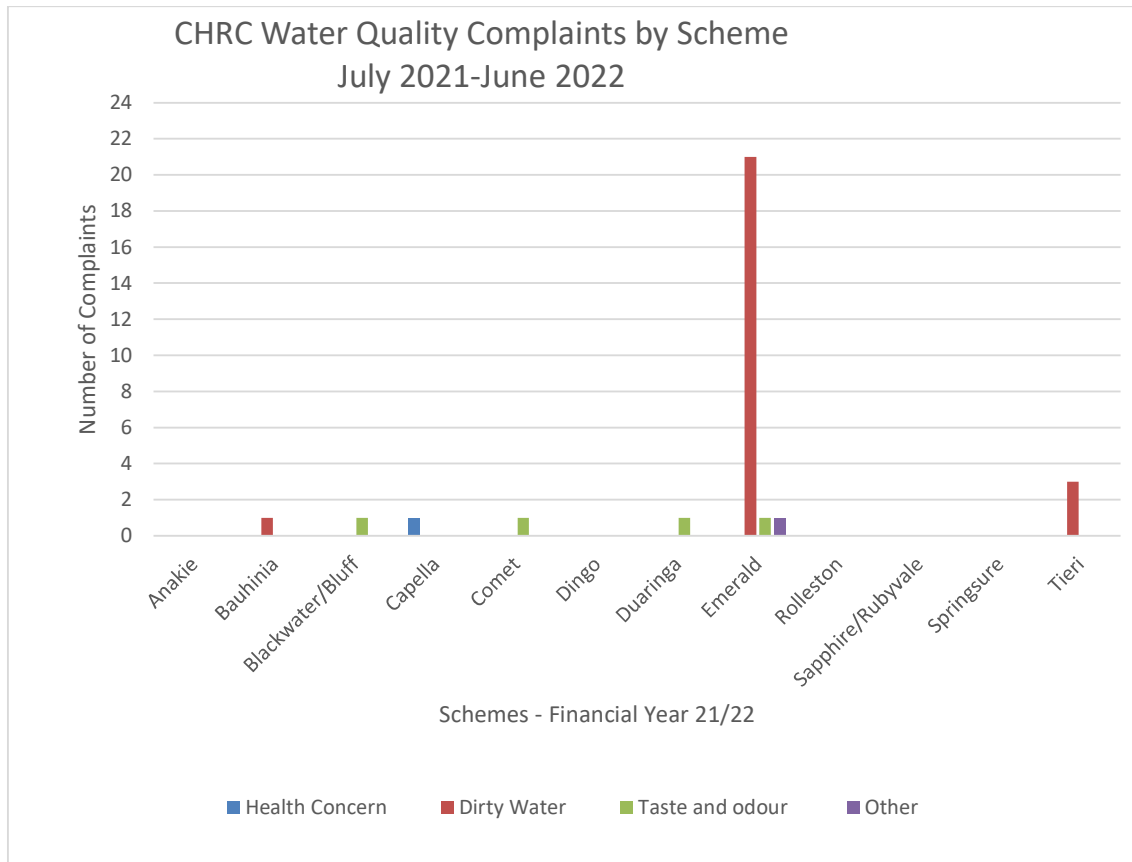


Figure 2 – Complaints about water quality by scheme



6.1 Health Concern

Complaints or enquiries are sometimes received from customers who suspect their water may be associated with an illness they are experiencing. Council investigates each complaint relating to alleged illness from its water quality, typically by testing the customer’s tap and other sampling points close by for general water quality indicators and/or for the presence of *E. coli*. and a standard water analysis as required.

During the 2021-2022 financial year one complaint was received in relation to a health concern. A number of families in Capella were affected by boils and town water was suggested as a potential cause.

Council investigated the complaint, multiple water sources were identified including town supply, Tieri pipeline and rainwater tanks. Based on council’s water quality monitoring results, town disinfection and the multiple water sources, no link to town water supply was established.

6.2 Dirty Water

A total of 25 customer complaints associated with dirty water were received between July 2021 and June 2022.

The town of Emerald reported 21 of these complaints. Six of these related to black particles in the water, all at differing times, July, October, February and March. Grab samples from complainant households were sent for analysis but did not identify a potential cause.

Testing results at the time indicated no parameters exceeded the ADWG guidelines, filters were changed, and lines flushed.

Following heavy rain in late December and January, thirteen complaints were received in Emerald in relation to dirty/discoloured water. Lines were flushed in the reported areas, with a total of 109 fire hydrant locations utilised to flush the mains. Post rain, pre-chlorination commenced at the Opal Street WTP to treat high levels of manganese in the raw water.

Similarly, December rain events in Tieri resulted in three discolouration complaints.

High levels of manganese in the raw water post rain and the subsequent accumulation of minerals in the pipelines, is the expected cause of discolouration in both Emerald and Tieri. This is an historic issue that occurs seasonally following wet weather events.

Each complaint relating to discoloured water or unusual water appearance is investigated by Council. Testing the water quality, typically by testing the customer's tap and other sampling points close by for turbidity, chlorine levels and/or getting a standard water analysis as required.

The reported areas are then flushed to remove the dirty water and to achieve acceptable chlorine residual results. Flushing targets specific areas such as dead-end mains, where it is anticipated the dirty water would not be flushed through normal use. Customers that report a complaint in this context are advised of the reasons for the dirty or unusual water appearance and are requested to allow the main a short period of time to settle.

6.3 Taste and Odour

A total of 4 customer complaints associated with taste and odour were received between July 2021 and June 2022.

The four complaints received were isolated, unrelated incidents, all in different towns across the region. Lines were flushed, resolving the issue for two customers in Comet and Emerald. The other two complaints, one in Duaringa and one in Blackwater, were both resolved themselves in a short time without requiring any action from council.

6.4 Other

During the 2021-2022 financial year council received one complaint about 'other' water quality issues. A customer in Emerald queried the water treatment process as a number of their fish had died. A general overview explaining the water treatment process, disinfection procedures and water quality sampling regime provided a satisfactory outcome. The customer resolved to investigate their own tank on their property.

7 DWQMP Review Outcomes

CHRC facilitated the regular review of the DWQMP which was completed in November 2021. The process consisted of:

- desktop review of the approved DWQMP and associated documents
- water quality data analysis from July 2018 to June 2021
- review discussions with operational staff
- review of critical limits and critical control procedures
- risk register review meeting
- preparation of the final review report

As a result of the review, a number of amendments were made to the DWQMP including:

- Schematics for each location were updated including chemicals, dosing and monitoring points. A number of rented ultra-filtration membrane systems have been commissioned.
- Catchment risk assessments have been undertaken across all drinking water schemes.
- Risk Registers reviewed and updated with new risks specific to each scheme.
- Chemical usage, dosage and critical limits reviewed and updated accordingly. Procedures continue to be developed.
- RMIP updated, completed items removed and new items added as a result of the risk register review.
- Additional verification monitoring has been added, frequency and locations updated. Transition to in house E.Coli testing completed.
- Operational monitoring parameters reviewed and updated accordingly.

The next regular review of CHRC's DWQMP is due for completion in November 2023.

Following completion of the next DWQMP review, an application for approval to amend the DWQMP may be made to the regulator.

8 DWQMP Audit Findings

No audit was conducted during the reporting period of 01/07/2021 to 30/06/2022.

Findings from the DWQMP regulatory audit 2018 were considered during the last DWQMP review in November 2021.

The next DWQMP regulatory audit is due for completion by November 2022.

Appendix A – Summary of Compliance with Water Quality Criteria

The drinking water results were compared against the water quality criteria, i.e., the health guideline values in the current Australian Drinking Water Guidelines (ADWG), as well as the standards in the former *Public Health Regulation 2005 and the current Public Health Regulation 2018*. While all samples taken tested negative for *E. coli*, a number of schemes did have recorded result/s for coliforms. Most physicochemical drinking water quality results from the standard monitoring program met the recommended health value ranges in the ADWG.

Note: these results do not include dual samples sent to the external laboratory which were all compliant.

Table 4.1 to 4.14 – Verification monitoring results

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Anakie	Reticulation	Chlorine (Free)	mg/L	Monthly	12	0	1.13	1.71	1.39	0.01
		Ecoli	CFU/100mL	Monthly	12	0	0	0	0	0
		Coliforms	CFU/100mL	Monthly	12	0	0	0	0	0
		Chlorates	mg/L	Monthly	8	0	0.23	0.64	0.35	0.01
		Conductivity	µs/cm	Monthly	12	No value	670	700	697	1
		pH	at 22°C	Monthly	12	0	6.91	7.78	7.37	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	12	12	227	233	229	1
		Alkalinity	mg CaCO ₃ /L	Monthly	12	No value	270	280	279	1
		Silica	mg/L	Monthly	12	0	47	48	48	1
		Dissolved Solids	mg/L	Monthly	12	0	420	430	424	1
		True Colour	hazen	Monthly	12	0	8	9	8	1
		Turbidity	NTU	Monthly	12	0	1	2	1	1
		Sodium	mg/L	Monthly	12	0	66	68	67	1
		Potassium	mg/L	Monthly	12	No value	1.3	1.3	1.3	0.1
		Calcium	mg/L	Monthly	12	No value	40	41	40.4	0.1
		Magnesium	mg/L	Monthly	12	No value	31	32	31	0.1
		Chloride	mg/L	Monthly	12	0	5	49	45	1
		Fluoride	mg/L	Monthly	12	0	0.22	0.24	0.23	0.01
		Nitrate	mg/L	Monthly	12	0	0.05	0.08	0.06	0.5
		Sulphate	mg/L	Monthly	12	0	20	20	20	0.1
	Iron	mg/L	Monthly	12	0	<0.01	<0.01	<0.01	0.01	
	Manganese	mg/L	Monthly	12	0	0.001	0.001	0.001	0.01	
	Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01	
Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05		
Boron	mg/L	Monthly	12	0	0.04	0.05	0.048	0.01		
Copper	mg/L	Monthly	12	0	0.007	0.016	0.0119	0.03		
Raw Water	Gross Alpha Activity	Bq/L	Seasonal/Event	2	0	0.10	0.13	0.12	0.1	
	Gross Beta Activity	Bq/L	Seasonal/Event	2	0	0.10	0.10	0.10	0.1	

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Bauhinia	Reticulation	Chlorine (Free)	mg/L	Monthly	12	0	0.1	2.3	0.92	0.01
		Coliforms	CFU/100mL	Monthly	12	0	0	0	0	0
		Ecoli	CFU/100mL	Monthly	12	0	0	0	0	0
		Gross Alpha Activity	Bq/L	Seasonal/Event	2	0	0.13	0.35	0.24	0.1
		Gross Beta Activity	Bq/L	Seasonal/Event	2	0	0.20	0.20	0.20	0.1
		Conductivity	µs/cm	Monthly	12	No value	280	460	444	1
		pH	mg/L	Monthly	12	0	7.12	8.12	7.87	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	12	0	39	64	57	1
		Alkalinity	mg CaCO ₃ /L	Monthly	12	No value	92	160	151	1
		Silica	mg/L	Monthly	12	0	11	18	17	1
		Dissolved Solids	mg/L	Monthly	12	0	160	270	258	1
		True Colour	hazen	Monthly	12	3	8	40	13	1
		Turbidity	NTU	Monthly	12	3	1	11	4	1
		Sodium	mg/L	Monthly	12	0	37	68	62	1
		Potassium	mg/L	Monthly	12	No value	14	22	20.7	0.1
		Calcium	mg/L	Monthly	12	No value	7.8	13	11.1	0.1
		Magnesium	mg/L	Monthly	12	No value	4.8	7.9	7.2	0.1
		Chloride	mg/L	Monthly	12	0	32	51	48	1
		Fluoride	mg/L	Monthly	12	0	0.11	0.18	0.17	0.01
		Nitrate	mg/L	Monthly	12	0	0.07	1.2	0.20	0.5
		Sulphate	mg/L	Monthly	12	0	0.2	0.3	0.28	0.1
		Iron	mg/l	Monthly	12	1	<0.01	0.68	0.138	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.013	0.0033	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05
		Boron	mg/L	Monthly	12	0	0.03	0.04	0.039	0.01
		Copper	mg/L	Monthly	12	0	0.003	0.048	0.0068	0.03
		Total Aluminium	mg/L	Seasonal/Event	5	0	0.00	0.01	0.00	0.003
		Arsenic	mg/L	Seasonal/Event	5	0	0.0001	0.0004	0.0003	0.0001
		Cadium	mg/L	Seasonal/Event	5	0	0.0001	0.0001	0.0001	0.0001
		Chromium	mg/L	Seasonal/Event	5	0	0.0001	0.0001	0.0001	0.0001
		Total Copper	mg/L	Seasonal/Event	5	0	0.001	0.085	0.028	0.001
		Total Iron	mg/L	Seasonal/Event	5	4	0.01	2.8	1.45	0.005
		Lead	mg/L	Seasonal/Event	5	0	0.0001	0.0007	0.0003	0.0001
Total Manganese	mg/L	Seasonal/Event	5	0	0.000	0.072	0.041	0.0001		
Nickel	mg/L	Seasonal/Event	5	0	0.0001	0.0001	0.0001	0.0001		
Total Zinc	mg/L	Seasonal/Event	5	0	0.001	0.026	0.008	0.001		

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR	
Blackwater	Reticulation	Chlorine (Free)	mg/L	Weekly	52	0	0.39	1.15	0.85	0.01	
		Coliforms	CFU/100mL	Weekly	52	0	0	0	0	0	
		Ecoli	CFU/100mL	Weekly	52	0	0	0	0	0	
		Chlorates	mg/L	Monthly	8	0	0.16	0.37	0.29	0.01	
		Trihalomethanes	µg/L	Seasonal/Event	10	0	67	130	100	1	
		Conductivity	us/cm	Monthly	12	No value	250	420	314	1	
		pH	mg/L	Monthly	12	0	6.19	8.11	7.44	0.01	
		Total Hardness	mg CaCO3/L	Monthly	12	0	65	109	86	1	
		Alkalinity	mg CaCO3/L	Monthly	12	No value	64	99	82	1	
		Silica	mg/L	Monthly	12	0	0	11	8	1	
		Dissolved Solids	mg/L	Monthly	12	0	140	220	174	1	
		True Colour	hazen	Monthly	12	0	8	10	8	1	
		Turbidity	NTU	Monthly	12	0	1	1	1	1	
		Sodium	mg/L	Monthly	12	0	20	40	27	1	
		Potassium	mg/L	Monthly	12	No value	4.4	5.5	4.9	0.1	
		Calcium	mg/L	Monthly	12	No value	16	26	21	0.1	
		Magnesium	mg/L	Monthly	12	No value	5.8	10	8.1	0.1	
		Chloride	mg/L	Monthly	12	0	23	61	37	1	
		Fluoride	mg/L	Monthly	12	0	0.12	0.67	0.4	0.01	
		Nitrate	mg/L	Monthly	12	0	0.05	0.81	0.13	0.5	
		Sulphate	mg/L	Monthly	12	0	13	19	16	0.1	
		Iron	mg/l	Monthly	12	0	<0.01	<0.01	<0.01	0.01	
		Manganese	mg/L	Monthly	12	0	0.001	0.001	0.001	0.01	
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01	
		Aluminium	mg/L	Monthly	12	0	0.03	0.06	0.04	0.05	
		Boron	mg/L	Monthly	12	0	0.04	0.05	0.04	0.01	
		Copper	mg/L	Monthly	12	0	0.003	0.004	0.003	0.03	
		Metachlor	µg/L	Seasonally	1	NA	0.01	0.01	0.01	0.01	
		Tebuthiuron	µg/L	Seasonally	1	NA	0.05	0.05	0.05	0.01	
		Dalapon (2,2-DPA)	µg/L	Seasonally	1	NA	1.6	1.6	1.6	0.01	
		Total Aluminium	mg/L	Seasonal/Event	1	0	0.062	0.062	0.062	0.003	
		Arsenic	mg/L	Seasonal/Event	1	0	0.0004	0.0004	0.0004	0.0001	
		Cadium	mg/L	Seasonal/Event	1	0	0.0001	0.0001	0.0001	0.0001	
	Chromium	mg/L	Seasonal/Event	1	0	0.0001	0.0001	0.0001	0.0001		
	Total Copper	mg/L	Seasonal/Event	1	0	0.003	0.003	0.003	0.001		
	Total Iron	mg/L	Seasonal/Event	1	0	0.013	0.013	0.013	0.005		
	Lead	mg/L	Seasonal/Event	1	0	0.0003	0.0003	0.0003	0.0001		
	Total Manganese	mg/L	Seasonal/Event	1	0	0.0014	0.0014	0.0014	0.0001		
	Nickel	mg/L	Seasonal/Event	1	0	0.0007	0.0007	0.0007	0.0001		
	Total Zinc	mg/L	Seasonal/Event	1	0	0.004	0.004	0.004	0.001		
	Raw Water	Ecoli	CFU/100mL			47	NA	0	64	21	0
		Atrazine	µg/L	Seasonally	1	NA	0.04	0.04	0.04	0.01	
		Metachlor	µg/L	Seasonally	1	NA	0.05	0.05	0.05	0.01	
Tebuthiuron		µg/L	Seasonally	1	NA	0.24	0.24	0.24	0.01		
Atrazine, 2-hydroxy		µg/L	Seasonally	1	NA	0.03	0.03	0.03	0.01		
Total Aluminium		mg/L	Seasonal/Event	1	0	0.47	0.47	0.47	0.003		
Arsenic		mg/L	Seasonal/Event	1	0	0.0014	0.0014	0.0014	0.0001		
Cadium		mg/L	Seasonal/Event	1	0	0.0001	0.0001	0.0001	0.0001		
Chromium		mg/L	Seasonal/Event	1	0	0.0005	0.0005	0.0005	0.0001		
Total Copper		mg/L	Seasonal/Event	1	0	0.048	0.048	0.048	0.001		
Total Iron		mg/L	Seasonal/Event	1	0	0.27	0.27	0.27	0.005		
Lead		mg/L	Seasonal/Event	1	0	0.0003	0.0003	0.0003	0.0001		
Total Manganese		mg/L	Seasonal/Event	1	0	0.050	0.050	0.050	0.0001		
Nickel		mg/L	Seasonal/Event	1	0	0.0022	0.0022	0.0022	0.0001		
Total Zinc	mg/L	Seasonal/Event	1	0	0.003	0.003	0.003	0.001			

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Bluff	Reticulation	Chlorine (Free)	mg/L	Monthly	12	0	0.58	1.14	0.92	0.01
		Coliforms	CFU/100mL	Monthly	12	0	0	0	0	0
		Ecoli	CFU/100mL	Monthly	12	0	0	0	0	0
		Chlorates	mg/L	Monthly	7	2	0.48	1.12	0.72	0.01
		Trihalomethanes	µg/L	Seasonal/Event	8	0	92	220	150	1

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR	
Capella	Reticulation	Chlorine (Free)	mg/L	Monthly	52	0	0.05	1.19	0.63	0.01	
		Coliforms	CFU/100mL	Monthly	52	1	0	1	0	0	
		Ecoli	CFU/100mL	Monthly	52	0	0	0	0	0	
		Trihalomethanes	µg/L	Seasonal/Event	9	0	64	150	99	1	
		Conductivity	us/cm	Monthly	12	No value	29	480	350	1	
		pH	mg/L	Monthly	12	0	7.36	8.32	7.92	0.01	
		Total Hardness	mg CaCO3/L	Monthly	12	0	71	111	95	1	
		Alkalinity	mg CaCO3/L	Monthly	12	No value	100	170	140	1	
		Silica	mg/L	Monthly	12	0	12	14	13	1	
		Dissolved Solids	mg/L	Monthly	12	0	160	270	212	1	
		True Colour	hazen	Monthly	12	0	8	9	8	1	
		Turbidity	NTU	Monthly	12	0	1	1	1	1	
		Sodium	mg/L	Monthly	12	0	31	59	43	1	
		Potassium	mg/L	Monthly	12	No value	2.5	3.8	2.9	0.1	
		Calcium	mg/L	Monthly	12	No value	1.8	24	20	0.1	
		Magnesium	mg/L	Monthly	12	No value	7.2	13	10.1	0.1	
		Chloride	mg/L	Monthly	12	0	21	49	30	1	
		Fluoride	mg/L	Monthly	12	0	0.16	0.37	0.27	0.01	
		Nitrate	mg/L	Monthly	12	0	0.1	1	0.55	0.5	
		Sulphate	mg/L	Monthly	12	0	2.7	19	6.1	0.1	
		Iron	mg/l	Monthly	12	0	<0.01	<0.01	<0.01	0.01	
		Manganese	mg/L	Monthly	12	0	0.001	0.001	0.001	0.01	
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01	
		Aluminium	mg/L	Monthly	12	0	0.03	0.05	0.035	0.05	
		Boron	mg/L	Monthly	12	0	0.09	0.16	0.11	0.01	
		Copper	mg/L	Monthly	12	0	0.003	0.06	0.004	0.03	
		Total Aluminium	mg/L	Seasonal/Event	1	0	0.064	0.064	0.064	0.003	
		Arsenic	mg/L	Seasonal/Event	1	0	0.0002	0.0002	0.0002	0.0001	
		Cadium	mg/L	Seasonal/Event	1	0	0.0001	0.0001	0.0001	0.0001	
		Chromium	mg/L	Seasonal/Event	1	0	0.0001	0.0001	0.0001	0.0001	
		Total Copper	mg/L	Seasonal/Event	1	0	0.003	0.003	0.003	0.001	
		Total Iron	mg/L	Seasonal/Event	1	0	0.005	0.005	0.005	0.005	
		Lead	mg/L	Seasonal/Event	1	0	0.0001	0.0001	0.0001	0.0001	
	Total Manganese	mg/L	Seasonal/Event	1	0	0.0004	0.0004	0.0004	0.0001		
	Nickel	mg/L	Seasonal/Event	1	0	0.0014	0.0014	0.0014	0.0001		
	Total Zinc	mg/L	Seasonal/Event	1	0	0.002	0.002	0.002	0.001		
	Algae (pot. toxic)	Cells/mL	Seasonally	2	No value	200	660	430	1		
	Toxin (cylindro)	µg/L	Seasonally	2	No value	0.2	0.2	0.2	0.2		
	Raw Water	Ecoli	CFU/100mL			41	NA	0	40	7	0
		Atrazine	µg/L	Seasonally		1	NA	0.80	0.80	0.80	0.01
		Desethyl Atrazine	µg/L	Seasonally		1	No value	0.05	0.05	0.05	0.01
		Metachlor	µg/L	Seasonally		1	NA	1.5	1.5	1.5	0.01
		Metolachlor-OXA	µg/L	Seasonally		1	NA	0.25	0.25	0.25	0.01
		Simazine	µg/L	Seasonally		1	NA	0.03	0.03	0.03	0.01
		Atrazine, 2-hydroxy	µg/L	Seasonally		1	NA	0.10	0.10	0.10	0.01
		2,4-D	µg/L	Seasonally		1	NA	0.13	0.13	0.13	0.01
		Fluroxypyr	µg/L	Seasonally		1	NA	0.20	0.20	0.20	0.01
		Terbutylazine	µg/L	Seasonally		1	NA	0.10	0.10	0.10	0.01
		Terbutylazine desethyl	µg/L	Seasonally		1	NA	0.09	0.09	0.09	0.01
		Desisopropyl Atrazine	µg/L	Seasonally		1	NA	0.07	0.07	0.07	0.01
Imazapyr		µg/L	Seasonally		1	NA	0.10	0.10	0.10	0.01	
Total Aluminium		mg/L	Seasonal/Event		1	0	0.042	0.042	0.042	0.003	
Arsenic		mg/L	Seasonal/Event		1	0	0.0004	0.0004	0.0004	0.0001	
Cadium		mg/L	Seasonal/Event		1	0	0.0001	0.0001	0.0001	0.0001	
Chromium		mg/L	Seasonal/Event		1	0	0.0009	0.0009	0.0009	0.0001	
Total Copper		mg/L	Seasonal/Event		1	0	0.006	0.006	0.006	0.001	
Total Iron		mg/L	Seasonal/Event		1	0	0.40	0.40	0.40	0.005	
Lead		mg/L	Seasonal/Event		1	0	0.0004	0.0004	0.0004	0.0001	
Total Manganese		mg/L	Seasonal/Event		1	0	0.029	0.029	0.029	0.0001	
Nickel		mg/L	Seasonal/Event		1	0	0.0041	0.0041	0.0041	0.0001	
Total Zinc		mg/L	Seasonal/Event		1	0	0.007	0.007	0.007	0.001	
Algae (pot. toxic)		Cells/mL	Seasonally		6	No value	25	6,800	1,581	1	
Toxin (cylindro)		µg/L	Seasonally		6	No value	0.2	1.0	0.5	0.2	

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Comet	Reticulation	Chlorine (Free)	mg/L	Monthly	12	0	0.24	1.36	0.88	0.01
		Coliforms	CFU/100mL	Monthly	12	0	0	0	0	0
		Ecoli	CFU/100mL	Monthly	12	0	0	0	0	0
		Chlorates	mg/L	Monthly	8	5	0.25	2.18	1.06	0.01
		Trihalomethanes	µg/L	Seasonal/Event	9	0	110	170	139	1
		Conductivity	us/cm	Monthly	12	No value	170	280	238	1
		pH	mg/L	Monthly	12	0	6.79	8.33	7.63	0.01
		Total Hardness	mg CaCO3/L	Monthly	12	0	40	105	74	1
		Alkalinity	mg CaCO3/L	Monthly	12	No value	47	120	91	1
		Silica	mg/L	Monthly	12	0	8	20	14	1
		Dissolved Solids	mg/L	Monthly	12	0	100	160	139	1
		True Colour	hazen	Monthly	12	0	8	9	8	1
		Turbidity	NTU	Monthly	12	0	1	1	1	1
		Sodium	mg/L	Monthly	12	0	12	23	17	1
		Potassium	mg/L	Monthly	12	No value	4.4	6	5.33	0.1
		Calcium	mg/L	Monthly	12	No value	9.6	24	18	0.1
		Magnesium	mg/L	Monthly	12	No value	3.8	11	7.33	0.1
		Chloride	mg/L	Monthly	12	0	14	25	19	1
		Fluoride	mg/L	Monthly	12	0	0.13	0.24	0.17	0.01
		Nitrate	mg/L	Monthly	12	0	0.27	1.4	0.76	0.5
		Sulphate	mg/L	Monthly	12	0	1.9	3.2	2.35	0.1
		Iron	mg/l	Monthly	12	0	<0.01	<0.02	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.002	0.001	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05
		Boron	mg/L	Monthly	12	0	0.02	0.05	0.04	0.01
		Copper	mg/L	Monthly	12	0	0.007	0.013	0.009	0.03
	Atrazine	µg/L	Seasonally	1	NA	0.05	0.05	0.05	0.01	
	Metachlor	µg/L	Seasonally	1	NA	0.03	0.03	0.03	0.01	
	Tebuthiuron	µg/L	Seasonally	1	NA	0.44	0.44	0.44	0.01	
	Atrazine, 2-hydroxy	µg/L	Seasonally	1	NA	0.03	0.03	0.03	0.01	
	Dalapon (2,2-DPA)	µg/L	Seasonally	1	NA	3.3	3.3	3.3	0.01	
	Terbutylazine	µg/L	Seasonally	1	NA	0.01	0.01	0.01	0.01	
Raw Water	Atrazine	µg/L	Seasonally	1	NA	0.58	0.58	0.58	0.01	
	Desethyl Atrazine	µg/L	Seasonally	1	No value	0.06	0.06	0.06	0.01	
	Metachlor	µg/L	Seasonally	1	NA	0.10	0.10	0.10	0.01	
	Tebuthiuron	µg/L	Seasonally	1	NA	0.30	0.30	0.30	0.01	
	Atrazine, 2-hydroxy	µg/L	Seasonally	1	NA	0.08	0.08	0.08	0.01	
Fluroxypyr	µg/L	Seasonally	1	NA	0.07	0.07	0.07	0.01		

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Dingo	Reticulation	Chlorine (Free)	mg/L	Monthly	12	0	0.86	1.65	1.17	0.01
		Coliforms	CFU/100mL	Monthly	12	1	0	1	0	0
		Ecoli	CFU/100mL	Monthly	12	0	0	0	0	0
		Chlorates	mg/L	Monthly	7	0	0.35	0.79	0.54	0.01
		Trihalomethanes	µg/L	Seasonally	8	0	99	180	144	1
		Conductivity	us/cm	Monthly	12	No value	130	150	141	1
		pH	mg/L	Monthly	12	0	6.76	7.79	7.21	0.01
		Total Hardness	mg CaCO3/L	Monthly	12	0	24	33	28	1
		Alkalinity	mg CaCO3/L	Monthly	12	No value	35	47	41	1
		Silica	mg/L	Monthly	12	0	10	12	12	1
		Dissolved Solids	mg/L	Monthly	12	0	77	87	83	1
		True Colour	hazen	Monthly	12	0	8	8	8	1
		Turbidity	NTU	Monthly	12	0	1	1	1	1
		Sodium	mg/L	Monthly	12	0	14	16	15	1
		Potassium	mg/L	Monthly	12	No value	3.4	4.1	3.7	0.1
		Calcium	mg/L	Monthly	12	No value	4.1	6.6	5.6	0.1
		Magnesium	mg/L	Monthly	12	No value	3	3.9	3.5	0.1
		Chloride	mg/L	Monthly	12	0	15	20	17	1
		Fluoride	mg/L	Monthly	12	0	0.11	0.14	0.13	0.01
		Nitrate	mg/L	Monthly	12	0	0.1	0.4	0.2	0.5
		Sulphate	mg/L	Monthly	12	0	1.1	2.2	1.6	0.1
		Iron	mg/l	Monthly	12	0	<0.01	<0.09	<0.02	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.002	0.001	0.01
		Zinc	mg/L	Monthly	12	0	0.006	0.06	0.055	0.01
		Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05
		Boron	mg/L	Monthly	12	0	0.05	0.06	0.053	0.01
	Copper	mg/L	Monthly	12	0	0.003	0.003	0.003	0.03	
Raw Water	Ecoli	CFU/100mL			7	NA	0	4	2	0

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Duaringa	Reticulation	Chlorine (Free)	mg/L	Monthly	12	0	0.90	1.84	1.42	0.01
		Coliforms	CFU/100mL	Monthly	12	0	0	0	0	0
		Ecoli	CFU/100mL	Monthly	12	0	0	0	0	0
		Chlorates	mg/L	Monthly	7	0	0.21	0.44	0.34	0.01
		Trihalomethanes	µg/L	Seasonally	8	0	99	160	121	1
		Conductivity	us/cm	Monthly	12	No value	190	310	236	1
		pH	mg/L	Monthly	12	0	6.92	8.07	7.60	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	12	0	43	76	57	1
		Alkalinity	mg CaCO ₃ /L	Monthly	12	No value	58	85	72	1
		Silica	mg/L	Monthly	12	0	6	16	13	1
		Dissolved Solids	mg/L	Monthly	12	0	110	180	138	1
		True Colour	hazen	Monthly	12	0	8	8	8	1
		Turbidity	NTU	Monthly	12	0	1	1	1	1
		Sodium	mg/L	Monthly	12	0	18	30	22	1
		Potassium	mg/L	Monthly	12	No value	5.63	7.2	6.2	0.1
		Calcium	mg/L	Monthly	12	No value	11	18	14.5	0.1
		Magnesium	mg/L	Monthly	12	No value	3.7	7.7	5.1	0.1
		Chloride	mg/L	Monthly	12	0	18	39	25	1
		Fluoride	mg/L	Monthly	12	0	0.12	0.19	0.14	0.01
		Nitrate	mg/L	Monthly	12	0	0.13	1.4	0.66	0.5
		Sulphate	mg/L	Monthly	12	0	3.5	17	7.2	0.1
		Iron	mg/l	Monthly	12	0	<0.01	0.03	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.015	0.003	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
	Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05	
	Boron	mg/L	Monthly	12	0	0.04	0.05	0.04	0.01	
	Copper	mg/L	Monthly	12	0	0.003	0.009	0.005	0.03	
	Algae (pot. toxic)	Cells/mL	Seasonally	1	No value	0	0	0	1	
	Ecoli	CFU/100mL		10	NA	0	42	13	0	
	Algae (pot. toxic)	Cells/mL	Seasonally	2	No value	1100	1800	1450	1	
Toxin (microcystins)	µg/L	Seasonally	2	No value	0.2	1.0	0.5	0.2		
	Raw Water									

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR	
Emerald	Reticulation	Chlorine (Free)	mg/L	Weekly	104	0	0.89	1.73	1.29	0.01	
		Coliforms	CFU/100mL	Weekly	104	2	0	2	0	0	
		Ecoli	CFU/100mL	Weekly	104	0	0	0	0	0	
		Trihalomethanes	µg/L	Seasonally	1	0	44	44	44	1	
		Conductivity	us/cm	Monthly	24	No value	190	290	250	1	
		pH	mg/L	Monthly	24	0	6.53	8.10	7.36	0.01	
		Total Hardness	mg CaCO3/L	Monthly	24	0	53	89	74	1	
		Alkalinity	mg CaCO3/L	Monthly	24	No value	41	100	86	1	
		Silica	mg/L	Monthly	24	0	8	13	10	1	
		Dissolved Solids	mg/L	Monthly	24	0	110	160	141	1	
		True Colour	hazen	Monthly	24	0	8	9	8	1	
		Turbidity	NTU	Monthly	24	0	1	1	1	1	
		Sodium	mg/L	Monthly	24	0	12	23	17	1	
		Potassium	mg/L	Monthly	24	No value	4.6	9	7.85	0.1	
		Calcium	mg/L	Monthly	24	No value	13	22	18.3	0.1	
		Magnesium	mg/L	Monthly	24	No value	5.1	8.5	7.1	0.1	
		Chloride	mg/L	Monthly	24	0	18	35	23	1	
		Fluoride	mg/L	Monthly	24	0	0.15	0.87	0.43	0.01	
		Nitrate	mg/L	Monthly	24	0	0.13	2.4	1.01	0.5	
		Sulphate	mg/L	Monthly	24	0	3.6	7.4	4.8	0.1	
		Iron	mg/l	Monthly	24	0	<0.01	<0.01	<0.01	0.01	
		Manganese	mg/L	Monthly	24	0	0.001	0.001	0.001	0.01	
		Zinc	mg/L	Monthly	24	0	0.06	0.06	0.06	0.01	
		Aluminium	mg/L	Monthly	24	0	0.03	0.03	0.03	0.05	
		Boron	mg/L	Monthly	24	0	0.04	0.06	0.05	0.01	
		Copper	mg/L	Monthly	24	0	0.005	0.012	0.009	0.03	
		Total Aluminium	mg/L	Seasonal/Event	2	0	0.012	0.015	0.0135	0.003	
		Arsenic	mg/L	Seasonal/Event	2	0	0.0003	0.0004	0.00035	0.0001	
		Cadium	mg/L	Seasonal/Event	2	0	0.0001	0.0001	0.0001	0.0001	
		Chromium	mg/L	Seasonal/Event	2	0	0.0001	0.0001	0.0001	0.0001	
		Total Copper	mg/L	Seasonal/Event	2	0	0.008	0.013	0.011	0.001	
		Total Iron	mg/L	Seasonal/Event	2	0	0.005	0.005	0.005	0.005	
		Lead	mg/L	Seasonal/Event	2	0	0.0001	0.0002	0.00015	0.0001	
		Total Manganese	mg/L	Seasonal/Event	2	0	0.0001	0.0006	0.00035	0.0001	
	Nickel	mg/L	Seasonal/Event	2	0	0.0006	0.0007	0.00065	0.0001		
	Total Zinc	mg/L	Seasonal/Event	2	0	0.002	0.003	0.0025	0.001		
	Atrazine	µg/L	Seasonally	2	NA	0.06	0.30	0.18	0.01		
	Tebuthiuron	µg/L	Seasonally	2	NA	0.24	0.52	0.38	0.01		
	Dalapon (2,2-DPA)	µg/L	Seasonally	2	NA	1.2	1.7	1.45	0.01		
	Terbuthylazine	µg/L	Seasonally	2	NA	0.01	0.03	0.02	0.01		
	Metachlor	µg/L	Seasonally	2	NA	0.01	0.01	0.01	0.01		
	2,4-D	µg/L	Seasonally	2	NA	0.04	0.04	0.04	0.01		
	Fluroxypyr	µg/L	Seasonally	2	NA	0.09	0.09	0.09	0.01		
	Clothianidin	µg/L	Seasonally	2	NA	0.63	0.63	0.63	0.01		
	Imazapyr	µg/L	Seasonally	2	NA	0.02	0.02	0.02	0.01		
	MCPA	µg/L	Seasonally	2	NA	0.02	0.02	0.02	0.01		
	Ecoli	CFU/100mL				73	NA	1	1700	164	0
	Total Aluminium	mg/L	Seasonal/Event	2	0	2.2	2.3	2.25	0.003		
	Arsenic	mg/L	Seasonal/Event	2	0	0.0002	0.0002	0.0002	0.0001		
	Cadium	mg/L	Seasonal/Event	2	0	0.0001	0.0001	0.0001	0.0001		
Chromium	mg/L	Seasonal/Event	2	0	0.0024	0.0027	0.00255	0.0001			
Total Copper	mg/L	Seasonal/Event	2	0	0.007	0.013	0.010	0.001			
Total Iron	mg/L	Seasonal/Event	2	0	2.4	2.5	2.45	0.005			
Lead	mg/L	Seasonal/Event	2	0	0.0013	0.0015	0.0014	0.0001			
Total Manganese	mg/L	Seasonal/Event	2	0	0.050	0.079	0.064	0.0001			
Nickel	mg/L	Seasonal/Event	2	0	0.0052	0.0053	0.00525	0.0001			
Total Zinc	mg/L	Seasonal/Event	2	0	0.011	0.011	0.011	0.001			
Atrazine	µg/L	Seasonally	2	NA	0.37	0.46	0.415	0.01			
Metachlor	µg/L	Seasonally	2	NA	0.02	0.09	0.055	0.01			
Tebuthiuron	µg/L	Seasonally	2	NA	0.75	1.7	1.225	0.01			
Atrazine, 2-hydroxy	µg/L	Seasonally	2	NA	0.02	0.04	0.03	0.01			
2,4-D	µg/L	Seasonally	2	NA	0.07	0.1	0.085	0.01			
Fluroxypyr	µg/L	Seasonally	2	NA	0.2	0.36	0.28	0.01			
Terbuthylazine	µg/L	Seasonally	2	NA	0.06	0.3	0.18	0.01			
Clothianidin	µg/L	Seasonally	2	NA	0.09	1.3	0.7	0.01			
Imazapyr	µg/L	Seasonally	2	NA	0.04	0.04	0.04	0.01			
MCPA	µg/L	Seasonally	2	NA	0.03	0.04	0.035	0.01			
Haloxypop (acid)	µg/L	Seasonally	2	NA	0.04	0.1	0.07	0.01			
Methoxyfenozide	µg/L	Seasonally	2	NA	0.04	0.07	0.055	0.01			
	Raw Water										

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Rolleston	Reticulation	Chlorine (Free)	mg/L	Weekly	12	0	0.73	1.73	1.25	0.01
		Coliforms	CFU/100mL	Weekly	12	0	0	0	0	0
		Ecoli	CFU/100mL	Weekly	12	0	0	0	0	0
		Chlorates	mg/L	Monthly	7	3	0.34	1.31	0.77	0.01
		Trihalomethanes	µg/L	Seasonal/Event	8	0	100	200	151	1
		Conductivity	us/cm	Monthly	12	No value	210	310	253	1
		pH	mg/L	Monthly	12	1	7.59	8.62	8.2	0.01
		Total Hardness	mg CaCO3/L	Monthly	12	0	56	80	69	1
		Alkalinity	mg CaCO3/L	Monthly	12	No value	77	110	98	1
		Silica	mg/L	Monthly	12	0	13	14	13	1
		Dissolved Solids	mg/L	Monthly	12	0	120	180	148	1
		True Colour	hazen	Monthly	12	0	8	8	8	1
		Turbidity	NTU	Monthly	12	0	1	1	1	1
		Sodium	mg/L	Monthly	12	0	16	37	24	1
		Potassium	mg/L	Monthly	12	No value	5	5.9	5.5	0.1
		Calcium	mg/L	Monthly	12	No value	12	16	14.5	0.1
		Magnesium	mg/L	Monthly	12	No value	6.1	9.6	7.8	0.1
		Chloride	mg/L	Monthly	12	0	14	30	20	1
		Fluoride	mg/L	Monthly	12	0	0.17	0.24	0.20	0.01
		Nitrate	mg/L	Monthly	12	0	0.21	6.5	0.86	0.5
	Sulphate	mg/L	Monthly	12	0	1.5	4.4	2.6	0.1	
	Iron	mg/l	Monthly	12	0	<0.01	<0.01	<0.01	0.01	
	Manganese	mg/L	Monthly	12	0	0.001	0.001	0.001	0.01	
	Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01	
	Aluminium	mg/L	Monthly	12	0	0.03	0.04	0.03	0.05	
	Boron	mg/L	Monthly	12	0	0.03	0.04	0.039	0.01	
	Copper	mg/L	Monthly	12	0	0.003	0.007	0.004	0.03	
	Raw Water	Ecoli	CFU/100mL			8	NA	0	2	0
Algae (pot. toxic)		Cells/mL	Seasonally		5	No value	100	210,979	54,595	1
Toxin (cylindro)		µg/L	Seasonally		5	No value	0.20	3.2	1.0	0.2
Gross Alpha Activity Bore 5		Bq/L	Seasonal/Event		2	0	0.10	0.14	0.12	0.1
Gross Beta Activity Bore 5		Bq/L	Seasonal/Event		2	0	0.20	0.20	0.20	0.1
Gross Alpha Activity Bore 7		Bq/L	Seasonal/Event		2	0	0.06	0.10	0.08	0.1
Gross Beta Activity Bore 7	Bq/L	Seasonal/Event		2	0	0.20	0.20	0.20	0.1	

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Rubyvale	Reticulation	Chlorine (Free)	mg/L	Weekly	52	0	0.51	1.10	0.85	0.01
		Coliforms	CFU/100mL	Weekly	52	0	0	0	0	0
		Ecoli	CFU/100mL	Weekly	52	0	0	0	0	0
		Chlorates	mg/L	Monthly	8	0	0.19	0.42	0.27	0.01
		Conductivity	us/cm	Monthly	12	No value	550	640	592	1
		pH	mg/L	Monthly	12	0	6.89	7.87	7.40	0.01
		Total Hardness	mg CaCO3/L	Monthly	12	1	171	202	185	1
		Alkalinity	mg CaCO3/L	Monthly	12	No value	160	170	168	1
		Silica	mg/L	Monthly	12	0	33	34	34	1
		Dissolved Solids	mg/L	Monthly	12	0	330	370	349	1
		True Colour	hazen	Monthly	12	0	8	9	8	1
		Turbidity	NTU	Monthly	12	0	1	1	1	1
		Sodium	mg/L	Monthly	12	0	48	54	50	1
		Potassium	mg/L	Monthly	12	No value	1.3	1.4	1.4	0.1
		Calcium	mg/L	Monthly	12	No value	43	50	46.5	0.1
		Magnesium	mg/L	Monthly	12	No value	16	19	17	0.1
		Chloride	mg/L	Monthly	12	0	58	77	67	1
		Fluoride	mg/L	Monthly	12	0	0.19	0.80	0.52	0.01
		Nitrate	mg/L	Monthly	12	0	2.7	4	3.19	0.5
		Sulphate	mg/L	Monthly	12	0	25	31	28	0.1
		Iron	mg/l	Monthly	12	0	<0.01	<0.01	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.001	0.001	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05		
Boron	mg/L	Monthly	12	0	0.03	0.04	0.03	0.01		
Copper	mg/L	Monthly	12	0	0.041	0.065	0.053	0.03		

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR	
Sapphire	Reticulation	Chlorine (Free)	mg/L	Weekly	52	0	0.69	1.90	0.99	0.01	
		Coliforms	CFU/100mL	Weekly	52	0	0	0	0	0	
		Ecoli	CFU/100mL	Weekly	52	0	0	0	0	0	
		Chlorates	mg/L	Monthly	8	0	0.19	0.43	0.27	0.01	
		Conductivity	us/cm	Monthly	12	No value	550	630	590	1	
		pH	mg/L	Monthly	12	0	6.55	8.11	7.48	0.01	
		Total Hardness	mg CaCO3/L	Monthly	12	1	171	202	184	1	
		Alkalinity	mg CaCO3/L	Monthly	12	No value	160	170	167	1	
		Silica	mg/L	Monthly	12	0	33	34	34	1	
		Dissolved Solids	mg/L	Monthly	12	0	330	370	348	1	
		True Colour	hazen	Monthly	12	0	8	9	8	1	
		Turbidity	NTU	Monthly	12	0	1	1	1	1	
		Sodium	mg/L	Monthly	12	0	48	53	50	1	
		Potassium	mg/L	Monthly	12	No value	1.3	1.4	1.35	0.1	
		Calcium	mg/L	Monthly	12	No value	43	50	46	0.1	
		Magnesium	mg/L	Monthly	12	No value	16	19	17	0.1	
		Chloride	mg/L	Monthly	12	0	58	78	67	1	
		Fluoride	mg/L	Monthly	12	0	0.18	0.85	0.55	0.01	
		Nitrate	mg/L	Monthly	12	0	2.7	4	3.2	0.5	
		Sulphate	mg/L	Monthly	12	0	25	31	28	0.1	
		Iron	mg/l	Monthly	12	0	<0.01	<0.01	<0.01	0.01	
		Manganese	mg/L	Monthly	12	0	0.001	0.001	0.001	0.01	
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01	
	Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05		
	Boron	mg/L	Monthly	12	0	0.03	0.04	0.034	0.01		
	Copper	mg/L	Monthly	12	0	0.018	0.038	0.029	0.03		
		Raw Water	Ecoli Bore 1	CFU/100mL	Monthly	19	NA	0	13	2	0
			Ecoli Bore 2	CFU/100mL	Monthly	19	NA	0	0	0	0
			Ecoli Bore 3	CFU/100mL	Monthly	19	NA	0	0	0	0
			Gross Alpha Activity Bore 1	Bq/L	Seasonal/Event	2	0	0.10	0.10	0.10	0.1
	Gross Beta Activity Bore 1		Bq/L	Seasonal/Event	2	0	0.10	0.10	0.10	0.1	
	Gross Alpha Activity Bore 2		Bq/L	Seasonal/Event	2	0	0.06	0.10	0.08	0.1	
	Gross Beta Activity Bore 2		Bq/L	Seasonal/Event	2	0	0.10	0.10	0.10	0.1	
	Gross Alpha Activity Bore 3	Bq/L	Seasonal/Event	2	0	0.10	0.10	0.10	0.1		
	Gross Beta Activity Bore 3	Bq/L	Seasonal/Event	2	0	0.10	0.10	0.10	0.1		

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Springsure	Upper Reticulation Zone SG	Chlorine (Free)	mg/L	Monthly	12	0	1.19	1.87	1.49	0.01
		Coliforms	CFU/100mL	Monthly	12	0	0	0	0	0
		Ecoli	CFU/100mL	Monthly	12	0	0	0	0	0
		Conductivity	us/cm	Monthly	12	No value	950	970	960	1
		pH	mg/L	Monthly	12	3	8.3	8.57	8.46	0.01
		Total Hardness	mg CaCO3/L	Monthly	12	0	14	16	15	1
		Alkalinity	mg CaCO3/L	Monthly	12	No value	480	500	483	1
		Silica	mg/L	Monthly	12	0	21	22	21	1
		Dissolved Solids	mg/L	Monthly	12	0	580	600	589	1
		True Colour	hazen	Monthly	12	0	8	8	8	1
		Turbidity	NTU	Monthly	12	0	1	1	1	1
		Sodium	mg/L	Monthly	12	12	230	240	237	1
		Potassium	mg/L	Monthly	12	No value	4	4.1	4	0.1
		Calcium	mg/L	Monthly	12	No value	3.7	4.6	4	0.1
		Magnesium	mg/L	Monthly	12	No value	1.2	1.4	1.28	0.1
		Chloride	mg/L	Monthly	12	0	31	33	32	1
		Fluoride	mg/L	Monthly	12	0	0.47	0.50	0.48	0.01
		Nitrate	mg/L	Monthly	12	0	0.25	0.28	0.27	0.5
		Sulphate	mg/L	Monthly	12	0	0.2	0.3	0.2	0.1
		Iron	mg/l	Monthly	12	0	0.02	0.08	0.06	0.01
	Manganese	mg/L	Monthly	12	0	0.001	0.002	0.0012	0.01	
	Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01	
	Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05	
	Boron	mg/L	Monthly	12	0	0.17	0.17	0.17	0.01	
	Copper	mg/L	Monthly	12	0	0.003	0.03	0.006	0.03	
	Raw Water	Gross Alpha Activity Bore 11	Bq/L	Seasonal/Event	2	0	0.10	0.10	0.10	0.1
		Gross Beta Activity Bore 11	Bq/L	Seasonal/Event	2	0	0.10	0.10	0.10	0.1
		Gross Alpha Activity Bore 12	Bq/L	Seasonal/Event	2	0	0.08	0.10	0.09	0.1
		Gross Beta Activity Bore 12	Bq/L	Seasonal/Event	2	0	0.10	0.10	0.10	0.1
	Lower Reticulation Zone WH	Chlorine (Free)	mg/L	Monthly	12	0	0.48	1.61	1.29	0.01
		Coliforms	CFU/100mL	Monthly	12	1	0	5	0	0
		Ecoli	CFU/100mL	Monthly	12	0	0	0	0	0
		Conductivity	us/cm	Monthly	12	No value	960	1200	1113	1
		pH	mg/L	Monthly	12	3	8.26	8.53	8.45	0.01
		Total Hardness	mg CaCO3/L	Monthly	12	0	13	47	21	1
		Alkalinity	mg CaCO3/L	Monthly	12	No value	480	590	560	1
		Silica	mg/L	Monthly	12	0	17	23	19	1
		Dissolved Solids	mg/L	Monthly	12	11	590	700	687	1
		True Colour	hazen	Monthly	12	0	8	8	8	1
		Turbidity	NTU	Monthly	12	0	1	1	1	1
Sodium		mg/L	Monthly	12	12	240	290	277	1	
Potassium		mg/L	Monthly	12	No value	3.4	4.5	3.78	0.1	
Calcium		mg/L	Monthly	12	No value	3.4	9.1	4.79	0.1	
Magnesium		mg/L	Monthly	12	No value	1	6	2.16	0.1	
Chloride		mg/L	Monthly	12	0	32	55	43	1	
Fluoride		mg/L	Monthly	12	0	0.34	0.48	0.38	0.01	
Nitrate		mg/L	Monthly	12	0	0.18	0.31	0.23	0.5	
Sulphate		mg/L	Monthly	12	0	0.2	1.9	1.02	0.1	
Iron		mg/l	Monthly	12	0	<0.01	0.05	0.03	0.01	
Manganese	mg/L	Monthly	12	0	0.001	0.002	0.0013	0.01		
Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01		
Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05		
Boron	mg/L	Monthly	12	0	0.17	0.32	0.268	0.01		
Copper	mg/L	Monthly	12	0	0.003	0.011	0.005	0.03		
Raw Water	Gross Alpha Activity Bore 9	Bq/L	Seasonal/Event	2	0	0.10	0.10	0.10	0.1	
	Gross Beta Activity Bore 9	Bq/L	Seasonal/Event	2	0	0.10	0.10	0.10	0.1	
	Gross Alpha Activity Bore 10	Bq/L	Seasonal/Event	2	0	0.10	0.10	0.10	0.1	
	Gross Beta Activity Bore 10	Bq/L	Seasonal/Event	2	0	0.10	0.10	0.10	0.1	

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Tier I	Reticulation	Chlorine (Free)	mg/L	Weekly	52	0	0.20	1.42	0.81	0.01
		Coliforms	CFU/100mL	Weekly	52	1	0	1	0	0
		Ecoli	CFU/100mL	Weekly	52	0	0	0	0	0
		Trihalomethanes	µg/L	Seasonal/ Event	9	0	79	190	127	1
		Conductivity	us/cm	Monthly	12	No value	370	620	499	1
		pH	mg/L	Monthly	12	0	6.37	8.09	7.42	0.01
		Total Hardness	mg CaCO ₃ /L	Monthly	12	0	73	124	102	1
		Alkalinity	mg CaCO ₃ /L	Monthly	12	No value	100	140	121	1
		Silica	mg/L	Monthly	12	0	9	13	10	1
		Dissolved Solids	mg/L	Monthly	12	0	220	350	288	1
		True Colour	hazen	Monthly	12	0	8	9	8	1
		Turbidity	NTU	Monthly	12	0	1	1	1	1
		Sodium	mg/L	Monthly	12	0	46	82	64	1
		Potassium	mg/L	Monthly	12	No value	4.8	5.8	5.24	0.1
		Calcium	mg/L	Monthly	12	No value	18	27	24.25	0.1
		Magnesium	mg/L	Monthly	12	No value	6.9	14	10	0.1
		Chloride	mg/L	Monthly	12	0	20	83	50	1
		Fluoride	mg/L	Monthly	12	0	0.09	0.33	0.19	0.01
		Nitrate	mg/L	Monthly	12	0	0.05	0.73	0.18	0.5
		Sulphate	mg/L	Monthly	12	0	46	59	52	0.1
		Iron	mg/l	Monthly	12	0	<0.01	<0.01	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.001	0.001	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	12	0	0.03	0.08	0.043	0.05
		Boron	mg/L	Monthly	12	0	0.04	0.05	0.045	0.01
		Copper	mg/L	Monthly	12	0	0.003	0.003	0.003	0.03
		Total Aluminium	mg/L	Seasonal/Event	1	0	0.053	0.053	0.053	0.003
		Arsenic	mg/L	Seasonal/Event	1	0	0.0003	0.0003	0.0003	0.0001
		Cadium	mg/L	Seasonal/Event	1	0	0.0001	0.0001	0.0001	0.0001
		Chromium	mg/L	Seasonal/Event	1	0	0.0001	0.0001	0.0001	0.0001
		Total Copper	mg/L	Seasonal/Event	1	0	0.002	0.002	0.002	0.001
		Total Iron	mg/L	Seasonal/Event	1	0	0.005	0.005	0.005	0.005
		Lead	mg/L	Seasonal/Event	1	0	0.0001	0.0001	0.0001	0.0001
		Total Manganese	mg/L	Seasonal/Event	1	0	0.011	0.011	0.011	0.0001
		Nickel	mg/L	Seasonal/Event	1	0	0.001	0.001	0.001	0.0001
		Total Zinc	mg/L	Seasonal/Event	1	0	0.005	0.005	0.005	0.001
		Atrazine	µg/L	Seasonally	1	NA	0.03	0.03	0.03	0.01
	Metachlor	µg/L	Seasonally	1	NA	0.02	0.02	0.02	0.01	
	Tebuthiuron	µg/L	Seasonally	1	NA	0.5	0.5	0.5	0.01	
	Atrazine, 2-hydroxy	µg/L	Seasonally	1	NA	0.04	0.04	0.04	0.01	
	Dalapon (2,2-DPA)	µg/L	Seasonally	1	NA	1.7	1.7	1.7	0.01	
	2,4-D	µg/L	Seasonally	1	NA	0.04	0.04	0.04	0.01	
	Hexazinone	µg/L	Seasonally	1	NA	0.01	0.01	0.01	0.01	
	Terbutylazine	µg/L	Seasonally	1	NA	0.03	0.03	0.03	0.01	
	Raw Water	Atrazine	µg/L	Seasonally	1	NA	0.03	0.03	0.03	0.01
		Desethyl Atrazine	µg/L	Seasonally	1	No value	0.01	0.01	0.01	0.01
		Metolachlor-OXA	µg/L	Seasonally	1	NA	0.10	0.10	0.10	0.01
Tebuthiuron		µg/L	Seasonally	1	NA	0.80	0.80	0.80	0.01	
Atrazine, 2-hydroxy		µg/L	Seasonally	1	NA	0.06	0.06	0.06	0.01	
Hexazinone		µg/L	Seasonally	1	NA	0.01	0.01	0.01	0.01	
Terbutylazine		µg/L	Seasonally	1	NA	0.10	0.10	0.10	0.01	
Terbutylazine desethyl	µg/L	Seasonally	1	NA	0.04	0.04	0.04	0.01		

Appendix B – Reticulation E.coli verification monitoring

All samples taken tested negative for *E.coli* and below are summaries of the results of the reticulation *E.coli* verification monitoring program for all council water supply schemes.

Table 5.1 to 5.12 – Reticulation E.coli verification monitoring

Drinking water scheme: Anakie scheme

Year	2021 to 2022											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
No. of samples collected in which <i>E. coli</i> is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	12	12	12	12	12	12	12	12	12	12	12	12
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2018* (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no *E. Coli*.

This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Bauhinia Scheme

Year	2021 to 2022											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
No. of samples collected in which <i>E. coli</i> is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	11	11	11	11	11	11	11	11	11	11	11	12
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2018* (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no *E. Coli*.

This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Blackwater & Bluff Scheme

Year	2021 to 2022											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	6	5	5	5	6	5	5	6	5	6	5
No. of samples collected in which <i>E. coli</i> is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	63	63	63	63	63	63	63	63	63	63	63	64
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2018* (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Capella Scheme

Year	2021 to 2022											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	4	5	4	4	4	5	4	4	5	4	5	4
No. of samples collected in which <i>E. coli</i> is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	51	51	51	51	50	51	52	52	52	52	52	52
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2018* (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Comet Scheme

Year	2021 to 2022											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
No. of samples collected in which <i>E. coli</i> is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	12	12	12	12	12	12	12	12	12	12	12	12
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2018* (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Dingo Scheme

Year	2021 to 2022											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
No. of samples collected in which <i>E. coli</i> is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	12	12	12	12	12	12	12	12	12	12	12	12
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2018* (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Duaringa Scheme

Year	2021 to 2022											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
No. of samples collected in which <i>E. coli</i> is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	12	12	12	12	12	12	12	12	12	12	12	12
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2018* (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Emerald Scheme

Year	2021 to 2022											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	8	10	8	8	8	10	8	8	10	8	10	8
No. of samples collected in which <i>E. coli</i> is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	104	104	104	104	102	104	104	104	104	104	104	104
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2018* (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Rolleston Scheme

Year	2021 to 2022											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
No. of samples collected in which <i>E. coli</i> is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	13	13	13	13	13	13	12	11	11	11	11	12
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2018* (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Sapphire and Rubyvale Scheme

Year	2021 to 2022											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	8	10	8	8	8	10	8	8	10	8	10	8
No. of samples collected in which <i>E. coli</i> is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	104	104	104	104	102	104	104	104	104	104	104	104
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2018* (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Springsure Scheme

Year	2021 to 2022											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	2	2	2	2	2	2	2	2	2	2	2	2
No. of samples collected in which <i>E. coli</i> is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	24	24	24	24	24	24	24	24	24	24	24	24
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2018* (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Tieri Scheme

Year	2021 to 2022											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	4	5	4	4	4	5	4	4	5	4	5	4
No. of samples collected in which <i>E. coli</i> is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	52	52	52	52	51	52	52	52	52	52	52	52
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2018* (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Appendix C – Implementation of the DWQMP Risk Management Improvement Program

Table 6.1 to 6.14 – Progress against the RMIP program in the approved DWQMP

Legend: Complete Changes

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2022	Responsible Position
		Short term	Medium term	Long term		
CHRC WIDE						
CHR 1	Procedures and Data		Procedures required for bore inspection, reservoir inspection, mains breaks, pH correction, pipeline transfer.		Disinfection, Filtration, Coagulation & Fluoridation procedures completed for all sites. Remaining procedures drafted and awaiting signoff by end of 2022/2023 FY.	Treatment Co-ordinator
CHR 4	Catchment Management - microplastics		Investigate testing options.		Investigation completed	Planning Co-ordinator
CHR 5	Network Management - Legionella	See bacteria RMIP items.		-	To be removed in next review	Planning Co-ordinator
CHR 5	Network Management - Naegleria	See bacteria RMIP items.			To be removed in next review	Planning Co-ordinator
CHR 8 CHR 9 CHR 10	Treated water storage / Reservoirs	develop reservoir inspection procedure	Continue to implement recommendations from Reservoir inspections	Contractor re-inspection within 5 years of previous	Procedure completed. Inspections completed in 2019 by external contractor. Opal St WTP reservoir roof replaced. 10-15 vermin proofing items on CAPEX list completed 2021/2022 FY including leak repairs, cleaning, external checks. Remaining repairs expected to be completed 2022/2023 FY.	Manager WU
CHR 11	Reticulation		Targeted mains cleaning program for surface water schemes		Network program under development, to include valve exercising and flushing	WU Strategic Manager
CHR 12 CHR 13 CHR 14	Training / operator knowledge	Implement training plans / Ensure other staff are confident to operate scheme	Progressive procedure development	Targeted SCADA and alarming	Continual training required due to ongoing staff turnover. All current operators either have or are in the process of attaining Cert III (noting current RTO constraints).	Treatment Co-ordinator

CHR 15 CHR16	Recruitment / staff retention	Fill vacancies	Corporate people plan and plan for upskilling		Recruitment is ongoing due to continual staff turnover. Operator rotations to continue. More Emerald based operators to know other plants i.e., Anakie, Sapphire, Springsure, Rolleston, Comet. Blackwater based operators to know Bluff, Dingo, Duaringa, Bauhinia.	Treatment Co-ordinator Network Co-ordinator
CHR 17 CHR 18	Maintenance		develop internal skills to reduce reliance on external support, critical spares to be identified	Preventive maintenance of blowers, air compressors, centrifuges, spare retic pumps, dam switchboards, fluoride plant maintenance, chlorine replacement work, generator plug points.	Maintenance schedules to be developed to assist with costing of tenders and technical specifications. Develop list of critical spares for treatment and network assets. Noted on WU 5-year plan.	Treatment Co-ordinator Network Co-ordinator Engineering Co-ordinator
CHR 19 CHR 20	Cyber Security	Investigate governance structure. Linked to site security RMIP items.	Investigate cyber security detection process - current response and recovery plans, add cyber security focused section if necessary.		Engage consultant to assist with review of current plans and identify gaps specific to water utilities. Include cyber security protection, detection processes, response and recovery plans in the SCADA and Telemetry Master Plan.	WU Strategic Manager Engineering Co-ordinator
CHR 21 CHR 23	Site Security	Implement non-capital Audit recommendations. Investigate reducing temptation of site access for robbery.		Implement capital Audit and Assessment recommendations.	Received proposal from consultant to undertake security audit. Opal St and Blackwater security gate replacements completed. Continuing to implement non-capital audit recommendations.	Manager WU
CHR 24	Sole Operators	Consider formalised staff check ins/texting for schemes without teams and SCADA trends			Considering options and linkage to CHRC lone worker policy.	Treatment Co-ordinator
CHR 27	Standpipe & Hydrant access		Install Backflow Prevention where need identified or decommission		New Standpipes installed with Backflow Prevention in Emerald, Blackwater, Duaringa and Sapphire. Additional standpipes at Tieri and Bluff (turned off but physically still installed).	Network Co-ordinator Planning Co-ordinator
CHR 28 CHR 29	Health Based Targets/Catchment		Action catchment and treatment assessments	Implement capital recommendations	Surface water and groundwater catchment risk assessments were completed in 2020-2021 with a suite of recommendations to address key risks impacting water supply. A review of the recommended actions is required to identify an implementation plan and timeline.	Planning Co-ordinator

CHR 30	Key Consultants not available			Long term key supplier panels and contracts. Review function and capacity of panels	Panel in place and long-term contracts executed.	Manager WU
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RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2022	Responsible Position
		Short term	Medium term	Long term		
ANAKIE						
ANA 1	Raw water storage	develop reservoir inspection procedure	design/install new tank		Capex project has commenced design and land acquisition for replacement of 2 x tanks. Installation expected to occur 2022-2023 FY.	Manager WU
ANA 2 ANA 3	Disinfection	Trend and response analysis	Action outcomes of analysis		Trending indicates improved residual. Next review to consider improvement options.	Treatment Co-ordinator
ANA 4 ANA 5 ANA 6		Add chlorate sampling to verification monitoring program	data collection for options analysis	Investigate options / dual storage	Awaiting outcome of options analysis capital project.	Treatment Co-ordinator Engineering Co-ordinator
ANA 7	System Wide		Switchboard replacement		New switchboard installed.	Engineering Co-ordinator

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2022	Responsible Position
		Short term	Medium term	Long term		
BLACKWATER						
BLK 3 BLK 4 BLK 5	Disinfection/Redosing (Bluff Reservoir)	Add chlorate sampling to verification monitoring program	data collection for options analysis	Investigate options / chlorine gas	Awaiting outcome of options analysis capital project.	Manager WU
BLK 6	Reticulation		Investigate standby generator (reservoirs)		Design completed for WTP. Current tender for Blackwater Reservoir generator.	Manager WU
BLK 7	Redosing (Bluff Reservoir)			Replace generator on site	Current tender for Bluff Reservoir generator.	Manager WU

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2022	Responsible Position
		Short term	Medium term	Long term		
CAPELLA						
CAP 3 CAP 4	Raw Water Abstraction		Tieri-Capella pipeline condition assessment	Implement actions	Priority sections of the pipeline to be replaced 2022/2023 FY.	Manager WU
CAP 5	Coagulation	confirm clarifier turbidity monitoring commissioned, and trends show risk reduced			Rented ultra-filtration membrane plant installed. CAPEX budget for WTP upgrade.	Engineering Co-ordinator
CAP 7	Filtration		auto backwash to be investigated		Rented ultra-filtration membrane plant installed. CAPEX budget for WTP upgrade.	Manager WU
CAP 9 CAP 10		Data collection on turbidity spikes	Investigate ripening to waste		Rented ultra-filtration membrane plant installed. CAPEX budget for WTP upgrade.	Manager WU
CAP 11 CAP 12	Disinfection	collect new data set	Investigate pH range and update procedure if required		Review pH correction in WTP upgrade scope.	Manager WU
CAP 13 CAP 14	Transfer from Tieri to Capella	Data collection of chlorine levels	Develop transfer procedure		Awaiting pipeline replacement work and include in WTP upgrade scope.	Treatment Co-ordinator Engineering Co-ordinator

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2022	Responsible Position
		Short term	Medium term	Long term		
COMET						
COM 1	Raw Water Abstraction		Replace 2 x raw water pumps, reinstate duty/standby Replace jetty/pier		Construction completed 21/22 FY.	Project Team
COM 2 COM 3	pH correction	data collection for procedure target ranges and develop procedure	investigate alarm		New pH probe installed.	Treatment Co-ordinator

COM 4	Coagulation	confirm clarifier turbidity monitoring commissioned, and trends show risk reduced			Turbidity instrument installed and commissioned.	Engineering Co-ordinator
COM 6	Filtration	confirm filter turbidity monitoring trends show risk reduced			Turbidity instrument installed and commissioned.	Engineering Co-ordinator
COM 7 COM 8 COM 9	Disinfection	Add chlorate sampling to verification monitoring program	data collection for options analysis	Investigate options / dual storage	Awaiting outcome of options analysis capital project.	Manager WU
COM 10 COM 11	Reticulation		Investigate UPS and generator for transfer pumps to high tower	Implement appropriate action	Current tender for Comet generator.	Project Team

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2022	Responsible Position
		Short term	Medium term	Long term		
	DINGO					
DIN 1 DIN 2 DIN 3	Catchment		Investigate disinfection improvements	Filter replacement / action disinfection improvements	Rented ultra-filtration membrane plant installed. CAPEX budget for WTP upgrade.	Project Team
DIN 5				Relocate pumps	Awaiting prioritisation within CAPEX budget.	Manager WU
DIN 6 DIN 7	Coagulation	clarifier Turbidity monitoring	Turbidity meter online monitoring		Rented ultra-filtration membrane plant installed. CAPEX budget for WTP upgrade.	Project Team
DIN 9 DIN 3	Filtration		Turbidity meter online monitoring	Filter replacement	Rented ultra-filtration membrane plant installed. CAPEX budget for WTP upgrade.	Project Team
DIN 11 DIN 3			Investigate ripen to waste option	Filter replacement to include ripen to waste.	Rented ultra-filtration membrane plant installed. CAPEX budget for WTP upgrade.	Project Team
DIN 9	Disinfection		Turbidity meter online monitoring			Project Team
DIN 12 DIN 3			online monitoring and alarms	Filter replacement	Rented ultra-filtration membrane plant installed. CAPEX budget for WTP upgrade.	Project Team
DIN 13 DIN 14 DIN 15	Disinfection	Add chlorate sampling to verification monitoring program	data collection for options analysis	Investigate options, dual storage / chlorine gas	Awaiting outcome of options analysis capital project.	Manager WU

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2022	Responsible Position
		Short term	Medium term	Long term		
DUARINGA						
DUA 1 DUA 2 DUA 3	Catchment		Investigate disinfection improvements	action disinfection improvements	Rented ultra-filtration membrane plant installed. CAPEX budget for WTP upgrade.	Project Team
DUA 4	Coagulation			flow switch	Rented ultra-filtration membrane plant installed. CAPEX budget for WTP upgrade.	Project Team
DUA 5 DUA 6		clarifier Turbidity monitoring	Turbidity meter online monitoring		Rented ultra-filtration membrane plant installed. CAPEX budget for WTP upgrade.	Project Team
DUA 7 DUA 8 DUA 3	Filtration	Filtered Turbidity monitoring	Turbidity meter online monitoring	Filter replacement	Rented ultra-filtration membrane plant installed. CAPEX budget for WTP upgrade.	Project Team
DUA 9	Disinfection		online monitoring and alarms		Rented ultra-filtration membrane plant installed. CAPEX budget for WTP upgrade.	Project Team
DUA 10 DUA 11 DUA 12		Add chlorate sampling to verification monitoring program	data collection for options analysis	Investigate options / dual storage	Awaiting outcome of options analysis capital project.	Manager WU

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2022	Responsible Position
		Short term	Medium term	Long term		
EMERALD EAST NOGOA						
EMEN 1 EMEN 2	pH correction	data collection for procedure target ranges and develop procedure	investigate alarm		Awaiting outcome of consultant process review report. pH correction dosing currently not used.	Treatment Co-ordinator
EMEN 3 EMEN 4 EMEN 5	Coagulation	develop operational rules and document procedure	investigate control of supernatant return	Design and implement solution	Awaiting outcome of consultant process review report. Awaiting prioritisation within CAPEX budget. Recycled return currently not in use.	Manager WU

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2022	Responsible Position
		Short term	Medium term	Long term		
	EMERALD OPAL ST					
EMOS 1 EMOS 2	Coagulation - recycle stream	develop operational rules and document procedure	turbidity meter as control of supernatant return	dewatering upgrade	Ongoing options analysis on dewatering system. Recycled return currently not in use.	Manager WU
EMOS 3	Coagulation - blanket destabilised	develop operational rules and document procedure			Procedure to be developed.	Treatment Co-ordinator
EMOS 4 EMOS 5	Filtration		auto backwash, shutdowns, to be investigated	Investigate need to replace filter media	Awaiting prioritisation within CAPEX budget.	Manager WU
EMOS 6			investigate new backwash pumps instead of backflow prevention valve		Awaiting prioritisation within CAPEX budget.	Manager WU
EMOS 7			investigate blanking off valve		Awaiting prioritisation within CAPEX budget and requires further scoping. Recycled return currently not in use.	Manager WU
EMOS 8 EMOS 9	Reticulation		Investigate UPS and other options	Implement appropriate action	Clearwater switchboard replacement due for completion 2022-2023 FY budget.	Project Team

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2022	Responsible Position
		Short term	Medium term	Long term		
	ROLLESTON					
ROL 1 ROL 2	Coagulation	manual turbidity testing at clarifier		turbidity meter	Clearwater switchboard replaced. Rented UFMP installed which reduces the risk of clarified turbidity affecting water quality.	Project Team
ROL 3	Filtration		Plan and implement post UF unit rental option / upgrade		Upgrade options report due 2022/23 FY. CAPEX budget 2023-2024.	Manager WU
ROL 3	Disinfection		Plan and implement post UF unit rental option / upgrade		Upgrade options report due 2022/23 FY. CAPEX budget 2023-2024.	Manager WU
ROL 5			calculation of CT, probably OK, but need to check. pH adjustment capital solution may be required.		Upgrade options report due 2022/23 FY.	Manager WU
ROL 6 ROL 7 ROL 8		Add chlorate sampling to verification monitoring program	data collection for options analysis	investigate options	Awaiting outcome of options analysis capital project.	Manager WU
ROL 9 ROL 10	pH correction	data collection for procedure target ranges and develop procedure	Investigate online monitoring / alarm		Procedure to be developed.	Treatment Co-ordinator

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2022	Responsible Position
		Short term	Medium term	Long term		
	SAPPHIRE/RUBYVALE					
SAP 1 SAP 2	Disinfection	Adjust timing of chlorine dosing pump		Consider disinfection upgrade / UV treatment	UV and chlorine gas installation completed.	Engineering Co-ordinator
SAP 3 SAP 4 SAP 5		Add chlorate sampling to verification monitoring program	data collection for options analysis	Investigate options / dual storage	Chlorine gas installation completed.	Engineering Co-ordinator

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2022	Responsible Position
		Short term	Medium term	Long term		
	SPRINGSURE					
SPR 1	Network Management - Legionella / Naegleria	Assess water cooling options i.e., closed heat exchanger being considered. See bacteria RMIP's.			New cooling system to be installed. Existing cooling systems at both Dame Street and Twin Tanks isolated/bypassed.	Project Team
SPR 3	Disinfection		upgrade to auto dosing		Awaiting prioritisation within CAPEX budget.	Engineering Co-ordinator

RMIP Reference	Process Step	Risk Management Improvements			Status as at 30/06/2022	Responsible Position
		Short term	Medium term	Long term		
	TIERI					
TIE 3 TIE 4	Raw Water Abstraction	develop operational rules and document procedure	Investigate turbidity meter as control of supernatant return.		Turbidity meter installed, awaiting commissioning.	Engineering Co-ordinator
TIE 5 TIE 6	pH correction	data collection for target ranges, develop procedure	investigate alarm		Pre clarifier procedure to be developed.	Treatment Co-ordinator
TIE 7 TIE 8	Coagulation	clarifier Turbidity monitoring	online monitoring		Turbidity meter installed.	Engineering Co-ordinator
TIE 3 TIE 4		document the recycle procedure	Investigate recycle control. Requires flow meter/pump upgrade.		Awaiting prioritisation within CAPEX budget.	Engineering Co-ordinator
TIE 11	Filtration	investigate alarm level			EDAC replacement awaiting installation.	Engineering Co-ordinator
TIE 12 TIE 13		Data collection on turbidity spikes	Investigate ripening to waste		Awaiting prioritisation within CAPEX budget.	Engineering Co-ordinator
TIE 14 TIE 15		Investigate lockout		Investigate blanking off	Awaiting prioritisation within CAPEX budget.	Treatment Co-ordinator