Drinking Water Quality Management Plan (DWQMP) report

2021 - 2022

Etheridge Shire Council

SPID: SP49

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Glossary of terms

ADWG 2004	Australian Drinking Water Guidelines (2004). Published by the National Health and Medical Research Council of Australia
ADWG 2011	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
E. coli	*Escherichia coli*, a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
HACCP	Hazard Analysis and Critical Control Points certification for protecting drinking water quality
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
MPN/100mL	Most probable number per 100 millilitres
CFU/100mL	Colony forming units per 100 millilitres
<	Less than
>	Greater than

1. Introduction

This report documents the performance of Etheridge Shire Council's drinking water service with respect to water quality and performance in implementing the actions detailed in the drinking water quality management plan (DWQMP) as required under the *Water Supply (Safety and Reliability) Act 2008* (the Act).

The report assists the Regulator to determine whether the approved DWQMP and any approval conditions have been complied with and provides a mechanism for providers to report publicly on their performance in managing drinking water quality.

This template has been prepared in accordance with the *Water Industry Regulatory Reform – drinking water quality management plan report factsheet* published by the Department of Energy and Water Supply, Queensland, accessible at www.dews.qld.gov.au.

2. Overview of Operations

Georgetown's water supply is drawn from the aquifer in the alluvial bed sands of the Etheridge River. Surface water filters through the alluvial sands of the Riverbed to the aquifer where it is drawn from a series of wells. Due to occasional high levels of manganese and iron in Georgetown's water source, a treatment plant was installed in March-May 2015. The treatment comprises of a flocculation tank, 3 sand\carbon media filters and 3 DMI filters. Water is disinfected at the treatment plant and stored in two service reservoirs (1 x 600KL and 1 x 1800KL added in 2017). Water in the reservoirs is monitored and further disinfected (if required) before reticulation via a trim system.

Forsayth's water is sourced from the Big Reef Dam located 6 kilometres from the township. The water supply is treated by a DAF water treatment plant commissioned in 2006. Treated water is fed to a 600-kL service reservoir (installed in 2021) which in turn gravity feeds the township.

The treatment was upgraded in 2018 and comprises of a Pot perm dosing system, a pre-aeration system, carbon dosing and a carbon retention tank, flocculation tank, clarifier, dissolved air floatation system and 4 sand media filters. Water is disinfected at the treatment plant and monitored and further disinfected (if needed) via a trim system in the 600kl reservoir.

We have installed a new Dam (Charleston Dam) and have been testing the water since February 2021 with good results. We plan to start utilising this water source within the next reporting period.

3. Actions taken to implement the DWQMP

Georgetown and Forsayth

Management conducts regular toolbox meetings to make operational staff aware and familiar with the DWQMP and its implementation. Risk management measures are performed as written in our DWQMP. This includes operational procedures/practices and operational and verification monitoring. We have continued to work through improvements in our Risk management improvement plan.

Operational parameters have been checked and maintained at locations regularly as per our DWQMP. Verification testing has confirmed the operational monitoring programme to be effective.

Progress in implementing the risk management improvement program

We have continued to progress in implementing the risk management improvement program. We have worked towards all actions and completed some of them. For all progress information see Appendix B – Implementation of the Risk Management Improvement Program, Table 5 – Progress against the risk management improvement program in the approved DWQMP

Amendments made to the DWQMP

Our last DWQMP review was submitted in April 2022.
Our next review is due to be completed by 31 March 2024.

4. Compliance with water quality criteria for drinking water

See appendix A – Summary of compliance with water quality criteria

5. Notifications to the Regulator under sections 102 and 102A of the Act

Forsayth

There were two ongoing incidents at Forsayth for the detection of Bromide & Chlorate, which are parameters with no water quality criteria although we have now adopted guidelines.

An investigation Report was submitted in April-2021 and a guideline value of 1 mg/L was agreed upon for Bromide and this ongoing incident was closed.

An investigation Report was submitted on the 3-8-2021 and a guideline value of .8 mg/L was agreed upon for Chlorates and this ongoing incident was closed.

This financial year there were two new instances at Forsayth where the Regulator required notification under sections 102 or 102A of the Act.

The first was a 1.29 mg/L detection of Chlorate on the 19-10-2021 which has an adopted guideline of .8 mg/L.

The second was a 0.069 mg/L detection of Bromate on the 8-2-2022 which has a health limit of 0.02 mg/L.

Georgetown

There were two ongoing incidents at Georgetown for the detection of Bromide & Chlorate, which are parameters with no water quality criteria although we have now adopted guidelines.

An investigation Report was submitted on the 5-4-2021 and a guideline value of 1 mg/L was agreed upon for Bromide and this ongoing incident was closed.

An investigation Report was submitted on the 3-8-2021 and a guideline value of .8 mg/L was agreed upon for Chlorates and this ongoing incident was closed.

This financial year there was one new instance at Georgetown where the Regulator was notified under sections 102 or 102A of the Act.

This was a 1.18 mg/L detection of Chlorate on the 21-2-2022 which has an adopted guideline of .8 mg/L.

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

Incident Description: **Bromide – Forsayth** DWI-7-49-00022 This was an ongoing incident for the detection of Bromide, which is a parameter with no water quality criteria. An investigation report was submitted in April 2021 and the incident is now closed.

Corrective and Preventative Actions Bromide is usually detected in the raw water. Our Treatment Plant often removes bromide and usually only very low detections are found in the treated water. A guideline value was agreed on of 1 mg/L.

Incident Description: **Chlorate – Forsayth**. DWI-7-49-00015. This was an ongoing incident for the detection of Chlorate, which is a parameter with no water quality criteria. An investigation report was submitted 0n 3-8-2021 and the incident is now closed.

Corrective and Preventative Actions We turn over chlorine as frequently as possible and store it out of the sun. We regular clean our chlorine storage containers. We have talked with our chemical supplier about the importance of supplying fresh product and test the strength on arrival. We have talked to our freight company about issues while transporting and storing the hypo. We dilute the hypo with demineralised water asap after it arrives. We now make our own demineralised water. We have installed an aircon room to store our chlorine stock. A guideline value was agreed on of .8 mg/L.

Incident Description: **Chlorate – Forsayth** – 1.29 mg/L of Chlorate was detected at the Forsayth library on the 19-10-2021, which is over the guideline value limit of .8 mg/L, and incident DWI-49-21-09224 was opened.

Corrective and Preventative Actions We installed a trim system on the 600kl reservoir including chlorine storage which was in the sun causing a breakdown of chlorine and chlorates. We turned off the trim system until a shelter was built over it to keep it out of the sun.

Incident Description: **Bromate – Forsayth** - 0.069 mg/L of Bromate was detected at the Forsayth library on the 8-2-2022, which is over the health limit of .020 mg/L, and incident DWI-49-22-09475 was opened. We have had no further detections since then. An investigation report was submitted on the 16-3-2022.

Corrective and Preventative Actions We turn over our chlorine as frequently as possible and keep it out of the sun. We have installed an aircon storage room for our chlorine in stock. Detections are rare.

Incident Description: **Bromide – Georgetown** DWI-7-49-00023. We had an ongoing incident for the detection of bromide, which is a parameter with no water quality criteria. An investigation report was submitted in April 2021 and the incident is now closed.

Corrective and Preventative Actions Bromide is usually detected in the raw water. Our Treatment Plant often removes bromide and usually only very low detections are found in the treated water. A guideline value was agreed on of 1 mg/L.

Incident Description: **Chlorate – Georgetown** DWI-7-49-00014. This was an ongoing incident for the detection of Chlorate, which is a parameter with no water quality criteria. An investigation report was submitted 0n 3-8-2021 and the incident is now closed.

Corrective and Preventative Actions We turn over chlorine as frequently as possible and store it out of the sun. We regular clean our chlorine storage containers. We have talked with our chemical supplier about the importance of supplying fresh product and test the strength on arrival. We have talked to our freight company about issues while transporting and storing the hypo. We dilute the hypo with demineralised water asap after it arrives. We now make our own demineralised water. We have installed an aircon room to store our chlorine stock. A guideline value was agreed on of .8 mg/L.

Incident Description: **Chlorate – Georgetown** – 1.18 mg/L of Chlorate was detected at the Georgetown Rec Grounds on the 21-2-2022, which is over the guideline value limit of .8 mg/L, and incident DWI-49-22-09479 was opened. An investigation report was submitted on the 16-3-2022.

Corrective and Preventative Actions It was unclear what caused this although the next sample came back well under the guideline value. Detections over the guideline are rare.

6. Customer complaints related to water quality

Etheridge Shire Council is required to report on the number of complaints, general details of complaints, and the responses undertaken.

Throughout the year the following complaints about water quality were received:

Table 1 - complaints about water quality, (including per 1000 customers)

	Suspected Illness	Discoloured water	Taste and odour	Total
Georgetown	0	0	0	0
Forsayth	0	1	0	1
Total	0	0	0	0

Suspected Illness

Complaints are sometimes received from customers who suspect their water may be associated with an illness they are experiencing. Etheridge Shire Council investigates each complaint relating to alleged illness from our water quality, typically by testing the customers tap and closest reticulation sampling point for the presence of *E. coli*.

During 2021/2022, there were zero confirmed cases of illness arising from the water supply system.

Discoloured water

- *We had 1 anominus complaint about coloured water. Flushed water mains as regularly as possible, continued to sample, found no coloured water.*

One customer complaint was received from within the town of Forsayth on 24-4-2022 related to coloured water. Staff flushed the retic and found no coloured water. Detectable chlorine residual was maintained. We suspect it may have occurred from their pipework on the premises.	

7. Findings and recommendations of the DWQMP auditor

An Audit was performed in 2021. An audit has not occurred in this period. Our next audit is required by 2025.

8. Outcome of the review of the DWQMP and how issues raised have been addressed

An internal review of our DWQMP was conducted and submitted to the Regulators by April 2022. Everything was reviewed and updated including incident history, infrastructure details, risk assessment tables, operational and maintenance procedure documentation and record keeping, information management, incident/emergency levels, risk management improvement program and verification monitoring. Historical water quality data table information was compiled.
There were no issues raised and this review was updating and improving accuracy.

Appendix A – Summary of compliance with water quality criteria

The results from the verification-monitoring program have been compared against the levels of the water quality criteria specified by the Regulator in the *Water Quality and Reporting Guideline for a Drinking Water Service*.

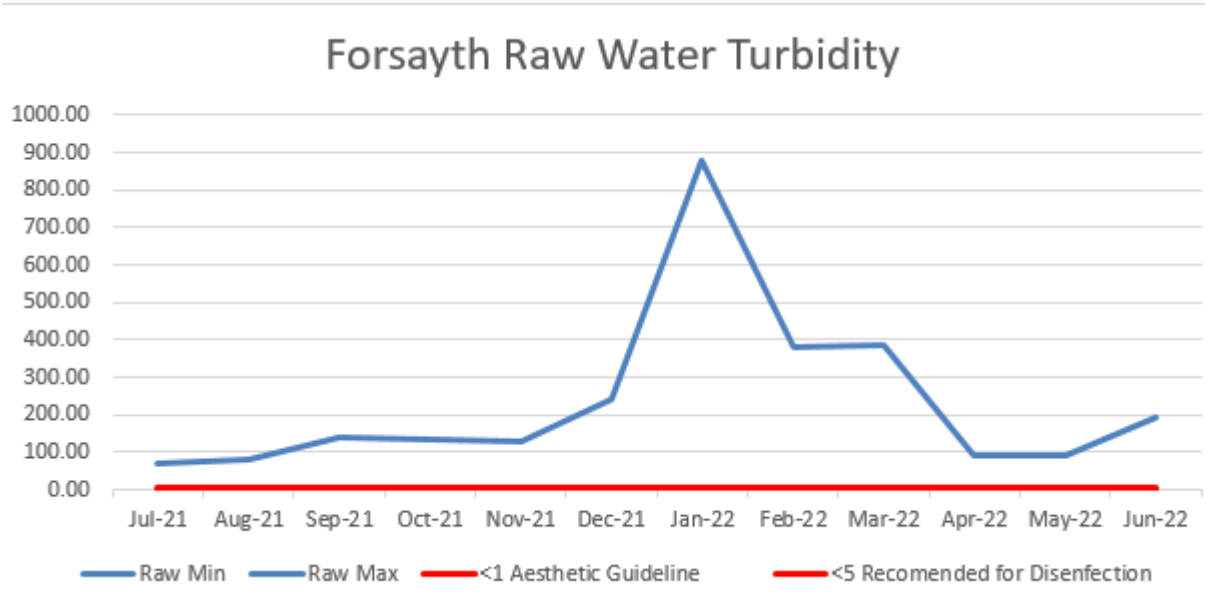
The reported statistics do not include results derived from repeat samples, or from emergency or investigative samples undertaken in response to an elevated result.

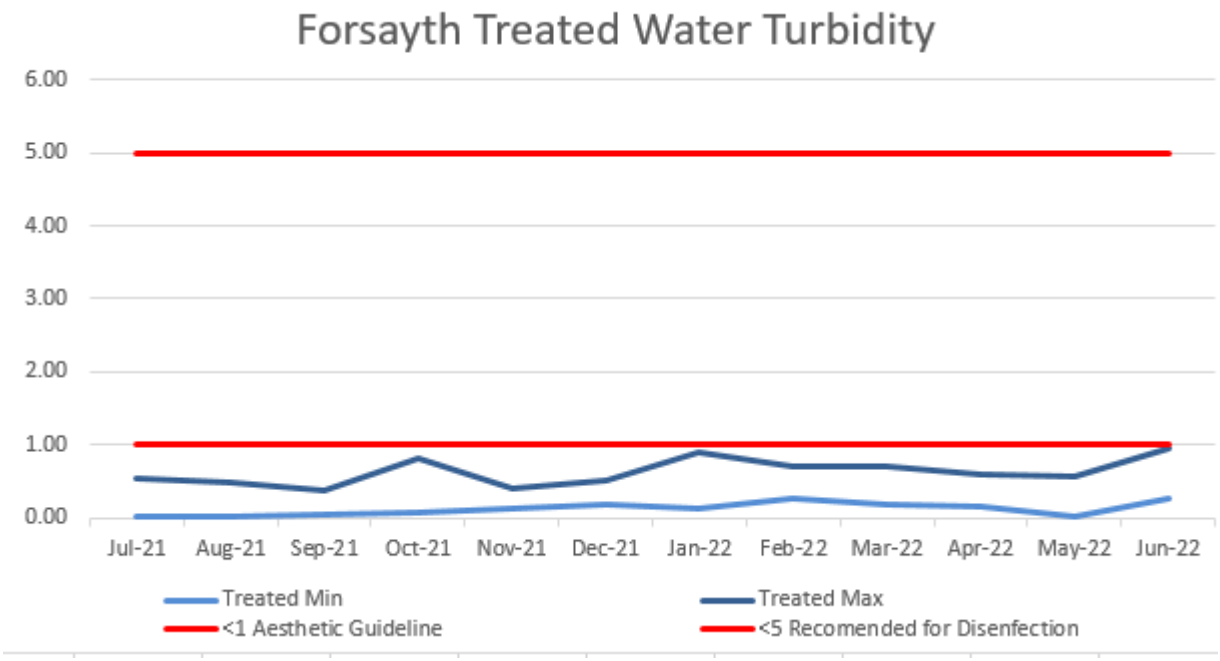
Other verification monitoring was carried out as per our DWQMP.

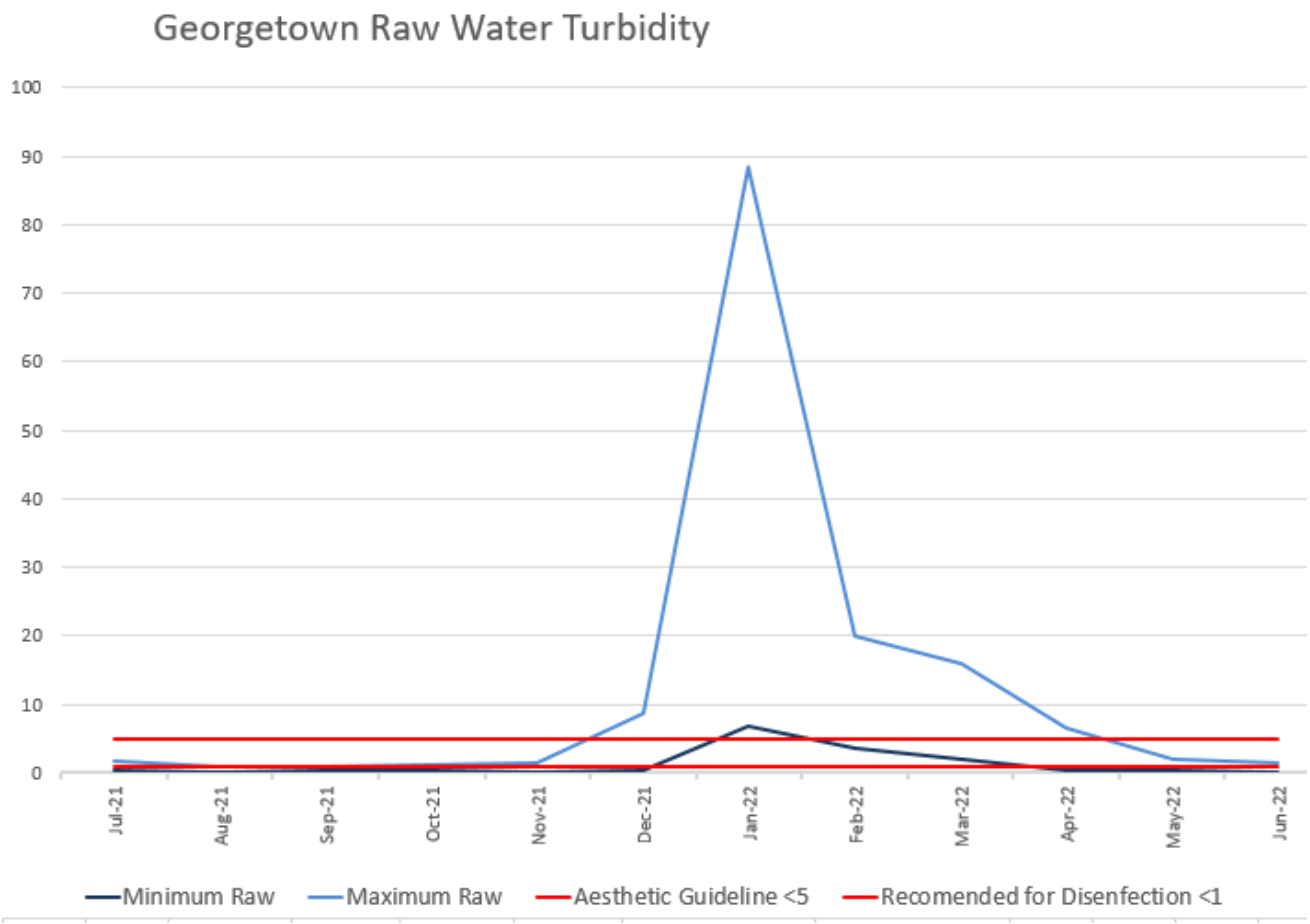
The presence of potentially toxic Blue/green algae in the raw water at Forsayth is detected on occasions and is treated and removed from the retic water. High levels of turbidity, colour, iron and manganese are also detected in the raw water at Forsayth and is treated and removed in the water treatment plant. Our verification monitoring covers all aspects. It shows any operational faults which can be rectified fast and confirms our operational monitoring is working and remains appropriate.

Upgrades to the Water treatment Plant at Forsayth in 2018 was a have succeeded to greatly improve turbidity levels in the reticulation.

Our verification monitoring results in the following table shows verification results for treated retic water. They also show operational results from the raw water to help compare and show the achievement of the treatment plants.


Forsayth Raw Water Turbidity
1000.00
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Jul-21
Aug-21
Sep-21
Oct-21
Nov-21
Dec-21
Jan-22
Feb-22
Mar-22
Apr-22
May-22
Jun-22
Raw Min
Raw Max
<1 Aesthetic Guideline
<5 Recomended for Disenfection


Forsayth Treated Water Turbidity
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Jul-21
Aug-21
Sep-21
Oct-21
Nov-21
Dec-21
Jan-22
Feb-22
Mar-22
Apr-22
May-22
Jun-22
Treated Min
Treated Max
<1 Aesthetic Guideline
<5 Recomended for Disenfection


Georgetown Raw Water Turbidity
100
90
80
70
60
50
40
30
20
10
0
Jul-21
Aug-21
Sep-21
Oct-21
Nov-21
Dec-21
Jan-22
Feb-22
Mar-22
Apr-22
May-22
Jun-22
Minimum Raw
Maximum Raw
Aesthetic Guideline <5
Recomended for Disenfection <1

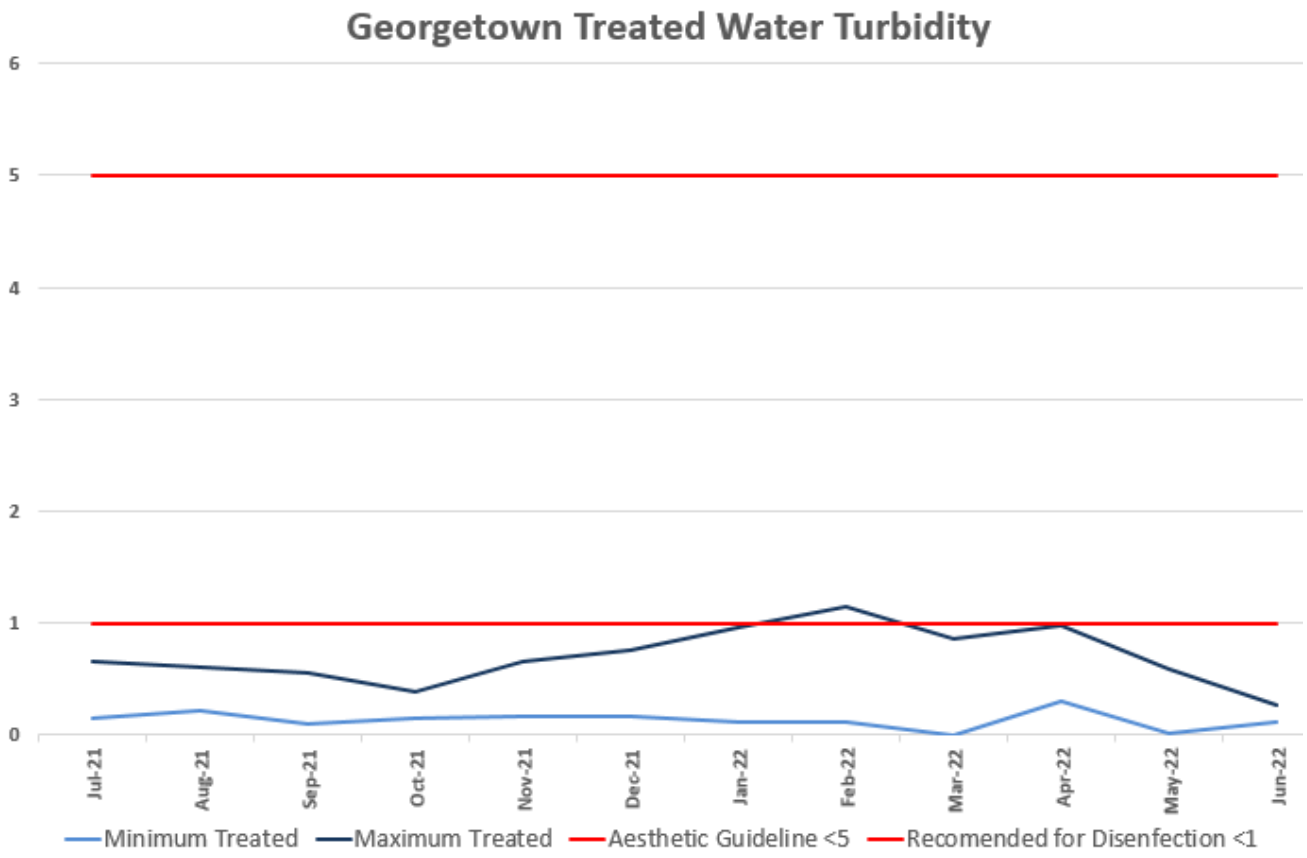

Georgetown Treated Water Turbidity
6
5
4
3
2
1
0
Jul-21
Aug-21
Sep-21
Oct-21
Nov-21
Dec-21
Jan-22
Feb-22
Mar-22
Apr-22
May-22
Jun-22
Minimum Treated
Maximum Treated
Aesthetic Guideline <5
Recomended for Disenfection <1

Table 1 - Verification monitoring results 2021/2022

Scheme name	Scheme component	Parameter	Units	Frequency of sampling	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Georgetown	Reticulation	Turbidity	Ntu	Daily	358	358	NA	0.00	1.14	.37		In House
Georgetown	Reticulation	True colour	Pt/Co	Twice a week	84	84	NA	0.00	4.00	0.31		In House
Georgetown	Reticulation	PH		Daily	361	361	NA	6.0	8.7	7.1		In House
Georgetown	Reticulation	Temperature	C	Daily	353	353	NA	17.9	38.0	28.0		In House
Georgetown	Reticulation	Chlorine Free	Ppm	Daily	429	429	NA	0.11	1.60	.56		In House
Georgetown	Reticulation	Chlorine Total	Ppm	Daily	353	353	NA	.19	2.10	.69		In House
Georgetown	Reticulation	Aluminium	Mg/L	Monthly	24	21	NA	<0.015	0.248	0.039	<0.005	Cairns Regional Council
Georgetown	Reticulation	Silicon	Mg/L	Quarterly	4	4	NA	19	20	19.5	<0.10	Cairns Regional Council
Georgetown	Reticulation	Mercury	ug/L	Quarterly	4	0	0	<0.06	<0.06	<0.06	<0.06	Cairns Regional Council
Georgetown	Reticulation	Arsenic	Mg/L	Quarterly	4	1	0	<0.0002	0.0002	0	<0.0002	Cairns Regional Council
Georgetown	Reticulation	Cadmium	Mg/L	Quarterly	4	0	0	<0.0001	<0.0001	0	<0.0001	Cairns Regional Council
Georgetown	Reticulation	Chromium	Mg/L	Quarterly	4	0	0	<0.0005	<0.0005	<0.0005	<0.0005	Cairns Regional Council
Georgetown	Reticulation	Copper	Mg/L	Quarterly	4	4	0	0.003	0.004	0.003	<0.001	Cairns Regional Council
Georgetown	Reticulation	Iron	Mg/L	Monthly	24	2	NA	<0.015	0.022	0.00	<0.015	Cairns Regional Council
Georgetown	Reticulation	Lead	Mg/L	Quarterly	4	1	0	<0.0005	0.0011	0.0003	<0.0005	Cairns Regional Council
Georgetown	Reticulation	Manganese	Mg/L	Monthly	24	24	0	0.0003	0.0079	0.0017	<0.0002	Cairns Regional Council
Georgetown	Reticulation	Nickel	Mg/L	Quarterly	4	0	0	<0.0005	<0.0005	<0.0005	<0.0005	Cairns Regional Council
Georgetown	Reticulation	Zinc	Mg/L	Quarterly	4	0	NA	<0.008	<0.008	<0.008	<0.008	Cairns Regional Council
Georgetown	Reticulation	Calcium	Mg/L	Quarterly	4	4	NA	6.3	12.0	9.8	<0.20	Cairns Regional Council
Georgetown	Reticulation	Magnesium	Mg/L	Quarterly	4	4	NA	1.5	3.4	2.7	<0.10	Cairns Regional Council
Georgetown	Reticulation	Potassium	Mg/L	Quarterly	4	4	NA	2.1	2.7	2.4	<0.10	Cairns Regional Council
Georgetown	Reticulation	Sodium	Mg/L	Quarterly	4	4	NA	13	18	16.2	<1	Cairns Regional Council
Georgetown	Reticulation	Total Hardness	MgCaC03/L	Quarterly	4	4	NA	22	44	36	<1	Cairns Regional Council
Georgetown	Reticulation	Salinity	Psu	Quarterly	4	4	NA	.0591	.0875	.0766		Cairns Regional Council
Georgetown	Reticulation	Total Dissolved Solids	Mg/L	Quarterly	4	4	NA	80	120	102.5	<1	Cairns Regional Council
Georgetown	Reticulation	Electrical Conductance	Us/cm	Quarterly	4	4	NA	120	180	155	<1	Cairns Regional Council
Georgetown	Reticulation	Total alkalinity	MgCaCO3/L	Quarterly	4	4	NA	25	60	44.5	<0.1	Cairns Regional Council
Georgetown	Reticulation	Fluoride	Mg/L	Quarterly	4	4	0	.09	.11	.10	<0.02	Cairns Regional Council
Georgetown	Reticulation	Sulphate	Mg/L	Quarterly	4	4	0	11	23	16.3	<0.01	Cairns Regional Council
Georgetown	Reticulation	Chloride	Mg/L	Quarterly	4	4	NA	8.9	10	9.4	<0.1	Cairns Regional Council
Georgetown	Reticulation	Chlorate	Mg/L	Monthly	12	11	1	<0.005	1.18	0.336	<0.005	Cairns Regional Council

Scheme name	Scheme component	Parameter	Units	Frequency of sampling	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Georgetown	Reticulation	Chlorite	Mg/L	Monthly	12	0	0	<0.005	<0.005	<0.005	<0.005	Cairns Regional Council
Georgetown	Reticulation	Bromate	Mg/L	Monthly	12	0	0	<0.005	<0.005	<0.005	<0.005	Cairns Regional Council
Georgetown	Reticulation	Bromide	Mg/L	Monthly	12	4	NA	<0.005	0.386	0.034	<0.005	Cairns Regional Council
Georgetown	Reticulation	Giardia, protozoa	Mg/L	Annually	1	0	0	0	0	0		Cairns Regional Council
Georgetown	Reticulation	Organochlorine Pesticides	Ug/L	Annually	1	0	0	0	0	0		Cairns Regional Council
Georgetown	Reticulation	Chloroform	Ug/L	Annually	4	4	0	8	16	12.2		Cairns Regional Council
Georgetown	Reticulation	Bromodichloromethane	Ug/L	Annually	4	2	0	<5	11	4		Cairns Regional Council
Georgetown	Reticulation	Dibomochloromethane	Ug/L	Annually	4	0	0	<5	<5	<5		Cairns Regional Council
Georgetown	Reticulation	Bromoform	Ug/L	Annually	4	0	0	<5	<5	<5		Cairns Regional Council
Georgetown	Reticulation	Total Trihalomethanes	Ug/L	Annually	4	4	0	8	19	14.8		Cairns Regional Council
Georgetown	Reticulation	E. coli	Cells/ML	Monthly	60	0	0	<1	<1	<1		Cairns Regional Council
Georgetown	Reticulation	Total Coliforms	Cells/ML	Monthly	60	2	NA	<1	16	.3		Cairns Regional Council
Georgetown	Reticulation	HPC	Cells/ML	Monthly	60	7	NA	<10	60	2		Cairns Regional Council
Georgetown	Reticulation	TOC	Cells/ML	Quarterly	5	5	N/A	1.1	1.7	1		Cairns Regional Council
Georgetown	Raw	Turbidity	Ntu	Daily	547	547	NA	0.19	88.40	3.50		In House
Georgetown	Raw	True colour	Pt/Co	Twice a week	91	91	NA	0.00	165.00	23.66		In House
Georgetown	Raw	PH		Daily	359	359	NA	5.0	7.8	6.6		In House
Georgetown	Raw	Temperature	C	Daily	361	361	NA	16.0	31.5	26.8		In House
Georgetown	Raw	Aluminium	Mg/L	Monthly	12	12	NA	<0.015	0.723	0.284	<0.015	Cairns Regional Council
Georgetown	Raw	Silicon	Mg/L	Quarterly	4	4	NA	19	22	20	<0.10	Cairns Regional Council
Georgetown	Raw	Mercury	Ug/L	Quarterly	4	0	NA	<0.06	<0.06	<0.06	<0.06	Cairns Regional Council
Georgetown	Raw	Arsenic	Mg/L	Quarterly	4	4	NA	0.0002	0.0004	0.0003	<0.0001	Cairns Regional Council
Georgetown	Raw	Cadmium	Mg/L	Quarterly	4	3	NA	<0.0001	0.0001	0.0001	0.0001	Cairns Regional Council
Georgetown	Raw	Chromium	Mg/L	Quarterly	4	0	NA	<0.0005	<0.0005	<00005	<0.0005	Cairns Regional Council
Georgetown	Raw	Copper	Mg/L	Quarterly	4	4	NA	0.001	0.002	0.001	<0.001	Cairns Regional Council
Georgetown	Raw	Iron	Mg/L	Monthly	12	11	NA	<0.015	0.608	0.133	<0.015	Cairns Regional Council
Georgetown	Raw	Lead	Mg/L	Quarterly	4	1	NA	<0.0005	0.0005	0.0001	<0.005	Cairns Regional Council
Georgetown	Raw	Manganese	Mg/L	Monthly	12	12	NA	0.0069	0.144	0.0601	<0.001	Cairns Regional Council
Georgetown	Raw	Nickel	Mg/L	Quarterly	4	0	NA	<0.0005	<0.0005	<0.0005	<0.0001	Cairns Regional Council
Georgetown	Raw	Zinc	Mg/L	Quarterly	4	1	NA	<0.008	0.009	0.002	<0.008	Cairns Regional Council
Georgetown	Raw	Calcium	Mg/L	Quarterly	4	4	NA	7.8	13.0	10.45	<0.20	Cairns Regional Council
Georgetown	Raw	Magnesium	Mg/L	Quarterly	4	4	NA	2.5	4.1	3.4	<0.10	Cairns Regional Council

Scheme name	Scheme component	Parameter	Units	Frequency of sampling	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Georgetown	Raw	Potassium	Mg/L	Quarterly	4	4	NA	2.5	3	2.7	<0.10	Cairns Regional Council
Georgetown	Raw	Sodium	Mg/L	Quarterly	4	4	NA	12	18	14.2	<1	Cairns Regional Council
Georgetown	Raw	Total Hardness	MgCaC03/L	Quarterly	4	4	NA	30	49	40.2	<1	Cairns Regional Council
Georgetown	Raw	Salinity	Psu	Quarterly	4	4	NA	0.0591	0.0944	0.0739		Cairns Regional Council
Georgetown	Raw	Total Dissolved solids	Mg/L	Quarterly	4	4	NA	72	130	99.5	<1	Cairns Regional Council
Georgetown	Raw	Electrical conductance	Us/cm	Quarterly	4	4	NA	120	190	147.5		Cairns Regional Council
Georgetown	Raw	Total Alkalinity	MgCaCO3/L	Quarterly	4	4	NA	41	61	53	<0.1	Cairns Regional Council
Georgetown	Raw	Fluoride	Mg/L	Quarterly	4	4	NA	.11	.12	.12	<0.02	Cairns Regional Council
Georgetown	Raw	Sulphate	Mg/L	Quarterly	4	4	NA	2.4	28	9.7	<0.1	Cairns Regional Council
Georgetown	Raw	Chloride	Mg/L	Quarterly	4	4	NA	3.4	13	6.5	<0.1	Cairns Regional Council
Georgetown	Raw	Chlorate	Mg/L	Monthly	12	0	NA	<0.005	<0.005	<0.005	<0.005	Cairns Regional Council
Georgetown	Raw	Chlorite	Mg/L	Monthly	12	0	NA	<0.005	<0.005	<0.005	<0.005	Cairns Regional Council
Georgetown	Raw	Bromate	Mg/L	Monthly	12	0	NA	<0.005	<0.005	<0.005	<0.005	Cairns Regional Council
Georgetown	Raw	Bromide	Mg/L	Monthly	12	12	NA	0.012	0.038	0.027	<0.005	Cairns Regional Council
Georgetown	Raw	E. coli	Cells/ML	Monthly	12	3	NA	<.1	23	2.5	<0.1	Cairns Regional Council
Georgetown	Raw	Total Coliforms	Cells/ML	Monthly	12	12	NA	1	1700	212	<10	Cairns Regional Council
Georgetown	Raw	HPC	Cells/ML	Monthly	12	7	NA	<10	260	48	<10	Cairns Regional Council
Forsayth	Reticulation	Turbidity	Ntu	Daily	362	362	NA	0.01	.94	0.31		In House
Forsayth	Reticulation	True colour	Pt/Co	Twice a week	97	97	NA	0.00	9.00	.88		In House
Forsayth	Reticulation	PH	PH units	Daily	325	325	NA	6.2	7.9	7.1		In House
Forsayth	Reticulation	Temperature	C	Daily	360	360	NA	18.5	35.8	27.8		In House
Forsayth	Reticulation	Chlorine Free	Ppm	Daily	408	408	NA	0.10	1.95	.59		In House
Forsayth	Reticulation	Chlorine Total	Ppm	Daily	362	362	NA	0.14	2.10	.83		In House
Forsayth	Reticulation	Aluminium	Mg/L	Monthly	24	23	NA	<0.015	0.113	0.043	<0.005	Cairns Regional Council
Forsayth	Reticulation	Silicon	Mg/L	Quarterly	4	4	NA	0.46	8.6	3.8	<0.10	Cairns Regional Council
Forsayth	Reticulation	Mercury	Ug/L	Quarterly	5	0	0	<0.06	<0.06	<0.06	<0.06	Cairns Regional Council
Forsayth	Reticulation	Arsenic	Mg/L	Quarterly	4	4	0	0.0002	0.0005	0.0003	<0.0001	Cairns Regional Council
Forsayth	Reticulation	Cadmium	Mg/L	Quarterly	4	0	0	<0.0001	<0.0001	<0.0001	<0.0001	Cairns Regional Council
Forsayth	Reticulation	Chromium	Mg/L	Quarterly	4	0	0	<0.0005	<0.0005	<0.0005	<0.0005	Cairns Regional Council
Forsayth	Reticulation	Copper	Mg/L	Quarterly	4	4	0	0.015	0.020	0.017	<0.001	Cairns Regional Council
Forsayth	Reticulation	Iron	Mg/l	Monthly	24	3	NA	<0.015	0.042	0.005	<0.015	Cairns Regional Council
Forsayth	Reticulation	Lead	Mg/L	Quarterly	4	0	0	<0.0005	<0.0005	<0.0005	<0.0005	Cairns Regional Council
Forsayth	Reticulation	Manganese	Mg/L	Monthly	24	24	0	0.007	0.181	0.077	<0.0002	Cairns Regional

Scheme name	Scheme component	Parameter	Units	Frequency of sampling	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
												Council
Forsayth	Reticulation	Nickel	Mg/L	Quarterly	4	0	0	<0.0005	<0.0005	<0.0005	<0.0005	Cairns Regional Council
Forsayth	Reticulation	Zinc	Mg/L	Quarterly	4	4	NA	0.023	0.081	0.039	<0.008	Cairns Regional Council
Forsayth	Reticulation	Calcium	MG/L	Quarterly	4	4	NA	3.8	7.1	5.1	<0.20	Cairns Regional Council
Forsayth	Reticulation	Magnesium	Mg/L	Quarterly	4	4	NA	1.4	2.3	1.7	<0.10	Cairns Regional Council
Forsayth	Reticulation	Potassium	Mg/L	Quarterly	4	4	NA	2.9	8.3	5.0	<0.10	Cairns Regional Council
Forsayth	Reticulation	Sodium	Mg/L	Quarterly	4	4	NA	31	54	42.8	<1	Cairns Regional Council
Forsayth	Reticulation	Total Hardness	MgCaC03/L	Quarterly	4	4	NA	15	29	22	<1	Cairns regional Council
Forsayth	Reticulation	Salinity	Psu	Quarterly	3	3	NA	0.099	0.161	0.135		Cairns Regional Council
Forsayth	Reticulation	Total Dissolved Solids	Mg/L	Quarterly	4	4	NA	120	210	158	<1	Cairns Regional Council
Forsayth	Reticulation	Electrical Conductance	Us/cm	Quarterly	4	4	NA	200	330	258	<1	Cairns Regional Council
Forsayth	Reticulation	Total Alkalinity	MgCaCO3/L	Quarterly	4	4	NA	29	87	62	<1	Cairns Regional Council
Forsayth	Reticulation	Fluoride	Mg/L	Quarterly	4	4	0	0.04	0.14	0.08	<0.02	Cairns Regional Council
Forsayth	Reticulation	Sulphate	Mg/L	Quarterly	4	4	0	38	52	46	<0.1	Cairns Regional Council
Forsayth	Reticulation	Chloride	Mg/L	Quarterly	4	4	NA	6.9	12	8.5	<0.01	Cairns Regional Council
Forsayth	Reticulation	Chlorate	Mg/L	Monthly	12	11	1	<0.005	1.290	0.390	<0.005	Cairns Regional Council
Forsayth	Reticulation	Chlorite	Mg/L	Monthly	12	0	0	<0.005	<0.005	<0.005	<0.005	Cairns Regional Council
Forsayth	Reticulation	Bromate	Mg/L	Monthly	12	1	1	<0.005	0.069	0.006	<0.005	Cairns Regional Council
Forsayth	Reticulation	Bromide	Mg/L	Monthly	12	6	0	<0.005	0.298	0.031	<0.005	Cairns Regional Council
Forsayth	Reticulation	Giardia, protozoa	Mg/L	Annually	1	0	0	0	0	0		Cairns Regional Council
Forsayth	Reticulation	Organochlorine Pesticides	Ug/L	Annually	1	0	0	0	0	0		Cairns Regional Council
Forsayth	Reticulation	Microcystis aeruginosa	Cells/ML	Monthly	12	0	0	0	0	0		Cairns Regional Council
Forsayth	Reticulation	Raphidiopsis/Cylindrospermopsis raciborskii	Cells/ML	Monthly	12	0	0	0	0	0		Cairns Regional Council
Forsayth	Reticulation	Dolichospermum circinale	Cells/ML	Monthly	12	0	0	0	0	0		Cairns Regional Council
Forsayth	Reticulation	Chrysosporum ovalisporum	Cells/ML	Monthly	12	0	0	0	0	0		Cairns Regional Council
Forsayth	Reticulation	Chloroform	Ug/L	Annually	4	2	0	<5	7	3	<5	Cairns Regional Council
Forsayth	Reticulation	Bromodichloromethane	Ug/L	Annually	4	2	0	<5	7	3	<5	Cairns Regional Council
Forsayth	Reticulation	Dibomochloromethane	Ug/L	Annually	4	0	0	<5	<5	<5	<5	Cairns Regional Council
Forsayth	Reticulation	Bromoform	Ug/L	Annually	4	0	0	<5	<5	<5	<5	Cairns Regional Council
Forsayth	Reticulation	Total Trihalomethanes	Ug/L	Annually	4	2	0	<5	78	31	<5	Cairns Regional Council

Scheme name	Scheme component	Parameter	Units	Frequency of sampling	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Forsayth	Reticulation	E. coli	Cells/ML	Monthly	36	0	0	<1	<1	<1	<1	Cairns Regional Council
Forsayth	Reticulation	Total Coliforms	Cells/ML	Monthly	36	0	NA	<1	<1	<1	<1	Cairns Regional Council
Forsayth	Reticulation	HPC	Cells/ML	Monthly	36	6	NA	<10	30	2.5	<10	Cairns Regional Council
Forsayth	Reticulation	TOC	Cells/ML	Quarterly	5	5	N/A	2.9	5.3	3.7		Cairns Regional Council
Forsayth	Raw	Turbidity	Ntu	Daily	492	492	NA	.22	879.99	8.05		In House
Forsayth	Raw	True colour	Pt/Co	Twice a week	106	106	NA	0.00	305.00	81.71		In House
Forsayth	Raw	PH	PH units	Daily	358	358	NA	6.0	8.3	6.8		In House
Forsayth	Raw	Temperature	C	Daily	351	351	NA	16.1	38.2	26.7		In House
Forsayth	Raw	Aluminium	Mg/L	Monthly	12	11	NA	<0.03	1.58	0.028	<0.005	Cairns Regional Council
Forsayth	Raw	Silicon	Mg/L	Quarterly	4	4	NA	1.3	12.0	5.8	<0.10	Cairns Regional Council
Forsayth	Raw	Mercury	Ug/L	Quarterly	5	0	NA	<0.06	<0.06	<0.06	<0.06	Cairns Regional Council
Forsayth	Raw	Arsenic	Mg/L	Quarterly	4	4	NA	0.0006	0.0017	0.0010	<0.0001	Cairns Regional Council
Forsayth	Raw	Cadmium	Mg/L	Quarterly	4	0	NA	<0.0001	<0.0002	<0.0001	<0.0001	Cairns Regional Council
Forsayth	Raw	Chromium	Mg/L	Quarterly	4	0	NA	<0.0005	<0.001	<0.0005	<0.0005	Cairns Regional Council
Forsayth	Raw	Copper	Mg/L	Quarterly	4	3	NA	<0.002	0.052	0.015	<0.002	Cairns Regional Council
Forsayth	Raw	Iron	Mg/l	Monthly	12	12	NA	1.05	10.00	4.28	<0.015	Cairns Regional Council
Forsayth	Raw	Lead	Mg/L	Quarterly	4	2	NA	<0.001	0.0014	0.0001	<0.001	Cairns Regional Council
Forsayth	Raw	Manganese	Mg/L	Monthly	12	12	NA	0.013	1.26	0.500	<0.0005	Cairns Regional Council
Forsayth	Raw	Nickel	Mg/L	Quarterly	4	2	NA	<0.001	0.0011	0.0006	<0.001	Cairns Regional Council
Forsayth	Raw	Zinc	Mg/L	Quarterly	4	1	NA	<0.016	0.046	0.019	<0.016	Cairns Regional Council
Forsayth	Raw	Calcium	MG/L	Quarterly	4	4	NA	4.1	7.8	5.7	<0.20	Cairns Regional Council
Forsayth	Raw	Magnesium	Mg/L	Quarterly	4	4	NA	1.5	2.4	1.9	<0.10	Cairns Regional Council
Forsayth	Raw	Potassium	Mg/L	Quarterly	4	4	NA	2.3	4.8	3.0	<0.10	Cairns Regional Council
Forsayth	Raw	Sodium	Mg/L	Quarterly	4	4	NA	5.4	14	10.4	<1	Cairns Regional Council
Forsayth	Raw	Total Hardness	MgCaC03/L	Quarterly	4	4	NA	16	29	22	<1	Cairns Regional Council
Forsayth	Raw	Salinity	Psu	Quarterly	4	4	NA	0.0435	0.0743	0.0552		Cairns Regional Council
Forsayth	Raw	Total Dissolved Solids	Mg/L	Quarterly	4	4	NA	65	130	83	<1	Cairns Regional Council
Forsayth	Raw	Electrical Conductance	Us/cm	Quarterly	4	4	NA	82	150	104	<1	Cairns Regional Council
Forsayth	Raw	Total Alkalinity	MgCaCO3/L	Quarterly	4	4	NA	36	62	44	<0.1	Cairns Regional Council
Forsayth	Raw	Fluoride	Mg/L	Quarterly	4	4	NA	0.10	0.29	0.19	<0.02	Cairns Regional Council
Forsayth	Raw	Sulphate	Mg/L	Quarterly	4	1	NA	<1	1.2	.3	<1	Cairns Regional Council
Forsayth	Raw	Chloride	Mg/L	Quarterly	4	4	NA	2.1	6.9	4.7	<0.01	Cairns Regional Council

Scheme name	Scheme component	Parameter	Units	Frequency of sampling	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Forsayth	Raw	Chlorate	Mg/L	Monthly	12	0	NA	<0.005	<0.005	<0.005	<0.005	Cairns Regional Council
Forsayth	Raw	Chlorite	Mg/L	Monthly	12	0	NA	<0.005	<0.005	<0.005	<0.005	Cairns Regional Council
Forsayth	Raw	Bromate	Mg/L	Monthly	12	1	NA	<0.005	0.006	0.001	<0.005	Cairns Regional Council
Forsayth	Raw	Bromide	Mg/L	Monthly	12	12	NA	0.008	0.033	0.017	<0.025	Cairns Regional Council
Forsayth	Raw	Microcystis aeruginosa	Cells/ML	Monthly	12	1	NA	0	40800	3400		Cairns Regional Council
Forsayth	Raw	Cylindrospermopsis raciborskii	Cells/ML	Monthly	12	0	NA	0	0	0		Cairns Regional Council
Forsayth	Raw	Dolichospermum circinale	Cells/ML	Monthly	12	2	NA	0	520	48		Cairns Regional Council
Forsayth	Raw	Chrysosporum ovalisporum	Cells/ML	Monthly	12	0	NA	0	0	0		Cairns Regional Council
Forsayth	Raw	E. coli	Cells/ML	Monthly	12	10	NA	<1	260	28	<1	Cairns Regional Council
Forsayth	Raw	Total Coliforms	Cells/ML	Monthly	12	12	NA	330	18000	3038	<1	Cairns Regional Council
Forsayth	Raw	HPC	Cells/ML	Monthly	12	12	NA	70	8400	1579	<10	Cairns Regional Council

Table - Reticulation *E. coli* verification monitoring

Georgetown	***2021***											
Month	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***June***	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***
No. of samples collected	5	5	5	5	5	5	5	5	5	5	5	5
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	1	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	60	60	60	60	60	60	60	60	60	60	60	60
No. of failures for previous 12 month period	0	0	1	1	1	1	1	1	1	1	1	1
% of samples that comply	100.0%	98.3%	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

Georgetown	*2022*											
Month	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***June***	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***
No. of samples collected	5	5	5	5	5	5	5	5	5	5		
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0		
No. of samples collected in previous 12 month period	60	60	60	60	60	60	60	60	60	60		
No. of failures for previous 12 month period	1	1	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%		
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		

Forsayth	*2021*											
Month	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***June***	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***
No. of samples collected	3	3	3	3	3	3	3	3	3	3	3	3
No. of samples collected in which *E. coli* 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	36	36	36	36	36	36	36	36	36	36	36	36
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

Forsayth	*2022*											
Month	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***June***	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***
No. of samples collected	3	3	3	3	3	3	3	3	3	3		
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0		
No. of samples collected in previous 12-month period	36	36	36	36	36	36	36	36	36	36		
No. of failures for previous 12-month period	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%		
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		

Appendix B – Implementation of the DWQMP Risk Management Improvement Program

Table 2 – Progress against the risk management improvement program in the approved DWQMP

IP item	Action	Priority	Description Describe the deliverable and the scope	Original Target date/s	Progress	Target date/s	Responsibility
Determine & manage Chlorate levels in Georgetown & Forsayth & manage.	*5*	*Med*	*Sample for chlorate more often (at least twice yearly). Monitor and develop options to manage chlorate production.*	*End 2015*	*Complete – Incident closed. Detections are rare*	*Complete /ongoing*	*Town & Water manager, Water Treatment Supervisor, Council*
Loss of Forsayth water supply from structural failure at Big Reef Dam.	*7*	*Med*	*Investigate water sourcing options or dam repairs/improvements.*	*End 2024*	*Complete – New Dam to be utilised from July 2022*	*2022*	*Council*
Ongoing siltation & weed management at Big Reef Dam	*8*	*High*	*Investigate resolving ongoing siltation and weed management problems at Big Reef Dam.*	*2020*	*Complete – New Dam to be utilised from July 2022*	*2022*	*Council*
Loss of water supply through inadequate wet season	*9*	*High*	*Investigate water sourcing options for supply security for Georgetown & Forsayth*	*2020*	*Complete – New Dam to be utilised from July 2022*	*2022*	*Council*
Scada	*12*	*Med*	*Investigate scada computer system specifically chlorine alarms*	*End 2014*	*We have a system in the Georgetown and Forsayth Reservoirs which circulates the water, senses the chlorine levels and adds chlorine if needed.* *We have a telemetry system at Georgetown, which allows us to monitor reservoir levels and activate pumps. We are in the process of upgrades to monitor cl2, ph & turbidity levels entering the reservoirs and, in the trim, remotely.*	*2023/on going upgrades*	*Town & Water Manager, Water Treatment Supervisor, Council*

IP item	Action	Priority	Description Describe the deliverable and the scope	Original Target date/s	Progress	Target date/s	Responsibility
					We have upgraded the computer system within our upgrade at the Forsayth Treatment plant and can view this from Georgetown or a tablet. We can remotely view reservoir levels, chlorine levels, plant faults etc. *We plan to budget to keep updating our scada*		
Water mains	*13*	*Low*	*Investigate capital works projects to replace 80mm AC with PVC & extend mains with PVC to complete circuits.*	*2023*	*We have performed capital works jobs each year and eliminated some dead ends. This is ongoing at this stage.*	*2025*	*Town & Water Manager, Engineer, Council*