



GLADSTONE REGIONAL COUNCIL

ABN: 27 330 979 106

DRINKING WATER QUALITY MANAGEMENT PLAN REPORT

2021-22

SPID: 483

Gladstone Regional Council
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Glossary of terms

ADWG 2011	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
CFU/mL	Colony forming units per millilitre
<i>E. coli</i>	<i>Escherichia coli</i> , a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
DRDMW	Department of Regional Development, Manufacturing and Water
GAWB	Gladstone Area Water Board
GRC	Gladstone Regional Council
HU	Hazen Units
mg/L	Milligrams per litre
MPN/100mL	Most probable number per 100 millilitres
NTU	Nephelometric Turbidity Units
WTP	Water Treatment Plant
<	Less than
>	Greater than



1. Introduction

This report documents the performance of Gladstone Regional Council's (GRC) drinking water service with respect to water quality, and implementation of 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.

2. Overview of Operations

The Gladstone Regional Council provides water to its residents through four water schemes:

- **Lake Awoonga Scheme.** Under this scheme the Gladstone Area Water Board (GAWB) collects and treats raw water harvested from the Lake Awoonga Dam. The water is treated through a conventional water treatment plant before being sold to Gladstone Regional Council at a number of reservoir and supply points throughout Gladstone, Boyne Island, Tannum Sands Calliope and Mt Larcom. GRC distributes the water to approximately 23 592 connections.
- **Bororen Scheme.** GRC sources water from two production bores located to the west of Lagoon Creek within the Baffle Creek catchment. The groundwater is treated at the Bororen Water Treatment Plant (WTP) and disinfected before being reticulated to 88 connections within the Bororen Township.
- **Miriam Vale Scheme.** GRC usually sources water from Baffle Creek (~80%) and the Thornes Road bore. The water is mixed and treated through a conventional treatment process and disinfected before being reticulated to approximately 209 connections.
- **Agnes Water/1770 Scheme.** GRC sources water from seawater and groundwater bores along Springs Road. The seawater is treated through a reverse osmosis desalination plant, and the bore water is treated through an ultrafiltration plant. Disinfected water is supplied to approximately 1384 connections within the townships of Agnes Water and 1770. The treatment plant is operated and maintained under contract by Trility Pty Ltd.

GRC manages drinking water quality through an approved Drinking Water Quality Management Plan (DWQMP). This ensures that water supplied to its 25 272 total connections, which represents an estimated population of approximately 64 304 people, is safe and public health is maintained.

3. Compliance with water quality criteria for drinking water

A summary of water quality performance over the four schemes is summarised in Appendix A.

GRC have produced a consistent and safe water supply that meet the requirements set by the *Public Health Regulation 2018* for drinking water with 100% of the 943 drinking water samples tested free of *E. coli*.

The microbial, chemical and physical testing program involved approximately 11,377 individual tests undertaken on drinking water samples. None of these test results exceeded a health guideline value in the Australian Drinking Water Guidelines 2011.



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

There were no instances during 2021-22 where the Regulator was notified under sections 102 or 102A of the Act.

5. Customer complaints related to water quality

Gladstone Regional 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 Relating to Water Quality, 2021-22

Scheme	Suspected Illness	Discoloured water	Taste and Odour	Other	Total
Lake Awoonga	2	19	7	0	28
Agnes Water/1770	0	2	1	1	4
Miriam Vale	0	0	0	0	0
Bororen	0	1	0	0	1
Total	2	22	8	1	33

Suspected Illness

Gladstone Regional Council investigates each complaint relating to alleged illness from the water supply, typically by conducting *E. coli* analysis from the source tap and monitoring the levels of free chlorine present in the water.

During 2021-2022, there were no confirmed cases of illness arising from the water supply system. The two suspected illness complaints were investigated; one customer believed their issue was internal, however enquired with GRC based on their doctor's advice, and the other was ultimately believed to be illness likely caused by mould throughout the house (water testing confirmed the GRC water supply met drinking water standards).

Discoloured water

A total of 22 customer complaints were received related to discoloured water. In response to discoloured water complaints, Council staff flush the relevant mains until the water runs clear.

Council staff also contacts the customer to advise them of the actions taken. Council proactively flushes mains on a routine basis in areas with a history of discoloured water complaints.

It is standard practice for Council to flush mains after breaks and in response to abnormal water quality sample results and low residual free chlorine.

Taste and odour

Gladstone Regional Council investigates taste and odour complaints and where required, undertakes response actions (for example checking of chlorine results or flushing in the reticulation system).

Investigation of each of the 8 taste and odour complaints found no evidence of public health risks. The taste and odour complaints are possibly due to variations in chlorine concentration throughout the year and/or other operational changes (i.e. setpoint increase) or in some cases, residents moving into a new home.



6. Findings and recommendations of the DWQMP auditor

The regular audit of the DWQMP was completed in November 2021, with the report provided on 20 December 2021.

Of the 59 findings raised in the audit report, GRC was found compliant in 55 areas, with four minor nonconformances:

Minor non-conformance	Auditor recommendation	Action / Response to finding
Within the water quality data audited, there were numerous chlorine residual readings below 0.2mg/L in Miriam Vale and Gladstone.	Ensure that the chlorine residual is above 0.2 mg/L in the Miriam Vale and Gladstone reticulation system.	GRC already undertakes its best endeavours to maintain chlorine residual within all water supply systems, and will continue to do so. In some cases, due to chlorine decay, it is not possible to maintain chlorine in all areas, at all times. GRC also notes that there is no requirement under legislation nor the approved DWQMP to maintain chlorine residual above 0.2mg/L, this is only a desirable target.
Some of the operational test chemicals / reagents were past their expiry date.	Order new chlorine sachets, turbidity standards, and Zobell solution and ensure that are ordered in anticipation of their use-by date.	These have been ordered and Operators provided training in the process to be followed to ensure reagents are within use by dates and ordered proactively.
Flow meters were not calibrated at the Thorne's Road bore.	Undertake a regular check of operational calibration record checks to ensure that the instruments are being calibrated regularly and effectively.	GRC is currently in the process of establishing a program of works for calibration of flow meters across all schemes.
One improvement action was identified as overdue (Round Hill Reservoir roof replacement).	Complete the outstanding action in the RMIP (Round Hill Reservoir).	GRC had already submitted a DWQMP amendment application to the Regulator, extending the date, which was approved shortly after the audit was completed. The roof replacement is a complex project which requires significant planning, and construction of new infrastructure before the reservoir can be taken offline. This level of complexity (and therefore the time requirement to complete the action) was not known when the original DWQMP was submitted.



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

The DWQMP was reviewed and updated in 2021-22, with an amended plan submitted in September 2021. This amendment was approved in December 2021.

The plan update was to reflect the following changes:

- Reinstatement of bore water supply in Agnes Water / 1770
- Changes to treatment processes at Agnes Water WTP
- Review and update of Agnes Water / 1770 risk assessment as a result of operational changes
- Minor changes to Operational Control Points and procedure details
- Updates to risk improvement actions and resulting changes to risk assessments
- Additional minor updates throughout the document

8. Actions taken to implement the DWQMP

Actions taken by GRC to implement the DWQMP in 2021-22 included:

- Completed implementation of the new Water Quality and Environmental Management System (database to house verification monitoring data)
- Ongoing collaboration with GAWB regarding investigations and improvements to manage increased chlorine decay in Lake Awoonga scheme
- Finalised and implemented a new Drinking Water Asset Commissioning Procedure
- Implemented seasonal chlorine dosing set point changes at Miriam Vale WTP to assist in managing chlorine decay in warmer months
- Options analysis undertaken for UV Disinfection at Miriam Vale WTP
- 4 x Drinking Water Technical Committee meetings held including attendees from Gladstone Area Water Board and Queensland Health



Appendix A – Summary of compliance with water quality criteria

The results from the verification monitoring program have been compared against the regulatory water quality criteria and summarised in the following tables.

Verification monitoring results - Lake Awoonga - Reticulation System – 2021-22

Parameter	Unit of Measure	Sample Results	Guideline Value*	Minimum	Average	Maximum	Non-compliances*
Aluminium - Total	mg/L	92		0.03	0.05	0.2	0
Antimony - Total	mg/L	9	0.003	<	<	<	0
Arsenic - Total	mg/L	9	0.01	<	<	<	0
Barium - Total	mg/L	9	2	0.009	0.01	0.014	0
Boron - Total	mg/L	9	4	0	0.04	0.06	0
Bromate	mg/L	81	0.02	<	<	<	0
Bromide	mg/L	81		<	0.02	0.077	0
Bromodichloromethane	µg/L	94	250	6	26	41	0
Bromoform	µg/L	94	250	<	<	8	0
Cadmium - Total	mg/L	9	0.002	<	<	<	0
Chlorate	mg/L	94	0.8 [^]	0.048	0.16	0.45	0
Chloride	mg/L	81		25	36	44	0
Chlorine (free)	mg/L	755		<	0.77	2.7	0
Chloroform	µg/L	94	250	<	32	60	0
Chromium - Total	mg/L	9	0.05	<	<	0.012	0
Copper - Total	mg/L	18	2	<	<	0.001	0
Dibromochloromethane	µg/L	94	250	8	20	30	0
<i>E. coli</i>	MPN/100mL	721	0	<	<	<	0
Electrical Conductivity	µS/cm	755		293	322	372	0
Fluoride	mg/L	81	1.5	<	<	0.4	0
Heterotrophic Plate Count (22°C)	CFU/mL	435		<	21	>300	0
Iron - Total	mg/L	92		<	<	0.11	0
Lead - Total	mg/L	9	0.01	<	<	<	0
Manganese - Dissolved	mg/L	184	0.5	<	<	0.002	0
Manganese - Insoluble	mg/L	64	0.5	<	<	0.003	0
Manganese - Total	mg/L	56	0.5	<	<	0.002	0
Mercury - Total	mg/L	9	0.001	<	<	<	0
Molybdenum - Total	mg/L	9	0.05	<	<	<	0
Nickel - Total	mg/L	9	0.02	<	<	<	0
Nitrate as NO ₃	mg/L	55	50	0.04	0.1	0.19	0
Nitrite as NO ₂	mg/L	55	3	<	<	0.05	0
pH	pH units	755		6.7	7.4	8.7	0
Phosphate as PO ₄	mg/L	55		<	<	0.03	0
Selenium - Total	mg/L	9	0.01	<	<	<	0
Sulfate as SO ₄	mg/L	81		21	29.7	34	0
Temperature	°C	755		17.5	25.7	34.1	0
Total Alkalinity (as CaCO ₃)	mg/L	92		62	74	88	0
Total Coliforms (Colilert)	MPN/100mL	722		<	<	48	0
Total Hardness (as CaCO ₃)	mg/L	92		68	86	104	0
Trihalomethanes Total	µg/L	93	250	14	79	127	0
True Colour	HU	743		<	0.52	9	0
Turbidity (NTU)	NTU	755		<	0.1	1.5	0
Zinc - Total	mg/L	9		<	<	0.005	0

*Guideline values and non-compliances refer to the regulatory water quality criteria (i.e. health based limits) but not aesthetic limits

[^] A guideline value of 0.8mg/L for chlorate has been implemented under GRC's DWQMP as per guidance from QLD Health

< symbol denotes that the number is below the limit of reporting for the test. In all cases, the limits of reporting are below the ADWG health (and aesthetic) guideline values.



Verification monitoring results - Bororen – Treated Water / Reticulation System – 2021-22

Parameter [#]	Unit of Measure	Sample Results	Guideline Value*	Minimum	Average	Maximum	Non-compliances*
Aluminium - Total	mg/L	27		<	0.02	0.09	0
Bromate	mg/L	5	0.02	<	<	<	0
Bromide	mg/L	5		0.11	0.13	0.15	0
Bromodichloromethane	µg/L	10	250	6	9.1	12	0
Bromoform	µg/L	10	250	11	14.5	20	0
Chlorate	mg/L	10	0.8 [^]	0.13	0.24	0.33	0
Chloride	mg/L	5		128	133.6	141	0
Chlorine (free)	mg/L	27		1.21	1.39	1.55	0
Chloroform	µg/L	10	250	<	<	<	0
Dibromochloromethane	µg/L	10	250	13	19.5	24	0
<i>E. coli</i>	MPN/100mL	36	0	<	<	<	0
Electrical Conductivity	µS/cm	26		499	777	813	0
Fluoride	mg/L	5	1.5	<	<	0.1	0
Heterotrophic Plate Count (22°C)	CFU/mL	13		<	<	<	0
Iron - Total	mg/L	27		<	<	<	0
Manganese - Dissolved	mg/L	52	0.5	<	<	0.002	0
Manganese - Insoluble	mg/L	18	0.5	<	<	0.027	0
Manganese - Total	mg/L	18	0.5	0.001	0.003	0.011	0
Nitrate as NO ₃	mg/L	3	50	0.02	0.02	0.02	0
Nitrite as NO ₂	mg/L	3	3	<	<	<	0
pH	pH units	26		7.1	7.3	7.8	0
Phosphate as PO ₄	mg/L	3		<	<	<	0
Sulfate as SO ₄	mg/L	5		3	3	3	0
Temperature	°C	26		19.3	24.9	29.4	0
Total Alkalinity (as CaCO ₃)	mg/L	27		72	215	242	0
Total Coliforms (Colilert)	MPN/100mL	36		<	<	<	0
Total Hardness (as CaCO ₃)	mg/L	26		82	284	318	0
Trihalomethanes Total	µg/L	10	250	30	43	55	0
True Colour	HU	24		<	1.0	5	0
Turbidity (NTU)	NTU	26		<	0.11	0.32	0

[#] Heavy metals are not reported in this report as the 2021 annual sample was in May, and the 2022 annual samples were in November.

*Guideline values and non-compliances refer to the regulatory water quality criteria (i.e. health based limits) but not aesthetic limits

[^] A guideline value of 0.8mg/L for chlorate has been implemented under GRC's DWQMP as per guidance from QLD Health

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Verification monitoring results - Miriam Vale – Treated Water / Reticulation System – 2021-22

Parameter#	Unit of Measure	Guideline Value*	Sample Results	Minimum	Average	Maximum	Non-compliances*
Aluminium - Total	mg/L		55	<	<	0.03	0
Bromate	mg/L	0.02	9	<	<	<	0
Bromide	mg/L		9	0.02	0.03	0.06	0
Bromodichloromethane	µg/L	250	24	14	34	53	0
Bromoform	µg/L	250	24	<	<	7	0
Chlorate	mg/L	0.8^	24	0.13	0.27	0.44	0
Chloride	mg/L		9	75	97	122	0
Chlorine (free)	mg/L		76	<	0.86	2.3	0
Chloroform	µg/L	250	24	10	34	69	0
Dibromochloromethane	µg/L	250	24	<	20	35	0
<i>E. coli</i>	MPN/100mL	0	81	<	<	<	0
Electrical Conductivity	µS/cm		76	309	501	600	0
Fluoride	mg/L	1.5	9	<	<	<	0
Heterotrophic Plate Count (22°C)	CFU/mL		56	<	27	>300	0
Iron - Total	mg/L		55	<	<	0.11	0
Manganese - Dissolved	mg/L	0.5	110	<	<	0.007	0
Manganese - Insoluble	mg/L	0.5	36	<	<	0.008	0
Manganese - Total	mg/L	0.5	38	<	<	0.002	0
Nitrate as NO ₃	mg/L	50	5	0.08	0.13	0.18	0
Nitrite as NO ₂	mg/L	3	5	<	<	<	0
pH	pH units		76	6.9	7.2	7.6	0
Phosphate as PO ₄	mg/L		5	<	<	<	0
Sulfate as SO ₄	mg/L		9	3	3.3	4	0
Temperature	°C		76	18.5	24.8	30.8	0
Total Alkalinity (as CaCO ₃)	mg/L		55	40	100	140	0
Total Coliforms (Colilert)	MPN/100mL		81	<	<	<	0
Total Hardness (as CaCO ₃)	mg/L		55	34	98	126	0
Trihalomethanes Total	µg/L	250	24	40	89	150	0
True Colour	HU		74	<	0.64	8	0
Turbidity (NTU)	NTU		76	<	0.11	0.35	0

Heavy metals are not reported in this report as the 2021 annual sample was in May, and the 2022 annual samples were in November.

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^ A guideline value of 0.8mg/L for chlorate has been implemented under GRC's DWQMP as per guidance from QLD Health

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Verification monitoring results - Agnes Water/1770 - Reticulation System – 2021-22

Parameter#	Unit of Measure	Guideline Value	Sample Results	Minimum	Average	Maximum	Non-compliances*
Aluminium - Total	mg/L		19	0.01	0.03	0.05	0
Bromate	mg/L	0.02	20	<	<	<	0
Bromide	mg/L		20	0.14	0.27	0.41	0
Chlorate	mg/L	0.8 [^]	4	0.09	0.12	0.14	0
Chloride	mg/L		20	78	106	121	0
Chlorine (free)	mg/L		114	0.42	0.85	1.2	0
<i>E. coli</i>	MPN/100mL	0	105	<	<	<	0
Electrical Conductivity	µS/cm		114	339	445	568	0
Fluoride	mg/L	1.5	20	<	<	0.1	0
Heterotrophic Plate Count (22°C)	CFU/mL		70	<	144	>300	0
Iron - Total	mg/L		19	<	<	<	0
Manganese - Dissolved	mg/L	0.5	40	<	<	0.001	0
Manganese - Insoluble	mg/L	0.5	12	<	<	0.002	0
Manganese - Total	mg/L	0.5	14	<	<	0.002	0
Nitrate as NO ₃	mg/L	50	12	<	0.13	0.2	0
Nitrite as NO ₂	mg/L	3	12	<	<	<	0
pH	pH units		114	7.2	7.7	8.1	0
Phosphate as PO ₄	mg/L		12	<	<	<	0
Sulfate as SO ₄	mg/L		20	2	2.9	3	0
Temperature	°C		114	17.3	25.7	32.3	0
Total Alkalinity (as CaCO ₃)	mg/L		20	39	49	60	0
Total Coliforms (Colilert)	MPN/100mL		105	<	<	4	0
Total Hardness (as CaCO ₃)	mg/L		20	39	55	103	0
True Colour	HU		107	<	0.13	3	0
Turbidity (NTU)	NTU		114	<	0.11	0.47	0

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