



Drinking Water Service Annual Report 2022-2023

This report has been prepared in accordance with the
Guideline for the preparation, review and audit of Drinking
Water Management Plans

SPID:476

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1. Service Provider Details

Detail	Information
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LGA covered by this plan	Bundaberg Regional Council
Water Service Schemes covered by this plan	Bundaberg, Kalkie, Gregory River, Gin Gin, Moore Park Beach, River Park, Rocky Point, Wallaville, Lake Monduran.

2. Glossary of Terms

ADWG 2011	Australian Drinking Water Guidelines (2011) Published by the National Health and Medical Research Council of Australia.
ALS	Australian Laboratory Services
BRC	Bundaberg Regional Council
E. coli	Escherichia coli is a bacterium which is considered to be a superior indicator for detecting faecal contamination which could present a potential health risk.
CFU/100ml	Colony forming units per 100 millilitres
CCP	Critical Control Point
DAF	Diffused Air Floatation
DRDMW	Department of Regional Development, Manufacturing & Water
DWQMP	Drinking Water Quality Management Plan
F&SS	Forensic & Scientific Services (Queensland Government)
GWTP	Groundwater Treatment Plant/s
IMS	Integrated Management System
LIMS	Laboratory Information Management System
mg/L	Milligrams per litre
MIB	Methylisobomeol, is an organic chemical with a strong odour that can present with an algal bloom
NTU	Nephelometric Turbidity Units
PFAS	Per- and poly - fluoroalkyl substances
QWSR	Queensland Water Supply Regulator
QH	Queensland Health
QCP	Quality Control Point
THM/s	Trihalomethanes are a group of chemicals that may be formed as a by-product when chlorine reacts with organic matter that can be found in some water sources.
TOC	Total Organic Carbon
WSA	Water Service Area
WTP	Water Treatment Plant
<	Less than
>	Greater than
µg/L	Micro-Grams per litre
µS/cm	Micro-Siemens per centimetre

3. Introduction

This is the Drinking Water Service annual report for Bundaberg Regional Council (BRC) for the 2022-2023 financial year.

BRC is a registered service provider with identification (SPID) number 476. BRC is operating under an approved DWQMP (Information Notice issued 29 May 2020, with a new Information Notice issued 9 May 2023) to ensure consistent supply of safe quality drinking water to protect public health. This is done through proactive identification and minimisation of public health related risks associated with drinking water.

This report documents the performance of BRC's drinking water services with respect to:

- ❖ The water quality performance of BRC's drinking water supply,
- ❖ The actions undertaken to implement the DWQMP, and
- ❖ The information BRC is required to provide to the Queensland Water Supply Regulator, Department of Regional Development, Manufacturing and Water (DRDMW) (the Regulator) in accordance with the *Water Supply (Safety and Reliability) Act 2008* (the Act).

This report is submitted to the Regulator, DRDMW, to fulfil Council's regulatory requirement, and is also made available to customers through Council's website or for inspection upon request at Council offices.

This report has been prepared in accordance with the *Guideline for the preparation, review and audit of Drinking Water Quality Management Plans – October 2022* published by DRDMW.



4. Overview of Operations

BRC manages nine (9) Water Service Areas (WSA) which are zoned in either the Coastal or Hinterland Operational areas. Table 1 below provides a summary of each WSA.

Table 1 - Summary of Schemes

Scheme (Population)	Water Source	Treatment Process	Treatment Capacity (ML/day)	Towns supplied
Coastal Operational Area				
Bundaberg Water Service Area (WSA) (56,742)	Burnett River	Branyan Water Treatment Plant (WTP) - PAC Adsorption, coagulation, flocculation, clarification, sedimentation, filtration, and disinfection.	21	Bundaberg City, including Gooburrum
	Bores: - Heaps St - Peatey St - Lovers Walk - Powers St - Works Depot	Groundwater Treatment Plant (GWTP) - Aeration over limestone process with disinfection	57.6 (combined)	
Kalkie WSA (20,956)	Burnett River via SunWater's Woongarra Main Channel	WTP - Coagulation, flocculation, clarification (DAF), filtration and disinfection	17.3	The Port, Burnett Heads, Bargara, The Hummock, Innes Park, Coral Cove, Elliott Heads, Riverview
	Bundaberg WSA treated water supplement to Hummock reservoirs for consumption within the Kalkie WSA.			
Moore Park WSA (3,235)	SunWater Gooburrum Main Channel	Vecellios Rd WTP - Coagulation, flocculation, clarification filtration and disinfection	2.16	Moore Park
	Zandes Bores 1 & 2	Murdochs Rd GWTP - Aeration over limestone process with disinfection		
River Park WSA (317)	SunWater irrigation holding dam	WTP - Coagulation, flocculation, clarification, filtration, and disinfection	1.5	River Park
Rocky Point WSA (221)	Bore	GWTP - Aeration over limestone process with disinfection	0.69	Rocky Point
Hinterland Operational Area				
Gregory River WSA (6,248)	Gregory River	WTP – PAC, flocculation, coagulation, clarification (Inclined Plate Sedimentation Tank), and disinfection	4.3	Childers, Woodgate, Redridge, Forest Ridge, Kinkuna, Goodwood
Gin Gin WSA (1,479)	Gin Gin Creek & SunWater Channel	WTP - coagulation, flocculation, clarification, filtration, and disinfection	1	Gin Gin
Wallaville WSA (257)	Burnett River	WTP - coagulation, flocculation, clarification, filtration, and disinfection	2.5	Wallaville
Lake Monduran WSA (16 Water Connections – 40 people)	Fred Haigh Dam	WTP - coagulation, flocculation, filtration, and disinfection	0.86	Lake Monduran Tourist Park



Figure 1 Overview Map of BRC's WSA's 2022-2023

5. DWQMP Implementation

In accordance with the Information Notice issued by DRDMW on 29 May 2020, the regular review outcomes and subsequent amendment of Council's DWQMP was submitted to the Regulator on 10 August 2022. The amended plan captured the commissioning of the new Gregory River Water Treatment Plant and the removal of Gooburrum as a Water Service Area, WTP CCP and OCP reviews and supporting documents etc. The application to amend Council's DWQMP was approved, with the new Information Notice issued by DRDMW on 9 May 2023.

Throughout the review of the DWQMP, information sessions were held with operators to discuss items such as CCPs and OCPs, incident management, reporting timeframes and operational vs verification monitoring. The review and amendment of procedures such as the 'Algae action flowchart' also involved the engagement of multiple stakeholders within Water Services.

The Kalkie Water Treatment Plant upgrade is nearing completion and has commenced the commissioning process. The completed upgrade and commissioning process is expected to be finalised with the plant fully operational by August 2023.

Water Services Service Delivery team conducts daily toolbox and monthly meetings to discuss water (and sewerage) issues within the region. These meetings provide the opportunity to inform operators of the information provided in the approved DWQMP and the importance of operating under the plan.

During the 2022-2023 reporting period, one new water operator was recruited. All new water operations staff are made aware of their role in relation to implementing the DWQMP and forms part of the onsite training provided.

Appendix B – provides a summary of the actions taken with regards to the Improvement actions captured within Council's Improvement Plan. Some Improvement actions captured prior to December 2022 have been captured again during the regular review process. The actions identified in 2022 have been referenced against the existing actions. Actions undertaken during the 2022-2023 financial year Council include:

- Commencement of Lake Monduran WTP process optimisation study.
- A lock replacement program to improve site security across the region.
- A trial to enclose the groundwater treatment plant limestone spray beds – Lovers Walk GWTP.
- A review of the verification monitoring sample points to ensure compliance and was representative of the source water supply.

5.1 Revisions made to the operational/verification monitoring.

BRC continues to carry out operational monitoring programs across all BRC water schemes, as per the approved DWQMP.

The completed review of the verification sample locations across all Council water service areas was undertaken with locations assessed to ensure compliance and align with the microbiological sampling requirements set by the *Public Health Regulation 2018*. Each sample location was assessed to ensure compliance, was representative of the source water supplied, provided fair geographical representation and the ability for historical data comparison.

Following this review, Council is moving away from collection of the verification water samples from private residences and will be installing dedicated sample points on the water main outside the current sample locations. The installation of this infrastructure will:

- Ensure sample collection is not restricted due to changes at a residential property (e.g., erection of a fence),
- Enable an increase to sample collection frequencies within the reticulation networks to align with the regulated monitoring requirements,
- Provides a more representative sample directly from Council’s water main, without the need to access private properties,
- Reduces the risk to false positives, due to aging infrastructure, insufficient flushing,
- Reduced risk to the safety of the samplers.

Council’s Water Services team is working to install forty (40) designated sample points across the region. The installation project is expected to be completed by October 2023.

6. Notification to the Regulator under section 102 & 102A of the Act.

Notification to the Regulator is a requirement under Sections 102 and 102A of the Act and Conditions 7.2 and 7.3 of the BRC Drinking Water Quality Management Plan Information Notice issued by DRDMW on 9 May 2023, for incidents where the quality of water supplied within the drinking water service does not comply with the water quality criteria and / or a prescribed incident / event has occurred in relation to service.

During the 2022-2023 financial year Council reported twelve (12) incidents / events to the Regulator and provided regular updates to one (1) ongoing incident from the 2021-2022 reporting period. The majority of these are detections that were made during routine verification monitoring.

6.1 Non-compliance with the water quality criteria and corrective and preventative actions undertaken.

Table 2 summarises the incidents reported to the Regulator during the 2022-2023 reporting year.

Table 2. Incidents reported to the Regulator 2022-2023

Water Service Area	Parameter	Monitoring Type	Incident Date	QWSR reference	Date reported to QWSR	Corrective and Preventative Actions
Bundaberg	<i>E. coli</i>	Verification	13/06/2023	DWI-476-23-10306	15/06/2023	The detection of <i>E. coli</i> was recorded in the reservoir of the Bundaberg – Peatey Street GWTP prior to entering the supply network. A chlorine residual of 0.78mg/L was recorded. Operators attended site and isolated the supply to the reticulation network. An alternate supply was provided for the service area from the Bundaberg – Heaps Street GWTP. Council assessed the chlorine residual within the alternate Heaps St supply to ensure adequate disinfection within the reticulation network, readings ranged between 0.88mg/L to 1.07mg/L. A resample was collected and reported no detection of <i>E. coli</i> . Peatey St GWTP remained offline while pipe repair works were undertaken and the alternate supply from Heaps St GWTP remained in place. Closure advice for incident DWI-476-23-10306 was received from QWSR on 15/09/2023.
	Lead	Verification	06/09/2022	DWI-476-22-09784	29/09/2022	An exceedance of the Lead ADWG Health Limit of 0.01 mg/L was detected at an individual sample site within the Bundaberg – Works Depot GWTP supply network as part of Council routine metals sampling program – BL-K Metals. An additional sample site within this same supply network reported a Lead level of <0.001mg/L. A mains flush was conducted at the sample location. The resample analysis reported a Lead level below the ADWG Health Limit. Closure advice for incident DWI-476-22-09784 was received from QWSR on 23/12/2022.
	Lanthanum	Verification	06/09/2022	DWI-476-22-09785	29/09/2022	An exceedance of the Lanthanum ADWG Health Limit of 0.002 mg/L was detected at an individual sample site within the Bundaberg – Works Depot GWTP supply network as part of Council routine metals sampling program – BL-K Metals. An additional sample site within this same supply network reported a Lanthanum level of <0.001mg/L. A mains flush was conducted at the sample location. The resample analysis reported a Lanthanum level below the ADWG Health Limit. The investigation report for incident DWI-476-22-09785 was submitted to QWSR on 20/10/2022.
	Disinfection failure	Operational CCP	29/03/2023	DWI-476-23-10236	31/03/2023	A disinfection failure at the Bundaberg – Heaps Street GWTP was identified following the scheduled chlorine leak detector maintenance undertaken on site, where the chlorine bottles were turned off. Later during the day when then plant called for water, a low chlorine alarm activated. Notification was received by the on-call operator who attended site and turned the chlorine bottles back on. Closure advice for incident DWI-476-23-10236 was received from QWSR on 13/06/2023.
Gregory River	Turbidity	Operational CCP	19/06/2023	DWI-476-23-10309	20/06/2023	Operators noted turbidity spikes >0.5 NTU over a 16-minute duration in the treated water tanks. Investigation identified a polymer dosing non-return valve failure. The entire poly injection assembly was replaced. Operators are to conduct weekly inspection of the polymer dosing non-return valve. The plant backwash sequence time for the filters has been reduced from 100 hours to 60 hours to allow for the treatment of increased settled water turbidity. Operators have made changes to the control system to shut down the plant when there is a critical control point exceedance. Closure advice for incident DWI-476-23-10309 was received from QWSR on 20/09/2023.
Kalkie	Lead	Verification	06/09/2022	DWI-476-22-09786	29/09/2022	An exceedance of the Lead ADWG Health Limit of 0.01 mg/L was detected at an individual sample site within the Kalkie supply network as part of Council routine metals sampling program – BL-K Metals. Four (4) additional sample sites within this same supply network reported Lead levels between <0.001mg/L and 0.006mg/L. A mains flush was conducted at the sample location. The resample analysis reported a Lead level below the ADWG Health Limit. Closure advice for incident DWI-476-22-09786 was received from QWSR on 23/12/2022.
Lake Monduran	THM's	Verification	03/03/2022 (ongoing issue 2021/22)	DWI-476-22-09526	14/03/2022	The Monduran WTP has difficulty in treating elevated levels of organics in the source water and therefore, at times, the THM levels in the treated water can exceed the ADWG Health limit of 250µg/L. The WTP only services the Lake Monduran Caravan Park which has a seasonal consumer demand. Council is assessing various strategies including other treatment technology options. Updates have been provided to QWSR throughout the 2022-2023 period. Closure advice for incident DWI-476-22-09526 was received to QWSR on 15/09/2023.
	Turbidity	Operational CCP	06/05/2023	DWI-476-23-10273	09/05/2023	Operators noted turbidity spikes >0.5 NTU post filters. The treated water was dumped and the filters backwashed. The post filter turbidity again spiked, with the operators dumping the treated water and conducting another filter backwash. Water was trucked into the plant to supply the service area. Investigation identified increased iron levels in the raw water which resulted in the filter backwash frequency not being sufficient and the need for further cleaning required. Operators have increased the frequency of the backwash cycle. Council is looking to install a turbidity analyser to measure post filter turbidity and will undertake an investigation to amend the control shutdown of the plant when the post filter turbidity exceeds the set limit of 0.5 NTU. Closure advice for incident DWI-476-23-10273 was received from QWSR on 23/06/2023.
	Chlorate	Verification	21/07/2022 02/02/2023	DWI-476-22-09717 DWI-476-23-10158	10/08/2022 07/02/2023	Chlorate levels were recorded greater than 0.8mg/L (ADWG interim health limit) in the reticulation network. In response to these exceedances' operators undertook routine tank cleaning. Council continues to dilute the sodium hypochlorite. The investigation report for incident DWI-476-22-09717 was submitted to QWSR on 05/09/2022. Updates for incident DWI-476-23-10158 were provided to QWSR throughout the 2022-2023 period. Closure advice for incident DWI-476-23-10158 was received from QWSR on 20/09/2023.
River Park	Herbicide	Verification	09/02/2023	DWI-476-23-10168	10/02/2023	SunWater staff applied the herbicide (Weedmaster Duo Dual Salt Technology) to the Woongarra Balancing Storage Lagoon, which supplies the River Park WTP, to treat water lettuce. Spraying of the herbicide was done at allocation within the lagoon away from the WTP offtake point. Council operators emptied and flushed the plant treated water reservoirs. Water was trucked into the plant to supply the service area until the laboratory analysis results were received. Supply from the WTP was reinstated upon receipt of results below the ADWG limit for Glyphosate and Total Glyphosate. SunWater is to advise Council prior to the application of herbicide treatment to the water storage lagoons and irrigation channels. The investigation report for incident DWI-476-23-10168 was submitted to QWSR on 22/03/2023 and further information was provided on 12/09/2023.
All BRC WSA	Pesticides – missed samples	Verification	10/10/2022	DWI-476-22-09821	10/10/2022	The scheduled quarterly pesticide analysis program was sampled (24 samples total – all Water Service Areas raw water and reservoirs) in July 2022. The samples were not processed within the holding time for transport to ALS for analysis. Samples are to be collected in October and November to ensure compliance for the 2022/2023 financial year. Council has implemented a 3-year contract for the supply of external laboratory analysis. The investigation report for incident DWI-476-22-09821 was submitted to QWSR on 13/12/2022.
Bundaberg / Kalkie / Moore Park	Pesticides	Verification	October 2022	DWI-476-22-09995	09/12/2022	Laboratory analysis results received for the routine quarterly pesticide sample program were assessed against the ADWG limits and the Qld Health pesticide assessment parameter limit spreadsheet (based on the review of BRC past detection limits of pesticides without ADWG limits). There were no detections of pesticides above the ADWG limits. There were 2 pesticides detected that had not been identified previously and 2 pesticide detections that exceeded the established maximum detection limits. Council will apply the Qld Health assessed maximum detection limit when assessing pesticide detections with no ADWG limit. Any parameter detected that has not been assessed by Qld Health and does not have an ADWG limit will be reported to the Regulator and Qld Health. The investigation report for incident DWI-476-22-09995 was submitted to QWSR on 16/12/2022.

7. Customer Complaints

BRC's Water Services monitors and investigates customer complaints received relating to drinking water quality. Reporting on the number of complaints received, the general details of complaints and the actions undertaken is a requirement that BRC must comply with in accordance with section 142(3)(g) of the Act.

Table 3 below provides a summary of the number and nature of customer complaints received during the 2022-2023 financial year.

Table 3 - Water Quality Customer Complaints

WSA	Discoloured Water	Taste & Odour	Suspected Illness	Total Complaints
Bundaberg	13	11	1	33
Kalkie	7	15	0	22
Gregory River	3	1	0	4
Gin Gin	3	0	0	3
River Park	1	0	0	1
BRC Total Complaints	27	35	1	-

Please note that no customer complaints were received for the following WSA's – Lake Monduran, Moore Park, Rocky Point & Wallaville.

Discoloured Water (inc. Cloudy Water)

During 2022-2023 BRC received twenty-seven (27) customer complaints relating to discoloured water across all WSA's, the majority of which were reported within the Bundaberg WSA.

Three (3) of these twenty-seven (27) complaints related to cloudy water specifically. These complaints are primarily the result of sloughing of sediments in the water mains. At times, milky/white water can be experienced at the consumers tap. This is due to air being trapped within the water main and can occur following repair work when re-establishing the water mains back into service.

Generally, discolouration issues can be resolved quickly through operational corrective actions such as flushing.

Taste & Odour

Taste and odour complaints regarding potable water can be subjective as it depends on an individual's perception. During 2022-2023 BRC received thirty-five (35) water quality complaints related to taste/odour. In some WSA's BRC can operate on either surface water and/or groundwater, this change can prompt complaints as there can be a slight change in the water taste and/or odour. The most common complaint descriptions included chlorine, chemical and earthy/dirt.

Due to varying raw surface water conditions, some Bundaberg Regional Council WSA's can experience Methylisoborneol (MIB) and Geosmin at levels above the taste threshold of 5ng/L.

When taste and/or odour complaints are received, Council contacts the customer to obtain further information regarding the matter. The latest water quality results for the WTP that supplies the water to property are checked and if no issues are identified the customer is provided information on what is

potentially causing the taste/odour issue and why it is happening. If the matter persists the customer is advised that they can contact Council and an operational crew will be sent out to flush the mains.

Suspected Illness

On occasions, complaints are received from customers who believe an illness they are experiencing may be associated with the water supply. BRC investigates all alleged illness complaints relating to its various potable water supplies, typically by testing the closest reticulation sampling point for the presence of *E. coli* and free chlorine residual levels.

During the 2022-2023 reporting year, there were no 'confirmed' cases of illness arising from the BRC water supply networks. The one (1) suspected illness complaint was a complaint where the customer 'believed' the water was responsible for their suspected illness. Review of the laboratory analysis for the water supplied to the property was within the required ADWG health limits. After the complaint was investigated by Council staff, it was recommended to the customer that they contact Queensland Health to investigate the matter further in aid of identifying the cause of the suspected illness.

8. DWQMP Review Outcomes

Council submitted the completed DWQMP regular review outcomes to the Regulator on 10 August 2022. An Information Requirement Notice (IRN) was received from DRDMW on 31 October 2022 following their assessment of the submitted DWQMP. Council submitted the required IRN response to the Regulator on 01 February 2023. See below for a summary of the IRN response made:

- A summary of the PFAS results for the on-going monitoring in groundwater raw water supply and reservoir sites has been added to Appendix B Water Quality Analysis.
- Scheme risk assessment Unmitigated Risk and Whole of System Risk Registers have been updated to capture identified heavy metal and emerging contaminant hazards/source of hazards, eg PFAS, Lead, Lanthanum.
- Clarification was provided surrounding the supplementation of drinking water to the Kalkie Water Service Area from the Bundaberg supply area.
- A summary providing additional information has been added identifying the declared non potable areas – Burnett Downs and Moore Park (Malvern Drive estate).
- Availability of operational and maintenance procedures for each water treatment plant, reservoirs and distribution networks at each WTP.
- The frequency and locations of the verification monitoring sample points in the reticulation system has been reviewed and updated to comply with the ADWG standards and the sampling frequency set by the *Public Health Regulation 2018*.
- The Operational Monitoring Tables have been updated for the Lake Monduran, Wallaville, Rocky Point, River Park and Vecellios Road water supply areas to ensure the frequency of operational monitoring is consistent throughout the plan.
- The disinfection CCP and re-chlorination OCP alert limits have been amended to align with ADWG standards.
- The sample frequency including months sampled, sample numbers, analysis parameters and analysing laboratory information for each verification monitoring program has been captured in Appendices A and B.

Council received an Information Notice issued by DRDMW on 9 May 2023 following their assessment of the submitted IRN response.

Table 4 – DWQMP Review Outcomes

Regular Review Component	Findings	Actions	Action status	Responsible Officer / Role
Regular Review Date: 30 June 2022				
Service description	Removal of Gooburrum Water Service Area	Gooburrum WSA incorporated into Bundaberg WSA, Gooburrum bore offline since January 2021	Completed, reviewed DWQMP submitted to Regulator on 10 August 2022	Governance team / Service Delivery team / External Consultant
Details of infrastructure	Asset information/descriptions including upgraded Gregory WTP, removal of Gooburrum WSA	Information reviewed and updated, creation of stand-alone Plan sections for each Water Service Area for Operators	Completed, reviewed DWQMP submitted to Regulator on 10 August 2022	Governance team / Service Delivery team / External Consultant
Catchment characteristics and water quality data	Water quality performance data 2017 to 2022	Water quality data compiled and analysed. Catchment characteristics reviewed during risk assessment workshops	Completed, reviewed DWQMP submitted to Regulator on 10 August 2022	Governance team / Service Delivery team / External Consultant
Hazard Identification and risk assessment	Risk assessment workshops	Risk assessments reviewed and updated to include catchment characteristics, hazards and hazardous events associated with source waters and process risks	Completed, reviewed DWQMP submitted to Regulator on 10 August 2022	Governance team / Service Delivery team / External Consultant
Documented procedures	Incorporated in overall document structure and layout	Document reviewed, text updated for clarity, excessive detail condensed, document more concise and user friendly	Completed, reviewed DWQMP submitted to Regulator on 10 August 2022	Governance team / Service Delivery team / External Consultant
Information management and record keeping	Incorporated in overall document structure and layout	Document reviewed, text updated for clarity, excessive detail condensed, document more concise and user friendly	Completed, reviewed DWQMP submitted to Regulator on 10 August 2022	Governance team / Service Delivery team / External Consultant
Risk Management & Record keeping	Risk management improvement actions	Risk management improvement actions reviewed to address all unacceptable risks and responsibility assigned to appropriate staff	Completed, reviewed DWQMP submitted to Regulator on 10 August 2022 Refer to Appendix B Page 27	Governance team / Service Delivery team / External Consultant
Operational monitoring	Critical Control Point and Operational Control Point procedures	CCP and QCP procedures developed for all treatment plants/schemes based on industry best practice, monitoring tables updated to ensure frequency of monitoring consistent throughout Plan	Completed, reviewed DWQMP submitted to Regulator on 10 August 2022	Governance team / Service Delivery team / Central Laboratory team / External Consultant
Verification monitoring	Verification monitoring sample sites	Sample sites reviewed to ensure compliance and accurate representation of water supplied to service area	Completed, reviewed DWQMP submitted to Regulator on 10 August 2022 Council is working to install dedicated sample points directly on the main line within all Water Service Areas.	Governance team / Central Laboratory team / External Consultant
Other	None	Not applicable	Not applicable	Not applicable

9. DWQMP Audit

No audit was required or conducted during the relevant financial year 01/07/2022 to 30/06/2023.

10. Verification Monitoring – Water Quality Information & Summary

BRC undertakes verification monitoring across the drinking water network to ensure the provision of safe and reliable drinking water to our customers. Verification monitoring sites are utilised for sample collection for several monitoring programs undertaken by Councils Central Laboratory and ALS. The quantity and location of monitoring sites is provided in the following table:

Table 5. Monitoring Site Details per WSA

Water Service Areas	Quantity of verification monitoring sites	Proposed quantity of monitoring sites	Location of verification monitoring site
Bundaberg	45	17	Section 3.1 Verification Monitoring Program of BRC's DWQMP
Kalkie	22	7	
Moore Park	7	2	
River Park	3	1	
Rocky Point	3	1	
Gregory River	24	8	
Gin Gin	8	2	
Wallaville	4	1	
Lake Monduran	1	1	

Verification monitoring for 2022-2023 has not been compliant with the verification monitoring program as stated in the BRC DWQMP *Section 10 – Operational and Verification Monitoring*. On submission of the reviewed DWQMP, Council advised the Regulator that the increase to the microbial sampling frequency within the region could not be implemented at this time and requested an extension to smoothly transition to the new monitoring program. Until the new program is implemented Council will continue with the existing initial DWQMP microbial sample monitoring program. Council has received no correspondence on this matter to date.

Council is moving away from collection of the verification water samples at private residences and will be installing dedicated sample points on the water main. Council's Water Services team is working to install forty (40) designated sample points across the region. The installation project is expected to be completed by October 2023.

To determine compliance, verification monitoring results are assessed against the following:

- ❖ Drinking water quality criteria prescribed in the *Public Health Regulation 2018*,
- ❖ Health guideline values in the ADWG (2011); and
- ❖ Water quality criteria stated in the *Water Quality and Reporting Guideline for a Drinking Water Service*.

The water quality data for 2022-2023 has been summarised in Appendix A, including the 12 month 'rolling' annual value *E.coli* compliance table. The reported statistics do not include results derived from repeat samples, or from emergency or investigative samples undertaken in response to an elevated result, as described in the ADWG (2011) section 10.3.1. 100% Microbial compliance was achieved for all BRC WSA's during the 2022-2023 financial year.

Appendix A. Summary of Compliance with Water Quality Criteria for Drinking Water

Result	Page(s)
WSA's Standard Water Analysis (SWA)	15-23
Pesticide	24
<i>E. coli</i>	25
THM's	27



Drinking water quality performance - Verification Monitoring – Bundaberg WSA

Parameter	DWQMP requirement ALL schemes/ Year	Frequency of Sampling	Total No. Samples Collected/ Year	Source	ADWG Health Value (mg/L)	No. of samples Exceeding ADWG Health Value	Comments
Microbiological							
E. coli	216	Monthly	216	Reticulation	1	0	
SPC	216	Monthly	216	Reticulation	~	~	
Faecal Coliforms	216	Monthly	216	Reticulation	~	~	
Physical							
Chlorine (Free)	216	Monthly	216	Reticulation	5	0	
pH	216	Monthly	216	Reticulation	~	~	
Conductivity	88	Quarterly	36	Reticulation	~	~	
Colour (True)	88	Quarterly	36	Reticulation	15	0	
Colour Apparent	88	Quarterly	36	Reticulation	~	~	
Turbidity	88	Quarterly	36	Reticulation	~	~	
Inorganic							
Alkalinity	88	Quarterly	36	Reticulation	~	~	
Calcium Hardness	88	Quarterly	36	Reticulation	~	~	
Chloride	88	Quarterly	36	Reticulation	~	~	
Fluoride	88	Quarterly	36	Reticulation	1.5	0	
Hardness (Total)	88	Quarterly	36	Reticulation	~	~	
Nitrate	88	Quarterly	36	Reticulation	50	0	
Nitrite	88	Quarterly	36	Reticulation	3	0	
Phosphate (Dissolved)	88	Quarterly	36	Reticulation	~	~	
Potassium	88	Quarterly	36	Reticulation	~	~	
Magnesium	88	Quarterly	36	Reticulation	~	~	
Sodium	88	Quarterly	36	Reticulation	~	~	
Sulphate	88	Quarterly	36	Reticulation	500	0	
Calcium	88	Quarterly	36	Reticulation	~	~	
Total Dissolved Solids	88	Quarterly	36	Reticulation	~	~	
Metals							
Aluminium	58	Biannual	18	Reticulation	~	~	
Antimony	58	Biannual	18	Reticulation	0.003	0	
Arsenic	58	Biannual	18	Reticulation	0.01	0	
Barium	58	Biannual	18	Reticulation	2	0	
Beryllium	58	Biannual	18	Reticulation	0.06	0	
Bismuth	58	Biannual	18	Reticulation	~	~	
Boron	58	Biannual	18	Reticulation	4	0	
Caesium	58	Biannual	18	Reticulation	~	~	
Cadmium	58	Biannual	18	Reticulation	0.002	0	
Cerium	58	Biannual	18	Reticulation	~	~	
Chromium	58	Biannual	18	Reticulation	0.05	0	
Cobalt	58	Biannual	18	Reticulation	~	~	
Copper	58	Biannual	18	Reticulation	2	0	
Dysprosium	58	Biannual	18	Reticulation	~	~	
Erbium	58	Biannual	18	Reticulation	~	~	
Gadolinium	58	Biannual	18	Reticulation	~	~	
Gallium	58	Biannual	18	Reticulation	~	~	
Hafnium	58	Biannual	18	Reticulation	~	~	
Holmium	58	Biannual	18	Reticulation	~	~	
Indium	58	Biannual	18	Reticulation	~	~	
Iron	58	Biannual	18	Reticulation	~	~	
Lanthanum	58	Biannual	18	Reticulation	0.002	1	Non-compliant sample reported to the Regulator (refer to Table 2 Page 9)

Lead	58	Biannual	18	Reticulation	0.01	1	Non-compliant sample reported to the Regulator (refer to Table 2 Page 9)
Lithium	58	Biannual	18	Reticulation	~	~	
Lutetium	58	Biannual	18	Reticulation	~	~	
Manganese	58	Biannual	18	Reticulation	0.5	0	
Molybdenum	58	Biannual	18	Reticulation	0.05	0	
Nickel	58	Biannual	18	Reticulation	0.02	0	
Neodymium	58	Biannual	18	Reticulation	~	~	
Praseodymium	58	Biannual	18	Reticulation	~	~	
Rubidium	58	Biannual	18	Reticulation	~	~	
Samarium	58	Biannual	18	Reticulation	~	~	
Selenium	58	Biannual	18	Reticulation	0.01	0	
Silver	58	Biannual	18	Reticulation	0.1	0	
Strontium	58	Biannual	18	Reticulation	~	~	
Tellurium	58	Biannual	18	Reticulation	~	~	
Terbium	58	Biannual	18	Reticulation	~	~	
Tin	58	Biannual	18	Reticulation	~	~	
Titanium	58	Biannual	18	Reticulation	~	~	
Thallium	58	Biannual	18	Reticulation	~	~	
Thorium	58	Biannual	18	Reticulation	~	~	
Thulium	58	Biannual	18	Reticulation	~	~	
Uranium	58	Biannual	18	Reticulation	0.017	0	
Vanadium	58	Biannual	18	Reticulation	~	~	
Ytterbium	58	Biannual	18	Reticulation	~	~	
Yttrium	58	Biannual	18	Reticulation	~	~	
Zinc	58	Biannual	18	Reticulation	~	~	
Zirconium	58	Biannual	18	Reticulation	~	~	
Miscellaneous							
THMs	104	Quarterly	21	Reticulation	250	0	Refer to THM Summary Table Page 26
TOCs	252	Monthly	74	Raw	~	~	
Chlorates	144	Quarterly	39	Treated	0.8 (Interim)	0	
MIB	52	Monthly/Quarterly	10	Raw	~	~	
	59		12	Treated	~	~	
Geosmin	52	Monthly/Quarterly	10	Raw	~	~	
	59		12	Treated	~	~	
Algal Count	64	Seasonal	9	Raw	~	~	
PFAS	16	Quarterly	20	Raw	0.07 (µg/L)	7	Exceedances relate to the Powers St Bore, this supply is diluted when mixed with Bourbong St Reservoir, the PFAS results in Bourbong St were compliant - with QLD Health approval.
Pesticide	32	Quarterly	4	Raw	Refer to Pesticide Summary Table Page 24		
	63	Quarterly	27	Treated			
Radiological	18 (9 ground / 9 surface)	Groundwater 2yrs Surface Water 5yr	1 (surface water)	Treated	~	~	Gross Alpha result did not exceed 0.16 Bq/L, Gross Beta result did not exceed 0.10 Bq/L

Drinking water quality performance - Verification Monitoring – Kalkie WSA

Parameter	DWQMP requirement ALL schemes/ Year	Frequency of Sampling	Total No. Samples Collected/ Year	Source	ADWG Health Value (mg/L)	No. of samples Exceeding ADWG Health Value	Comments
Microbiological							
E. coli	102	Monthly	104	Reticulation	1	0	
SPC	102	Monthly	104	Reticulation	~	~	
Faecal Coliforms	102	Monthly	104	Reticulation	~	~	
Physical							
Chlorine (Free)	102	Monthly	104	Reticulation	5	0	
pH	102	Monthly	104	Reticulation	~	~	
Conductivity	88	Quarterly	20	Reticulation	~	~	
Colour (True)	88	Quarterly	20	Reticulation	15	0	
Colour Apparent	88	Quarterly	20	Reticulation	~	~	
Turbidity	88	Quarterly	20	Reticulation	~	~	
Inorganic							
Alkalinity	88	Quarterly	20	Reticulation	~	~	
Calcium Hardness	88	Quarterly	20	Reticulation	~	~	
Chloride	88	Quarterly	20	Reticulation	~	~	
Fluoride	88	Quarterly	20	Reticulation	1.5	0	
Hardness (Total)	88	Quarterly	20	Reticulation	~	~	
Nitrate	88	Quarterly	20	Reticulation	50	0	
Nitrite	88	Quarterly	20	Reticulation	3	0	
Phosphate (Dissolved)	88	Quarterly	20	Reticulation	~	~	
Potassium	88	Quarterly	20	Reticulation	~	~	
Magnesium	88	Quarterly	20	Reticulation	~	~	
Sodium	88	Quarterly	20	Reticulation	~	~	
Sulphate	88	Quarterly	20	Reticulation	500	0	
Calcium	88	Quarterly	20	Reticulation	~	~	
Total Dissolved Solids	88	Quarterly	20	Reticulation	~	~	
Metals							
Aluminium	58	Biannual	10	Reticulation	~	~	
Antimony	58	Biannual	10	Reticulation	0.003	0	
Arsenic	58	Biannual	10	Reticulation	0.01	0	
Barium	58	Biannual	10	Reticulation	2	0	
Beryllium	58	Biannual	10	Reticulation	0.06	0	
Bismuth	58	Biannual	10	Reticulation	~	~	
Boron	58	Biannual	10	Reticulation	4	0	
Caesium	58	Biannual	10	Reticulation	~	~	
Cadmium	58	Biannual	10	Reticulation	0.002	0	
Cerium	58	Biannual	10	Reticulation	~	~	
Chromium	58	Biannual	10	Reticulation	0.05	0	
Cobalt	58	Biannual	10	Reticulation	~	~	
Copper	58	Biannual	10	Reticulation	2	0	
Dysprosium	58	Biannual	10	Reticulation	~	~	
Erbium	58	Biannual	10	Reticulation	~	~	
Gadolinium	58	Biannual	10	Reticulation	~	~	
Gallium	58	Biannual	10	Reticulation	~	~	
Hafnium	58	Biannual	10	Reticulation	~	~	
Holmium	58	Biannual	10	Reticulation	~	~	
Indium	58	Biannual	10	Reticulation	~	~	
Iron	58	Biannual	10	Reticulation	~	~	
Lanthanum	58	Biannual	10	Reticulation	0.002	0	
Lead	58	Biannual	10	Reticulation	0.01	1	Non-compliant sample reported to the Regulator (refer to Table 2 Page 9)

Lithium	58	Biannual	10	Reticulation	~	~	
Lutetium	58	Biannual	10	Reticulation	~	~	
Manganese	58	Biannual	10	Reticulation	0.5	0	
Molybdenum	58	Biannual	10	Reticulation	0.05	0	
Nickel	58	Biannual	10	Reticulation	0.02	0	
Neodymium	58	Biannual	10	Reticulation	~	~	
Praseodymium	58	Biannual	10	Reticulation	~	~	
Rubidium	58	Biannual	10	Reticulation	~	~	
Samarium	58	Biannual	10	Reticulation	~	~	
Selenium	58	Biannual	10	Reticulation	0.01	0	
Silver	58	Biannual	10	Reticulation	0.1	0	
Strontium	58	Biannual	10	Reticulation	~	~	
Tellurium	58	Biannual	10	Reticulation	~	~	
Terbium	58	Biannual	10	Reticulation	~	~	
Tin	58	Biannual	10	Reticulation	~	~	
Titanium	58	Biannual	10	Reticulation	~	~	
Thallium	58	Biannual	10	Reticulation	~	~	
Thorium	58	Biannual	10	Reticulation	~	~	
Thulium	58	Biannual	10	Reticulation	~	~	
Uranium	58	Biannual	10	Reticulation	0.017	0	
Vanadium	58	Biannual	10	Reticulation	~	~	
Ytterbium	58	Biannual	10	Reticulation	~	~	
Yttrium	58	Biannual	10	Reticulation	~	~	
Zinc	58	Biannual	10	Reticulation	~	~	
Zirconium	58	Biannual	10	Reticulation	~	~	
Miscellaneous							
THMs	104	Quarterly	17	Reticulation	250	0	Refer to THM Summary Table Page 26
TOCs	252	Monthly	81	Raw	~	~	
Chlorates	144	Quarterly	20	Treated	0.8 (Interim)	0	
MIB	52	Monthly/Quarterly	10	Raw	~	~	
	59		10	Treated	~	~	
Geosmin	52	Monthly/Quarterly	10	Raw	~	~	
	59		10	Treated	~	~	
Algal Count	64	Seasonal	8	Raw	~	~	
Pesticides	32	Quarterly	4	Raw	Refer to Pesticide Summary Table Page 24		
	63	Quarterly	4	Treated			
Radiological	18 (9 ground / 9 surface)	Surface Water 5yr	1 (surface)	Treated	~	~	Gross Alpha result did not exceed 0.16 Bq/L, Gross Beta result 0.12 Bq/L

Drinking water quality performance - Verification Monitoring – Moore Park WSA

Parameter	DWQMP requirement ALL schemes/ Year	Frequency of Sampling	Total No. Samples Collected/ Year	Source	ADWG Health Value (mg/L)	No. of samples Exceeding ADWG Health Value	Comments
Microbiological							
E. coli	60	Monthly	60	Reticulation	1	0	
SPC	60	Monthly	60	Reticulation	~	~	
Faecal Coliforms	60	Monthly	60	Reticulation	~	~	
Physical							
Chlorine (Free)	60	Monthly	60	Reticulation	5	0	
pH	60	Monthly	64	Reticulation	~	~	
Conductivity	88	Quarterly	4	Reticulation	~	~	
Colour (True)	88	Quarterly	4	Reticulation	15	0	
Colour Apparent	88	Quarterly	4	Reticulation	~	~	
Turbidity	88	Quarterly	4	Reticulation	~	~	
Inorganic							
Alkalinity	88	Quarterly	4	Reticulation	~	~	
Calcium Hardness	88	Quarterly	4	Reticulation	~	~	
Chloride	88	Quarterly	4	Reticulation	~	~	
Fluoride	88	Quarterly	4	Reticulation	1.5	0	
Hardness (Total)	88	Quarterly	4	Reticulation	~	~	
Nitrate	88	Quarterly	4	Reticulation	50	0	
Nitrite	88	Quarterly	4	Reticulation	3	0	
Phosphate (Dissolved)	88	Quarterly	4	Reticulation	~	~	
Potassium	88	Quarterly	4	Reticulation	~	~	
Magnesium	88	Quarterly	4	Reticulation	~	~	
Sodium	88	Quarterly	4	Reticulation	~	~	
Sulphate	88	Quarterly	4	Reticulation	500	0	
Calcium	88	Quarterly	4	Reticulation	~	~	
Total Dissolved Solids	88	Quarterly	4	Reticulation	~	~	
Metals							
Aluminium	58	Biannual	4	Reticulation	~	~	
Antimony	58	Biannual	4	Reticulation	0.003	0	
Arsenic	58	Biannual	4	Reticulation	0.01	0	
Barium	58	Biannual	4	Reticulation	2	0	
Beryllium	58	Biannual	4	Reticulation	0.06	0	
Bismuth	58	Biannual	4	Reticulation	~	~	
Boron	58	Biannual	4	Reticulation	4	0	
Caesium	58	Biannual	4	Reticulation	~	~	
Cadmium	58	Biannual	4	Reticulation	0.002	0	
Cerium	58	Biannual	4	Reticulation	~	~	
Chromium	58	Biannual	4	Reticulation	0.05	0	
Cobalt	58	Biannual	4	Reticulation	~	~	
Copper	58	Biannual	4	Reticulation	2	0	
Dysprosium	58	Biannual	4	Reticulation	~	~	
Erbium	58	Biannual	4	Reticulation	~	~	
Gadolinium	58	Biannual	4	Reticulation	~	~	
Gallium	58	Biannual	4	Reticulation	~	~	
Hafnium	58	Biannual	4	Reticulation	~	~	
Holmium	58	Biannual	4	Reticulation	~	~	
Indium	58	Biannual	4	Reticulation	~	~	
Iron	58	Biannual	4	Reticulation	~	~	
Lanthanum	58	Biannual	4	Reticulation	0.002	0	
Lead	58	Biannual	4	Reticulation	0.01	0	
Lithium	58	Biannual	4	Reticulation	~	~	
Lutetium	58	Biannual	4	Reticulation	~	~	

Manganese	58	Biannual	4	Reticulation	0.5	0	
Molybdenum	58	Biannual	4	Reticulation	0.05	0	
Nickel	58	Biannual	4	Reticulation	0.02	0	
Neodymium	58	Biannual	4	Reticulation	~	~	
Praseodymium	58	Biannual	4	Reticulation	~	~	
Rubidium	58	Biannual	4	Reticulation	~	~	
Samarium	58	Biannual	4	Reticulation	~	~	
Selenium	58	Biannual	4	Reticulation	0.01	0	
Silver	58	Biannual	4	Reticulation	0.1	0	
Strontium	58	Biannual	4	Reticulation	~	~	
Tellurium	58	Biannual	4	Reticulation	~	~	
Terbium	58	Biannual	4	Reticulation	~	~	
Tin	58	Biannual	4	Reticulation	~	~	
Titanium	58	Biannual	4	Reticulation	~	~	
Thallium	58	Biannual	4	Reticulation	~	~	
Thorium	58	Biannual	4	Reticulation	~	~	
Thulium	58	Biannual	4	Reticulation	~	~	
Uranium	58	Biannual	4	Reticulation	0.017	0	
Vanadium	58	Biannual	4	Reticulation	~	~	
Ytterbium	58	Biannual	4	Reticulation	~	~	
Yttrium	58	Biannual	4	Reticulation	~	~	
Zinc	58	Biannual	4	Reticulation	~	~	
Zirconium	58	Biannual	4	Reticulation	~	~	
Miscellaneous							
THMs	104	Quarterly	7	Reticulation	250	0	Refer to THM Summary Table Page 26
TOCs	252	Monthly	24	Raw	~	~	
Chlorates	144	Quarterly	4	Treated	0.8 (Interim)	0	
MIB	52	Monthly/ Quarterly	6	Raw	~	~	
	59		6	Treated	~	~	
Geosmin	52	Monthly/ Quarterly	6	Raw	~	~	
	59		6	Treated	~	~	
Algal Count	64	Seasonal	29	Raw	~	~	
Pesticides	32	Quarterly	4	Raw	Refer to Pesticide Summary Table Page 24		
	63	Quarterly	8	Treated			
Radiological	18 (9 ground / 9 surface)	Surface Water 5yr	1 (surface)	Treated	~	~	Gross Alpha result did not exceed 0.16 Bq/L, Gross Beta result did not exceed 0.10 Bq/L

Drinking water quality performance - Verification Monitoring – River Park WSA

Parameter	DWQMP requirement ALL schemes/ Year	Frequency of Sampling	Total No. Samples Collected/ Year	Source	ADWG Health Value (mg/L)	No. of samples Exceeding ADWG Health Value	Comments
Microbiological							
E. coli	24	Monthly	24	Reticulation	1	0	
SPC	24	Monthly	24	Reticulation	~	~	
Faecal Coliforms	24	Monthly	24	Reticulation	~	~	
Physical							
Chlorine (Free)	24	Monthly	24	Reticulation	5	0	
pH	24	Monthly	24	Reticulation	~	~	
Conductivity	88	Quarterly	4	Reticulation	~	~	
Colour (True)	88	Quarterly	4	Reticulation	15	0	
Colour Apparent	88	Quarterly	4	Reticulation	~	~	
Turbidity	88	Quarterly	4	Reticulation	~	~	
Inorganic							
Alkalinity	88	Quarterly	4	Reticulation	~	~	
Calcium Hardness	88	Quarterly	4	Reticulation	~	~	
Chloride	88	Quarterly	4	Reticulation	~	~	
Fluoride	88	Quarterly	4	Reticulation	1.5	0	
Hardness (Total)	88	Quarterly	4	Reticulation	~	~	
Nitrate	88	Quarterly	4	Reticulation	50	0	
Nitrite	88	Quarterly	4	Reticulation	3	0	
Phosphate (Dissolved)	88	Quarterly	4	Reticulation	~	~	
Potassium	88	Quarterly	4	Reticulation	~	~	
Magnesium	88	Quarterly	4	Reticulation	~	~	
Sodium	88	Quarterly	4	Reticulation	~	~	
Sulphate	88	Quarterly	4	Reticulation	500	0	
Calcium	88	Quarterly	4	Reticulation	~	~	
Total Dissolved Solids	88	Quarterly	4	Reticulation	~	~	
Metals							
Aluminium	58	Biannual	2	Reticulation	~	~	
Antimony	58	Biannual	2	Reticulation	0.003	0	
Arsenic	58	Biannual	2	Reticulation	0.01	0	
Barium	58	Biannual	2	Reticulation	2	0	
Beryllium	58	Biannual	2	Reticulation	0.06	0	
Bismuth	58	Biannual	2	Reticulation	~	~	
Boron	58	Biannual	2	Reticulation	4	0	
Caesium	58	Biannual	2	Reticulation	~	~	
Cadmium	58	Biannual	2	Reticulation	0.002	0	
Cerium	58	Biannual	2	Reticulation	~	~	
Chromium	58	Biannual	2	Reticulation	0.05	0	
Cobalt	58	Biannual	2	Reticulation	~	~	
Copper	58	Biannual	2	Reticulation	2	0	
Dysprosium	58	Biannual	2	Reticulation	~	~	
Erbium	58	Biannual	2	Reticulation	~	~	
Gadolinium	58	Biannual	2	Reticulation	~	~	
Gallium	58	Biannual	2	Reticulation	~	~	
Hafnium	58	Biannual	2	Reticulation	~	~	
Holmium	58	Biannual	2	Reticulation	~	~	
Indium	58	Biannual	2	Reticulation	~	~	
Iron	58	Biannual	2	Reticulation	~	~	
Lanthanum	58	Biannual	2	Reticulation	0.002	0	
Lead	58	Biannual	2	Reticulation	0.01	0	
Lithium	58	Biannual	2	Reticulation	~	~	
Lutetium	58	Biannual	2	Reticulation	~	~	

Manganese	58	Biannual	2	Reticulation	0.5	0	
Molybdenum	58	Biannual	2	Reticulation	0.05	0	
Nickel	58	Biannual	2	Reticulation	0.02	0	
Neodymium	58	Biannual	2	Reticulation	~	~	
Praseodymium	58	Biannual	2	Reticulation	~	~	
Rubidium	58	Biannual	2	Reticulation	~	~	
Samarium	58	Biannual	2	Reticulation	~	~	
Selenium	58	Biannual	2	Reticulation	0.01	0	
Silver	58	Biannual	2	Reticulation	0.1	0	
Strontium	58	Biannual	2	Reticulation	~	~	
Tellurium	58	Biannual	2	Reticulation	~	~	
Terbium	58	Biannual	2	Reticulation	~	~	
Tin	58	Biannual	2	Reticulation	~	~	
Titanium	58	Biannual	2	Reticulation	~	~	
Thallium	58	Biannual	2	Reticulation	~	~	
Thorium	58	Biannual	2	Reticulation	~	~	
Thulium	58	Biannual	2	Reticulation	~	~	
Uranium	58	Biannual	2	Reticulation	0.017	0	
Vanadium	58	Biannual	2	Reticulation	~	~	
Ytterbium	58	Biannual	2	Reticulation	~	~	
Yttrium	58	Biannual	2	Reticulation	~	~	
Zinc	58	Biannual	2	Reticulation	~	~	
Zirconium	58	Biannual	2	Reticulation	~	~	
Miscellaneous							
THMs	104	Quarterly	7	Reticulation	250	0	Refer to THM Summary Table Page 26
TOCs	252	Monthly	24	Raw	~	~	
Chlorates	144	Quarterly	4	Treated	0.8 (Interim)	0	
MIB	52	Monthly/ Quarterly	6	Raw	~	~	
	59		6	Treated	~	~	
Geosmin	52	Monthly/ Quarterly	6	Raw	~	~	
	59		6	Treated	~	~	
Algal Count	64	Seasonal	8	Raw	~	~	
Pesticide	32	Quarterly	4	Raw	Refer to Pesticide Summary Table Page 24		
	63	Quarterly	4	Treated			
Radiological	18 (9 ground / 9 surface)	Surface Water 5yr	1 (surface)	Treated	~	~	Gross Alpha result did not exceed 0.16 Bq/L, Gross Beta result 0.15 Bq/L

Drinking water quality performance - Verification Monitoring – Rocky Point WSA

Parameter	DWQMP requirement ALL schemes/ Year	Frequency of Sampling	Total No. Samples Collected/ Year	Source	ADWG Health Value (mg/L)	No. of samples Exceeding ADWG Health Value	Comments
Microbiological							
E. coli	24	Monthly	24	Reticulation	1	0	
SPC	24	Monthly	24	Reticulation	~	~	
Faecal Coliforms	24	Monthly	24	Reticulation	~	~	
Physical							
Chlorine (Free)	24	Monthly	24	Reticulation	5	0	
pH	24	Monthly	24	Reticulation	~	~	
Conductivity	88	Quarterly	4	Reticulation	~	~	
Colour (True)	88	Quarterly	4	Reticulation	15	0	
Colour Apparent	88	Quarterly	4	Reticulation	~	~	
Turbidity	88	Quarterly	4	Reticulation	~	~	
Inorganic							
Alkalinity	88	Quarterly	4	Reticulation	~	~	
Calcium Hardness	88	Quarterly	4	Reticulation	~	~	
Chloride	88	Quarterly	4	Reticulation	~	~	
Fluoride	88	Quarterly	4	Reticulation	1.5	0	
Hardness (Total)	88	Quarterly	4	Reticulation	~	~	
Nitrate	88	Quarterly	4	Reticulation	50	0	
Nitrite	88	Quarterly	4	Reticulation	3	0	
Phosphate (Dissolved)	88	Quarterly	4	Reticulation	~	~	
Potassium	88	Quarterly	4	Reticulation	~	~	
Magnesium	88	Quarterly	4	Reticulation	~	~	
Sodium	88	Quarterly	4	Reticulation	~	~	
Sulphate	88	Quarterly	4	Reticulation	500	0	
Calcium	88	Quarterly	4	Reticulation	~	~	
Total Dissolved Solids	88	Quarterly	4	Reticulation	~	~	
Metals							
Aluminium	58	Biannual	2	Reticulation	~	~	
Antimony	58	Biannual	2	Reticulation	0.003	0	
Arsenic	58	Biannual	2	Reticulation	0.01	0	
Barium	58	Biannual	2	Reticulation	2	0	
Beryllium	58	Biannual	2	Reticulation	0.06	0	
Bismuth	58	Biannual	2	Reticulation	~	~	
Boron	58	Biannual	2	Reticulation	4	0	
Caesium	58	Biannual	2	Reticulation	~	~	
Cadmium	58	Biannual	2	Reticulation	0.002	0	
Cerium	58	Biannual	2	Reticulation	~	~	
Chromium	58	Biannual	2	Reticulation	0.05	0	
Cobalt	58	Biannual	2	Reticulation	~	~	
Copper	58	Biannual	2	Reticulation	2	0	
Dysprosium	58	Biannual	2	Reticulation	~	~	
Erbium	58	Biannual	2	Reticulation	~	~	
Gadolinium	58	Biannual	2	Reticulation	~	~	
Gallium	58	Biannual	2	Reticulation	~	~	
Hafnium	58	Biannual	2	Reticulation	~	~	
Holmium	58	Biannual	2	Reticulation	~	~	
Indium	58	Biannual	2	Reticulation	~	~	
Iron	58	Biannual	2	Reticulation	~	~	
Lanthanum	58	Biannual	2	Reticulation	0.002	0	
Lead	58	Biannual	2	Reticulation	0.01	0	
Lithium	58	Biannual	2	Reticulation	~	~	
Lutetium	58	Biannual	2	Reticulation	~	~	

Manganese	58	Biannual	2	Reticulation	0.5	0	
Molybdenum	58	Biannual	2	Reticulation	0.05	0	
Nickel	58	Biannual	2	Reticulation	0.02	0	
Neodymium	58	Biannual	2	Reticulation	~	~	
Praseodymium	58	Biannual	2	Reticulation	~	~	
Rubidium	58	Biannual	2	Reticulation	~	~	
Samarium	58	Biannual	2	Reticulation	~	~	
Selenium	58	Biannual	2	Reticulation	0.01	0	
Silver	58	Biannual	2	Reticulation	0.1	0	
Strontium	58	Biannual	2	Reticulation	~	~	
Tellurium	58	Biannual	2	Reticulation	~	~	
Terbium	58	Biannual	2	Reticulation	~	~	
Tin	58	Biannual	2	Reticulation	~	~	
Titanium	58	Biannual	2	Reticulation	~	~	
Thallium	58	Biannual	2	Reticulation	~	~	
Thorium	58	Biannual	2	Reticulation	~	~	
Thulium	58	Biannual	2	Reticulation	~	~	
Uranium	58	Biannual	2	Reticulation	0.017	0	
Vanadium	58	Biannual	2	Reticulation	~	~	
Ytterbium	58	Biannual	2	Reticulation	~	~	
Yttrium	58	Biannual	2	Reticulation	~	~	
Zinc	58	Biannual	2	Reticulation	~	~	
Zirconium	58	Biannual	2	Reticulation	~	~	
Miscellaneous							
THMs	104	Quarterly	4	Reticulation	250	0	Refer to THM Summary Table Page 26
TOCs	252	Monthly	24	Raw	~	~	
Chlorates	144	Quarterly	4	Treated	0.8 (Interim)	0	
Pesticide	63	Quarterly	4	Treated	Refer to Pesticide Summary Table 24		
Radiological	18 (9 ground / 9 surface)	Groundwater 2yrs	Radiological sampling for groundwater plants not undertaken in 2022/23				

Drinking water quality performance - Verification Monitoring – Gregory River WSA

Parameter	DWQMP requirement ALL schemes/ Year	Frequency of Sampling	Total No. Samples Collected/ Year	Source	ADWG Health Value (mg/L)	No. of samples Exceeding ADWG Health Value	Comments
Microbiological							
E. coli	156	Monthly	156	Reticulation	1	0	
SPC	156	Monthly	156	Reticulation	~	~	
Faecal Coliforms	156	Monthly	156	Reticulation	~	~	
Physical							
Chlorine (Free)	156	Monthly	156	Reticulation	5	0	
pH	156	Monthly	156	Reticulation	~	~	
Conductivity	88	Quarterly	8	Reticulation	~	~	
Colour (True)	88	Quarterly	8	Reticulation	15	0	
Colour Apparent	88	Quarterly	8	Reticulation	~	~	
Turbidity	88	Quarterly	8	Reticulation	~	~	
Inorganic							
Alkalinity	88	Quarterly	8	Reticulation	~	~	
Calcium Hardness	88	Quarterly	8	Reticulation	~	~	
Chloride	88	Quarterly	8	Reticulation	~	~	
Fluoride	88	Quarterly	8	Reticulation	1.5	0	
Hardness (Total)	88	Quarterly	8	Reticulation	~	~	
Nitrate	88	Quarterly	8	Reticulation	50	0	
Nitrite	88	Quarterly	8	Reticulation	3	0	
Phosphate (Dissolved)	88	Quarterly	8	Reticulation	~	~	
Potassium	88	Quarterly	8	Reticulation	~	~	
Magnesium	88	Quarterly	8	Reticulation	~	~	
Sodium	88	Quarterly	8	Reticulation	~	~	
Sulphate	88	Quarterly	8	Reticulation	500	0	
Calcium	88	Quarterly	8	Reticulation	~	~	
Total Dissolved Solids	88	Quarterly	8	Reticulation	~	~	
Metals							
Aluminium	58	Biannual	8	Reticulation	~	~	
Antimony	58	Biannual	8	Reticulation	0.003	0	
Arsenic	58	Biannual	8	Reticulation	0.01	0	
Barium	58	Biannual	8	Reticulation	2	0	
Beryllium	58	Biannual	8	Reticulation	0.06	0	
Bismuth	58	Biannual	8	Reticulation	~	~	
Boron	58	Biannual	8	Reticulation	4	0	
Caesium	58	Biannual	8	Reticulation	~	~	
Cadmium	58	Biannual	8	Reticulation	0.002	0	
Cerium	58	Biannual	8	Reticulation	~	~	
Chromium	58	Biannual	8	Reticulation	0.05	0	
Cobalt	58	Biannual	8	Reticulation	~	~	
Copper	58	Biannual	8	Reticulation	2	0	
Dysprosium	58	Biannual	8	Reticulation	~	~	
Erbium	58	Biannual	8	Reticulation	~	~	
Gadolinium	58	Biannual	8	Reticulation	~	~	
Gallium	58	Biannual	8	Reticulation	~	~	
Hafnium	58	Biannual	8	Reticulation	~	~	
Holmium	58	Biannual	8	Reticulation	~	~	
Indium	58	Biannual	8	Reticulation	~	~	
Iron	58	Biannual	8	Reticulation	~	~	
Lanthanum	58	Biannual	8	Reticulation	0.002	0	
Lead	58	Biannual	8	Reticulation	0.01	0	
Lithium	58	Biannual	8	Reticulation	~	~	
Lutetium	58	Biannual	8	Reticulation	~	~	

Manganese	58	Biannual	8	Reticulation	0.5	0	
Molybdenum	58	Biannual	8	Reticulation	0.05	0	
Nickel	58	Biannual	8	Reticulation	0.02	0	
Neodymium	58	Biannual	8	Reticulation	~	~	
Praseodymium	58	Biannual	8	Reticulation	~	~	
Rubidium	58	Biannual	8	Reticulation	~	~	
Samarium	58	Biannual	8	Reticulation	~	~	
Selenium	58	Biannual	8	Reticulation	0.01	0	
Silver	58	Biannual	8	Reticulation	0.1	0	
Strontium	58	Biannual	8	Reticulation	~	~	
Tellurium	58	Biannual	8	Reticulation	~	~	
Terbium	58	Biannual	8	Reticulation	~	~	
Tin	58	Biannual	8	Reticulation	~	~	
Titanium	58	Biannual	8	Reticulation	~	~	
Thallium	58	Biannual	8	Reticulation	~	~	
Thorium	58	Biannual	8	Reticulation	~	~	
Thulium	58	Biannual	8	Reticulation	~	~	
Uranium	58	Biannual	8	Reticulation	0.017	0	
Vanadium	58	Biannual	8	Reticulation	~	~	
Ytterbium	58	Biannual	8	Reticulation	~	~	
Yttrium	58	Biannual	8	Reticulation	~	~	
Zinc	58	Biannual	8	Reticulation	~	~	
Zirconium	58	Biannual	8	Reticulation	~	~	
Miscellaneous							
THMs	104	Quarterly	15	Reticulation	250	0	Refer to THM Summary Table Page 26
TOCs	252	Monthly	36	Raw	~	~	
Chlorates	144	Quarterly	92	Treated	0.8 (Interim)	0	
MIB	52	Monthly/ Quarterly	4	Raw	~	~	
	59		4	Treated	~	~	
Geosmin	52	Monthly/ Quarterly	4	Raw	~	~	
	59		4	Treated	~	~	
Algal Count	64	Seasonal	12	Raw	~	~	
Pesticides	32	Quarterly	4	Raw	Refer to Pesticide Summary Table Page 24		
	63	Quarterly	4	Treated			
Radiological	18 (9 ground / 9 surface)	Surface Water 5yr	2 (surface)	Treated	~	~	Gross Alpha results did not exceed 0.16 Bq/L, Gross Beta results 0.14 Bq/L and 0.12 Bq/L

Drinking water quality performance - Verification Monitoring – Gin Gin WSA

Parameter	DWQMP requirement ALL schemes/ Year	Frequency of Sampling	Total No. Samples Collected/ Year	Source	ADWG Health Value (mg/L)	No. of samples Exceeding ADWG Health Value	Comments
Microbiological							
E. coli	60	Monthly	60	Reticulation	1	0	
SPC	60	Monthly	60	Reticulation	~	~	
Faecal Coliforms	60	Monthly	60	Reticulation	~	~	
Physical							
Chlorine (Free)	60	Monthly	60	Reticulation	5	0	
pH	60	Monthly	60	Reticulation	~	~	
Conductivity	88	Quarterly	4	Reticulation	~	~	
Colour (True)	88	Quarterly	4	Reticulation	15	0	
Colour Apparent	88	Quarterly	4	Reticulation	~	~	
Turbidity	88	Quarterly	4	Reticulation	~	~	
Inorganic							
Alkalinity	88	Quarterly	4	Reticulation	~	~	
Calcium Hardness	88	Quarterly	4	Reticulation	~	~	
Chloride	88	Quarterly	4	Reticulation	~	~	
Fluoride	88	Quarterly	4	Reticulation	1.5	0	
Hardness (Total)	88	Quarterly	4	Reticulation	~	~	
Nitrate	88	Quarterly	4	Reticulation	50	0	
Nitrite	88	Quarterly	4	Reticulation	3	0	
Phosphate (Dissolved)	88	Quarterly	4	Reticulation	~	~	
Potassium	88	Quarterly	4	Reticulation	~	~	
Magnesium	88	Quarterly	4	Reticulation	~	~	
Sodium	88	Quarterly	4	Reticulation	~	~	
Sulphate	88	Quarterly	4	Reticulation	500	0	
Calcium	88	Quarterly	4	Reticulation	~	~	
Total Dissolved Solids	88	Quarterly	4	Reticulation	~	~	
Metals							
Aluminium	58	Biannual	4	Reticulation	~	~	
Antimony	58	Biannual	4	Reticulation	0.003	0	
Arsenic	58	Biannual	4	Reticulation	0.01	0	
Barium	58	Biannual	4	Reticulation	2	0	
Beryllium	58	Biannual	4	Reticulation	0.06	0	
Bismuth	58	Biannual	4	Reticulation	~	~	
Boron	58	Biannual	4	Reticulation	4	0	
Caesium	58	Biannual	4	Reticulation	~	~	
Cadmium	58	Biannual	4	Reticulation	0.002	0	
Cerium	58	Biannual	4	Reticulation	~	~	
Chromium	58	Biannual	4	Reticulation	0.05	0	
Cobalt	58	Biannual	4	Reticulation	~	~	
Copper	58	Biannual	4	Reticulation	2	0	
Dysprosium	58	Biannual	4	Reticulation	~	~	
Erbium	58	Biannual	4	Reticulation	~	~	
Gadolinium	58	Biannual	4	Reticulation	~	~	
Gallium	58	Biannual	4	Reticulation	~	~	
Hafnium	58	Biannual	4	Reticulation	~	~	
Holmium	58	Biannual	4	Reticulation	~	~	
Indium	58	Biannual	4	Reticulation	~	~	
Iron	58	Biannual	4	Reticulation	~	~	
Lanthanum	58	Biannual	4	Reticulation	0.002	0	
Lead	58	Biannual	4	Reticulation	0.01	0	
Lithium	58	Biannual	4	Reticulation	~	~	
Lutetium	58	Biannual	4	Reticulation	~	~	

Manganese	58	Biannual	4	Reticulation	0.5	0	
Molybdenum	58	Biannual	4	Reticulation	0.05	0	
Nickel	58	Biannual	4	Reticulation	0.02	0	
Neodymium	58	Biannual	4	Reticulation	~	~	
Praseodymium	58	Biannual	4	Reticulation	~	~	
Rubidium	58	Biannual	4	Reticulation	~	~	
Samarium	58	Biannual	4	Reticulation	~	~	
Selenium	58	Biannual	4	Reticulation	0.01	0	
Silver	58	Biannual	4	Reticulation	0.1	0	
Strontium	58	Biannual	4	Reticulation	~	~	
Tellurium	58	Biannual	4	Reticulation	~	~	
Terbium	58	Biannual	4	Reticulation	~	~	
Tin	58	Biannual	4	Reticulation	~	~	
Titanium	58	Biannual	4	Reticulation	~	~	
Thallium	58	Biannual	4	Reticulation	~	~	
Thorium	58	Biannual	4	Reticulation	~	~	
Thulium	58	Biannual	4	Reticulation	~	~	
Uranium	58	Biannual	4	Reticulation	0.017	0	
Vanadium	58	Biannual	4	Reticulation	~	~	
Ytterbium	58	Biannual	4	Reticulation	~	~	
Yttrium	58	Biannual	4	Reticulation	~	~	
Zinc	58	Biannual	4	Reticulation	~	~	
Zirconium	58	Biannual	4	Reticulation	~	~	
Miscellaneous							
THMs	104	Quarterly	7	Reticulation	250	0	Refer to THM Summary Table Page 26
TOCs	252	Monthly	35	Raw	~	~	
Chlorates	144	Quarterly	4	Treated	0.8 (Interim)	0	
MIB	52	Monthly/ Quarterly	10	Raw	~	~	
	59		11	Treated	~	~	
Geosmin	52	Monthly/ Quarterly	10	Raw	~	~	
	59		11	Treated	~	~	
Algal Count	64	Seasonal	8	Raw	~	~	
Pesticides	32	Quarterly	4	Raw	Refer to Pesticide Summary Table Page 24		
	63	Quarterly	4	Treated			
Radiological	18 (9 ground / 9 surface)	Groundwater 2yrs Surface Water 5yr	1 (surface water)	Treated	~	~	Gross Alpha result did not exceed 0.16 Bq/L, Gross Beta result did not exceed 0.10 Bq/L

Drinking water quality performance - Verification Monitoring – Wallaville WSA

Parameter	DWQMP requirement ALL schemes/ Year	Frequency of Sampling	Total No. Samples Collected/ Year	Source	ADWG Health Value (mg/L)	No. of samples Exceeding ADWG Health Value	Comments
Microbiological							
E. coli	36	Monthly	36	Reticulation	1	0	
SPC	36	Monthly	36	Reticulation	~	~	
Faecal Coliforms	36	Monthly	36	Reticulation	~	~	
Physical							
Chlorine (Free)	36	Monthly	36	Reticulation	5	2	Two of three sample points tested above 5.0mg/L, sample/environmental contamination issue, resamples compliant, internal incident
pH	36	Monthly	36	Reticulation	~	~	
Conductivity	88	Quarterly	4	Reticulation	~	~	
Colour (True)	88	Quarterly	4	Reticulation	15	0	
Colour Apparent	88	Quarterly	4	Reticulation	~	~	
Turbidity	88	Quarterly	4	Reticulation	~	~	
Inorganic							
Alkalinity	88	Quarterly	4	Reticulation	~	~	
Calcium Hardness	88	Quarterly	4	Reticulation	~	~	
Chloride	88	Quarterly	4	Reticulation	~	~	
Fluoride	88	Quarterly	4	Reticulation	1.5	0	
Hardness (Total)	88	Quarterly	4	Reticulation	~	~	
Nitrate	88	Quarterly	4	Reticulation	50	0	
Nitrite	88	Quarterly	4	Reticulation	3	0	
Phosphate (Dissolved)	88	Quarterly	4	Reticulation	~	~	
Potassium	88	Quarterly	4	Reticulation	~	~	
Magnesium	88	Quarterly	4	Reticulation	~	~	
Sodium	88	Quarterly	4	Reticulation	~	~	
Sulphate	88	Quarterly	4	Reticulation	500	0	
Calcium	88	Quarterly	4	Reticulation	~	~	
Total Dissolved Solids	88	Quarterly	4	Reticulation	~	~	
Metals							
Aluminium	58	Biannual	8	Reticulation	~	~	
Antimony	58	Biannual	8	Reticulation	0.003	0	
Arsenic	58	Biannual	8	Reticulation	0.01	0	
Barium	58	Biannual	8	Reticulation	2	0	
Beryllium	58	Biannual	8	Reticulation	0.06	0	
Bismuth	58	Biannual	8	Reticulation	~	~	
Boron	58	Biannual	8	Reticulation	4	0	
Caesium	58	Biannual	8	Reticulation	~	~	
Cadmium	58	Biannual	8	Reticulation	0.002	0	
Cerium	58	Biannual	8	Reticulation	~	~	
Chromium	58	Biannual	8	Reticulation	0.05	0	
Cobalt	58	Biannual	8	Reticulation	~	~	
Copper	58	Biannual	8	Reticulation	2	0	
Dysprosium	58	Biannual	8	Reticulation	~	~	
Erbium	58	Biannual	8	Reticulation	~	~	
Gadolinium	58	Biannual	8	Reticulation	~	~	
Gallium	58	Biannual	8	Reticulation	~	~	
Hafnium	58	Biannual	8	Reticulation	~	~	
Holmium	58	Biannual	8	Reticulation	~	~	
Indium	58	Biannual	8	Reticulation	~	~	
Iron	58	Biannual	8	Reticulation	~	~	

Lanthanum	58	Biannual	8	Reticulation	0.002	0	
Lead	58	Biannual	8	Reticulation	0.01	0	
Lithium	58	Biannual	8	Reticulation	~	~	
Lutetium	58	Biannual	8	Reticulation	~	~	
Manganese	58	Biannual	8	Reticulation	0.5	0	
Molybdenum	58	Biannual	8	Reticulation	0.05	0	
Nickel	58	Biannual	8	Reticulation	0.02	0	
Neodymium	58	Biannual	8	Reticulation	~	~	
Praseodymium	58	Biannual	8	Reticulation	~	~	
Rubidium	58	Biannual	8	Reticulation	~	~	
Samarium	58	Biannual	8	Reticulation	~	~	
Selenium	58	Biannual	8	Reticulation	0.01	0	
Silver	58	Biannual	8	Reticulation	0.1	0	
Strontium	58	Biannual	8	Reticulation	~	~	
Tellurium	58	Biannual	8	Reticulation	~	~	
Terbium	58	Biannual	8	Reticulation	~	~	
Tin	58	Biannual	8	Reticulation	~	~	
Titanium	58	Biannual	8	Reticulation	~	~	
Thallium	58	Biannual	8	Reticulation	~	~	
Thorium	58	Biannual	8	Reticulation	~	~	
Thulium	58	Biannual	8	Reticulation	~	~	
Uranium	58	Biannual	8	Reticulation	0.017	0	
Vanadium	58	Biannual	8	Reticulation	~	~	
Ytterbium	58	Biannual	8	Reticulation	~	~	
Yttrium	58	Biannual	8	Reticulation	~	~	
Zinc	58	Biannual	8	Reticulation	~	~	
Zirconium	58	Biannual	8	Reticulation	~	~	
Miscellaneous							
THMs	104	Quarterly	7	Reticulation	250	0	Refer to THM Summary Table Page 26
TOCs	252	Monthly	36	Raw	~	~	
Chlorates	144	Quarterly	8	Treated	0.8 (Interim)	0	
MIB	52	Monthly/Quarterly	4	Raw	~	~	
	59		4	Treated	~	~	
Geosmin	52	Monthly/Quarterly	4	Raw	~	~	
	59		4	Treated	~	~	
Algal Count	64	Seasonal	8	Raw	~	~	
Pesticides	32	Quarterly	4	Raw	Refer to Pesticide Summary Table Page 24		
	63	Quarterly	4	Treated			
Radiological	18 (9 ground / 9 surface)	Groundwater 2yrs Surface Water 5yr	1 (surface water)	Treated	~	~	Gross Alpha result did not exceed 0.16 Bq/L, Gross Beta result 0.13 Bq/L

Drinking water quality performance - Verification Monitoring – Lake Monduran WSA

Parameter	DWQMP requirement ALL schemes/ Year	Frequency of Sampling	Total No. Samples Collected/ Year	Source	ADWG Health Value (mg/L)	No. of samples Exceeding ADWG Health Value	Comments
Microbiological							
E. coli	12	Monthly	12	Reticulation	1	0	
SPC	12	Monthly	12	Reticulation	~	~	
Faecal Coliforms	12	Monthly	12	Reticulation	~	~	
Physical							
Chlorine (Free)	12	Monthly	12	Reticulation	5	0	
pH	12	Monthly	12	Reticulation	~	~	
Conductivity	88	Quarterly	4	Reticulation	~	~	
Colour (True)	88	Quarterly	4	Reticulation	15	0	
Colour Apparent	88	Quarterly	4	Reticulation	~	~	
Turbidity	88	Quarterly	4	Reticulation	~	~	
Inorganic							
Alkalinity	88	Quarterly	4	Reticulation	~	~	
Calcium Hardness	88	Quarterly	4	Reticulation	~	~	
Chloride	88	Quarterly	4	Reticulation	~	~	
Fluoride	88	Quarterly	4	Reticulation	1.5	0	
Hardness (Total)	88	Quarterly	4	Reticulation	~	~	
Nitrate	88	Quarterly	4	Reticulation	50	0	
Nitrite	88	Quarterly	4	Reticulation	3	0	
Phosphate (Dissolved)	88	Quarterly	4	Reticulation	~	~	
Potassium	88	Quarterly	4	Reticulation	~	~	
Magnesium	88	Quarterly	4	Reticulation	~	~	
Sodium	88	Quarterly	4	Reticulation	~	~	
Sulphate	88	Quarterly	4	Reticulation	500	0	
Calcium	88	Quarterly	4	Reticulation	~	~	
Total Dissolved Solids	88	Quarterly	4	Reticulation	~	~	
Metals							
Aluminium	58	Biannual	2	Reticulation	~	~	
Antimony	58	Biannual	2	Reticulation	0.003	0	
Arsenic	58	Biannual	2	Reticulation	0.01	0	
Barium	58	Biannual	2	Reticulation	2	0	
Beryllium	58	Biannual	2	Reticulation	0.06	0	
Bismuth	58	Biannual	2	Reticulation	~	~	
Boron	58	Biannual	2	Reticulation	4	0	
Caesium	58	Biannual	2	Reticulation	~	~	
Cadmium	58	Biannual	2	Reticulation	0.002	0	
Cerium	58	Biannual	2	Reticulation	~	~	
Chromium	58	Biannual	2	Reticulation	0.05	0	
Cobalt	58	Biannual	2	Reticulation	~	~	
Copper	58	Biannual	2	Reticulation	2	0	
Dysprosium	58	Biannual	2	Reticulation	~	~	
Erbium	58	Biannual	2	Reticulation	~	~	
Gadolinium	58	Biannual	2	Reticulation	~	~	
Gallium	58	Biannual	2	Reticulation	~	~	
Hafnium	58	Biannual	2	Reticulation	~	~	
Holmium	58	Biannual	2	Reticulation	~	~	
Indium	58	Biannual	2	Reticulation	~	~	
Iron	58	Biannual	2	Reticulation	~	~	
Lanthanum	58	Biannual	2	Reticulation	0.002	0	
Lead	58	Biannual	2	Reticulation	0.01	0	
Lithium	58	Biannual	2	Reticulation	~	~	
Lutetium	58	Biannual	2	Reticulation	~	~	

Manganese	58	Biannual	2	Reticulation	0.5	0	
Molybdenum	58	Biannual	2	Reticulation	0.05	0	
Nickel	58	Biannual	2	Reticulation	0.02	0	
Neodymium	58	Biannual	2	Reticulation	~	~	
Praseodymium	58	Biannual	2	Reticulation	~	~	
Rubidium	58	Biannual	2	Reticulation	~	~	
Samarium	58	Biannual	2	Reticulation	~	~	
Selenium	58	Biannual	2	Reticulation	0.01	0	
Silver	58	Biannual	2	Reticulation	0.1	0	
Strontium	58	Biannual	2	Reticulation	~	~	
Tellurium	58	Biannual	2	Reticulation	~	~	
Terbium	58	Biannual	2	Reticulation	~	~	
Tin	58	Biannual	2	Reticulation	~	~	
Titanium	58	Biannual	2	Reticulation	~	~	
Thallium	58	Biannual	2	Reticulation	~	~	
Thorium	58	Biannual	2	Reticulation	~	~	
Thulium	58	Biannual	2	Reticulation	~	~	
Uranium	58	Biannual	2	Reticulation	0.017	0	
Vanadium	58	Biannual	2	Reticulation	~	~	
Ytterbium	58	Biannual	2	Reticulation	~	~	
Yttrium	58	Biannual	2	Reticulation	~	~	
Zinc	58	Biannual	2	Reticulation	~	~	
Zirconium	58	Biannual	2	Reticulation	~	~	
Miscellaneous							
THMs	104	Quarterly	24	Reticulation	250	3	Refer to THM Summary Table Page 26 and Table 2 Page 9
TOCs	252	Monthly	36	Raw	~	~	
Chlorates	144	Quarterly	4	Treated	0.8 (Interim)	1	Non-compliant sample reported to the Regulator (refer to Table 2 Page 9)
MIB	52	Monthly/Quarterly	6	Raw	~	~	
	59		6	Treated	~	~	
Geosmin	52	Monthly/Quarterly	6	Raw	~	~	
	59		6	Treated	~	~	
Algal Count	64	Seasonal	8	Raw	~	~	
Pesticides	29	Quarterly	4	Raw	Refer to Pesticide Summary Table Page 24		
	60	Quarterly	4	Treated			
Radiological	18 (9 ground / 9 surface)	Groundwater 2yrs Surface Water 5yr	1 (surface water)	Treated	~	~	Gross Alpha result did not exceed 0.16 Bq/L, Gross Beta result did not exceed 0.10 Bq/L

Verification Monitoring Results - All WSA's July 2022 - June 2023 - Pesticides Detected

Scheme Name	Scheme Component	Parameter	Laboratory Name	Unit of Measure	Limit of Reporting	Frequency of Sampling	Total No. samples collected	No. of Samples in which parameter Detected	ADWG Health Value (µg/L)	No. of samples exceeding ADWG Health Value	Min Value (µg/L)	Max Value (µg/L)
Bundaberg WSA	Branyan WTP Reservoir	Atrazine	ALS	µg/L	0.02	Quarterly	27	1	20	0	<0.02	0.03
		Atrazine, 2-hydroxy*	ALS	µg/L	0.01			1	NA		<0.01	0.02
		Dalapon 2,2-DPA	ALS	µg/L	0.2			4	500		0.5	1.3
		DEET*	ALS	µg/L	0.01			1	NA		<0.01	0.01
		Hexazinone	ALS	µg/L	0.01			2	400		<0.01	0.02
		Imazapic*	ALS	µg/L	0.01			1	NA		<0.01	0.01
		Metolachlor	ALS	µg/L	0.01			2	300		<0.01	0.13
		Metolachlor-OXA*	ALS	µg/L	0.01			1	NA		<0.05	0.17
		Tebuthiuron*	ALS	µg/L	0.02			4	NA		0.07	0.21
	Heaps St Reservoir	Bromacil	ALS	µg/L	0.02			3	400		<0.02	0.17
Power St Reservoir	Fipronil amide*	ALS	µg/L	0.02	2	NA	<0.02	0.03				
		N-Butylbenzenesulfonamide*	ALS	µg/L	0.05	4	NA	0.02	0.03			
							1	NA	<0.05	0.29		
Gin Gin WSA	Gin Gin Reservoir	Dalapon 2,2-DPA	ALS	µg/L	0.2	Quarterly	4	4	500	0	1.8	3.1
Gregory River WSA	Gregory Reservoir	Dalapon 2,2-DPA	ALS	µg/L	0.2	Quarterly	4	4	500	0	0.5	2.2
Kalkie WSA	Kalkie Reservoir	Atrazine	ALS	µg/L	0.02	Quarterly	4	1	20	0	<0.02	0.05
		Atrazine, 2-hydroxy*	ALS	µg/L	0.01			4	NA		0.01	0.03
		Dalapon 2,2-DPA	ALS	µg/L	0.2			4	500		0.5	1.7
		Hexazinone	ALS	µg/L	0.01			4	400		0.01	0.02
		Metolachlor	ALS	µg/L	0.01			3	300		<0.01	0.14
		Metolachlor-OXA*	ALS	µg/L	0.01			1	NA		<0.05	0.20
		Pendimethalin	ALS	µg/L	0.02			1	400		<0.02	0.03
		Tebuthiuron*	ALS	µg/L	0.02			4	NA		0.12	0.81
Lake Monduran WSA	Monduran Reservoir	Dalapon 2,2-DPA	ALS	µg/L	0.2	Quarterly	4	4	500	0	3.6	5.1
Moore Park WSA	Murdochs Rd Groundwater Reservoir	Imidacloprid*	ALS	µg/L	0.02	Quarterly	8	4	NA	0	0.04	0.05
		Total Imidacloprid*	ALS	µg/L	0.05			2	NA		<0.05	0.05
	Vecellios Rd Reservoir	Atrazine	ALS	µg/L	0.02			4	20		0.08	0.59
		Atrazine, 2-hydroxy*	ALS	µg/L	0.01			4	NA		0.11	0.17
		Dalapon 2,2-DPA	ALS	µg/L	0.2			4	500		1.2	2.0
		Desethyl Atrazine*	ALS	µg/L	0.01			4	NA		0.01	0.05
		Imazapic*	ALS	µg/L	0.01			2	NA		<0.01	0.02
		Metolachlor	ALS	µg/L	0.01			4	300		0.02	0.10
		Metolachlor-OXA*	ALS	µg/L	0.01			4	NA		0.1	0.26
River Park WSA	River Park Reservoir	Atrazine	ALS	µg/L	0.02	Quarterly	4	2	20	0	<0.02	0.05
		Atrazine, 2-hydroxy*	ALS	µg/L	0.01			4	NA		0.01	0.04
		Dalapon 2,2-DPA	ALS	µg/L	0.2			4	500		0.7	1.6
		Hexazinone	ALS	µg/L	0.01			3	400		<0.01	0.03
		Metolachlor	ALS	µg/L	0.01			4	300		0.02	0.24
		Metolachlor-OXA*	ALS	µg/L	0.01			1	NA		<0.05	0.17
		Tebuthiuron*	ALS	µg/L	0.02			4	NA		0.16	0.59
Wallaville WSA	Wallaville Reservoir	2,4-D	ALS	µg/L	0.02	Quarterly	4	1	30	0	<0.02	0.03
		Atrazine	ALS	µg/L	0.02			1	20		<0.02	0.02
		Atrazine, 2-hydroxy*	ALS	µg/L	0.01			4	NA		0.01	0.02
		Dalapon 2,2-DPA	ALS	µg/L	0.2			4	500		0.5	1.1
		Hexazinone	ALS	µg/L	0.01			3	400		<0.01	0.03
		Metolachlor	ALS	µg/L	0.01			4	300		0.02	0.05
		Metolachlor-OXA*	ALS	µg/L	0.01			1	NA		<0.05	0.06
		Tebuthiuron*	ALS	µg/L	0.02			4	NA		0.29	0.49

The Bundaberg Regional Council carries out full and comprehensive pesticide analysis on a routine basis.

* Parameters do not have ADWG health limit – detection of these parameters were not reported to the regulator as all detected levels were below levels previously checked by Qld Health.

Rolling 12-month annual value E. coli compliance – All WSA’s July 2022 – June 2023

	Month												
	July 2022	August 2022	September 2022	October 2022	November 2022	December 2022	January 2023	February 2023	March 2023	April 2023	May 2023	June 2023	
% of samples which comply with the nil <i>E. coli</i> limit													
Bundaberg	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99.5%
Kalkie	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Moore Park	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
River Park	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Rocky Point	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Gregory River	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Gin Gin	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Wallville	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Lake Monduran	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Summary of Trihalomethane Sampling – 2022-2023					
Water Service Area	Frequency of Sampling	Total No. of Samples	No. of Samples Exceeding ADWG Health Guideline of 250 µg/L	Value of Exceedances (µg/L)	Comments
Bundaberg	Quarterly	21	0	-	
Kalkie	Quarterly	17	0	-	
Gregory River	Quarterly	15	0	-	
Moore Park	Quarterly	7	0	-	
Gin Gin	Quarterly	7	0	-	
River Park	Quarterly	7	0	-	
Rocky Point	Quarterly	4	0	-	
Wallaville	Quarterly	7	0	-	
Lake Monduran	Quarterly	4	3	420, 345, 428	Non-compliant samples reported to the Regulator (refer to Table 2 Page 9)
	Totals	89	3		

Appendix B – Implementation of the DWQMP Risk Management Improvement Program

Scheme Name	Ref	Improvement Actions July – December 2022	Target Date	Actions taken to date	Status and Revised target date	Responsible Officer/Position
GWTPs	DMP18-03	Review the options to improve the security around the Bundaberg Bore Treatment Plants.	Dec-20	A new lock system has been installed at all water treatment plants. Council is also investigating options to enclose/contain the spray bed infrastructure in use.	2022-2023 - captured in RMIP 22-09, 22-57	Manager Planning & Delivery/Electrical & Mechanical Team Manager
Kalkie	DMP18-21	Kalkie Water Treatment Plant (WTP) implementation plan. The Kalkie WTP implementation plan identified the following improvement measures: <ul style="list-style-type: none"> Upgrade the existing Kalkie WTP. The plant process will have conventional units such as – Coagulation/flocculation/sedimentation/filtration/disinfection process replacing the existing DAF process. The upgraded plant will incorporate powdered activated carbon (PAC) dosing system and a PAC contact tank. Upgrade the alum storage and dosing system to a new bulk liquid coagulant storage and dosing system; Establish a new bulk bag PAC handling and dosing facility to replace the existing PAC system that uses 15kg bags; Set up an acid (preferably sulphuric acid) storage and dosing facility to enable flexibility in achieving the desired coagulation pH target; Install online instrumentation (e.g., turbidimeters, pH meter and free chlorine residual analysers; Install a sedimentation process to increase the solids removal capacity and improve the clarified water quality (turbidity as well as TOC) and provide a robust treatment process for prolonged raw water turbidity events; 	2021	New plant is currently under construction	Dec-2022 - captured in RMIP 22-15, 22-30, 22-31, 22-32, 22-33, 22-47, 22-48	Service Delivery Manager
Lake Monduran	DMP18-22	Lake Monduran Water Treatment Plants (WTP) identified improvement measures: Investigate alternative treatment options to address removal of organics, and algal hazards. <u>Option 1 – Upgrade to Existing Plant</u> <ul style="list-style-type: none"> Additional pre-treatment process for coagulation and settling to remove of organics and algal removal prior to filtration; Establish a PAC dosing and storage facility and contact tank to address raw water source algal bloom risks. Implementation of control system to include pump operation and filter operation to ensure operation and reliability of the plant; Filter media replacement; Differential pressure testing for the filters to ensure the performance of the filters post backwashing; <u>Option 2 - Investigate other Treatment Technology Options</u> <u>Option 3 - BRC may decide to make this water service scheme a non-potable scheme due the high capital costs to upgrade the WTP with a low number of connections.</u>	Dependent on Council decision & budget	Council’s Service Delivery Treatment is continuing to work through operational adjustments. A project is to be undertaken to assess the treatment process and identify measures to reduce THM levels.	2022-2023 – captured in RMIP 22-16, 22-20, 22-21, 22-34	Process & Asset Manager
GWTPs	DMP18-24	All Ground Water Treatment Plants (GWTP’s): Consideration being given to in-line turbidimeters.	Jul-22	Council is looking to undertake grab samples to verify turbidity results to validate the need for in-line turbidimeters	2022-2023	Process & Asset Manager
Kalkie	DMP18-27	A review of the supernatant return point in the off-stream storage is required. The potential exists for short circuiting to occur. This is to be rectified with the plant upgrade as per item 18-21.	Jun-23	New plant is currently under construction	Captured in RMIP 22-33	Service Delivery Manager
Wallaville	DMP18-28	Wallaville Water Treatment Plant (WTP) identified improvement measures: <u>Option 1 – Upgrade to Existing Plant</u> <ul style="list-style-type: none"> Establish a PAC dosing and storage facility and contact tank to address raw water source algal bloom risks <u>Option 2 – Alternative raw water supply</u> <ul style="list-style-type: none"> Groundwater supply is currently being investigated. <u>Option 3 - Investigate alternative Treatment Technology Options.</u>	Jun-24	Council’s Water Service Planning & Delivery team are in the concept design stage for a possible pipeline connection between Wallaville and Gin Gin WWTP. Water from the Gin Gin or Bundaberg Schemes is being trucked in to support the Wallaville Scheme when required.	Dependant on Budget - captured in RMIP 22-03, 22-04, 22-05, 22-36	Service Delivery Manager
All Schemes	DMP20-13	Perform routine manual operation of sites, and ensure documentation exists for operating procedures. Staff should be trained and deemed competent to run manual operation of sites. Training of manual mode operations for each facility ongoing.	Apr-21	Development and review of existing operating procedures are due to occur following the review of the DWQMP	2023-2024 – captured in RMIP 22-18, 22-39, 22-44, 22-45, 22-46, 22-55	Service Delivery Manager
All Schemes	DMP20-20	SCADA Monitoring - - Whilst calibration occurs, it is suggested that the operators specifically check that the instrument readings match the verification records as an additional confirmation of the SCADA results accuracy; - It is suggested, as the conversion from the instrument on the SCADA does not update if the deviation point is not triggered, that the operators refresh the screen (or auto refreshes) so that the data logger can be accurately shown on SCADA, which can then be accurately checked against verification results. A procedure may be written.	Feb-22	Looking at capturing the treatment plant log sheets into Water Services Works Management System – FOCUS in which automatic reminders and checks will be undertaken by operators	2022-2023	Business Services Manager

All Schemes	DMP20-23	There needs to be a process at the time of chemical delivery on-site whereby each delivery comes with a quality assured certificate for each batch of chemical instead of retrospective certificates being provided. The certificates audited do show the concentration of chemical being supplied. Each delivery docket number should link to that certificate/batch in addition to the Sample ID and delivery docket. The service provider must also be checked for ongoing quality compliance;	Jun-23	Tested parameter results now provided with chemical delivery. Insertion of special conditions into chemical tenders will require the supplier to provide with the delivery docket the SDS and batch certificate of analysis.	Completed Oct 2022	Service Delivery Manager
All Schemes	DMP20-24	Sourcing of Quality Assured Materials – It is recommended that sites be checked for remnant equipment and materials that may be questionable in terms of quality materials;	Mar-22	Water Services Technical Team has updated the preferred equipment supplier to reduce this risk.	Completed Oct 2022	Treatment Team Manager

System / Scheme	Reference ID	Improvement Items January – July 2023	Target Period	Action taken to date	Status and Revised target date	Responsibility
River Pk	22-01	Action: Options study for alternate water supply/treatment plant Rationale: Water is trucked upon CCP critical limit exceedance, but this is not a sustainable long-term solution for managing pathogen risk	2022-23	No action taken to date	2023-25	Service Delivery Manager
River Pk & Wallaville	22-02	Action: Investigate interim measures to improve sedimentation and filtration Rationale: Media is suspected to be an issue. This needs to be investigated and rectified whilst awaiting options study solution. Water is trucked upon CCP critical limit exceedance. CCPs to be reviewed on implementation of improvement measures	2022-23	Council's Water Service Planning & Delivery team are in the concept design stage for a possible pipeline connection between Wallaville and Gin Gin WWTP.	2023-25	Service Delivery Manager
Wallaville	22-03	Action: Options assessment on treatment facility Rationale: Highly manual plant with limited remote visibility of processes. Water quality results indicate processes not working optimally.	2022-23	Council's Water Service Planning & Delivery team are in the concept design stage for a possible pipeline connection between Wallaville and Gin Gin WWTP.	2023-25	Planning & Delivery Manager
Wallaville	22-04	Action: Investigate second protozoan barrier Rationale: Highly manual plant with limited remote visibility of processes. Water quality results indicate processes not working optimally.	2022-23	Council's Water Service Planning & Delivery team are in the concept design stage for a possible pipeline connection between Wallaville and Gin Gin WWTP.	2023-25	Planning & Delivery Manager
Wallaville	22-05	Action: In depth review of filter operation & condition Rationale: Highly manual plant with limited remote visibility of processes. Water quality results indicate processes not working optimally.	2022-23	Council's Water Service Planning & Delivery team are in the concept design stage for a possible pipeline connection between Wallaville and Gin Gin WWTP.	2023-25	Service Delivery Manager
Heaps St, Power St, Works Depot, Gin Gin WTP	22-06	Action: Investigate options to increase chlorine C.t. (options review) Rationale: Chlorine Ct is substantially less than 15mg.min/L at sites without a contact tank	2022-23	Water Services is looking to engage a consultant is the 2nd quarter of the 2023-24 financial year	2023-24	Process & Asset Manager
Heaps St, Power St, Works Depot,	22-07	Action: Engineering solution to increase chlorine C.t.at bore sites (e.g., move dose to before reservoirs at bore sites, Rationale: Chlorine Ct is substantially less than 15mg.min/L at sites without a contact tank	2023-24	Water Services is looking to engage a consultant is the 2nd quarter of the 2023-24 financial year	2023-24	Process & Asset Manager
Gin Gin	22-08	Action: Install baffling at Gin Gin CWT. Rationale: Current Ct at rest area is approximately 6.4mg.min/L	2022-23	A consultant has been engaged to review the treatment process at the plant, including disinfection dosing/application	2024-25	Service Delivery Manager
All groundwater plants	22-09	Action: Trial enclosure of limestone bed at Lovers Walk Rationale: The open limestone beds are a potential source of vermin access and contamination.	2022-23	Currently in construction at the Lovers Walk GWTP	2023-24	Planning & Delivery Manager
All groundwater plants	22-10	Action: Review requirement for, and options to provide protozoan treatment barriers. Rationale: There is some evidence that aquifers are unconfined. There are currently no protozoan barriers	2024-25	No action taken to date	2024-25	Process & Asset Manager
Bundaberg / ALL systems	22-11	Action: Review calibration and verification schedule of online turbidity analyser. Rationale: The individual filter turbidity analysers are critical instruments. They should be challenged regularly against verification standards and ensure calibration meets requirements.	2022-23	Operational monitoring recording will be moving from paper based to capture in Water Services FOCUS system. Routine scheduled maintenance actions have and are continuing to be captured in FOCUS.	2023-24	Service Delivery Manager
Branyan WTP	22-12	Action: Review control philosophy for instigation of filter backwash, as part of wider review to establish Functional Specification. Rationale: Filter backwash based on time will not meet all plant conditions (e.g., raw water challenge. Ideally, filter should backwash on turbidity, headloss or time.	2022-23	No action taken to date	2023-24	Process & Asset Manager
Bundaberg	22-13	Action: Review Power St disinfection requirements (ensure sufficient C.t) and consider whether water needs any additional treatment. Rationale: This is an untreated source which could re-contaminate surface water treated at Branyan WTP	2022-23	This item is to be included in the undertaking of items 22-06 and 22-07.	2023-24	Process & Asset Manager
Gregory River	22-14	Action: Install actuator on clarifier inlet to close on power failure Rationale: Risk of dumping PAC tank into clarifiers in event of power outage	2022-23	Actuator installed on clarifier inlet and connected to SCADA.	2023-24	Service Delivery Manager

System / Scheme	Reference ID	Improvement Items January – July 2023	Target Period	Action taken to date	Status and Revised target date	Responsibility
Kalkie	22-15	Action: Repair clear water tank and investigate permanent cover for module Rationale: CW tank is inground with leaks which could potentially allow groundwater ingress. Currently controlled with pump to keep groundwater below tank level.	2022-23	Service delivery is currently investigating the matter	2023-24	Service Delivery Manager
Lake Monduran	22-16	Action: Investigate options for online water quality monitoring and control philosophy as part of wider review to establish Functional Specification. Rationale: Currently only online treated water quality monitoring and very limited SCADA control.	2022-23	Post filter turbidity analyser has been installed and is monitored online via SCADA	2023-24	Process & Asset Manager
WOS	22-17	Action: Investigate water quality induction for contractor management Rationale: To ensure all contractors are aware of water quality obligations when working on drinking water assets	2022-23	No action taken to date	2023-24	Business Services Manager
WOS	22-18	Action: Develop and implement a process for ongoing review of operational procedures and ensuring implementation Rationale: Up to date operational documents are essential for knowledge management	2022-23	No action taken to date	2023-24	Service Delivery Manager
All	22-19	Action: Inspect and ensure vermin proofing meets requirements for all reservoirs. Rationale: Vermin proofing varies at different reservoirs (e.g., mesh size, vermin proofing of overflows). A standardised approach to be applied to ensure system integrity and allow operators to inspect against common standard.	2022-24	Treatments capture in FOCUS is currently underway. The option of a checklist is being considered.	2022-24	Service Delivery Manager
Gregory River, Gin Gin, Lake Monduran	22-20	Action: Review sodium hypochlorite storage management practices Rationale: Ensure hypo management practices are documented and reflect best practice to minimise formation of chlorates	2022-23	Qld Water, Chlorate Fact Sheet, used as reference document in the management, storage and use of Sodium Hypochlorite.	Completed	Service Delivery Manager
Lake Monduran	22-21	Action: Review drinking water Levels of Service in light of THM issues (e.g., non-potable supply, upgrade treatment process) Rationale: THM formation in this system has been problematic	2022-23	Currently being investigated	2023-24	Process & Asset Manager
All	22-22	Action: Review control functional specification / control philosophy for chlorination as part of wider review to establish Functional Specification. (note: this does not include implementation of updated control systems) Rationale: Chlorination is a CCP and an exceedance should shut down plant production to ensure safe water	2022-23	No action taken to date	2023-24	Process & Asset Manager
All	22-23	Action: Review/formalise flushing protocol Rationale: To standardise the approach for water quality outcomes across all WSAs	2022-23	No action taken to date	2023-24	Service Delivery Manager
All groundwater plants	22-24	Action: Groundwater study to understand need for further treatment barriers Rationale: Some bores have been impacted by salinity wedges, nitrates & PFAS. A better understanding is required of potential interaction between surface and subsurface flows and the unconfined aquifers and pathogen risk.	2024-25	No action taken to date	2024-25	Planning & Delivery Manager
All surface plants	22-25	Action: Filter asset and media condition inspection. Rationale: Loss of media is evident and cause must be established and rectified to ensure reliable filtration (Vecellios Road) Breakthroughs above alert limit are occurring more often and require investigation of cause (Bryan). Filters generally operate well, however overdue for inspection (Gin Gin). While this is a new plant, filter media is old/aged in some plants. A regime of routine inspections is good practice and will allow forward planning for replacement (Gregory). High turbidity's in clear water tank - require investigation of cause (Kalkie)	2022-24 (2-year program)	No action taken to date	2022-24	Service Delivery Manager
Bryan WTP	22-26	Action: Investigate installation of flow indication on push water for polymer dosing Rationale: Flow indication will allow direct detection of low/no flow on settling aid	2022-23	Currently working on this item	2023-24	Process & Asset Manager
Gin Gin	22-27	Action: Investigate methods to monitor & improve filter ripening. Rationale: Filter ripening should not exceed 15 minutes	2023-24	No action taken to date	2023-24	Service Delivery Manager
Gin Gin	22-28	Action: Review control philosophy for plant interlocks prior to clearwater turbidity. Rationale: Online monitoring with alarming/control for settled and filtered water turbidity will allow quarantine of out of spec water before entering CW	2022-23	Turbidity monitored online via SCADA on filtered and treated water, with high set point alarm.	Completed	Process & Asset Manager
Gin Gin	22-29	Action: Review control philosophy for filter operation Rationale: Filtrate currently monitored on inlet to clearwater reservoir. Filters should have individual online turbidity monitoring.	2022-23	No action taken to date	2024-25	Process & Asset Manager
Kalkie	22-30	Action: Introduce interim shift-based sub-natant turbidity monitoring (grab samples) Rationale: As an OCP, Operators need to be able to measure performance of process of dissolved air flotation	2022-23	No action taken to date	2023-24	Service Delivery Manager
Kalkie	22-31	Action: Investigate filter turbidity monitoring and controls for filtration process, including backwash triggers & ripening parameters, and aligned to HBT framework Rationale: Each individual filter should ideally be monitored continuously for turbidity, with ability to interlock when CCP is exceeded. Currently the plant is interlocked on CW turbidity with sample point after the CW reservoir (ie in beginning of reticulation)	2022-23	No action taken to date	2023-24	Planning & Delivery Manager
Kalkie, Gin Gin, Gregory River	22-32	Action: Review functional description on chlorine dosing at rechlorination site Rationale: Re-chlorination is an OCP. Currently fixed paced dosing. There may be an opportunity for better dose control	2023-24	No action taken to date	2023-24	Process & Asset Manager
Kalkie	22-33	Action: Review functional specification of supernatant return (ie location of discharge into storage dam) Rationale: The current location for discharge is close to inlet pumping and does not guarantee less than 10% return to head of plant, especially when the plant is offline while supernatant continues to be discharged	2022-23	No action taken to date	2023-24	Service Delivery Manager

System / Scheme	Reference ID	Improvement Items January – July 2023	Target Period	Action taken to date	Status and Revised target date	Responsibility
Lake Monduran	22-34	Action: Investigate options and justification for a second protozoan barrier Rationale: Unprotected surface water catchment. Highly manual plant with limited remote visibility of processes. Water quality results indicate processes not working optimally.	2024-25	No action taken to date	2024-25	Planning & Delivery Manager
Moore Pk (Vecellios Rd)	22-35	Action: Review OCP limits on subnatant Rationale: If subnatant turbidity is too high can result in overload on filters.	2022-23	No action taken to date	2023-24	Service Delivery Manager
Wallaville	22-36	Action: Repair inlet works at Wallaville Rationale: Subsidence around inlet works	2023-24	Council's Water Service Planning & Delivery team are in the concept design stage for a possible pipeline connection between Wallaville and Gin Gin WWTP.	2023-24	Service Delivery Manager
WOS	22-37	Action: Develop maintenance schedule framework as part of asset management system. Rationale: A well-developed AMS is essential to ensure continued supply of safe water	2024-25	No action taken to date	2024-25	Planning & Delivery Manager
WOS	22-38	Action: Develop water quality safety checklist as part of SWMS Rationale: A well-developed AMS is essential to ensure continued supply of safe water	2023-24	No action taken to date	2023-24	Service Delivery Manager
WOS	22-39	Action: Develop and implement a Verification of Competence process Rationale: VoCs will ensure operators are familiar with operational variations at different sites.	2024-25	No action taken to date	2024-25	Service Delivery Manager
WOS	22-40	Action: Review governance of control changes and CCPs Rationale: Access to change setpoints in SCADA needs to consider the level of process risk to ensure OCPs & especially CCPs are functioning within specification.	2023-24	No action taken to date	2023-24	Process & Asset Manager
WOS	22-41	Action: Review verification sampling locations Rationale: Sampling programs should be periodically reviewed to ensure they are still representative.	2022-23	Verification sample locations reviewed, prior to the installation of dedicated sample points. Historical data and incidents reviewed as part of sample location.	Completed	Process & Asset Manager
WOS	22-42	Action: Review operational monitoring at all plants including OCP/CCP to ensure samples are representative of the processes they are monitoring Rationale: Sampling programs should be periodically reviewed to ensure they are still representative.	2024-25	No action taken to date	2024-25	Process & Asset Manager
WOS	22-43	Action: Implement OT strategy Rationale: The OT strategy has been developed to manage risk to control systems from cyber security threats. As more control systems and remote monitoring/control is introduced OT security is essential.	2022-23	No action taken to date	2023-24	Process & Asset Manager
WOS	22-44	Action: Review and formalise emergency preparedness Rationale: Currently rely heavily on operator experience and knowledge in an emergency (eg flood). Documenting response plans/actions will improve knowledge across the team and the response	2024-25	No action taken to date	2024-25	Business Services Manager
WOS	22-45	Action: Work with industry bodies (e.g., Queensland Water) in planning for operator shortage Rationale: Recruitment of trained/experienced operators is a growing problem across the industry.	2022-23	Conferences attendance, Qld Water Engagement etc	Ongoing	Branch Manager
WOS	22-46	Action: Develop succession plan Rationale: Recruitment of trained/experienced operators is a growing problem across the industry.	2022-23	Traineeship program in place.	Completed	Service Delivery Manager
Kalkie	22-47	Action: PAC contact tank under construction (Construct PAC Tank) Rationale: Kalkie is undergoing major upgrades to replace aging plant & equipment and improve reliability	2022-23	Plant upgrade near completion	2023-24	Planning & Delivery Manager
Kalkie	22-48	Action: Ensure early operator involvement in commissioning and proof of performance of new plant. Rationale: Early operator involvement will help to ensure smooth transition to new plant operation.	2022-23	Operators were involved in the commissioning of the plant and continues to assist in the capture of operational actions/monitoring in Water Services Works Management System.	Completed	Service Delivery Manager
All surface plants	22-49	Action: Alternate coagulants under investigation Rationale: Coagulant used across all WSAs is primarily based on experience and legacy. BRC is undertaking a review to ensure appropriate coagulant is being used for the water quality challenges and plant design	2022-24	No action taken to date	2022-24	Service Delivery Manager
Bundaberg, Gin Gin	22-50	Action: Investigate options to maintain <10% limit on supernatant return Rationale: Current fixed rate flow of supernatant means drop in plant flow may result in above 10% return rate. Reliant on Operators knowing not to drop flow rates lower than threshold	2023-24	No action taken to date	2023-24	Process & Asset Manager
Branyan WTP	22-51	Action: Identify method to ensure PAC dosing is occurring correctly Rationale: Flow sensors only detect carrier water flow, not correct PAC dispensing	2023-24	No action taken to date	2023-24	Process & Asset Manager
Branyan WTP	22-52	Action: Undertake assessment and rectification of subsidence at inlet Rationale: Ongoing erosion of bank and subsidence noted in local area around inlet works	2023-24	No action taken to date	2023-24	Service Delivery Manager
Gregory River	22-53	Action: Rectify existing damages to inlet works Rationale: Inlet works are damaged.	2023-24	No action taken to date	2023-24	Service Delivery Manager
Vecellios Road	22-54	Action: Review coagulant dose control philosophy Rationale: Fluctuations in plant flow can result in slight over/under dosing	2023-24	No action taken to date	2023-24	Service Delivery Manager

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All systems	22-55	Action: Review processes for sharing of operational information Rationale: Operators need to be aware of status of operational challenges and cross-seeding of system knowledge amongst all operators.	2022-23	No action taken to date	2023-24	Service Delivery Manager
Vecellios Rd, River Pk	22-56	Action: Review need/options for PAC dosing. Rationale: Triggers for dosing PAC should be relative to risk and consistent across WSAs.	2023-24	No action taken to date	2023-24	Service Delivery Manager
WOS	22-57	Action: Lock replacement program to limit access to sites Rationale: This is an ongoing program to improve site security	2022-23	The majority of this item has been addressed; all treatment plants have new locks – other facilities are outstanding.	2023-24	Service Delivery Manager
All	22-58	Action: Review BGA action plan Rationale: Action Plan is due for review to update to latest state of knowledge	2023-24	Updated flow chart will be included in the regular review of the DWQMP. Its development included QLD Health engagement and feedback.	Completed	Process & Asset Manager