LOGAN WATER

Drinking Water Quality Management Plan

Annual Report 2021/22

logan.qld.gov.au

CITY OF LOGAN

Accessing the Report

This report is available to the public via the City of Logan website and copies may be provided to members of the public upon request. Logan Water understands that our community is made up of people from more than 217 different cultures, if you have any difficulty in understanding this report an interpretation service is available on 131 450.

Feedback

If you have any feedback about this report or the services that Logan Water provides, you can contact us on 3412 3412 or via email at **council@logan.qld.gov.au**.

Acknowledgement of Country

Logan Water acknowledges the Traditional Custodians of the Waterways and Country on which we operate.

We acknowledge their living culture and their unique role in the life of this region.

We have much to learn from our Elders' past practices in water management and we commit to caring for both Water and Country by continuing to sustain the cultural and spiritual connection to this valuable resource.

Contents

About Logan Water

Our Strategic Direction

As a water service provider, Logan Water is responsible for providing safe, reliable, and efficient drinking water supply and wastewater services to customers in the City of Logan.

Our Vision

Reliable. Sustainable. Committed.

Our Objectives

- We ensure our customers get what they need and expect.
- We trust each other to drive a safe and supportive culture.
- We provide infrastructure to meet the growth challenges of the future.
- We drive long term viability by managing cost, service, and commercial return.
- We enhance our natural and built environment.
- We measure and improve our performance, systems, and information.
- We are one innovative and high performing team.
- We make Logan Water a great place to work.
- We deliver, what we say is what we do.

Welcome

I am pleased to present Logan Water's *2021/22 Drinking Water Quality Management Plan Annual Report*. The Report showcases our commitment to deliver a safe, high quality drinking water supply service that safeguards public health and supports our growing community.

This Report provides the Logan community with information about the quality of their drinking water and advises the Department of Regional Development, Manufacturing and Water, the Queensland Water Supply Regulator, on how we have complied with our *Drinking Water Quality Management Plan* and its approval conditions. In doing so, it allows us to meet our compliance obligations under the *Water Supply (Safety and Reliability) Act 2008* (Qld).

The supply of safe drinking water is our greatest public health responsibility. To ensure we fulfil this responsibility, we operate and maintain a water distribution network that includes 2,431 kilometres of drinking water pipeline and 22 drinking water reservoirs. In addition, through 2,500 drinking water samples and 60,000 laboratory tests, we constantly verify that the drinking water supplied to the Logan community meets the strict requirements of the *Australian Drinking Water Guidelines 2011*.

I am pleased to report that in 2021/22 we continued to meet these stringent guidelines.

In 2021/22, we continued to seek innovative and sustainable ways to operate. In mid-2022, we moved into our new purpose-built workspace in the heart of Beenleigh, where we can take full advantage of our new Integrated Service Hub.

The Integrated Services Hub is the engine room of everything we do, allowing our highly skilled teams to respond to live data in real time, manage emerging issues in the water distribution networks and keep the networks running smoothly. Working as one team we continue to achieve a common goal: to deliver safe and clean drinking water to the Logan community.

Mike Basterfield
Group Manager Logan Water

Introduction

1

Under section 95 of the *Water Supply (Safety and Reliability) Act 2008* (the Act), Logan Water as a drinking water service provider (SPID542), must prepare a drinking water quality management plan (DWQMP). The purpose of the DWQMP is to protect public health.

Logan Water is also required to prepare a DWQMP annual report to comply with the requirements of sections 141 and 142 of the Act. The purpose of the report is to demonstrate to our customers, stakeholders, and the water supply regulator (the Director-General of the Department of Regional Development, Manufacturing and Water) that we have satisfactorily implemented the approved DWQMP each financial year.

The Report must be submitted to the Regulator within 120 business days from the end of the relevant financial year.

Logan Water's 2021/22 Report:

- summarises the activities undertaken in operating our drinking water service,
- details our water quality performance and compliance with drinking water quality criteria,
- summarises drinking water quality incidents reported to the Regulator,
- details drinking water quality related customer complaints, and
- includes actions taken to implement our DWQMP.

This report assists the Regulator to determine compliance with Logan Water's approved DWQMP and relevant approval conditions.

This Report has been prepared in accordance with the Drinking Water Quality Management Plan Report guidance note and the Drinking Water Quality Management Plan report template.

2 2021/22 in review

Drinking water quality operations

 23,075 ML of drinking water (the equivalent of 9,230 olympic size swimming pools per annum)	 348,000 customers	 131,000 property connections	 2,431 km of drinking water mains	 22 reservoirs	 6 water supply zones

We monitored and verified the quality of the drinking water supply through

 10 chlorine dosing facilities	 21 water quality network analysers	 112 dedicated drinking water quality sampling point	 2,694 samples	 60,000+ tests

Drinking water quality performance

100% compliance with the Australian Drinking Water Guidelines health-related parameters
100% compliance with the Australian Drinking Water Guidelines chemical-related parameters
100% compliance with the Australian Drinking Water Guidelines aesthetic-related parameters

One incident notification. Of the 60,000+ water quality tests, one sample result required reporting to the Regulator.

Drinking Water Quality Management Plan approved by the Regulator

Delivering water to our community

3

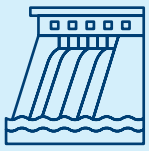
We provide drinking water services to 348,000 customers within the Logan City Council service area.

Seqwater, a Queensland Government statutory body and bulk water supply authority, supplies water from the dams, weirs, and water treatment plants that it manages. Logan Water then distributes the treated water to your property via a network of reservoirs, pumps, and pipes across six water supply zones. The entire process from raw water source to your meter is known as 'Catchment to consumer'. See Figure 1.

The key responsibilities of Seqwater and Logan Water are summarised in Table 1. For more information about the water supply network refer to section 3.1.

Table 1: Key Seqwater and Logan Water responsibilities

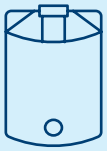
Seqwater	Logan Water
› Catchment Management › Raw water treatment (including fluoridation) › Clear Water Storage › Bulk water transport to defined transfer points › Monitoring of raw and treated water supply, including fluoridation	› Receipt of bulk treated water from Seqwater at defined transfer points › Delivery to customers through Logan Water's distribution network › Operation and maintenance of the distribution network, reservoirs, pump stations, and several secondary disinfection facilities › Monitoring of drinking water quality performance throughout the distribution network



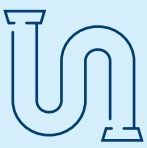
Seqwater manages the raw water that comes from the catchments, dams and weirs.

The raw water is processed through Seqwater's water treatment plants.

This water treatment process – known as conventional treatment – is a combination of coagulation, flocculation, sedimentation and filtration.



The treated water is distributed to Logan Water's 22 drinking water reservoirs via seven bulk water supply points.



Drinking water is then distributed via Logan Water's network of pumps and pipes.

Safe and high-quality drinking water is delivered to our customers.

Figure 1: Catchment to consumer

3.1 The water supply network

Logan Water is supplied clean, treated drinking water through the South East Queensland (SEQ) Water Supply Network Grid (the Grid), which is managed and operated by Seqwater, as shown in Appendix A Seqwater Grid Map. Water may be sourced from various sources throughout the Grid, dependent on operational supply requirements. For example, treated water may be supplied via the Eastern Pipeline Interconnector (EPI) and may flow west to supply Logan Water or east to supply Redlands City Council.

In practice, most of Logan City Council's treated water is supplied from the Mt Crosby Water Treatment Plants (WTPs), refer to Appendix B Logan Water Supply Network Schematic.

An overview of Logan Water's drinking water supply network is provided in Table 2.

Table 2: Overview of Logan Water's drinking water supply

Overview	Description
Responsibility	Delivery of clean, treated water from bulk supply points (transfer points) to customer meters.
Area	957 square kilometres
Population	348,020[1]
Population connected to water supply network	343,034[2]
Seqwater's primary WTPs (and respective catchments that supply Logan Water)	› Mt Crosby (Wivenhoe Dam via Brisbane River) › North Stradbroke Island (North Stradbroke Island Bores) › Capalaba (Tingalpa Dam) › Molendinar (Hinze Dam) › Gold Coast desalination plant (seawater off Tugun, Gold Coast)
Logan Water's Supply Network Schematic	› Indicating key water supply zones and supplying reservoirs, with latest updates in Logan Water's SCADA and GIS systems. › Refer to Appendix B – Logan Water Supply Network Schematic
Bulk Supply Points (transfer points)	› Compton Road meter via Kuraby reservoir inlet main › Trinder Park pump station via Kuraby Reservoir › Illaweena bulk meters (3) via Kuraby Reservoir › EPI supply via Kimberley Park Reservoir › Southern Regional Water Pipeline (SRWP) supply via Teviot Road Offtake › SRWP supply via New Beith Offtake (Pub Lane Offtake) › Gold Coast supply via Stanmore Pump Station

1 *Population taken from Home \| City of Logan \| Community profile (id.com.au)*

2 *Connected population estimated from reported total connections in Logan Water's Performance Plan Report*

3.2 Our water supply zones

Logan Water operates six defined water supply zones (WSZ). A WSZ can be defined as an area of the water distribution network with shared bulk water supply sources. The next level of categorisation below a WSZ is a water quality zone (WQZ). A WQZ shares the same disinfectant type (i.e. chloramine or chlorine).

These categories are used when undertaking medium to long term water quality trend analysis and regulatory reporting. A summary of Logan Water's suburbs by WSZ is shown in Table 3.

Table 3: Logan Water's water supply zones by associated suburbs

Water Supply Zone	Main Suburbs	Partial Suburbs
Greenbank	Boronia Heights, Browns Plains, Forestdale, Greenbank, Heritage Park, Hillcrest, Park Ridge, Regents Park	Berrinba, Chambers Flat, Crestmead, Logan Reserve, Munruben, Park Ridge South
Kimberley Park	Carbrook, Cornubia, Loganholme, Shailer Park, Tanah Merah	Slacks Creek
Logan East	Bannockburn, Bahrs Scrub, Beenleigh, Belivah, Bethania, Edens Landing, Holmview, Mount Warren Park, Waterford, Windaroo, Wolffdene,	Eagleby
Logan South	Cedar Grove, Cedar Vale, Chambers Flat, Flagstone, Jimboomba, Logan Village, Maclean, Mundoolun, Munruben, New Beith, North Maclean, Park Ridge South, Stockleigh, Veresdale Scrub, Woodhill, Yarrabilba,	Greenbank
Marsden	Crestmead, Logan Reserve, Loganlea, Marsden, Meadowbrook, Waterford West	Berrinba, Heritage Park, Kingston, Park Ridge
Springwood	Springwood High Level Zone: Underwood, Priestdale, Rochedale South	N/A
	Springwood Low Level Zone: Berrinba, Daisy Hill, Eagleby, Kingston, Logan Central, Slacks Creek, Springwood, Woodridge	Loganholme, Marsden, Shailer Park, Tanah Merah, Underwood

Operational activities may require changes to our network which could result in some suburbs being serviced by an alternative WSZ. If there is an expected change to your water quality, we will advise customers when a network configuration change may impact their water supply.

There may be some properties which are not connected to our drinking water network, this means that these residents do not receive drinking water directly to their properties.

If you would like to know which WSZ services your suburb or property, please contact us on 07 3412 3412.

4 Managing safe drinking water

4.1 Our legislative obligations

The supply of safe and reliable drinking water in Queensland is regulated by various pieces of state legislation, including the *Water Supply (Safety and Reliability) Act 2008* (Qld) (the Act), the *South-East Queensland Water (Distribution and Retail Restructuring) Act 2009* (Qld), the *Public Health Act 2005* (Qld), the *Public Health Regulation 2018* (Qld), and the *Water Fluoridation Act 2008* (Qld).

Under the Act, a drinking water service provider may only carry out a registered drinking water service in accordance with an approved Drinking Water Quality Management Plan (DWQMP).

Under the *Public Health Act 2005* (Qld) and *Water Fluoridation Act 2008* (Qld), Queensland Health (QHealth) regulates the standards for drinking water quality related to *Escherichia coli (E. coli)* and fluoride[3], respectively.

These standards, together with the health guideline levels in the *Australian Drinking Water Guidelines 2011*[4] (ADWG), comprise water quality criteria for drinking water in Queensland, as set out in the Act.

4.2 Our approach to managing drinking water quality

We use a risk management approach to drinking water quality which allows us to identify the substances that may pose a risk to public health.

Our methodology is based on the *ADWG – Framework for Management of Drinking Water Quality*. There are 12 elements within the framework, as shown in Figure 2.

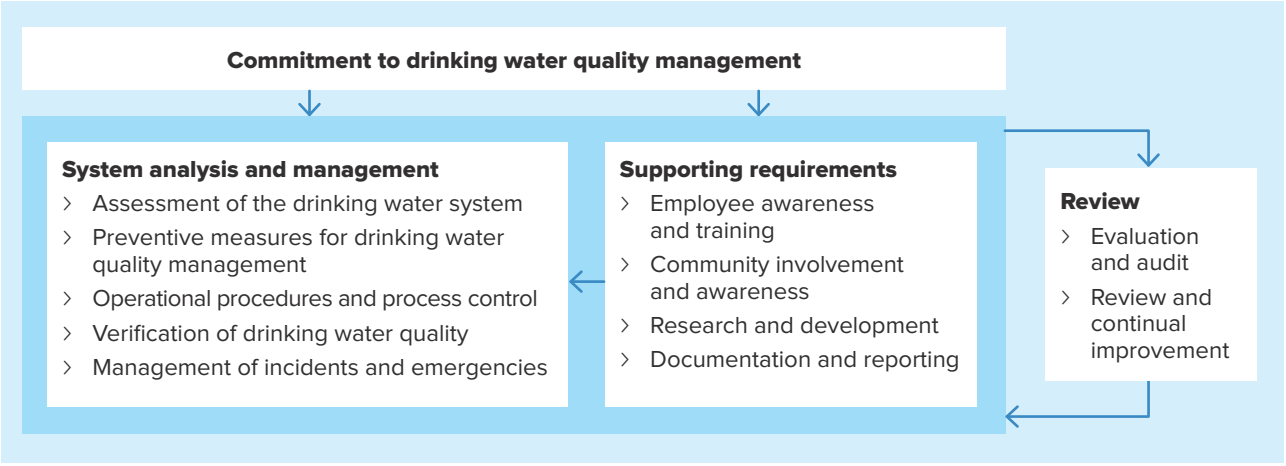


Figure 2: Framework for the management of drinking water quality

3 *Low levels of fluoride occur naturally in many water sources. Seqwater adds fluoride to the Logan Water drinking water supply. For this reason, we are required to test for fluoride.*

4 *Version 3.8, update September 2022*

4.3 Verifying drinking water quality

A critical component of drinking water quality management is verifying that the water we supply to the Logan community meets the strict standards articulated in the relevant legislation and regulations. We assure the quality of the drinking water supply through our Drinking Water Quality Verification Monitoring Program (VMP).

The VMP is a comprehensive program designed to maximise visibility of drinking water quality as it travels through the 2,431 km of water mains that service our community.

The VMP alerts us to emergent changes or sudden occurrences which may impact the drinking water, allowing us to manage the quality of the product we supply to our customers. The VMP provides us with confidence in the product we deliver and supports our commitment to maintain protection barriers and prevent contamination.

4.4 Summary assessment of drinking water compliance

Our in-house accredited laboratory[5] performs our sampling and analytical requirements. In 2021/22, the Laboratory routinely sampled from 112 drinking water sample points, collecting over 2,600 samples, and performing over 60,000 tests of the drinking water supply. The drinking water quality parameters were monitored and reviewed in accordance with Queensland legislative requirements and the ADWG.

To determine drinking water compliance, the VMP results are assessed against:

- water quality criteria specified by the Regulator in the Water Quality and Reporting Guideline for a Drinking Water Service,
- health guideline values in the ADWG, and
- drinking water quality criteria as required by the *Public Health Regulation 2018*.

Monitoring during 2021/22 was carried out in accordance with Logan Water's approved VMP.

In 2021/22, we met the prescribed health-related and aesthetic[6] standards for all six water supply zones. See Table 4.

Table 4: Drinking water supply zone results 1 July 2021 – 30 June 2022

Water Supply Zone	E. coli	Health	Aesthetic
Greenbank	✓	✓	✓
Kimberley Park	✓	✓	✓
Logan East	✓	✓	✓
Logan South	✓	✓	✓
Marsden	✓	✓	✓
Springwood	✓	✓	✓

5 *The Logan Water Laboratory is accredited by the National Association of Testing Authorities (NATA).*

6 *The aesthetic standards address how the drinking water appears, tastes and smell.*

4.5 Laboratory reporting changes

During March 2022, there was a reduction to the Limit of Reporting (LOR) for Ammonia-N results from <0.1mg/L to <0.01mg/L, which may result in a reduced average result. The data summary in Appendix C contains the current maximum and minimum values.

4.6 Data analysis methodology

Table 5 summarises the methodology employed to analyse the data for 2021/22. This methodology is consistent with the ADWG advice provided on statistical principles (Information sheet 3.3).

Table 5: Data analysis methodology

Data subject	Methodology	Reference
Outliers	All outliers are included in the analysis.	ADWG information sheet 3.3
Less than values (<)	Less than values (<) are substituted with a value equivalent to half the Limit of Reporting (LOR). For example, a result of <1 is considered 0.5 for the purposes of chemical data analysis.	ADWG information sheet 3.3
Data exclusions	Data from repeat samples, project, emergency, or investigative sampling are not included in the data analysis.	*DRDMW Drinking Water Quality Management Plan Report*, Guidance Note 2018

The summary of water quality data, found in Appendix C, is represented in seven separate tables representing the whole of supply for Logan Water and each of the six WSZs.

Also included, in Table 18, is a summary of compliance results for *E. coli* sampling undertaken during drinking water quality verification monitoring. *E. coli* results are included for the whole of Logan Water network in Appendix C.

5 Improving Drinking Water Quality

Logan Water strives for continual improvement in our drinking water quality management practices. Logan Water's Risk Management Improvement Program (RMIP) is the key register used to capture actions aimed at reducing contamination risks associated with the supply of drinking water.

Opportunities for improvements captured in the RMIP may originate from the following sources:

- risk assessments – high risks,
- DWQMP reviews and audits – non-conformances, opportunities for improvements and general improvements (if appropriate),
- drinking water quality incidents – longer term improvement actions,
- Regulator feedback, and
- general improvements.

To ensure the RMIP is communicated, implemented, and monitored for effectiveness, Logan Water conducts reviews of the RMIP progress.

5.1 Implementation of the Risk Management Improvement Program

Our RMIP is aligned with the 12 elements of the ADWG – *Framework for Management of Drinking Water Quality* (see Section 4.2). This alignment enables us to strive for best practice drinking water quality management in a systematic, focused and measurable manner. Our progress during 2021/22 is described on pages 14-16.

Element 1 – Commitment to drinking water quality management

- The Logan Water/Seqwater Desired Service Standards was reviewed and updated. In addition, a Memorandum of Understanding (MoU) was developed and agreed. The Logan/Seqwater Desired Service Standards and MoU demonstrate the shared commitment between Logan Water and Seqwater to manage drinking water quality throughout the entire network.

Element 2 – Assessment of the drinking water supply system

- Online water quality monitoring systems were reviewed and updated to confirm all associated alarming via SCADA. Ongoing reviews occur via regular Critical Control Point (CCP) review processes.
- Outcomes from the whole of network Drinking Water Quality Risk Assessment conducted in May 2020 continued to be reviewed and incorporated in the RMIP during 2021/22.
- Following the receipt of Information Requirement Notices (IRNs) from the Regulator during 2021/22, the RMIP was reviewed to ensure all unacceptable risks identified during the 2020 whole of network drinking water quality risk assessment are being managed to an acceptable level.
- A project to implement a Common Information System (CIS) was initiated. The CIS is a tool designed to provide efficient access to valuable data from a variety of sources and allows greater assessment and evidence-based decision making throughout the business. This project will continue to incorporate new data sources through 2022/23.
- The Critical Infrastructure Security Upgrade Plan activities continued during the reporting period. This project includes assessment and improvement of Logan Water's reservoir physical security and cyber security management systems. This project is ongoing.

Element 3 – Preventative measures for drinking water quality management

- During 2021/22, we initiated a project to install a CO_2 dosing facility at the Woodhill reservoir. In the coming years, Seqwater has proposed possible increases in pH to extend the longevity of chloramine residuals and improve network disinfection. The CO_2 treatment method is easy to control, harmless and naturally reduces the pH levels compliant with the ADWG.
- Review of the CCPs and Operational Control Points (OCPs) processes continued. SCADA pages were reviewed for each dosing site and clearly listed with relevant limits.
- Installation of online water quality analysers at the outlet of every operational reservoir in the network was completed.
- The reservoir renewals program continued during 2021/22 with improvement works performed at the Springwood Low Level and Round Mountain reservoir complexes. The improvements at each site addressed safety, network operational capability and water quality performance. In addition, reservoir security enhancements continued as part of the Critical Infrastructure Security Plan development.
- A review of optimal reservoir operational levels was undertaken, with the end outcome expected to minimise water age within our reservoirs, whilst maintaining desired service standards accounting for site specific conditions or constraints. Implication of these identified setpoints is expected to be trialled in 2022/23.

Element 4 – Operational procedures and process control

- A procedure to manage accuracy of online monitoring, including calibration of analysers was implemented and appropriate team members were trained.
- Development of the *Healthy Networks Framework* for drinking water management continued. Some actions identified in this framework, like formalised mains cleaning programs, are currently underway with organisational changes in progress to allocate dedicated staff to the roll out and implementation of this framework.
- Ongoing management and improvement of the water quality database (Aquantify) continued. Specific activities included the identification and correction of abnormal data importation, improving the functionality and the development of a notification system for operational limit exceedances to allow for corrective actions to be undertaken in a timely manner. Information from Aquantify will feed forward to the CIS allowing appropriate data to be accessed by all teams within Logan Water. This data informs decisions regarding prioritisation of operational works or planned projects.
- Logan Water transitioned to a new purpose-built office space, including a specialty Integrated Services Hub, known as the ISH. This ISH is a physical hub enabling integrated teams to provide a consistent and optimised approach to service delivery and support. The ISH provides end-to-end visibility of functions and activities and improves customer coordination, planning, scheduling, dispatch, network operations and SCADA management.
- We progressed the Technology One Capability Uplift (TOCU) project. TOCU is a continuous improvement project focussed on uplifting existing TechOne functionality into Logan Water's maintenance management processes (work order lifecycle processes). TOCU will standardise and integrate processes and systems that enable continuous management of our end-to-end maintenance activities.

Element 5 – Verification of drinking water quality

- Customer complaints monitoring is an important part of drinking water quality verification. We continued work on the *Logan 2025 Strategy* and supporting plans, including the Customer Management Model. The model will, amongst other things, improve how we manage and respond to water quality enquiries and complaints.
- We continued to develop disinfection by-product operating protocols. This included continued review and development of the Trihalomethane (THM) and Chlorate operating protocols, with an annual process for review and continual improvements implemented.
- As mentioned in Element 4, we continued the implementation of Aquantify. This database assists personnel to interpret water quality data and determine the appropriate corrective actions to address adverse water quality results. This includes automated notification of ADWG (health and aesthetic) limits breaches, as well as internal operating limits.

Element 6 – Management of incidents and emergencies

- In August 2021, Logan Water participated in the annual All Agencies Emergency Management Group collaborative team training event called Operation Hydra, facilitated by Seqwater. The team included members from the Logan Water Incident Management Team.
- We commenced review of Logan Water's Incident Management Plan and associated Toolkit to accurately reflect the service model realignment.

Element 7 – Employee awareness and training

- Safe drinking water quality awareness training continued to be rolled out to Logan Water staff via the Logan Learning Hub. This training provides all staff with an understanding of our drinking water quality management system and a shared commitment to supply safe drinking water.
- Hazard analysis and critical control points (HACCP) monitoring training continued for SCADA operators. The training involved HACCP alarms management and actions required of the operators whilst looking after the drinking water network.

Element 8 – Community involvement and awareness

- We continued to utilise our Water Wagon at various community events throughout 2021/22. The Water Wagon provides free chilled drinking water to customers with the staff providing education to the community on the environmental and financial benefits of choosing tap water.

Element 9 – Research and development

- We initiated the Reservoir Aeration Investigation Project. The purpose of this project is to identify an effective reservoir aeration design for optimised THM removal. The project will involve a trial at an onsite location with the intent to implement the solution across various reservoirs requiring THM management. This project will continue through 2022/23.

Element 10 – Documentation and record keeping

- We continued to develop our capabilities using Office365. This included the use of various Office365 applications in conjunction with SharePoint to enhance collaboration during the development and review of corporate documents such as, but not limited to, procedures, processes, protocols, forms, and template.

Element 11 – Evaluation and audit

- Our DWQMP is subject to an external regulatory audit on a four-year cycle. There was no requirement to conduct this audit during 2021/22. The next external regulatory audit of Logan Water's approved DWQMP must be conducted by 30 June 2025.

Element 12 – Review and continual improvement

- During the 2021/22, reviews of the DWQMP occurred following IRNs. This included submissions of Rev5.7 in September 2021, and submission of Rev5.8 in May 2022.
- The above reviews of the DWQMP also saw a review of the RMIP to include emerging risks such as chlorate management and to ensure all unacceptable risks identified form the risk assessment were identified and managed to an acceptable level. Improvements to the RMIP review process were identified during the 2021/22 and will be implemented during the 2022/23.
- No regular review of the DWQMP was conducted during 2021/22. The next regular review of Logan Water's DWQMP is to be conducted by 29 December 2023.

Notifying the Regulator

6

Under section 102 of the Act, Logan Water is required to immediately notify the Regulator if the quality of water supplied from the drinking water service does not comply with the water quality criteria as specified in the ADWG. Our water quality incidents represent the number of times a water quality sample did not meet the ADWG parameters, resulting in the immediate notification of the incident to the Regulator.

Notifiable events may include:

- a detection of *E. coli*, and/or
- an exceedance of a health guideline value in the ADWG, and/or
- detections of parameters with no guideline values in the ADWG, and/or
- water quality events that a service provider cannot manage within existing processes and/or that may impact on the health of customers. For example, a wide-spread discoloured water event, or a flood event that threatens water quality.

In 2021/22, we took over 2,600 water samples and conducted more than 60,000 water quality tests. Of those samples, one test did not meet the requirements of the ADWG requiring us to report this as an incident to the Regulator. The incident occurred on 28 February 2022 in the Kimberley Park WSZ, details are provided in Table 6.

Table 6: Water quality incidents reported to the Regulator 1 July 2021 – 30 June 2022

Date	Location	Description	Immediate corrective actions	Investigation outcome and further actions
28/02/22	**Kimberley Park WSZ**	The non-compliance was a detection of *E. coli* from a routine sample taken from the Kimberley Park Elevated Reservoir sample point (DSP033). 1MPN *E.coli* organisms per 100mL was detected. Follow-up samples exhibited no continued presence of *E. coli* and supply met ADWG (health) guidelines.	An Incident Management Team was mobilised to manage the incident, including notification to Seqwater. Resampling at initial detection site and downstream within affected DMA045, as well as downstream of Seqwater owned Kimberley Park Ground reservoir. Isolated Kimberley Park elevated reservoir and supplying nearby area in pressure mode. Inspected Logan Water's Kimberley Park elevated reservoir for potential contamination of ingress opportunities. Requested inspection of Seqwater's Kimberley Park ground reservoir.	No adverse customer impact was associated with this event Low chlorine residual was present at time of routine sample, in conjunction with a significant rainfall event. Continue investigation into options to improve disinfection across this water supply zone.

7 Customer satisfaction

We encourage our community to contact us if they have any concerns about their water quality. As a service provider, we are committed to providing safe, consistent, and reliable water to our customers, and we recognise the value in the feedback of our customers to help identify possible areas of improvement in the operation, maintenance and management of our drinking water network.

Water quality complaints are classified into four categories, as shown in Table 7.

Table 7: Water quality complaint categories

Water quality complaint category	Description
Appearance	Unexpected events such as broken water mains or firefighting could result in discoloured water. This is due to deposits that build up over time being disturbed by the change in the water flow and direction. If your water looks white or milky, it could be due to recent maintenance, which can trap air bubbles in pipes.
Taste/odour	Taste and odour complaints can vary widely based on the customer's perception. The most common taste and odour complaint descriptions included chlorine, metallic and chemical tastes. Our water quality team investigates these complaints, assesses water quality results in the area, undertakes further consultation with the customer and identifies works that may have contributed to this change. This information is useful to determine appropriate corrective actions, which may include localised flushing, network flushing, or sampling.
Suspected illness	All calls received from customers who suspect their drinking water may be associated with an illness they are experiencing.
Other	This classification captures complaints that do not fall within the standard Logan Water categories.

7.1 Water quality complaints performance 2021/22

Table 8 shows water quality complaints by category and WSZ.

Table 8: Water quality complaint categories by water supply zone

2021/22 Water Quality Complaints					
Water Supply Zone	**Appearance**	**Taste/Odour**	**Suspected Illness**	**Other**	**Total**
Greenbank	26	16	4	1	47
Kimberley Park	10	23	1	1	35
Logan East	17	11	2	1	31
Logan South	12	3	4	1	20
Marsden	25	46	4	4	79
Springwood	58	70	6	0	134
Total	**148**	***169***	***21***	**8**	**346**
% of Total	42.8%	48.8%	6.1%	2.3%	100%

In 2021/22, we received 346 water quality complaints across the four water quality categories, as shown in Table 9.

Table 9: Water quality complaints 2021/22 by category

Category	Complaints	Commentary
Appearance	**148**	Our response included flushing affected areas to improve water quality.
Taste/odour	**169**	In summer of 2021/22, the increased rainfall volumes and warmer temperatures led to the establishment of two compounds known as Geosmin and MIB (2-Methylisoborneol) in the mid Brisbane River, upstream of Seqwater's Mt Crosby WTPs. These two compounds are safe to consume but impart a distinct earthy taste and odour and were unable to be removed by existing treatment processes. This led to approximately 150,000 customers in Logan experiencing an earthy taste and odour to their water and generated 100 enquiries associated with this event.
Suspected illness	**21**	These complaints came from customers who suspected the water quality had contributed to an illness or adverse health condition they had experienced. In all instances, staff from our internal NATA accredited laboratory collected a sample at the customer's property, and our nearest network sample point for comparison. All testing during these investigations confirmed that the water supplied met the ADWG with the customer advised accordingly.
Other	**8**	These complaints did not fall within the standard complaints categories. Examples include customers who expressed a general dissatisfaction with their water supply, customers querying the quality of the drinking water after at home test kits indicated abnormally high values, or when a white residue remains after washing a vehicle or glassware. Our water quality team investigates these complaints and works with customers to determine if any corrective actions can be implemented.

Figure 3 demonstrates our performance regarding the number of complaints per 1,000 property connections. Whilst the metric for complaints per 1,000 connections is elevated from previous years, it is worth noting that 100 of the complaints received this year can be attributed to the Geosmin and 2-Methyl isoborneol (MIB)[7] event that occurred during December 2021 – January 2022, and directly relates to the inability of the Mt Crosby WTPs to remove these compounds. We saw a notable decrease in the number of complaints received from our WSZs that receive water from sources other than Mt Crosby.

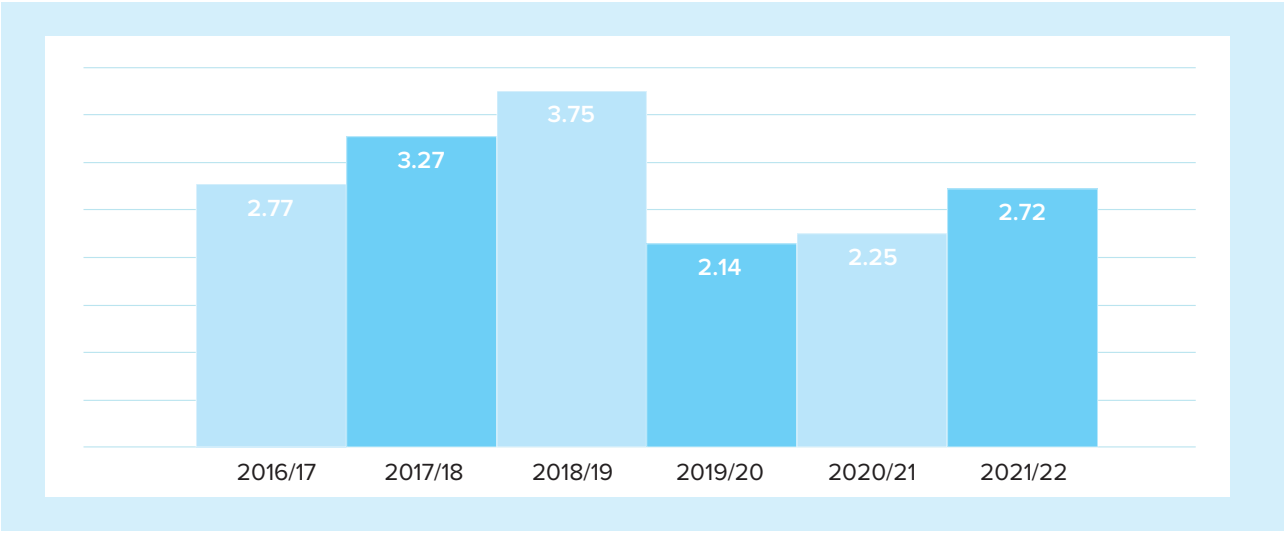


Figure 3 – Historical trend of water quality complaints per 1,000 connections

7 *Geosmin and MIB are compounds produced from algae or bacteria in catchments contributing to taste and odour of water typically described as earthy, musty, swampy or metallic.*

8

Drinking Water Quality Management Plan review and audit activities

8.1 DWQMP regular review

We are required to carry out reviews of our approved DWQMP on a biennial cycle, or as otherwise directed by the Regulator. The purpose of the regular review is to ensure the DWQMP remains relevant, having regard for the current circumstances and operation of the water service.

In accordance with Section 99 (2)(b) and Section 106 of the Act, Logan Water last undertook a review of the DWQMP in July 2020.

During the 2021/22 reporting period, Logan Water received and responded to two formal IRNs issued by the Regulator. The response to those IRNs is summarised in Table 10.

The Regulator accepted these responses and approved the revised DWQMP on 14 June 2022. The next scheduled regular review of the DWQMP is to be conducted by 29 December 2023.

8.2 DWQMP regular audit

We are required to carry out an audit of our approved DWQMP on a four-year cycle. The last audit was undertaken in May 2021. The next external regulatory audit of Logan Water's approved DWQMP must be conducted by 30 June 2025.

Table 10: Summary of DWQMP amendments

Item		Actions	DWQMP
Rev5.7	Provide the water quality data for all bulk supply points identified in the DWQMP.	Spring Mountain reservoir performance data added.	Appendix H
	Provide the details of the personnel (i.e. position) who participated in the hazard identification and risk assessment process.	Details of personnel updated and position descriptions added.	Appendix J
	Address the risks of chlorates in the drinking water supply.	Risk of chlorates addressed	Section 3.1.7.2
	Review the list of operational and maintenance procedures in Appendix K, to include all operational and maintenance procedures along with the date each was last revised.	Operational and maintenance procedures reviewed and updated.	Appendix K
	Include the water quality procedure 'ADWG (Health) Limit Exceedance Action Plan Flowchart' as stated in the DWQMP.	ADWG (Health) Exceedance Action Plan added.	Appendix T
	Review the Risk Management Improvement Plan (RMIP) in Appendix R to ensure that the RMIP actions are identified to manage the unacceptable residual risks from the risk assessment.	RMIP reviewed with actions identified and unacceptable risks from the risk assessment managed.	Appendix R

Table 10: Summary of DWQMP amendments			
Item		**Actions**	**DWQMP**
Rev5.8	Undertake risk assessment for chlorate formation from the sodium hypochlorite disinfection systems and include in the Plan's risk assessment.	Chlorate risks assessed and included in the risk assessment.	Appendix I
	Review preventative measures and comments in the risk assessment to ensure the preventative measures are appropriately applied to manage the risk to an acceptable level. Comments should not contradict preventative measures in place. If risk cannot be further reduced, then should be noted 'as low as reasonably practicable (ALARP)'.	Preventative measure and comments have been reviewed to ensure management is to an acceptable level. Contradicting preventative measures have also been corrected and risks that have been reduced to ALARP have been included.	Appendix I
	Review risk assessment to ensure all preventative measures are appropriately applied to determine the mitigated risks.	Risk assessment reviewed and preventative measures applied to determine mitigated risks.	Appendix I
	Review risk assessment to determine if the mitigated risks are accurate and reflective of preventative measures in place.	Risk assessment reviewed to ensure mitigated risks are accurate and reflective of preventative measures.	Appendix I
	Review risk assessment to identify RMIP items that will be implemented to reduce the risk to an acceptable level.	Risk assessment reviewed and RMIP items identified to reduce risks to an acceptable level.	Appendix I
	Review the Plan's RMIP in Appendix R to ensure that the RMIP actions are identified to manage all unacceptable residual risks from the risk assessment and clearly link the RMIP action items to the risk assessment.	RMIP actions identified to manage unacceptable residual risks from the risk assessment. All RMIP action items have been linked to the risk assessment.	Appendix I
	Ensure all procedures identified within the risk assessment are clearly listed in Appendix K.	Procedures within risk assessment identified and listed (Appendix K).	Appendix K
	Revise and update the incident reporting information in Annex Q Stakeholder Engagement Matrix.	Incident reporting timeframes updated to show the 3-hour reporting timeframe (Annex Q).	Appendix Q
	Review and update the incident management plan to include appropriate reporting time framing.	Incident reporting timeframes updated within the Incident Management Plan.	Section 3.2
	Include a statement to justify why the operational monitoring is considered appropriate. The justification can include for example, an explanation of why the monitoring parameters have been chosen and their frequency of analysis.	Statements included to justify operational monitoring parameters and their frequency of analysis.	Section 5.2
	Include chlorate monitoring in the Plan's verification monitoring program. To make it clear, once the risk of chlorate has been assessed and included in the (ref 6.1.1) any detection of chlorate >0.8 mg/L must be notified to the Regulator within 3 hours of becoming aware of the incident.	Chlorate monitoring included in the verification monitoring program. Risk of chlorates assessed, and interim reportable limits included.	Appendix B

9

Appendices

Appendix A – Seqwater Grid Map

Seqwater Grid Map as at September 2022.

South East Queensland Water Grid

Legend

- Northern Pipeline Interconnector
- Western Corridor Recycled Water Scheme
- Southern Regional Water Pipeline
- Eastern Pipeline Interconnector
- Network Integration Pipeline
- Other bulk water pipelines connecting the SEQ Water Grid
- Local Government boundary
- Bulk Water Storage Reservoirs
- Water Treatment Plants (WTP) - connected to grid
- Water Treatment Plants (WTP - off-grid
- Water Treatment Plants (WTP) - other
- Purified Recycled Water Treatment Plants
- Desalination Plant
- Power Stations

Water Treatment Plants (WTP)

1 Amity Point
2 Beaudesert
3 Boonah Kalbar
4 Canungra
5 Capalaba
6 Dayboro
7 Dunwich
8 Esk
9 Ewen Maddock
10 Hinze Dam
11 Image Flat
12 Jimna
13 Kenilworth
14 Kilcoy
15 Kirkleagh
16 Kooralbyn
17 Landers Shute
18 Linville
19 Lowood
20 Maroon Dam
21 Molendinar
22 Moogerah
23 Mount Crosby East Bank
24 Mount Crosby West Bank
25 Mudgeeraba
26 Noosa
27 North Pine
28 North Stradbroke (Minjerribah)
29 Point Lookout
30 Rathdowney
31 Somerset Dam (Township)
32 Wivenhoe Dam

Desalination Plant

33 Gold Coast

Purified Recycled Water Treatment Plants

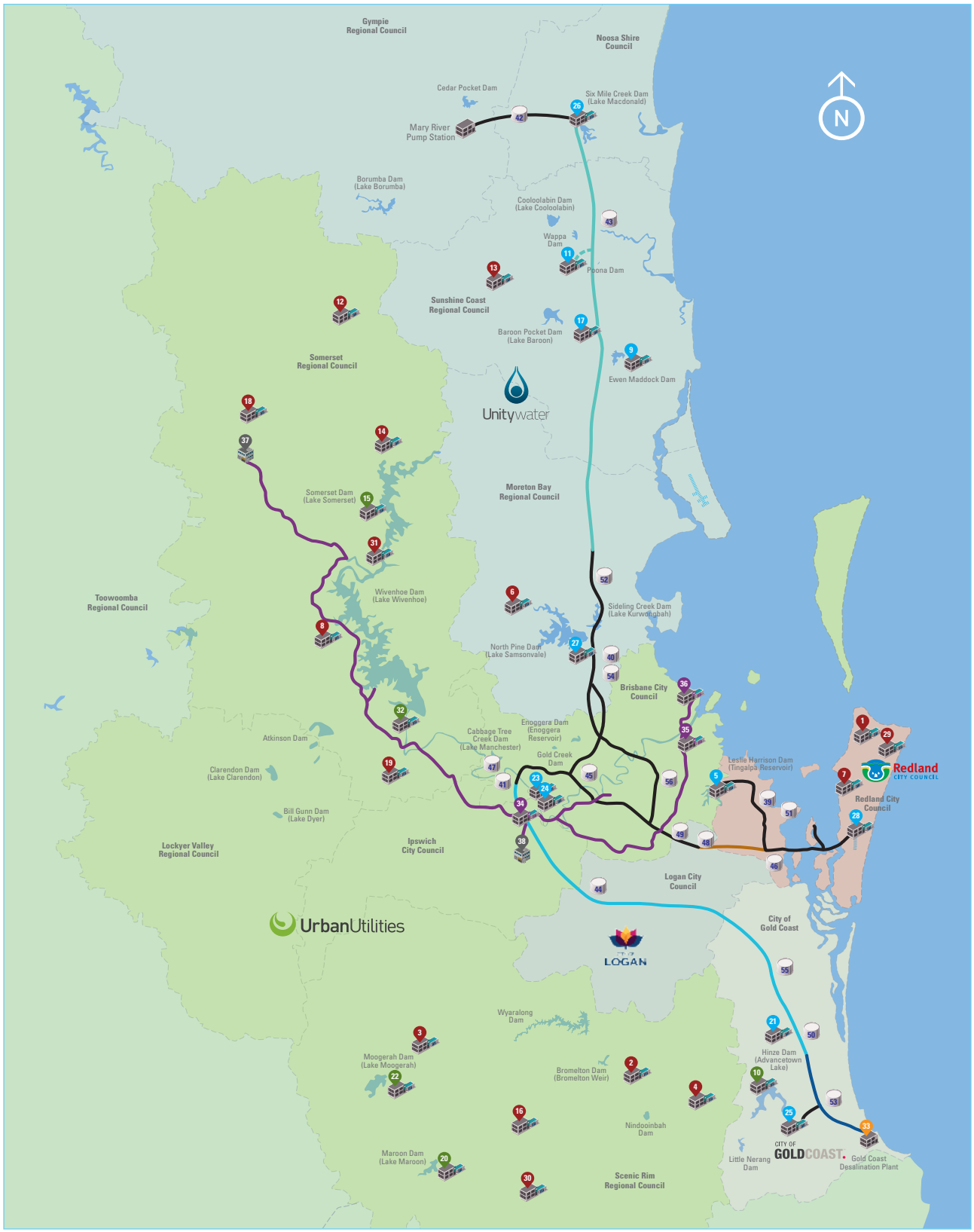
34 Bundamba
35 Gibson Island
36 Luggage Point

Power Stations

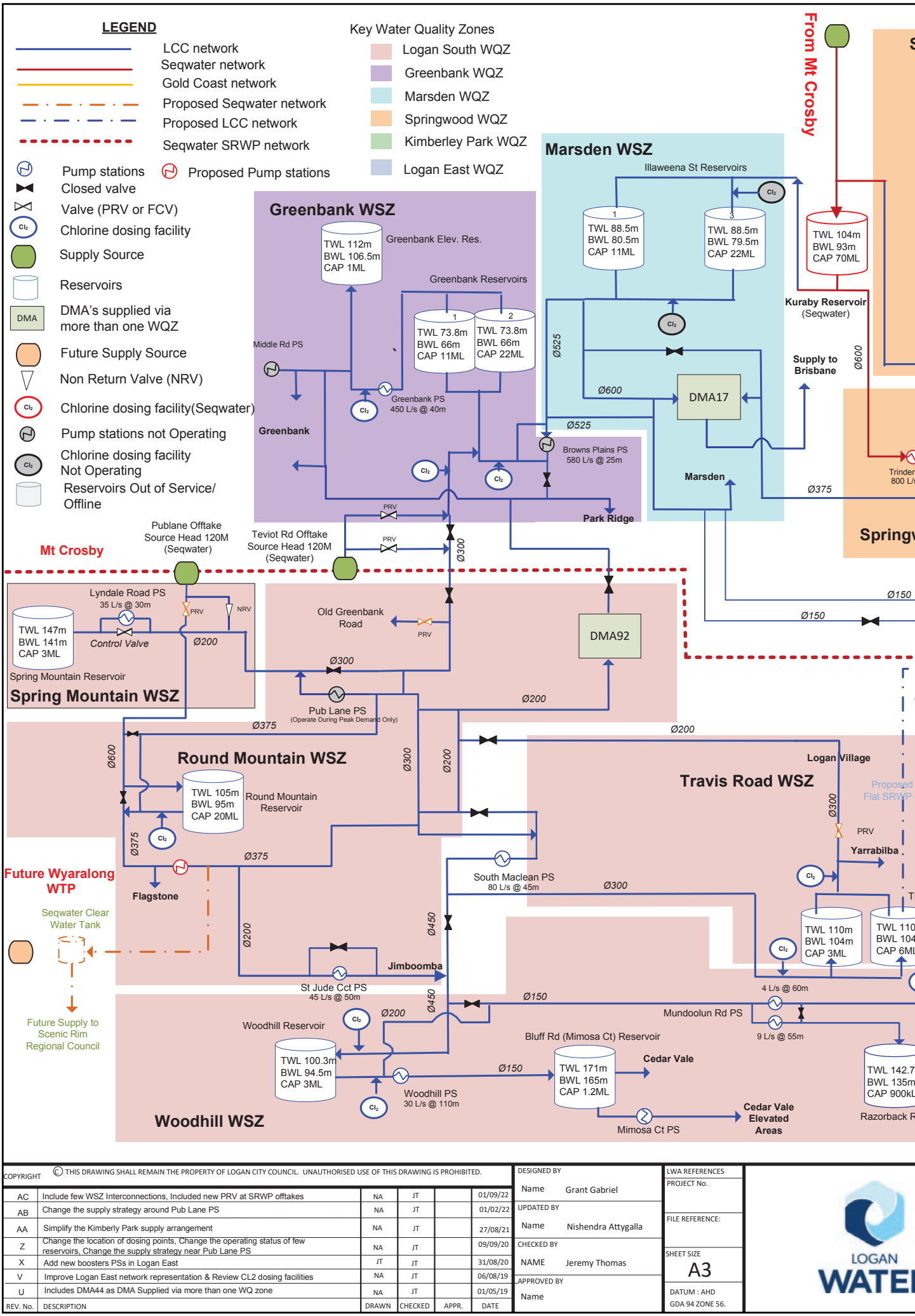
37 Tarong
38 Swanbank

Reservoirs

39 Alexandra Hills
40 Aspley
41 Camerons Hill
42 Cooroora
43 Ferntree
44 Greenbank
45 Green Hill
46 Heinemann Road
47 Holts Hill
48 Kimberley Park
49 Kuraby
50 Molendinar
51 Mt Cotton
52 Narangba
53 Robina
54 Sparkes Hill
55 Stapylton
56 Wellers Hill


Gympie Regional Council
Noosa Shire Council
Cedar Pocket Dam
Six Mile Creek Dam (Lake Macdonald)
Mary River Pump Station
Borumba Dam (Lake Borumba)
Cooloolabin Dam (Lake Cooloolabin)
Wappa Dam
Poona Dam
Sunshine Coast Regional Council
Baroon Pocket Dam (Lake Baroon)
Ewen Maddock Dam
Somerset Regional Council
Unitywater
Somerset Dam (Lake Somerset)
Moreton Bay Regional Council
Wivenhoe Dam (Lake Wivenhoe)
Toowoomba Regional Council
Sideling Creek Dam (Lake Kurwongbah)
North Pine Dam (Lake Samsonvale)
Brisbane City Council
Enoggera Dam (Enoggera Reservoir)
Cabbage Tree Creek Dam (Lake Manchester)
Atkinson Dam
Gold Creek Dam
Leslie Harrison Dam (Tingalpa Reservoir)
Redland City Council
Clarendon Dam (Lake Clarendon)
Bill Gunn Dam (Lake Dyer)
Lockyer Valley Regional Council
Ipswich City Council
Logan City Council
UrbanUtilities
City of Gold Coast
LOGAN
Wyaralong Dam
Hinze Dam (Advancetown Lake)
Moogerah Dam (Lake Moogerah)
Bromelton Dam (Bromelton Weir)
Nindooinbah Dam
Maroon Dam (Lake Maroon)
Little Nerang Dam
CITY OF GOLDCOAST
Gold Coast Desalination Plant
Scenic Rim Regional Council

Appendix B – Logan Water Supply Network Schematic

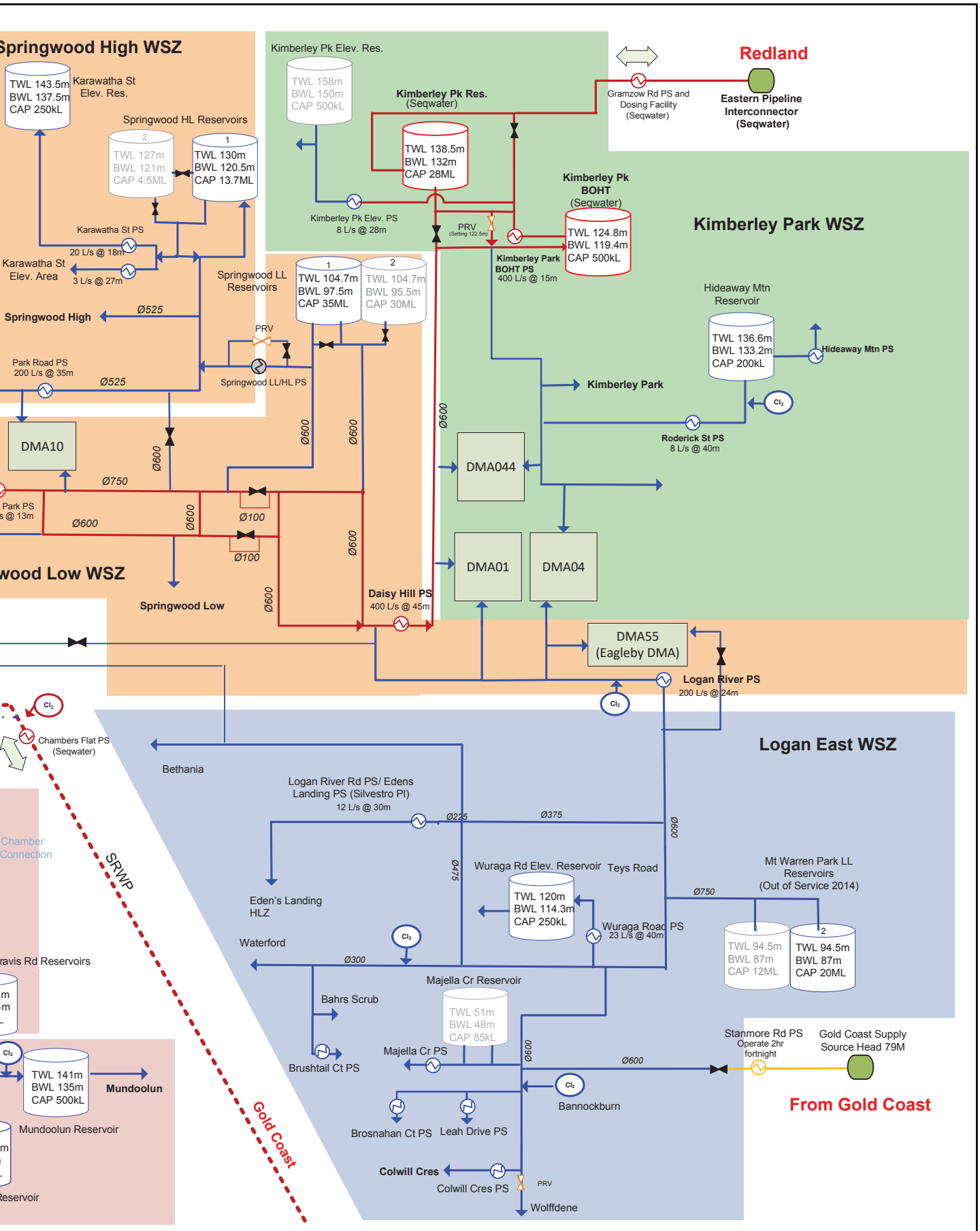


REV. No.	DESCRIPTION	DRAWN	CHECKED	APPR.	DATE
AC	Include few WSZ Interconnections, Included new PRV at SRWP offtakes	NA	JT		01/09/22
AB	Change the supply strategy around Pub Lane PS	NA	JT		01/02/22
AA	Simplify the Kimberly Park supply arrangement	NA	JT		27/08/21
Z	Change the location of dosing points, Change the operating status of few reservoirs, Change the supply strategy near Pub Lane PS	NA	JT		09/09/20
X	Add new boosters PSs in Logan East	JT	JT		31/08/20
V	Improve Logan East network representation & Review CL2 dosing facilities	NA	JT		06/08/19
U	Includes DMA44 as DMA Supplied via more than one WQ zone	NA	JT		01/05/19

DESIGNED BY Name Grant Gabriel
UPDATED BY Name Nishendra Attygalla
CHECKED BY NAME Jeremy Thomas
APPROVED BY Name

LWA REFERENCES
PROJECT No.
FILE REFERENCE:
SHEET SIZE A3
DATUM : AHD
GDA 94 ZONE 56.

LOGAN WATER



CITY OF LOGAN

PROJECT:	Logan Water Supply Network Schematic
DATE.	01/09/2022
DRAWING TITLE:	Water Supply Servicing Strategy (2022 September)
WIPA DRAWING No.	FIGURE 6
DESIGN COMPANY.	WIPA
REV.	AC
TECH SERVICES DRG No.	DM# 9553933

Appendix C – Summary of Compliance with Water Quality Criteria

Table 11 – 2021/22 All Water Supply Zone Water Quality Summary

Parameter (Microbial)	Total No. of samples collected	No. of samples in which parameter was detected	% Sampled complied	ADWG Guideline (Health)	ADWG Compliance (Health)
E. coli by Colilert	2692	1	99.96%	98.00%	✓

Parameter (Physical / Chemical)	Number of samples	Min	Max	Average	ADWG Guideline (Aesthetic)	No. over Aesthetic Limit	ADWG Guideline (Health)	No. over Health Limit	Regulatory Status
Alkalinity as CaCO3	2694	25	119	62	ns	ns	b	b	b
Aluminium, Total	637	0.01	0.38	0.03	0.2	1	b	b	b
Ammonia-N	2664	<0.01	0.40	0.08	0.41	0	b	b	b
Arsenic, Total	637	<0.001	0.001	<0.001	ns	ns	0.01	0	✓
Barium, Total	637	<0.001	0.042	0.017	ns	ns	2	0	✓
Beryllium, Total	637	<0.001	<0.001	<0.001	ns	ns	0.06	0	✓
Bismuth, Total	637	<0.001	0.03	<0.001	ns	ns	b	b	b
Boron, Total	637	0.02	0.342	0.107	ns	ns	4	0	✓
Bromodichloromethane	1646	<0.005	0.063	0.024	ns	ns	b	b	b
Bromoform	1646	<0.005	0.038	0.005	ns	ns	b	b	b
Cadmium, Total	637	<0.001	<0.001	<0.001	ns	ns	0.002	0	✓
Calcium Hardness	637	23	84	55	ns	ns	b	b	b
Calcium Total	637	9	34	22	ns	ns	b	b	b
Chloride	637	14	110	38	250	0	b	b	b
Chlorine, Free	2694	<0.05	4.1	0.47	0.6	1004	5	0	✓
Chlorine, Total	2694	<0.05	4.6	1.06	0.6	1825	5	0	✓
Chloroform	1646	<0.005	0.126	0.050	ns	ns	b	b	b
Chromium, Total	637	<0.001	0.004	<0.001	ns	ns	0.05	0	✓
Cobalt, Total	637	<0.001	0.001	<0.001	ns	ns	b	b	b
Colour, Apparent	637	<3	40	2	ns	ns	b	b	b
Colour, True	637	<3	13	2	15	0	b	b	b
Conductivity	2694	113	751	336	ns	ns	b	b	b
Copper, Total	637	<0.001	0.036	0.004	1	0	2	0	✓
Dibromochloromethane	1646	<0.005	0.081	0.016	ns	ns	b	b	b

ns – no ADWG (2011) aesthetic guideline specified
b – no ADWG (2011) health guideline specified
✓ – Results meet ADWG (Health) criteria compliance limits

Table 11 – 2021/22 All Water Supply Zone Water Quality Summary									
Parameter (Physical / Chemical)	Number of samples	Min	Max	Average	ADWG Guideline (Aesthetic)	No. over Aesthetic Limit	ADWG Guideline (Health)	No. over Health Limit	Regulatory Status
Fluoride	637	0.3	1.1	0.8	ns	ns	1.5	0	✓
Heterotrophic Plate Count	1755	<10	3001	22	ns	ns	b	b	b
Iron, Total	637	<0.003	0.891	0.013	0.3	2	b	b	b
Lead, Total	637	<0.001	0.007	<0.001	ns	ns	0.01	0	✓
Lithium, Total	637	<0.001	0.001	<0.001	ns	ns	b	b	b
Magnesium, Total	637	<1	18	7	ns	ns	b	b	b
Manganese, Total	637	<0.001	0.285	0.004	0.1	1	0.5	0	✓
Molybdenum, Total	637	<0.001	0.001	<0.001	ns	ns	0.05	0	✓
Nickel, Total	637	<0.001	0.003	<0.001	ns	ns	0.02	0	✓
Nitrate-N	637	<0.1	1.3	0.5	ns	ns	11.3	0	✓
Nitrite-N	637	<0.1	0.5	0.1	ns	ns	0.9	0	✓
pH	2694	6.8	8.7	7.5	6.5 – 8.5	6	b	b	b
Potassium, Total	637	<1	6	2	ns	ns	b	b	b
Selenium, Total	637	<0.01	<0.01	<0.01	ns	ns	0.01	0	✓
Sodium, Total	637	13	71	33	180	0	b	b	b
Sulphate	637	9	110	31	250	0	500	0	✓
TDS, Calculated	2694	32	456	204	600	0	b	b	b
Temperature	2693	15.9	29.5	22.9	ns	ns	b	b	b
Thallium, Total	637	<0.001	<0.001	<0.001	ns	ns	b	b	b
Total Coliforms	2692	0	2401	3	ns	ns	b	b	b
Total Hardness	637	45	152	83	200	0	b	b	b
Total THM	1646	<0.02	0.21	0.09	ns	ns	0.25	0	✓
Turbidity	2694	<0.1	4.4	0.1	5	0	b	b	b
Zinc	637	<0.01	0.02	<0.01	3	0	b	b	b

ns – no ADWG (2011) aesthetic guideline specified
b – no ADWG (2011) health guideline specified
✓ – Results meet ADWG (Health) criteria compliance limits

Table 12 – 2021/22 Greenbank Water Supply Zone Water Quality Summary									
Parameter (Microbial)	**Total No. of samples collected**	**No. of samples in which parameter was detected**		**% Sampled complied**		**ADWG Guideline (Health)**		**ADWG Compliance (Health)**	
E. coli by Colilert	332	0		100.00%		98.00		✓	
Parameter (Physical / Chemical)	**Number of samples**	**Min**	**Max**	**Average**	**ADWG Guideline (Aesthetic)**	**No. over Aesthetic Limit**	**ADWG Guideline (Health)**	**No. over Health Limit**	**Regulatory Status**
Alkalinity as CaCO3	332	25	116	56	ns	ns	b	b	b
Aluminium, Total	78	0.02	0.06	0.03	0.2	0	b	b	b
Ammonia-N	323	<0.01	0.30	0.08	0.41	0	b	b	b
Arsenic, Total	78	<0.001	0.001	<0.001	ns	ns	0.01	0	✓
Barium, Total	78	0.008	0.033	0.013	ns	ns	2	0	✓
Beryllium, Total	78	<0.001	<0.001	<0.001	ns	ns	0.06	0	✓
Bismuth, Total	78	<0.001	0.002	<0.001	ns	ns	b	b	b
Boron, Total	78	0.03	0.22	0.12	ns	ns	4	0	✓
Bromodichloromethane	274	0.011	0.047	0.024	ns	ns	b	b	b
Bromoform	274	<0.005	0.020	0.004	ns	ns	b	b	b
Cadmium, Total	78	<0.001	<0.001	<0.001	ns	ns	0.002	0	✓
Calcium Hardness	78	38	71	51	ns	ns	b	b	b
Calcium Total	78	15	28	21	ns	ns	b	b	b
Chloride	78	17	68	34	250	0	b	b	b
Chlorine, Free	332	<0.05	1.73	0.66	0.6	196	5	0	✓
Chlorine, Total	332	<0.05	2.80	1.10	0.6	268	5	0	✓
Chloroform	274	0.016	0.115	0.055	ns	ns	b	b	b
Chromium, Total	78	<0.001	0.001	<0.001	ns	ns	0.05	0	✓
Cobalt, Total	78	<0.001	<0.001	<0.001	ns	ns	b	b	b
Colour, Apparent	78	<3	5	<3	ns	ns	b	b	b
Colour, True	78	<3	<3	<3	15	0	b	b	b
Conductivity	332	190	623	294	ns	ns	b	b	b
Copper, Total	78	<0.001	0.015	0.003	1	0	2	0	✓
Dibromochloromethane	274	<0.005	0.050	0.015	ns	ns	b	b	b

ns – no ADWG (2011) aesthetic guideline specified
b – no ADWG (2011) health guideline specified
✓ – Results meet ADWG (Health) criteria compliance limits

Table 12 – 2021/22 Greenbank Water Supply Zone Water Quality Summary									
Parameter (Physical / Chemical)	Number of samples	Min	Max	Average	ADWG Guideline (Aesthetic)	No. over Aesthetic Limit	ADWG Guideline (Health)	No. over Health Limit	Regulatory Status
Fluoride	78	0.7	1.0	0.8	ns	ns	1.5	0	✓
Heterotrophic Plate Count	228	<10	301	17	ns	ns	b	b	b
Iron, Total	78	<0.003	0.032	0.007	0.3	0	b	b	b
Lead, Total	78	<0.001	<0.001	<0.001	ns	ns	0.01	0	✓
Lithium, Total	78	<0.001	0.001	<0.001	ns	ns	b	b	b
Magnesium, Total	78	2	16	5	ns	ns	b	b	b
Manganese, Total	78	<0.001	0.014	0.002	0.1	0	0.5	0	✓
Molybdenum, Total	78	<0.001	0.001	<0.001	ns	ns	0.05	0	✓
Nickel, Total	78	<0.001	0.001	<0.001	ns	ns	0.02	0	✓
Nitrate-N	78	<0.1	1.0	0.3	ns	ns	11.3	0	✓
Nitrite-N	78	<0.1	0.4	<0.1	ns	ns	0.9	0	✓
pH	332	6.9	8.7	7.4	6.5 – 8.5	2	b	b	b
Potassium, Total	78	1	4	2	ns	ns	b	b	b
Selenium, Total	78	<0.01	<0.01	<0.01	ns	ns	0.01	0	✓
Sodium, Total	78	16	60	30	180	0	b	b	b
Sulphate	78	14	85	25	250	0	500	0	✓
TDS, Calculated	332	116	378	179	600	0	b	b	b
Temperature	332	17.0	27.9	22.6	ns	ns	b	b	b
Thallium, Total	78	<0.001	<0.001	<0.001	ns	ns	b	b	b
Total Coliforms	332	0	0	0	ns	ns	b	b	b
Total Hardness	78	52	132	73	200	0	b	b	b
Total THM	274	0.04	0.16	0.10	ns	ns	0.25	0	✓
Turbidity	332	<0.1	0.3	0.1	5	0	b	b	b
Zinc	78	<0.01	<0.01	<0.01	3	0	b	b	b

ns – no ADWG (2011) aesthetic guideline specified
b – no ADWG (2011) health guideline specified
✓ – Results meet ADWG (Health) criteria compliance limits

Table 13 – 2021/22 – Kimberley Park Water Supply Zone Water Quality Summary									
Parameter (Microbial)	**Total No. of samples collected**	**No. of samples in which parameter was detected**		**% Sampled complied**		**ADWG Guideline (Health)**		**ADWG Compliance (Health)**	
E. coli by Colilert	166	1		99.40%		98.00%		✓	
Parameter (Physical / Chemical)	**Number of samples**	**Min**	**Max**	**Average**	**ADWG Guideline (Aesthetic)**	**No. over Aesthetic Limit**	**ADWG Guideline (Health)**	**No. over Health Limit**	**Regulatory Status**
Alkalinity as CaCO3	166	43	117	77	ns	ns	b	b	b
Aluminium, Total	39	0.02	0.06	0.04	0.2	0	b	b	b
Ammonia-N	166	<0.01	0.30	0.06	0.41	0	b	b	b
Arsenic, Total	39	<0.001	0.001	<0.001	ns	ns	0.01	0	✓
Barium, Total	39	0.015	0.033	0.026	ns	ns	2	0	✓
Beryllium, Total	39	<0.001	<0.001	<0.001	ns	ns	0.06	0	✓
Bismuth, Total	39	<0.001	<0.001	<0.001	ns	ns	b	b	b
Boron, Total	39	0.03	0.08	0.05	ns	ns	4	0	✓
Bromodichloromethane	119	<0.005	0.063	0.030	ns	ns	b	b	b
Bromoform	119	<0.005	0.073	0.028	ns	ns	b	b	b
Cadmium, Total	39	<0.001	<0.001	<0.001	ns	ns	0.002	0	✓
Calcium Hardness	39	36	72	60	ns	ns	b	b	b
Calcium Total	39	14	29	24	ns	ns	b	b	b
Chloride	39	25	90	57	250	0	b	b	b
Chlorine, Free	166	<0.05	4.1	0.35	0.6	47	5	0	✓
Chlorine, Total	166	<0.05	4.6	0.67	0.6	72	5	0	✓
Chloroform	119	<0.005	0.126	0.039	ns	ns	b	b	b
Chromium, Total	39	<0.001	0.001	<0.001	ns	ns	0.05	0	✓
Cobalt, Total	39	<0.001	<0.001	<0.001	ns	ns	b	b	b
Colour, Apparent	39	<3	5	<3	ns	ns	b	b	b
Colour, True	39	<3	<3	<3	15	0	b	b	b
Conductivity	166	242	729	473	ns	ns	b	b	b
Copper, Total	46	<0.001	0.013	0.005	1	0	2	0	✓
Dibromochloromethane	119	<0.005	0.073	0.028	ns	ns	b	b	b

ns – no ADWG (2011) aesthetic guideline specified
b – no ADWG (2011) health guideline specified
✓ – Results meet ADWG (Health) criteria compliance limits

Table 13 – 2021/22 – Kimberley Park Water Supply Zone Water Quality Summary									
Parameter (Physical / Chemical)	Number of samples	Min	Max	Average	ADWG Guideline (Aesthetic)	No. over Aesthetic Limit	ADWG Guideline (Health)	No. over Health Limit	Regulatory Status
Fluoride	39	0.6	1.0	0.8	ns	ns	1.5	0	✓
Heterotrophic Plate Count	120	<10	301	<10	ns	ns	b	b	b
Iron, Total	39	0.007	0.108	0.019	0.3	0	b	b	b
Lead, Total	39	<0.001	0.001	<0.001	ns	ns	0.01	0	✓
Lithium, Total	39	<0.001	<0.001	<0.001	ns	ns	b	b	b
Magnesium, Total	39	5	16	12	ns	ns	b	b	b
Manganese, Total	39	0.002	0.015	0.006	0.1	0	0.5	0	✓
Molybdenum, Total	39	<0.001	0.001	<0.001	ns	ns	0.05	0	✓
Nickel, Total	39	<0.001	0.001	<0.001	ns	ns	0.02	0	✓
Nitrate-N	39	0.2	1.3	0.7	ns	ns	11.3	0	✓
Nitrite-N	39	<0.1	0.4	0.1	ns	ns	0.9	0	✓
pH	166	6.9	7.9	7.5	6.5 – 8.5	0	b	b	b
Potassium, Total	39	2	6	3	ns	ns	b	b	b
Selenium, Total	39	<0.01	<0.01	<0.01	ns	ns	0.01	0	✓
Sodium, Total	39	36	71	47	180	0	b	b	b
Sulphate	39	27	67	44	250	0	500	0	✓
TDS, Calculated	166	147	442	287	600	0	b	b	b
Temperature	165	16.4	29.1	23.3	ns	ns	b	b	b
Thallium, Total	39	<0.001	<0.001	<0.001	ns	ns	b	b	b
Total Coliforms	166	0	31	0	ns	ns	b	b	b
Total Hardness	39	59	132	110	200	0	b	b	b
Total THM	119	0.01	0.20	0.10	ns	ns	0.25	0	✓
Turbidity	166	<0.1	0.6	0.2	5	0	b	b	b
Zinc	39	<0.01	0.01	<0.01	3	0	b	b	b

ns – no ADWG (2011) aesthetic guideline specified
b – no ADWG (2011) health guideline specified
✓ – Results meet ADWG (Health) criteria compliance limits

Table 14 – 2021/22 Logan East Water Supply Zone Water Quality Summary									
Parameter (Microbial)	**Total No. of samples collected**	**No. of samples in which parameter was detected**		**% Sampled complied**		**ADWG Guideline (Health)**		**ADWG Compliance (Health)**	
E. coli by Colilert	537	0		100.00%		98.00%		✓	
Parameter (Physical / Chemical)	**Number of samples**	**Min**	**Max**	**Average**	**ADWG Guideline (Aesthetic)**	**No. over Aesthetic Limit**	**ADWG Guideline (Health)**	**No. over Health Limit**	**Regulatory Status**
Alkalinity as CaCO3	539	37	90	55	ns	ns	b	b	b
Aluminium, Total	128	0.01	0.08	0.03	0.2	0	b	b	b
Ammonia-N	539	<0.01	0.33	0.04	0.41	0	b	b	b
Arsenic, Total	128	<0.001	0.001	<0.001	ns	ns	0.01	0	✓
Barium, Total	128	<0.001	0.031	0.014	ns	ns	2	0	✓
Beryllium, Total	128	<0.001	<0.001	<0.001	ns	ns	0.06	0	✓
Bismuth, Total	128	<0.001	0.003	<0.001	ns	ns	b	b	b
Boron, Total	128	0.02	0.31	0.11	ns	ns	4	0	✓
Bromodichloromethane	351	0.010	0.057	0.024	ns	ns	b	b	b
Bromoform	351	<0.005	0.038	<0.005	ns	ns	b	b	b
Cadmium, Total	128	<0.001	<0.001	<0.001	ns	ns	0.002	0	✓
Calcium Hardness	128	40	84	54	ns	ns	b	b	b
Calcium Total	128	16	34	22	ns	ns	b	b	b
Chloride	128	14	110	35	250	0	b	b	b
Chlorine, Free	539	<0.05	1.85	0.64	0.6	310	5	0	✓
Chlorine, Total	539	<0.05	2.10	0.83	0.6	364	5	0	✓
Chloroform	351	0.018	0.092	0.054	ns	ns	b	b	b
Chromium, Total	128	<0.001	0.001	<0.001	ns	ns	0.05	0	✓
Cobalt, Total	128	<0.001	<0.001	<0.001	ns	ns	b	b	b
Colour, Apparent	128	<3	7	<3	ns	ns	b	b	b
Colour, True	128	<3	<3	<3	15	0	b	b	b
Conductivity	539	162	632	280	ns	ns	b	b	b
Copper, Total	128	<0.001	0.026	0.006	1	0	2	0	✓
Dibromochloromethane	351	<0.005	0.081	0.015	ns	ns	b	b	b

ns – no ADWG (2011) aesthetic guideline specified
b – no ADWG (2011) health guideline specified
✓ – Results meet ADWG (Health) criteria compliance limits

Table 14 – 2021/22 Logan East Water Supply Zone Water Quality Summary									
Parameter (Physical / Chemical)	Number of samples	Min	Max	Average	ADWG Guideline (Aesthetic)	No. over Aesthetic Limit	ADWG Guideline (Health)	No. over Health Limit	Regulatory Status
Fluoride	128	0.6	1.0	0.8	ns	ns	1.5	0	✓
Heterotrophic Plate Count	284	<10	301	15	ns	ns	b	b	b
Iron, Total	128	<0.003	0.135	0.008	0.3	0	b	b	b
Lead, Total	128	<0.001	0.007	<0.001	ns	ns	0.01	0	✓
Lithium, Total	128	<0.001	0.001	<0.001	ns	ns	b	b	b
Magnesium, Total	128	1	16	6	ns	ns	b	b	b
Manganese, Total	128	<0.001	0.016	0.002	0.1	0	0.5	0	✓
Molybdenum, Total	128	<0.001	0.001	<0.001	ns	ns	0.05	0	✓
Nickel, Total	128	<0.001	0.001	<0.001	ns	ns	0.02	0	✓
Nitrate-N	128	<0.1	1.2	0.4	ns	ns	11.3	0	✓
Nitrite-N	128	<0.1	0.4	<0.1	ns	ns	0.9	0	✓
pH	539	6.9	8.1	7.3	6.5 – 8.5	0	b	b	b
Potassium, Total	128	1	4	2	ns	ns	b	b	b
Selenium, Total	128	<0.01	<0.01	<0.01	ns	ns	0.01	0	✓
Sodium, Total	128	13	68	29	180	0	b	b	b
Sulphate	128	9	90	30	250	0	500	0	✓
TDS, Calculated	539	32	384	170	600	0	b	b	b
Temperature	539	17.3	29.1	23.0	ns	ns	b	b	b
Thallium, Total	128	<0.001	<0.001	<0.001	ns	ns	b	b	b
Total Coliforms	537	0	0	0	ns	ns	b	b	b
Total Hardness	128	47	145	78	200	0	b	b	b
Total THM	351	0.04	0.21	0.09	ns	ns	0.25	0	✓
Turbidity	539	<0.1	1.0	0.1	5	0	b	b	b
Zinc	119	<0.01	0.01	<0.01	3	0	b	b	b

ns – no ADWG (2011) aesthetic guideline specified
b – no ADWG (2011) health guideline specified
✓ – Results meet ADWG (Health) criteria compliance limits

Table 15 – 2021/22 Logan South Water Supply Zone Water Quality Summary									
Parameter (Microbial)	**Total No. of samples collected**	**No. of samples in which parameter was detected**		**% Sampled complied**		**ADWG Guideline (Health)**		**ADWG Compliance (Health)**	
E. coli by Colilert	759	0		100.00%		98.00%		✓	
Parameter (Physical / Chemical)	**Number of samples**	**Min**	**Max**	**Average**	**ADWG Guideline (Aesthetic)**	**No. over Aesthetic Limit**	**ADWG Guideline (Health)**	**No. over Health Limit**	**Regulatory Status**
Alkalinity as CaCO3	759	36	68	49	ns	ns	b	b	b
Aluminium, Total	179	0.01	0.04	0.03	0.2	0	b	b	b
Ammonia-N	745	<0.01	0.31	0.07	0.41	0	b	b	b
Arsenic, Total	179	<0.001	<0.001	<0.001	ns	ns	0.01	0	✓
Barium, Total	179	0.004	0.015	0.006	ns	ns	2	0	✓
Beryllium, Total	179	<0.001	<0.001	<0.001	ns	ns	0.06	0	✓
Bismuth, Total	179	<0.001	0.003	<0.001	ns	ns	b	b	b
Boron, Total	179	0.02	0.34	0.17	ns	ns	4	0	✓
Bromodichloromethane	498	0.009	0.031	0.019	ns	ns	b	b	b
Bromoform	498	<0.005	<0.005	<0.005	ns	ns	b	b	b
Cadmium, Total	179	<0.001	<0.001	<0.001	ns	ns	0.002	0	✓
Calcium Hardness	179	42	60	51	ns	ns	b	b	b
Calcium Total	179	17	24	21	ns	ns	b	b	b
Chloride	179	15	31	20	250	0	b	b	b
Chlorine, Free	759	<0.05	1.99	0.73	0.6	433	5	0	✓
Chlorine, Total	759	<0.05	3.90	1.34	0.6	659	5	0	✓
Chloroform	498	0.020	0.107	0.058	ns	ns	b	b	b
Chromium, Total	179	<0.001	0.001	<0.001	ns	ns	0.05	0	✓
Cobalt, Total	179	<0.001	<0.001	<0.001	ns	ns	b	b	b
Colour, Apparent	179	<3	5	<3	ns	ns	b	b	b
Colour, True	179	<3	<3	<3	15	0	b	b	b
Conductivity	759	113	249	208	ns	ns	b	b	b
Copper, Total	179	<0.001	0.010	0.002	1	0	2	0	✓
Dibromochloromethane	498	<0.005	0.014	0.007	ns	ns	b	b	b

ns – no ADWG (2011) aesthetic guideline specified
b – no ADWG (2011) health guideline specified
✓ – Results meet ADWG (Health) criteria compliance limits

Table 15 – 2021/22 Logan South Water Supply Zone Water Quality Summary									
Parameter (Physical / Chemical)	Number of samples	Min	Max	Average	ADWG Guideline (Aesthetic)	No. over Aesthetic Limit	ADWG Guideline (Health)	No. over Health Limit	Regulatory Status
Fluoride	179	0.7	1.1	0.8	ns	ns	1.5	0	✓
Heterotrophic Plate Count	468	<10	301	<10	ns	ns	b	b	b
Iron, Total	179	<0.003	0.060	0.011	0.3	1	b	b	b
Lead, Total	179	<0.001	0.001	<0.001	ns	ns	0.01	0	✓
Lithium, Total	179	<0.001	0.001	<0.001	ns	ns	b	b	b
Magnesium, Total	179	<1	2	1	ns	ns	b	b	b
Manganese, Total	179	<0.001	0.009	<0.001	0.1	0	0.5	0	✓
Molybdenum, Total	179	<0.001	0.001	<0.001	ns	ns	0.05	0	✓
Nickel, Total	179	<0.001	0.001	<0.001	ns	ns	0.02	0	✓
Nitrate-N	179	<0.1	0.9	0.5	ns	ns	11.3	0	✓
Nitrite-N	179	<0.1	0.5	<0.1	ns	ns	0.9	0	✓
pH	759	6.8	8.5	7.7	6.5 – 8.5	4	b	b	b
Potassium, Total	179	<1	2	1	ns	ns	b	b	b
Selenium, Total	179	<0.01	<0.01	<0.01	ns	ns	0.01	0	✓
Sodium, Total	179	14	23	19	180	0	b	b	b
Sulphate	179	10	25	16	250	0	500	0	✓
TDS, Calculated	759	68	151	126	600	0	b	b	b
Temperature	759	16.2	29.5	22.2	ns	ns	b	b	b
Thallium, Total	179	<0.001	<0.001	<0.001	ns	ns	b	b	b
Total Coliforms	759	0	3	0	ns	ns	b	b	b
Total Hardness	179	49	65	57	200	0	b	b	b
Total THM	498	0.04	0.14	0.08	ns	ns	0.25	0	✓
Turbidity	759	<0.1	1.6	0.1	5	0	b	b	b
Zinc	179	<0.01	<0.01	<0.01	3	0	b	b	b

ns – no ADWG (2011) aesthetic guideline specified
b – no ADWG (2011) health guideline specified
✓ – Results meet ADWG (Health) criteria compliance limits

Table 16 – 2021/22 Marsden Water Supply Zone Water Quality Summary									
Parameter (Microbial)	**Total No. of samples collected**	**No. of samples in which parameter was detected**		**% Sampled complied**		**ADWG Guideline (Health)**		**ADWG Compliance (Health)**	
E. coli by Colilert	357	0		100.00%		98.00%		✓	
Parameter (Physical / Chemical)	**Number of samples**	**Min**	**Max**	**Average**	**ADWG Guideline (Aesthetic)**	**No. over Aesthetic Limit**	**ADWG Guideline (Health)**	**No. over Health Limit**	**Regulatory Status**
Alkalinity as $CaCO_3$	357	40	119	79	ns	ns	b	b	b
Aluminium, Total	84	0.01	0.14	0.04	0.2	0	b	b	b
Ammonia-N	353	<0.01	0.40	0.13	0.41	0	b	b	b
Arsenic, Total	84	<0.001	0.001	<0.001	ns	ns	0.01	0	✓
Barium, Total	84	0.008	0.042	0.026	ns	ns	2	0	✓
Beryllium, Total	84	<0.001	<0.001	<0.001	ns	ns	0.06	0	✓
Bismuth, Total	84	<0.001	0.002	<0.001	ns	ns	b	b	b
Boron, Total	84	0.03	0.25	0.06	ns	ns	4	0	✓
Bromodichloromethane	146	0.014	0.054	0.028	ns	ns	b	b	b
Bromoform	146	<0.005	0.034	0.008	ns	ns	b	b	b
Cadmium, Total	84	<0.001	<0.001	<0.001	ns	ns	0.002	0	✓
Calcium Hardness	84	37	81	59	ns	ns	b	b	b
Calcium Total	84	15	33	24	ns	ns	b	b	b
Chloride	84	25	83	56	250	0	b	b	b
Chlorine, Free	357	<0.05	1.23	0.09	0.6	9	5	0	✓
Chlorine, Total	357	<0.05	3.50	0.96	0.6	183	5	0	✓
Chloroform	146	0.010	0.101	0.037	ns	ns	b	b	b
Chromium, Total	84	<0.001	0.001	<0.001	ns	ns	0.05	0	✓
Cobalt, Total	84	<0.001	<0.001	<0.001	ns	ns	b	b	b
Colour, Apparent	84	<3	9	<3	ns	ns	b	b	b
Colour, True	84	<3	<3	<3	15	0	b	b	b
Conductivity	357	313	750	471	ns	ns	b	b	b
Copper, Total	84	<0.001	0.015	0.002	1	0	2	0	✓
Dibromochloromethane	146	0.005	0.058	0.027	ns	ns	b	b	b

ns – no ADWG (2011) aesthetic guideline specified
b – no ADWG (2011) health guideline specified
✓ – Results meet ADWG (Health) criteria compliance limits

Table 16 – 2021/22 Marsden Water Supply Zone Water Quality Summary									
Parameter (Physical / Chemical)	Number of samples	Min	Max	Average	ADWG Guideline (Aesthetic)	No. over Aesthetic Limit	ADWG Guideline (Health)	No. over Health Limit	Regulatory Status
Fluoride	84	0.4	1.0	0.8	ns	ns	1.5	0	✓
Heterotrophic Plate Count	338	<10	3001	65	ns	ns	b	b	b
Iron, Total	84	<0.003	0.334	0.016	0.3	1	b	b	b
Lead, Total	84	<0.001	0.002	<0.001	ns	ns	0.01	0	✓
Lithium, Total	84	<0.001	<0.001	<0.001	ns	ns	b	b	b
Magnesium, Total	84	2	15	12	ns	ns	b	b	b
Manganese, Total	84	<0.001	0.054	0.007	0.1	0	0.5	0	✓
Molybdenum, Total	84	<0.001	0.001	<0.001	ns	ns	0.05	0	✓
Nickel, Total	84	<0.001	0.001	<0.001	ns	ns	0.02	0	✓
Nitrate-N	84	<0.1	1.3	0.6	ns	ns	11.3	0	✓
Nitrite-N	84	<0.1	0.4	0.1	ns	ns	0.9	0	✓
pH	357	6.9	8.0	7.5	6.5 – 8.5	0	b	b	b
Potassium, Total	84	1	4	3	ns	ns	b	b	b
Selenium, Total	84	<0.01	<0.01	<0.01	ns	ns	0.01	0	✓
Sodium, Total	84	14	66	44	180	0	b	b	b
Sulphate	84	27	94	44	250	0	500	0	✓
TDS, Calculated	357	190	455	286	600	0	b	b	b
Temperature	357	16.0	28.9	23.4	ns	ns	b	b	b
Thallium, Total	84	<0.001	<0.001	<0.001	ns	ns	b	b	b
Total Coliforms	357	0	2401	23	ns	ns	b	b	b
Total Hardness	84	45	141	107	200	0	b	b	b
Total THM	146	0.06	0.18	0.10	ns	ns	0.25	0	✓
Turbidity	357	<0.1	2.2	0.2	5	0	b	b	b
Zinc	84	<0.01	0.02	<0.01	3	0	b	b	b

ns – no ADWG (2011) aesthetic guideline specified
b – no ADWG (2011) health guideline specified
✓ – Results meet ADWG (Health) criteria compliance limits

Table 17 – 2021/22 Springwood Water Supply Zone Water Quality Summary									
Parameter (Microbial)	**Total No. of samples collected**	**No. of samples in which parameter was detected**		**% Sampled complied**		**ADWG Guideline (Health)**		**ADWG Compliance (Health)**	
E. coli by Colilert	541	0		100.00%		98.00%		✓	
Parameter (Physical / Chemical)	**Number of samples**	**Min**	**Max**	**Average**	**ADWG Guideline (Aesthetic)**	**No. over Aesthetic Limit**	**ADWG Guideline (Health)**	**No. over Health Limit**	**Regulatory Status**
Alkalinity as $CaCO_3$	541	41	118	77	ns	ns	b	b	b
Aluminium, Total	129	0.01	0.38	0.04	0.2	1	b	b	b
Ammonia-N	538	<0.01	0.40	0.13	0.5	0	b	b	b
Arsenic, Total	129	<0.001	0.001	<0.001	ns	ns	0.01	0	✓
Barium, Total	129	0.008	0.040	0.026	ns	ns	2	0	✓
Beryllium, Total	129	<0.001	<0.001	<0.001	ns	ns	0.06	0	✓
Bismuth, Total	129	<0.001	0.002	<0.001	ns	ns	b	b	b
Boron, Total	129	0.03	0.24	0.06	ns	ns	4	0	✓
Bromodichloromethane	258	0.015	0.059	0.027	ns	ns	b	b	b
Bromoform	258	<0.005	0.033	0.008	ns	ns	b	b	b
Cadmium, Total	129	<0.001	<0.001	<0.001	ns	ns	0.002	0	✓
Calcium Hardness	129	23	79	59	ns	ns	b	b	b
Calcium Total	129	9	31	24	ns	ns	b	b	b
Chloride	129	20	76	53	250	0	b	b	b
Chlorine, Free	541	<0.05	1.48	0.09	0.6	9	5	0	✓
Chlorine, Total	541	<0.05	3.90	1.08	0.6	279	5	0	✓
Chloroform	258	0.012	0.102	0.035	ns	ns	b	b	b
Chromium, Total	129	<0.001	0.004	<0.001	ns	ns	0.05	0	✓
Cobalt, Total	129	<0.001	0.001	<0.001	ns	ns	b	b	b
Colour, Apparent	110	<3	40	3	ns	ns	b	b	b
Colour, True	110	<3	13	<3	15	0	b	b	b
Conductivity	541	175	751	465	ns	ns	b	b	b
Copper, Total	129	0.001	0.036	0.005	1	0	2	0	✓
Dibromochloromethane	258	<0.005	0.068	0.025	ns	ns	b	b	b

ns – no ADWG (2011) aesthetic guideline specified
b – no ADWG (2011) health guideline specified
✓ – Results meet ADWG (Health) criteria compliance limits

Table 17 – 2021/22 Springwood Water Supply Zone Water Quality Summary									
Parameter (Physical / Chemical)	Number of samples	Min	Max	Average	ADWG Guideline (Aesthetic)	No. over Aesthetic Limit	ADWG Guideline (Health)	No. over Health Limit	Regulatory Status
Fluoride	129	0.3	1.1	0.8	ns	ns	1.5	0	✓
Heterotrophic Plate Count	317	<10	301	13	ns	ns	b	b	b
Iron, Total	129	0.003	0.891	0.022	0.3	1	b	b	b
Lead, Total	129	<0.001	0.003	<0.001	ns	ns	0.01	0	✓
Lithium, Total	129	<0.001	0.001	<0.001	ns	ns	b	b	b
Magnesium, Total	129	2	18	12	ns	ns	b	b	b
Manganese, Total	129	<0.001	0.285	0.009	0.1	0	0.5	0	✓
Molybdenum, Total	129	<0.001	0.001	<0.001	ns	ns	0.05	0	✓
Nickel, Total	129	<0.001	0.003	<0.001	ns	ns	0.02	0	✓
Nitrate-N	129	<0.1	1.3	0.5	ns	ns	11.3	0	✓
Nitrite-N	129	<0.1	0.5	0.2	ns	ns	0.9	0	✓
pH	541	6.9	8.1	7.5	6.5 – 8.5	0	b	b	b
Potassium, Total	129	1	5	3	ns	ns	b	b	b
Selenium, Total	129	<0.01	<0.01	<0.01	ns	ns	0.01	0	✓
Sodium, Total	129	16	65	45	180	0	b	b	b
Sulphate	129	10	110	45	250	0	500	0	✓
TDS, Calculated	541	106	456	282	600	0	b	b	b
Temperature	541	15.9	29.3	23.5	ns	ns	b	b	b
Thallium, Total	129	<0.001	<0.001	<0.001	ns	ns	b	b	b
Total Coliforms	541	0	75	0	ns	ns	b	b	b
Total Hardness	129	51	152	107	200	0	b	b	b
Total THM	258	0.06	0.18	0.09	ns	ns	0.25	0	✓
Turbidity	541	<0.1	4.4	0.2	5	0	b	b	b
Zinc	129	<0.01	0.01	<0.01	3	0	b	b	b

ns – no ADWG (2011) aesthetic guideline specified
b – no ADWG (2011) health guideline specified
✓ – Results meet ADWG (Health) criteria compliance limits

Table 18 – 2021/22 Whole of Logan E. coli water quality summary						
Water Quality Summary: *E. coli*						
Microbial parameter	**Units**	**Number of samples collected**	**Number of detections**	**% Samples which met compliance**	**ADWG Guideline (Health)**	**ADWG Compliance (Health)**
E. coli	MPN/100mL	2692	1	99.96%	100%	✓

✓ – Results meet ADWG (Health) criteria compliance limits

Table 19 – 2021/22 Logan Water *E. coli* Verification Monitoring Performance												
***E. coli* Verification Monitoring**												
WHOLE OF LOGAN CITY – 2021/22 – ALL ZONES												
Year and month	**2021**						**2022**					
	Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
No. of samples collected	185	240	205	212	258	201	249	201	222	215	279	225
No. of samples collected in which *E. coli* is detected	0	0	0	0	0	0	0	1	0	0	0	0
No. of samples collected in previous 12-month period	2500	2523	2507	2521	2546	2553	2597	2602	2585	2607	2677	2692
No. of failures in previous 12-month period	1	1	1	1	1	1	1	2	1	1	1	1
% compliance in previous 12-month period	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.92%	99.96%	99.96%	99.96%	99.96%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
% compliance for month	100%	100%	100%	100%	100%	100%	100%	99.50%	100%	100%	100%	100%

Appendix D – Implementation of the Risk Mana

Implementation of the Risk Management Improvement Program										
Item No.	**DWQMP Section**	**Risk Source** RA – Risk Assessment IA – Internal Audit EA – External Audit II – Incident Investigation GI – General Improvement					**Risk Reference**	**Water Supply Act Guideline** BP – Best Practise	**Issues / risks**	**Key actions**
		RA	**IA**	**EA**	**II**	**GI**				
2.3.	E2: Assessment of Drinking Water Supply Systems	RA		EA			**EANC** **RA-EMG1.7** **RA-EMG1.8** **RA-RES1.3** **RA-RES1.4** **RA-EMG**		There has been evidence of security breaches at a number of reservoir facilities.	a. **Investigate** the requirements for an Infrastructure Security Plan. a. **Develop** Infrastructure Security Plan (reservoirs). a. **Implement** Infrastructure Security Plan (reservoirs).
2.4.	E2: Assessment of Drinking Water Supply Systems					GI	**R** **RA-DIS3.1** **RA-DIS3.1a** **RA-DIS3.1b**		Cyber security risks which may affect the Drinking Water Management System	a. **Investigate** requirements of the cyber security KPIs to be included as part of the DWQMP annual reports. **Done.** a. **Develop** a Cyber security gap analysis is part of the scope of works for the CISUP project and also scope to develop implementation plans for the five Cyber security KPIs required to be included as part of the DWQMP annual reports. **Done**. a. **Implement** CISUP project across Logan.

ngement Improvement Program

	Current status	Branch	Owner	Lead	Start date	Target date	Revised target date	% Complete	Status (Note all status assessments are under review as at October 2022)
	a. **Investigate** – Project MGR facilitated two key stakeholder sessions in October 2019. Tenders are now out (which include cyber security also – refer RMIP item 2.4). b. **Develop** – Once tender has been returned, plan will be developed. c. **Implement** – update: Loganwater aims to complete and deliver all security and access arrangements for reservoirs will be addressed through 2022 on a priority basis. December 2021 calendar project construction underway. Priority list developed. By the end of FY2021-22 completed. In forward Capital Works Plan 2021-22 is programmed there. This includes fences and access controls. Work packages: Mt Warren Park, Illaweena, Sprinogwood High, Greenbank (including Wineglass) (Commecing Sept). Then smaller reservoirs (Commencing Dec).	Water Business	PL – Water Asset Management	CISUP Project Director	Jun-18	TBC	Jul-22	80%	**ON TRACK**
	a. **Investigate** – Addressed as part of CISUP project. Two key stakeholder sessions have been held in October 2019. a. **Develop** – Gap analysis has been performed and recommendations have been reviewed and accepted. Implementation discussion is ongoing. In addition, a cyber security audit was commissioned by ISS. This covered GeoSCADA, Cytec and ClearSCADA. a. **Implement** – First recommendation is to Commencement of IS asset register compilation. Works on other recommendations are ongoing. *Security of Critical Infrastructure Act 2018 requirements also affect this requirement.	Water Business	PL – Water Asset Management	CISUP Project Director	Nov-19	Jun-21	Dec-21	70%	**ON TRACK**

Implementation of the Risk Management Improvement Program									
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3.7.	E3: Preventive Measures for Drinking Water Quality	RA	IA	EA			**NC DIS 3.1** **DIS 5.5** **Ext Audit (2,3)**	3.9.2	Internal audit identified that not all CCPs are easily visible on SCADA system to confirm limits. CCP limits are hard coded. Inconsistency of CCP SCADA limits vs CCP chart limits.	a. **Investigate** HACCP Gap analysis to be performed into the current DWQMS. b. **Develop** HACCP plan and review. c. **Implement** HACCP implementation project including developing CCP WOPs and associated training to ensure effective record keeping and implementation.
3.13.	E3: Preventive Measures for Drinking Water Quality		IA				**G** **RA-DIS4.7** **RA-DIS4.8** **RA-DIS4.9**		Preventive Measure and Multiple Barriers – Critical Control Points. Establish mechanisms for operational control – Operational philosophy of the CCPs is not currently consistent across sites. Recommend a clearer articulation as to when applicable e.g. offline.	a. **Investigate** requirements for operation and maintenance manuals for WQS. b. **Develop** O&M manuals. c. **Implement** O&M manuals.
3.20	E3: Preventive Measures for Drinking Water Quality	RA					**RA-BUL3.2** **RA-BUL1.1a** **RA-BUL1.6** **RA-BUL1.7** **RA-BUL1.8** **RA-BUL1.9** **RA-BUL2.1**		Algal blooms in Seqwater catchments/Taste and Odour complaints.	a. **Investigate** updates to the Operational Protocol to formally proceduralise how increases in THMs in the network are communicated to Seqwater. b. **Develop** THM communications triggers to send to Seqwater. c. **Implement** THM comms triggers in next review of the Operations Protocol.

	Current status	Branch	Owner	Lead	Start date	Target date	Revised target date	% Complete	Status (Note all status assessments are under review as at October 2022)
	d. **Investigate** – HACCP review gap analysis project scope of works to be generated in 2019/20 financial year (see Item 3.6) – **completed.** e. **Develop** – Not commenced – to be evaluated in 2022/23. Business case to be raised for business, and then engage a contractor to implement the next phase. f. Implement – Not commenced.	Water Service Performance	PL – Service Quality and Sustainability	Lead – Water Service Performance	Jun-15	Jun-21	Jul-23	20%	**ON TRACK**
	a. **Investigate** – **completed**. b. **Develop ongoing** – Operations and Maintenance manuals developed and are in draft for Woodhill. Stakeholder review finalised. c. **Implement** – Woodhill almost ready and then implementation phase and test. Needs to run for a while for maintenance tasks and also over summer. Then others can be developed and implemented as per RMIP action item 3.27.	Water Service Delivery	PL – Network Operations	Drinking Water Quality Operations Team Leader	Mar-20	Jan-21	Dec-22	50%	**ON TRACK**
	a. **Investigated**. b. **THM** management protocol identifies when to communicate with Seqwater (completed). c. **To be included** in the next Operations Protocol (awaiting next update. Note it is in the Water Quality Desired Service Standards).	Water Service Performance	PL – Service Quality and Sustainability	Lead – Water Service Performance	Jun-20	Jun-21	Dec-22	80%	**ON TRACK**

Implementation of the Risk Management Improvement Program										
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		RA	**IA**	**EA**	**II**	**GI**				
3.21.	E3: Preventive Measures for Drinking Water Quality	RA					**RA-Bul1.2** **RA-BUL1.3** **RA-BUL1.5** **RA-BUL1.6** **RA-BUL1.7** **RA-BUL1.8** **RA-BUL1.9** **RA-BUL2.1** **RA-DIS1.2**		Chambers Flat and Gramzow Road chlorination break-point – taste and odour.	a. **Investigate** updates to the Operational Protocol to formally proceduralise how increases in reported taste and odour complaints are communicated to Seqwater. b. **Develop** Taste and Odour communications triggers to send to Seqwater. c. **Implement** Taste and Odour comms triggers in next review of the Operations Protocol.
3.23	E3: Preventive Measures for Drinking Water Quality	RA					**RES1.3**		Protozoan contamination from ingress into the Springwood Low reservoir (currently public access to roof).	a. **Investigate** options to prevent public access to the roof of Springwood Low reservoir. b. **Develop** plan to prevent public access to the roof. c. **Implement** reservoir renewal works to address sealing issues at Springwood Low reservoir complex and also to prevent public access to the roof.
3.27	E3: Preventive Measures for Drinking Water Quality	RA	IA	EA			**NC** **DIS 3.1** **DIS3.1a DIS 5.5** **Ext Audit (2,3)** **RA reference** **RA- DIS1.1**	3.9.2	Internal audit identified that not all CCPs are easily visible on SCADA system to confirm limits. CCP limits are hard coded. Inconsistency of CCP SCADA limits vs CCP chart limits. Consistent review is required to confirm CCPs are effective.	a. **Investigate** appropriate CCP review workshop process. b. **Develop** CCP review workshop process. c. **Implement** CCP review workshop process.

	Current status	Branch	Owner	Lead	Start date	Target date	Revised target date	% Complete	Status (Note all status assessments are under review as at October 2022)
	a. **Investigate** b. **Develop** c. **Implement**	Water Service Performance	PL – Service Quality and Sustainability	Lead – Water Service Performance	Jun-20	Jun-21	Dec-22	10%	**ON TRACK**
	a) and b) Proposal currently before Council executive to close public access to Springwood Low. The proposal for complete prevention of access was denied. Instead, repair works are to be undertaken by Council to maintain the integrity of the reservoir and protect Public Health. **c)** Sealing works underway as part of the reservoir renewal works. **To be completed in 2022.**	Water Business	PL – Water Asset Management	TBA	Mar-20	Jan-21	Jul-22	80%	**ON TRACK**
	a. **Investigation** – First review undertaken by TL WQ Operations. b. **Ongoing** – first one held, in the process of designing FY2021-22 onwards. c. **Ongoing** – to be implemented for next review after FY2021-22.	Water Service Delivery	PL – Network Operations	Drinking Water Quality Operations Team Leader	Jun-20	Dec-20	Dec-21	20%	**ON TRACK**

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		RA	**IA**	**EA**	**II**	**GI**				
4.24	E4: Operational Procedures and Process Control	RA	IA	EA			**NC DIS 3.1** **DIS 5.5** **Ext Audit (2,3)** **RA-EMG1.23**	3.9.2	No clear operational monitoring program currently in place. Develop and show how to link to corrective actions by operations. Also relate to SCADA. Informal operational monitoring occurs as part of the Lab's routine Verification Monitoring program (i.e. HPC, etc.) and ad hoc SCADA trend reviews. Internal audit identified that not all CCPs are easily visible on SCADA system to confirm limits. CCP limits are hard coded. Inconsistency of CCP SCADA limits vs CCP chart limits.	a. **Develop** formal operational monitoring with training in CCPs and also use of Water Information Management System (WIMS). Use of WIMS to be agreed upon and implemented. b. **Develop** function specifications of all existing dosing systems and develop associated R&M and operational manuals and system to ensure currency. Also develop monitoring procedures within Network Maintenance team. c. **Implement** both O&M manuals and procedures throughout team.
4.26	E4: Operational Procedures and Process Control					GI	**G**		**Operational Procedures and Process Control – Operational procedures** **Document all procedures and compile into an operations manual** – The intent of this criteria is met with site specific WOPs. However, some of the WOPs are outdated – e.g. customer service requests and completion of WWETT forms appear to be outdated as SAMMS has now replaced WWETT. WOP 216 is a 2015 version and could also be updated to include trigger for recalibration. The need to keep SOPs up to date is the reason for OFI.	a. **Investigate** document control system which covers Water Operations procedures needs to be defined with responsibilities assigned for document update. b. **Develop** process to confirm Water Operations documents are reviewed and updated to meet review cycle requirements. c. **Implement** review system.

	Current status	Branch	Owner	Lead	Start date	Target date	Revised target date	% Complete	Status (Note all status assessments are under review as at October 2022)
	a. **Informal** CCP internal training of on-call personnel has taken place. b. **Aquantify** training of some operations personnel has occurred. c. **O&M** manual project completed in September 2020 for Woodhill. Next program of work is to roll out to other. d. **WDF**. e. **To be implemented** by December 2022 (Woodhill WDF only – then rolled out to rest following successful summer trial).	Water Service Delivery	PL – Network Operations	Drinking Water Quality Operations Team Leader	Jun-19	Dec-20	Dec-22	70%	**ON TRACK**
	a. **Investigate** Currently Water Grid and Operations Support Coordinator manages Written Direction for WOPs via spreadsheet: DM#8414293. b. **Develop** Water Grid and Operations Support Coordinator to develop procedure to document the Written Direction register management and associated processes (i.e. document how you manage the register). This also has broad links to the Enterprise Quality Management Approach being developed by Service Quality and Improvement Team. c. **Implement** procedure.	Water Service Delivery	Water Operations Coordinator	Water Operations Coordinator	Mar-20	Dec-20	Dec-20	80%	**ON TRACK**

Implementation of the Risk Management Improvement Program										
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		RA	**IA**	**EA**	**II**	**GI**				
4.27	E4: Operational Procedures and Process Control					GI	**G**		**Operational Procedures and Process Control – Operational procedures** **Are there sufficient effective SOPs to support work orders?** – As above – calibration of instruments is based on the operator to determine the appropriate level for recalibration rather than an explicit statement. It was stated that recalibration is triggered at somewhere between 0.2 and 0.3 mg/L. This is a large variance in comparison to wider industry expectations.	a. **Investigate** recalibration trigger limits for chlorine meters used within Network Operations WQ team and if they are aligned with best practice requirements. Investigate key training required and ensure appropriately resourced and equipped. pH calibration is also to be added to the WOP. b. **Develop** a process for recalibration process for online chlorine monitoring equipment (LCC procedure). c. **Implement** procedure amongst the Network Operations team.
4.34	E4: Operational Procedures and Process Control	RA					**RA-RES1.14**		Bringing contaminated reservoir online/Bacteria.	a. **Investigate** reservoir commissioning procedure requirements – review literature and other utility procedures. b. **Develop** design, and distribute for review and confirm the procedure dealing with recommissioning of offline reservoirs. c. **Implement** procedure amongst stakeholders.
4.36	E4: Operational Procedures and Process Control	RA							Protozoan risk from backflow into network.	a. **Investigate** review tanker management program. b. **Develop** improvement plan based on findings of review. c. **Implement** improvement plan to improve tanker customer management system. Formerly – Review and implement procedure for auditing water carrier compliance with user permits (include confirmation of backflow prevention device on truck). Compliance monitoring of high-use hydrant controls – standard design of tanker supply sites.

	Current status	Branch	Owner	Lead	Start date	Target date	Revised target date	% Complete	Status (Note all status assessments are under review as at October 2022)
	a. Recalibration limits developed and to be discussed with the team. b. WOP222 Started (80%). c. not started.	Water Service Delivery	PL – Network Operations	Drinking Water Quality Operations Team Leader	Mar-20	Oct-20	Dec-22	60%	**ON TRACK**
	a. **Investigate** – The offline reservoir report has detailed procedures and checklists for implementation. b. **Develop** – Checklists have been developed as part of the offline reservoir report. **Completed.** c. **Implement** – Not commenced.	Water Service Delivery	PL – Network Operations	Senior Water Operations Coordinator	Jun-20	Dec-20	Dec-21	70%	**ON TRACK**
	a. **Investigate** – gap analysis underway (reviewing of BF certifications, current training requirements, auditing and compliance program). This will inform future *Standpipe/Tanker Customer Management System*. In addition, and holistic review of service delivery to tanker standpipe is required. b. **Develop** – Register has now been reviewed. Some outstanding training is required. c. **Implement** – not commenced.	Water Service Performance	PL – Customer Experience and Business Performance	Metering and Customer Connections Lead	Jun-20	TBC	Jul-23	40%	**ON TRACK**

Implementation of the Risk Management Improvement Program										
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		RA	**IA**	**EA**	**II**	**GI**				
4.39	E4: Operational Procedures and Process Control	RA							Ingress causing bacterial contamination.	a. **Investigate** project to install online analysers at all reservoirs (CCPs and operational alarms). b. **Develop** project plan to install online analysers at all reservoirs (CCPs and operational alarms). c. **Implement** plan to install online analysers at all reservoirs (CCPs and operational alarms).
4.45	E4: Operational Procedures and Process Control					GI	**5.2 (G)** **RA-DIS1.1**	3.9.3	Identify RMIP "none actions" which could impact the Business by RMIP annual review, which includes high risks, internal audit non-conformances and long term actions to address drinking water health incidents.	Establish effective drinking water Corrective Action system with associated responsibilities and WOP to be developed. Consider implementation process across all 3 Water Branches required.
4.45	E4: Operational Procedures and Process Control	RA				GI	**Res1.11**	3.9.3	Microbial growth in tank Loss of chlorine residual Nitrification.	Establish effective Network Disinfection Clean procedures.
5.1.	E5: Verification of Drinking Water Quality					GI	**6.2 (G)** **6.4 (G)**		Various "disjointed" customer complaint systems exist (i.e. pathways, WWETT, various CM database (emails/ letters), etc.). Internal audit found incorrect Priority assignment to health related customer complaints in WWETT.	**Short term:** WWETT system developed to replace UMD. **Long term:** investigation is taking place to look at "one" Customer Relationship Management System (CRM) integrated with other systems such as SAMMS.

	Current status	Branch	Owner	Lead	Start date	Target date	Revised target date	% Complete	Status (Note all status assessments are under review as at October 2022)
	a. **Investigate** – Completed. b. **Develop** – Completed. c. **Implement** – All but one site remaining.	Water Service Delivery	PL – Network Operations	Drinking Water Quality Operations Team Leader	Jul-20	Jul-21	Jul-21	90%	**ON TRACK**
	a. **Investigate** – Effective Corrective Actions Management system to manage actions on the RMIP and also incident actions and WQ improvement actions. b. **Develop** – MGMT system. **Ongoing**. c. **Implement** – MGMT system.	Water Service Performance	PL – Service Quality and Sustainability	Lead – Water Service Performance	Jan-17	Dec-21	Dec-22	70%	**ON TRACK**
	d. **Investigate** – Establish effective Work plans to conduct an Network Disinfection Clean (NDC). e. **Develop** – Maintenance System schedules to program in NDCs in required WSZ. f. **Implement** – Maintenance System.	Water Service Delivery	PL – Network Operations	Senior Water Operations Coordinator	May-21	Dec-22	Dec-22	50%	**ON TRACK**
	WWETT system implemented – **completed**. Water Branch CRM system now to be **investigated and developed as interim solution**, until SAMMS implemented (limited by Corporate initiatives) – **SAMMS Ref Item 9.02**. Delays as Council wide CRM system now being investigated hence Water Branch investigate interim solution such as Power-BI. **Proposed development and implementation TBC.** **Current status** – Active investigations on a customer data MGMT system. Loganwater 2025 project feedback project.	Water Service Performance	PL – Customer Experience and Business Performance	PL – Customer Experience and Business Performance	Jun-15	Dec-17	Jun-25	30%	**MONITOR**

Implementation of the Risk Management Improvement Program										
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		RA	**IA**	**EA**	**II**	**GI**				
5.4.	E5: Verification of Drinking Water Quality					GI	**G** **RA-NET1.1**		**Verification Drinking Water Quality – Consumer satisfaction** **Establish a consumer complaint and response program, including appropriate training of employees** – Complaints process 90% through phone calls (tracking of customer complaints). External BCC out of hours, and internal staff at Smith Rd. WOP 401 identifies the work process it was updated in 2019; it still refers to Pathway. Minor OFI – DWQMP identifies WWETT as still operational.	a. Establish Customer complaint procedure, including assigning actions where appropriate Completed. b. Establish a customer complaint training program for front of line personnel and those involved with responding to customer complaints. c. Remove reference to WWETT within DWQMP as part of 2020 update **Completed**.
5.6.	E5: Verification of Drinking Water Quality		IA						Establish a consumer complaint and response program, including appropriate training of employees.	a. **Investigate** an overarching Customer Complaint Management System – which covers all teams involved in process. b. **Develop** overarching Customer Complaint Management System. c. **Implement** overarching Customer Management System (includes Complaint MGMT system).

	Current status	Branch	Owner	Lead	Start date	Target date	Revised target date	% Complete	Status (Note all status assessments are under review as at October 2022)
	a. **Completed** – Updated procedure WOP 401 completed in January 2021. b. To be developed and delivered in July 2021. c. **Completed**.	Water Service Performance	PL – Service Quality and Sustainability	Lead – Water Service Performance	Mar-20	TBC	Jul-21	80%	**ON TRACK**
	a. **Investigate** – current overarching process is being captured under WOP 401. WOP 401 captures current (disjointed) systems in the absence of a CRM (refer RMIP item 5.1). This procedure is to be referred to in the current customer management system, managed by CEBP team. b. **Develop** – Ongoing development – to be developed as part of RMIP item 5.1. New process developed to incorporate current procedure and also ISH formation c. **Implement** – Not started.	Water Service Performance	PL – Customer Experience and Business Performance	PL – Customer Experience and Business Performance	Nov-19	Dec-20	Dec-22	30%	**MONITOR**

Implementation of the Risk Management Improvement Program										
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		RA	**IA**	**EA**	**II**	**GI**				
6.3.	E6: Management of Incidents and Emergencies					GI			Sample taps layers are not accurately displayed on GIS, e.g. which main the sample is connected to. Opportunity to improve and develop GIS layer/s and maps for incident response.	a. **Investigate** system of location for GIS layer/s and maps downstream of sample taps and supply reservoir to include ID references, flushing plans, and follow-up sample locations. Ensure maps are easily available for incident team. b. **Develop** plan. c. **Implement** system.
6.7.	E6: Management of Incidents and Emergencies	RA					**6.7** **RA-EMG1.1** **RA-EMG1.4**		Power failure and loss of critical systems	a. **Investigate** electrical redundancy requirements at critical assets. b. **Develop** gap analysis of critical sites in terms of minimum requirements to manage power failure and loss. c. **Implement** plan – task brief for retrofitting of systems.
7.6	E7: Employee Awareness and Training	RA					**RA-EMG1.23** **RA-EMG1.20**		Knowledge retention and knowledge resilience	Operator training to ensure GIS being appropriately updated – require identification of responsible roles. Improved handover process and cross training. Clearly defined role responsibilities and training matrix. Prepare procedures for all operational activities.

	Current status	Branch	Owner	Lead	Start date	Target date	Revised target date	% Complete	Status (Note all status assessments are under review as at October 2022)
	a. Sample tap master list contains register of downstream taps, associated reservoirs and related DMAs. A general flushing process has been developed, which is more useful than developing individual flushing plans (these are decided upon during the incident response). A GIS layer exists with current and up to date sample taps. This layer will be included in the corporate layer. b. Develop task notice / scope of works to be delivered through LWIA to have a corporate GIS sample tap layer. Develop ongoing review and maintenance procedure as part of the project.	Water Service Performance	PL – Service Quality and Sustainability	Lead – Water Service Performance	Oct-18	Mar-20	Jul-21	50%	**MONITOR**
	a. **Investigate** – Undertaken by Elec coordinator and TL DWQ. This included review of all sites at high level. b. **Develop** – To be commenced. c. **Implement** – To be commenced dependent on a) b).	Water Service Delivery	PL – Network Operations	Electrical and Telemetry Coordinator	Jul-20	TBC	Dec-22	50%	**ON TRACK**
	a. **Investigate** this task is related to training requirements. The task is currently assigned to PL – WPQ until we can determine what actions are required to address and by whom.	Water Service Performance	PL – Service Quality and Sustainability	Lead – Water Service Performance	Jun-20	TBC		20%	**NEW**

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		RA	**IA**	**EA**	**II**	**GI**				
9.3	E9: Research and Development	RA							Contamination when bringing mains back online	Investigate innovative technologies related to mains recommissioning (e.g. Sydney Water's mobile Ozonation). Develop plans to trail technologies recommended. Implement trial in Loganwater networks.
10.4	E10: Documentation and Reporting					GI	**G**		**Documentation and Reporting – Management of documentation and records.** **Establish a records management system and ensure that employees are trained to fill out records** – DM is a document storage system, not a document management system. There are issues finding documents if they are not appropriately saved and referenced.	a. **Investigate** Document Control Framework Principles. (Currently underway) b. **Develop** framework c. **Implement** Document Control framework throughout business
10.5	E10: Documentation and Reporting					GI	**G**		**Documentation and Reporting – Management of documentation and records.** **Periodically review documentation and revise as necessary** – There are WOPs that appear to be outdated and should be reviewed. For example, WOP 216 (and WOPs for other reservoir sites) appear outdated as the work orders now being issued include a different table for recording results. That is, working documentation is updated, but not reflected back into the WOP.	Actions as per item RMIP action item 10.1

	Current status	Branch	Owner	Lead	Start date	Target date	Revised target date	% Complete	Status (Note all status assessments are under review as at October 2022)
	a. **Trial** of NO-DES mains cleaning asset to be planned. This trial has been delayed presently due to Logan Water Service Alignment activities.	Water Service Performance	PL – Service Quality and Sustainability	Lead – Water Service Performance	Jun-20	TBC	Jul-23	90%	**ON TRACK**
	Investigation, review and gap analysis underway. Review and investigation phase is still underway. An interim doc solution is available via Sharepoint.	Water Service Performance	PL – Service Quality and Sustainability	Lead – Water Service Performance	Mar-20	TBC		10%	**ON TRACK**
	Project currently underway to review current status of procedure management system	Water Service Performance	PL – Service Quality and Sustainability	Lead – Water Service Performance	Mar-20	TBC		10%	**NEW**

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Item No.	**DWQMP Section**	**Risk Source** RA – Risk Assessment IA – Internal Audit EA – External Audit II – Incident Investigation GI – General Improvement					**Risk Reference**	**Water Supply Act Guideline** BP – Best Practise	**Issues / risks**	**Key actions**
		RA	**IA**	**EA**	**II**	**GI**				
12.2	E12: Review and Continual Improvement			EA		GI	**13.1 (G)** **Ext Audit (7)**	3.11.4 BP	Identify RMIP "none actions" which could impact the Business by RMIP annual review, which includes high risks, internal audit non-conformances and long term actions to address drinking water health incidents.	a. **Investigate** system to assist with RMIP reporting b. **Develop** system c. **Implement** system PLs responsible to ensure RMIP actions implemented such as incorporation into appropriate Water Branch Plans.

	Current status	Branch	Owner	Lead	Start date	Target date	Revised target date	% Complete	Status (Note all status assessments are under review as at October 2022)
	a. **Audit and Inspection** – module development commenced. Corrective Action in telex module required once Audit module implemented. b. **Delays** due to Intelex provider ceased operation, continue with current excel system until further notice. Liaise with Corporate stakeholders. c. **Process** for RMIP review and implentation is now to be reviewed in context with Service Alignment changes.	Water Service Performance	PL – Service Quality and Sustainability	Lead – Water Service Performance	Jun-15	Dec-18	Jul-22	30%	**MONITOR**

Appendix E – Glossary

Word/phrase	Definition
<	Less than
>	Greater than
2-Methyl isoborneol	A compound produced from algae or bacteria in catchments contributing to taste and odour of water typically described as earthy, musty, swampy or metallic. May become noticeable at greater than 5ng/L.
Ammonia (NH3)	A highly soluble compound resulting from the decomposition of organic matter containing nitrogen. Ammonia will be detected in chloraminated water as it is a component of chloramine.
***Australian Drinking Water Guidelines 2011* (ADWG)**	The guidelines were developed by the National Health and Medical Research Council (NHMRC) and undergo rolling revision to ensure they represent the latest scientific evidence on good quality drinking water.
Bulk water	The treated water supplied from the Queensland Bulk Water Authority (Seqwater) to distributor retailers, including Logan Water.
Chloramination / chloramine	The application of chlorine and ammonia to create monochloramine (NH_2Cl), a stable disinfectant that is added to drinking water to inactivate bacteria or to oxidise undesirable compounds. Chloramines persist for a longer time than chlorine and as a result, are used in longer water distribution systems.
Chlorine – Free	The residual formed with chlorine dosage once all the chlorine demand has been satisfied. This chlorine is free to inactivate microorganisms
Chlorine – Total	Total chlorine is the sum of combined and free chlorine including chloramine.
Colour (True)	Colour is mainly due to the presence of dissolved substances from organic matter in water, such as decaying leaves and vegetation. True colour refers to the colour of water after particles of organic matter have been removed through filtration and is the measurement of the extent to which light is absorbed by the water
Department of Regional Development, Manufacturing and Water	The Queensland Government department responsible for overseeing Queensland's water service providers to ensure these essential services are provided to Queenslanders in a safe, efficient, and reliable way.
Disinfectant	An agent that inactivates microorganisms which cause disease. Logan Water uses either chlorine or chloramine.
Disinfection by-products (DBPs)	A group of by-products that may form under certain conditions when chlorine is used to disinfect drinking water.
Drinking water	Water that is suitable for human consumption.
Drinking Water Quality Management Plan (DWQMP)	Drinking Water Quality Management Plan as required by the *Water Supply (Safety and Reliability) Act 2008* (Qld). The purpose of a DWQMP is to protect public health by implementing a risk-management system to manage the quality of drinking water.
Escherichia coli (*E. coli*)	A bacterium when present in water indicates that the water may be contaminated by faecal matter and therefore there is the potential to cause illness when people drink the water. *E. coli* can be killed by standard disinfection practices.
Fluoride (F)	Fluoride is regarded as a useful constituent of drinking water, particularly for the prevention of tooth decay. Concentration is maintained within the recommended levels set by Queensland Health.
Geosmin	A compound produced from algae or bacteria in catchments contributing to taste and odour of water typically described as earthy, musty, swampy, or metallic. May become noticeable at greater than 5ng/L.

Word/phrase	Definition
Information Requirement Notice (IRN)	Issued by the Regulator when requesting additional information about an amended DWQMP, which is necessary for the Regulator to properly consider an amendment application.
Iron (Fe)	An element which, when found in water, can cause a brownish discolouration. Limits on the amount of iron in water are usually due to taste and appearance factors rather than any detrimental health effects.
km	kilometre, which is 1,000 metres
Megalitre (ML)	One million litres or 1,000 kilolitres
MPN/100mL	Most Probable Number per 100 millilitres
Naturally occurring	Present in the natural environment as minerals, elements, salts and other substances.
ng/L	Nanograms per litre
Network	An arrangement or system of pipes, pumps and reservoirs used for distributing water.
Nephelometric Turbidity Unit (NTU)	A measure of turbidity which is the cloudiness or haziness of water caused by particles that are generally invisible to the naked eye. The measurement of turbidity is a key test of water quality.
pH	The pH value indicates if a substance is acidic, neutral, or alkaline. It is calculated from the number of hydrogen ions present and is measured on a scale from zero to 14. A pH greater than seven is alkaline, less than seven is acidic and seven is neutral. The pH of public water supplies should be slightly alkaline to minimise corrosion and stabilise disinfection.
Reservoir	A water tower or tank used for the storage of treated water within the water distribution system.
Seqwater	Queensland Bulk Water Supply Authority, trading as Seqwater. The bulk drinking water provider for Logan Water.
The Regulator	See Department of Regional Development, Manufacturing and Water.
Trihalomethanes	A group of disinfection by-products that may form under certain conditions when chlorine is used to disinfect drinking water.
Turbidity	Refers to the presence of suspended solids in water causing a muddy or discoloured appearance. Turbidity is measured in Nephelometric Turbidity Units (NTU).
Verification Monitoring Program (VMP)	Water quality verification monitoring is used as the final check that the barriers and preventive measures used in protecting the public health from drinking water risks are performing effectively. Verification monitoring is used to verify the quality of drinking water supplied to Logan Waters' customers as well as collecting data to complement future operational monitoring programs.
Water Quality Zone (WQZ)	The next level of categorisation below a WSZ. A WQZ shares the same disinfectant type (i.e. chloramine or chlorine)
Water Supply Zone (WSZ)	Defined as an area of the water distribution network with shared bulk water supply sources.
Water Treatment Plant (WTP)	A plant that improves water quality by removing impurities through filtration and disinfection.

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LOGAN WATER

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