

Drinking Water Quality Management Plan

Annual Report – 2022/2023

Due Date: 15 December 2023

Burdekin Shire Council

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Glossary of terms

<	Less than
>	Greater than
ADWG 2004	Australian Drinking Water Guidelines (2004). Published by the National Health and Medical Research Council of Australia
ADWG 2011	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
BSC	Burdekin Shire Council
CFU/100mL	Colony forming units per 100 millilitres
CO ₂	Carbon Dioxide
DNRME	Department of Natural Resources, Mines & Energy
DWQMP	Drinking Water Quality Management Plan
<i>E. coli</i>	<i>Escherichia coli</i> , a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
HACCP	Hazard Analysis and Critical Control Points certification for protecting drinking water quality
mg/L	Milligrams per litre
ML	Mega Litres
CaCO ₃ mg/L	Milligrams per litre of calcium carbonate
MPN/100mL	Most probable number per 100 millilitres
NTU	Nephelometric Turbidity Units
PFOA	Perfluorooctanoic Acid
PFHxS	Perfluorohexanesulfonic Acid
PFOS	Perfluorooctanesulfonic Acid
PFHxS/PFOS	Sum of PFHxS and PFOS
RDMW	Department of Regional Development, Manufacturing and Water
THM's	Trihalomethanes
SES	State Emergency Services Sample Point
TCC	Townsville City Council
TOC's	Total Organic Carbons
ug/L	Micrograms per litre

1. Introduction

The Burdekin Shire Council is a registered service provider with identification (SPID) number 25. This report covers BSC's drinking water services for the 2022/2023 Financial Year with respect to water quality and implementing the actions detailed in the Drinking Water Quality Management Plan (DWQMP) as required under the *Water Supply (Safety and Reliability) Act 2008*.

This report will demonstrate to BSC customers, stakeholders and the water supply regulator (i.e. the Director-General of the Department of Regional Development, Manufacturing and Water) that we have satisfactorily implemented the approved DWQMP this financial year.

This report will be submitted to the regulator within 120 business days from the end of the financial year (approx. 15 December 2023) and as a requirement of the Act, published on the Council's public website.

2. Summary of Schemes Operated

Table 2.1 – Summary of Schemes

Scheme	Water Source	Treatment	Customers Supplied (Approx.)	Towns Supplied	Comments
Ayr/Brandon	South Ayr – Bore 6 Bore 9 Bore 10 Bore 12 Bore 13 Bore 14	Disinfection using 10% Sodium Hypochlorite Solution prior to reticulation.	10,141 people Total connected properties 4,573	Ayr Brandon Alva Beach Outlying Areas	South Ayr Bores were switched off in August 2022 and have not been in service since then.
	Conlan – Bore 1 Bore 2 Bore 3 Bore 4	Control satellite design systems in place – South Ayr (pre and post), Ayr Water Tower, Conlan Street and Darwins.			Nelsons also has bores 1 and 6 which have not been in service due to high PFAS detections.
	Nelsons – Bore 3 Bore 4				
	Chambers – Bore 15 Bore 16	The South Ayr Reservoir site has disinfection, UV filtration and aeration. Two chlorine booster stations situated approx. 7km apart along the water main to Alva Beach.			New 10ML Reservoir with UV Filtration now operational WA7 - Volume Water Sourced 2362ML WA201 – Max Daily Demand 11.6ML

Scheme	Water Source	Treatment	Customers Supplied (Approx.)	Towns Supplied	Comments
Home Hill	Bore 1 Bore 2 Bore 3 Bore 4 Bore 5 Bore 6 Bore 7 Bore 8	Home Hill Water Tower has aeration for removal of CO ₂ as well as UV Filtration Disinfection using 10% Sodium Hypochlorite Solution prior to reticulation. Control satellite design systems in place pre and post at HH Water 5ML reservoir.	3,055 people Total connected properties 1,414	Home Hill Outlying Areas	New 5ML Reservoir with UV Filtration now operational WA7 - Volume water sourced 972.5ML WA201 – Max Daily Demand 5.6ML
	Bore 9 Bore 10	Disinfection at bore site prior to reticulation.			Emergency Bores Only
Mt Kelly	Bore 1 Bore 2 Bore 3	Disinfection using 10% Sodium Hypochlorite Solution prior to reticulation. Control satellite design system in place.	281 people Total connected properties 103	Mt Kelly Outlying Areas	WA7 - Volume water sourced 143ML WA201 – Max Daily Demand 0.9ML
Cungulla	Cungulla Water Treatment Plant via Haughton River	Secondary disinfection using 10% Sodium Hypochlorite Solution prior to reticulation. Control satellite design system in place at Cungulla WTP. Chlorine booster station along Shirbourne Road approx. 8km from Giru Water Tower.	512 people Total connected properties 233	Giru Shirbourne Outlying Areas	Treated water purchased from TCC (Haughton River water treated through Cungulla WTP), then secondary dosed by BSC WA7 - Volume water sourced 113.1ML WA201 – Max Daily Demand 1.1ML

3. Actions taken to implement the DWQMP

3.1 Progress in implementing the risk management improvement program

The Burdekin Shire Council DWQMP was originally created on 31 July 2012 with final approval by DEWS being granted on 13 November 2013. Version 2.2

Amendments to this original plan:

- 8 December 2016 approved on 24 July 2017 – Minor amendment
- 12 December 2018 subsequently amended in response to an information requirement notice on 17 May 2019 for the inclusion of PFAS and Chlorates, approved on 20 August 2019. Version 2.5.3
- In October 2020, the services of Dr. Michael Lawrence were obtained to carry out a complete overhaul of the DWQMP. This new Plan was approved by RDMW on 20 May 2021 and was brought into effect on 1 June 2021. Version 3.3

This financial year, Council operated under the DWQMP V3.3. A review of Version 3.3 was commenced in October 2022 resulting in an Information Requirement Notice. This IRN was answered in April 2023 and Council now awaits approval of the reviewed DWQMP V3.5.

Council holds regular discussions with the RDMW to maintain a dialogue with them on our progression.

This DWQMP was developed in accordance with the regulatory requirements of the Water Supply (safety and Reliability) Act 2008, the Public Health Act 2005 and Public Health Regulation 2018. It is a risk-based management plan intended to protect public health of consumers of drinking water.

Appendix C: Risk Management Improvement Program is attached for your information. Below are details that show actions taken during 2022/2023 to mitigate risks.

PFAS – Council continues to monitor PFAS levels at Nelsons Bores, Chambers Bores, South Ayr Bores and various test bores.

The new 5ML reservoir with additional UV disinfection at the Home Hill Water Tower including a Pre and Post Chlorination System is now fully operational and is monitored and controlled remotely by Council's SCADA system.

At South Ayr Reservoir site, the new 10ML reservoir tank and UV filters with the same architecture of Pre and Post Chlorination System including the same monitoring and control philosophy as Home Hill (to ensure uniformity), was completed and brought online in January 2023.

Training for these systems was carried out by the supplier, with UV Disinfection Training being completed by all relevant employees and Treatment Plant Operators. Accredited UV training has been completed by six (6) operational staff.

A program of chlorination disinfection system replacement is almost completed. Council has installed automatic flushing units and monitoring stations throughout the network to aid in maintaining consistent chlorine residual levels.

Burdekin Shire Council has in place a management regime on the age and quality of hypochlorite solution supplied to all schemes by implementing a two dosing tank arrangement where a standby duty system operates. This will allow fresh sodium hypochlorite to be used within the system and also helps ensure minimal chlorine by-products are introduced into the system in the dosing process. Control satellite dosing systems have been installed at South Ayr Reservoir (Pre and Post), Ayr Water Tower, Darwins, Home Hill 5ML Reservoir (Pre and Post), Mt Kelly and Giru Cungulla Water Treatment Plant allow for better control of chlorine levels. All are on SCADA, trended and monitored twenty-four seven.

The mains cleaning program in the Ayr/Brandon network involving air scouring and swabbing of water mains, including the 500mm South Ayr water main, the 375mm Railway Street water main, the 300mm Brandon water main and the 250mm Cislowski Road water main feeding Rossiter's Hill has been carried out in conjunction with the pipeline installation works for the new 10ML South Ayr Reservoir. Council will reprogram these works more regularly once staffing levels have been organized.

Emergency back-up generators are test run on a fortnightly basis to ensure they maintain operational capability with monthly checks initiated utilizing workshop staff and contract electricians.

Work method statements, procedures and risk assessments continue to be created, updated and improved as part of our ongoing process improvement policy and teaching methods.

A pre-disaster checklist for Water & Wastewater is updated annually and ensures the following:

- Emergency generators tested and fuelled
- Priority agreement to supply emergency generators at all other critical water supply sites with Ergon Energy
- Hypochlorite tanks are filled and have reserve capacity for disaster situations
- Water reservoirs are filled
- All plant and equipment are fuelled, checked, secured at strategic locations
- VSD pumps at the South Ayr will be switched off and isolated prior to a disaster reverting back to the Ayr Water Tower to provide system pressures.
- Council Water/Waste Water employees living in Home Hill with access to Home Hill Water Tower and sample points provided with photometers to continue monitoring Chlorine residuals in Home Hill during any event.
- Remote access monitoring is now paramount and is continually being improved.

This checklist has proved valuable during major rain/flood events and assisting in preventing non-compliances in quality of our drinking water.

Council is in the process of replacing all old analogue water meters with new smart digital meters at all metered properties in the Shire. These new smart meters have the capacity to track water usage, allow Council to recognise peak usage times and potential leaks thus improving the accuracy of water usage by residents and businesses. It is anticipated that this replacement program will take approximately 5 years to complete and at the end of June 2023 was approximately 25% completed.

New and improved monitoring equipment such as photometers, pH meters, turbidity meters etc., have been implemented with training on usage and calibration in place on a regular basis. The installation of pressure and chlorine residual analysers within the reticulation system are now progressing with real time data generated on the above mentioned parameters. Council is also trying to uniform all monitoring equipment to ensure results are consistent amongst all areas and operators.

3.2 Revisions made to the operational monitoring program to assist in maintaining the compliance with water quality criteria¹ in verification monitoring.

Revisions have been made to the operational monitoring program to include the following:

- Bores 3 and 4 Nelsons Lagoon and Chambers bores 15 & 16, are utilized as final call in emergencies only. Bores 1 and 6 Nelsons have been switched off due to spikes in levels of PFAS and are tagged out not to be used however, we continue to monitor these two bores twice yearly as part of Council's non-potable PFAS investigation sampling. During flushing and monitoring, these bores are run to atmosphere and not into the system. The SCADA system will now assist in the control of the blending regime allowing all water resources available to be controlled via SCADA for optimum blending.
- Bore 12 South Ayr is also being monitored for PFAS but has been switched off for the 2022/23 financial year.

¹ Refer to *Water Quality and Reporting Guideline for a Drinking Water Service* for the water quality criteria for drinking water.

- Training continues to be provided to relevant employees with further training planned.
- Cross-training of staff is now in place to ensure we have more experienced and diverse operational crews.

3.3 Revisions made to the verification and operational monitoring programs maintaining compliance with water quality criteria.

Improvements to the verification and operational monitoring programs were due to:

- Major improvement - the installation of the new 10ML Reservoir Tank at South Ayr where monitoring was increased.
- SCADA system now plays an integral role for monitoring and verification to ensure “the gold standard is achieved”.

3.4 Amendments made to the DWQMP

Council commenced a review of DWQMP V3.3 in October 2022 with the assistance of Dr. Michael Lawrence of Bligh Tanner. This review included (but was not limited to) the following:

- All Water Schemes data updated to current
- Upgrades and improvements to the Home Hill Water Supply with the new 5ML reservoir tank
- Completed upgrades to South Ayr Water Supply infrastructure (Stage 2) and commissioning for the South Ayr Water Treatment Plant
- Updates to reflect current and possible future management of PFAS
- Updated Schematics to all water supplies
- Updates to the Hazard Identification and Risk Assessment Program and Matrix
- Updates to the Operational and Verification monitoring
- Continued upgrades to the SCADA system for water supply
- Using network models to scrutinise operational and verification monitoring test sites throughout the Shire with a view to ensuring critical points are monitored
- Using network models to determine auto-scouring points in systems
- Maintaining the small laboratory for in-house microbiological analysis by qualified staff
- New and updated work method statements, procedures and risk assessments added
 - Changes to operation of Giru Reservoirs around eventual plans for mothballing of the tower, new chlorine top-up dosing facilities and online monitoring.
 - Pressure loggers are being introduced to ensure consistent pressure and chlorine residuals are maintained throughout the network.
 - A separate field calibration room will be set up to ensure all field equipment will be calibrated on a regular basis and issued to field staff weekly.

3.4 Future Amendments to be made to the DWQMP

During the next review due by December 2024, the DWQMP will be amended to reflect changes and improvements that have been made in all schemes, or are intended to be made over the next financial year. This will be particularly true in relation to Ayr systems where changes are being planned and executed regularly in response to the challenges caused by PFAS contamination of the Burdekin River Aquifer.

This next review will recognise a major infrastructure project carried out in the Ayr/Brandon water supply scheme which include:

- the construction and commissioning of a 10ML reservoir at the South Ayr Water Treatment Plant completed in January 2023
- the construction of a duplicate trunk main from the South Ayr Water Treatment Plant to Anzac Park in Ayr (completed in September 2022)

4. Compliance with water quality criteria for drinking water

Refer Appendix A of this document for summarised analysis results.

There was one E.coli detection in the Ayr/Brandon Water Supply Scheme during the financial year 2022/2023. This was at the South Ayr Reservoir on 14/07/2022. See Table 5.1.1 below.

The latest version of SWIMLocal has been installed and is utilised as a water quality database manager as well as the reporting vehicle to the RDMW. The new reporting side of SWIMLocal once installed will enable quicker reactions to any parameters that may fall outside the guidelines.

Council Water employees all hold the Water Industry Aqua Card, with refreshers being carried out as and when necessary. Current training of employees for Cert III in Water Operations will be completed within the next couple of months. This will also aid in maintaining accurate compliance.

In-house microbiological analysis is being carried out by qualified staff with 10% of blind samples being sent to an external NATA approved laboratory for verification.

5. Notifications to the Regulator under Sections 102 or 102A of the Water Supply (Safety and Reliability) Act 2008

5.1 Notifiable Incidents:

- (a) BSC has a regular team meeting with members of RDMW to update and advise on works that will be, or have been, carried out. These team meetings help build a good rapport as well as exchange of information and advice.

During this financial year, BSC utilized these meetings to report on the progress of various works including, the commissioning of the South Ayr 10ML reservoir, replacement of pipework at Mt Kelly Reservoir, valve replacement at the South Ayr Reservoir, expected rain events and various other minor issues and incidents.

- (b) The following notifiable incident was recorded in the Ayr Brandon Water Supply Scheme during 2022/2023 financial year:

Table 5.1.1: Recorded Incidents

Date	Incident Description	Finalised
14/07/2022	DWI-25-22-09682 – South Ayr chlorine dosing pump failure due to a corroded communication cable that links the dose pump to the PLC. Repairs were carried out along with extensive testing and a duplicate cable was installed for post dosing as a backup in case of future failure. One E.coli was detected. Follow up sample was clear.	Closed Internally 29/09/2022 waiting closure from RDMW
13/06/2023	DWI-25-23-10300 – Loss of Water Supply due to the controller burning out. Controller now replaced with new one, alarm system amended and procedures developed.	Closed internally 24/07/2023 waiting closure from RDMW

5.2 Non-Conformance with DWQMP V 3.3

There was one Health non-conformance against the DWQMP in the reticulation water for verification sampling as below:

Table 5.2.1 – Verification Non-Conformances Against DWQMP – Reticulation Water

Indicator	Scheme	Guideline Health/Aesthetic	Target	Actual	Comments
E.coli	Ayr/ Brandon	Zero	0	1 Org/100ml	Reported to RDMW 14/07/2022 (see Table 5.1.1)

There were no Aesthetic non-conformances against the DWQMP in the reticulation water for verification sampling.

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There were no Health non-conformances against the DWQMP in the reticulation water for operational sampling.

There were 6 Aesthetic non-conformances against the DWQMP in the reticulation water for operational sampling as below:

Table 5.2.2 – Operational Non-Conformances Against DWQMP – Reticulation Water

Indicator	Scheme	Guideline Health/Aesthetic	Target	Actual	Comments
pH	Ayr Brandon	Aesthetic	6.5-8.5	48 between 5.9 & 6.4	Dealt with in-house. Some of these were while testing the new South Ayr Reservoir before bringing it online. Some were equipment issues resulting in new pH meters being purchased. Some were verified low pH.
Turbidity	Ayr Brandon	Aesthetic	5 NTU	1 at 5.27 NTU	Dealt with in-house. Maidavale Road - outskirts. Flushed to improve water quality.
pH	Home Hill	Aesthetic	6.5-8.5	4 between 6.4 & 6.48 2 between 8.58 & 8.6	Dealt with in-house. 4 low detections at HH Water Tower. 2 high detections at 5ML Tank. Follow up samples with different meter within range.
pH	Giru/Cungulla	Aesthetic	6.5-8.5	3 between 5.8 & 6.1 2 between 9.0 & 9.2	Dealt with in-house. 3 low detections in January at Cungulla Water Treatment Plant and 2 high detections at Shirbourne Booster in April. Follow up samples within range.
Turbidity	Giru/Cungulla	Aesthetic	5 NTU	1 at 5.69 NTU	Dealt with in-house. At Cungulla Water Treatment Plant after heavy rain and flow in Houghton River.
pH	Mt Kelly Bores	Aesthetic	5 NTU	2 between 6.0 & 6.4	Dealt with in-house. One at Lena Road and one at Mt Kelly Breaktank. Follow up samples within range.

There were 6 Health non-conformance against the DWQMP in the raw untreated water in operational sampling as below, however, these were all bores that were not running into the network at time of sampling:

Table 5.2.3 – Operational Non-Conformances Against DWQMP – Raw Untreated Water

Indicator	Scheme	Guideline Health/Aesthetic	Target	Actual	Comments
E.coli	South Ayr Bore 12	Health	0	7 Org/100ml	11/01/2023 Bore 12 was not in service at the time so was not reported. Follow up sample returned clear results.
E.coli	Nelsons Lagoon Bore 3	Health	0	14 Org/100ml	23/01/2023 Bore was being flushed to atmosphere at time when sample taken from end of plastic fluming. Bore was not running into system at the time so was not reported. A further sample was taken in the correct manner returning clear results.
E.coli	Conlan Street Bore 1	Health	0	1 Org/100ml	29/03/2023 - Bore was not in service at the time due to repairs. Sampling was prior to bringing online so was not reported. Bore was disinfected and resampled returning clear followup results.
PFOS	Nelsons B1	Health	0.07ug/L	0.097ug/L 0.072 ug/L	10/08/2022 12/04/2023 Bore not in service but sampled as per DWQMP for monitoring purposes
PFHxS/PFOS	Nelsons B1	Health	0.07ug/L	0.153 ug/L 0.116 ug/L 0.085 ug/L	10/08/2022 12/04/2023 13/04/2023 Bore not in service but sampled for monitoring purposes

Indicator	Scheme	Guideline Health/Aesthetic	Target	Actual	Comments
PFHxS	Nelsons B6	Health	0.07ug/L	0.15 ug/L 0.18 ug/L 0.13 ug/L	10/08/2022 12/09/2022 13/09/2022

				0.14 ug/L 0.12 ug/L	12/04/2023 13/04/2023 Bore not in service but sampled for monitoring purposes
PFOS	Nelsons B6	Health	0.07ug/L	0.45 ug/L 0.49 ug/L 0.31 ug/L 0.54 ug/L 0.39 ug/L	10/08/2022 12/09/2022 13/09/2022 12/04/2023 13/04/2023 Bore not in service but sampled for monitoring purposes
PFHxS/PFOS	Nelsons B6	Health	0.07ug/L	0.6 ug/L 0.67 ug/L 0.44 ug/L 0.68 ug/L 0.51 ug/L	10/08/2022 12/09/2022 13/09/2022 12/04/2023 13/04/2023 Bore not in service but sampled for monitoring purposes

There were 5 Aesthetic non-conformances against the DWQMP in the raw untreated water in operational sampling as follows.

Table 5.2.4 – Operational Non-Conformances Against DWQMP – Raw Untreated Water

Indicator	Scheme	Guideline Health/Aesthetic	Target	Actual	Comments
Turbidity	South Ayr Bore 13	Aesthetic	5 NTU	6 NTU 11/01/2023	South Ayr Bores were switched off on 19 August 2022 due to works at the South Ayr 10ML Reservoir site and the installation of new trunk mains. These bores remained switched off for the rest of the financial year however, we still sampled for monitoring purposes and flushed to atmosphere to keep bores in working order in case of emergency.
Turbidity	South Ayr Bore 14	Aesthetic	5 NTU	90 NTU 11/01/2023	
True Colour	South Ayr Bore 14	Aesthetic	15 HU	240 HU 11/01/2023	

Indicator	Scheme	Guideline Health/Aesthetic	Target	Actual	Comments
Total Hardness	Home Hill Emergency Bore 9	Aesthetic	200 mg CaCO ₃ /L	276mg 28/07/2022 279mg 4/01/2023	This bore is not utilized unless where required by planned works or in

Total Dissolved Solids	Home Hill Emergency Bore 9	Aesthetic	600 mg/L	620mg/L 28/07/2022 630mg/L 4/01/2023	an emergency, but is sampled for monitoring purposes. It was not connected to the system at the time of these samples.
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6. Customer complaints

Burdekin Shire Council is required to report on the number of complaints regarding water quality, general details of complaints, and the responses undertaken.

6.1 Target Ratio

Council has a set target for water quality with compliments verse complaints being 4 to 1.

Statistics show that for the 2022/2023 financial year BSC received **10 compliments to 2 complaints (5:1)** which were attributed to dirty water, well above our target ratio. Approximately 97% of all customer requests were completed within nominated timeframes. The remaining 3% outside of target were broken water mains that required more in-depth planning to actually find the broken section of main or service, and to carry out repairs.

For all planned maintenance or new works, **the public are given advance warning** by one or more of the following:

- strategically positioned neon display boards
- advertisements in the local newspaper
- social media, and
- on the Council Public Website

6.2 Loss of Supply

There were 27 Customer Requests for loss of water during this financial year. 3 were as a result of a faulty controller at the Home Hill 5ML reservoir site (Incident Report Raised). 3 stopcocks that had been turned off by persons unknown, 7 were attributed to damaged or old water meters not working and the rest can be attributed to water main breaks, service breaks and planned water main works.

6.3 Suspected Illness

Burdekin Shire Council is dedicated to providing high quality potable water to its customers and has a stringent monitoring/testing regime in place throughout the Shire.

During 2022/2023, there were no confirmed cases of illness arising from Burdekin Shire Council's water supply systems.

6.4 Discoloured water

A total of 166 reports of discoloured water were received in the 2022/2023 financial year.

160 reports in the Ayr/Brandon Scheme. The bulk of these can be attributed to repairs to water mains and services, valve replacements as well as capital works (new main installations) requiring planned shutdowns. Some discoloured water was a result of planned flushing of major water mains and trunk mains. New mains were disinfected with 10% solution Sodium Hypochlorite, flushed and sampled prior to bringing online.

6 reports in the Home Hill Scheme. Upon investigation, no discoloured water was found at any of the reported sites. Flushing was undertaken as a precautionary measure.

There were no reports of discoloured water, in either of the Giru/Cungulla or Mt Kelly Schemes.

Council's large 500mm South Ayr Trunk Main and the 300mm Brandon Trunk Main were flushed during this financial year.

Table 1 – Requests regarding discoloured water – 2022/2023 Financial Year

	Suspected Illness	Discoloured Water	Total
Ayr/Brandon	Nil	160	160
Home Hill	Nil	6	6
Mt Kelly	Nil	Nil	Nil
Giru/Cungulla	Nil	Nil	Nil
Total	Nil	166	166

6.5 Taste and odour

A total of nine taste and odour reports were received in the 2022/2023 financial year.

Seven taste and odour reports were received in Ayr and relevant areas flushed.

Two taste and odour reports were received in Home Hill, however upon investigation no odour or taste was found. Both areas were flushed as a precautionary measure.

No reports of taste and odour were received in either Giru/Cungulla or Mt Kelly Schemes.

7. Findings and recommendations of the DWQMP Auditor

No external audit was performed during this financial year as the next DWQMP audit is due November, 2025. Small internal audits were performed to ensure compliance with the DWQMP was current.

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

DWQMP review version 3.3 was approved by RDMW on 20 May 2021 and implemented on 1 June 2021. There were no issues in the implementation of that version. A review was due by November 2022 and was undertaken by Dr. Michael Lawrence of Bligh Tanner. An Information Requirement Notice was received in April 2023 with the final DWQMP V3.6 dated 16 May 2023 being approved on 21 August 2023. This will be reflected in the 2023/2024 Annual Report.

8.1 Hazards and hazardous events that affected the quality of drinking water during the year and which were not addressed in the DWQMP

Planned works were successfully carried out throughout the year on water infrastructure with no recorded incidents. A major valve on the outlet of the South Ayr basin was replaced while at Mt Kelly, the old PVC inlet and outlet pipeworks were replaced with new cast iron pipe. Rigorous planning and testing made these planned works a success.

The commissioning of the new 10ML Tank at South Ayr and associated infrastructure was a major achievement successfully completed without incident. Council staff and contractors worked diligently to achieve timeframes without interruption or contamination of our potable water supply to residents.

A major rain period was experienced in January 2023 however, continuity of safe potable water in all schemes was maintained with no E.coli detections in the reticulation networks.

Appendix A – Summary of compliance with water quality criteria

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

The reported statistics include results derived from repeat samples, and from emergency or investigative samples undertaken in response to an elevated result.

Data listed below in Table 1 covers the period 1 July 2022 to 30 June 2023 and has been collated to show the yearly averages for various parameters under individual schemes for both verification and operational in both reticulated and raw water.

All verification and operational monitoring were carried out as per the program stated in the Burdekin Shire Council's DWQMP V3.3 which was adopted on 1 June 2021.

Table 1 - Verification monitoring results – Treated Water – Mins, Max, and Averages are based on detections in each parameter.

Scheme name	Scheme component	Parameter	Guideline Value Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
STANDARD WATER ANALYSIS – AYR BRANDON															
Ayr Brandon	Reticulation	Conductivity	N/A		us/m	6 Monthly / Annually	26	27	27	0	350.00	530.00	437.77	0.10	QHF & SS
Ayr Brandon	Reticulation	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly / Annually	26	27	27	0	6.84	8.15	7.20	0.10	QHF & SS
Ayr Brandon	Reticulation	Hardness (Total)	200	Aesthetic	mg CaCO ₃ /L	6 Monthly / Annually	26	27	27	0	47.00	139.00	101.07	0.10	QHF & SS
Ayr Brandon	Reticulation	Alkalinity	N/A		mg CaCO ₃ /L	6 Monthly / Annually	26	27	27	0	110.00	190.00	141.11	0.10	QHF & SS
Ayr Brandon	Reticulation	Silica	80	Aesthetic	mg/L	6 Monthly / Annually	26	27	27	0	47.00	53.00	49.88	0.10	QHF & SS
Ayr Brandon	Reticulation	Total Dissolved Solids	600	Aesthetic	mg/L	6 Monthly / Annually	26	27	27	0	240.00	350.00	293.33	1.00	QHF & SS
Ayr Brandon	Reticulation	True Colour	15	Aesthetic	HU	6 Monthly / Annually	26	27	0	0	<8.00	<8.00	<8.00	<8.00	QHF & SS
Ayr Brandon	Reticulation	Turbidity	5	Aesthetic	NTU	6 Monthly / Annually	26	27	2	0	1.00	1.00	1.00	<1.00	QHF & SS
Ayr Brandon	Reticulation	Sodium	180	Aesthetic	mg/L	6 Monthly / Annually	26	27	27	0	47.00	63.00	51.74	0.10	QHF & SS
Ayr Brandon	Reticulation	Chloride	250	Aesthetic	mg/L	6 Monthly / Annually	26	27	27	0	25.00	32.00	28.07	0.10	QHF & SS
Ayr Brandon	Reticulation	Fluoride (naturally occurring)	1.5	Health	mg/L	6 Monthly / Annually	26	27	27	0	0.12	0.19	0.13	0.10	QHF & SS
Ayr Brandon	Reticulation	Nitrate	50	Health	mg/L	6 Monthly / Annually	26	27	27	0	1.40	25.00	19.37	0.10	QHF & SS
Ayr Brandon	Reticulation	Sulphate	500	Health	mg/L	6 Monthly / Annually	26	27	27	0	16.00	26.00	22.00	0.10	QHF & SS
Ayr Brandon	Reticulation	Boron	4	Health	mg/L	6 Monthly / Annually	26	27	27	0	0.05	0.07	0.05	0.02	QHF & SS

Scheme name	Scheme component	Parameter	Guideline Value Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
HEAVY METALS – AYR BRANDON															
Ayr Brandon	Reticulation	Aluminium (acid-soluble)	N/A		mg/L	Annually	11	11	5	0	0.003	0.006	0.004	0.003	QHF & SS
Ayr Brandon	Reticulation	Arsenic	0.01	Health	mg/L	Annually	11	11	11	0	0.0004	0.0006	0.0004	0.0001	QHF & SS
Ayr Brandon	Reticulation	Cadmium	0.002	Health	mg/L	Annually	11	11	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF & SS
Ayr Brandon	Reticulation	Chromium	0.05	Health	mg/L	Annually	11	11	10	0	0.0001	0.001	0.0003	0.0001	QHF & SS
Ayr Brandon	Reticulation	Copper	2	Health	mg/L	Annually	11	11	10	0	0.007	0.100	0.0324	0.001	QHF & SS
Ayr Brandon	Reticulation	Iron	0.3	Aesthetic	mg/L	Annually	11	11	3	0	0.007	0.011	0.009	0.005	QHF & SS
Ayr Brandon	Reticulation	Lead	0.01	Health	mg/L	Annually	11	11	10	0	0.0001	0.0023	0.0005	0.0001	QHF & SS
Ayr Brandon	Reticulation	Manganese	0.5	Health	mg/L	Annually	11	11	11	0	0.0002	0.017	0.0023	0.0001	QHF & SS
Ayr Brandon	Reticulation	Nickel	0.02	Health	mg/L	Annually	11	11	11	0	0.0001	0.0007	0.0003	0.0001	QHF & SS
Ayr Brandon	Reticulation	Zinc	3	Aesthetic	mg/L	Annually	11	11	10	0	0.002	0.039	0.0163	0.001	QHF & SS
PFAS – AYR BRANDON															
Ayr Brandon	Reticulation	PFOA	0.07	Health	ug/L	Quarterly	4	19	3	0	0.0016	0.0026	0.0019	0.005	NMI Institute
Ayr Brandon	Reticulation	PFHxS	0.07	Health	ug/L	Quarterly	4	19	8	0	0.001	0.0024	0.0068	0.005	NMI Institute
Ayr Brandon	Reticulation	PFOS	0.07	Health	ug/L	Quarterly	4	19	6	0	0.0028	0.045	0.0158	0.005	NMI Institute
Ayr Brandon	Reticulation	PFHxS/PFOS	0.07	Health	ug/L	Quarterly	4	19	7	0	0.0042	0.069	0.0227	0.005	NMI Institute
ATRAZINES & PESTICIDES – AYR BRANDON															
Ayr Brandon	Reticulation	Atrazine	20	Health	ug/L	Quarterly	4	4	0	0	<0.02	<0.02	<0.02	0.02	QHF & SS
Ayr Brandon	Reticulation	Decethyl Atrazine	20	Health	ug/L	Quarterly	4	4	2	0	0.01	0.01	0.01	0.02	QHF & SS
Ayr Brandon	Reticulation	Desisopropyl Atrazine	20	Health	ug/L	Quarterly	4	4	0	0	<0.02	<0.02	<0.02	0.02	QHF & SS
Ayr Brandon	Reticulation	Non-Detects		Health	ug/L	Quarterly	4	4	0	0	<0.02	<0.02	<0.02	<0.02	QHF & SS
WATER QUALITY – AYR BRANDON															
Ayr Brandon	Reticulation	Bromate	0.02		mg/L	Quarterly	16	16	0	0	<0.01	<0.01	<0.01	0.01	QHF & SS
Ayr Brandon	Reticulation	Chlorate	0.8	Health	mg/L	Quarterly	16	16	16	0	0.03	0.44	0.166	0.01	QHF & SS
Ayr Brandon	Reticulation	Corrected Beta Activity	0.5		Bq/L	5 Yearly	2	2	2	0	0.10	0.10	0.10	0.01	QHF & SS
Ayr Brandon	Reticulation	Total Alpha Activity	0.5		Bq/L	5Yearly	2	2	1	0	0.10	0.10	0.10	0.01	QHF & SS
Ayr Brandon	Reticulation	Total Beta Activity	0.5		Bq/L	5 Yearly	2	2	0	0	0	0	0	0.01	QHF & SS
Ayr Brandon	Reticulation	Chlorine (free)	5	Health	mg/L	Weekly / Monthly	2813	2813	2813	0	0.01	3.21	0.61	0.01	In-house

Scheme name	Scheme component	Parameter	Guideline Value Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Ayr Brandon	Reticulation	pH	6.5-8.5	Aesthetic	pH Units	Weekly / Monthly	128	179	179	0	6.50	8.50	7.10	0.10	In-house
Ayr Brandon	Reticulation	Turbidity	5	Aesthetic	NTU	Weekly / Monthly	128	179	179	0	0.15	1.65	0.51	<1.00	In-house
Ayr Brandon	Reticulation	Trihalomethanes, Total	250	Health	ug/L	Quarterly / Annually	20	20	14	0	10.00	37.00	19.85	21.09	Townsville CC
Ayr Brandon	Reticulation	E.coli	0	Health	Org/100ml	Weekly / Monthly / 6 Monthly	128	179	1	1 (Reported to RDMW 14/07/2022)**	1.00	1.00	1.00	<1.00	In-House & Tvlle CC
STANDARD WATER ANALYSIS – HOME HILL															
Home Hill	Reticulation	Conductivity	N/A		us/m	6 Monthly / Annually	9	10	10	0	450.00	540.00	496.00	0.10	QHF &SS
Home Hill	Reticulation	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly / Annually	9	10	10	0	7.43	8.00	7.69	0.10	QHF &SS
Home Hill	Reticulation	Hardness (Total)	200	Aesthetic	mg CaCO ₃ /L	6 Monthly / Annually	9	10	10	0	118.00	148.00	129.90	0.10	QHF &SS
Home Hill	Reticulation	Alkalinity	N/A		mg CaCO ₃ /L	6 Monthly / Annually	9	10	10	0	10.00	210.00	177.00	0.10	QHF &SS
Home Hill	Reticulation	Silica	80	Aesthetic	mg/L	6 Monthly / Annually	9	10	10	0	35.00	38.00	36.40	0.10	QHF &SS
Home Hill	Reticulation	Total Dissolved Solids	600	Aesthetic	mg/L	6 Monthly / Annually	9	10	10	0	290.00	350.00	319.0	1.00	QHF &SS
Home Hill	Reticulation	True Colour	15	Aesthetic	HU	6 Monthly / Annually	9	10	0	0	<8.00	<8.00	<8.0	<8.00	QHF &SS
Home Hill	Reticulation	Turbidity	5	Aesthetic	NTU	6 Monthly / Annually	9	10	0	0	<1.00	<1.00	<1.0	<1.00	QHF &SS
Home Hill	Reticulation	Sodium	180	Aesthetic	mg/L	6 Monthly / Annually	9	10	10	0	54.00	62.00	58.1	0.10	QHF &SS
Home Hill	Reticulation	Chloride	250	Aesthetic	mg/L	6 Monthly / Annually	9	10	10	0	19.00	24.00	20.6	0.10	QHF &SS
Home Hill	Reticulation	Fluoride (naturally occurring)	1.5	Health	mg/L	6 Monthly / Annually	9	10	10	0	0.08	0.12	0.10	0.10	QHF &SS
Home Hill	Reticulation	Nitrate	50	Health	mg/L	6 Monthly / Annually	9	10	10	0	22.00	31.00	24.8	0.10	QHF &SS
Home Hill	Reticulation	Sulphate	500	Health	mg/L	6 Monthly / Annually	9	10	10	0	13.00	20.00	16.0	0.10	QHF &SS
Home Hill	Reticulation	Boron	4	Health	mg/L	6 Monthly / Annually	9	10	10	0	0.04	0.05	0.042	0.02	QHF &SS
HEAVY METALS – HOME HILL															
Home Hill	Reticulation	Aluminium (acid-soluble)	N/A		mg/L	Annually	3	3	2	0	0.004	0.004	0.004	0.003	QHF &SS
Home Hill	Reticulation	Arsenic	0.01	Health	mg/L	Annually	3	3	3	0	0.0004	0.0004	0.0004	0.0001	QHF &SS
Home Hill	Reticulation	Cadmium	0.002	Health	mg/L	Annually	3	3	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF &SS

**Refer Table 5.2.2 for details of non-conformances

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQM P sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Home Hill	Reticulation	Chromium	0.05	Health	mg/L	Annually	3	3	3	0	0.0001	0.0002	0.0001	0.0001	QHF & SS
Home Hill	Reticulation	Copper	2	Health	mg/L	Annually	3	3	3	0	0.004	0.011	0.0086	0.001	QHF & SS
Home Hill	Reticulation	Iron	0.3	Aesthetic	mg/L	Annually	3	3	2	0	0.013	0.026	0.0195	0.005	QHF & SS
Home Hill	Reticulation	Lead	0.01	Health	mg/L	Annually	3	3	2	0	0.0005	0.0013	0.0009	0.0001	QHF & SS
Home Hill	Reticulation	Manganese	0.5	Health	mg/L	Annually	3	3	3	0	0.0004	0.0034	0.0014	0.0001	QHF & SS
Home Hill	Reticulation	Nickel	0.02	Health	mg/L	Annually	3	3	3	0	0.0007	0.0028	0.0014	0.0001	QHF & SS
Home Hill	Reticulation	Zinc	3	Aesthetic	mg/L	Annually	3	3	3	0	0.006	0.034	0.02	0.001	QHF & SS
PFAS – HOME HILL															
Home Hill	Reticulation	PFOA	0.07	Health	ug/L	Quarterly	2	2	0	0	<0.001	<0.001	<0.001	0.005	NMI Institute
Home Hill	Reticulation	PFHxS	0.07	Health	ug/L	Quarterly	2	2	0	0	<0.001	<0.001	<0.001	0.005	NMI Institute
Home Hill	Reticulation	PFOS	0.07	Health	ug/L	Quarterly	2	2	0	0	<0.002	<0.002	<0.002	0.005	NMI Institute
Home Hill	Reticulation	PFHxS/PFOS	0.07	Health	ug/L	Quarterly	2	2	0	0	<0.003	<0.003	<0.003	0.005	NMI Institute
ATRAZINES & PESTICIDES – HOME HILL															
Home Hill	Reticulation	Atrazine	20	Health	ug/L	Quarterly	2	3	0	0	<0.02	<0.02	<0.02	0.02	QHF & SS
Home Hill	Reticulation	Decethyl Atrazine	20	Health	ug/L	Quarterly	2	3	3	0	0.05	0.06	0.055	0.02	QHF & SS
Home Hill	Reticulation	Desisopropyl Atrazine	20	Health	ug/L	Quarterly	2	3	0	0	<0.02	<0.02	<0.02	0.02	QHF & SS
Home Hill	Reticulation	Non-Detects			ug/L	Quarterly	2	3	0	0	<0.02	<0.02	<0.02	0.02	QHF & SS
WATER QUALITY – HOME HILL															
Home Hill	Reticulation	Bromate	0.02		mg/L	Quarterly	4	4	0	0	<0.01	<0.01	<0.01	0.01	QHF & SS
Home Hill	Reticulation	Chlorate	0.8	Health	mg/L	Quarterly	4	4	4	0	0.10	0.19	0.16	0.01	QHF & SS
Home Hill	Reticulation	Corrected Beta Activity	0.5		Bq/L	5 Yearly	1	1	0	0	0	0	0	0.10	QHF & SS
Home Hill	Reticulation	Total Alpha Activity	0.5		Bq/L	5 Yearly	1	1	0	0	0	0	0	0.10	QHF & SS
Home Hill	Reticulation	Total Beta Activity	0.5		Bq/L	5 Yearly	1	1	0	0	0	0	0	0.10	QHF & SS
Home Hill	Reticulation	Chlorine (free)	5	Health	mg/L	Weekly / 6 Monthly	64	64	64	0	0.41	0.92	0.68	0.01	In-house
Home Hill	Reticulation	pH	6.5-8.5	Aesthetic	pH Units	Weekly	64	64	64	0	6.60	8.29	7.21	0.10	In-house

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Home Hill	Reticulation	Turbidity	5	Aesthetic	NTU	Weekly / Monthly	64	99	99	0	0.16	3.53	0.71	0.10	In-house
Home Hill	Reticulation	Trihalomethanes, Total	250	Health	ug/L	Quarterly / Annually	6	6	5	0	8.00	20.0	13.8	<1.00	Townsville CC
Home Hill	Reticulation	E.coli	0	Health	Org/100ml	Weekly / Monthly / 6 Monthly	64	99	0	0	<1.00	<1.00	<1.00	<1.00	In-House & Tville CC
STANDARD WATER ANALYSIS - GIRU															
Giru/Cungulla	Reticulation	Conductivity	N/A		us/m	6 Monthly / Annually	7	7	7	0	190.00	300.00	245.71	0.10	QHF & SS
Giru/Cungulla	Reticulation	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly / Annually	7	7	7	0	6.73	7.24	7.05	0.10	QHF &SS
Giru/Cungulla	Reticulation	Hardness (Total)	200	Aesthetic	mg CaCO ₃ /L	6 Monthly / Annually	7	7	7	0	34.00	69.00	50.71	0.10	QHF &SS
Giru/Cungulla	Reticulation	Alkalinity	N/A		mg CaCO ₃ /L	6 Monthly / Annually	7	7	7	0	31.00	51.00	41.28	0.10	QHF & SS
Giru/Cungulla	Reticulation	Silica	80	Aesthetic	mg/L	6 Monthly / Annually	7	7	7	0	17.00	20.00	18.85	0.10	QHF &SS
Giru/Cungulla	Reticulation	Total Dissolved Solids	600	Aesthetic	mg/L	6 Monthly / Annually	7	7	7	0	120.00	180.00	148.57	1.00	QHF &SS
Giru/Cungulla	Reticulation	True Colour	15	Aesthetic	HU	6 Monthly / Annually	7	7	0	0	<8.00	<8.00	<8.00	<8.00	QHF & SS
Giru/Cungulla	Reticulation	Turbidity	5	Aesthetic	NTU	6 Monthly / Annually	7	7	0	0	<1.00	<1.00	<1.00	<1.00	QHF &SS
Giru/Cungulla	Reticulation	Sodium	180	Aesthetic	mg/L	6 Monthly / Annually	7	7	7	0	22.00	30.00	26.42	0.10	QHF &SS
Giru/Cungulla	Reticulation	Chloride	250	Aesthetic	mg/L	6 Monthly / Annually	7	7	7	0	19.00	51.00	33.71	0.10	QHF &SS
Giru/Cungulla	Reticulation	Fluoride (naturally occurring)	1.5	Health	mg/L	6 Monthly / Annually	7	7	7	0	0.04	0.08	0.06	0.10	QHF &SS
Giru/Cungulla	Reticulation	Nitrate	50	Health	mg/L	6 Monthly / Annually	7	7	7	0	0.19	0.46	0.28	0.10	QHF &SS
Giru/Cungulla	Reticulation	Sulphate	500	Health	mg/L	6 Monthly / Annually	7	7	7	0	19.0	30.00	25.14	0.10	QHF &SS
Giru/Cungulla	Reticulation	Boron	4	Health	mg/L	6 Monthly / Annually	7	7	7	0	0.02	0.02	0.02	0.02	QHF &SS

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
HEAVY METALS - GIRU															
Giru/Cungulla	Reticulation	Aluminium (acid-soluble)	N/A		mg/L	Annually	4	4	4	0	0.031	0.17	0.067	0.003	QHF &SS
Giru/Cungulla	Reticulation	Arsenic	0.01	Health	mg/L	Annually	4	4	4	0	0.0002	0.0003	0.0002	0.0001	QHF &SS
Giru/Cungulla	Reticulation	Cadmium	0.002	Health	mg/L	Annually	4	4	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF &SS
Giru/Cungulla	Reticulation	Chromium	0.05	Health	mg/L	Annually	4	4	1	0	0.0001	0.0001	0.0001	0.0001	QHF &SS
Giru/Cungulla	Reticulation	Copper	2	Health	mg/L	Annually	4	4	3	0	0.001	0.002	0.0016	0.001	QHF &SS
Giru/Cungulla	Reticulation	Iron	0.3	Aesthetic	mg/L	Annually	4	4	4	0	0.006	0.046	0.0165	0.005	QHF &SS
Giru/Cungulla	Reticulation	Lead	0.01	Health	mg/L	Annually	4	4	3	0	0.0001	0.0003	0.0002	0.0001	QHF &SS
Giru/Cungulla	Reticulation	Manganese	0.5	Health	mg/L	Annually	4	4	4	0	0.0011	0.033	0.009	0.0001	QHF &SS
Giru/Cungulla	Reticulation	Nickel	0.02	Health	mg/L	Annually	4	4	4	0	0.0001	0.0002	0.00017	0.0001	QHF &SS
Giru/Cungulla	Reticulation	Zinc	3	Aesthetic	mg/L	Annually	4	4	4	0	0.003	0.013	0.0065	0.001	QHF &SS
ATRAZINES & PESTICIDES - GIRU															
Giru/Cungulla	Reticulation	Atrazine	20	Health	ug/L	Quarterly	2	2	1	0	0.15	0.15	0.15	0.02	QHF &SS
Giru/Cungulla	Reticulation	Decethyl Atrazine	20	Health	ug/L	Quarterly	2	2	1	0	0.01	0.01	0.01	0.02	QHF &SS
Giru/Cungulla	Reticulation	Desisopropyl Atrazine	20	Health	ug/L	Quarterly	2	2	1	0	0.015	0.015	0.015	0.02	QHF &SS
Giru/Cungulla	Reticulation	Non-Detects			ug/L	Quarterly	2	2	0	0	<0.02	<0.02	<0.02	<0.02	QHF & SS
WATER QUALITY - GIRU															
Giru/Cungulla	Reticulation	Bromate	0.02		mg/L	Quarterly	8	8	0	0	<0.01	<0.01	<0.01	0.01	QHF & SS
Giru/Cungulla	Reticulation	Chlorate	0.8		mg/L	Quarterly	8	8	8	0	0.21	0.59	0.38	0.01	QHF & SS
Giru/Cungulla	Reticulation	Corrected Beta Activity	0.5		Bq/L	5 Yearly	1	1	0	0	0	0	0	0.10	QHF & SS
Giru/Cungulla	Reticulation	Total Alpha Activity	0.5		Bq/L	5Yearly	1	1	0	0	0	0	0	0.10	QHF & SS
Giru/Cungulla	Reticulation	Total Beta Activity	0.5		Bq/L	5 Yearly	1	1	0	0	0	0	0	0.10	QHF & SS
Giru/Cungulla	Reticulation	Chlorine (free)	5	Health	mg/L	Weekly / 6 Monthly	26	55	55	0	0.37	1.93	0.95	0.01	In-house
Giru/Cungulla	Reticulation	pH	6.5-8.5	Aesthetic	pH Units	Weekly	26	55	55	0	6.60	8.00	7.10	0.10	In-house
Giru/Cungulla	Reticulation	Turbidity	5	Aesthetic	NTU	Weekly / Monthly	26	55	55	0	0.07	1.58	0.86	0.10	In-house
Giru/Cungulla	Reticulation	Trihalomethanes, Total	250	Health	ug/L	Quarterly / Annually	6	26	26	0	58.00	205.00	98.67	<1.00	Townsville CC
Giru/Cungulla	Reticulation	E.coli	0	Health	Org/100ml	Weekly / Monthly / 6 Monthly	26	55	0	0	<1.00	<1.00	<1.00	<1.00	In-House & Tville CC

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
STANDARD WATER ANALYSIS – MT KELLY															
Mt Kelly Bores	Reticulation	Conductivity	N/A		us/m	6 Monthly / Annually	5	5	5	0	610.00	630.00	614.00	0.10	QHF & SS
Mt Kelly Bores	Reticulation	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly / Annually	5	5	5	0	7.16	7.34	7.26	0.10	QHF & SS
Mt Kelly Bores	Reticulation	Hardness (Total)	200	Aesthetic	mg CaCO ₃ /L	6 Monthly / Annually	5	5	5	0	172.00	196.00	177.60	0.10	QHF & SS
Mt Kelly Bores	Reticulation	Alkalinity	N/A		mg CaCO ₃ /L	6 Monthly / Annually	5	5	5	0	130.00	140.00	138.00	0.10	QHF & SS
Mt Kelly Bores	Reticulation	Silica	80	Aesthetic	mg/L	6 Monthly / Annually	5	5	5	0	46.00	50.00	49.20	0.10	QHF & SS
Mt Kelly Bores	Reticulation	Total Dissolved Solids	600	Aesthetic	mg/L	6 Monthly / Annually	5	5	5	0	390.00	410.00	398.00	1.00	QHF & SS
Mt Kelly Bores	Reticulation	True Colour	15	Aesthetic	HU	6 Monthly / Annually	5	5	0	0	<8.00	<8.00	<8.00	<8.00	QHF & SS
Mt Kelly Bores	Reticulation	Turbidity	5	Aesthetic	NTU	6 Monthly / Annually	5	5	0	0	<1.00	<1.00	<1.00	<1.00	QHF & SS
Mt Kelly Bores	Reticulation	Sodium	180	Aesthetic	mg/L	6 Monthly / Annually	5	5	5	0	51.00	57.00	55.20	0.10	QHF & SS
Mt Kelly Bores	Reticulation	Chloride	250	Aesthetic	mg/L	6 Monthly / Annually	5	5	5	0	44.00	54.00	49.00	0.10	QHF & SS
Mt Kelly Bores	Reticulation	Fluoride (naturally occurring)	1.5	Health	mg/L	6 Monthly / Annually	5	5	5	0	0.080	0.10	0.09	0.10	QHF & SS
Mt Kelly Bores	Reticulation	Nitrate	50	Health	mg/L	6 Monthly / Annually	5	5	5	0	23.00	36.00	32.40	0.10	QHF & SS
Mt Kelly Bores	Reticulation	Sulphate	500	Health	mg/L	6 Monthly / Annually	5	5	5	0	60.00	93.00	67.60	0.10	QHF & SS
Mt Kelly Bores	Reticulation	Boron	4	Health	mg/L	6 Monthly / Annually	5	5	5	0	0.040	0.04	0.04	0.02	QHF & SS
HEAVY METALS – MT KELLY															
Mt Kelly Bores	Reticulation	Aluminium (acid-soluble)	N/A		mg/L	Annually	3	3	2	0	0.004	0.004	0.004	0.003	QHF & SS
Mt Kelly Bores	Reticulation	Arsenic	0.01	Health	mg/L	Annually	3	3	3	0	0.0004	0.0004	0.0004	0.0001	QHF & SS
Mt Kelly Bores	Reticulation	Cadmium	0.002	Health	mg/L	Annually	3	3	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF & SS
Mt Kelly Bores	Reticulation	Chromium	0.05	Health	mg/L	Annually	3	3	3	0	0.0001	0.0002	0.0001	0.0001	QHF & SS

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
HEAVY METALS – MT KELLY (CONT.)															
Mt Kelly Bores	Reticulation	Copper	2	Health	mg/L	Annually	3	3	3	0	0.004	0.011	0.008	0.001	QHF &SS
Mt Kelly Bores	Reticulation	Iron	0.3	Aesthetic	mg/L	Annually	3	3	2	0	0.013	0.026	0.019	0.005	QHF &SS
Mt Kelly Bores	Reticulation	Lead	0.01	Health	mg/L	Annually	3	3	2	0	0.0005	0.0013	0.0009	0.0001	QHF &SS
Mt Kelly Bores	Reticulation	Manganese	0.5	Health	mg/L	Annually	3	3	3	0	0.0004	0.0034	0.0014	0.0001	QHF &SS
Mt Kelly Bores	Reticulation	Nickel	0.02	Health	mg/L	Annually	3	3	3	0	0.0007	0.0028	0.0014	0.0001	QHF &SS
Mt Kelly Bores	Reticulation	Zinc	3	Aesthetic	mg/L	Annually	3	3	3	0	0.006	0.034	0.02	0.001	QHF &SS
ATRAZINES & PESTICIDES – MT KELLY															
Mt Kelly Bores	Reticulation	Atrazine	20	Health	ug/L	Quarterly	2	2	0	0	<0.02	<0.02	<0.02	0.02	QHF &SS
Mt Kelly Bores	Reticulation	Decethyl Atrazine	20	Health	ug/L	Quarterly	2	2	2	0	0.09	0.14	0.115	0.02	QHF &SS
Mt Kelly Bores	Reticulation	Desisopropyl Atrazine	20	Health	ug/L	Quarterly	2	2	1	0	0.01	0.01	0.01	0.02	QHF &SS
Mt Kelly Bores	Reticulation	Non-Detects			ug/L	Quarterly	2	2	0	0	0.02	0.02	0.02	<0.02	QHF & SS
WATER QUALITY – MT KELLY															
Mt Kelly Bores	Reticulation	Bromate	0.02		mg/L	Quarterly	4	4	0	0	<0.01	<0.01	<0.01	0.01	QHF & SS
Mt Kelly Bores	Reticulation	Chlorate	0.8	Health	mg/L	Quarterly	4	4	4	0	0.10	0.19	0.16	0.01	QHF & SS
Mt Kelly Bores	Reticulation	Corrected Beta Activity	0.5		Bq/L	5 Yearly	1	1	1	0	0.03	0.03	0.03	0.10	QHF & SS
Mt Kelly Bores	Reticulation	Total Alpha Activity	0.5		Bq/L	5Yearly	1	1	0	0	0	0	0	0.10	QHF & SS
Mt Kelly Bores	Reticulation	Total Beta Activity	0.5		Bq/L	5 Yearly	1	1	0	0	0	0	0	0.10	QHF & SS
Mt Kelly Bores	Reticulation	Chlorine (free)	5	Health	mg/L	6 Monthly	12	32	32	0	0.35	1.20	0.79	0.01	In-house
Mt Kelly Bores	Reticulation	pH	6.5-8.5	Aesthetic	pH Units	Weekly	12	32	32	0	6.70	8.10	7.24	0.10	In-house
Mt Kelly Bores	Reticulation	Turbidity	5	Aesthetic	NTU	Weekly / Monthly	12	32	32	0	0.25	2.03	0.96	0.10	In-house
Mt Kelly Bores	Reticulation	Trihalomethanes, Total	250	Health	ug/L	Quarterly / Annually	4	4	3	0	10.00	17.00	13.00	<1.00	Townsville CC
Mt Kelly Bores	Reticulation	E.coli	0	Health	Org/100ml	Monthly / 6 Monthly	12	32	0	0	<1.00	<1.00	<1.00	<1.00	In-House & Tville CC

Table 2 - Operational monitoring results – Treated Water - Mins, Max, and Averages are based on samples where parameter showed a detection.

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Ayr Brandon	Reticulation	Chlorine (free)	5	Health	mg/L	Daily / Weekly / Monthly	2813	2852	2852	0	0.01	3.21	0.62	0.01	In-house
Ayr Brandon	Reticulation	pH	6.5-8.5	Aesthetic	pH Units	Daily / Weekly	2813	2820	2820	48 ** (5.9 – 6.4)	5.90	8.50	6.93	0.10	In-house
Ayr Brandon	Reticulation	CO ²	N/A		mg/L	Monthly	24	29	29	0	0.015	24.0	2.81	0.01	In-house
Ayr Brandon	Reticulation	Temperature	N/A		°C	Daily / Weekly	0	2824	2824	0	16.20	33.50	26.39	0.01	In-house
Ayr Brandon	Reticulation	Turbidity	5	Aesthetic	NTU	Daily / Weekly	0	2807	2807	1 ** (5.27)	0.01	5.27	0.41	0.01	In-house
Home Hill	Reticulation	Chlorine (free)	5	Health	mg/L	Daily / Weekly	625	1043	1043	0	0.05	1.50	0.59	0.01	In-house
Home Hill	Reticulation	pH	6.5-8.5	Aesthetic	pH Units	Daily / Weekly	625	1042	1042	6 ** (6.4 – 6.48) (8.58 – 8.6)	6.40	8.60	7.28	0.10	In-house
Home Hill	Reticulation	CO ²	N/A		mg/L	Monthly	12	14	14	0	0.40	14.75	2.88	0.01	In-house
Home Hill	Reticulation	Temperature	N/A		°C	Daily / Weekly	0	1043	1043	0	16.10	32.80	26.24	0.01	In-house
Home Hill	Reticulation	Turbidity	5	Aesthetic	NTU	Daily / Weekly	0	1042	1042	0	0.01	3.34	3.21	<1.00	In-house
Giru/Cungulla	Reticulation	Chlorine (free)	5	Health	mg/L	Daily / Weekly	886	1266	1266	0	0.06	2.06	0.84	0.01	In-house
Giru/Cungulla	Reticulation	pH	6.5-8.5	Aesthetic	pH Units	Daily / Weekly	886	1266	1266	5 ** (5.8 – 6.1) (9.0 – 9.2)	5.80	9.20	7.32	0.10	In-house
Giru/Cungulla	Reticulation	CO ²	N/A		mg/L	Monthly	12	12	12	0	0.80	2.89	1.48	0.01	In-house
Giru/Cungulla	Reticulation	Temperature	N/A		°C	Daily / Weekly	0	1265	1265	0	15.10	33.00	26.75	0.01	In-house
Giru/Cungulla	Reticulation	Turbidity	5	Aesthetic	NTU	Daily / Weekly	0	1247	1247	1 ** (5.69)	0.01	5.69	0.34	<1.00	In-house
Mt Kelly Bores	Reticulation	Chlorine (free)	5	Health	mg/L	Daily / Weekly	834	854	854	0	0.11	1.30	0.73	0.01	In-house
Mt Kelly Bores	Reticulation	pH	6.5-8.5	Aesthetic	pH Units	Daily / Weekly	834	852	852	2 ** (6.0 – 6.4)	6.00	8.50	7.14	0.10	In-house
Mt Kelly Bores	Reticulation	CO ²	N/A		mg/L	Monthly	12	12	12	0	1.70	3.86	2.38	0.01	In-house
Mt Kelly Bores	Reticulation	Temperature	N/A		°C	Daily / Weekly	0	853	853	0	18.90	32.40	27.03	0.01	In-house
Mt Kelly Bores	Reticulation	Turbidity	5	Aesthetic	NTU	Daily / Weekly	0	850	850	0	0.01	4.89	0.36	<1.00	In-house

**Refer Table 5.2.2 for details of non-conformances

Table 3 - Operational monitoring results – Raw Untreated Water - Mins, Max, and Averages are based on samples where parameter showed a detection.

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
STANDARD WATER ANALYSIS – AYR BRANDON															
Ayr/Brandon	Chambers	Conductivity	N/A		us/m	6 Monthly	4	4	4	0	310.00	420.00	357.50	0.10	QHF & SS
Ayr/Brandon	Chambers	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	4	4	4	0	6.75	6.97	6.83	0.10	QHF & SS
Ayr/Brandon	Chambers	Hardness (Total)	200	Aesthetic	mg CaCO ₃ /L	6 Monthly	4	4	4	0	46.00	94.00	60.50	0.10	QHF & SS
Ayr/Brandon	Chambers	Alkalinity	N/A		mg CaCO ₃ /L	6 Monthly	4	4	4	0	75.00	130.00	94.75	0.10	QHF & SS
Ayr/Brandon	Chambers	Silica	80	Aesthetic	mg/L	6 Monthly	4	4	4	0	41.00	48.00	43.50	0.10	QHF & SS
Ayr/Brandon	Chambers	Total Dissolved Solids	600	Aesthetic	mg/L	6 Monthly	4	4	4	0	210.00	280.00	237.50	1.00	QHF & SS
Ayr/Brandon	Chambers	True Colour	15	Aesthetic	HU	6 Monthly	4	4	0	0	<8.00	<8.00	<8.00	<8.00	QHF & SS
Ayr/Brandon	Chambers	Turbidity	5	Aesthetic	NTU	6 Monthly	4	4	4	0	<1.00	<1.00	<1.00	<1.00	QHF & SS
Ayr/Brandon	Chambers	Sodium	180	Aesthetic	mg/L	6 Monthly	4	4	4	0	42.00	53.00	47.50	0.10	QHF & SS
Ayr/Brandon	Chambers	Chloride	250	Aesthetic	mg/L	6 Monthly	4	4	4	0	30.00	37.00	34.25	0.10	QHF & SS
Ayr/Brandon	Chambers	Fluoride (naturally occurring)	1.5	Health	mg/L	6 Monthly	4	4	4	0	0.10	0.13	0.12	0.10	QHF & SS
Ayr/Brandon	Chambers	Nitrate	50	Health	mg/L	6 Monthly	4	4	4	0	5.90	18.00	9.15	0.10	QHF & SS
Ayr/Brandon	Chambers	Sulphate	500	Health	mg/L	6 Monthly	4	4	4	0	20.00	24.00	21.75	0.10	QHF & SS
Ayr/Brandon	Chambers	Boron	4	Health	mg/L	6 Monthly	4	4	4	0	0.06	0.08	0.07	0.02	QHF & SS
Ayr/Brandon	Conlan St	Conductivity	N/A		us/m	6 Monthly	8	8	8	0	310.00	530.00	411.00	0.10	QHF & SS
Ayr/Brandon	Conlan St	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	8	8	8	0	6.84	7.67	7.15	0.10	QHF & SS
Ayr/Brandon	Conlan St	Hardness (Total)	200	Aesthetic	mg CaCO ₃ /L	6 Monthly	8	8	8	0	74.00	135.00	100.38	0.10	QHF & SS
Ayr/Brandon	Conlan St	Alkalinity	N/A		mg CaCO ₃ /L	6 Monthly	8	8	8	0	99.00	180.00	134.88	0.10	QHF & SS
Ayr/Brandon	Conlan St	Silica	80	Aesthetic	mg/L	6 Monthly	8	8	8	0	48.00	51.00	49.75	0.10	QHF & SS
Ayr/Brandon	Conlan St	Total Dissolved Solids	600	Aesthetic	mg/L	6 Monthly	8	8	8	0	220.00	350.00	280.00	1.00	QHF & SS
Ayr/Brandon	Conlan St	True Colour	15	Aesthetic	HU	6 Monthly	8	8	0	0	<8.00	<8.00	<8.00	<8.00	QHF & SS
Ayr/Brandon	Conlan St	Turbidity	5	Aesthetic	NTU	6 Monthly	8	8	1	0	2.00	2.00	2.00	<1.00	QHF & SS
Ayr/Brandon	Conlan St	Sodium	180	Aesthetic	mg/L	6 Monthly	8	8	8	0	32.00	62.00	46.75	0.10	QHF & SS
Ayr/Brandon	Conlan St	Chloride	250	Aesthetic	mg/L	6 Monthly	8	8	8	0	19.00	29.00	24.25	0.10	QHF & SS
Ayr/Brandon	Conlan St	Fluoride (naturally occurring)	1.5	Health	mg/L	6 Monthly	8	8	8	0	0.05	0.20	0.12	0.10	QHF & SS
Ayr/Brandon	Conlan St	Nitrate	50	Health	mg/L	6 Monthly	8	8	8	0	15.00	28.00	22.00	0.10	QHF & SS
Ayr/Brandon	Conlan St	Sulphate	500	Health	mg/L	6 Monthly	8	8	8	0	12.00	29.00	20.50	0.10	QHF & SS
Ayr/Brandon	Conlan St	Boron	4	Health	mg/L	6 Monthly	8	8	8	0	0.04	0.07	0.05	0.02	QHF & SS

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Nelsons Lagoon - Bores 3 and 4 Only															
Ayr/Brandon	Nelsons Lagoon	Conductivity	N/A		us/m	6 Monthly	4	4	4	0	340.00	540.00	415.00	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	4	4	4	0	6.69	6.84	6.78	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Hardness (Total)	200	Aesthetic	mg CaCO ₃ /L	6 Monthly	4	4	4	0	57.00	106.00	75.75	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Alkalinity	N/A		mg CaCO ₃ /L	6 Monthly	4	4	4	0	94.00	110.00	99.25	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Silica	80	Aesthetic	mg/L	6 Monthly	4	4	4	0	35.00	40.00	37.75	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Total Dissolved Solids	600	Aesthetic	mg/L	6 Monthly	4	4	4	0	220.00	330.00	260.00	1.00	QHF & SS
Ayr/Brandon	Nelsons Lagoon	True Colour	15	Aesthetic	HU	6 Monthly	4	4	0	0	<8.00	<8.00	<8.00	<8.00	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Turbidity	5	Aesthetic	NTU	6 Monthly	4	4	0	0	<1.00	<1.00	<1.00	<1.00	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Sodium	180	Aesthetic	mg/L	6 Monthly	4	4	4	0	47.00	67.00	54.00	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Chloride	250	Aesthetic	mg/L	6 Monthly	4	4	4	0	40.00	75.00	52.00	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Fluoride (naturally occurring)	1.5	Health	mg/L	6 Monthly	4	4	4	0	0.08	0.10	0.087	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Nitrate	50	Health	mg/L	6 Monthly	4	4	4	0	4.00	14.00	8.03	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Sulphate	500	Health	mg/L	6 Monthly	4	4	4	0	13.00	31.00	20.00	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Boron	4	Health	mg/L	6 Monthly	4	4	4	0	0.06	0.10	0.085	0.02	QHF & SS
Nelsons Lagoon - Bores 1 and 6 Only - Not in Service															
Ayr/Brandon	Nelsons Lagoon	Conductivity	N/A		us/m	6 Monthly	0	2	2	0	460.00	490.00	475.00	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	0	2	2	0	6.72	6.82	6.77	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Hardness (Total)	200	Aesthetic	mg CaCO ₃ /L	6 Monthly	0	2	2	0	56.00	80.00	68.00	0.10	QHF & SS

Nelsons Lagoon - Bores 1 and 6 Only - Not in Service – (Cont.)

Ayr/Brandon	Nelsons Lagoon	Alkalinity	N/A		mg CaCO ₃ /L	6 Monthly	0	2	2	0	94.00	100.00	97.00	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Silica	80	Aesthetic	mg/L	6 Monthly	0	2	2	0	41.00	44.00	42.50	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Total Dissolved Solids	600	Aesthetic	mg/L	6 Monthly	0	2	2	0	290.00	300.00	295.00	1.00	QHF & SS
Ayr/Brandon	Nelsons Lagoon	True Colour	15	Aesthetic	HU	6 Monthly	0	2	0	0	<8.00	<8.00	<8.00	<8.00	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Turbidity	5	Aesthetic	NTU	6 Monthly	0	2	0	0	<1.00	<1.00	<1.00	<1.00	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Sodium	180	Aesthetic	mg/L	6 Monthly	0	2	2	0	65.00	71.00	68.00	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Chloride	250	Aesthetic	mg/L	6 Monthly	0	2	2	0	60.00	71.00	65.50	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Fluoride (naturally occurring)	1.5	Health	mg/L	6 Monthly	0	2	2	0	0.08	0.10	0.09	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Nitrate	50	Health	mg/L	6 Monthly	0	2	2	0	8.30	12.00	10.15	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Sulphate	500	Health	mg/L	6 Monthly	0	2	2	0	24.00	26.00	25.00	0.10	QHF & SS
Ayr/Brandon	Nelsons Lagoon	Boron	4	Health	mg/L	6 Monthly	0	2	2	0	0.09	0.09	0.09	0.02	QHF & SS
**South Ayr Bores were only in service from 1 July to 18 August 2022. Not in service from 19 August 2022 to 30 June 2023.															
Ayr/Brandon	South Ayr**	Conductivity	N/A		us/m	6 Monthly	120	13	13	0	290.00	810.00	486.92	0.10	QHF & SS
Ayr/Brandon	South Ayr**	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	120	13	13	0	6.67	7.64	7.09	0.10	QHF & SS
Ayr/Brandon	South Ayr**	Hardness (Total)	200	Aesthetic	mg CaCO ₃ /L	6 Monthly	12	13	13	0	43.00	148.00	80.31	0.10	QHF & SS
Ayr/Brandon	South Ayr**	Alkalinity	N/A		mg CaCO ₃ /L	6 Monthly	12	13	13	0	84.00	270.00	138.00	0.10	QHF & SS
Ayr/Brandon	South Ayr**	Silica	80	Aesthetic	mg/L	6 Monthly	12	13	13	0	40.00	52.00	45.77	0.10	QHF & SS
Ayr/Brandon	South Ayr**	Total Dissolved Solids	600	Aesthetic	mg/L	6 Monthly	12	13	13	0	190.00	500.00	313.07	1.00	QHF & SS
Ayr/Brandon	South Ayr**	True Colour	15	Aesthetic	HU	6 Monthly	12	13	1	1 (B14 not in use)	240.00	240.00	240.00	<8.00	QHF & SS
Ayr/Brandon	South Ayr**	Turbidity	5	Aesthetic	NTU	6 Monthly	12	13	6	2 (B13 & B14 not in use)	1.00	90.00	18.00	<1.00	QHF & SS
Ayr/Brandon	South Ayr**	Sodium	180	Aesthetic	mg/L	6 Monthly	12	13	13	0	25.00	120.00	70.69	0.10	QHF & SS
Ayr/Brandon	South Ayr**	Chloride	250	Aesthetic	mg/L	6 Monthly	12	13	13	0	23.00	77.00	42.77	0.10	QHF & SS
Ayr/Brandon	South Ayr**	Fluoride (naturally occurring)	1.5	Health	mg/L	6 Monthly	12	13	13	0	0.11	0.23	0.17	0.10	QHF & SS

****Refer Table 5.2.4 for details of non-conformances**

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
**South Ayr Bores were only in service from 1 July to 18 August 2022. Not in service from 19 August 2022 to 30 June 2023.															
Ayr/Brandon	South Ayr**	Nitrate	50	Health	mg/L	6 Monthly	12	13	7	0	0.06	1.60	0.48	0.10	QHF &SS
Ayr/Brandon	South Ayr**	Sulphate	500	Health	mg/L	6 Monthly	12	13	13	0	0.20	110.00	38.84	0.10	QHF &SS
Ayr/Brandon	South Ayr**	Boron	4	Health	mg/L	6 Monthly	12	13	13	0	0.05	0.11	0.7	0.02	QHF &SS
HEAVY METALS – AYR BRANDON															
Ayr/Brandon	Chambers	Aluminium (acid-soluble)	N/A		mg/L	Annually	2	2	1	0	0.004	0.004	0.004	0.003	QHF &SS
Ayr/Brandon	Chambers	Arsenic	0.01	Health	mg/L	Annually	2	2	2	0	0.0003	0.0005	0.0004	0.0001	QHF &SS
Ayr/Brandon	Chambers	Cadmium	0.002	Health	mg/L	Annually	2	2	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF &SS
Ayr/Brandon	Chambers	Chromium	0.05	Health	mg/L	Annually	2	2	1	0	0.0003	0.0003	0.0003	0.0001	QHF &SS
Ayr/Brandon	Chambers	Copper	2	Health	mg/L	Annually	2	2	2	0	0.001	0.004	0.0025	0.001	QHF &SS
Ayr/Brandon	Chambers	Iron	0.3	Aesthetic	mg/L	Annually	2	2	0	0	<0.005	<0.005	<0.005	0.005	QHF &SS
Ayr/Brandon	Chambers	Lead	0.01	Health	mg/L	Annually	2	2	2	0	0.0001	0.0003	0.0002	0.0001	QHF &SS
Ayr/Brandon	Chambers	Manganese	0.5	Health	mg/L	Annually	2	2	2	0	0.0001	0.0002	0.0001	0.0001	QHF &SS
Ayr/Brandon	Chambers	Nickel	0.02	Health	mg/L	Annually	2	2	2	0	0.0002	0.0004	0.0003	0.0001	QHF &SS
Ayr/Brandon	Chambers	Zinc	3	Aesthetic	mg/L	Annually	2	2	2	0	0.002	0.002	0.002	0.001	QHF &SS
Ayr/Brandon	Conlan	Aluminium (acid-soluble)	N/A		mg/L	Annually	4	4	0	0	<0.003	<0.003	<0.003	0.003	QHF &SS
Ayr/Brandon	Conlan	Arsenic	0.01	Health	mg/L	Annually	4	4	4	0	0.0004	0.0005	0.0004	0.0001	QHF &SS
Ayr/Brandon	Conlan	Cadmium	0.002	Health	mg/L	Annually	4	4	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF &SS
Ayr/Brandon	Conlan	Chromium	0.05	Health	mg/L	Annually	4	4	1	0	0.0001	0.0001	0.0001	0.0001	QHF &SS
Ayr/Brandon	Conlan	Copper	2	Health	mg/L	Annually	4	4	4	0	0.008	0.012	0.01	0.001	QHF &SS
Ayr/Brandon	Conlan	Iron	0.3	Aesthetic	mg/L	Annually	4	4	2	0	0.01	0.016	0.013	0.005	QHF &SS
Ayr/Brandon	Conlan	Lead	0.01	Health	mg/L	Annually	4	4	4	0	0.0002	0.0005	0.0004	0.0001	QHF &SS
Ayr/Brandon	Conlan	Manganese	0.5	Health	mg/L	Annually	4	4	4	0	0.0007	0.0054	0.0023	0.0001	QHF &SS
Ayr/Brandon	Conlan	Nickel	0.02	Health	mg/L	Annually	4	4	4	0	0.0009	0.0018	0.0013	0.0001	QHF &SS
Ayr/Brandon	Conlan	Zinc	3	Aesthetic	mg/L	Annually	4	4	4	0	0.002	0.005	0.0037	0.001	QHF &SS
Nelsons Lagoon – Bores 3 and 4 Only															
Ayr/Brandon	Nelsons	Aluminium (acid-soluble)	N/A		mg/L	Annually	2	3	0	0	<0.025	<0.003	<0.003	0.003	QHF &SS
Ayr/Brandon	Nelsons	Arsenic	0.01	Health	mg/L	Annually	2	3	3	0	0.0002	0.0003	0.0002	0.0001	QHF &SS

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Ayr/Brandon	Nelsons	Cadmium	0.002	Health	mg/L	Annually	2	3	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF &SS
Ayr/Brandon	Nelsons	Chromium	0.05	Health	mg/L	Annually	2	3	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF &SS
Ayr/Brandon	Nelsons	Copper	2	Health	mg/L	Annually	2	3	1	0	0.001	0.001	0.001	0.001	QHF &SS
Ayr/Brandon	Nelsons	Iron	0.3	Aesthetic	mg/L	Annually	2	3	3	0	0.008	0.058	0.027	0.005	QHF &SS
Ayr/Brandon	Nelsons	Lead	0.01	Health	mg/L	Annually	2	3	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF &SS
Ayr/Brandon	Nelsons	Manganese	0.5	Health	mg/L	Annually	2	3	3	0	0.0007	0.012	0.005	0.0001	QHF &SS
Ayr/Brandon	Nelsons	Nickel	0.02	Health	mg/L	Annually	2	3	3	0	0.0002	0.0003	0.0002	0.0001	QHF &SS
Ayr/Brandon	Nelsons	Zinc	3	Aesthetic	mg/L	Annually	2	3	1	0	0.002	0.002	0.002	0.001	QHF &SS
Nelsons Lagoon – Bores 1 and 6 Only - Not in Service															
Ayr/Brandon	Nelsons	Aluminium (acid-soluble)	N/A		mg/L	Annually	2	2	0	0	<0.003	<0.003	<0.003	0.003	QHF &SS
Ayr/Brandon	Nelsons	Arsenic	0.01	Health	mg/L	Annually	2	2	2	0	0.0003	0.0003	0.0004	0.0001	QHF &SS
Ayr/Brandon	Nelsons	Cadmium	0.002	Health	mg/L	Annually	2	2	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF &SS
Ayr/Brandon	Nelsons	Chromium	0.05	Health	mg/L	Annually	2	2	2	0	0.0001	0.0002	0.0001	0.0001	QHF &SS
Ayr/Brandon	Nelsons	Copper	2	Health	mg/L	Annually	2	2	0	0	0.002	0.003	0.002	0.001	QHF &SS
Ayr/Brandon	Nelsons	Iron	0.3	Aesthetic	mg/L	Annually	2	2	2	0	0.011	0.012	0.012	0.005	QHF &SS
Ayr/Brandon	Nelsons	Lead	0.01	Health	mg/L	Annually	2	2	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF &SS
Ayr/Brandon	Nelsons	Manganese	0.5	Health	mg/L	Annually	2	2	2	0	0.0008	0.0009	0.0008	0.0001	QHF &SS
Ayr/Brandon	Nelsons	Nickel	0.02	Health	mg/L	Annually	2	2	0	0	0.0003	0.0005	0.0004	0.0001	QHF &SS
Ayr/Brandon	Nelsons	Zinc	3	Aesthetic	mg/L	Annually	2	2	2	0	0.002	0.002	0.002	0.001	QHF &SS
Ayr/Brandon	South Ayr**	Aluminium (acid-soluble)	N/A		mg/L	Annually	6	6	0	0	<0.003	<0.003	<0.003	0.003	QHF &SS
Ayr/Brandon	South Ayr**	Arsenic	0.01	Health	mg/L	Annually	6	6	6	0	0.0005	0.0019	0.0011	0.0001	QHF &SS
Ayr/Brandon	South Ayr**	Cadmium	0.002	Health	mg/L	Annually	6	6	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF &SS
Ayr/Brandon	South Ayr**	Chromium	0.05	Health	mg/L	Annually	6	6	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF &SS
Ayr/Brandon	South Ayr**	Copper	2	Health	mg/L	Annually	6	6	2	0	0.003	0.003	0.003	0.001	QHF &SS
Ayr/Brandon	South Ayr**	Iron	0.3	Aesthetic	mg/L	Annually	6	6	6	0	0.086	0.77	0.27	0.005	QHF &SS
Ayr/Brandon	South Ayr**	Lead	0.01	Health	mg/L	Annually	6	6	2	0	0.0001	0.0002	0.0001	0.0001	QHF &SS
Ayr/Brandon	South Ayr**	Manganese	0.5	Health	mg/L	Annually	6	6	6	0	0.0073	0.33	0.1353	0.0001	QHF &SS
Ayr/Brandon	South Ayr**	Nickel	0.02	Health	mg/L	Annually	6	6	6	0	0.0002	0.0009	0.0004	0.0001	QHF &SS
Ayr/Brandon	South Ayr**	Zinc	3	Aesthetic	mg/L	Annually	6	6	4	0	0.001	0.003	0.002	0.001	QHF &SS

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
PFAS – AYR BRANDON															
Ayr/Brandon	Chambers	PFOA	0.07	Health	ug/L	Annually	4	23	18	0	0.0012	0.0021	0.0016	0.005	NMI Institute
Ayr/Brandon	Chambers	PFHxS	0.07	Health	ug/L	Annually	4	23	19	0	0.0032	0.016	0.0097	0.005	NMI Institute
Ayr/Brandon	Chambers	PFOS	0.07	Health	ug/L	Annually	4	23	19	0	0.009	0.04	0.0238	0.005	NMI Institute
Ayr/Brandon	Chambers	PFHxS/PFOS	0.07	Health	ug/L	Annually	4	23	19	0	0.0122	0.055	0.0335	0.005	NMI Institute
Nelsons Lagoon – Bores 3 and 4 Only															
Ayr/Brandon	Nelsons	PFOA	0.07	Health	ug/L	Annually	2	29	27	0	0.001	0.0035	0.0026	0.005	NMI Institute
Ayr/Brandon	Nelsons	PFHxS	0.07	Health	ug/L	Annually	2	29	29	0	0.0096	0.025	0.0167	0.005	NMI Institute
Ayr/Brandon	Nelsons	PFOS	0.07	Health	ug/L	Annually	2	29	29	0	0.0096	0.029	0.0197	0.005	NMI Institute
Ayr/Brandon	Nelsons	PFHxS/PFOS	0.07	Health	ug/L	Annually	2	29	29	0	0.019	0.054	0.0363	0.005	NMI Institute
Nelsons Lagoon – Bores 1 and 6 Only – Not in Service															
Ayr/Brandon	Nelsons	PFOA	0.07	Health	ug/L	Annually	0	8	8	0	0.0017	0.013	0.0078	0.005	NMI Institute
Ayr/Brandon	Nelsons	PFHxS	0.07	Health	ug/L	Annually	0	8	8	5 ** (B6)	0.034	0.18	0.1067	0.005	NMI Institute
Ayr/Brandon	Nelsons	PFOS	0.07	Health	ug/L	Annually	0	8	8	7 ** (B1 & B6)	0.051	0.54	0.30	0.005	NMI Institute
Ayr/Brandon	Nelsons	PFHxS/PFOS	0.07	Health	ug/L	Annually	0	8	8	8 ** (B1 & B6)	0.085	0.68	0.4067	0.005	NMI Institute
WATER QUALITY – AYR BRANDON															
Ayr/Brandon	Chambers	E.coli	0	Health	Org/100ml	6 Monthly	4	7	0	0	<1.00	<1.00	<1.00	<1.00	In-House & Tvlle CC
Ayr/Brandon	Chambers	Turbidity	5	Aesthetic	NTU	6 Monthly	4	7	0	0	0.16	4.03	0.67	0.01	In-house
Ayr/Brandon	Chambers	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	4	7	7	0	0.16	4.03	0.67	0.10	In-house
Ayr/Brandon	Chambers	Temperature	N/A		°C	6 Monthly	0	7	7	0	23.9	29.3	27.58	0.01	In-house
Ayr/Brandon	Conlan St	E.coli	0	Health	Org/100ml	6 Monthly	8	9	1	1 ** (B1)	1.00	1.00	1.00	<1.00	In-House & Tvlle CC
Ayr/Brandon	Conlan St	Turbidity	5	Aesthetic	NTU	6 Monthly	8	8	8	0	0.17	0.94	0.54	0.01	In-house
Ayr/Brandon	Conlan St	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	8	8	8	0	6.62	7.07	6.79	0.10	In-house
Ayr/Brandon	Conlan St	Temperature	N/A		°C	6 Monthly	0	8	8	0	23.80	28.10	25.78	0.10	In-house

**Refer Table 5.2.3 for details of non-conformances

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
WATER QUALITY – AYR BRANDON (CONT.)															
Nelsons Lagoon – Bores 3 and 4 Only															
Ayr/Brandon	Nelsons	E.coli	0	Health	Org/100ml	6 Monthly	4	7	1	1** (B3)	14.00	14.00	14.00	<1.00	In-House & Tvlle CC
Ayr/Brandon	Nelsons	Turbidity	5	Aesthetic	NTU	6 Monthly	4	7	7	0	0.14	1.66	0.69	0.01	In-house
Ayr/Brandon	Nelsons	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	4	7	7	0	6.95	7.18	7.01	0.10	In-house
Ayr/Brandon	Nelsons	Temperature	N/A		°C	6 Monthly	0	7	7	0	23.80	28.60	26.42	0.10	In-house
Ayr/Brandon	South Ayr**	E.coli	0	Health	Org/100ml	6 Monthly	12	20	1	1** (B12)	7.00	7.00	7.00	<1.00	In-House & Tvlle CC
Ayr/Brandon	South Ayr**	Turbidity	5	Aesthetic	NTU	6 Monthly	12	20	20	0	0.19	3.84	1.25	0.01	In-house
Ayr/Brandon	South Ayr**	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	12	20	20	0	6.65	7.23	6.98	0.10	In-house
Ayr/Brandon	South Ayr**	Temperature	N/A		°C	6 Monthly	0	20	20	0	21.80	29.40	26.44	0.10	In-house
STANDARD WATER ANALYSIS – HOME HILL BORES 1 TO 8															
Home Hill	Bores	Conductivity	N/A		us/m	6 Monthly	16	16	16	0	430.00	550.00	403.75	0.10	QHF & SS
Home Hill	Bores	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	16	16	16	0	6.82	7.39	6.99	0.10	QHF & SS
Home Hill	Bores	Hardness (Total)	200	Aesthetic	mg CaCO ₃ /L	6 Monthly	16	16	16	0	99.00	163.00	132.13	0.10	QHF & SS
Home Hill	Bores	Alkalinity	N/A		mg CaCO ₃ /L	6 Monthly	16	16	16	0	160.00	240.00	202.50	0.10	QHF & SS
Home Hill	Bores	Silica	80	Aesthetic	mg/L	6 Monthly	16	16	16	0	34.00	39.00	36.38	0.10	QHF & SS
Home Hill	Bores	Total Dissolved Solids	600	Aesthetic	mg/L	6 Monthly	16	16	16	0	280.00	350.00	321.25	1.00	QHF & SS
Home Hill	Bores	True Colour	15	Aesthetic	HU	6 Monthly	16	16	0	0	<8.00	<8.00	<8.00	<1.00	QHF & SS
Home Hill	Bores	Turbidity	5	Aesthetic	NTU	6 Monthly	16	16	0	0	<1.00	<1.00	<1.00	<1.00	QHF & SS
Home Hill	Bores	Sodium	180	Aesthetic	mg/L	6 Monthly	16	16	16	0	44.00	69.00	58.56	0.10	QHF & SS
Home Hill	Bores	Chloride	250	Aesthetic	mg/L	6 Monthly	16	16	16	0	11.00	25.00	19.19	0.10	QHF & SS
Home Hill	Bores	Fluoride (naturally occurring)	1.5	Health	mg/L	6 Monthly	16	16	16	0	0.07	0.16	0.11	0.10	QHF & SS
Home Hill	Bores	Nitrate	50	Health	mg/L	6 Monthly	16	16	16	0	13.00	37.00	24.25	0.10	QHF & SS
Home Hill	Bores	Sulphate	500	Health	mg/L	6 Monthly	16	16	16	0	10.00	28.00	15.94	0.10	QHF & SS
Home Hill	Bores	Boron	4	Health	mg/L	6 Monthly	16	16	16	0	0.04	0.05	0.04	0.02	QHF & SS
STANDARD WATER ANALYSIS – HOME HILL EMERGENCY BORES 9 AND 10															
Home Hill	Bores	Conductivity	N/A		us/m	6 Monthly	4	4	4	0	730.00	1000.00	867.50	0.10	QHF & SS
Home Hill	Bores	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	4	4	4	0	7.24	7.51	7.37	0.10	QHF & SS

**Refer Table 5.2.3 for details of non-conformances

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
STANDARD WATER ANALYSIS – HOME HILL EMERGENCY BORES 9 AND 10 (CONT.)															
Home Hill	Bores	Hardness (Total)	200	Aesthetic	mg CaCO ₃ /L	6 Monthly	4	4	4	2** (B9)	184.00	279.00	232.50	0.10	QHF & SS
Home Hill	Bores	Alkalinity	N/A		mg CaCO ₃ /L	6 Monthly	4	4	4	0	270.00	410.00	340.00	0.10	QHF & SS
Home Hill	Bores	Silica	80	Aesthetic	mg/L	6 Monthly	4	4	4	0	38.00	38.00	38.00	0.10	QHF & SS
Home Hill	Bores	Total Dissolved Solids	600	Aesthetic	mg/L	6 Monthly	4	4	4	2** (B9)	450.00	630.00	542.50	1.00	QHF & SS
Home Hill	Bores	True Colour	15	Aesthetic	HU	6 Monthly	4	4	0	0	<8.00	<8.00	<8.00	<1.00	QHF & SS
Home Hill	Bores	Turbidity	5	Aesthetic	NTU	6 Monthly	4	4	0	0	<1.00	<1.00	<1.00	<1.00	QHF & SS
Home Hill	Bores	Sodium	180	Aesthetic	mg/L	6 Monthly	4	4	4	0	87.00	120.00	105.00	0.10	QHF & SS
Home Hill	Bores	Chloride	250	Aesthetic	mg/L	6 Monthly	4	4	4	0	37.00	46.00	42.50	0.10	QHF & SS
Home Hill	Bores	Fluoride (naturally occurring)	1.5	Health	mg/L	6 Monthly	4	4	4	0	0.10	0.12	0.11	0.10	QHF & SS
Home Hill	Bores	Nitrate	50	Health	mg/L	6 Monthly	4	4	4	0	24.00	42.00	33.50	0.10	QHF & SS
Home Hill	Bores	Sulphate	500	Health	mg/L	6 Monthly	4	4	4	0	33.00	45.00	40.25	0.10	QHF & SS
Home Hill	Bores	Boron	4	Health	mg/L	6 Monthly	4	4	4	0	0.05	0.06	0.055	0.02	QHF & SS
HEAVY METALS – HOME HILL – BORES 1 TO 8															
Home Hill	Bores	Aluminium (acid-soluble)	N/A		mg/L	Annually	8	8	0	0	<0.003	<0.003	<0.003	0.003	QHF & SS
Home Hill	Bores	Arsenic	0.01	Health	mg/L	Annually	8	8	8	0	0.0004	0.0007	0.0006	0.0001	QHF & SS
Home Hill	Bores	Cadmium	0.002	Health	mg/L	Annually	8	8	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF & SS
Home Hill	Bores	Chromium	0.05	Health	mg/L	Annually	8	8	1	0	0.0001	0.0001	0.0001	0.0001	QHF & SS
Home Hill	Bores	Copper	2	Health	mg/L	Annually	8	8	7	0	0.002	0.005	0.003	0.001	QHF & SS
Home Hill	Bores	Iron	0.3	Aesthetic	mg/L	Annually	8	8	1	0	0.031	0.031	0.031	0.005	QHF & SS
Home Hill	Bores	Lead	0.01	Health	mg/L	Annually	8	8	7	0	0.0001	0.001	0.0004	0.0001	QHF & SS
Home Hill	Bores	Manganese	0.5	Health	mg/L	Annually	8	8	4	0	0.0002	0.0005	0.0003	0.0001	QHF & SS
Home Hill	Bores	Nickel	0.02	Health	mg/L	Annually	8	8	8	0	0.0005	0.0022	0.0012	0.0001	QHF & SS
Home Hill	Bores	Zinc	3	Aesthetic	mg/L	Annually	8	8	8	0	0.002	0.019	0.0088	0.001	QHF & SS

****Refer Table 5.2.4 for details of non-conformances**

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
HEAVY METALS – HOME HILL – EMERGENCY BORES 9 AND 10															
Home Hill	Bores	Aluminium (acid-soluble)	N/A		mg/L	Annually	2	2	0	0	<0.003	<0.003	<0.003	0.003	QHF & SS
Home Hill	Bores	Arsenic	0.01	Health	mg/L	Annually	2	2	2	0	0.0007	0.0007	0.0007	0.0001	QHF & SS
Home Hill	Bores	Cadmium	0.002	Health	mg/L	Annually	2	2	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF & SS
Home Hill	Bores	Chromium	0.05	Health	mg/L	Annually	2	2	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF & SS
Home Hill	Bores	Copper	2	Health	mg/L	Annually	2	2	2	0	0.009	0.013	0.011	0.001	QHF & SS
Home Hill	Bores	Iron	0.3	Aesthetic	mg/L	Annually	2	2	2	0	0.01	0.011	0.0105	0.005	QHF & SS
Home Hill	Bores	Lead	0.01	Health	mg/L	Annually	2	2	2	0	0.0004	0.0014	0.0009	0.0001	QHF & SS
Home Hill	Bores	Manganese	0.5	Health	mg/L	Annually	2	2	2	0	0.0004	0.0016	0.001	0.0001	QHF & SS
Home Hill	Bores	Nickel	0.02	Health	mg/L	Annually	2	2	2	0	0.0004	0.0013	0.0009	0.0001	QHF & SS
Home Hill	Bores	Zinc	3	Aesthetic	mg/L	Annually	2	2	2	0	0.009	0.051	0.03	0.001	QHF & SS
WATER QUALITY – HOME HILL - BORES 1 TO 8															
Home Hill	Bores	E.coli	0	Health	Org/100ml	6 Monthly	8	29	0	0	<1.00	<1.00	<1.00	<1.00	In-House & Tville CC
Home Hill	Bores	Turbidity	5	Aesthetic	NTU	6 Monthly	8	26	26	0	0.09	3.05	0.93	0.01	In-house
Home Hill	Bores	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	8	26	26	1** (B5 not in use)	6.42	7.54	6.89	0.01	In-house
Home Hill	Bores	Temperature	N/A		°C	6 Monthly	8	26	26	0	23.20	29.10	26.19	0.01	In-house
WATER QUALITY – HOME HILL – EMERGENCY BORES 9 AND 10															
Home Hill	Bores	E.coli	0	Health	Org/100ml	6 Monthly	2	6	0	0	<1.00	<1.00	<1.00	<1.00	In-House & Tville CC
Home Hill	Bores	Turbidity	5	Aesthetic	NTU	6 Monthly	2	5	5	0	0.22	1.38	0.536	0.01	In-house
Home Hill	Bores	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	2	5	5	0	6.88	7.26	7.11	0.01	In-house
Home Hill	Bores	Temperature	N/A		°C	6 Monthly	2	5	5	0	23.40	29.10	26.76	0.01	In-house
STANDARD WATER ANALYSIS – MT KELLY															
Mt Kelly Bores	Bores	Conductivity	N/A		us/m	6 Monthly	6	6	6	0	550.00	620.00	593.00	0.10	QHF & SS
Mt Kelly Bores	Bores	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	6	6	6	0	6.59	6.80	6.70	0.10	QHF & SS
Mt Kelly Bores	Bores	Hardness (Total)	200	Aesthetic	mg CaCO ₃ /L	6 Monthly	6	6	6	0	151.00	174.00	167.83	0.10	QHF & SS
Mt Kelly Bores	Bores	Alkalinity	N/A		mg CaCO ₃ /L	6 Monthly	6	6	6	0	130.00	140.00	133.33	0.10	QHF & SS
Mt Kelly Bores	Bores	Silica	80	Aesthetic	mg/L	6 Monthly	6	6	6	0	44.00	51.00	47.83	0.10	QHF & SS
Mt Kelly Bores	Bores	Total Dissolved Solids	600	Aesthetic	mg/L	6 Monthly	6	6	6	0	350.00	400.00	383.33	1.00	QHF & SS

**Refer Table 5.2.4 for details of non-conformances

Scheme name	Scheme component	Parameter	Guideline Value – Health	Health or Aesthetic	Units	Frequency of sampling	Current DWQMP sample targets	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
STANDARD WATER ANALYSIS – MT KELLY (CONT.)															
Mt Kelly Bores	Bores	True Colour	15	Aesthetic	HU	6 Monthly	6	6	0	0	<8.00	<8.00	<8.00	<8.00	QHF & SS
Mt Kelly Bores	Bores	Turbidity	5	Aesthetic	NTU	6 Monthly	6	6	2	1** (B3 not in use)	1.00	8.00	4.50	<1.00	QHF & SS
Mt Kelly Bores	Bores	Sodium	180	Aesthetic	mg/L	6 Monthly	6	6	6	0	51.00	55.00	53.50	0.10	QHF & SS
Mt Kelly Bores	Bores	Chloride	250	Aesthetic	mg/L	6 Monthly	6	6	6	0	45.00	56.00	50.83	0.10	QHF & SS
Mt Kelly Bores	Bores	Fluoride (naturally occurring)	1.5	Health	mg/L	6 Monthly	6	6	6	0	0.07	0.10	0.09	0.10	QHF & SS
Mt Kelly Bores	Bores	Nitrate	50	Health	mg/L	6 Monthly	6	6	6	0	24.00	53.00	36.83	0.10	QHF & SS
Mt Kelly Bores	Bores	Sulphate	500	Health	mg/L	6 Monthly	6	6	6	0	39.00	63.00	54.33	0.10	QHF & SS
Mt Kelly Bores	Bores	Boron	4	Health	mg/L	6 Monthly	6	6	6	0	0.04	0.04	0.04	0.02	QHF & SS
HEAVY METALS – MT KELLY															
Mt Kelly Bores	Bores	Aluminium (acid-soluble)	N/A		mg/L	Annually	3	5	0	0	<0.025	<0.003	<0.003	0.003	QHF & SS
Mt Kelly Bores	Bores	Arsenic	0.01	Health	mg/L	Annually	3	5	5	0	0.0002	0.0004	0.0003	0.0001	QHF & SS
Mt Kelly Bores	Bores	Cadmium	0.002	Health	mg/L	Annually	3	5	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF & SS
Mt Kelly Bores	Bores	Chromium	0.05	Health	mg/L	Annually	3	5	2	0	0.0001	0.0001	0.0002	0.0001	QHF & SS
Mt Kelly Bores	Bores	Copper	2	Health	mg/L	Annually	3	5	3	0	0.001	0.003	0.002	0.001	QHF & SS
Mt Kelly Bores	Bores	Iron	0.3	Aesthetic	mg/L	Annually	3	5	5	0	0.008	0.058	0.021	0.005	QHF & SS
Mt Kelly Bores	Bores	Lead	0.01	Health	mg/L	Annually	3	5	0	0	<0.0001	<0.0001	<0.0001	0.0001	QHF & SS
Mt Kelly Bores	Bores	Manganese	0.5	Health	mg/L	Annually	3	5	5	0	0.0007	0.012	0.0031	0.0001	QHF & SS
Mt Kelly Bores	Bores	Nickel	0.02	Health	mg/L	Annually	3	5	5	0	0.0002	0.0005	0.0003	0.0001	QHF & SS
Mt Kelly Bores	Bores	Zinc	3	Aesthetic	mg/L	Annually	3	5	3	0	0.002	0.002	0.002	0.001	QHF & SS
WATER QUALITY – MT KELLY															
Mt Kelly Bores	Bores	E.coli	0	Health	Org/100ml	6 Monthly	6	9	0	0	<1.00	<1.00	<1.00	<1.00	In-House & Tville CC
Mt Kelly Bores	Bores	Turbidity	5	Aesthetic	NTU	6 Monthly	6	6	4	0	0.18	4.00	1.28	0.01	In-house
Mt Kelly Bores	Bores	pH	6.5-8.5	Aesthetic	pH Units	6 Monthly	6	6	4	1** (B2)	6.46	6.64	6.56	0.01	In-house
Mt Kelly Bores	Bores	Temperature	N/A		°C	6 Monthly	0	6	6	0	25.00	28.00	26.62	0.01	In-house

**Refer Table 5.2.4 for details of non-conformances

Appendix B - Reticulation E. coli verification monitoring

Drinking water scheme: Ayr/Brandon Storage and Bores

Year	Financial Year 2022/2023											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	21	14	12	12	14	15	18	14	19	12	16	12
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	1	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	181	174	171	169	171	175	179	171	176	177	179	179
No. of failures for previous 12 month period	1	1	1	1	1	1	1	1	1	1	1	1
% of samples that comply	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

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

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement comes into effect once you have 12 months data and should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Home Hill Water Tower

Year	Financial Year 2022/2023											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	10	8	7	7	8	7	9	8	9	7	11	8
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	73	72	73	75	79	83	86	86	89	91	96	99
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

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

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement comes into effect once you have 12 months data and should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Giru - Cungulla Water Treatment Plant

Year	<i>Financial Year 2022/2023</i>											
Month	<i>July</i>	<i>Aug</i>	<i>Sept</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>	<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>Jun</i>
No. of samples collected	7	3	3	3	3	3	11	6	4	4	4	4
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	37	38	37	38	39	40	49	49	49	51	53	55
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

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

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement comes into effect once you have 12 months data and should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Mt. Kelly Bores

Year	Financial Year 2022/2023											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
No. of samples collected	3	2	2	2	3	2	4	4	2	2	4	2
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	30	27	27	27	28	28	28	30	30	30	32	32
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

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

The *Public Health Regulation 2005* (the regulation) requires that 98 per cent of samples taken in a 12 month period should contain no *E. Coli*. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement comes into effect once you have 12 months data and should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Appendix C – Risk Management Improvement Program

Process Step	Scheme	Primary Hazard	Source of Hazard/ Hazardous event	Maximum Risk	Primary preventive measure	Other preventive measures	Comments	Residual Risk				Improvement Items (High residual risks = regulated improvement item)		
								Consequence	Likelihood	Risk	Uncertainty	This year	1-2 years	5 to 10 years
Water abstraction	Ayr, Home Hill, Mt Kelly	Turbidity (Bore Water)	Flood events	Low	Aquifer filtration processes, bore integrity			Moderate	Rare	Low	Confident	Elevated bore pump extraction points installed		
Water abstraction	Ayr, Home Hill, Mt Kelly	Protozoa (Crypto/ Giardia) (Intrusion into bores)	Flood/ rain event with ingress down bore casing	High	Aquifer filtration processes, bore integrity		Last flood event demonstrated there is some ingress in extreme events.	Catastrophic	Unlikely	High	Estimate	All bores at Home Hill will have a slab around the bore casing to prevent ingress down the outer casing. Visual checks during routine pump runs.	UV at Home Hill Dec 21, UV Ayr, June 22	Mt Kelly to be considered for UV disinfection
Water abstraction	Ayr, Home Hill, Mt Kelly	Bacteria/ Virus (Intrusion into bores)	Flood/ rain event with ingress down bore casing	High	disinfection		Last flood event demonstrated there is some ingress in extreme events.	Catastrophic	Rare	Medium	Estimate	Visual checks during routine pump runs.	Program to upgrade disinfection infrastructure with additional backup dosing pump, analysers and SCADA visibility.	
Water abstraction	Home Hill	Nitrate (HH emergency bores)	agricultural activity in Lower Burdekin Basin	Medium	Only used in emergency.	regular testing confirms that bores are below health guideline	Managed by not using these sources unless absolutely necessary. Testing for PPCPs provided strong evidence that this is not from a proximal septic source. Recent results have nitrate levels below 50. High results in ~2012.	Moderate	Unlikely	Medium	Reliable	Created procedure for all bores before they go back on line after extended repairs.	Develop startup procedure for these bores that include benchtop nitrate testing. Pre-issue of health fact information to residents via Council media platforms.	
Water abstraction	Ayr, Home Hill, Mt Kelly	Pesticides	Agriculture, spill	Medium	Aquifer filtration processes, bore integrity		No robust barrier. Routine trace pesticide detections in bore water.	Moderate	Unlikely	Medium	Estimate			Activated carbon to be considered if filtration plant is commissioned.

Process Step	Scheme	Primary Hazard	Source of Hazard/ Hazardous event	Maximum Risk	Primary preventive measure	Other preventive measures	Comments	Residual Risk				Improvement Items (High residual risks = regulated improvement item)		
								Consequence	Likelihood	Risk	Uncertainty	This year	1-2 years	5 to 10 years
Water abstraction	Ayr and Home Hill	PFAS	Nelsons Lagoon, Chambers Bore, (Home Hill) contamination from QFES	High	Bores 2, & 5 at Nelsons have been disconnected as over health guideline. Bore 3 has been turned off but is still connected. 1, 4 and 6 can operate, Bores 1 and 6 sometimes have higher results however are blended with Bore 4 to reduce concentration to below ADWG health target.	Not using the higher contaminated bores, blending of Nelsons 4 and 6. Chambers, Conlan and South Ayr water is also blended in before customers. Conlan bore is first borefield in sequence. Chambers bores also combine with Nelsons to reduce PFAS concentration prior to reticulation.	Home Hill has known contamination at QFES, not currently detected in bores, but possible. Chambers Bore 15 has consistent trace detections. Ultimate decision is likely to be abandonment of Nelsons borefield. Risk of elevated PFAS is probably not likely in final treated water, however this is a severe reputational impact to council so rated as an unacceptable risk.	Moderate	Likely	High	Reliable	Funding is available for 2 new bores - need to identify an appropriate location for the borefield as migration of PFAS plume is not yet defined. QFES undertaking offsite impact contaminated land report that should provide more guidance if done correctly. Continue to monitor quarterly.	Monitoring program for PFAS in both reticulation and raw water. Reduced activity from bores that have high PFAS.	
Water abstraction	Ayr	Iron/Manganese (South Ayr Borefield)		High	aeration	chlorine dosing prior to ground tank	very high use days can start to draw iron through.	Moderate	Possible	Medium	Reliable		Design of treatment facility at South Ayr	Construction of treatment facility at South Ayr
Water abstraction	Ayr, Home Hill, Mt Kelly	Heavy metals	CO2 in bore schemes makes water more aggressive	Medium	aeration		could occur in customers fittings	Moderate	Possible	Medium	Reliable			
supply from Townsville	Giru	Bacteria/virus (from Townsville water)	Treatment process from Cungulla not appropriate	Medium	Townsville DWQMP	Disinfection		Catastrophic	Rare	Medium	Confident	In constant communication with TCC		
supply from Townsville	Giru	Protozoa (Crypto/ Giardia) (from Townsville water)	Treatment process from Cungulla not appropriate	High	Townsville DWQMP		Turbidity has improved noticeably since upgrade at Cungulla WTP however, critical limit stated in Townsville Water DWQMP Report 18/19 indicates that critical limit is 1 NTU. ALARP for Burdekin Shire Council	Catastrophic	Unlikely	High	Confident	Engage with TCC to highlight this risk		Engage with TCC to manage this risk when HBT are required. Consider UV disinfection for Giru noting that UV post chlorination is not ideal. E.g. it is more appropriate for TCC to treat the entire supply.

Process Step	Scheme	Primary Hazard	Source of Hazard/ Hazardous event	Maximum Risk	Primary preventive measure	Other preventive measures	Comments	Residual Risk				Improvement Items (High residual risks = regulated improvement item)		
								Consequence	Likelihood	Risk	Uncertainty	This year	1-2 years	5 to 10 years
Aerator	Ayr and Home Hill	Bacteria/ Virus (Treatment and Reticulation)	Contamination at aerator	High	disinfection post aeration			Catastrophic	Rare	Medium	Confident		Maintenance and inspection checklists to be developed. Ongoing.	
Aerator	Ayr and Home Hill	Manganese (Source)		High	South Ayr bores - aeration	chlorine dosing prior to ground tank	Have investigated permanganate - will require filtration for this to be effective.	Moderate	Likely	High	Reliable		Design of treatment facility at South Ayr	Filtration considered in 3-5 year timeframe (permanganate alone does not drop out Mn in South Ayr ground tank)
Chlorination	All	Bacteria/ Virus (Treatment and Reticulation)	Underdose chlorine	High	Disinfection CCP	Minimum levels validated as per CCP procedures..	Considers the failure of disinfection at (e.g. Chambers) with the contact time and residual in the Water Tower providing effective disinfection. CT calculations demonstrate (within Water Val considering temperature, pH and turbidity) that appropriate disinfection is achieved.	Catastrophic	Rare	Medium	Estimate		SCADA program and site upgrades to establish critical low chlorine control and alarms on all sites - currently being staged with initial upgrade for SCADA for capacity to monitor and alarm. Continuing	SCADA program and site upgrades to establish critical low chlorine control and alarms on all sites - currently being staged with initial upgrade for SCADA for capacity to monitor and alarm - stage two to install and commission monitoring and full control.
Chlorination	All	Bacteria/ Virus (Treatment and Reticulation)	Turbidity	High	Disinfection CCP		Turbidity not an issue for bore schemes, since upgrade, Cungulla WTP consistently provides low turbidity water	Catastrophic	Rare	Medium	Reliable			
Chlorination	All	Chlorine	Overdose chlorine	High	Disinfection CCP	Manual setting linked to bore pumping at Giru, HH, Mt Kelly, Chambers bores and booster sites. Nelsons South Ayr double redundant pumps with full alarms. Critical	Alarm at Sth Ayr - nothing at Giru, Mt Kelly, HH. Operational monitoring of chlorine residual. Was an incident where delivery driver was unattended, and topped up the diluted tank with hypo stock solution.	Moderate	Unlikely	Medium	Confident		SCADA program and site upgrades to establish critical low chlorine control and alarms on all sites - currently being staged with initial upgrade for SCADA for capacity to	SCADA program and site upgrades to establish critical low chlorine control and alarms on all sites - currently being staged with initial upgrade for SCADA for capacity to monitor and alarm - stage two to install

Process Step	Scheme	Primary Hazard	Source of Hazard/ Hazardous event	Maximum Risk	Primary preventive measure	Other preventive measures	Comments	Residual Risk				Improvement Items (High residual risks = regulated improvement item)		
								Consequence	Likelihood	Risk	Uncertainty	This year	1-2 years	5 to 10 years
						alarms on high.	Signage was updated on all tanks.no longer delivery to this site.						monitor and alarm	and commission monitoring and full control.
Chlorination	All	Bromate		Medium			dosing point for chlorine to be moved post reservoir	Moderate	Possible	Medium	Reliable			
Chlorination	All	Chlorate		High	quality (batch certificates) specified in the procurement process (supplier unable to provide – no response)	test chlorine strength of each batch (measured at South Ayr WWTP).	Alva water is rechlorinated twice diluted 10:1. Shirbourne Road in Giru hypochlorite is diluted 10:1 for redosing.	Moderate	Possible	Medium	Reliable	Rechlorination locations for Alva - change the chlorine handling to replace 20L drums rather than top up. Program in place to ensure cleaning of tanks at changeover.	Longer term plan to change to chlorine gas – starting at Ayr. Giru bulk chlorine tank to be moved/ shaded to prevent UV breakdown.	Investigate converting other schemes to chlorine gas over time Staying with 10% Sodium Hypochlorite Solution. Investigations showed due to WHS reasons not viable to change.
Chlorination	Giru	Disinfection byproducts in Giru (THMs)	Reaction with organics	Medium	Disinfection CCP		total and residual chlorine monitoring for redosing	Moderate	Unlikely	Medium	Reliable			
Reticulation	All	Heavy metals	Leaching out of pipes/ fittings	High	Smartwater mark or AS4020 pipes, valves and fittings specified at procurement		Plumbing standards, AS 4020	Moderate	Unlikely	Medium	Confident			
Reticulation	All	Bacteria/ Virus (Treatment and Reticulation)	Vermin contamination of reservoirs	High	Reservoir design. Inspection program. Residual chlorine maintained.	Telcos and other contractors required to have Aquacard to access reservoirs/ site induction/ inspection checklist	Visual inspections of major issues, consider improvement for specific inspection for vermin proofing.	Catastrophic	Rare	Medium	Estimate	Forms part of regular water pump run. Checklist to be created for annual inspection of reservoirs and tanks.	Inspection checklist to be implemented	
Reticulation	All	Protozoa (Crypto/ Giardia) (Treatment and Reticulation)	contamination following mains breaks	High	SOPs	Flushing, confirmation of Cl- residual on repair prior to return to service	Training on mains repair, Aquacard	Catastrophic	Rare	Medium	Estimate	Cert III training commenced.	Additional training	
Reticulation	All	Bacteria/ Virus (Treatment and Reticulation)	contamination following mains breaks	High	SOPs	Disinfection of mains, flushing, confirmation of Cl- residual prior to return to service	Training on mains repair, Aquacard	Catastrophic	Rare	Medium	Estimate			

Process Step	Scheme	Primary Hazard	Source of Hazard/ Hazardous event	Maximum Risk	Primary preventive measure	Other preventive measures	Comments	Residual Risk				Improvement Items (High residual risks = regulated improvement item)		
								Consequence	Likelihood	Risk	Uncertainty	This year	1-2 years	5 to 10 years
Reticulation	All	Bacteria/ Virus (Treatment and Reticulation)	Backflow	High	Annual testing of devices as per plumbing code. Tanker filling points have backflow prevention and air gap for trucks.	Residual disinfection		Catastrophic	Rare	Medium	Estimate	Check to ensure that all Council devices are also captured in this program. Captured in training matrix		
Reticulation	All	Bacteria/ Virus (Treatment and Reticulation)	Rural schemes	High	Primary disinfection ensures safe water. Chlorine residual leaving reservoirs is typically maintained > 0.5 mg/L. Regular testing of residual in low flow areas.	Routine advice to customers in rural low pressure systems.	Customers in rural low pressure systems have on site storage as condition of connection. Customers advised to check quality of water, and to maintain chlorine residual in water tank.	Catastrophic	Rare	Medium	Reliable		Installing automatic flushing stations at strategic locations	Installing automatic flushing stations at strategic locations. Intend to install primary disinfection systems at major locations which will assist in monitoring & controlling disinfection systems.
Reticulation	All	Bacteria/ Virus (Treatment and Reticulation)	Third party access of hydrants	High	Council restricts issue of hydrants to holders of Aquacards with inspected vehicles.		Rural areas have lower pressures, and can be below 20 m. Townsville CC allows hydrants to be distributed - this facilitates illegal access.	Catastrophic	Rare	Medium	Estimate	Ensure all council staff with hydrants have Aquacard training		
Reticulation	All	Protozoa (Crypto/ Giardia) (Treatment and Reticulation)	Backflow	High	Annual testing of devices as per plumbing code			Catastrophic	Rare	Medium	Estimate			
Reticulation	All	Protozoa (Naegleria) (Reticulation)	Opportunistic ingress	High	Chlorine - dosed at 0.8mg/L - aim to maintain > 0.5 in most parts of reticulation		Temperature in summer is high enough that Naegleria could survive. Townsville has monitored, and not found in reticulation.	Major	Rare	Medium	Estimate			
Reticulation	Ayr	Manganese (reticulation)		Medium	South Ayr bores - aeration	Chlorine dosing prior to ground tank	High demand days Mn precipitates into rising mains - some services off rising main.	Moderate	Likely	High	Reliable	Limiting usage from these bores where possible.	Design of treatment facility at South Ayr	Filtration considered in 3-5 year timeframe (permanganate alone does not drop out Mn in South Ayr ground tank)

Process Step	Scheme	Primary Hazard	Source of Hazard/ Hazardous event	Maximum Risk	Primary preventive measure	Other preventive measures	Comments	Residual Risk				Improvement Items (High residual risks = regulated improvement item)		
								Consequence	Likelihood	Risk	Uncertainty	This year	1-2 years	5 to 10 years
Whole of System	All	Malicious action	Terrorism/ Vandalism	Medium	Routine inspections of assets. CCTV at South Ayr WTP	Some bores fenced	Develop checklist and create record	Catastrophic	Rare	Medium	Estimate	Bores at HH to be fenced. 80% complete.	South Ayr treatment plant to be refenced following 10 ML Reservoir upgrade Ayr racecourse to be authorised access area. Controlled locking system to be implemented with registered key arrangement	Expand CCTV network
Whole of System	All	Malicious action	Cyber attack	Medium	SCADA system isolated from the internet and corporate network with restricted client access from the corporate network.	Duplicate SCADA server. Intrusion testing undertaken in 2018/19.	Current system is not considered at risk of cyber attack due to restricted access to the system and limited ability to control key aspects of system. All systems can be operated without SCADA.	Catastrophic	Rare	Medium	Estimate			
Whole of System	All	Malicious action	Loss of corporate information	Medium	Routine system backups, industry standard security, compliance with Councils User Access Operational Standards.		SWIM local for water quality data - backed up to cloud	Catastrophic	Rare	Medium	Reliable			
Whole of System	All	Operator Error	e.g. from an accidental oversight, an untrained or overworked operator	High	Trained and competent operators	Water industry worker training being rolled out across entire team, across roles. Aquacard	Aiming to develop redundancy in the workforce through cross training of water and sewer operators	Catastrophic	Unlikely	High	Reliable	ongoing toolbox talks to limit issues, but cannot rule out errors. Implemented training needs analysis on current workforce.	Review scope of procedures and develop additional procedures as required. Train according to fill in skills gap.	
Whole of System	All	Loss power	Disruption of power supply	High	South Ayr, Conlan, Nelsons, Giru, Home Hill sites have generators. SCADA protected	Priority listing with Ergon for other critical sites.	Redosing locations - Portable generators are available	Catastrophic	Rare	Medium	Reliable			

Process Step	Scheme	Primary Hazard	Source of Hazard/ Hazardous event	Maximum Risk	Primary preventive measure	Other preventive measures	Comments	Residual Risk				Improvement Items (High residual risks = regulated improvement item)		
								Consequence	Likelihood	Risk	Uncertainty	This year	1-2 years	5 to 10 years
					with UPS and also powered by generators.									
Whole of System	All	Loss of Network	Disruption of power supply, radio interference, damage to equipment or equipment failure.	Medium	UPS protecting network equipment, backhaul radio links use licensed frequencies and life time replacement warranty for network switches.	Generators and UPS at key sites.		Catastrophic	Rare	Medium	Reliable		Consider need for spare Radio components for resilience within Council telemetry	Consider installation of pressure loggers in reticulation system.
Whole of System	All	Loss of Supply		Medium		Water resilience strategy	Design of 5ML reservoir for HH and 10 ML reservoir for Ayr underway	Catastrophic	Rare	Medium	Reliable	New 5ML reservoir in HH now operational.	Additional reservoirs HH 2024, Ayr December 2022.	

ALARP = as low as reasonably practicable