



Drinking Water Quality Management Plan

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Report contains	Activities undertaken over the 2024/2025 financial year in operating Townsville City Council's (Council) drinking water service. Summary of drinking water quality for Townsville's three drinking water schemes. Summary of Council's performance in implementing their approved Drinking Water Quality Management Plans (DWQMP).



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Abbreviations and Acronyms

Acronym	Definition
ADWG	Australian Drinking Water Guidelines
BWA	Boil Water Advisory
CCP	Critical Control Point
DBP	Disinfection By Product
DO	Dissolved Oxygen
DW	Dirty Water
DLGWV	Department of Local Government, Water and Volunteers
DWQMP	Drinking Water Quality Management Plan
GAC	Granular Activated Carbon
Hypo	Sodium Hypochlorite
LIMS	Laboratory Information Management System
DWS	Drinking Water Scheme
PBR	Picnic Bay Reservoir
MW	Milky Water
NATA	National Association of Testing Authorities
OS	Owners Side
PAC	Powdered Activated Carbon
RMIP	Risk Management Improvement Program
RRD	Ross River Dam
THM	Trihalomethanes
TLS	Townsville Laboratory Services
T&O	Taste and Odour
TCC	Townsville City Council
WTP	Water Treatment Plant
TC	Tropical Cyclone

Approvals

In signing this approval:

I agree that the report meets the standards required and approve the report to be submitted to Water Supply Regulation, Department of Local Government, Water and Volunteers.

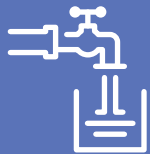


Travis Richards

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Townsville City Council*

Water Supply in Townsville

2024/2025 Fast Facts



26,340 ML

of residential drinking water
supplied to 204,541 residents



Maximum daily
water demand

187 ML



3

3 drinking water
supply schemes



4

4 water treatment
plants



0.72

customer water quality
complaints per 1,000
connections



\$1,008

Typical water bill based
on 200kL per annum



84,840

residential properties
connected



2,782 km

of water mains



\$116M

spent on capital
investments



\$1.99bn

Replacement cost of
Townsville's water supply assets

1. Executive Summary

Townsville City Council's (TCC) Drinking Water Quality Management Plan (DWQMP) was approved in August 2012 with the most recent review (2023) approved in 2024. Included in the approval notice was the requirement to submit an annual water quality report to outline the performance of Townsville Water Services against their DWQMP as required under the *Water Supply (Safety and Reliability) Act 2008*.

TCC has met all requirements under its DWQMP, the *Australian Drinking Water Guidelines 2011 (ADWG)* and the *Public Health Regulation 2005* for the reporting period. The reporting period being the 2024/2025 financial year.

Council has three Drinking Water Schemes (DWS): Townsville DWS, Giru/Cungulla DWS and Paluma DWS. All three schemes fall under one DWQMP.

The *Public Health Regulation 2005* for *Escherichia coli (E. coli)* requires that 98% of samples taken in a 12-month period should not detect *E. coli*. Annual compliance for the three schemes was met with 100% compliance for Townsville DWS, 100% compliance for Giru/Cungulla DWS and 100% compliance for Paluma DWS.

Two notifications of non-compliance and four events were submitted to the Office of the Water Supply Regulator (The Regulator) for the three schemes for the reporting period:

- 1 disinfection by-product exceedance
- 1 total chlorine exceedance
- 6 events.

There were 65 customer complaints regarding drinking water quality:

- 34 dirty water complaints
- 23 taste/odour complaints
- 3 suspected illness
- 2 owner's side issues
- 3 high chlorine complaints.

Townsville continues to face challenges with harmful algal blooms in the Ross River Dam. In collaboration with Trility, the Office of Water Supply Regulation, Queensland Public Health and industry experts, Townsville City Council remains committed to delivering treated water that meets the ADWG.

This DWQMP annual report is made available to the community through Council's public website, upon request through email enquiries@townsville.qld.gov.au or for inspection upon request at the Customer Service Centre, 103 Walker Street, Townsville City.

2. Overview

The supply of safe and reliable drinking water is regulated by state legislation: *Water Supply (Safety and Reliability) Act 2008* and the *Public Health Act 2005* which are further enforced by the Department of Local Government, Water and Volunteers (DLGWW) and Queensland Health, respectively. State government regulates TCC to ensure drinking water services are conducted in accordance with an approved DWQMP and drinking water quality meets or exceeds the *Australian Drinking Water Guidelines (ADWG)* to protect public health.

TCC's Drinking Water Quality Policy provides guidelines and assigns responsibility for the management of drinking water quality in adherence to the *Public Health Act 2005* and the *Water Supply (Safety and Reliability) Act 2008*. The Drinking Water Quality Policy can be accessed here:

Policies – Townsville City Council

The DWQMP outlines the management of Council's water supply system from “catchment to tap” in a risk-based approach. The DWQMP is framed to meet and exceed the ADWG by incorporating the following:

- commitment and responsibility to provide safe and reliable drinking water
- assessment of drinking water supplies
- operational procedures and process control
- verification and monitoring of drinking water quality,
- management of incidents and emergencies,
- employee awareness and training,
- community involvement and awareness,
- information management,
- evaluation and audit, and
- review and continual improvement.

The DWQMP is made available to relevant employees through Council's corporate document management system.

Townsville City Council's DWQMP was initially submitted to the Office of the Water Supply Regulator on 21 June 2011 and approved with conditions on 29 August 2012. Since then, the plan has undergone regular reviews every two years, with external audits conducted every four years in line with regulatory requirements. The first DWQMP audit was completed in July 2016, followed by a significant plan review in January 2018, which received conditional approval in April 2018. A subsequent regulatory audit was undertaken in December 2020, with the associated plan review approved in November 2021. The 2023 review was developed with the expertise of Viridis and was approved with conditions in May 2024. The latest audit, conducted by Water Futures, took place in September 2024. The next scheduled DWQMP review is due in August 2025.

Water Services (WS) is a business unit of TCC and is a registered service provider under the *Water Supply (Safety and Reliability) Act 2008*. WS is responsible for the management of the city's potable water supply network and provision of safe and reliable water to the residents of Townsville, Paluma Township and Cungulla Township. Public health is protected through proactive identification and minimisation of public health related risks associated with drinking water.

WS serves a population of approximately 204,541 with 89,763 connected properties, in three drinking water schemes: Townsville DWS, Paluma DWS and Giru/Cungulla DWS. This annual report relates to all three schemes.

Table 1. Summary of Townsville's Drinking Water Schemes.

Scheme Name	Water Treatment Plant (WTP)	Water Source	Treatment Processes	Treatment Capacity	Towns Supplied
Townsville Drinking Water Scheme	Douglas Water Treatment Plant (Angus Smith Drive)	Ross River Dam (water supplemented from the Burdekin Dam through the Haughton Pipeline when required)	Conventional treatment with chlorine disinfection	195 ML/D	Townsville
	Northern Water Treatment Plant (Kinduro)	Paluma Dam/ Crystal Creek	Ultrafiltration with chlorine disinfection	40 ML/D	
Giru/ Cungulla Drinking Water Scheme	Giru Water Treatment Plant (Cromarty Creek Road)	Haughton River	Conventional treatment with chlorine disinfection	2 ML/D	Cungulla Township
Paluma Drinking Water Scheme	Paluma Water Treatment Plant (Lennox Crescent)	Paluma Weir	Ultrafiltration, UV and chlorine disinfection	90 KL/D	Paluma Township

Giru Water Treatment Plant supplies water to Cungulla Township and Giru Township. Water is supplied to Giru Township through agreement with the Burdekin Shire Council. Management of Giru's drinking water quality is covered under the Burdekin Shire Council's DWQMP.

40,645 ML of potable water was produced in the 2024/2025 financial year. WS maintains and operates 2 major water storages (Ross River Dam and Paluma Dam), 2 weirs (Paluma Weir and Blacks Weir), 26 water pumping stations, 23 chlorinators, 44 reservoirs (treated water storage facilities) and 2,788 km of water distribution mains.

3. Actions taken to Implement the DWQMP

3.1 Management of Council's DWQMP

WS employs experienced operators, scientists, engineers, technical specialists, and plumbers who work to monitor, regulate, and improve water quality for all drinking water schemes. The team includes the Water Quality Officer (custodian of the DWQMP), Principal Treatment Operations – Water & Wastewater, Water Resources Engineer, Water Operations Engineer, Coordinator Compliance Water, Coordinator Water Networks, Team Leader Water Treatment and the Water Operators. They collectively manage water quality non-compliances and customer inquiries, oversee all Critical Control Points (CCPs) and the water sampling plan, and analyse the resulting data to ensure compliance and performance.

The Water Quality Team hold weekly water quality meetings to discuss water quality issues. A weekly operations meeting is held with Townsville DWS's contractor TRILITY, who operate Douglas and Northern WTPs. A water quality governance meeting is held with management every two months and is chaired by the General Manager Water Services.

A Blue-Green Algae Task Force was established in January 2025 in response to the persisting presence of cyanobacteria in the main raw water source for Townsville. The Task Force provides expert advice and management of the risks associated with algal blooms to the treatment and supply of potable water to the Townsville community. The team includes representatives from different departments of Council, Townsville Laboratory Services and James Cook University.

3.2 Amendments made to the DWQMP

WS completed a full risk assessment and review of the DWQMP across all three schemes with relevant stakeholders during the reporting period. The DWQMP was amended to reflect the following:

- all DWS data updated to current statistics
- catchment assessment of all water supplies with regards to Health Based Targets
- updates to new and upgraded infrastructure
- updates to the risk register and risk management improvement plan
- updated schematics and Critical Control Points.

The DWQMP will be submitted in August 2025 and details will be provided in the 2025/2026 DWQMP Annual Report.

3.3 Training

All staff involved with water treatment and supply obtain the “Aquacard” which is managed through our internal Learning Management System (LMS). Aquacard is a QldWater course which gives an overview of water quality risks, particularly when working on or around water infrastructure. It provides a simple overview of what contaminants are, the risks that they pose, how they can enter a drinking water system and the responsibilities of those working on infrastructure to reduce that risk. It includes practical guidance on how to operate within work sites including good housekeeping and disinfection practices.

WS staff members continue to complete the Water Industry Worker Program. The Water Industry Worker Program was developed in partnership with QldWater, government, industry and training providers to help retain skilled staff and improve future opportunities for workers through industry specific training. The program is focused on the formal recognition of skills and training employees within the construction and maintenance field in the water industry. A large component of this training is drinking water quality and the role of the worker in maintaining safe supply as a public health requirement of their role.

3.4 Operation of Douglas Water Treatment Plant and Northern Water Treatment Plant

TRILITY operate the Douglas Water Treatment Plant and Northern Water Treatment Plant under contract for Council. Operational performance of the WTPs is managed by TRILITY in liaison with TCC via meetings and written communications; and contract matters are managed through formal meetings and contract notices.

3.5 Education

During the 24/25 financial year 1,415 students were engaged across water education tours and classroom engagements. There was an increase in the number of new schools and early learning centres engaging with water education services, as well as increased visitation to Ross River Dam and Douglas Water Treatment Plant sites.

The Water Discovery Hub at Douglas Water Treatment Plant officially opened in April 2025. The year 4 cohort from Belgian Gardens State School were the first to experience the interactive space, participating in hands-on activities and building engagement on Townsville’s Water Story. Students built their own water filter and experimented with various materials to analyse which were most effective at filtering water.

Virtual STEM hydro innovation challenge continued for its 5th year, with students from all over Queensland, including Townsville, working together to find solutions to real-world water challenges.

Council continued to support major school events including, St Benedict’s Eco Fiesta, Kelso Under 8’s Day, Vincent State School Under 8’s Day and Kirwan State High School Science week.

For the second year in a row, Council ran the Scott Savewater Campaign, with targeted outreach across TV, radio, and newspaper channels, as well as during the NRL Cowboys games at Townsville Stadium.

For National Water Week (NWW) 2024, Council held a drawing competition for primary schools and TikTok competition for secondary schools based on the theme ‘accelerating action’. Winners were announced at Riverway Movie Night, with 1st, 2nd and 3rd place winners. Council also held a water story time at Riverway library to celebrate NWW.

3.6 Major Capital Projects

3.6.1 Recreation

In May 2025 Council opened land-based recreation fishing at Ross River dam. A land-based fishing outcrop extends into the dam from the dam wall to permit fishing. Council has installed amenities and safety systems (CCTV, signage) and upgraded access stairs to facilitate public use of the fishing area. Council is currently reviewing concept options for on water fishing (stage 2) and water skiing (stage 3) to potentially be implemented in future financial years.

3.6.2 Douglas Water Treatment Plant Filter Media Trial

Council conducted a plant trial of new filter media to inform a project to replace Filter Media on modules 3 and 4 of the Douglas Water Treatment Plant. The replacement of filter media is a scheduled maintenance project and the purpose of the pilot plant testing was to ensure that the composition of the filter media would achieve the required filtration of the water being treated by the treatment plant. The project was successful and in FY26 Council has proceeded to order the filter media required to complete the replacement.

3.7 Risk Management Improvement Program

A DWQMP Risk Assessment facilitated by WS was undertaken in May 2025 with relevant stakeholders. A new risk management improvement program (RMIP) was generated and is included in the DWQMP 2025 review.

The RMIP is attached in Appendix A of this report.

3.8 Customer Service Standards

WS's Customer Service Standards were reviewed and will be approved in August 2025. The outcome of the review will be published in the 2025/2026 Annual Report.

3.9 DWQMP 2025 Review

The DWQMP was reviewed in 2025 and will be submitted to the Water Supply Regulation for approval on August 1st 2025. The outcome of the review will be published in the 2025/2026 Annual Report.

4. Information supplied to the Regulator Regarding Non-Compliances and Prescribed Incidents

There were two non-compliances with water quality criteria and six water supply events reported for the 2024/2025 financial year. A severe weather event in February and March 2025 led to five water supply incidents with Townsville receiving 2,202.6 mm and Paluma 4,342.8 mm of rain. Despite these conditions, all three drinking water schemes consistently met ADWG requirements. Northern WTP was offline from February to June 2025 due to inaccessible roads and damaged infrastructure.

Table 2. Disinfection by-products in Townsville — Chlorate January 2025.

DWI-506-25-11754 Disinfection by-products in Townsville	
Scheme	Townsville
Incident date	15/01/2025
Parameter	Chlorate
Results	816 µg/L and 978 µg/L
Event description	Chlorate values over the QLD Health limit (800 µg/L) were detected at two treated water reservoirs, Nelly Bay and Roseneath. Only one other exceedance was detected (825 µg/L) at 16 Brady Rd, Oak Valley on 04/03/2025. See figure 1 for chlorate results during the 2025 summer period.
Corrective and preventative actions	<p>TCC and Trility have DBP management strategies which include the following:</p> <ul style="list-style-type: none"> • Close monitoring of sodium hypochlorite age and replace it regularly to minimise DBPs from DWTP through reticulation. • Trility receive their hypo in smaller and frequent batches that are always tested for chlorine demand and chlorate. • Regular flushing occurs at all end points in the reticulation to pull fresh water through. • Coogee, the hypo supplier, now have a batching plant based in Townsville to decrease transport time. • TCC maintains appropriately sized hypo tanks that are kept out of the sun. • A dual tank system is used where possible. <p>Chlorine residual is kept as low as possible without compromising disinfection.</p>

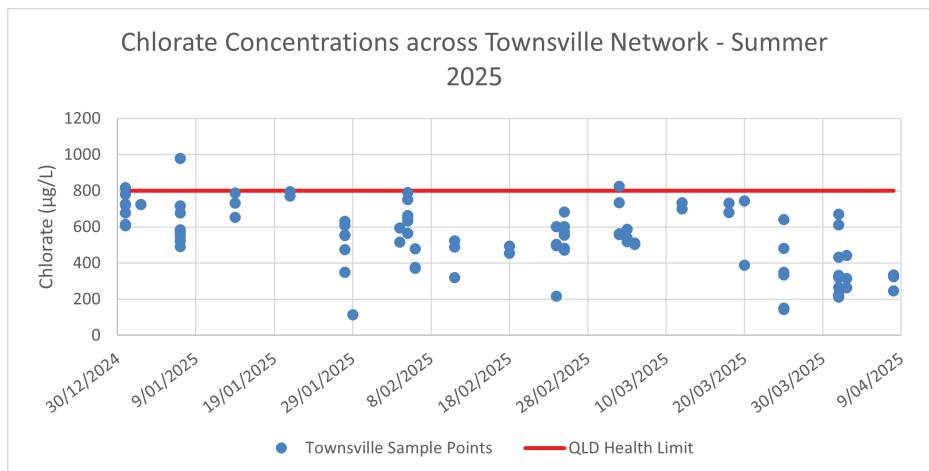


Figure 1. Chlorate values across Townsville through the incident period. Markers represent various reservoir and house sample points across the network.

Table 3. Samples not collected in Townsville — Southern suburbs.

DWI-506-25-11809 Samples not collected in southern suburbs	
Scheme	Townsville
Incident date	31/01/2025
Event	Samples not collected
Event description	14 weekly samples in the southern suburbs of Townsville were unable to be collected as part of TCC's verification monitoring program due to a severe rain event.
Correction and preventative actions	All samples were collected the following week. All results fell within the ADWG limits.

Table 4. Water Carting Event — Giru/Cungulla.

DWI-506-25-11820 – Giru WTP Water Carting	
Scheme	Giru/Cungulla
Incident date	05/02/2025
Event	WTP power outage
Event description	On 31/01/2025, Giru WTP lost power and was inaccessible due to a severe rain event causing flooding to the area. Power was restored to the WTP on 04/02/2025, however the plant required time to bring online due to high raw water turbidity.
Corrective and preventative actions	On 05/02/2025, water carts were utilised to fill the Cungulla Balance Tank (60kL) and the Giru Clearwater Storage (120kL) as a precaution. Giru WTP experienced no water quality issues.

Table 5. Samples not collected — Paluma DWS.

DWI-506-25-11850 — Paluma DWS samples not collected	
Scheme	Paluma
Incident date	14/02/2025
Event	Samples not collected
Event description	Due to the severe rain event hindering access to the Paluma Township, water treatment operators were unable to attend the Paluma WTP or collect treated water samples for the month of February.
Corrective and preventative actions	Access to Paluma was restored for “back road” routes, increasing travel time to 3 hours each way. Samples were taken on 06/03/2025 and all results were with the ADWG limits.

Table 6. Sample not collected — Paluma Dam.

DWI-506-25-11890 — Paluma Dam samples not collected	
Scheme	Townsville
Incident date	03/03/2025
Event	Samples not collected
Results	2095 µg/L, 1715 µg/L, 2050 µg/L, 1705 µg/L
Event description	Due to the severe rain event hindering access to the Paluma Township (and in extension Paluma Dam), samples were unable to be collected by TLS staff from February to June 2025.
Corrective and preventative actions	Discussions with TLS staff have led to a solution to trim the Paluma Dam sample run so they are able to travel to and from the dam and sample within the workday. Paluma Dam sampling will resume in July 2025.

Table 7. Total Chlorine Exceedance at Mt Margaret Pump Station.

DWI-506-25-11940 — Total Chlorine exceedance at Mt Margaret Pump Station	
Scheme	Townsville
Incident date	17/03/2025
Parameter	Total chlorine
Results	5.81 mg/L (total), 4.65 mg/L (free)
Event description	Weekly samples collected at Mt Margaret Pump Station returned a result of 5.81 mg/L total chlorine on 11/03/2025. As a part of routine operations, a roving operator tested free chlorine at the pump station on 14/03/2025 and returned a result of 2.02 mg/L. Mt Margaret Pump Station is fed directly from Douglas WTP, thus chlorine residuals typically correspond with plant dosages.
Correction and preventative actions	It was confirmed that correct sampling techniques were utilised when collecting the initial sample. The chlorine analyser used at the time was NATA calibrated in February 2025. It was confirmed the chlorine set point at Douglas WTP was 3.4 mg/L and data from Douglas WTP showed no significant increase in chlorine dosage prior to the sample being taken. Chlorine residuals across the network at the time were all within critical control point range. Samples taken after the incident were also within range. The exceedance was deemed an anomaly.

Table 8. Balgal Beach Temporary Chlorine Dosing Point.

DWI-506-25-11979 — Balgal Beach temporary chlorine dosing point	
Scheme	Townsville
Incident date	31/03/2025
Event	Balgal Beach temporary dosing point
Event description	Balgal Beach is typically fed drinking water from Northern WTP. Northern WTP was offline from February to June 2025, so water was supplied from Douglas WTP, re-chlorinated at Rollingstone Reservoir and then transferred to Balgal Beach. The pipeline between Rollingstone Res and Balgal Beach ruptured during the severe rain event in February and March 2025, which meant water travelled from Douglas WTP to Balgal Beach (~56km) with no re-chlorination after the WTP. Free chlorine levels were consistently low throughout March, April and early May. No <i>E. coli</i> was detected during this period.
Corrective and preventative actions	Flushing at Balgal Beach was undertaken at least twice a week during the period by an operator to pull fresh water through. A temporary sodium hypochlorite injection dosing system was arranged to dose chlorine into the main pipeline feeding Balgal Beach as an interim solution. The pipeline was repaired on 09/05/2025 and residuals have remained above the disinfection minimum of 0.5 mg/L.

Table 9. Oak Valley Generator Failure.

DWI-506-25-12097 — Oak Valley Generator Failure	
Scheme	Townsville
Incident date	29/05/2025
Event	Oak Valley generator failure
Event description	On 29/05/2025, there was a power outage in Oak Valley and the southern suburbs of Townsville. The backup generator for the chlorine dosing pumps at the Mt Jack Chlorinator failed to start, allowing between 2.1 and 5.6 kL of unchlorinated water to pass into Oak Valley reticulation.
Corrective and preventative actions	Water operators responded quickly and had the generator running and pumps dosing an hour after the initial alarm. An operator flushed and checked chlorine residuals at all end points in Oak Valley. Chlorine was well above the disinfection minimum (0.5 mg/L). <i>E. coli</i> was tested at all Oak Valley samples. No <i>E. coli</i> was detected. An electrician attended site to ensure the generator was working and signage was erected to instruct workers to switch site into remote operation once works are completed to prevent an occurrence like this again

5. Compliance with Water Quality Criteria for Drinking Water

WS has a comprehensive sampling regime “from catchment to tap” which covers catchments, raw water supply, water treatment and water distribution. Over 100,000 tests are taken weekly, monthly, quarterly and annually for various parameters including (but not limited to) chlorine, pH, turbidity, alkalinity, metals, chemical, pesticides, disinfection by-products, per and polyfluoroalkyl substances and microbiological parameters.

Treated water samples are taken from dedicated sample points in council owned parks and open spaces. These sample points are housed in secure vandal proof casings called “Ned Kelly’s”.

All samples are taken and analysed by Townsville Laboratory Services, a National Association of Testing Authorities (NATA) accredited lab. Results are emailed to the water quality team as soon as they are verified and finalised by the laboratory. The water quality team also have access to the Laboratory Information Management System (LIMS) to obtain results as required. All results above ADWG limits are phoned and emailed through immediately to the water quality team. Exceedance reports are generated weekly. All water quality data is monitored, and trends analysed throughout the year by the Water Quality Officer.

WS has been largely compliant with the water quality criteria for the financial year navigating two water quality exceedances and six water quality events.

One reportable incident was due to chlorate above the QLD Health limit and one was a total chlorine exceedance. Details for the incidents and events are included in section 4 above.

TCC were compliant with the Public Health Regulation 2005 which requires “nil cfu/100ml found in 98% of the samples taken for a 12-month period” for all three schemes for the period. There was no *E.coli* detected in Townsville, Paluma or Giru/Cungulla DWSs. Annual compliance for all three schemes was met with 100% for the reporting period.

Table 10: Number of *E. coli* Incidents and Percentage Annual Compliance with the Public Health Regulation 2005.

Drinking Water Scheme	No. of samples taken	Number of Incidents	% Annual Compliance
Townsville	3357	0	100.00%
Paluma	142	0	100.00%
Giru/Cungulla	204	0	100.00%

Failures to meet sampling frequencies due to wet weather inaccessibility are detailed in Section 4.

Drinking water quality performance (verification monitoring) is included in Appendix B. This is a snapshot of the most relevant water quality parameters for the three schemes. If further detailed information is required residents (or businesses) are asked to contact the Water Quality Officer through email enquiries@townsville.qld.gov.au or by calling Customer Service on 13 48 10.

6. Details of Complaints made to the Provider about the Drinking Water Service Supplied to the Customers

All customer water quality complaints are lodged through Council's 24-hour Operations Centre, with all information regarding the complaint and how it was rectified recorded in Council's Customer Request management system. Each complaint has a unique identification number which enables the complaint to be tracked from initial request to completion. There were 65 drinking water quality complaints for the reporting period.

Table 11: Number of complaints by type July 1st 2024 to June 30th 2025.

Type of Water Quality Complaint	Dirty Water	High Chlorine	Taste/Odour	Suspected illness/ Customer Concern	Owners Side	Milky Water
Number of complaints 2024/2025	31	3	23	3	2	3

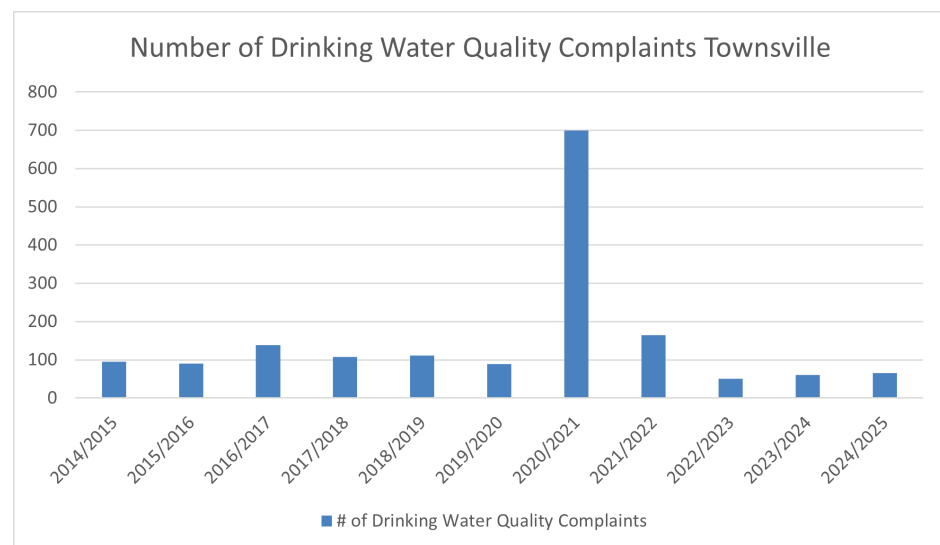


Figure 2: Number of drinking water quality complaints per financial year. The spike in customer complaints in 2020/2021 was due to a water discolouration event.

There were 6 main types of water quality complaints in Townsville as outlined below:

6.1 Dirty Water (DW)

There were 34 dirty water (DW) complaints. DW develops when sediments from the bottom of the pipes are stirred up due to works occurring in the area such as pipe repairs, water trucks filling from hydrants and construction work. It can also be caused by changing velocities in pipes stirring up the sediment. When a DW complaint is lodged, a water reticulation crew is dispatched to flush the area until the DW is removed, and the chlorine residuals are back within specification. Customers are advised to flush their side by running sprinklers. Customers receive a call the following day to ensure water remains clear before their complaint is closed out.

6.2 Milky Water (MW)

There were 3 Milky Water (MW) complaints. MW is caused when air becomes trapped in the water under pressure, forming tiny air bubbles. As these air bubbles escape, they cause the water to look milky. MW occurs following large main repairs or when new mains are commissioned. The issue generally resolves itself over time as the air bubbles escape but if not, the mains are flushed by work crews.

6.3 Taste and Odour (T&O)

There were 23 taste and odour (T&O) complaints. T&O complaints in Townsville are generally caused by:

- DW events
- MIB/Geosmin
- high chlorine (or sudden changes in chlorine concentration)
- old or new pipework on customer's side of the meter
- old hot water systems.

2-Methylisoborneol (MIB) and Geosmin are taste and odour compounds that give water an earthy, pond-like or dirty taste and odour. MIB is produced by various species of blue-green algae that are in abundance in Ross River Dam and is usually detected at levels above the average taste threshold (~10 ng/L) during summer periods in Townsville drinking water. MIB and Geosmin are not dangerous to consume and cannot be filtered out of water. Boiling water will concentrate the taste. It is recommended to drink water with a squeeze of lemon or chilled to mask the flavour.

WS liaises with customers for all T&O complaints, flush where required and take samples for further investigation if warranted.

6.4 Owners' Side Issues

There were 2 owners' side issues for the reporting period. These can be caused by:

- Fuel/hydrocarbons/paint/VOC spills – Spillages of hydrocarbons, BTEX and volatile organic compounds on residents' lawns can seep into the soil and permeate polyethylene piping causing taste and odour issues. Compounds of note can include: paint, petrol and fuels.
- Hot water systems – nearing the end of their life and the breakdown of the anode inside.
- New or old internal pipework.
- Newly installed irrigation systems without backflow prevention.

Depending on the complaint, WS will collect and analyse samples where required to narrow down the cause of the issue.

6.5 Suspected Illness

There were 3 suspected illness complaints this year. These were the results of customers reporting "gastro-like" symptoms. Contact is made with the customer to clarify the treatment and verification processes in place to ensure safe drinking water. If requested, water samples from their residence can be analysed through TLS and results are explained to the resident. All water tested has met ADWG.

6.6 High Chlorine

There were 3 high chlorine complaints during the reporting period. High chlorine complaints typically occur around water treatment plants and re-chlorination facilities on days of high demand directly after a period of low demand. Lower water demand triggers a response to increase the chlorine set-points across the city to ensure disinfection throughout the outer areas of the network. When the water demand increases after a low demand period, fresh chlorinated water is pulled through the network, resulting in intensified chlorine taste and odour. The higher water demand then triggers a response to decrease the city's chlorine set points.

WS liaises with customers for all high chlorine complaints to explain this process. If requested, WS will test the customer's free chlorine.

7. Outcome and Recommendations of Audit

An external audit of TCC's DWQMP is required every four years. The most recent audit was completed in 2024 by Water Futures Pty Ltd. The audit covered a sample of TCC's Drinking Water Schemes (DWS) centring on a Water Treatment Plant (WTP) for each scheme as well as covering selected aspects of catchments, source waters and distribution systems. The schemes audited were Townsville DWS with Douglas WTP and Giru/Cungulla.

There were five opportunities for improvement (OFI) noted and no non-conformances.

The audit concluded that TCC:

- provided accurate verification and operational monitoring data to the regulator
- complied with its obligations under the Act, Regulations and Audit Guidelines, and
- continues to reduce the quality risk profile for safe drinking water in accordance with the DWQMP.

Opportunities for improvement were as follows:

Topic Area	Opportunity for Improvement
Implementation of all preventative measures for managing hazards and hazardous events including those applied in the distribution/reticulation network	<p>OFI 1: Fast track the rectification of weaknesses in reservoir roof structures to reduce risk of ingress of microbial pathogens and <i>E. coli</i>.</p> <p>OFI 2: To avoid a future non-compliance, reevaluate the decision relating to created a step change in risk by permitting public access to Ross River Dam. This level of source water challenge has not been adequately described or assessed in the approved DWQMP. The decision conflicts with the 2022 update to the ADWG. Relevant risks and mitigation strategies should be reassessed considering the 2024 Water Research Australia Research Report on impacts of recreation on water supply reservoirs. The DWQMP would need to be revised and approved by DLGWV to reflect acceptance of these increased risks by the regulator to avoid a potential future non-compliance.</p>
Implementation of operational and maintenance procedures (including instrument calibration), including availability and currency of the procedures	<p>OFI 3: Formalise the management of shelf lives for certified reference standards and reagents used for benchtop monitoring instruments.</p>
Implementation of the risk management improvement program	<p>OFI 4: Upskill staff in water quality management and operational roles through boosting continual professional development and professional networking to provide TCC with enhanced expertise and access to the broader community of practice.</p> <p>OFI 5: Consider updating the Trility contract to reflect more recent raw water quality data, particularly in relation to algal biomass, and seek to further incentivise improved water quality management.</p>

8. Ongoing Harmful Algal Blooms in Ross River Dam

RRD harbours two types of harmful algae blooms (HABs): Cyanobacteria (also known as blue-green algae) and Diatoms. Over the years, cyanobacteria has been detected in the RRD; however, in 2019 a significant bloom developed and treatment has required ongoing management. Since the onset of cyanobacteria blooms within RRD, significant improvements have been made to the water treatment process at Douglas WTP, including: an improved monitoring program, pre-chlorination on all filters, Powdered Activated Carbon (PAC) dosing on Modules 1 and 2 and the addition of clarification on modules 3 and 4. Additionally, the design for a permanent, more effective PAC dosing system covering all modules is in progress. Finally, filter media replacement in modules 3 and 4 is budgeted to take place in 2025/2026 to improve filtered water quality.

Every summer the bloom duration and biovolume increases. The average summer (November – January) biovolumes in 2024/2025 FY (11.87 mm³/L) increased by 51% from the previous FY (7.85 mm³/L). The weather conditions of long hot days and wash-in of nutrients from rainfall provide optimal conditions for growth. The dominant species is *Raphidiopsis raciborskii* which produces a toxin called Cylindrospermopsin. This toxin is mitigated through the treatment process and has not been detected in the treated water.

Examining the whole year, the average cyanobacteria biovolume in 2024/2025 FY (7.5 mm³/L) increased by 4% from the previous FY (7.23 mm³/L). The low increase can be attributed to the significant rainfall experienced in the Townsville region in February and March 2025. Over 800 GL was released from the RRD gates for flood mitigation during and after the events. This massive flush decreased the cyanobacteria biovolume from 10.73 mm³/L down to 0.48 mm³/L.

TCC continues to work with Trility, the Office of Water Supply Regulation, Queensland Health and industry experts to address the risks associated with HAB's and assess and implement management and treatment strategies at a catchment, dam and treatment level. Despite continued implementation of these strategies and measures, risks associated with HAB's remain a concern. A part of managing these risks includes the implementation of water conservation and restriction measures, particularly during high demand periods and significant HABs to ensure that clean, safe and high-quality drinking water is consistently provided to the Townsville community.

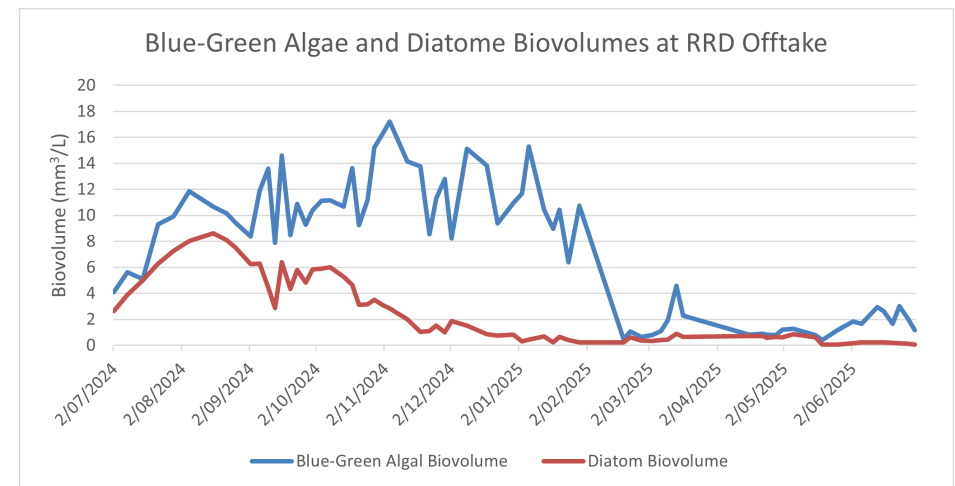


Figure 3: Average algae biovolumes at offtake level within the RRD for the 2024/2025 FY.

Appendix A.
**Risk Management
Improvement Program**



Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete
Douglas Water Treatment Plant Townsville Supply Scheme	Hydrocarbons from recreational activities	Check that Trility tests for hydrocarbons	Can shandy the water and remove with PAC on Module 1 & 2. Dilution factor will negate any hydrocarbon detection. RRD recreation is not permitted once the dam is below 50% in level	1/12/2025			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Water Quality Officer	
	Low and high alkalinity from significant rainfall or low dam level	Check that Trility has OCPs for alkalinity	Affects pH, disinfection, maintenance issues and fluoride dosing issues	1/12/2025			Low priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Water Quality Officer	
	Diatoms causing issues with chemical consumption, solids loading, filter blinding, breakthrough, loss of production, increased washwater	Risk assessment for BGA EMP update	Seasonal and species dependant. Ultrasonic trial may have some benefit	1/07/2026			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Water Quality Officer	
	Cross contamination - Raw ingress, leaking valve, misoperation of bypass infrastructure	Trility to review trip at 1 NTU		1/07/2026			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Water Quality Officer	
	Protozoa, pathogens, THMs: from filter breakthrough, ineffective backwash, high organics in raw, unprotected catchment	Filter media replacement for Modules 3 & 4	Filter media for modules 3 & 4 was originally designed as direct filtration, which is not effective with the recently installed clarifiers. Filter media replacement is required	1/07/2026	In progress		High priority based on residual risk level determined from the risk assessment	Yes, in progress	Team Manager Water Resources & Dam Safety	
	Soluble Manganese (Oxidising at end of plant resulting in discoloured water), Cyindrospermopsis	Permanent installation of pre-chlorination system	Require a permanent pre-chlorination solution to oxidise manganese at the head of the plant	1/07/2027	Scoping occurring 8/8/24	Old date - 01/07/2024	Medium priority based on residual risk level determined from the risk assessment	Yes	General Manager Water	
	Aesthetic - Colour above ADWG causing dirty water complaints	Upgrade ACH system		1/07/2027			Low priority based on residual risk level determined from the risk assessment	Pending	Team Manager Water Resources & Dam Safety	
	Dissolved Oxygen - stratification and algal blooms in dam	Install another ORP for individual module outlets	Affects dosing. If DO is too low none of the oxidation processes work	1/07/2027			Low priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources and funding required	Principal Treatment Operations - Water & Wastewater	
	Pathogens - Failure of equipment or incorrect chemical dose rate	Install ACH skids to improve capacity + flow meters		1/07/2027			Medium priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Principal Treatment Operations - Water & Wastewater	
	Protozoa (Crypto/Giardia) - Filter breakthrough	Improve mixing for Module 4	Although turbidity after Module 4 filters is adequate, we see increased algal cell filter breakthrough. Investigations have revealed that mixing in the clarifier can be improved to allow better coagulation and flocculation	1/07/2027			High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Principal Treatment Operations - Water & Wastewater	
	Loss of Supply - Inadequate ACH storage	ACH storage modifications	Unable to keep up with dosing requirements in high demand periods. Mainly administrative controls in place (forecasting of demand and ordering timeframes). IBCs can be delivered. Look at alternatives for coagulant	1/07/2027			High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Principal Dam Safety & Operations	

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete
Douglas Water Treatment Plant Townsville Supply Scheme	Bacteria/Virus - Underdose of chlorine, insufficient chlorine C.t	Trility to review C.t. monitoring alarms for PCP, review flow and tank level (trigger point where we are not achieving C.t.). If C.t cannot be reached, consider restrictions or move monitoring point downstream?		1/07/2027			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Water Quality Officer	
	Cyanobacterial Toxins	Permanent PAC dosing System		1/01/2028	Currently investigating other dosing options as PAC may have inefficiencies		Medium priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Team Manager Water Resources & Dam Safety	
	Protozoa (Crypto/Giardia) (Open unprotected catchment, cattle grazing, projected recreation on Ross River Dam)	Complete design and installation of UV system	In order to accommodate opening the dam for recreation, UV is required to achieve the necessary Log reduction (LRV 6)	1/01/2028			High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	General Manager Water Services	
	Loss of Supply - Component failure of 415V supply leading to power failure	Separate generator and pump for Mt Louisa supply	Cannot obtain a generator of sufficient capacity to pump the required head. Require a generator and pump suitably sized. Retain additional critical spares (feasible?)	1/07/2028			High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Principal Dam Safety & Operations	
	Loss of Supply - Component failure of 415V supply leading to power failure	Upgrade switchboard to permit redundant system	Cannot obtain a generator of sufficient capacity to pump the required head. Require a generator and pump suitably sized. Retain additional critical spares (feasible?). Switchboard upgrade to permit redundant system (Additional 415 - HV). Derating plant would be required	1/07/2028			High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Principal Dam Safety & Operations	
	Protozoa (Crypto/Giardia) - Change in raw water quality, underdose ACH & PDM	Install filter to waste on Modules 1 and 2		1/07/2029			High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Team Manager Water Resources & Dam Safety	
	Fluoride - Major overdosing	Fluoride dosing system improvements	Unable to buy fluoride dosing equipment that matches currently installed assets (unable to upgrade/ replace). Feeders in particular an issue, screws specifically. Major components difficult to repair and source. Currently targeting a lower dose rate (~.5 mg/L) to err on the side of caution	1/07/2029			Medium priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Team Manager Water Resources & Dam Safety	
	Cross contamination - Raw ingress, leaking valve, misoperation of bypass infrastructure	Installation of secondary valve and bleed		1/07/2029			Medium priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources and funding required	Principal Dam Safety & Operations	
	Loss of supply (Raw water main break)	Permanent emergency pump station at DWTP	DWTP currently has a temporary emergency intake to draw water from blacks weir. The intake has three diesel power pumps on hire, the pumps must be moved when the RRD gates are opened	1/07/2029			Medium priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Team Manager Water Resources & Dam Safety	

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete
Douglas Water Treatment Plant Townsville Supply Scheme	Loss of Supply - Mt Louisa pump failure	Improve redundancy by installing a spare pump at the Mt Louisa Pump Station		1/07/2029			Medium priority based on residual risk level determined from the risk assessment	In progress	Principal Dam Safety & Operations	
	Loss of Supply - Drought	Haughton Pipeline Project		1/07/2030	Currently in Stage 2		Medium priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	General Manager Water	
	Protozoa (Crypto/Giardia) - Gross failure of sludge thickener; poor control of sludge handling	Sludge management improvements	Increased chemical usage due to unprecedented algae bloom has led to an increase in sludge and the need for improved sludge management system in the back end of the plant	1/07/2030	In progress		High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Principal Dam Safety & Operations	
	Reduction of Supply - Service water supply (carry water/batching water); DWTP has outgrown service supply	Incorporate service water supply into future designs	Consumption of plant treated supply is maxed out (e.g. if plant is batching a chemical, hydrant at back of plant cannot be used). Insufficient supply (pressure and volume). Unless supply is amended, dosing is restricted and no other processes can be run concurrently/expanded (no other temp system can be set up)	01/07/2027 (ongoing)			Medium priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Principal Dam Safety & Operations	
	Bromate - Sodium hypochlorite contamination during manufacturing, bromide in raw water	Review historical data and reconsider monitoring regime	Keep monitoring	1/07/2026 (ongoing)			Medium priority based on residual risk level determined from the risk assessment	Ongoing	Water Quality Officer	
	Chlorate - Sodium hypochlorite degradation increases chlorate levels in final water quality	Encourage supply in North QLD through QldWater directorate, QLD Health, Water Supply Regulation	Improvements have been made with supplier of sodium hypochlorite. Hypochlorite is now being delivered 18% to Townsville and dilutes to 13% for trility and to 10% for TCC every batch. Supplier has a new setup in Townsville diluting locally. Douglas hypo has reduced chlorate a quarter of previous levels. Risk assessed, discussed with QLD health. Considered gas, WH&S prohibited	1/07/2027 (ongoing)			High priority based on residual risk level determined from the risk assessment	Ongoing	Water Quality Officer	
DWQMP	A description of any variations to process operation (for example, bypassing a process step) must be included in the plan	Giru needs to show where Turbidity monitoring is in relation to filters	Update P&ID to show location of turbidity monitoring	1/07/2025		1/01/2025	Low priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Operations Engineer	Complete
Giru/Cungulla Drinking Water Scheme	pH correction (Soda ash) (Low alkalinity, high alum dose)	Formalise as OCP: need to incorporate triggers for the turning on/ off soda ash	Soda ash is primarily used to control pH. Typically not required/used, around 6.5. Utilised after rain event and low alkalinity water. pH CCP 2	1/09/2025		1/07/2025	Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Water Resources Engineer	
	Aluminium (Overdose coagulant chemicals)	Ensure that coagulation pH targets are recorded and digitised	pH CCP. Acid and soda ash available to correct pH	1/09/2025	Need to formalise OCP first	1/07/2025	Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Team Leader Water Treatment	
	Loss of Supply - Mains break, high turbidity events causing WTP shut down	Develop Giru and Cungulla water carting procedure		1/12/2025	Procedure written, needs to be formalised		High priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete
Giru/Cungulla Drinking Water Scheme	Bacteria/Virus - pH too high for effective chlorination, can result in increased AI levels	Additional pH and turbidity monitoring at sedimentation tank		1/12/2025	In progress		High priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Water Resources Engineer	
	Aluminium - Naturally occurring high AI	Review of operational procedures and provide subsequent training for coagulation and pH control. Coagulation control needs to be documented to ensure that everyone is targeting the same thing	Maximum raw water 10.3 mg/L last 5 years. Treated water result from 2020-2024 is 0.4mg/L and 0.3mg/L in reservoir, which is still above the aesthetic value of 0.2 mg/L. AI in treated water either comes close to or just exceeds the aesthetic limit once a year max. No customer complaints received	1/12/2025			High priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Water Resources Engineer	
	Protozoa (Crypto/Giardia) - High raw turbidity event	CCP wall charts at Giru WTP to be updated		1/12/2025			High priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Team Leader Water Treatment	
	Bacteria/Virus - Underdose of chlorine, insufficient chlorine C.t	Confirm C.t. of chlorine		1/12/2025			High priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Operations Engineer	
	Chlorate - Sodium hypochlorite degradation increases chlorate levels in final water quality	Develop hypo age calculator		1/12/2025			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Operations Engineer	
	Loss of Supply due to single supply line between Giru and Cungulla	Giru/Cungulla review cyclone preparation procedures (potential to Isolate high reservoir). Develop a procedure for what to do during high raw water turbidity. This includes levels in reservoirs for shutting down the plant during high turbidity events. Document what must occur before the plant is shut down	Currently losing the line only sits in normal repair procedures. Army flew in generator since Yasi. System has been upgraded since then. Trucking Water to Giru is the back up plan. High turbidity into Giru in to WTP and its shut down. Storages must be filled before the high turbidity event	1/07/2026			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Principal Treatment Operations - Water & Wastewater	
	Protozoa (Crypto/Giardia) - Unprotected catchment, high turbidity, max E. coli 200 cfu/100ml. Loss of Supply - Mains break, high turbidity events causing WTP shut down	Redundancy in turbidity monitoring in filtered water	Typically ~10, spikes with rainfall and can stay high (>40) for more than a week so plant has to run. Open catchment - Crypto risk present, high inflow periods. Surface water catchment with human inputs. Turbidity is alarmed and auto lock down in place. Catchment is likely category 4 and log 4 required (therefore deficient). Current Turbidity set at 1 NTU. UV likely required from	1/07/2027			High priority based on residual risk level determined from the risk assessment	Pending	Water Resources Engineer	

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete
Giru/Cungulla Drinking Water Scheme	Protozoa (Crypto/Giardia) - Filter Breakthrough	Install individual filter turbidity analysers	Critical set point - Combined turbidity meter set at critical limit of 0.30 (3 minute). Alarm only no auto action. High at 0.8 NTU (0 time)	1/07/2027			High priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources and funding required	Water Resources Engineer	
	Protozoa (Crypto/Giardia) - Media has passed its used-by age	Replace filter media		1/07/2027	Filter media has been procured		High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Team Manager Water Resources & Dam Safety	
	Protozoa (Crypto/Giardia) - Gross failure of sludge thickener; poor control of sludge handling	Need to risk assess supernatant return	Runs between 6 L/s and 10 L/s based on operator experience. Determine and state the operating window so operators know not to run flow rate in below this rate or interlock the pump flow rates. Develop OCP with procedure to target 5% and alarm at 7.5%. Look at the hydraulic relationship so the fixed rate return pump cannot pump more than 10% at plant minimum flow rate (determine and state in	1/07/2027	Supernatant is not currently returned		High priority based on residual risk level determined from the risk assessment, though supernatant is not currently returned so priority is low	Can be completed with available resources/ funding	Water Quality and Treatment Team	Parked
	All hazards - Supply outside of Council area to Burdekin Shire Council	Water Supply Agreement with BSC needs updating		1/07/2027			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Coordinator Water Programs and Contracts	
	Protozoa (Crypto/Giardia) - Unprotected catchment, high turbidity, max <i>E. coli</i> 200 cfu/100ml. Loss of Supply - Mains break, high turbidity events causing WTP shut down	Complete HBT assessment for Giru	Typically ~10, spikes with rainfall and can stay high (>40) for more than a week so plant has to run. Open catchment - Crypto risk present, high inflow periods. Surface water catchment with human inputs. Turbidity is alarmed and auto lock down in place. Catchment is likely category 4 and log 4 required (therefore deficient). Current Turbidity set at 1 NTU. UV likely required from	1/12/2028			High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Water Quality Officer	
	Cyanobacterial Toxins	Develop BGA Management Plan	BGA sampling monthly. Never detected, however high pH event years ago potentially suggested BGA as the source. If required develop a BGA response plan	1/07/2029			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Water Quality Officer	
	Loss of Supply - Insufficient supply, drought	Investigate demand management strategy	If river is too low, Sunwater will release from Burdekin Dam. However if the Burdekin Dam is low from drought, the rest of North QLD would be the same. Look into demand management strategy: what restrictions would be required in an emergency situation etc.	1/07/2029			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Water Resources Engineer	
	Loss of Supply - Electrical failure	Increasing storage capacity	Due to the location of the site, there is no generator on site. Experience has shown that it is faster to wait for Ergon Energy to attend the site rather than get an generator and attend site. Generators can be trucked to site	1/07/2029			Medium priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Principal Treatment Operations - Water & Wastewater	

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete
Giru/Cungulla Drinking Water Scheme	Protozoa (Crypto/Giardia) - Upset sludge blanket and carryover of solids	Full plant upgrade to allow reduction of system losses	Supernatant is not returned currently. Supernatant pump is a fixed rate flow, incoming raw flow is variable rate which could lead in excess of 10% return rate. Risk too high to return. Conservation required on how and who will pay for WTP upgrade	1/07/2030			High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Team Manager Water Resources & Dam Safety	
Northern Water Treatment Plant Townsville Supply Scheme	Fluoride (Overdose of fluoride form old infrastructure still in place at the plant)	Confirm old pipework has been removed and remove from schematics		1/12/2025			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	
	Protozoa (Crypto/Giardia) - Poorly protected catchment, raw water turbidity above 5NTU	Trility to change MF to UF across all documents, and to check source category on NWTP DWQMP		1/07/2026			High priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	
	Infrastructure Damage (Alkalinity)	Trility to formalise process of alkalinity testing at stabilisation plant and digitise to Sharepoint	There was monitoring completed for scaling index in the past, which in the long term can lead to significant infrastructure damage	1/07/2026			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	
	Bacteria/Virus - Overdose of lime/ underdose of CO2 = high pH impacting disinfection	Trility to review/ include a PCP for undosed and dosed pH control		1/07/2026			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	
	Loss of supply (Asset failure (i.e. raw water main or pump failure))	Develop levels of service framework	Commitment from council to continue implementing water security. Two pipes and can shut one off going in to plant. Run at a lower rate - loss of supply is rare	1/07/2027			Medium priority based on residual risk level determined from the risk assessment	Priority based on residual risk level determined from the risk assessment	Principal Treatment Operations - Water & Wastewater	
	Loss of Supply - Asset failure (raw water main or pump failure)	Options assessment for alternatives (e.g. new treatment plant, new water source)	Severe weather event in 2025 caused significantly damaged raw water intake and main, NWTP offline for 6 months. Capital investment to replace raw pipeline is very high, so TCC are assessing alternatives (other sources or treatment plants)	1/07/2027		In progress	High priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources and funding required	Team Manager Water Resources and Dam Safety	
	Trihalomethanes - High return rate of neutralised citric acid (reaction of DOC with chlorine)	Trility to conduct study on when THMFP >300 occurs and whether it correlates with CIPs	Organics - Return of Citric acid which is a precursor for THMs	1/07/2027			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	
	Impacts production - Ineffective CIP/ ineffective backwash	Trility to review PCP for CIPs		1/07/2027			High priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete
Northern Water Treatment Plant Townsville Supply Scheme	Bacteria/Virus - Underdose of chlorine, insufficient chlorine C.t	Trility to review C.t. monitoring alarms for PCP, review flow and tank level (trigger point where we are not achieving C.t.). Ensure C.t data does not get wiped. If C.t cannot be reached, consider restrictions or move monitoring point downstream?	C.t. may not be reached at times at the plant, however will be reached in the network prior to services. Consider moving C.t. monitoring point downstream if plant is continuously unable to reach optimal C.t	1/07/2027			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	
	Protozoa (Crypto/Giardia) - increased pathogens from supernatant return	Trility to add supernatant turbidity as a PCP		1/07/2027			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	
	Aluminium - High Al in supernatant returning to head of plant	Trility to investigate what is the source of the aluminium; what is the impact of returning?	Source could be from ACH dosing to the raw water or interruption during neutralisation	1/07/2027			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	
	Communication Loss - Poor service (Telstra), storms	Install Starlink	Consistent issues with Telstra services. Storms commonly cause communication issues	1/07/2027			High priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Principal Treatment Operations - Water & Wastewater	
	Protozoa (Crypto/Giardia) - Poorly protected catchment, raw water turbidity above 5NTU	Complete installation of UV system	Crypto requires Log 5 reduction, currently 4; Virus requires 6, currently 4	1/07/2029	Design Phase	In progress	High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	General Manager Water	
	Loss of Supply - Asset failure (raw water main or pump failure)	Renew Pipeline	Severe weather event in 2025 caused significantly damaged raw water intake and main, NWTP offline for 6 months. Capital investment to replace raw pipeline is very high, so TCC are assessing alternatives (other sources or treatment plants)	1/07/2029			High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	General Manager Water	
	Communication Loss - Poor service (Telstra), storms	Review communication options for stabilisation plant	Consistent issues with Telstra services. Storms commonly cause communication issues	1/07/2029			High priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources and funding required	Principal Treatment Operations - Water & Wastewater	
	Loss of Supply - Asset failure (raw water main or pump failure)	Dual raw water lines to treatment plant	Severe weather event in 2025 caused significantly damaged raw water intake and main, NWTP offline for 6 months. Capital investment to replace raw pipeline is very high, so TCC are assessing alternatives (other sources or treatment plants)	1/07/2030			High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	General Manager Water	

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete
Paluma Drinking Water Scheme	Protozoa (Crypto/Giardia) (recirculation) (Recirculated water increases risk of protozoan breakthrough)	Check the process and develop a procedure to target return at 5% of process flow. Develop OCP Procedure	Boil up of sludge placing a high challenge onto the process. Accumulation may occur in the sludge. At less than 10% dilution effect is sufficient to ensure that return does not impact treated water quality. ACH dosing into the feed to the clarifier. Optimising back end of process is important for water quality as well as ensuring the amount of	1/07/2025	No control over return. Extending production times or reducing flow or time of backwash (impacts effectiveness). ~20% return. More storage? Managing issue with UV, ultrafiltration, chlorination. See what HBT		High priority based on residual risk level determined from the risk assessment.	Can be completed with available resources/ funding.	Senior Water Systems Engineer	Parked
	Disinfection By-products - THMFP	Check what level firefighting requires in the reservoir		1/12/2025			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Operations Engineer	
	Pathogen - Recirculation	Look into DOC results of GAC to see whether we need a trigger point to backwash	GAC can be backwashed manually when required. DOC is reviewed to determine when required	1/12/2025			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	
	Disinfection By-products - THMs	Review THM and THMFP monitoring pre and post GAC to look at GAC performance		1/12/2025			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Water Quality Officer	
	Disinfection By-products - THMFP	Review the process including DOC and ACH dosing		1/07/2026			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	
	Disinfection By-products - THMFP	Develop hypo age calculator		1/07/2026			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Operations Engineer	
	Pathogen (Recirculation) (Poor performance of residuals handling and return of organics)	Install flow switch so sludge transfer pumps will alarm if they fail	Boil up of sludge placing a high challenge onto the process. Accumulation may occur in the sludge. At less than 10% dilution effect is sufficient to ensure that return does not impact treated water quality. ACH dosing into the feed to the clarifier. Optimising back end of process is important for water quality as well as ensuring the amount of waste produced is minimal	1/07/2026			Medium priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources required	Water Resources Engineer	
	Cyanobacterial Toxins	Continue BGA Sampling and review to determine if BGA management plan is necessary		1/07/2027	Ongoing		Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete
Paluma Drinking Water Scheme	Loss of Supply - Insufficient supply, drought	Develop potable water carting procedure	Most residential houses have rainwater tanks. Can supply bottled water most demand comes from school camps -Schools can take their own bottled water. Trucking has been done before; truck can fill to 5000 L	1/07/2027			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	
	Protozoa (Crypto/Giardia) (Failure of UV)	UV Fault Alarm to be included in SCADA project to see data	UV disinfection is effective at 63 mj/ cm2 for 2 log cysts and more than 4 log of the Trophozoite. Self Cleaning. Operators/maintenance pick up failed lamps and replace	1/07/2027			Medium priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources required	Water Operations Engineer	
	Bacteria/Virus - Underdose of chlorine, insufficient chlorine C.t	Online monitoring & control to SCADA for chlorine dosing pump	Residence time in water storages makes it unlikely that insufficient C.t. would be a concern. Daily Grab sampling of chlorine	1/07/2027			Medium priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources required	Water Operations Engineer	
	Protozoa (Crypto/Giardia) (recirculation) (Recirculated water increases risk of protozoan breakthrough)	Review the return volumes across the process and review the ratio of return to the production volume and Turbidity limit downstream	Zero liquid discharge site. World Heritage Site	1/07/2027			Medium priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources required	Water Resources Engineer	
	Iron - Total iron coming back to plant is more than 10x the raw water	Review of oxidation for supernatant return	Possible re-solubilisation of Iron through anoxic (low oxygen) conditions in sludge. Insufficient volume and concentration to impact final pH. Results indicate sol Fe in supernatant impacts raw water upon return, however it is oxidised by chlorination and is reflected only by small spikes in treated water	1/07/2027	Operators test supernatant turbidity and jar test from there to ensure optimal clarification for sludge. There would be spikes for online monitoring when plant is running because the clarifier is built too tall and thin. Unable to trigger any		Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Resources Engineer	
	Aesthetic (Colour above the ADWG of 15 HU causing dirty water complaints)	Investigate the impact of coagulation on the membrane fouling rate and cleaning interval	Coagulation is not always used due to fear of membrane fouling	1/07/2028	Can achieve ADWG without coagulation, HOWEVER coag may provide additional LRV. UV 7 for crypto, UF 3 IF filtrate turb <0.1 ntu for 95% of month	Old target date 01/06/2025	Low priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources required	Water Resources Engineer	

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete	
Paluma Drinking Water Scheme	Aesthetic (Colour above the ADWG of 15 HU causing dirty water complaints)	HBT Assessment	Coagulation is not always used due to fear of membrane fouling	1/07/2028			Low priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources required	Water Quality Officer		
	Chlorate (High Chlorate above the QLD Health guideline level of 0.8 mg/L for prolonged periods)	Investigate changing the chlorine disinfection to gas or electro generation		31/12/2028			Medium priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Water Operations Engineer		
Storage and Distribution	DBPs, pathogens, pH due to water age/stagnation	Update the flushing program	Water model for the network complete but needs some calibration. Can be greater than 9 days old in Northern part of TVE Network (in Arcadia). Trying to balance re-chlorination with THM formation. Flushing program to be informed by the model. Issue from Douglas WTP. Cleaning and asset inspections completed	1/12/2025	Chlorine results are documented after flushing. Water Retic flushing procedure stipulates testing chlorine residual after flushing, Currently working on	1/07/2025	High priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer/Team Leader Water Treatment		
	Chlorine overdose, DBPs - Failure in re-chlorination causes overdose, incorrect setting	NaOCl age and usage calculator	Create hypo age and usage calculator to track age, strength and chlorate contamination at rechlorination facilities	1/12/2025		1/07/2025	High priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Operations Engineer		
	Contamination of the network due to installation of new mains	Review procedures around installation of new main (both by contractors for acceptance by Council and Council installed mains upgrade projects)	Check sterilisation techniques, ensure testing chlorine residual is listed. See if any WQ testing is required. Check standards/codes for correct commissioning processes	1/12/2025	Under planning in DA approval conditions, inspections occur. When the asset team say the new main is ready, water unit start with flush and take residuals and put vales etc in place. Pipes are capped but not disinfected			High priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer/Team Manager Network Services	
	E.coli Detected at Magnetic Island Reservoirs	Picnic Bay and Arcadia Reservoir Roofs require temporary fix and permanent fix		1/12/2025	In progress; Picnic Bay Reservoir being repaired to be finished in June 2025. Arcadia offline indefinitely	1/07/2025		Yes	Team Manager Water Resources & Dam Safety		

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete	
Storage and Distribution	All Hazards - contamination from water carriers accessing the potable water network	List of access points for water carriers	Where customers can fill need to be put back on GIS Map or they call team leader to find out where they can fill from. All taking water are registered and use Council fill points. Drop with air gap. Filling stations have bollard around parking area but no swipe card with meter. Way is to hire a stand pipe. Council Roads will take and rural fire will take water from a standpipe. They hire stand pipes which have non return valves	1/01/2026			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Team Leader Water Treatment		
	Contamination of the network due to installation of new mains	Fit plumber crews with chlorine meters and train for use	Plumbers currently don't test for residual when flushing	1/01/2026			High priority based on residual risk level determined from the risk assessment	Pending	Team Leader Water Treatment		
	Annual external assessment of reservoirs including roof. Drones and submersibles used. Sites with ladders have a cage with bottom locked or the site is fenced. West End Reservoir is built in the hill but offline currently	Ensure the documented process for bringing disused reservoirs back on-line included risk assessment, improved security measures and water quality testing			1/01/2026	Currently in progress. Creating overarching procedures for commissioning disused and new reservoirs as process should be the same		Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Water Operations Engineer	
	Bacteria/Viruses - Contamination of reservoirs due to maintenance	Review procedures for Trades (tools, disinfection, aquacard)			1/01/2026			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Resources Engineer	
	All Hazards - contamination from water carriers accessing the potable water network	Need to ensure that licenced water carters are following code and document which hydrants they can take water from (for incident investigations). Investigate if SES/ Rural Fire Service Standpipe has back flow prevention. Connection is straight to hydrant		Where customers can fill need to be put back on GIS Map or they call team leader to find out where they can fill from. All taking water are registered and use Council fill points. Drop with air gap. Filling stations have bollard around parking area but no swipe card with meter. Way is to hire a stand pipe. Council Roads will take and rural fire will take water from a standpipe. They hire stand pipes which have non return valves	1/07/2026			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Team Leader Water Treatment	
	Reuse (Recycled water) connection to potable network	Tallis Street at the Stadium has at least one for the water and recycled water network. Ensure these are included in the list for annual checks. Develop a RW commissioning plan for the dual reticulation network		Stadium irrigation infrastructure is recycled pipework . Connection to network. This needs to be formalised. This is a cross connection that needs to be accounted for	1/07/2026			Medium priority based on residual risk level determined from the risk assessment	Recycled water plant yet to be commissioned. Some planning and project establishment/ resources required	Team Manager Network Services	Parked

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete
Storage and Distribution	Backflow Prevention	As constructed record the asset and then put on the schedule. However, non council owned RPZ are not on GIS. This maybe recorded somewhere. Need to check the process and where they are recorded so its known in the event of an incident. Check with Geoff Woodall	All BFP tested every 12 months. Plumbing inspectors check with grease traps etc as part of their inspections. Food, restaurants, industrial, sun metals has one. Previous issue with some customers removing parts inside the meter to get more water (so its not pressure limiting). Known issues in low pressure area being rectified. Meter replacement program. All applications come in to DA picks up through the system if needs a RPZ	1/07/2026	Check with Coordinator Hydraulics		Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Quality Officer	
	Pathogens - Poor water quality due to accumulation of particles, particularly at dead ends	Re-instate program review of network for removal of dead ends for preventative and reactive maintenance	In progress	1/07/2026		In progress	Medium priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources required	Team Manager Network Services	
	Disinfection Byproducts, pathogens, taste & odour, pH from increased water age, dead ends and stagnation	Calibrate/update water age model	The detail water model needs to be reviewed and updated to allowed for optimised water levels in reservoirs reducing THM formation and to assist targeted flushing program. Provide adequate resourcing for keeping the model current and up to date and allow linkages to water quality data	1/07/2026			High priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources and funding required	Water Operations Engineer	
	Manual dosing of reservoirs occurs. There is some variation in the concentration of chlorine used	Review a procedure for manual dosing including calculations with concentration of hypo, dilution rates and quantity	Develop a procedure with a look up table, volume, increase in residual and plug in strength of hypo. Complete hypo strength test in the morning. Pumps on tanks need to be running when dosing	1/12/2026			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Operations Engineer	
	All Hazards - unable to react to water quality incident or outbreak in a timely manner due to remoteness of Magnetic Island	Implement additional SCADA integration in Magnetic Island for online monitoring		1/01/2027			Medium priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources required	Water Resources Engineer	
	Chlorine overdose, DBPs - Failure in re-chlorination causes overdose, incorrect setting	Electrochlorination	Investigate small scale electrochlorination for low-usage rechlorination facilities, Giru and Paluma	1/01/2027			High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Principal Treatment Operations - Water & Wastewater	

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete
Storage and Distribution	Bacteria/Viruses - Contamination of reservoirs due to maintenance	Review the contract for companies working in reservoirs to require providers to have QLD Water Blue Card before working on reservoirs and obligation to disinfect before work and maintain water quality. This should be written into the scope of work	If an issue is raised with an internal clean, this may also raise further inspection to be completed. Post storm inspections completed. Use external plumbers for whirly birds repair quickly. Trility take own reservoirs offline and then use divers and then sterilize and have procedures for bringing online Test	1/07/2027			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Operations Engineer	
	Manual dosing of reservoirs occurs. There is some variation in the concentration of chlorine used	Increase number of chlorine dosing units		1/01/2028	Ongoing		Medium priority based on residual risk level determined from the risk assessment	Scheduled as part of a rolling capital works program which is renewed in the budget each year but is prioritised based on risk and need	Water Resources Engineer	
	Manual dosing of reservoirs occurs. There is some variation in the concentration of chlorine used	Complete program of works for Brookhill, Arcadia, Mt Margaret and all hand dosed reservoirs to install chemical doing system. Remove the need to manually dose reservoirs	Mt Margaret No manual handling as have pump system. New inlet main by 2024/2025. Ponti Road, design for recirc system design finish 24/25, construct 25/26, Arcadia same as Ponti, Brookhill same again	1/12/2028	Ongoing		Medium priority based on residual risk level determined from the risk assessment	Scheduled as part of a rolling capital works program which is renewed in the budget each year but is prioritised based on risk and need	Water Operations Engineer	
	Bacteria/Viruses - Ingress into reservoirs	Roof replacement program. Within 5 years will get drone inspections rolling for all reservoirs. Develop OCP Procedures for Reservoir Integrity	Tanks/Reservoirs are sealed, no adjacent trees. Inspections completed quarterly due to short staff maintenance person. Cleaned yearly. Reported in TechOne. OFI from 2024 DWQMP Audit	1/12/2028			Medium priority based on residual risk level determined from the risk assessment	Reservoir roof renewals are scheduled as part of a rolling capital works program which is renewed in the budget each year but is prioritised based on risk and need	Team Manager Water Resources & Dam Safety	
	Trihalomethanes - due to insufficient contact time or increased water age in reservoirs that are filled through outlets degrading water quality	Ensure there is a program for reservoirs with common inlet/ outlets to be upgraded with separate apertures	Can be greater than 9 days old in Northern part of TVE Network (in Arcadia). Trying to balance re-chlorination with THM formation. Flushing program to be informed by the model. Cleaning and asset inspections completed. Only 5 incidents of THM breaches in reservoirs over last 5 years	31/12/2028	Program of works for reservoir repairs/ refurbishment		Medium priority based on residual risk level determined from the risk assessment	Scheduled as part of a rolling capital works program which is renewed in the budget each year but is prioritise	Water Operations Engineer	

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete
Storage and Distribution	All Hazards	Formalise discussion with operations / strategic planning. Strategic Planning to consider Water Quality Issues as a high priority developing or making changes to long term plans. Needs to be included in 10 year plan	Planning needs to consider water quality as part of development approvals	31/12/2028			High priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Principal Treatment Operations - Water & Wastewater	
	Pathogens from resuspension (change of flow direction in network), chlorine overdose due to incorrect setting/failure of dosing	Increase visibility on network analysers.	Flushing crews have handheld chlorine analysers. Network monitoring detects breaks (more likely to have break that requires isolation.) Interacting zone may have to adjust	31/12/2028		Trility have a contract fly drone over rooves on an annual basis. Flow based on operation CWT at Douglas and Northern. Annual maintenance cleaned out of CWTs	Medium priority based on residual risk level determined from the risk assessment	Significant planning and project establishment, resources and funding required	Water Resources Engineer	
	Contamination of the network due to installation of new mains	Inspect subdivisions, initial planning and development approvals. How far is it enforced?				Check with Coordinator Hydraulics	Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Water Operations Engineer	

Whole of system	Supply to areas outside of Councils jurisdiction (Burdekin Shire Council & Port)	Document in both DWQMP's to have meetings twice a year between water unit staff (once before and once after wet season)	Document formalised meetings	1/07/2025	Communication protocol between both councils is listed in the Giru Water Supply Agreement		Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Water Quality Officer	Complete
	Expired standards/reagents leads to incorrect jar test results or incorrect calibration of analysers (insufficient or too much chemical)	Formalise the management of shelf lives for certified reference standards and reagents used for benchtop monitoring instruments. Record expiry date of calibration standard when calibrating	OFI #3 from 2024 Audit	1/07/2025	Expiry dates added to calendars. Dates are also more visible on standard sets		Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Team Leader Water Treatment	Complete

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete	
Whole of system	Inadequate response time to an incident leads to further complications or increases the severity of the incident	Check the IERP include a process step to check construction drawings and GIS	24 hour call system. Water quality complains all got through to Water Quality Area (incl after hours on call). Townsville PH unit have on call have hours. If someone doesn't answer automatically escalates. Handover from PMO to Asset Compliance can take 6 months from completion of capital project. Then GIS takes 2 months. Asset Compliance team need to review handover to ensure quality, then digitise everything	1/12/2025		1/01/2025	Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Team Manager Water Resources & Dam Safety		
	All hazards - Poor record keeping leads to information being missed resulting in a water quality incident	Implement QEMS		1/01/2026			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/ funding	Coordinator Compliance Water		
	Actions by disgruntled employees or contractors leading to malicious damage resulting in poor water quality	Need to review and reduce the number of keys in the system or switch to electronic key system	Security of Critical Infrastructure		1/01/2026	TCC review the key register. This risk has been added to the Operational Risk Register. Key register has been formalised		Medium priority based on residual risk level determined from the risk assessment	Cannot be completed quickly, huge capital job to replace all keys	Team Manager Water Resources & Dam Safety	
	All hazards - Poor asset planning leads to treatment or network failure or water quality event	Liaise with strategy team. WQ included in corporate risk. Water planning report and long term asset infrastructure plan and strategic view needs whole of life cost and impact on water quality. Integrated water management strategy			1/01/2026			High priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources and funding required	Water Quality Officer	
	All hazards - Lack of planning between Trility and TCC	Clarity on ultimate responsibility in TCC. Coordination of departments internally. Ensure all future planning and development activities include communications to Trility (documentation)		If there is no communications between Trility and TCC in relation to major maintenance (e.g. critical reservoir isolations, module offline, etc.) then capacity or WQ issues may result. Issues with limited storage, limited treatment capacity, lack of resources (staff) new projects	1/07/2026			Medium priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources required	Principal Treatment Operations - Water & Wastewater	

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete
Whole of system	Loss of supply due to power failure	Disaster relief funding arrangement: 33 sites to receive generators	Well rehearsed with cyclones, floods and bushfires in recent years, calling up emergency response plans. Yassi had 30 hours without power and still kept supply up. Douglas generator back up can only produce 35 ML/day. Northern can do full production of 40 ML/day. Douglas has an alternate supply. Generators can do plant and other supply to HP Pumps. All maintained monthly	1/01/2027			Medium priority based on residual risk level determined from the risk assessment	Government funding - \$2,098,000	Principal Treatment Operations - Water & Wastewater	
	All hazards - Insufficient operators and staff including experienced IT/SCADA staff members	Increased automation and monitoring		1/01/2027			High priority based on residual risk level determined from the risk assessment	Some planning and project establishment/resources and funding required	Water Resources Engineer	
	All hazards - Failure of telemetry system, resulting in delayed response and poor water quality	Improve or install peer to peer communications on relevant sites		1/01/2027			Medium priority based on residual risk level determined from the risk assessment	Some planning and project establishment/resources and funding required	Water Resources Engineer	
	Heavy Metals - Contaminated treatment chemicals & impurities	TCC, Trility & Edgar: risk assess individual chemical testing for frequency and requirements as per Chapter 8 ADWG		1/07/2027			Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources	Water Quality Officer	
	Inappropriately skilled Water Operators	Succession planning- Some information is not documented and is kept with individuals. Develop a recruitment plan to include succession planning	Water Services involved in projects with QldWater directorate to look at this as an industry	31/12/2027	Realignment of WS with new positions added. However there are issues within the industry for recruitment and retention of trained water operators, trades peoples and Engineers		Medium priority based on residual risk level determined from the risk assessment	Can be completed with available resources/funding	General Manager TWRR	Ongoing

Scheme Name	Description of Risk or Hazardous Event	Improvement Action	Comments	Target Date	Actions taken to Date	Status and revised Target Date	Rationale for Implementation	Availability of funding	Responsible Officer	Complete
Whole of system	All hazards - inappropriately skilled operators	Upskill staff in water quality management and operational roles through boosting continuing professional development and professional networking to provide TCC with enhanced expertise and access to the broader community of practice. Membership to industry organisations (Water RA, WIOA). Continual professional development. QLD water directorate, Trility training	OFI #4 from 2024 Audit	1/01/2028	Ongoing		Medium priority based on residual risk level determined from the risk assessment	Some planning and project establishment/ resources required	Team Manager Water Resources & Dam Safety	
	All hazards - Insufficient operators and staff including experienced IT/ SCADA staff members	Fill currently vacant positions and support retention of staff		1/01/2028	Ongoing		High priority based on residual risk level determined from the risk assessment	Ongoing	General Manager Water	
	Loss of integrity in pipes/ treatment systems not working correctly due to aging assets and infrastructure	Mapping system improvements showing valves and live information on which valves are currently open for the benefit of Ops Centre and operators	Massive undertaking - Nice to have but not feasible. Critical valves are on GIS. Valve boxes are painted red (closed) blue (open) on the ground so that crews and operators can determine if they are open and closed	31/12/2028	No capacity to complete this. Investigate a register within operations		Medium priority based on residual risk level determined from the risk assessment	Parked	Bulk Water Engineer	Parked
	Loss of supply - insufficient reservoir capacity	Increase network redundancy (such as Kulburn) to improve storage capacity		1/01/2030			Medium priority based on residual risk level determined from the risk assessment	Significant planning and project establishment/ resources and funding required	Team Manager Water Resources & Dam Safety	

Appendix B.

Drinking Water Quality Performance

Verification Monitoring

Townsville Water Services would like to thank all the employees of Townsville Laboratory Services (Scientific Services) for their ongoing hard work and constant support with source and drinking water verification monitoring. Townsville Scientific Services underwent a full NATA re-assessment audit for chemical and biological accreditation in early 2025. All the audit findings have been addressed including the expansion of the scope of accreditation to include the expanded fleet of nutrient analysers. The staff have been commended by the auditors for their professionalism and technical competency during the audit and in their management of the tests and documentation.

The Scientific Services team is also involved in several research partnerships with universities in areas of PFAS, biosolids and blue-green algae. The team continues to perform above and beyond in their constant dedication in advancing their capabilities and providing excellent service for WS and the community.



Giru/Cungulla Drinking Water Scheme

Scheme Component	Parameter Category	Parameter	Unit of Measure	Limit of Reporting (LOR)	Count	# of Samples Detected	# Exceed ADWG Guidelines Value	Min Value	Max Value	Avg Value	95th %tile	Comments	
Source Water Giru Raw Water (Haughton River)	Thermotolerant Coliforms	Total Coliform	MPN/100ml	1	50	50	0	10	24,200	2992	24,200		
	Thermotolerant Coliforms	E.coli	MPN/100ml	1	50	16	0	<LOR	231	20	137		
	Turbidity	Turbidity	NTU	0.1	50	50	0	0.64	56.1	10.2	44.9		
	pH	pH	pH Units	1	50	50	0	6.72	8.69	7.52	8.13		
	Metals	Iron, Total	mg/L	0.002	50	50	0	0.003	3.1	0.606	2.655		
	Metals	Manganese, Total	mg/L	0.0003	50	50	0	0.002	0.13	0.03	0.09		
	Pesticides	Pesticides	µg/L	Varied by pesticide	12	0	0	<LOR	<LOR	<LOR	<LOR	<LOR	No pesticides were detected for the reporting period.
	PFAS Compounds	Perfluorooctanoic acid (PFOA)	µg/L	0.002	3	0	0	<LOR	<LOR	<LOR	<LOR	<LOR	
	PFAS Compounds	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.002	3	0	0	<LOR	<LOR	<LOR	<LOR	<LOR	
	PFAS Compounds	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.005	3	0	0	<LOR	<LOR	<LOR	<LOR	<LOR	
PFAS Compounds	Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	3	0	0	<LOR	<LOR	<LOR	<LOR	<LOR		
Water Treatment Plant Giru Clear Water Storage	Thermotolerant Coliforms	Total Coliform	CFU/100ml	1	50	1	0	<LOR	910	18.2	<LOR	The detection of total coliforms was resampled and confirmed <LOR.	
	Thermotolerant Coliforms	E.coli	CFU/100ml	1	50	0	0	<LOR	<LOR	<LOR	<LOR		
	Turbidity	Turbidity	NTU	0.1	50	39	0	<LOR	0.8	0.16	0.48		
	pH	pH	pH Units	1	50	50	0	6.72	7.67	7.19	7.50		
	Colour	Colour, Apparent	Pt-Co Units	2	50	29	0	<LOR	4	<LOR	3		
	Metals	Aluminium, Total	mg/L	0.01	50	50	0	0.02	0.26	0.070	0.16		
	Metals	Calcium, Total	mg/L	0.7	50	50	0	5.5	27.6	13.0	23.2		
	Metals	Copper, Total	mg/L	0.002	50	2	0	<LOR	0.007	<LOR	<LOR		
	Metals	Iron, Total	mg/L	0.002	50	28	0	<LOR	0.092	0.004	0.006		
	Metals	Lead, Total	mg/L	0.0006	50	0	0	<LOR	<LOR	<LOR	<LOR		
	Metals	Magnesium, Total	mg/L	0.5	50	50	0	2.4	12.7	3.3	10.9		
	Metals	Manganese, Total	mg/L	0.0003	50	50	0	0.0004	0.02	0.0037	0.0091		
	Metals	Zinc, Total	mg/L	0.001	50	21	0	<LOR	0.012	0.001	0.003		
	Pesticides	Pesticides	µg/L	Varied by pesticide	12	0	0	<LOR	<LOR	<LOR	<LOR	<LOR	No pesticides were detected for the reporting period.
	PFAS Compounds	Perfluorooctanoic acid (PFOA)	µg/L	0.002	3	0	0	<LOR	<LOR	<LOR	<LOR	<LOR	
	PFAS Compounds	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.002	3	0	0	<LOR	<LOR	<LOR	<LOR	<LOR	
PFAS Compounds	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.005	3	0	0	<LOR	<LOR	<LOR	<LOR	<LOR		
PFAS Compounds	Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	3	0	0	<LOR	<LOR	<LOR	<LOR	<LOR		

Giru/Cungulla Drinking Water Scheme

Scheme Component	Parameter Category	Parameter	Unit of Measure	Limit of Reporting (LOR)	Count	# of Samples Detected	# Exceed ADWG Guidelines Value	Min Value	Max Value	Avg Value	95th %tile	Comments
Cungulla Transmission Cungulla Reservoir	Thermotolerant Coliforms	Total Coliform	CFU/100ml	1	51	0	0	<LOR	<LOR	<LOR	<LOR	
	Thermotolerant Coliforms	E.coli	CFU/100ml	1	51	0	0	<LOR	<LOR	<LOR	<LOR	
	Turbidity	Turbidity	NTU	0.1	51	51	0	0.1	0.4	0.2	0.3	
	pH	pH	pH Units	1	51	51	0	7.21	7.93	7.62	7.89	
	Disinfection Residual	Chlorine (free)	mg/L	0.05	51	51	0	0.25	1.92	1.34	1.80	
	Disinfection Residual	Chlorine (Total)	mg/L	0.05	51	51	0	0.27	1.97	1.39	1.81	
	Alkalinity	Alkalinity	mg CaCO3/L	5	51	51	0	15.46	93.02	48.4	90.09	
	Colour	Colour, Apparent	Pt-Co Units	1	51	28	0	<LOR	3	<LOR	2	
	Metals	Aluminium, Total	mg/L	0.01	51	51	0	0.02	0.13	0.05	0.09	
	Metals	Calcium, Total	mg/L	0.7	51	51	0	6.1	24.7	13.2	23.8	
	Metals	Copper, Total	mg/L	0.002	51	10	0	<LOR	0.01	<LOR	0.003	
	Metals	Iron, Total	mg/L	0.002	51	34	0	<LOR	0.008	0.002	0.005	
	Metals	Lead, Total	mg/L	0.0006	51	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Magnesium, Total	mg/L	0.5	51	51	0	2.8	11.3	6.3	10.6	
	Metals	Manganese, Total	mg/L	0.0003	51	50	0	<LOR	0.005	0.0009	0.003	
	Metals	Zinc, Total	mg/L	0.001	51	48	0	<LOR	0.008	0.002	0.01	
	Disinfection By products	Chlorates	µg/L	50	12	12	0	190	565	320	550	
	Disinfection By products	Trihalomethanes	µg/L	8	51	51	0	22	55	38	52	
	MIB	MIB	ng/L	2	51	1	0	<LOR	2	<LOR	<LOR	
Geosmin	Geosmin	ng/L	2	51	4	0	<LOR	2	<LOR	2		

Giru/Cungulla Drinking Water Scheme

Scheme Component	Parameter Category	Parameter	Unit of Measure	Limit of Reporting (LOR)	Count	# of Samples Detected	# Exceed ADWG Guidelines Value	Min Value	Max Value	Avg Value	95th %tile	Comments	
Cungulla	Reticulation Cungulla Houses	Thermotolerant Coliforms	Total Coliform	CFU/100ml	1	102	0	0	<LOR	<LOR	<LOR	<LOR	
		Thermotolerant Coliforms	E.coli	CFU/100ml	1	102	0	0	<LOR	<LOR	<LOR	<LOR	
		Turbidity	Turbidity	NTU	0.1	102	95	0	<LOR	4	0	0.59	
		pH	pH	pH Units	1	102	102	0	7.11	7.83	7.49	7.76	
		Disinfection Residual	Chlorine (free)	mg/L	0.05	102	102	0	0.56	2.11	1.20	1.68	
		Disinfection Residual	Chlorine (Total)	mg/L	0.05	102	102	0	0.62	2.16	1.25	1.74	
		Alkalinity	Alkalinity	mg CaCO3/L	5	51	51	0	15.75	93.18	48.99	90.36	
		Colour	Colour, Apparent	Pt-Co Units	1	51	27	0	<LOR	6	<LOR	2.50	
		Metals	Aluminium, Total	mg/L	0.01	51	50	0	<LOR	0.23	0.05	0.15	
		Metals	Calcium, Total	mg/L	0.7	51	51	0	6.4	24.8	13.6	24.40	
		Metals	Copper, Total	mg/L	0.002	51	25	0	<LOR	0.005	<LOR	0.00	
		Metals	Iron, Total	mg/L	0.002	51	46	0	<LOR	0.04	0.006	0.02	
		Metals	Lead, Total	mg/L	0.0006	51	1	0	<LOR	0.0006	<LOR	<LOR	
		Metals	Magnesium, Total	mg/L	0.5	51	51	0	2.8	11.6	6.2	10.60	
		Metals	Manganese, Total	mg/L	0.0003	51	32	0	<LOR	0.02	0.001	0.006	
		Metals	Zinc, Total	mg/L	0.001	51	51	0	0.003	0.011	0.005	0.008	
		Disinfection By products	Trihalomethanes	µg/L	8	51	51	0	40	88	54	73.000	
		MIB	MIB	ng/L	2	51	2	0	<LOR	2	<LOR	<LOR	
Geosmin	Geosmin	ng/L	2	51	4	0	<LOR	2	<LOR	2			

<LOR – Less than Limit of reporting

ND – Not Detected

Paluma Drinking Water Scheme

Scheme Component	Parameter Category	Parameter	Unit of Measure	Laboratory Limit of Reporting (LOR)	Count	# of Samples Detected	# Exceed ADWG Guidelines Value	Min Value	Max Value	Avg Value	95th %tile	Comments
Source Water Paluma Weir	Thermotolerant Coliforms	Thermotolerant Coliforms	CFU/100ml	1	12	12	0	12	3100	413	1868	
	Thermotolerant Coliforms	E.coli	MPN/100ml	1	7	7	0	10	1900	394	1450	
	pH	pH	pH Units	1	12	12	0	5.47	6.43	6.02	6.39	
	Metals	Iron, Total	mg/L	0.002	12	12	0	0.33	1.1	0.63	1.03	
	Metals	Manganese, Total	mg/L	0.0003	12	12	0	0.01	0.03	0.02	0.03	
	Turbidity	Turbidity	NTU	0.1	12	12	0	1.8	32.8	5.9	18.2	
	Cryptosporidium	Cryptosporidium	cells/10 Li	1	1	0	0	<LOR	<LOR	<LOR	<LOR	
	Giardia	Giardia	cells/10 Li	1	1	0	0	<LOR	<LOR	<LOR	<LOR	
	PFAS Compounds	Perfluorooctanoic acid (PFOA)	µg/L	0.002	4	0	0	<LOR	<LOR	<LOR	<LOR	
	PFAS Compounds	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.002	4	0	0	<LOR	<LOR	<LOR	<LOR	
Water Treatment Plant (Membrane Filtered Water)	PFAS Compounds	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.005	4	0	0	<LOR	<LOR	<LOR	<LOR	
	PFAS Compounds	Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	4	0	0	<LOR	<LOR	<LOR	<LOR	
	pH	pH	pH Units	1	34	34	0	6.37	6.98	6.77	6.95	
	Turbidity	Turbidity	NTU	0.1	34	23	0	<LOR	0.9	0.2	0.4	
Transmission Paluma Reservoir	Colour	Colour, true	Pt-Co Units	1	34	16	0	<LOR	17	2	7	
	Colour	Colour, apparent	Pt-Co Units	1	34	26	0	<LOR	19	4	8	
	Thermotolerant Coliforms	Total Coliform	CFU/100ml	1	7	1	0	<LOR	7	1	4.9	
	Thermotolerant Coliforms	E.coli	CFU/100ml	1	43	0	0	<LOR	<LOR	<LOR	<LOR	
	Disinfection Residual	Chlorine (free)	mg/L	0.05	41	41	0	0.25	1.78	1.2	1.64	
	Disinfection Residual	Chlorine (total)	mg/L	0.05	41	41	0	0.15	1.98	1.23	1.69	
	pH	pH	pH Units	1	43	43	0	6.71	7.33	6.96	7.17	
	Turbidity	Turbidity	NTU	0.1	60	60	0	0.1	1.9	0.44	1.31	
	Colour	Colour, apparent	Pt-Co Units	1	43	31	0	<LOR	12	3	7	
	Alkalinity	Alkalinity	mg CaCO3/L	5	7	7	0	14.75	25.76	17.59	23.72	
	Metals	Aluminium, Total	mg/L	0.01	43	9	0	<LOR	0.03	<LOR	0.02	
	Metals	Calcium, Total	mg/L	0.7	7	7	0	2.1	3.9	2.8	3.9	
	Metals	Copper, Total	mg/L	0.002	7	7	0	0.003	0.012	0.006	0.011	
	Metals	Iron, Total	mg/L	0.002	43	43	0	0.01	0.17	0.04	0.12	
	Metals	Magnesium, Total	mg/L	0.5	7	7	0	0.5	0.9	0.6	0.8	
	Metals	Manganese, Total	mg/L	0.0003	43	43	0	0.001	0.03	0.008	0.02	
	Metals	Lead, Total	mg/L	0.0006	43	2	0	<LOR	0.0017	<LOR	<LOR	
	Metals	Zinc, Total	mg/L	0.001	7	7	0	0.007	0.041	0.016	0.035	
	Disinfection By-product	Bromate	µg/L	10	42	1	0	<LOR	13	<LOR	<LOR	
	Disinfection By-product	Chlorates	µg/L	50	7	7	0	205	484	324	481	
	Disinfection By-product	Trihalomethanes	µg/L	8	7	6	0	<LOR	121	31	93	
	PFAS Compounds	Perfluorooctanoic acid (PFOA)	µg/L	0.002	3	0	0	<LOR	<LOR	<LOR	<LOR	
	PFAS Compounds	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.002	3	0	0	<LOR	<LOR	<LOR	<LOR	
	PFAS Compounds	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.005	3	0	0	<LOR	<LOR	<LOR	<LOR	
	PFAS Compounds	Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	3	0	0	<LOR	<LOR	<LOR	<LOR	

Paluma Drinking Water Scheme

Scheme Component	Parameter Category	Parameter	Unit of Measure	Laboratory Limit of Reporting (LOR)	Count	# of Samples Detected	# Exceed ADWG Guidelines Value	Min Value	Max Value	Avg Value	95th %tile	Comments
Reticulation Paluma Houses	Thermotolerant Coliforms	E.coli	CFU/100ml	1	55	0	0	<LOR	<LOR	<LOR	<LOR	
	Disinfection Residual	Chlorine (free)	mg/L	0.05	54	54	0	0.19	2.05	1.04	1.57	
	Disinfection Residual	Chlorine (total)	mg/L	0.05	54	54	0	0.24	2.45	1.09	1.64	
	pH	pH	pH Units	1	55	55	0	6.63	8.92	7.68	8.49	
	Turbidity	Turbidity	NTU	0.1	55	53	0	<LOR	0.8	0.3	0.6	
	Alkalinity	Alkalinity	mg CaCO3/L	5	19	19	0	17.78	32.74	22.27	31.71	
	Colour	Colour, apparent	Pt-Co Units	1	55	47	0	<LOR	12	3	9	
	Metals	Aluminium, Total	mg/L	0.01	55	37	0	<LOR	0.03	0.01	0.02	
	Metals	Calcium, Total	mg/L	0.7	19	19	0	3.3	8.3	5.4	7.6	
	Metals	Copper, Total	mg/L	0.002	19	16	0	<LOR	0.008	0.00	0.008	
	Metals	Iron, Total	mg/L	0.002	55	55	0	0.03	0.18	0.07	0.15	
	Metals	Magnesium, Total	mg/L	0.5	19	1	0	<LOR	0.5	<LOR	<LOR	
	Metals	Manganese, Total	mg/L	0.0003	55	55	0	0.0008	0.03	0.006	0.0200	
	Metals	Lead, Total	mg/L	0.0006	19	3	0	<LOR	0.001	<LOR	0.0006	
	Metals	Zinc, Total	mg/L	0.001	19	19	0	0.002	0.022	0.009	0.018	
	Fluoride	Fluoride (naturally occurring)	mg/L	0.02	19	18	0	<LOR	0.09	0.07	0.08	
	Disinfection By-product	Bromate	µg/L	10	53	2	0	<LOR	12	<LOR	<LOR	
	Disinfection By-product	Trihalomethanes	µg/L	8	19	15	0	<LOR	152	31	130	
Disinfection By-product	Chlorates	µg/L	50	19	19	0	203	523	320	500		

<LOR – Less than Limit of reporting

ND – Not Detected

Townsville Drinking Water Scheme

Scheme Component	Parameter Category	Parameter	Unit of Measure	Limit of Reporting (LOR)	Count	# of samples detected	# DW Guidelines Value	Min Value	Max Value	Avg Value	95th %tile	Comments
Source Water Ross River Dam	Thermotolerant Coliforms	Total Coliforms	MPN/100ml	1	193	193	0	122	24,200	4574	24,200	
	Thermotolerant Coliforms	E.coli	MPN/100ml	1	193	36	0	<LOR	281	9	45	
	Turbidity	Turbidity	NTU	0.1	736	736	0	2.8	38.3	9.0	12.2	
	pH	pH	pH Units	1	1139	1139	0	3.9	9.86	7.26	8.36	
	Metals	Iron, Total	mg/L	0.002	1139	1139	0	0.11	2.1	0.39	0.89	
	Metals	Manganese, Total	mg/L	0.0003	1139	1139	0	0.01	0.57	0.07	0.14	
	Metals	Mercury, Total	mg/L	0.0003	193	2	0	<LOR	0.0004	<LOR	<LOR	
	Metals	Lead, Total	mg/L	0.0006	1139	40	0	<LOR	0.0055	<LOR	<LOR	
	Anions	Oxidised Nitrogen as N	mg/L	0.01	736	138	0	<LOR	0.1	<LOR	0.03	
	Cyanobacteria	Blue-Green Algae Biovolume	mm3/L	0.01	629	629	0	0.07	22.27	7.73	15.77	
	PFAS Compound	Perfluorooctanoic acid (PFOA)	µg/L	0.002	35	0	0	<LOR	<LOR	<LOR	<LOR	
	PFAS Compound	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.002	35	0	0	<LOR	<LOR	<LOR	<LOR	
	PFAS Compound	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.005	35	0	0	<LOR	<LOR	<LOR	<LOR	
	PFAS Compound	Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	35	0	0	<LOR	<LOR	<LOR	<LOR	
Source Water Paluma Dam	Total Coliforms	Total Coliforms	MPN/100ml	1	86	86	0	98	1,660	430	1138	Paluma Dam was unable to be sampled from February 2025 to June 2025 due to no access from a severe weather event. Reported to the regulator: DWI-506-25-11890.
	E.coli	E.coli	MPN/100ml	1	86	17	0	<LOR	52	4	31	
	Turbidity	Turbidity	NTU	0.1	93	93	0	0.9	9.9	1.5	2.7	
	pH	pH	pH Units	1	93	93	0	4.95	6.96	5.81	6.45	
	Iron, Soluble	Iron, Soluble	mg/L	0.002	86	86	0	0.15	5.5	0.50	2.03	
	Manganese, Soluble	Manganese, Soluble	mg/L	0.0003	86	86	0	0.006	0.14	0.02	0.08	
	Oxidised Nitrogen as N	Oxidised Nitrogen as N	mg/L	0.01	93	4	0	<LOR	0.02	<LOR	<LOR	
	Perfluorooctanoic acid (PFOA)	Perfluorooctanoic acid (PFOA)	µg/L	0.002	18	0	0	<LOR	<LOR	<LOR	<LOR	
	Perfluorooctane sulfonic acid (PFOS)	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.002	18	0	0	<LOR	<LOR	<LOR	<LOR	
	Perfluorohexane sulfonic acid (PFHxS)	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.005	18	0	0	<LOR	<LOR	<LOR	<LOR	
Perfluorobutane sulfonic acid (PFBS)	Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	18	0	0	<LOR	<LOR	<LOR	<LOR		

Townsville Drinking Water Scheme

Scheme Component	Parameter Category	Parameter	Unit of Measure	Limit of Reporting (LOR)	Count	# of samples detected	# DW Guidelines Value	Min Value	Max Value	Avg Value	95th %tile	Comments
Water Treatment Plant Douglas WTP Raw Water	Thermotolerant Coliforms	Total Coliforms	MPN/100ml	1	99	98	0	<LOR	>24,200	3,395	14,680	
	Thermotolerant Coliforms	E.coli	MPN/100ml	1	100	20	0	<LOR	1,870	26	21	
	Turbidity	Turbidity	NTU	0.1	362	362	0	2.0	148.0	10.1	26.1	
	pH	pH	pH Units	1	362	362	0	6.61	8.89	7.41	8.17	
	Anions	Sulphate	mg/L	0.5	12	8	0	<LOR	3.2	0.8	2.6	
	Metals	Iron, Total	mg/L	0.002	52	52	0	0.08	1.6	0.43	1.28	
	Metals	Manganese, Total	mg/L	0.0003	52	52	0	0.02	0.12	0.05	0.09	
	Geosmin/ MIB	Geosmin	ng/L	2	153	141	0	<LOR	12	5	10	
	Geosmin/ MIB	MIB	ng/L	2	153	137	0	<LOR	30	10	23	
	Fluoride	Fluoride (Naturally occurring)	mg/L	0.02	52	52	0	0.04	0.11	0.08	0.11	
	Metals	Arsenic, Total	mg/L	0.001	4	4	0	0.0008	0.002	0.0012	0.0019	
	Metals	Selenium, Total	mg/L	0.001	4	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Mercury, Total	mg/L	0.0006	4	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Cadmium, Total	mg/L	0.0001	4	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Nickel, Total	mg/L	0.001	4	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Chromium, Total	mg/L	0.001	4	2	0	<LOR	0.001	<LOR	0.001	
	Cyanobacteria Toxin	Cylindrospermopsin	µg/L	0.03	145	142	0	<LOR	3.47	1.24	2.96	
	Giardia	Giardia	cysts/100ml	1	3	0	0	<LOR	<LOR	<LOR	<LOR	
	Cryptosporidium	Cryptosporidium	oocysts/10L	1	3	0	0	<LOR	<LOR	<LOR	<LOR	

Townsville Drinking Water Scheme

Scheme Component	Parameter Category	Parameter	Unit of Measure	Limit of Reporting (LOR)	Count	# of samples detected	# DW Guidelines Value	Min Value	Max Value	Avg Value	95th %tile	Comments
Water Treatment Plant Douglas WTP Treated Water	Thermotolerant Coliforms	Total Coliforms	cfu/100ml	1	134	0	0	<LOR	<LOR	<LOR	<LOR	
	Thermotolerant Coliforms	E.coli	cfu/100ml	1	134	0	0	<LOR	<LOR	<LOR	<LOR	
	Disinfection Residual	Chlorine, free	mg/L	0.05	675	675	0	1.7	4.48	3.11	3.62	
	Turbidity	Turbidity	NTU	0.1	690	678	0	<LOR	0.3	0.10	0.2	
	pH	pH	pH Units	1	678	678	0	7.35	7.75	7.55	7.65	
	Anions	Sulphate	mg/L	0.5	15	9	0	<LOR	3	0.72	2.23	
	Anions	Oxidised Nitrogen as N	mg/L	0.01	15	11	0	<LOR	0.09	0.04	0.09	
	Metals	Iron, Total	mg/L	0.002	136	52	0	<LOR	0.07	0.002	0.007	
	Metals	Manganese, Total	mg/L	0.0003	73	51	0	<LOR	0.005	0.0005	0.001	
	Metals	Aluminium, Total	mg/L	0.01	507	507	0	0.014	0.12	0.04	0.06	
	Fluoride	Fluoride	mg/L	0.02	507	507	0	0.07	0.79	0.59	0.69	
	Metals	Copper, Total	mg/L	0.002	15	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Zinc, Total	mg/L	0.001	15	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Arsenic, Total	mg/L	0.001	7	5	0	<LOR	0.002	0.001	0.002	
	Metals	Selenium, Total	mg/L	0.001	7	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Mercury, Total	mg/L	0.0006	7	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Cadmium, Total	mg/L	0.0001	7	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Nickel, Total	mg/L	0.001	7	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Chromium, Total	mg/L	0.001	7	0	0	<LOR	<LOR	<LOR	<LOR	
	Disinfection By-product	Trihalomethanes	ug/L	8	68	68	0	17	149	52	95	
	Disinfection By-product	Chlorates	ug/L	50	101	101	0	85	603	266	553	
	Geosmin/ MIB	MIB	ng/L	2	100	80	0	<LOR	37	8	19	
	Geosmin/ MIB	Geosmin	ng/L	2	100	87	0	<LOR	11	3	6	
	Cyanobacteria Toxin	Cylindrospermopsin	ug/L	0.03	123	0	0	<LOR	<LOR	<LOR	<LOR	
	PFAS Compound	Perfluorooctanoic acid (PFOA)	µg/L	0.002	4	0	0	<LOR	<LOR	<LOR	<LOR	
	PFAS Compound	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.002	4	0	0	<LOR	<LOR	<LOR	<LOR	
	PFAS Compound	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.005	4	0	0	<LOR	<LOR	<LOR	<LOR	
	PFAS Compound	Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	4	0	0	<LOR	<LOR	<LOR	<LOR	

Townsville Drinking Water Scheme

Scheme Component	Parameter Category	Parameter	Unit of Measure	Limit of Reporting (LOR)	Count	# of samples detected	# DW Guidelines Value	Min Value	Max Value	Avg Value	95th %tile	Comments
Water Treatment Plant Northern WTP Raw Water	Thermotolerant Coliforms	Total Coliforms	MPN/100ml	1	29	18	0	<LOR	512	38.00	183	Northern Water Treatment Plant was offline from February 2025 to June 2025 due to a severe weather event affecting access to the Crystal Creek Weir Intake and causing significant damage to infrastructure.
	Thermotolerant Coliforms	E.coli	MPN/100ml	1	29	3	0	<LOR	183	7.00	16	
	Turbidity	Turbidity	NTU	0.1	197	197	0	0.4	11.6	1.3	2.6	
	pH	pH	pH Units	1	197	197	0	10	11.02	10.59	10.85	
	Anions	Sulphate	mg/L	0.5	7	5	0	<LOR	3.2	1.3	2.9	
	Metals	Iron, Total	mg/L	0.002	29	29	0	0.04	0.27	0.14	0.23	
	Metals	Manganese, Total	mg/L	0.0006	29	29	0	0.003	0.01	0.005	0.008	
	Geosmin/ MIB	Geosmin	ng/L	2	7	3	0	<LOR	4	1	4	
	Geosmin/ MIB	MIB	ng/L	2	7	0	0	<LOR	<LOR	<LOR	<LOR	
	Fluoride	Fluoride	mg/L	0.02	29	28	0	<LOR	0.05	0.03	0.05	
	Metals	Arsenic, Total	mg/L	0.001	2	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Selenium, Total	mg/L	0.001	2	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Mercury, Total	mg/L	0.0006	2	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Cadmium, Total	mg/L	0.0001	2	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Nickel, Total	mg/L	0.001	2	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Chromium, Total	mg/L	0.001	2	0	0	<LOR	<LOR	<LOR	<LOR	
	Giardia	Giardia	cysts/100ml	1	2	0	0	<LOR	<LOR	<LOR	<LOR	
Cryptosporidium	Cryptosporidium	oocysts/10L	1	2	0	0	<LOR	<LOR	<LOR	<LOR		

Townsville Drinking Water Scheme

Scheme Component	Parameter Category	Parameter	Unit of Measure	Limit of Reporting (LOR)	Count	# of samples detected	# DW Guidelines Value	Min Value	Max Value	Avg Value	95th %tile	Comments
Water Treatment Plant Northern WTP Raw Water	Thermotolerant Coliforms	Total Coliforms	cfu/100ml	1	29	0	0	<LOR	<LOR	<LOR	<LOR	Northern Water Treatment Plant was offline from February 2025 to June 2025 due to a severe weather event affecting access to the Crystal Creek Weir Intake and causing significant damage to infrastructure.
	Thermotolerant Coliforms	<i>E.coli</i>	cfu/100ml	1	29	0	0	<LOR	<LOR	<LOR	<LOR	
	Disinfection Residual	Chlorine, free	mg/L	0.05	197	197	0	1.68	2.22	1.9	2.09	
	Turbidity	Turbidity	NTU	0.1	196	196	0	0.02	0.08	0.03	0.05	
	pH	pH	pH Units	1	196	186	0	7.36	7.77	7.52	7.58	
	Anions	Sulphate	mg/L	0.5	7	4	0	<LOR	3.6	1.5	3.6	
	Anions	Oxidised Nitrogen as N	mg/L	0.01	7	7	0	0.02	0.05	0.03	0.05	
	Metals	Manganese, Total	mg/L	0.0003	29	29	0	0.0004	0.004	0.0012	0.0026	
	Metals	Iron, Total	mg/L	0.002	57	51	0	<LOR	0.06	0.003	0.01	
	Metals	Aluminium, Total	mg/L	0.01	195	176	0	<LOR	0.309	0.023	0.063	
	Fluoride	Fluoride	mg/L	0.02	193	193	0	0.03	0.78	0.68	0.73	
	Metals	Copper, Total	mg/L	0.002	7	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Zinc, Total	mg/L	0.001	7	5	0	<LOR	0.003	0.001	0.003	
	Metals	Arsenic, Total	mg/L	0.001	2	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Selenium, Total	mg/L	0.001	2	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Mercury, Total	mg/L	0.0006	2	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Cadmium, Total	mg/L	0.0001	2	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Nickel, Total	mg/L	0.001	2	0	0	<LOR	<LOR	<LOR	<LOR	
	Metals	Chromium, Total	mg/L	0.001	2	0	0	<LOR	<LOR	<LOR	<LOR	
	Disinfection By-product	Trihalomethanes	µg/L	8	29	25	0	<LOR	85	24	65	
	PFAS Compound	Perfluorooctanoic acid (PFOA)	µg/L	0.002	2	0	0	<LOR	<LOR	<LOR	<LOR	
PFAS Compound	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.002	2	0	0	<LOR	<LOR	<LOR	<LOR		
PFAS Compound	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.005	2	0	0	<LOR	<LOR	<LOR	<LOR		
PFAS Compound	Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	2	0	0	<LOR	<LOR	<LOR	<LOR		

Townsville Drinking Water Scheme

Scheme Component	Parameter Category	Parameter	Unit of Measure	Limit of Reporting (LOR)	Count	# of samples detected	# DW Guidelines Value	Min Value	Max Value	Avg Value	95th %tile	Comments
Transmission Reservoirs	Thermotolerant Coliforms	Total Coliforms	CFU/100ml	1	1157	6	0	<LOR	20	<LOR	<LOR	
	Thermotolerant Coliforms	E.coli	CFU/100ml	1	1157	0	0	<LOR	<LOR	<LOR	<LOR	
	Disinfection residual	Chlorine, free	mg/L	0.05	1145	1144	0	<LOR	4.24	1.44	2.23	
	Disinfection residual	Chlorine, total	mg/L	0.05	1144	1143	0	<LOR	4.25	1.56	2.35	
	Turbidity	Turbidity	NTU	0.1	1157	1099	0	<LOR	0.8	0.2	0.3	
	pH	pH	pH Units	1	1157	1157	0	6.75	8.49	7.64	7.95	
	Electrical Conductivity	Electrical Conductivity	µS/cm	1	1157	1157	0	98	232	166	209	
	Alkalinity	Alkalinity	mg CaCO3/L	5	1157	1157	0	30.09	63.72	45.10	53.22	
	Colour	Colour, Apparent	Pt-Co Units	1	1157	596	0	<LOR	18	<LOR	2	
	Metals	Aluminium, Total	mg/L	0.01	1157	1145	0	<LOR	0.14	0.03	0.05	
	Metals	Calcium, Total	mg/L	0.7	1157	1157	0	5.7	16.2	10.3	13.5	
	Metals	Copper, Total	mg/L	0.002	1157	311	0	<LOR	0.038	0.001	0.006	
	Metals	Iron, Total	mg/L	0.002	1157	757	0	<LOR	0.15	0.005	0.02	
	Metals	Magnesium, Total	mg/L	0.5	1157	1131	0	<LOR	4.3	2.5	3.9	
	Metals	Manganese, Total	mg/L	0.0003	1157	891	0	<LOR	0.02	0.0007	0.002	
	Metals	Lead, Total	mg/L	0.0006	1157	21	0	<LOR	0.0013	<LOR	<LOR	
	Metals	Zinc, Total	mg/L	0.001	1157	711	0	<LOR	0.032	0.002	0.009	
	Geosmin/ MIB	Geosmin	ng/L	2	1058	773	0	<LOR	8	3	5	
	Geosmin/ MIB	MIB	ng/L	2	1058	760	0	<LOR	25	6	17	
	Disinfection By-product	Trihalomethanes	µg/L	8	1157	1156	0	<LOR	202	81	132	
	Disinfection By-product	Bromate	µg/L	10	240	8	0	<LOR	17	<LOR	<LOR	
	Disinfection By-product	Chlorates	µg/L	50	240	228	2	<LOR	978	340	733	Incident reported to Water Supply Regulation: DWI-506-25-11754
	Cyanobacteria Toxin	Cylindrospermopsin	µg/L	0.03	101	0	0	<LOR	<LOR	<LOR	<LOR	
Cyanobacteria Toxin	Anatoxin	µg/L	0.04	101	0	0	<LOR	<LOR	<LOR	<LOR		

Townsville Drinking Water Scheme

Scheme Component	Parameter Category	Parameter	Unit of Measure	Limit of Reporting (LOR)	Count	# of samples detected	# DW Guidelines Value	Min Value	Max Value	Avg Value	95th %tile	Comments
Transmission Reservoirs	Thermotolerant Coliforms	Total Coliforms	CFU/100ml	1	2210	17	0	<LOR	33	<LOR	<LOR	
	Thermotolerant Coliforms	E.coli	CFU/100ml	1	2210	0	0	<LOR	<LOR	<LOR	<LOR	
	Disinfection residual	Chlorine, free	mg/L	0.05	2211	2203	0	<LOR	4.65	1.27	2.03	
	Disinfection residual	Chlorine, total	mg/L	0.05	2211	2204	1	<LOR	5.81	1.39	2.18	Incident reported to Water Supply Regulation: DWI-506-25-11940
	Turbidity	Turbidity	NTU	0.1	2211	2148	0	<LOR	4.0	0.2	0.4	
	pH	pH	pH Units	1	2211	2211	0	6.70	8.80	7.64	8.09	
	Electrical Conductivity	Electrical Conductivity	µS/cm	1	2210	2210	0	81	246	169	216	
	Alkalinity	Alkalinity	mg CaCO3/L	5	638	638	0	28.43	69.26	47.01	61.64	
	Colour	Colour, Apparent	Pt-Co Units	1	536	298	0	<LOR	13	<LOR	2	
	Metals	Aluminium, Total	mg/L	0.01	535	524	0	<LOR	0.19	0.03	0.69	
	Metals	Calcium, Total	mg/L	0.7	636	636	0	6.3	17.5	11.4	15.5	
	Metals	Copper, Total	mg/L	0.002	535	493	0	<LOR	0.267	0.009	0.020	
	Metals	Iron, Total	mg/L	0.002	535	416	0	<LOR	0.16	0.006	0.02	
	Metals	Magnesium, Total	mg/L	0.5	535	486	0	<LOR	4.3	2.1	3.8	
	Metals	Manganese, Total	mg/L	0.0003	535	435	0	<LOR	0.010	0.0008	0.002	
	Metals	Lead, Total	mg/L	0.0006	535	174	0	<LOR	0.004	<LOR	0.001	
	Metals	Zinc, Total	mg/L	0.001	520	503	0	<LOR	0.101	0.005	0.013	
	Geosmin/ MIB	Geosmin	ng/L	2	349	286	0	<LOR	7	3	5	
	Geosmin/ MIB	MIB	ng/L	2	349	263	0	<LOR	26	7	18	
	Fluoride	Fluoride	mg/L	0.02	535	535	0	0.43	0.79	0.60	0.69	
	Disinfection By-product	Trihalomethanes	µg/L	8	636	633	0	<LOR	249	95	159	
Disinfection By-product	Bromate	µg/L	10	74	3	0	<LOR	16	<LOR	<LOR		
Disinfection By-product	Chlorates	µg/L	50	74	67	1	<LOR	825	322	723	Incident reported to Water Supply Regulation: DWI-506-25-11754	

<LOR – Less than Limit of reporting

ND – Not Detected



