

Drinking Water Quality Management Plan

ANNUAL REPORT 2019/2020 (FINANCIAL YEAR)

HARTEN

Bats Bear

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Report contains	Activities undertaken over the 2019/2020 financial year in operating Townsville City Council's (TCC) drinking water service. Summary of drinking water quality for Townsville's three drinking

water schemes.

Summary of TCC's performance in implementing their approved Drinking Water Quality Management Plan (DWQMP).



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Abbreviations and Acronyms

Acronym	Definition
ADWG	Australian Drinking Water Guidelines
BWA	Boil Water Advisory
ССР	Critical Control Point
DNRME	Department of Natural Resources, Mines and Energy
DWQMP	Drinking Water Quality Management Plan
GAC	Granular Activated Carbon
LIMS	Laboratory Information Management System
NATA	National Association of Testing Authorities
OS	Owner's Side
SES	State Emergency Services
тнм	Trihalomethanes
TLS	Townsville Laboratory Services
T&O	Taste and Odour
WTP	Water Treatment Plant

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 Natural Resources, Mines and Energy.

Stephen Martin Team Manager – Water and Wastewater

1. Executive Summary

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

Townsville Water 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 is the 2019/2020 financial year.

TCC has three drinking water schemes: Townsville, Giru/Cungulla and Paluma.

Overall annual compliance with the *Public Health Regulation 2005* for *Escherichia coli (E. coli)* for the three schemes was met with 99.94% compliance for Townsville Drinking Water Scheme, 100% compliance rate for Giru/Cungulla Drinking Water Scheme and a compliance rate of 99.5% for Paluma Drinking Water Scheme.

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

- 2 disinfection-by-product exceedances
- 3 E. coli detections
- 1 lead exceedance.

There were 87 customer complaints regarding drinking water quality:

- 46 dirty water
- 3 milky water
- 27 taste/ odour
- 4 suspected illness
- 7 owner's side issues.

COVID-19 and its restrictions in Queensland throughout the year did not impact on water treatment, water quality or water sampling. Due to the difficulty in movement of people and the working from home arrangements brought about by COVID-19 restrictions, an extension was granted on Council's DWQMP Regulatory Audit which was due 1 August 2020. The audit is now due 23 April 2021.

This report is made available to our customers through our 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

Townsville Water is a business unit of Council and is a registered service provider under the *Water Supply (Safety and Reliability) Act 2008.* Townsville Water 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.

Council's DWQMP was submitted to the Office of the Water Supply Regulator on 21 June 2011. It was approved with conditions on 29 August 2012. Townsville's first DWQMP Audit was undertaken in July 2016. The plan was reviewed, with significant amendments made in January 2018. The amendments were approved with conditions on 23 April 2018. The plan is reviewed every two years with an external audit undertaken every four years.

Townsville Water services a population of approximately 194,072 with 85,952 connected properties, in three drinking water schemes: Townsville Drinking Water Scheme, Paluma Drinking Water Scheme and Giru/Cungulla Drinking Water Scheme.

Scheme Name	Water Treatment Plant	Water Source	Treatment Processes	Treatment Capacity	Towns Supplied
Townsville Drinking Water Scheme	Douglas Water Treatment Plant (Angus Smith Drive)	Ross River Dam (with water supplemented from the Burdekin Dam through the Haughton Pipeline when required)	Conventional treatment with chlorine disinfection	232 ML/D	Townsville
Townsville Drinking Water Scheme	Northern Water Treatment Plant (Kinduro)	Paluma Dam Crystal Creek	Microfiltration with chlorine disinfection	40 ML/D	Townsville
Giru/ Cungulla Drinking Water Scheme	Giru Water Treatment Plant	Haughton River	Conventional treatment with chlorine disinfection	2 ML/D	Cungulla township

Table 1. Summary of Townsville's Drinking Water Schemes

Paluma Drinking Water Scheme	Paluma Water Treatment Plant	Paluma Weir	Ultrafiltration with UV and chlorine disinfection	90 KL/D	Paluma township
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Giru Water Treatment Plant also supplies water 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.

54,391ML of potable water was produced in the 2019/2020 financial year. This was significantly more than the 46,810ML produced in the previous year, due to the relaxation of water restrictions and the easing into water conservation measures. Townsville Water maintains two dams (Ross River Dam and Paluma Dam), two weirs (Paluma Weir and Blacks Weir), 23 water pumping stations, 18 chlorinators, 41 reservoirs (treated water storage facilities) and 2,658.3 km of water distribution mains.





3. Actions taken to implement the DWQMP

The DWQMP is managed and maintained by the Water Quality Officer. Both the Water Treatment Engineer and Water Quality Officer's role is to monitor, regulate and improve water quality for Townsville. They deal with all water quality non-compliances, water quality complaints and queries from customers, monitor all Critical Control Points (CCPs), the water sampling plan and the subsequent data it generates. They are part of a broader Water Quality Team which also includes the Water Operations Coordinator, Commercial Compliance Officer, Bulk Water Maintenance Officer and Water Operators.

Trility are engaged to operate Douglas Water Treatment Plant and Northern Water Treatment Plant under a managed contract with Council. The contract is managed through informal weekly operations meetings, formal monthly operational management team meetings and formal quarterly contract management committee meetings. Any issues arising between these times are dealt with through phone calls, emails, face-to-face and ad hoc meetings.

The water quality team hold a weekly water quality meeting, with water quality also discussed at weekly planning meetings and at toolbox meetings with staff as required. A water quality governance meeting is held with management every two months and is chaired by the General Manager Townsville Water and Waste.

Over sixty members of staff completed the QldWater Course 'Aqua Card', which is tailored for internal and external contractors. The course provides 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
- the responsibilities of those working on infrastructure to reduce that risk.

The course also includes practical guidance on how to operate within work sites including good housekeeping and disinfection practices. The course was delivered by the Water Quality Officer so discussion could be generated, questions could be answered, and it could be determined that staff had a good understanding after the course. All staff completed the mandatory questions to receive their certificate.

Ten staff members have continued with the Water Industry Worker Program, and four more staff started this year. 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 focussed 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.

The risk management improvement program implementation plan is included in Table 2 below.

Table 2. Risk management improvement program implementation status

Scheme Name	Component	Improvement Actions	Target Date	Status and revised target date	Responsible Officer	Complete
INKING WATER SCHEME (DWS)	Douglas WTP Turbidity (Common and Modules 1 &2)	Pre-Treatment Clarifier – Confirm the design envelope for the clarifiers and ensure that this is utilised.	Design in 2017/18 financial year with construct in 2019/20 financial year.	End 2020/21 financial year for design Budget constraints have pushed construction out to 2022	Manager Water and Waste	
		Sludge Handling – Confirm the amount of time available to 'stop' recycle to ensure that criticality is appropriate for the supernatant recycle system.	July 2019	December 2019	Trility Operations Manager	Scenario sheet developed and several case studies available. Summary to be submitted to Council Nov 2020
		Reservoirs – The reservoir cleaning program has stalled for a number of reasons, but should be reinstated and prioritised.		Reservoir Cleaning Contract to be put to tender by early 2021	Water Treatment Engineer and Drinking Water Quality Officer	
		Data is required to be assembled and reviewed to validate that the reactivator has been optimised.	December 2018	Summary of performance data and activities to be submitted June 2020. PCP to be added to WQP	Trility Operations Manager	Trility has developed a summary of performance of the reactivators given the Good Practice guide and LT2ESWTR. Performance in 2019 and 2020 shows good alignment to both standards. Provided to TCC Nov 2020.
ISVILLE D	Douglas WTP Turbidity Modules 3&4 Direct Filtration	Pre-Treatment and Filtration – Performance trials are planned to confirm the raw water range under which the system can operate to produce safe water.	Aim to complete further trials in 2020, subject to suitable raw water conditions.	Data from February monsoon event to be reviewed by June 2020	Water Treatment Engineer, Contract Compliance Officer Trility Operations Manager	Existing data from February monsoon event period to be reviewed by June 2020
TOWN	Organics and colour	Pipes/reservoirs – Documentation of system 'age' optimisation is required to ensure continuity. Currently this is primarily undertaken by one person.		June 2019	Water Treatment Engineer	
	Hazard Analysis Critical Control Point (HACCP)	Requires updating (last updated 2009). This will be included in Trility's Water quality plans due to be finalised 2020.	December 2019	June 2020	Trility - Operations Manager	
	Chlorates in Network	Investigate replacing Sodium Hypochlorite dosing system with a chlorine gas dosing system.	2020	Designs are currently being completed. Construction due end 2024	Team Manager Water and Wastewater	

Scheme Name	Component	Improvement Actions	Target Date	Status and revised target date	Responsible Officer	Complete
	Crypto Model	Clarification and UV required at Douglas Water Treatment Plant to reduce Cryptosporidium risk.	2020	Designs are currently being completed. Construction due end 2024	Team Manager Water and Wastewater	
	NWTP Turbidity	Filtration Node – False positives have been identified in the past and an investigation into sample preparation to eliminate false positives is underway.				Ongoing
TER SCHEME (DWS)	Pathogens – <i>E. coli</i> and Virus	Confirm the C.t (max flow, min level, chlorine minimum (1)) available at the WTP and compare this to the typical target C.t of 15 mg.min/L.	1/2/2019	Baffles installed in CWS tank. Performance has been analysed and determined that C.t. is easily met even under the worst conditions.	Operations Support Engineer	Complete
	Geosmin (Taste and Odour)	Consider measuring the level of geosmin in the open channel between Paluma and Crystal Creek intake to confirm the source of geosmin as well as continuing to investigate the source water.		This area is in a steep gorge and inaccessible -parked	Drinking Water Quality Officer	Parked
IKING WA		Treatment strategies to remove geosmin are to be investigated, including Powdered Activated Carbon (PAC) dosing even though this was noted as having a negative impact on membrane performance/life.	End 2020	End 2024 Project underway investigating PAC dosing and UV for NWTP	Team Manager Water and Wastewater	
TOWNSVILLE DRIN	Iron	Confirm iron results in raw and treated water. There is a discrepancy between the numbers in the raw (soluble) and the performance of the membranes. Essentially all of the soluble should pass through the membranes but the monitoring suggests that the membranes are pulling out 'soluble' iron. This could mean that the iron is colloidal and not 'true' soluble. Include event-based monitoring to investigate iron spikes in the raw water.	June 2020	June 2021	Water Quality Officer	
	НАССР	Requires updating (last updated 2009). This will be included in Trility's Water Quality Plans due to be finalised 2020.		June 2020		WQP under review
	Crypto Model	UV may be required for NWTP. This requires investigating and funding if required.	June 2020	Designs have been completed. Will present for approval to include in the 2020/21 Capital Program	Manager Water and Wastewater	

Scheme Name	Component	Improvement Actions	Target Date	Status and revised target date	Responsible Officer	Complete
GIRU/CUNGULLA DWS	Pathogens - Cryptosporidium	Operational Control Point (OCP) required to be documented and put into practice to assist in management of supernatant return.	March 2019	June 2021	Water Treatment Engineer	
	Organics and Colour	Suggest that measuring true colour of filtered water on jar testing will assist in managing coagulation (helps to identify the 'best' dosing regimen).		Parked June 2019	Water Treatment Engineer	
	Verification	Undertake project to acquire handheld	September 2019	September 2021	Bulk Water Engineer	
	of Drinking Water Quality	devices and store all water quality results in Laboratory Information System (LIMS).		Project currently being undertaken with TLS to store all data in LIMs	Drinking Water Quality Officer/ Water Treatment Engineer	
	Development of algae/algal toxin Trigger Scenarios	Procedure for detection of algae/algal toxins is required to be developed. This is not of high risk as algal blooms have not been detected in the Haughton River supply but a procedure should still be in place.	December 2019	January 2021 Procedure has been drafted with Trility and Hunter H2O which will be used to draft procedure for Giru WTP	Drinking Water Quality Officer	
A DWS	Pathogens – N. fowleri	Need to investigate the prevalence of <i>N. fowleri</i> to better understand the risk.		June 2020	Drinking Water Quality Officer	Ongoing to ensure adequate data is obtained in order to determine risk adequately
PALUM	Organics and Colour	Continue to monitor after WTP operational to confirm reduction in organics and Trihalomethanes (THMs).	September 2018	Ongoing. Data collected weekly so trends can be analysed specially after rain.	Drinking Water Quality Officer	Ongoing

4. Research Activities

Analysis of *Naegleria fowleri* in a Tropical Distribution Network.

Naegleria fowleri (N. fowleri) is a free-living thermophilic amoeba which when inhaled through the nasal passages may cause an infection resulting in the inflammation and destruction of brain tissue. Any freshwater body that seasonally exceeds 30°C or continually exceeds 25°C can support the growth of *N. fowleri*. Over twenty years of water monitoring data in Townsville shows that water temperatures >25°C can occur for long periods of time and water temperatures can exceed 30°C in the summer months.

In order to determine if *N. fowleri* is present in the drinking water supply in Townsville a monitoring program was put in place to sample for thermophilic amoeba in sections of the supply network where *N. fowleri* is most likely to be present. First, it is determined if any thermophilic amoeba are present. If they are detected, it is determined if *Naegleria* spp. are present. If *Naegleria* spp. are present the sample is then speciated for *N. fowleri*.

Results from 118 samples taken from the raw water sources and the distribution network during the summers of 2018/19 and 2019/20 did not detect *N. fowleri*. Thermophilic amoeba were detected in 17 raw water samples, 11 of these were determined to be *Naegleria* spp. but none were determined to be *N. fowleri*.

Even though *N. fowleri* was not detected in any of the samples, Council will continue to manage the risk as though it is present and will continue to manage chlorine residuals ≥0.5mg/l throughout the network and especially to outlying points.



5. Information supplied to the regulator regarding non-compliances and prescribed incidents

There were six non-compliances with water quality criteria reported for the 2019/20 financial year.

Table 3. Incidents reported to the Regulator for the reporting period

Incident Date and Number	Water Scheme and Location	Parameter and Issue	Corrective and Preventative Actions
18/09/2019 DWI-506-19-08032	Townsville DWS Mt Louisa Reservoir	E. coli 3 org/ 100ml	Routine sampling detected 3 MPN/100ml of <i>E. coli</i> . Chlorine residual was 1.77mg/L, pH was 7.08 and turbidity was 0.4 NTU, showing disinfection was adequate. C.t is met at the WTP so any further retention in the reservoir adds further C.t. Mt Louisa is one of the main feeder reservoirs and is routinely inspected. Reservoir and roof integrity were checked and determined to be in good condition. There were no issues at Douglas WTP. Twenty further samples taken on the same day throughout the distribution system (and at the WTP) showed no <i>E. coli</i> detected.
			A resample showed no <i>E. coli</i> detected and chlorine residual of 1.43mg/L.
27/02/2020 DWI-506-20-08356	Townsville DWS Reid Park Complex	Lead 0.047 mg/L	A complaint led to a sample being taken at Reid Park Complex and 0.047mg/L of lead was detected. Sample was taken from a dedicated fire line in error, rather than from a water distribution main while investigating the complaint. The fire service line is a separate line and is not connected to potable supply, it is solely used for emergency fire- fighting. Extensive sampling of water distribution mains in the same area did not detect lead above ADWG.
			Sample taken from wrong location in error.
2/03/2020 DWI-506-20-08359	Paluma DWS Paluma Reservoir	THM 292Mg/L	Routine sampling detected THMs above ADWG at Paluma Reservoir and in reticulation. Due to rainfall in the Township it was difficult to maintain adequate chlorine for CCPs at the Paluma WTP and residual in the network. Higher doses of chlorine were being used. Rain in the weir also caused a spike of organic matter in the raw water feed. The GAC while online and working was not able to reduce the natural organic matter (NOM) effectively and this coupled with a higher chlorine dose resulted in a spike of THMs.
			Reservoir level was dropped to 1 metre from 1.5 metres and refilled with fresh water. The township was flushed. Reservoir levels were set to 1 metre to enable a greater turnover of water and reduce the requirement for the ongoing addition of chlorine as reservoir is chlorinated on the inlet. Chlorates were also high at this time suggesting a lower quality sodium hypochlorite (8%) and hence why extra chlorine was required to meet CCPs and retain a residual in the network.
			Flushing of the network occurred so fresh water was provided to customers. More frequent backwashing of GAC will occur so that it can deal with the higher organic load at times of rainfall and increase NOM in the raw water feed.

Incident Date and Number	Water Scheme and Location	Parameter and Issue	Corrective and Preventative Actions
5/03/2020 DWI-506-20-08377	Townsville DWS Picnic Bay Reservoir	E. coli 2 CFU/100ml	Routine lab sampling detected two E. coli with free chlorine residual of 1.3, pH 7.18, turbidity of 0.4NTU with an adequate c.T. CCP was met and SCADA trends showed the chlorine residual was maintained on that date and the days prior. Chlorine gas system was checked by an operator and there were no issues. Reservoir and roof integrity were checked and are adequate.
			30 samples taken at the WTP and throughout the distribution system did not detect <i>E. coli</i> .
			Resample did not detect <i>E. coli</i> and the sample had a chlorine residual of 1.28mg/L.
19/03/2020 DWI-506-20-08363	Townsville DWS Serene Valley Reservoir	E. coli 2 CFU/100ml	Routine sampling detected two <i>E. coli</i> with free chlorine residual of 0.69mg/L (0.99 mg/L total). pH 7.4 and Turbidity 0.32 NTU.
			There were no treatment issues at the WTP, no integrity issues of reservoir or roof and with no pipe breaks. Chlorine residual, pH and turbidity all within range for adequate disinfection. An operator will now attend site three times a week instead of twice a week.
			Resample was clear of <i>E. coli</i> .
26/03/2020 DWI-506-20-08386	Paluma DWS Paluma Reservoir and mt Spec Road	Chlorates 0.846 and 0.859 mg/L	Routine lab sampling detected chlorates at 0.846 and 0.859 mg/L in Paluma Reservoir and reticulation. TCC were having issues maintaining the chlorine residual in the tank and it had been raining for the week. Chlorine dose was increased to maintain adequate disinfection.
			As results came through after the THM issue, the chlorates had been reduced due to the work carried out for THMs i.e. dropping of the reservoir level, decreasing of chlorine dose, flushing. Resamples showed a reduced chlorate at 598 and 602 ug/L.
			Usual management was in place with sodium hypochlorite kept in fridge, refilled when empty and filled with the newest stock available.

6. Compliance with water quality criteria for drinking water

Townsville Water has a comprehensive sampling regime "from catchment to tap" which covers raw water supply, water treatment and water distribution. Over 100,000 tests are taken over the year for various parameters including but not limited to chlorine, pH, turbidity, alkalinity, metals, chemical, pesticides and microbiological.

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.

All samples are taken and analysed by Townsville Laboratory Services (TLS) which is National Association of Testing Authorities (NATA) accredited. 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 called through immediately to the Water Quality Officer (Water Treatment Engineer if Water Quality Officer is not available). Exceedance reports can be generated as required. All water quality data is monitored, and trends analysed throughout the year by the Water Quality Officer.

COVID-19 restrictions did not affect sampling type or frequency. Townsville Water has been largely compliant with the water quality criteria for the financial year, having six water quality incidents.

Two reportable incidents were due to disinfection by-products above the ADWG limit for Paluma DWS, and there were three *E. coli* incidents and one lead for Townsville DWS, as per Table 3.

Cyanobacteria have been detected in the Ross River Dam and into the raw water feed into Douglas WTP. The composition consists mainly of Cylindrospermopsis for both biovolume and extent but also Psudoanabaena sp., Anabaenopsis sp., and Aphanocapsa sp are present at different times. Whilst this has not resulted in any non-compliance issues as the water treatment process is removing the cells (and the toxins) it has resulted in a greater management of the process and the optimisation of filters and filter chemical dose and ensuring adequate contact time in the clear water storage. Chlorine set point has been increased to 3mg/L with a residual of 0.5 mg L-1 maintained for at least 30 minutes to destroy cylindrospermopsin and thereby to reduce toxin risk. Fortunately, this has not resulted in higher disinfection by-products for the summer months. Townsville Water has increased sampling both in the dam and at the water treatment plant for algal cell count, algal species, and toxins. Aeration has been installed at the offtake as a trial to minimise cyanobacteria numbers. A temporary PAC system has been designed and parts are currently being sourced in case cell numbers/ biovolume increase. A permanent PAC dosing system is currently being designed.

Overall annual compliance for *E. coli* for each scheme was in compliance with the *Public Health Regulation 2005* which requires "nil cfu/100ml found in 98% of the samples taken for a 12-month period".

There were three *E. coli* incidents as outlined in Table 3 for Townsville Drinking Water Scheme, with a 99.94% compliance rate.

There were no *E. coli* detected at Giru/Cungulla DWS or Paluma DWS. An *E. coli* detection in January 2019 affected the yearly rolling average so even though no E. coli were detected for the year a compliance rate of 99.5% was achieved at Paluma. Cungulla had a compliance of 100%.

Table 4: Number of *E. coli* Incidents and Percentage Annual Compliance with the *Public Health Regulation* 2005.

Drinking Water Scheme	Number of samples taken	Number of Incidents	% Annual Compliance
Townsville	3271	3	99.94
Paluma	130	0*	99.5%
Giru/Cungulla	154	0	100%

*A detection in January 2019 affected the yearly rolling average so even though no E. coli were detected for the year 100% compliance was not achieved.

There have been no failures to meet sampling frequencies and all locations have been sampled.

Drinking water quality performance (verification monitoring) is included in appendix A.

7. Details of complaints made to the provider about the drinking water service supplied to customers

All customer water quality complaints are lodged through Council's 24-hour Customer Service Centre, with all information regarding the complaint and how it was rectified recorded in the Property and Rating (TechnologyOne) system. Each complaint has a unique number which enables the complaint to be followed from start to finish with comments added at each step. There were 87 drinking water quality complaints for the reporting period; less than the amount received in 2018/19 reporting period with 111 complaints.



Graph 1: Number of drinking water quality complaints per financial year.

Table 5: Number of dirty water complaints by type

Type of Water Quality Complaint	Dirty Water	Suspected illness/ Customer Concern	Owners Side	Т&О
Number of complaints 2019/20	46 DW 3MW	4	5 FM 2 HWS	27

There are four main types of water quality complaints in Townsville as outlined below:

Dirty Water and Milky Water

Dirty water results 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 works with heavy machinery. It can also be caused by changing velocities in pipes stirring up the sediment. When a dirty water complaint is lodged, a water reticulation crew is dispatched to flush the area until the dirty water 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.

Milky water is caused when air becomes trapped in the water under pressure, forming tiny bubbles. As these air bubbles escape, they cause the water to look milky. Milky water occurs following large main repairs or when new mains are commissioned. The issue usually resolves itself once all the air has escaped but if it does not the mains are flushed. If this still does not rectify the issue, more air valves are cut into the mains.

Taste and Odour

T&O complaints in Townsville are generally are caused by

- Dirty water events
- MIB/Geosmin
- High chlorine (or sudden changes in chlorine concentration)
- Old or new pipework on customer's side of the meter.

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

Owner's Side

There were seven owner's side issues this financial year with four caused by flick mix (FM) taps. Near the end of the life of flick mix taps (after seven to ten years) the inside braided hose degrades and leaves a black oily residue in the water. This issue is rectified through a phone call to customers to explain the issue and the requirement for a private plumber to install new taps.

Three were for hot water systems (HWS) nearing the end of their life and the breakdown of the anode inside. Townsville Water analyse samples through TLS where required and communicate with customers through these issue.

Suspected Illness

There were three suspected illness complaints this year. In all instances residents were contacted and water from their residence analysed through TLS. In all instances the water met the ADWG limits and was safe to drink.



8. Outcome and recommendations of audit

An extension was granted for the regulatory audit due to COVID-19 travel restrictions and working from home Council directive. The audit which was due by 1 August 2020 has been extended to 23 April 2021. The review completion date has been extended to 1 August 2021.

9. Appendix A. Drinking water quality performance – verification monitoring



GIRU/CUNGULLA 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
	n on	Thermotolerant Coliforms	Total Coliform	org/100ml	1	46	45	0	<1	24200	867	1793	
	r Gir ught	Thermotolerant Coliforms	E. coli	MPN/100ml	1	47	15	0	<1	65	2	4	
	late l (Ha 'er)	Turbidity	Turbidity	NTU	0.1	46	46	0	1.1	346	19.26	46.23	
	ce V ater Riv	рН	рН	pH Units	1	47	47	0	6.87	8.05	7.54	8	
	w W	Metals	Iron, Total	mg/L	0.005	47	47	0	0.06	4	0.64	1.77	
B	Ra	Metals	Manganese, Total	mg/L	0.001	47	47	0	0.002	0.24	0.04	0.11	
G	t	Thermotolerant Coliforms	Total Coliform	org/100ml	1	47	2	0	<1	34	1	<1	
	nen t r Wa	Thermotolerant Coliforms	E. coli	MPN/100ml	1	47	0	0	<1	<1	<1	<1	
	eati Clea rage	Turbidity	Turbidity	NTU	0.1	46	46	0	0.1	0.9	0.32	0.80	
	er Tr Stor	рН	рН	pH Units	1	47	47	0	6.26	8.13	7.15	7.92	
	Wate int 0	Metals	Iron, Total	mg/L	0.005	47	35	0	<0.005	0.02	0.005	0.01	
	bla	Metals	Manganese, Total	mg/L	0.001	46	46	0	0.0004	0.06	0.006	0.02	
		Thermotolerant Coliforms	Total Coliform	org/100ml	1	51	2	0	<1	11	<1	<1	
		Thermotolerant Coliforms	E. coli	MPN/100ml	1	51	0	0	<1	<1	<1	<1	
	.=	Turbidity	Turbidity	NTU	0.1	51	51	0	0.1	0.9	0.36	0.65	
	on	рН	рН	pH Units	1	51	51	0	6.94	8.06	7.59	7.97	
	n issi Rese	Metals	Iron, Total	mg/L	0.005	51	47	0	<0.005	0.18	0.02	0.09	
	ansn ulla	Metals	Manganese, Total	mg/L	0.001	51	45	0	<0.001	0.05	0.004	0.02	
	Tra	Disinfection Residual	Chlorine (free)	mg/L	0.05	51	51	0	0.39	2.13	1.27	1.94	
4	0	Disinfection Residual	Chlorine (Total)	mg/L	0.05	51	51	0	0.74	2.51	1.58	2.32	
F		Disinfection By products	Chlorates	µg/L	15	14	14	0	136	729	351	666	
ฮ		Disinfection By products	Trihalomethanes	µg/L	2	51	51	0	6	108	50	93	
S		Thermotolerant Coliforms	Total Coliform	org/100ml	1	95	1	0	<1	6	<1	<1	
ວ		Thermotolerant Coliforms	E. coli	MPN/100ml	1	95	0	0	<1	0	<1	<1	
	es	Turbidity	Turbidity	NTU	0.1	95	95	0	0.10	0.60	0.27	0.43	
	lous Hous	рН	рН	pH Units	1	95	95	0	7.01	8.06	7.55	7.87	
	cula Ila F	Metals	Iron, Total	mg/L	0.005	44	32	0	<0.005	0.002	<0.005	<0.005	
	Reti Ingu	Metals	Manganese, Total	mg/L	0.001	44	34	0	<0.001	0.007	<0.001	<0.001	
	Cr	Metals	Lead	mg/L	0.0006	44	9	0	<0.0006	0.002	<0.0006	<0.0006	
		Disinfection Residual	Chlorine (free)	mg/L	0.05	95	95	0	0.33	2.1	1.00	1.49	
		Disinfection Residual	Chlorine (Total)	mg/L	0.05	95	95	0	0.55	2.44	1.28	1.8	

PALUMA 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
	Thermotolerant Coliforms	Total Coliforms	MPN/100ml	1	12	11	0	<1	800	210	745	
	Thermotolerant Coliforms	E. coli	MPN/100ml	1	12	11	0	<1	700	188	608	
leir	рН	рН	pH Units	1	12	12	0	5.84	7.22	6.34	7.16	
a Ma	Metals	Iron	mg/L	0.002	12	12	0	0.26	2	0.85	1.78	
Ium	Metals	Manganese	mg/L	0.0003	12	12	0	0.006	0.04	0.02	0.04	
Pa	Turbidity	Turbidity	NTU	0.1	12	12	0	0.9	24.4	5.48	15.38	
	Cryptosporidium	Cryptosporidium	cells/10 Li	1	3	0	0	<1	<1	<1	<1	
	Giardia	Giardia	cells/10 Li	1	3	2	0	<1	60	20	54	
, gent	рН	рН	pH Units	1	47	47	0	5.83	6.93	6.41	6.83	
oral ater	Turbidity	Turbidity	NTU	0.1	47	47	0	0.1	0.7	0.30	0.67	
eml eml	Colour	Color, truemh	Pt-Co Units	1	47	39	0	<1	27	4.60	16.80	
red N	Colour	Color, apparent	Pt-Co Units	1	47	45	0	<1	31	7.28	20.50	
Jate Filte	Metals	Iron	mg/L	0.002	15	15	0	0.002	0.18	0.03	0.17	
<u> </u>	Metals	Aluminium	mg/L	0.0003	15	3	0	<0.0003	0.16	0.02	0.08	
	Thermotolerant Coliforms	Total Coliform	org/100ml	1	12	0	0	<1	<1	<1	<1	
	Thermotolerant Coliforms	E. coli	MPN/100ml	1	59	0	0	<1	<1	<1	<1	
	Disinfection Residual	Chlorine (free)	mg/L	0.05	57	57	0	0.2	3.09	1.40	2.60	
Ë.	Disinfection Residual	Chlorine (total)	mg/L	0.05	56	56	0	0.28	3.4	1.66	3.03	
erve	рН	рН	pH Units	1	59	59	0	6.31	7.23	6.75	6.90	
niss Rese	Turbidity	Turbidity	NTU	0.1	59	58	0	<0.1	1	0.41	0.82	
nan na F	Metals	Iron	mg/L	0.002	59	59	0	0.008	0.41	0.07	0.29	
alur	Metals	Manganese	mg/L	0.0003	45	45	0	0.001	0.06	0.02	0.05	
ä	Metals	Aluminium	mg/L	0.0003	59	37	0	<0.0003	0.12	0.02	0.08	
	Metals	Lead	mg/L	0.0006	45	7	0	<0.0006	0.002	<0.0006	0.0007	
	Disinfection By-product	Chlorates	µg/L	50	12	12	1	171	846	475	811	DWI-506-20-08386
	Disinfection By-product	Trihalomethanes	µg/L	5	12	12	0	20	232	64.17	168.75	
	Thermotolerant Coliforms	Total Coliform	org/100ml	1	24	0	0	<1	<1	<1	<1	
	Thermotolerant Coliforms	E. coli	MPN/100ml	1	71	0	0	<1	<1	<1	<1	
	Disinfection Residual	Chlorine (free)	mg/L	0.05	69	67	0	<0.05	2.9	1.13	2.33	
	Disinfection Residual	Chlorine (total)	mg/L	0.05	68	68	0	0.09	3.34	1.34	2.84	
es –	рН	рН	pH Units	1	71	71	0	6.39	8.41	7.34	8.03	
ous ous	Turbidity	Turbidity	NTU	0.1	71	71	0	0.1	1.8	0.49	0.95	
icula Ha H	Metals	Iron	mg/L	0.002	71	71	0	0.02	0.39	0.11	0.26	
Reti alun	Metals	Manganese	mg/L	0.0003	57	57	0	<0.0003	0.05	0.01	0.04	
Ĕ	Metals	Aluminium	mg/L	0.0003	71	59	0	<0.0003	0.10	0.02	0.05	
	Metals	Lead	mg/L	0.0006	24	14	0	<0.0006	0.002	<0.0006	<0.0006	
	Fluoride	Fluoride (naturally occuring)	mg/L	0.02	24	24	0	0.07	0.16	0.10	0.15	
	Disinfection By-product	Chlorates	µg/L	50	12	12	1	174	859	474	775	DWI-506-20-08386
	Disinfection By-product	Trihalomethanes	μg/L	5	24	24	1	18	292	76	206	DWI-506-20-08359

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
	Thermotolerant Coliforms	Total Coliforms	org/100ml	1	253	252	0	<1	121000	11556	4840	
. =	Thermotolerant Coliforms	E. coli	MPN/100ml	1	255	68	0	<1	12	<1	2	
ater Dar	Turbidity	Turbidity	NTU	0.1	822	822	0	2.1	101.00	5.18	8.7	
er ver	рН	рН	pH Units	1	833	833	0	6.61	8.93	7.80	8.5	
urce s Riv	Metals	Iron, Total	mg/L	0.005	832	832	0	0.04	7.5	0.19	0.39	
sos:	Metals	Manganese, Total	mg/L	0.001	833	832	0	<0.001	0.39	0.04	0.1	
Ľ.	Anions	Nitrate	mg/L	0.01	832	118	0	<0.01	0.24	0.006	0.03	
	PFAS/PFOA	PFAS/PFOA	ug/L	<0.005/ <0.01	680	0	0.000	0	0			
	Thermotolerant Coliforms	Thermotolerant Coliforms	org/100ml	1	155	155	0	93	121000	4876	11320	
	Thermotolerant Coliforms	E. coli	MPN/100ml	1	155	65	0	<1	12	1	2	
am am	Turbidity	Turbidity	NTU	0.1	166	166	0	0.80	49	2.78	5	
a D	рН	рН	pH Units	1	166	166	0	4.36	7.59	6.26	7	
Inm	Metals	Iron, Soluble	mg/L	0.005	155	155	0	0.11	2.2	0.50	1.33	
Pal	Metals	Manganese, Soluble	mg/L	0.001	155	155	0	0.007	0.07	0.02	0.04	
	Anions	Nitrate	mg/L	0.01	166	32	0	<0.01	0.02	<0.01	0.01	
	PFAS/PFOA	PFAS/PFOA	ug/L	<0.005/ <0.01	450	0	0	0	0	0	0	
	Thermotolerant Coliforms	Total Coliforms	org/100ml	1	53	53	0	225	46000	4403	12760	
	Thermotolerant Coliforms	E. coli	MPN/100ml	1	53	10	0	<1	6	<1	1	
	Turbidity	Turbidity	NTU	0.1	365	365	0	1.89	18	3.60	5.60	
	рН	рН	pH Units	1	366	366	0	7.00	7.89	7.53	7.73	
	Anions	Sulphate	mg/L	0.5	12	12	0	1.10	4.30	2.06	3.97	
	Metals	Iron, Total	mg/L	0.005	53	53	0	0.01	0.17	0.03	0.08	
ant ate	Metals	Manganese, Total	mg/L	0.001	53	50	0	<0.001	0.01	0.001	0.002	
t PI ≪	Geosmin/ MIB	Geosmin	ng/L	2	12	6	0	<2	3	1	3	
Rav	Geosmin/ MIB	MIB	ng/L	2	12	8	0	<2	12	4	11	
s WTP	Fluoride	Fluoride (Naturally occuring)	mg/L	0.02	53	52	0	<0.02	0.14	0.08	0.11	
gla:	Metals	Arsenic	mg/L	0.001	4	4	0	<0.001	0.001	0.0009	0.001	
Wat Doug	Metals	Selenium	mg/L	0.001	4	0	0	<0.001	<0.001	<0.001	<0.001	
	Metals	Mercury	mg/L	0.0006	4	0	0	<0.0006	<0.0006	<0.0006	<0.0006	
	Metals	Cadmium	mg/L	0.0001	4	0	0	<0.0001	<0.0001	<0.0001	<0.0001	
	Metals	Nickel	mg/L	0.001	4	0	0	<0.001	<0.001	<0.001	<0.001	
	Metals	Chromium	mg/L	0.001	4	0	0	<0.001	<0.001	< 0.001	<0.001	
	Giardia	Giardia	cysts/100ml	1	4	0	0	<1	<1	<1	<1	
	Cryptosporidium	Cryptosporidium	oocysts/10L	1	4	0	0	<1	<1	<1	<1	

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
	Thermotolerant Coliforms	Total Coliforms	org/100ml	1	85	1	0	<1	2	<1	<1	
	Thermotolerant Coliforms	E. coli	MPN/100ml	1	77	0	0	<1	<1	<1	<1	
	Disinfection Residual	Chlorine, free	mg/L	0.05	728	728	0	<0.05	3.39	2.42	3.10	
	Turbidity	Turbidity	NTU	0.1	730	730	0	0.30	0.29	0.10	0.14	
	рН	рН	pH Units	1	730	730	0	7.34	7.72	7.75	7.64	
	Anions	Sulphate	mg/L	0.5	24	24	0	1.20	5.20	2.10	4.69	
nt atei	Anions	Nitrate	mg/L	0.01	24	24	0	0.04	0.21	0.08	0.16	
d ⊗	Metals	Iron, Total	mg/L	0.005	208	18	0	<0.005	0.99	0.005	0.003	
ateo	Metals	Manganese, Total	mg/L	0.001	104	77	0	<0.001	0.07	0.002	0.005	
Trei	Metals	Aluminium	mg/L	0.005	730	624	0	<0.005	0.14	0.01	0.02	
TP	Fluoride	Fluoride	mg/L	0.02	730	730	0	0.60	0.75	0.68	0.72	
T N S	Metals	Copper	mg/L	0.002	24	0	0	<0.002	<0.002	<0.002	<0.002	
late Igla	Metals	Zinc	mg/L	0.001	24	4	0	<0.001	0.004	0.000	0.002	
Dou	Metals	Arsenic	mg/L	0.001	8	4	0	<0.001	0.0007	<0.001	<0.001	
	Metals	Selenium	mg/L	0.001	8	0	0	<0.001	<0.001	<0.001	<0.001	
	Metals	Mercury	mg/L	0.0006	8	0	0	<0.0006	<0.0006	<0.0006	<0.0006	
	Metals	Cadmium	mg/L	0.0001	8	0	0	<0.0001	<0.0001	<0.0001	<0.0001	
	Metals	Nickel	mg/L	0.001	8	0	0	<0.0001	<0.001	<0.001	<0.001	
	Metals	Chromium	mg/L	0.001	8	0	0	<0.0001	<0.001	<0.001	<0.001	
	Disinfection By-product	Trihalomethanes	ug/L	5	104	104	0	<0.0001	87	26	40.9	
	Thermotolerant Coliforms	Total Coliforms	org/100ml	1	46	44	0	<0.0001	579	36	91	
	Thermotolerant Coliforms	E. coli	MPN/100ml	1	46	15	0	<0.0001	20	1	3	
	Turbidity	Turbidity	NTU	0.1	317	317	0	<0.0001	15.9	1.10	1.70	
	рН	рН	pH Units	1	316	316	0	<0.0001	10.95	10.48	10.75	
	Anions	Sulphate	mg/L	0.5	11	11	0	<0.0001	3.60	2	3.45	
nt ter	Metals	Iron, Total	mg/L	0.005	46	46	0	<0.0001	0.37	0.15	0.28	
Pla Wa	Metals	Manganese, Total	mg/L	0.001	46	46	0	<0.0001	0.020	0.007	0.010	
e nt	Geosmin/ MIB	Geosmin	ng/L	1	11	8	0	<0.0001	21	6.27	18.50	
P R	Geosmin/ MIB	MIB	ng/L	1	11	1	0	<0.0001	2	0.18	1.00	
WT	Fluoride	Fluoride	mg/L	0.02	46	23	0	<0.0001	0.18	0.03	0.09	
ern	Metals	Arsenic	mg/L	0.001	4	0	0	<0.0001	<0.001	<0.001	<0.001	
Vate orth	Metals	Selenium	mg/L	0.001	4	0	0	<0.0001	<0.001	<0.001	<0.001	
× 2	Metals	Mercury	mg/L	0.0006	4	0	0	<0.0001	<0.0001	<0.0001	<0.0001	
	Metals	Cadmium	mg/L	0.0001	4	0	0	<0.0001	<0.0001	<0.0001	<0.0001	
	Metals	Nickel	mg/L	0.001	4	0	0	<0.0001	<0.001	<0.001	<0.001	
	Metals	Chromium	mg/L	0.001	4	0	0	<0.0001	<0.001	<0.001	<0.001	
	Giardia	Giardia	cysts/100ml	1	4	0	0	<0.0001	<0.0001	<0.0001	<0.0001	
	Cryptosporidium	Cryptosporidium	oocysts/10L	1	4	0	0	<0.0001	<0.0001	<0.0001	<0.0001	

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
	Thermotolerant Coliforms	Total Coliforms	org/100ml	1	46	0	0	<0.0001	<1	<1	<1	
	Thermotolerant Coliforms	E. coli	MPN/100ml	1	46	0	0	<0.0001	<1	<1	<1	
	Disinfection Residual	Chlorine, free	mg/L	0.05	317	317	0	<0.0001	2.37	1.95	2.25	
	Turbidity	Turbidity	NTU	0.1	317	317	0	<0.0001	0.07	0.04	0.05	
	рН	рН	pH Units	1	317	317	0	<0.0001	7.60	7.5	7.60	
<u> </u>	Anions	Sulphate	mg/L	0.5	11	11	0	<0.0001	4.1	2.20	3.95	
nt /ate	Anions	Nitrate	mg/L	0.01	11	10	0	<0.0001	0.06	0.03	0.06	
d w	Metals	Manganese, Total	mg/L	0.001	46	46	0	<0.0001	<0.001	<0.001	<0.001	
ent	Metals	Iron, Total	mg/L	0.005	91	22	0	<0.0001	0.10	0	0.01	
Tre time	Metals	Aluminium	mg/L	0.005	317	142	0	<0.0001	0.11	0.01	0.03	
VTP	Fluoride	Fluoride	mg/L	0.02	316	316	0	<0.0001	0.84	0.69	0.73	
L N N	Metals	Copper	mg/L	0.002	11	1	0	<0.0001	<0.002	<0.002	<0.002	
Wate Norther	Metals	Zinc	mg/L	0.001	11	4	0	<0.0001	0.003	0.001	0.003	
	Metals	Arsenic	mg/L	0.001	4	0	0	<0.0001	<0.001	<0.001	<0.001	
	Metals	Selenium	mg/L	0.001	4	0	0	<0.0001	<0.001	<0.001	<0.001	
	Metals	Mercury	mg/L	0.0006	4	0	0	<0.0001	<0.0001	<0.0001	<0.0001	
	Metals	Cadmium	mg/L	0.0001	4	0	0	<0.0001	<0.0001	<0.0001	<0.0001	
	Metals	Nickel	mg/L	0.001	4	0	0	<0.001	<0.001	<0.001	<0.001	
	Metals	Chromium	mg/L	0.001	4	0	0	<0.001	<0.001	<0.001	<0.001	
	Disinfection By-product	Trihalomethanes	ug/L	5	46	46	0	5	63	21.76	35.5	
	Thermotolerant Coliforms	Total Coliforms	org/100ml	1	1011	23	0	<1	201	1	<1	
	Thermotolerant Coliforms	E. coli	MPN/100ml	1	1013	3	3	<1	3	<1	<1	DWI-506-19-08032, DWI-205-20-08377, DWI-506-20-08363.
_	Disinfection residual	Chlorine, free	mg/L	0.05	1005	1005	0	0.39	3.00	1.56	2.23	
sio Dirs	Disinfection residual	Chlorine, total	mg/L	0.05	1011	1011	0	0.07	2.80	1.24	1.86	
ervo	Turbidity	Turbidity	NTU	0.1	1011	1000	0	<0.1	3.3	0.25	0.5	
ans	рН	рН	pH Units	1	1011	1011	0	6.35	8.20	7.56	7.90	
Ē	Metals	Iron, Total	mg/L	0.005	1010	501	0	<0.005	0.13	<0.005	0.02	
	Metals	Manganese, Total	mg/L	0.001	921	830	0	<0.001	0.03	<0.001	0.01	
	Metals	Lead, Total	mg/L	0.0006	979	60	0	<0.0006	<0.0006	<0.0006	<0.0006	
	Disinfection By-product	Trihalomethanes	µg/L	5	1007	1007	0	5	171	53	102	
	Disinfection By-product	Chlorates	µg/L	50	152	128	0	<50	749	201	569	

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
	Thermotolerant Coliforms	Total Coliforms	org/100ml	1	1913	25	0	<1	200	1	<1	
	Thermotolerant Coliforms	E. coli	MPN/100ml	1	1913	0	0	<1	<1	<1	<1	
	Disinfection residual	Chlorine, free	mg/L	0.05	1905	1903	0	<0.05	3.25	1.34	2.07	
	Disinfection residual	Chlorine, total	mg/L	0.05	1905	1898	0	<0.05	2.37	1.00	1.6	
	Turbidity	Turbidity	NTU	0.1	1855	1828	0	<0.1	4.3	0.27	0.6	
	рН	рН	pH Units	1	1831	1831	0	6.50	8.80	7.60	8.07	
Ę	Metals	Iron, Total	mg/L	0.005	441	230	0	< 0.005	0.07	0.001	0.01	
es	Metals	Manganese, Total	mg/L	0.001	369	314	0	<0.001	0.08	0.001	0.001	
Reticul: Hous	Metals	Lead, Total	mg/L	0.001	441	296	0	<0.001	0.01	<0.001	0.002	DWI-506-20-08356. Lead exceedance (0.047mg/L) in the Townsville drinking Water Scheme was determined to be a fire service line and not part of potable water supply.
	Fluoride	Fluoride	mg/L	0.02	441	441	0	0.42	0.8	0.69	0.76	
	Disinfection By-product	Trihalomethanes	µg/L	5	40	440	0	6	211	52	95	
	Disinfection By-product	Chlorates	µg/L	50	73	62	0	<50	657	199	518	

