

# Townsville City Council Townsville Water DWQMP Annual Report

2015/ 2016 (FINANCIAL YEAR)

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# 1 Executive Summary

Townsville City Council's Drinking Water Quality Management Plan 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 (updated February 2016) and the *Public Health Regulation 2005* for the 2015/2016 financial year.

The main issue for water quality for the reportable period was the introduction of drought imposed water restrictions and our management of these. Water quality (and supply) required increased management by the Water Quality Team especially with regards to water age through increased monitoring, targeted flushing, managing reservoir levels and managing chlorine residuals. It was demonstrated that the increased management of the system was effective as there was no apparent increase in microbiological detection or customer complaints.

Overall compliance for *Escherichia Coli* for each scheme was 99.9% for the Townsville Drinking Water Scheme, 100% for the Paluma Township Drinking Water scheme and 99.5% for the Giru/ Cungulla Drinking Water Scheme. (It must be noted that there was no *E.coli* detection in Cungulla for the financial year and this result has been generated through the rolling average calculation).

Four notifications of non-compliance were submitted to the Regulator. These comprised of two *E.coli* detections and one manganese non-compliance in the Townsville Drinking Water Scheme, and one trihalomethane non-compliance at Paluma Drinking Water Scheme.

There were 90 customer complaints regarding drinking water quality of which 13 were owner's side issues and 5 were vexatious. 52 were dirty/milky water, 16 were taste odour and 4 were suspected illness. All were rectified appropriately and with consultation with our customers.

Two research projects were undertaken within the 15/16 financial year. The potable water chlorate investigation which resulted in new reportable limits for chlorates being set and the aluminium bioremediation at Giru WTP project which is ongoing.

The DWQMP Audit was undertaken in July 2016, while it does not fall under the remit of this annual report; we would like to report that *“Within the scope of the audit, TCC complied with its obligations under the Act, Regulations and Audit Guidelines. There was good compliance between the current version of the DWQMP in use by TCC and the observations made during the audit. No poor quality or inadequately maintained infrastructure was observed. Therefore a compliant audit finding has been made by the auditor under the Act on behalf of DEWS”*



## 2 Overview

Townsville City Council's DWQMP was submitted to the Office of the Water Supply Regulator on 21st June 2011. It was approved with conditions on 29 August 2012. The plan underwent a review from April – June 2014 and was submitted for approval to the Office of the Water Supply Regulator with Townsville City Council's Drinking Water Quality Management Plan Annual Report on December 2014. Townsville's first DWQMP Audit was undertaken in July of 2016.

Townsville Water services a population of 192,038 with 70,973 water meter connections, in three drinking water schemes; Townsville Drinking Water Scheme, Paluma Drinking Water Scheme and Giru/ Cungulla Drinking Water Scheme.

Three Water Treatment Plants service the region with Douglas WTP and Northern WTP servicing Townsville and Giru Water Treatment Plant servicing Cungulla.

Ross Dam water, supplemented with water from the Burdekin Dam when required, feeds Douglas WTP. Paluma Dam/ Crystal Creek feed Northern WTP. The Houghton River feeds Giru WTP. An unnamed rainforest creek feeds Paluma Township

63,516 ML of water was produced in the financial year. Townsville Water maintains 2 dams, 2 Weirs (Paluma Weir and Blacks Weir), 23 water pumping stations, 41 reservoirs (water storage facilities) and 2,554 km of water distribution mains.



### 3 Actions taken to implement the DWQMP

The Drinking Water Quality Management Plan is managed and updated 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/ queries from consumers, and monitor all Critical Control Points, the water sampling plan and the subsequent data it generates. They are part of a broader Water Quality Team which includes the Manager Water Operations, Water Operations Engineer, Commercial Compliance Officer, Bulk Water Maintenance Officer and the Water Operators.

TRILITY are engaged to manage Douglas Water Treatment Plant and Northern Water Treatment Plant on Townsville City Council's (TCC) behalf. 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 and ad hoc meetings.

There were no hazards or hazardous events that affected water quality during the financial year.

To reduce risk to water supply to the Northern Beaches area, Kulburn Emergency pumps were installed and commissioned in July 2015 to enable the back-feeding of water to the Northern Beaches with Douglas treated water if Northern Water Treatment Plant requires maintenance or to be shut down in an emergency event e.g. cyclone.

A formalised review did not take place for the 15/16 reporting period for this annual plan.

An audit was undertaken 26-28 July 2016 which will fall into the 16/17 annual plan period but of which a brief outline will be given in section 8.

No new amendments were made to the plan for this reporting period.

### 3.1 Sampling Point Project

A review of sample point locations had previously been undertaken mid-2013. An issue with *E.coli* detection at a sample point in Rosslea showed that some of our sample point locations were no longer adequate. A decision was made to move sample points from houses to dedicated sample points in parks. A majority of the sample points have been relocated to appropriate parks and are housed in secure, vandal proof casings as per the blue structure in the photo below.



### 3.2 Water Operators Certificate III

Water Operations have five Water Operators who underwent training in their Certificate III. It is a nationally recognised qualification to undertake treatment of drinking water. It is industry focussed in monitoring and coordinating treatment processes to protect both public health and the environment. All Operators were successful in obtaining their certificates.



### 3.3 Managing Water Quality during drought imposed water restrictions

Perhaps the biggest issue affecting water quality in the reporting period was drought imposed water restrictions. In August 2015 Townsville was placed under level 1 restriction when Ross Dam hit 40%. In October 2015, when the dam level hit 30%, level 2 restrictions were imposed. This had the net effect of reducing the volume of water produced. It changed water flows and fluctuations within the reservoir and distribution system, and increased water age. This had an effect on water quality which required constant management by the Water Treatment Engineer and Water Quality Team. It was managed through:

- » increased monitoring (especially of chlorine residuals),
- » increased management of chlorine residuals throughout the distribution system,
- » a smart targeted approach to flushing,
- » managing reservoir levels, and
- » implementing a water quality monitoring program.

It was demonstrated that the increased work and management of the system has been effective as there has not been a corresponding increase in microbiological detection or customer water quality complaints.

## Are you up to the Dry Tropics Watersmart Outdoor Water use challenge? How many do you do?

1 Adjust watering schedule to match seasonal weather conditions and landscape requirements 2 Add organic matter to the soil (including top dressing the lawn) to improve moisture and nutrient holding capacity 3 Group plants with similar water needs together (hydro-zoning) 4 Ensure outdoor taps, hoses, and irrigation systems do not leak 5 Install and use targeted irrigation rather than handheld hoses or sprinkler systems 6 Lightly fertilise lawns to reduce watering needs 7 Improve the water absorption of clay soils by treating with gypsum products 8 Take the catcher off the mower and leave the grass clippings on the lawn to protect against evaporation 9 Place mulch on garden beds and potted plants to reduce evaporation and increase organic matter in the soils 10 Plant vegetation suitable to the climatic conditions 11 Grow plants best suited to the soil 12 Reduce lawn area to reduce watering requirement 13 Install an outdoor water meter and irrigation system 14 Water the garden in the early morning or in the evening to reduce evaporation 15 Add organic matter to the soil (including top dressing the lawn) to improve moisture and nutrient holding capacity 16 Install a groundwater system on the property 17 Install and use a hose for outdoor purposes 18 Place pool cover over pool when not in use to reduce evaporation 19 Use a handheld hose to water the lawn rather than a sprinkler system 20 Use plants as screens and windbreaks to protect gardens from hot winds and evaporation that dry out the soil 21 Do not water before rain events (check weather forecast before watering garden) 22 Improve the water absorption of clay soils by treating with gypsum products 23 Take the catcher off the mower and leave the grass clippings on the lawn to protect against evaporation 24 Install an automatic irrigation system with a rain switch or soil moisture sensor that shuts off when watering is not required 25 Place mulch on garden beds and potted plants to reduce evaporation and increase organic matter in the soils 26 Plant vegetation suitable to the climatic conditions 27 Grow plants best suited to the soil 28 Reduce lawn area to reduce watering requirement 29 Install a rainwater collection and storage system 30 Only wash your car as frequently as required 31 Use soil wetters and water crystals to ensure garden soil absorbs as much water as possible 32 Add humic acids to sandy soils to attract moisture from air spaces in the soil 33 Ensure taps are fully turned off 34 Install a windscreen to reduce pool water evaporation caused by the wind 35 Ensure taps are properly installed and maintained to reduce leakage 36 Avoid the purchase and use of recreational toys that require a steady stream of water 37 Adjust lawn mower height setting to highest appropriate setting to help retain lawn moisture 38 Adjust sprinklers so only the lawn/garden is watered and not the house, footpath or street 39 Set up a convenient outdoor irrigation system 40 Monitor and test soil moisture to determine if watering is required 41 Water the roots of plants rather than the leaves 42 Sweep driveways and pathways rather than hosing down 43 Landscape using natives to trap and direct rainwater and runoff 44 Install a tap timer for sprinkler and irrigation systems 45 Check for leaks around pool/spa pumps 46 Divert washing machine water to the garden 47 Identify and promptly fix soil leaks 48 Direct downspouts and other runoff towards vegetation to pots 49 Minimize paving of solid outdoor areas as this increases heat radiation and evaporation 50 Regularly remove weeds from garden and lawn areas which compete with plants for water 51 Avoid planting young plants or law grass in winter when the ground is harder, as the high heat and disturbed soil will lose more water 52 Minimise the use of potted plants in preference for plants in the ground to reduce water requirements 53 Only water lawn when it is showing signs of stress, and water in long, slow soakings to promote deep root systems 54 Water plants less frequently, but more heavily, to promote root growth and drought tolerance 55 Use the amount of water appropriate for the soil type 56 Wash car less often 57 Wash pots on the lawn 58 Use porous paving to increase water retention on the property 59 Design driveways and paved areas to slope towards the lawn or a garden bed if the soil is sandy to allow rainwater to water these areas 60 Wash the car and other vehicles on the lawn to reduce additional watering requirements 61 Use self-watering pots that trap access water for later use 62 Ensure pool is not overfilled when refilling pool or topping up 63 Use a pool wash service 64 Wash pots on the lawn 65 Use pots and containers that snuff pores to retain water in the pot 66 Reduce the amount of water splashed out of the pool when using the pool 67 Install and use garden hose trigger nozzles that shut off water when it is not being used, instead of setting a hose run 70 Utilise organic liquid fertilisers and/or compost rather than dry fertilisers, which take up water from the soil and raise salt levels 71 Use porous paving to increase water retention on the property



## **4 Research Activities**

### **4.1 Potable Water Chlorate Investigation**

Townsville Water completed a project to assess the levels of chlorates in the Townsville system 2013/2014. Operational amendments were made throughout Townsville's Drinking Water Schemes and reductions in chlorate formation were achieved. As a result of this project Townsville Water set a reportable value for chlorates. Ongoing breaches of this value (as outlined in section 5) and subsequent investigations suggested that further review of chlorates throughout the system was required.

The project was completed in February 2016. All corrective actions to reduce chlorates have been introduced and have been largely effective. An exception to this is Paluma, due to a lack of water treatment in the Township. Water treatment consists of chlorination only.

New reportable limits have been proposed and we continue to work towards these.

### **4.2 Aluminium Bioremediation at Giru WTP**

James Cook University (JCU), MBD Energy and Townsville City Council are undertaking a research program to understand the potential to use freshwater macro-algae as a tool to bio-remediate waste water from the Giru Drinking Water Treatment Plant (GDWTP). The focus of the research is on removing dissolved aluminium (Al) that is derived from the use of alum as a flocculent in the water treatment process. This will enable re-use of the water in local irrigation.

Initial testing has shown that removal of Al is possible with the next step being field trials. Field trials are expected to occur in the 16/17 financial year.

## 5 Information supplied to the Regulator regarding non-compliances and/ or prescribed incidents.

There were four non-compliances with water quality criteria for the 15/16 financial year. The following describes the non-compliance and how it was rectified.

### DWI-7-506-00038 Townsville Drinking Water Scheme

Incident Description: Detection of *E.coli* (1 org/100ml) in Rosslea house sample on 8<sup>th</sup> July 2015. Sample had a chlorine concentration of 1.3mg/L Free Chlorine and 1.7mg/L Total Chlorine. The *E.coli* rolling percentage average for the month was 99.9%

Corrective and Preventative Actions: The sample point was inspected and it was discovered that the sample address (house sample point) had become derelict and had no turnover of water (2KL consumed in the preceding year). It was ascertained that the sample was compromised by the poor sample location. A dedicated sample point was installed in a park nearby. Resamples and all further samples have come back clear of *E.coli*.

It must be noted that this non-compliance led to an overhaul of all of Townsville City Council's sampling locations.

### DWI-7-506-00039 Townsville Drinking Water Scheme

Incident Description: Detection of *E.coli* (1or/100ml) in an Oak Valley house sample on 23<sup>rd</sup> November 2015. Free chlorine was 0.19mg/L and total chlorine was 0.27mg/L. pH was 6.9. The rolling average for the month was 99.9%. Four other samples in the Oak Valley area did not detect *E.coli*.

Corrective and Preventative Actions: There was a chlorine dosing fault during the night at the re-chlorination station at Mt Jack. This allowed a "glug" of minimally chlorinated water to enter the system. Pumps were reset and the area was flushed. All resamples came back clear of *E.coli*.

### **DWI-7-506-00040 Townsville Drinking Water Scheme**

Incident Description: Detection of Manganese (1.1mg/L) at Casaurina Park, Annandale on 17<sup>th</sup> February 2016. This was a highly unusual sample. Historically there has never been an issue with elevated Manganese (Mn) in the Townsville drinking water system. There is no Mn in the treated water from Douglas WTP. No other sample taken on the day had elevated Mn. Public health would not have been affected as the tap was a vandal proof tap, not accessible to the public, on a grass verge that is not used by the public.

Corrective and Preventative Actions: All Manganese data was analysed. Resamples were taken, both at this point and at nearby points. All resamples came back as well below ADWQ Guidelines or not detected. It is unclear what caused the elevated Mn. The sample tap was removed and a more representative sample point is now in use. Elevated Mn has not been detected anywhere in the Townsville Drinking Water Scheme since.

### **DWI-7-506-00044 Paluma Drinking Water Scheme**

Incident Description: Detection of Trihalomethanes (291µg/L) at a house sample in the Paluma Township on 25<sup>th</sup> November 2015.

Corrective and Preventative Actions: As the Trihalomethanes (THMs) were detected after the fact no flushing occurred. Subsequent samples did not show THMs above guideline limits.



## 6 Compliance with Water Quality Criteria for Drinking Water

Townsville Water have 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 microbial.

All samples are taken and analysed by Townsville Laboratory services which are NATA accredited. Reports/ results are emailed to the water quality team and the team have access to Laboratory Information Management System (LIMS) to obtain results as required. All data is monitored and trends analysed throughout the year by the Water Quality Officer, Water Treatment Engineer and Water Treatment Graduate Engineer.

We have been largely compliant with the water quality criteria with four water quality incidents as outlined above occurring through the year. The *Public Health Regulation 2005*, that requires 98 per cent of samples taken in a 12 month period should contain no *Escherichia.coli*, has been complied with for the three schemes. There have been no failures to meet sampling frequencies and all locations have been sampled.

Overall compliance for *Escherichia coli* for each scheme was

Drinking Water Scheme	No. of samples	% Compliance
Townsville	3,446	99.9%
Paluma	87	100%
Giru/ Cungulla	127	99.5% *

Table 1. Percentage *E.coli* compliance for Townsville Water’s three drinking water schemes.

There were two *E.coli* detections in Townsville’s water supply scheme for the period as outlined in section 5 above.

\* It must be noted that there was no *E.coli* detection in Cungulla for the reporting period. The <100% compliance is due to the twelve month rolling average from the *E.coli* detection in the 14-15 reporting year.

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

There were 90 customer complaints regarding quality of water supplied. Five of these however were vexatious complaints.

There were six main types of water quality complaints and all are dealt with as per “the water quality complaints flowchart”, which ensures that all customers receive direct contact either through a phone call or attendance on site by a Council plumber or water operator.

Type of Water Quality Complaint	Dirty Water	Taste/ Odour	Geosmin	Suspected illness	Owners Side	Milky Water	Vexatious Customer Complaints
Number of Complaints	44	16	0	4	5FM 8OS	8	5

Table 2. Number of Drinking Water Quality Complaints for Townsville

The main complaints received regarding water quality every year are for dirty water. Dirty water occurs when sediment becomes stirred up from the bottom of the pipe; usually from construction works occurring in an area, filling of water trucks with hydrants and in the case of restrictions from sudden changes in water velocities during watering times. A Council plumber flushes the main and the customer is called the following day to ensure the issue has been rectified.

Taste and odour resulted in 16 complaints which were rectified by flushing the mains and the customer’s meters. They tend to be linked to dirty water events or high/ low chlorine. If linked to a dirty water event then flushing rectifies. In the case of chlorine, it is tested onsite and samples are generally taken to Townsville Laboratory Services for testing to ensure water quality is within guideline limits. Return phone calls to customers ensures the issue is resolved.

We had no geosmin complaints this year. Geosmin has an earthy taste and results in taste/ odour complaints. Geosmin causes periodic issues in the Northern Beaches area.

4 cases of suspected illness were received last year. In these instances we analyse samples at Townsville Laboratory Services and liaise one on one with the customer. In all instances it was shown reticulated water supply was fully compliant with Australian Drinking Water Guideline.

13 water quality issues that were deemed owners side issues were reported. These were a mix of flick hose degradation, old filters which required replacement, dirty taps and elevated copper. All customers were contacted and liaised with to rectify issue.

Townsville Water had an issue with milky water (8 complaints) in two suburbs that were difficult to rectify. Flushing alone did not remove the air from the system. Extra air valves were cut in to the mains to help remove the air.

## 8 Outcome of Review and findings/ recommendations of Audit

The DWQMP was reviewed mid- 2014, the next review is due September 2016.

The first regular audit was conducted in July 2016 by Water Futures Pty Ltd. While the discussion of the audit does not fall under the remit of this annual report; we would like to report that *“Within the scope of the audit, TCC complied with its obligations under the Act, Regulations and Audit Guidelines. There was good compliance between the current version of the DWQMP in use by TCC and the observations made during the audit. No poor quality or inadequately maintained infrastructure was observed. Therefore a compliant audit finding has been made by the auditor under the Act on behalf of DEWS”*



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ANNUAL WATER QUALITY REPORT  
for the reporting period  
1st July 2015 - 30 June 2016



TOWNSVILLE DRINKING WATER SCHEME

Drinking Water Service Provider	Townsville City Council
SPID	506
Drinking Water Scheme	Townsville Drinking Water Scheme
Names of Towns, communities or regions serviced by this scheme	Townsville
Population Serviced by this scheme	192,038
Reporting Year	July 2015- June 2016
Laboratory Name	Townsville Laboratory Services

Scheme Name	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
Townsville DWS	Source Water Ross River Dam	Thermotolerant Coliforms	Total Coliforms	org/100ml	1	200	200	0	62	24200	2619	7723	
		Thermotolerant Coliforms	Thermotolerant Coliforms	org/100ml	1	84	84	0	2	220	17035	60	
		Turbidity	Turbidity	NTU	0.1	185	185	0	3.4	30	10.34	19.12	
		pH	pH	pH Units	1	222	222	0	7.13	8.41	7.90	8.27	
		Metals	Iron, Total	mg/L	0.005	186	186	0	0.06	1.10	0.35	0.7	
		Metals	Manganese, Total	mg/L	0.001	186	186	0	0.003	0.30	0.03	0.07	
		Anions	Nitrate	mg/L	0.01	185	36	0	0	0.13	0.01	0.04	
	Source Water Paluma Dam	Thermotolerant Coliforms	Thermotolerant Coliforms	org/100ml	1	23	23	0	2	300	36.91	120	
		Turbidity	Turbidity	NTU	0.1	104	99	0	0	10.4	3.59	6.49	
		pH	pH	pH Units	1	115	115	0	5.19	8.31	6.61	8.19	
		Metals	Iron, Total	mg/L	0.005	83	83	0	0.32	5.90	0.72	1.96	
		Metals	Manganese, Total	mg/L	0.001	83	83	0	0.008	0.14	0.03	0.07	
		Anions	Nitrate	mg/L	0.01	48	48	0	0	0.20	0	0.16	
	Water Treatment Plant Douglas WTP Raw Water	Thermotolerant Coliforms	Total Coliforms	org/100ml	1	51	51	0	79	24000	1922	6915	
		Thermotolerant Coliforms	E.coli	MPN/100ml	1	51	16	0	0	30	1.06	2	
		Turbidity	Turbidity	NTU	0.1	366	366	0	1.49	19.4	7.27	11.6	
		pH	pH	pH Units	1	366	366	0	7.37	8.22	7.75	7.95	
		Anions	Sulphate	mg/L	0.5	11	10	0	0.00	4.20	1.89	3.75	
		Metals	Iron, Total	mg/L	0.005	52	52	0	0.06	0.44	0.19	0.31	
		Metals	Manganese, Total	mg/L	0.001	52	52	0	0.007	0.11	0.03	0.075	
		Geosmin/ MIB	Geosmin	ng/L	1	21	10	0	0.00	3.60	0.87	2.7	
		Geosmin/ MIB	MIB	ng/L	1	20	20	0	1.4	12.33	5.36	9.74	
		Fluoride	Fluoride (Naturally occurring)	mg/L	0.02	52	52	0	0.13	0.22	0.16	0.19	
		Metals	Arsenic	mg/L	0.001	4	4	0	0.001	0.003	0.002	0.002	
Metals		Selenium	mg/L	0.001	4	4	0	0	0	0	0		
Metals		Mercury	mg/L	0.0006	4	4	0	0	0	0	0		
Metals		Cadmium	mg/L	0.0001	4	4	0	0	0	0	0		
Metals		Nickel	mg/L	0.001	4	4	0	0	0	0	0		



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TOWNSVILLE DRINKING WATER SCHEME

Drinking Water Service Provider	Townsville City Council
SPID	506
Drinking Water Scheme	Townsville Drinking Water Scheme
Names of Towns, communities or regions serviced by this scheme	Townsville
Population Serviced by this scheme	192,038
Reporting Year	July 2015- June 2016
Laboratory Name	Townsville Laboratory Services

Scheme Name	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
Townsville DWS	Water Treatment Plant Douglas WTP Raw Water	Metals	Chromium	mg/L	0.001	4	4	0	0	0	0	0	
		Giardia	Giardia	cysts/100ml	1	4	4	0	0	0	0	0	
		Cryptosporidium	Cryptosporidium	oocysts/10L	1	4	4	0	0	0	0	0	
	Water Treatment Plant Douglas WTP Treated Water	Thermotolerant Coliforms	Total Coliforms	org/100ml	1	117	1	0	0	1	0	0	
		Thermotolerant Coliforms	E.coli	MPN/100ml	1	101	0	0	0	0	0	0	
		Disinfection Residual	Chlorine, free	mg/L	0.05	731	731	0	1	4	3.03	3.8	
		Turbidity	Turbidity	NTU	0.1	730	730	0	0.01	0.21	0.11	0.15	
		pH	pH	pH Units	1	730	730	0	7.39	7.7	7.53	7.6	
		Anions	Sulphate	mg/L	0.5	21	20	0	0	4.2	1.77	3.3	
		Anions	Nitrate	mg/L	0.01	21	21	0	0.01	0.22	0.11	0.19	
		Metals	Iron, Total	mg/L	0.005	205	2	0	0	0.009	0	0	
		Metals	Manganese, Total	mg/L	0.001	102	17	0	0	0.009	0	0.002	
		Metals	Aluminium	mg/L	0.005	728	534	0	0	0.102	0.007	0.013	
		Fluoride	Fluoride	mg/L	0.02	732	732	0	0.69	0.77	0.69	0.73	
		Metals	Copper	mg/L	0.002	24	3	0	0	0.002	0	0	
		Metals	Zinc	mg/L	0.001	24	3	0	0	0.005	0	0	
		Metals	Arsenic	mg/L	0.001	8	0	0	0	0	0	0	
		Metals	Selenium	mg/L	0.001	8	0	0	0	0	0	0	
		Metals	Mercury	mg/L	0.0006	8	0	0	0	0	0	0	
		Metals	Cadmium	mg/L	0.0001	8	0	0	0	0	0	0	
		Metals	Nickel	mg/L	0.001	8	0	0	0	0	0	0	
		Metals	Chromium	mg/L	0.001	8	0	0	0	0	0	0	
		Disinfection By-product	Trihalomethanes	ug/L	5	97	97	0	29	92	43.66	67.6	
	Water Treatment Plant Northern WTP Raw Water	Thermotolerant Coliforms	Total Coliforms	org/100ml	1	49	46	0	0	816	41	101	
		Thermotolerant Coliforms	E.coli	MPN/100ml	1	48	20	0	0	129	4	8	
		Turbidity	Turbidity	NTU	0.1	340	340	0	0.39	20.48	1.51	3.81	
		pH	pH	pH Units	1	339	339	0	9.99	11.31	10.60	10.78	
		Anions	Sulphate	mg/L	0.5	10	5	0	0	2.6	0.75	2.15	
		Metals	Iron, Total	mg/L	0.005	49	49	0	0.05	0.32	0.15	0.28	

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Reporting Year	July 2015- June 2016
Laboratory Name	Townsville Laboratory Services

Scheme Name	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
Townsville DWS	Water Treatment Plant Northern WTP Raw Water	Metals	Manganese, Total	mg/L	0.001	49	49	0	0	0.02	0.006	0.01	
		Geosmin/ MIB	Geosmin	ng/L	1	10	6	0	0	9	3.39	9.02	
		Geosmin/ MIB	MIB	ng/L	1	10	2	0	0	2	0	1.95	
		Fluoride	Fluoride	mg/L	0.02	42	42	0	0.02	0.09	0.04	0.07	
		Metals	Arsenic	mg/L	0.001	4	0	0	0	0	0	0	
		Metals	Selenium	mg/L	0.001	4	0	0	0	0	0	0	
		Metals	Mercury	mg/L	0.0006	4	0	0	0	0	0	0	
		Metals	Cadmium	mg/L	0.0001	4	0	0	0	0	0	0	
		Metals	Nickel	mg/L	0.001	4	0	0	0	0	0	0	
		Metals	Chromium	mg/L	0.001	4	0	0	0	0	0	0	
		Giardia	Giardia	cysts/100ml	1	4	0	0	0	0	0	0	
		Cryptosporidium	Cryptosporidium	oocysts/10L	1	4	1	0	0	1	0.25	0.85	
	Water Treatment Plant Northern WTP Treated Water	Thermotolerant Coliforms	Total Coliforms	org/100ml	1	49	0	0	0	0	0	0	
		Thermotolerant Coliforms	E.coli	MPN/100ml	1	49	0	0	0	0	0	0	
		Disinfection Residual	Chlorine, free	mg/L	0.05	340	340	0	1.31	2.2	1.82	2.05	
		Turbidity	Turbidity	NTU	0.1	342	342	0	0.007	0.47	0.038	0.053	
		pH	pH	pH Units	1	342	342	0	7.33	7.73	7.52	7.61	
		Anions	Sulphate	mg/L	0.5	10	5	0	0	3	1	2.685	
		Anions	Nitrate	mg/L	0.01	10	10	0	0.02	0.05	0.037	0.05	
		Metals	Manganese, Total	mg/L	0.001	49	33	0	0	0.01	0.002	0.007	
		Metals	Iron, Total	mg/L	0.005	99	10	0	0	0.01	0	0.007	
		Metals	Aluminium	mg/L	0.005	345	261	0	0	0.168	0.01	0.023	
		Fluoride	Fluoride	mg/L	0.02	342	342	0	0.63	0.76	0.70	0.73	
		Metals	Copper	mg/L	0.002	11	4	0	0	0.007	0.002	0.006	
		Metals	Zinc	mg/L	0.001	11	1	0	0	0.005	0	0.003	
		Metals	Arsenic	mg/L	0.001	4	0	0	0	0	0	0	
		Metals	Selenium	mg/L	0.001	4	0	0	0	0	0	0	
		Metals	Mercury	mg/L	0.0006	4	0	0	0	0	0	0	

Townsville City Councils (SPID 506)  
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1st July 2015 - 30 June 2016



TOWNSVILLE DRINKING WATER SCHEME

Drinking Water Service Provider  
SPID  
Drinking Water Scheme  
Names of Towns, communities or regions serviced by this scheme  
Population Serviced by this scheme

Townsville City Council  
506  
Townsville Drinking Water Scheme  
Townsville  
192,038

Reporting Year  
Laboratory Name

July 2015- June 2016  
Townsville Laboratory Services

Scheme Name	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	
Townsville DWS	Water Treatment Plant Northern WTP Treated Water	Metals	Cadmium	mg/L	0.0001	4	0	0	0	0	0	0		
		Metals	Nickel	mg/L	0.001	4	0	0	0	0	0	0		
		Metals	Chromium	mg/L	0.001	4	0	0	0	0	0	0	0	
		Disinfection By-product	Trihalomethanes	ug/L	5	47	47	0	11	137	29	47		
	Transmission Reservoirs	Thermotolerant Coliforms	Total Coliforms	org/100ml	1	1030	15	0	0	0	200	0.61	0.000	
		Thermotolerant Coliforms	E.coli	MPN/100ml	1	1030	0	0	0	0	0	0	0	
		Disinfection residual	Chlorine, free	mg/L	0.05	1027	1025	0	0	4.07	1.24	2.14		
		Disinfection residual	Chlorine, total	mg/L	0.05	1027	1027	0	0.09	4.77	1.58	2.487		
		Turbidity	Turbidity	NTU	0.1	1030	1008	0	0	2.2	0.24	0.5		
		pH	pH	pH Units	1	1030	1030	0	6.02	8.30	7.55	7.90		
		Metals	Iron, Total	mg/L	0.005	1030	305	0	0	0.54	0.005	0.02		
		Metals	Manganese, Total	mg/L	0.001	1030	312	0	0	0.04	0	0.004		
		Disinfection By-product	Trihalomethanes	ug/L	5	1029	1029	0	12	235	91	153		
		Disinfection By-product	Chlorates	ug/L	50	145	121	0	0	688	238	538		
	Reticulation Houses	Thermotolerant Coliforms	Total Coliforms	org/100ml	1	2126	48	0	0	165	0.267	0		
		Thermotolerant Coliforms	E.coli	MPN/100ml	1	2127	2	2	0	1	0	0		as per DWI-7-506-00038 & DWI-7-506-00039
		Disinfection residual	Chlorine, free	mg/L	0.05	2037	1997	0	0	2.9	0.97	1.79		
		Disinfection residual	Chlorine, total	mg/L	0.05	2037	2031	0	0	3.32	1.27	2.17		
		Turbidity	Turbidity	NTU	0.1	528	518	0	0	3.5	0.28	0.6		
		pH	pH	pH Units	1	2034	2034	0	6.13	8.79	7.57	7.98		
		Metals	Iron, Total	mg/L	0.005	521	162	0	0	0.23	0.005	0.02		
		Metals	Manganese, Total	mg/L	0.001	521	204	1	0	1.1	0	0		as per DWI-7-506-00040
		Fluoride	Fluoride	mg/L	0.02	520	520	0	0.61	0.78	0.7	0.75		
Disinfection By-product		Trihalomethanes	ug/L	5	572	572	0	11	209	93	165			
Disinfection By-product	Chlorates	ug/L	50	99	85	0	0	995	266	565				

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**PALUMA DRINKING WATER SCHEME**

Drinking Water Service Provider  
 SPID  
 Drinking Water Scheme  
 Names of Towns, communities or regions serviced by this scheme  
 Population Serviced by this scheme

Townsville City Council  
 506  
 Paluma Drinking Water Scheme  
 Paluma  
 25-140

Reporting Year  
 Laboratory Name

July 2015- June 2016  
 Townsville Laboratory Services

Scheme Name	Name place	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	
Paluma DWS	Paluma	Source Water Paluma Weir	Thermotolerant Coliforms	E.coli	MPN/100ml	1	11	11	0	8	2400	460	1900		
			pH	pH	pH Units	1	13	13	0	5.86	7.81	6.59	7.52		
			Metals	Iron	mg/L	0.005	13	13	0	0.35	1.9	1.01	1.84		
			Metals	Manganese	mg/L	0.001	13	13	0	0.002	0.07	0.03	0.07		
			Turbidity	Turbidity	NTU	0.1	13	13	0	2.9	14.3	5.93	11.84		
			Cryptosporidium	Cryptosporidium	cells/10 Li	1	2	0	0	0	0	0	0		
			Giardia	Giardia	cells/10 Li	1	2	0	0	0	0	0	0		
		Transmission Paluma Reservoir	Thermotolerant Coliforms	Total Coliform	org/100ml	1	62	0	0	0	0	0	0	0	
			Thermotolerant Coliforms	E.coli	MPN/100ml	1	62	0	0	0	0	0	0	0	
			Disinfection Residual	Chlorine (free)	mg/L	0.05	244	244	0	0.09	4.64	1.68	2.61		
			Disinfection Residual	Chlorine (total)	mg/L	0.05	11	11	0	0.97	2.58	1.9	2.51		
			pH	pH	pH Units	1	12	12	0	5.57	8.55	7.13	8.33		
			Turbidity	Turbidity	NTU	0.1	12	12	0	2.8	10.4	4.94	9.52		
			Disinfection By-product	Chlorates	µg/L	15	59	59	N/A	223	3140	894	2125	Chlorate project being undertaken in 15/16 Financial year.	
			Disinfection By-product	Trihalomethanes	µg/L	2	12	12	0	25	274	91	200	As per DWI-7-506-00044	
		Reticulation Paluma Houses	Thermotolerant Coliforms	Total Coliform	org/100ml	1	24	0	0	0	0	0	0	0	
			Thermotolerant Coliforms	E.coli	MPN/100ml	1	24	0	0	0	0	0	0	0	
			Disinfection Residual	Chlorine (free)	mg/L	0.05	22	22	0	0.09	1.94	0.93	1.71		
			Disinfection Residual	Chlorine (total)	mg/L	0.05	22	22	0	0.14	2.24	1.14	1.88		
			pH	pH	pH Units	2	24	24	0	6.26	8.38	7.44	8.19		
			Turbidity	Turbidity	NTU	0.1	24	24	0	2.6	13.3	4.84	11.89		
			Metals	Iron	mg/L	0.005	24	24	0	0.76	2.3	1.24	2.23		
			Metals	Manganese	mg/L	0.001	24	24	0	0.002	0.13	0.033	0.11		
			Metals	Aluminium	mg/L	0.005	24	24	0	0.099	0.365	0.23	0.34		
			Fluoride	Fluoride (naturally occurring)	mg/L	0.02	24	24	0	0	0.14	0.098	0.12		
			Disinfection By-product	Chlorates	µg/L	15	60	60	0	222	3106	884	2005	Reservoir was offline at the time of 3106ug/L chlorate result and was emptied of all water before being brought back online.	
			Disinfection By-product	Trihalomethanes	µg/L	2	24	24	1	42	291	120	231	As per DWI-7-506-00044	

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GIRU/ CUNGULLA DRINKING WATER SCHEME

Drinking Water Service Provider  
SPID  
Drinking Water Scheme  
Names of Towns, communities or regions serviced by this scheme  
Population Served by this scheme  
Reporting Year  
Laboratory Name

Townsville City Council  
506  
Giru/ Cungulla Drinking Water Scheme  
Cungulla  
288  
July 2015- June 2016  
Townsville Laboratory Services

Scheme Name	Name place	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	
Giru/Cungulla DWS	Giru	Source Water Giru Raw Water (Haughton River)	Thermotolerant Coliforms	Total Coliform	org/100ml	1	42	41	0	0	19000	1186	2350		
			Thermotolerant Coliforms	Thermotolerant Coliforms	org/100ml	1	3	3	0	2	40	17	37		
			Thermotolerant Coliforms	E.coli	MPN/100ml	1	49	24	0	0	100	5	10		
			Turbidity	Turbidity	NTU	0.1	50	50	0	0.2	71	5.1	31.42		
			pH	pH	pH Units	1	50	50	0	6.44	9.63	8.24	9.43		
			Metals	Iron, Total	mg/L	0.005	50	50	0	4.6	17.8	10.24	15.32		
			Metals	Manganese, Total	mg/L	0.001	48	48	0	0.002	0.35	0.033	0.15		
			Cryptosporidium	Cryptosporidium	cells/10 Li	1	1	0	0	0	0	0	0		
			Giardia	Giardia	cells/10 Li	1	1	0	0	0	0	0	0		
		Water Treatment Plant Giru Clear Water Storage	Thermotolerant Coliforms	Total Coliform	org/100ml	1	49	9	0	0	980	25	25		These were detected pre-chlorination. Water is chlorinated at Giru and Cungulla
			Thermotolerant Coliforms	E.coli	MPN/100ml	1	49	1	0	0	12	0.24	0		These were detected pre-chlorination. Water is chlorinated at Giru and Cungulla
			Turbidity	Turbidity	NTU	0.1	50	50	0	0.1	1.4	0.36	0.86		
			pH	pH	pH Units	1	50	50	0	6.65	8.12	7.35	7.93		
			Metals	Iron, Total	mg/L	0.005	50	13	0	0	0.04	0	0.02		
	Metals		Manganese, Total	mg/L	0.001	50	38	0	0	0.02	0	0.015			
	Thermotolerant Coliforms		Total Coliform	org/100ml	1	52	2	0	0	1	0	0			
	Cungulla	Transmission Cungulla Reservoir	Thermotolerant Coliforms	E.coli	MPN/100ml	1	52	0	0	0	0	0			
			Turbidity	Turbidity	NTU	0.1	52	51	0	0	1	0.41	0.75		
			pH	pH	pH Units	1	52	52	0	7.13	8.3	7.75	8.15		
			Metals	Iron, Total	mg/L	0.005	52	10	0	0	0.02	0.002	0.015		
			Metals	Manganese, Total	mg/L	0.001	52	22	0	0	0.09	0.003	0.009		
			Disinfection Residual	Chlorine (free)	mg/L	0.05	52	52	0	0.71	1.91	1.29	1.72		
			Disinfection Residual	Chlorine (Total)	mg/L	0.05	52	52	0	0.84	2.35	1.6	1.97		
			Disinfection By products	Chlorates	µg/L	15	13	13	0	107	812	318	665	Chlorate project being undertaken in 15/16 Financial year.	
			Disinfection By products	Trihalomethanes	µg/L	2	52	52	0	18	94	56	80		
			Thermotolerant Coliforms	Total Coliform	org/100ml	1	74	2	0	0	3	0.068	0		
			Reticulation Cungulla Houses	Thermotolerant Coliforms	E.coli	MPN/100ml	1	74	0	0	0	0	0		
		Turbidity		Turbidity	NTU	0.1	49	49	0	0.01	1.70	0.42	0.76		
		pH		pH	pH Units	1	74	74	0	7.12	8.36	7.74	8.18		
		Metals		Iron, Total	mg/L	0.005	52	12	0	0	0.097	0.004	0.014		
		Metals		Manganese, Total	mg/L	0.001	52	19	0	0	0.08	0.005	0.019		
		Disinfection Residual		Chlorine (free)	mg/L	0.05	74	74	0	0.06	1.58	0.88	1.4		
Disinfection Residual		Chlorine (Total)		mg/L	0.05	74	74	0	0.21	1.90	1.13	1.66			