

Drinking Water Quality Management Plan (DWQMP) report

For the financial year: 2016-2017

Scheme: LAURA

Cook Shire Council

SPID: 511

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COOK SHIRE COUNCIL - DRINKING WATER QUALITY MANAGEMENT PLAN ANNUAL REPORT

Glossary of terms

ADWG 2011	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
<i>E. coli</i>	<i>Escherichia coli</i> , a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
MPN/100mL	Most probable number per 100 millilitres
<	Less than
>	Greater than
NATA Lab	Accredited by the National Association of Testing Authorities of Australia

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1. Introduction

This report documents Cook Shire Council's drinking water service performance with respect to water quality and compliance with the Drinking Water Quality Management Plan (DWQMP) as required under the Water Supply (Safety and Reliability) Act 2008 (the Act).

This report assists the Regulator to determine compliance with the approved DWQMP and any approval conditions; and provides a mechanism for drinking water providers to publicly report on their drinking water quality performance.

2. Overview of Operations

Laura's Water is sourced solely from 2 bores located at the Treatment Plant Site (Lot 1 SP116188)

Bore 1 is 35m deep. Bore 1 is predominately used with Bore 2 being used as a backup

Water is pumped up from the Bores, injected with sodium hypochlorite and then goes through an aerator into a holding tank. The injection of Hypochlorite is for the oxidation process to remove Iron

Water is drawn from the holding tank, filtered through a Memcor Micro filtration plant from where it passes to a low level Clear water Reservoir.

The Bore water undertakes the following treatment processes

- Oxidation, by Sodium Hypochlorite and Aeration
- Filtration, by micro filtration
- Chlorination

The treated water is pumped to the reticulation via a bank of 4 pressure pumps. These pumps cut in / cut out as required to maintain a steady pressure within the reticulation.

Two overhead tanks provide water to the township during periods of Electricity power failures, (at a reduced pressure).

Laura currently has 48 water connections:

- Residential – 50%
- Commercial/Industrial – 6%
- Council/Institutional/Government -44%

3. Actions taken to implement the DWQMP

Actions taken to implement the DWQMP include:

- Improvement plan has been created. All drinking water improvements are documented in this plan.
- A procedure has been implemented for reporting of *E. coli* in drinking water.
- A procedure has been implemented for any Environmental Incidents.
- Chemical contracts have been entered into through FNQROC with Cleveland Bay chemicals and Elite. This contract involves FNQROC overseeing the chemical quality.

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

To date there has been no revisions to the operational monitoring since the DWQMP was approved

Amendments made to the DWQMP

A thorough review of the DWQMP was conducted with some extensive alterations being made to the original plan.

The revised plan was submitted to the Regulator on 26th April 2016

The revised plan, as submitted, was approved by the Regulator on 27th July 2016

4. Compliance with water quality criteria for drinking water

All drinking water in Laura met the recommended values in the Australian Drinking Water Guidelines and the Public Health Regulation for E.coli.

The following results for Laura are in Appendix A:

- Table 2A: Laura Reticulation – Treated Water - Physical Chemical – (NATA Lab)
- Table 2B: Laura Reticulation – Treated Water - Metals – (NATA Lab)
- Table 2C: Laura Reticulation – Treated Water - E.coli & Coliforms monitoring – (NATA Lab)
- Table 2D: Laura Reticulation – Physical Chemical – (CSC Annan WTP Lab)
- Table 3A: Laura Treated Water Final – Physical Chemical (NATA Lab)
- Table 3B: Laura Treated Water Final - Metals (NATA Lab)
- Table 3C: Laura Treated Water Final – Free Chlorine – (On-line chlorine analyser)
- Table 4A: Laura Raw Water - Physical Chemical (NATA Lab)
- Table 4B: Laura Raw Water - Metals (NATA Lab)
- Table 5: Reticulation E. coli 12 Month Rolling Average

Table 1 Location of sampling sites within Laura’s water reticulation network.

All reticulation sampling for all parameters are collected from these fixed sites for the reasons listed.

Sample Location Name	Street Name	Site Chosen Because	GPS Coordinates *
Laura Roadhouse	Peninsular Development Rd	End of the line.	15°33'59.10"S - 144°27'3.32"E
Telstra Hut	Terminus St	Towards the end of the line.	15°33'32.89"S - 144°26'42.73"E
Laura Library	Terminus St	Ease of access	15°33'31.15"S - 144°26'47.43"E
Laura Police Stn	Gladwell Court	Centrally located	15°33'33.67"S - 144°26'47.32"E
End of George Close	George Close	Towards the end of the line.	15°33'51.48"S - 144°27'4.35"E
End of Musgrave St	Musgrave St	Towards the end of the line.	15°33'55.55"S - 144°26'43.10"E

5. Notifications to the Regulator under sections 102 and 102A of the Act

For the financial year 2016-2017 there were nil instances where the Regulator needed to be notified under sections 102 or 102A of the Act. There was no detection of E. coli – an organism that may not directly represent a hazard to human health, in any samples but indicates the presence of recent faecal contamination. There were nil incidents that required a “Boil Water Alert” to be issued, or “Do not drink Water” notices displayed in the community.

6. Customer complaints related to water quality

Cook Shire Council is required to report on the number of complaints, general details of complaints, and the responses undertaken.

Cook Shire maintains a “Register of Complaints” which includes Water & Sewerage. Customer Services officers generally receive the initial complaints, which if it’s in the form of a letter, or email, then it is then filed in the CM9 Database, a Task is then generated from “Authority” and dispersed to the relevant officer/s for actioning. The relevant officer/s must record the actioned details in “Authority” to complete the Task. So a record of the complaint and the action taken to rectify the problem is all recorded. At the end, the complainant is notified of the outcome of the original complaint

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A search of both the CM9 database and the CRM (Customer Request Management) in “Authority” for the financial year 2016-2017 has failed to locate any Customer Complaints regarding Water Quality.

Suspected Illness

Cook Shire Council (Water & Wastewater) are not aware of any customers who suspect their water from the Laura Reticulated Water Supply may in some way be associated with an illness or sickness they are experiencing.

Discoloured water

Cook Shire Council had not had any Discoloured water incidents / complaints from the Laura Reticulated Water Supply in this reporting period

Taste and odour

Cook Shire Council had not had any Taste & Odour water incidents / complaints for the Laura Reticulated Water Supply in this reporting period.

7. Findings and recommendations of the DWQMP auditor

Viridis conducted an Audit on the Cook Shire Councils DWQMP's in April 2017. The audit concluded that Cook Shire had:

- 9 compliances
- 2 minor non-compliances:
 - Cooktown only. No non-compliances in Laura
- 0 major non-compliances

Viridis reported that Cook Shire Council demonstrated a very high overall level of compliance

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

The next internal review of the DWQMP is due before March 2018.

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Appendix A – Summary of compliance with water quality criteria

Table 2A Laura Reticulation – Treated Water – Physical Chemical (NATA Lab)

Date Sampled – 01/07/2016 – 30/06/2017								
Parameter	Unit	No of Samples collected	Summary of Results			ADWQ Guidelines Value (2011)	No of Samples exceeding ADWG	
			Min. Value	Max. Value	Avg. Value		Health	Aesthetic
Alkalinity	mg/L as CaCO ₃	4	82.0	479.0	185.8	-	-	-
Calcium	mg/L	4	5.0	6.7	5.8	-	-	-
Chloride	mg/L	4	27.0	32.0	29.5	< 250 - mg/L	-	0
Colour	HU	4	<5.0	<5.0	<5.0	< 15 - HU	-	0
Electrical Conductance	µs/cm	4	230.0	260.0	245.0	-	-	-
Fluoride	mg/L	4	0.14	0.18	0.16	< 1.5 - mg/L	0	-
Magnesium	mg/L	4	0.9	1.2	1.0	-	-	-
pH	pH units	4	7.5	7.9	7.7	6.5-8.5	-	0
Potassium	mg/L	4	2.9	3.0	3.0	-	-	-
Salinity	mg/L	4	150	170	160	-	-	-
SAR		4	4.20	4.40	4.30	-	-	-
Silica, Soluble	mg/L	4	21.0	31.0	24.8	< 80 - mg/L	-	4
Sodium	mg/L	4	41.0	45.0	43.0	< 180 - mg/L	-	0
Sulphate	mg/L	4	3.7	3.9	3.8	< 250 - mg/L	0	0
Total Dissolved Solids	mg/L	4	140.0	160.0	147.5	< 600 - mg/L	-	0
Total Hardness	mg/L as CaCO ₃	4	16.0	22.0	18.8	< 200 - mg/L	-	4
Turbidity	NTU	4	0.5	1.2	0.7	< 5 - NTU	-	0

* - Indicates no Guideline value set for this parameter

Samples collected from set sample points throughout the Reticulation.

Each month samples are collected from 1 location, systematically rotated to ensure all sample points are captured.

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Table 2B Laura Reticulation – Treated Water – Metals (NATA Lab)

Date Sampled – 01/07/2016 – 30/06/2017								
Parameter	Unit	No of Samples collected	Summary of Results			ADWQ Guidelines Value (2011)	No of Samples exceeding ADWG	
			Min. Value	Max. Value	Avg. Value		Health	Aesthetic
Arsenic	mg/L	4	<0.003	<0.003	<0.003	0.01-mg/L	0	-
Barium	mg/L	4	0.280	0.340	0.310	< 2 - mg/L	0	-
Beryllium	mg/L	4	<0.0001	<0.0001	<0.0001	< 0.06 - mg/L	0	-
Cadmium	mg/L	4	<0.0001	<0.0001	<0.0001	< 0.002 - mg/L	0	-
Chromium	mg/L	4	<0.0010	<0.0010	<0.0010	< 0.05 - mg/L	0	-
Cobalt	mg/L	4	<0.001	<0.001	<0.001	-	-	-
Copper	mg/L	4	0.010	0.028	0.019	< 2 - mg/L	0	0
Iron	mg/L	4	<0.005	<0.005	<0.005	< 0.3 - mg/L	-	0
Lead	mg/L	4	0.001	0.002	0.001	< 0.01 - mg/L	0	-
Manganese	mg/L	4	<0.005	<0.005	<0.005	< 0.1 - mg/L	0	0
Nickel	mg/L	4	<0.001	<0.001	<0.001	< 0.02 - mg/L	0	-
Selenium	mg/L	4	<0.003	<0.003	<0.003	< 0.01 - mg/L	0	-
Vanadium	mg/L	4	<0.001	<0.001	<0.001	-	-	-
Zinc	mg/L	4	0.008	0.035	0.018	< 3.0 - mg/L	-	0

* - Indicates no guideline value set for this parameter

Samples collected from set sample points throughout the Reticulation.

Each month samples are collected from 1 location, systematically rotated to ensure all sample points are captured

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Table 2C Laura Reticulation – Treated Water – E.coli and coliform monitoring

Date Sampled – 01/07/2016 – 30/06/2017								
	Parameter	Sampling Location	Time Period	No of samples taken in time period	Summary of results		Australian Drinking Water Guidelines guideline value (2011)	No of samples exceeding Australian Drinking Water Guidelines guideline value
					E.coli detected	No of Coliforms detected		
E.coli and Coliforms	E.coli – MPN/100ml	Various set Locations within the Laura Reticulation	July 2016 – June 2017	57	0	-	0	0
	Coliforms – MPN/100ml			57	-	0	0	0

Nil *E.coli* detected from the samples collected and analysed

Table 2D Laura Reticulation – Physical Chemical – (CSC Annan WTP Lab)

Date Sampled – 01/07/2016 – 30/06/2017					
Parameter	Unit	No of Samples collected	Summary of Results		
			Min. Value	Max. Value	Avg. Value
Free chlorine residual	mg/L	11	0.43	1.40	0.89
Colour	mg/L	11	0.000	6	0.82
Dissolved Oxygen	mg/L	11	1.87	7.50	4.94
Electrical Conductivity	mg/L	11	242.5	992.0	334.1
pH	mg/L	11	7.09	7.40	7.27
Turbidity	mg/L	11	0.05	0.24	0.14
Total Hardness	mg/L	11	15.0	262.0	43.18

Samples collected from Laura Reticulation sample points.

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Table 3A Laura Treated Water Final - Physical Chemical (NATA Lab)

Date Sampled – 01/07/2016 – 30/06/2017								
Parameter	Unit	No of Samples collected	Summary of Results			ADWQ Guidelines Value (2011)	No of Samples exceeding ADWG	
			Min. Value	Max. Value	Avg. Value		Health	Aesthetic
Alkalinity	mg/L as CaCO ₃	4	83.1	87.0	84.8	-	-	-
Calcium	mg/L	4	5.0	6.3	5.7	-	-	-
Chloride	mg/L	4	28.0	31.030.3	99.5	< 250 - mg/L	-	0
Colour	HU	4	<5.0	<5.0	<5.0	< 15 - HU	-	0
Electrical Conductance	µs/cm	4	230.0	260.0	242.5	-	-	-
Fluoride	mg/L	4	0.15	0.19	0	< 1.5 - mg/L	0	-
Magnesium	mg/L	4	0.9	1.1	1.0	-	-	-
pH	pH units	4	7.40	7.80	7.65	6.5-8.5	-	0
Potassium	mg/L	4	2.9	3.1	3.0	-	-	-
Salinity	mg/L	4	150.0	170.0	160.0	-	-	-
SAR		4	4.10	4.40	4.28	-	-	-
Silica, Soluble	mg/L	4	20.0	26.0	23.3	< 80 - mg/L	-	4
Sodium	mg/L	4	40.0	45.0	42.3	< 180 - mg/L	-	0
Sulphate	mg/L	4	3.6	3.7	3.7	< 250 - mg/L	0	0
Total Dissolved Solids	mg/L	4	140.0	160.0	150.0	< 600 - mg/L	-	0
Total Hardness	mg/L as CaCO ₃	4	16.0	20.0	18.0	< 200 - mg/L	-	4
Turbidity	NTU	4	0.5	0.5	0.5	< 5 - NTU	-	0

Analysed by SGS Cairns

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Table 3B Laura Treated Water Final – Metals – (NATA Lab)

Date Sampled – 01/07/2016 – 30/06/2017								
Parameter	Unit	No of Samples collected	Summary of Results			ADWQ Guidelines Value (2011)	No of Samples exceeding ADWG	
			Min. Value	Max. Value	Avg. Value		Health	Aesthetic
Arsenic	mg/L	2	<0.003	<0.003	<0.003	0.01-mg/L	0	-
Barium	mg/L	2	0.010	0.340	0.175	< 2 - mg/L	0	-
Beryllium	mg/L	2	<0.0001	<0.0001	<0.0001	< 0.06 - mg/L	0	-
Cadmium	mg/L	2	<0.0001	<0.0001	<0.0001	< 0.002 - mg/L	0	-
Chromium	mg/L	2	<0.0010	<0.0010	<0.0010	< 0.05 - mg/L	0	-
Cobalt	mg/L	2	<0.001	<0.001	<0.001	-	-	-
Copper	mg/L	2	0.001	0.042	0.022	< 2 - mg/L	0	0
Iron	mg/L	2	0.020	0.026	0.023	< 0.3 - mg/L	-	0
Lead	mg/L	2	<0.001	<0.001	<0.001	< 0.01 - mg/L	0	-
Manganese	mg/L	2	<0.005	<0.005	<0.005	< 0.1 - mg/L	0	0
Nickel	mg/L	2	<0.001	<0.001	<0.001	< 0.02 - mg/L	0	-
Selenium	mg/L	2	<0.003	<0.003	<0.003	< 0.01 - mg/L	0	-
Vanadium	mg/L	2	<0.001	<0.001	<0.001	-	-	-
Zinc	mg/L	2	<0.005	0.078	0.042	< 3.0 - mg/L	-	0

Analysed by SGS Cairns

Table 3C Laura Treated Water Final – Free Chlorine – (CSC Annan WTP Lab)

Date Sampled – 01/07/2016 – 30/06/2017								
Parameter	Unit	No of Samples collected	Summary of Results			ADWQ Guidelines Value (2011)	No of Samples exceeding ADWG	
			Min. Value	Max. Value	Avg. Value		Health	Aesthetic
Free Chlorine Residual	mg/L	357	0.05	2.13	1.01	<5	0	-

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Table 4A Laura Raw Water - Physical Chemical (NATA Analysed)

Date Sampled – 01/07/2016 – 30/06/2017							
Scheme component	Parameter Physical / Chemical	Units	Total No. samples collected	Min	Max	Average	Limit of reporting
Raw Water	Alkalinity as CaCO3	mg/L as CaCO3	4	63.0	96.0	79.8	5
	Calcium, Ca	mg/L	4	3.5	5.7	4.5	0.05
	Chloride, Cl	mg/L	4	20.0	55.0	31.5	1
	Colour Apparent	PCU	4	<5.0	70.0	27.5	5
	Conductivity @ 25°C	uS/cm	4	200.0	320.0	245.5	5
	Fluoride, by ISE	mg/L	4	0.13	0.17	0.15	0.05
	L.I.		4	-2.0	-0.7	-1.6	-10
	Magnesium, Mg	mg/L	4	0.7	1.0	0.8	0.05
	pH	pH units	4	6.70	7.90	7.15	0.1
	Potassium, K	mg/L	4	2.5	3.1	2.8	0.05
	SAR		4	4.00	6.20	4.70	
	Salinity	mg/L	4	130.0	210.0	157.5	
	Silica	mg/L	4	15.0	24.0	18.8	0.05
	Sodium, Na	mg/L	4	8.9	53.0	34.2	0.5
	Sulphate, SO4	mg/L	4	3.7	4.8	4.1	0.5
	TDS	mg/L	4	120.0	190.0	145.0	10
	Total Hardness	mg/L as CaCO3	4	12.0	18.0	14.8	1
Turbidity	NTU	4	0.5	28.0	13.7	0.5	

Analysed by SGS Cairns

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Table 4B Laura Raw Water – Metals (NATA Analysed)

Date Sampled – 01/07/2016 – 30/06/2017							
Scheme component	Parameter Metals	Units	Total No. samples collected	Max	Min	Average	Limit of reporting
Raw Water	Arsenic	mg/L	5	<0.003	<0.003	<0.003	0.003
	Barium	mg/L	5	0.280	0.370	0.318	0.005
	Beryllium	mg/L	5	<0.0001	<0.0001	<0.0001	0.0001
	Cadmium	mg/L	5	<0.0001	<0.0001	<0.0001	0.0001
	Chromium	mg/L	5	<0.0001	<0.001	<0.0009	0.001
	Cobalt	mg/L	5	<0.001	<0.001	<0.001	0.001
	Copper	mg/L	5	0.001	0.023	0.006	0.001
	Iron	mg/L	5	<0.005	1.800	0.853	0.005
	Lead	mg/L	5	<0.001	<0.001	<0.001	0.001
	Manganese	mg/L	5	0.005	0.190	0.078	0.005
	Mercury	mg/L	0				0.00005
	Nickel	mg/L	6	<0.001	0.004	0.002	0.001
	Selenium	mg/L	5	<0.003	<0.003	<0.003	0.003
	Vanadium	mg/L	5	<0.001	<0.001	<0.001	0.005
Zinc	mg/L	5	0.005	0.490	0.107	0.005	

Analysed by SGS Cairns

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Table 5 Reticulation *E. coli* 12 Month Rolling Average

Drinking water scheme: Laura Water

Year	2016/2017											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
No. of samples collected	4	6	4	5	4	5	5	5	4	4	7	4
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	58	56	57	56	57	56	56	57	56	56	56	57
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

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

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

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

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Appendix B – Implementation of the DWQMP Risk Management Improvement Program

Progress in implementing the risk management improvement program

Existing Risk Management Improvement Program with “Progress to Completion” column added

Issue	Priority			Target date/s	Progress to Completion
		short-term	long-term		
Sodium Hypochlorite dosing – no standby pump	High	Maintain a new pump on site at all times and maintain stocks of spare parts	Install a second dosing pump with associated wiring, switchboard	June 2017	Completed
Loss of Mains Power	Medium	Rely on the Ergon Energy Generators located in Cooktown	Purchase of suitable sized generator	Dec 2017	Generator available to run town pumps
Operational & Maintenance Procedures	Medium	Identify outdated procedures and update.	Identify and develop new procedures	Dec 2018	Some procedures have been developed, but more are required
No alarms	High	Monitor via SCADA manually	Install EDAC auto dial out system	June 2018	EDAC has been installed and working. Complete.
Biofilm growth	Low	Ad hoc Flushing	Dedicated routine flushing program	June 2019	Not started
Operator Error	High	Ensure all operators are trained to Certificate III level	Dec 2017	Training is complete. Awaiting certificates.	
Borefield. Bores need to be sealed and inspected	Low	Bores have been sealed	Bore inspection program needs to be implemented	Dec 2018	Not started
Ingress into reservoir	Medium	Reservoir has been sealed	Investigate whether reservoir needs to be replaced	Dec 2018	Not Started

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Appendix C – Implementation of the 2016/17 Budgeted Capital Works Improvement Program

Progress in implementing the 2016/17 Budget Capital Works improvement program

Capital Works Item	Priority	Completion Target Date	Progress to Completion
Replacement Laura Membranes	High	Completion - June 2017	Complete