Drinking Water Quality Management Plan (DWQMP) report

For the financial year: 2015-2016

Scheme: LAURA

Cook Shire Council

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Glossary of terms

ADWG 2011	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
E. coli	*Escherichia coli*, 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

1. Introduction

This report documents the performance of Cook Shire Council's drinking water service with respect to water quality and performance in implementing the actions detailed in the drinking water quality management plan (DWQMP) as required under the Water Supply (Safety and Reliability) Act 2008 (the Act).

The report assists the Regulator to determine whether the approved DWQMP and any approval conditions have been complied with and provides a mechanism for providers to report publicly on their performance in managing drinking water quality.

2. Overview of Operations

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

The original bore that was sunk has a drill bit firmly lodged at 35m depth, a second bore was then put down and this became Bore 1 with the original becomming Bore 2. Bore 1 is the Bore predominately used today with Bore 2 being used as a backup

Water is pumped up from the Bore/s with hypochlorite being injected, then through an aerator into a holding tank.

The injection of Hypochlorite is for the oxidisation 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 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 47 Service connections which can be broken down to approximately:

Residential 51%

Commercial / Industrial 6%

With the remaining 43% being Government, Council, Institutional or Other

3. Actions taken to implement the DWQMP

The water sampling schedule is now more rigorously adhered to than prior to the plan being approved, a database was set up with all the schedule details in it, this was given to all that collect samples. By typing in the "Week start date" a list of the required samples for that week is displayed, and can be printed. It tells the sample collectors the following information

- Week Commencing Date
- Type of sample to be collected e.g. E.coli & Total Coliforms, Fluoride, Reticulation Metals - (Suite of 15) etc
- Scheme e.g. Cooktown, Lakeland or Laura
- Who the sample is to be analysed by e.g. CSC Annan Lab., or NATA Lab.
- A description e.g. 3 Samples from Reticulation - Sample sites listed, 1 T/Plant Final Water Sample
- Sample Site - displays where the sample is to be taken from

A copy of the Sampling Matrix was sent to the NATA Lab, they now supply the appropriate sample bottles for each week as well as each scheme month by month. At approx the 3rd week of every month we receive the entire sample bottles for the following month. This seems to be working well

Implementation of the DWQMP Risk Management Improvement Program is well under way with the major item being bought forward from a stated completion year of 2018 this item is now completed.

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 existing 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

Table 1.0A Summary of All Treated Water quality details – Sampled from: Laura Reticulation, Analysed by: SGS - Cairns (NATA Certified)

Sample Period 1/7/2015 - 30/6/2016

Physical and Chemical Characteristics

Parameter	Unit	No of Samples collected	Summary of Results			ADWQ Guidelines Value (2011)	No of Samples exceeding ADWG	
			Max. Value	Min. Value	Avg. Value		Health	Aesthetic
Alkalinity	mg/L as CaCO3	4	80	72	77	-	-	-
Calcium	mg/L	4	46.0	5.1	15.7	-	-	-
Chloride	mg/L	4	32.0	25.0	28.8	< 250 - mg/L	-	0
Colour	HU	4	<5	<5	<5	< 15 - HU	-	0
Electrical Conductance	µs/cm	4	250	220	237.5	-	-	-
Fluoride	mg/L	4	0.17	0.12	0.16	< 1.5 - mg/L	0	-
Magnesium	mg/L	4	1.1	0.8	1.0	-	-	-
pH	pH units	4	7.7	7.6	7.68	6.5-8.5	-	0
Potassium	mg/L	4	3.2	2.9	3.1	-	-	-
Salinity	mg/L	4	160.0	150.0	157.5	-	-	-
SAR		4	4.8	4.4	4.5	-	-	-
Silica Soluble	mg/L	4	25.0	19.0	22.0	< 80 - mg/L	-	0
Sodium	mg/L	4	45.0	39.0	43.0	< 180 - mg/L	-	0
Sulphate	mg/L	4	4.0	3.4	3.7	< 250 - mg/L	0	0
Total Dissolved Solids	mg/L	4	150.0	130.0	157.0	< 600 - mg/L	-	0
Total Hardness	mg/L as CaCO3	4	19.0	15.0	17.5	< 200 - mg/L	-	0
Turbidity	NTU	4	<0.5	<0.5	<0.5	< 5 - NTU	-	0

* - Indicates no Guideline value set for this parameter

Samples collected from set sample points throughout the Reticulation including high and low flow areas.
Each month samples are collected from 3 locations, systematically rotated to ensure all sample points are captured

Table 1.0B Summary of All Treated Water quality details – Sampled from: Laura Reticulation, Analysed by: SGS - Cairns (NATA Certified)

Sample Period 1/7/2015 - 30/6/2016

Metals

Parameter	Unit	No of Samples collected	Summary of Results			ADWQ Guidelines Value (2011)	No of Samples exceeding ADWG	
			Max. Value	Min. Value	Avg. Value		Health	Aesthetic
Arsenic	*mg/L*	3	0.003	0.003	0.003	0.01-mg/L	0	-
Barium	*mg/L*	3	0.31	0.26	0.29	< 2 - mg/L	0	-
Beryllium	*mg/L*	3	0.0001	0.0001	0.0001	< 0.006 - mg/L	0	-
Cadmium	*mg/L*	3	0.0001	0.0001	0.0001	< 0.002 - mg/L	0	-
Chromium	*mg/L*	3	0.001	0.001	0.001	< 0.05 - mg/L	0	-
Cobalt	*mg/L*	3	0.001	0.001	0.001	-	-	-
Copper	*mg/L*	3	0.032	0.022	0.028	< 2 - mg/L	0	0
Iron	*mg/L*	3	0.006	0.005	0.0053	< 0.3 - mg/L	-	0
Lead	*mg/L*	3	0.001	0.001	0.001	< 0.01 - mg/L	0	-
Manganese	*mg/L*	3	0.0050	0.0050	0.0050	< 0.1 - mg/L	0	0
Mercury	*mg/L*	3	0.000045	0.000045	0.000045	< 0.001 -mg/L	0	-
Nickel	*mg/L*	3	0.001	0.001	0.001	< 0.02 - mg/L	0	-
Selenium	*mg/L*	3	0.003	0.003	0.003	< 0.01 - mg/L	0	-
Vanadium	*mg/L*	3	0.005	0.001	0.0023	-	-	-
Zinc	*mg/L*	3	0.027	0.020	0.0223	< 3.0 - mg/L	-	0

* - Indicates no guideline value set for this parameter

Samples collected from set sample points throughout the Reticulation including high and low flow areas.
Each month samples are collected from 3 locations, systematically rotated to ensure all sample points are captured

Table 1.1 Summary of All E.coli & Coliforms monitoring – Sampled from: Laura Reticulation

Sample Period 1/7/2015 - 30/6/2016

	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 value
					E.coli detected	No of Coliforms detected		
E.coli and Coliforms	E.coli – MPN/100ml	Various set Locations within the Laura Reticulation	July 2015 – June 2016	58	0	-	0	0
	Coliforms – MPN/100ml			58	-	1	-	-

Table 1.2 Location of Sampling sites within Laura's water reticulation network.

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

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

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

For the financial year 2015-2016 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 & Wastewater. 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 "TRIM" 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

A search of both the "Trim" database and the CRM (Customer Request Management) in "Authority" for the financial year 2015-2016 has failed to locate any Customer Complaints regarding Water Quality in Laura

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 in this reporting period.

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 from the Laura Reticulated Water Supply in this reporting period

7. Findings and recommendations of the DWQMP auditor

Cook Shire Council was not required to conduct a regular audit of the approved DWQMP during the current reporting period, 2015/2016

The first regular audit of Cook Shire's DWQMP's must be conducted by 30th June 2017

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

Cook Shire Councils first review of the DWQMP's was completed prior to 31st March 2016.
Michael Lawrence was engaged through Bligh Tanner to conduct the first review, in conjunction with Cook Shire Officers. Michael is highly qualified and experienced to perform these reviews, which in our case was quite extensive with some major changes to the original plan
The revised plans were submitted to the Regulator on 26/4/2016.
A notification of approval of the "As submitted" plan was received on the 3/8/2016

Appendix A – Summary of compliance with water quality criteria

Cook Shire Council has a Water sampling Schedule which shows which samples are to be collected and sent off for analysis on a weekly Basis. This is broken up into the 4 water Schemes. The Coen operator is responsible for the collection and dispatch of all the Coen Sampling, whilst the Cooktown Reticulation team is responsible for the collection and dispatch of all the Cooktown, Lakeland and Laura Samples. The Annan Treatment plant operators collect and dispatch the Raw and Final Treated water sampling from the Treatment plant

Verification monitoring has generally been carried out as per the stated program; some samples have had to be collected on the week before, or after, the dates in the Water Sampling Schedule, due to operational issues / commitments

Being in a remote location, the nearest NATA laboratories are located in Cairns which is over 300km by road from Cooktown, this has presented various challenges over the years in getting samples to the laboratory.

In the past samples collected have:

- Been taken to the airport only to be told that the flight was cancelled (This seriously affects bacteriological samples)
- Courier company in Cairns failed to pick up the samples at all
- Courier company in Cairns picks up samples but fails to deliver on time.
- (Airline or Courier Company) completely losses esky containing water samples

So despite our best intentions, not all samples that are collected get to be analysed due to reasons beyond our control. This becomes a huge inconvenience and cost to council to have to re-sample particularly from the even more remote schemes of Lakeland and Laura

Verification monitoring is a tool to verify that the water we are producing and suppling to consumers is a Safe drinking water and that it complies with the ADWG's

9.0 Verification Monitoring Results

Table 1.3 - Verification monitoring results Laura (Raw Water) - Physical Chemical (NATA Analysed)

Sample Period 1/7/2015 - 30/6/2016

Laura	Parameter Physical / Chemical	Units	Total No. samples collected	Min	Max	Average (Mean)	Limit of reporting
Raw Water	Alkalinity as CaCO3	mg/L as CaCO3	4	71.0	83.0	75.3	5
	Calcium, Ca	mg/L	4	2.8	5.5	4.1	0.05
	Chloride, Cl	mg/L	4	17.0	34.0	23.3	1
	Colour Apparent	PCU	4	5.0	40.0	20.0	5
	Conductivity @ 25°C	uS/cm	4	180.0	260.0	212.5	5
	Fluoride, by ISE	mg/L	4	0.13	0.17	0.14	0.05
	L.I.		4	-1.8	-1.3	-1.6	-10
	Magnesium, Mg	mg/L	4	0.60	1.0	0.80	0.05
	pH	pH units	4	7.7			0.1
	Potassium, K	mg/L	4				0.05
	Salinity	mg/L	4				10
	SAR		4				
	Silica	mg/L	4				0.05
	Sodium, Na	mg/L	4				05
	Sulphate, SO4	mg/L	4				0.5
	TDS	mg/L	4				10
	Total Hardness	mg/L as CaCO3	4				1
	Turbidity	NTU	4				0.5

Analysed by a NATA Lab (SGS Cairns)

Table 1.4 - Verification monitoring results (Raw Water) – Metals (NATA Analysed)

Sample Period 1/7/2015 - 30/6/2016

Laura	Parameter Metals	Units	Total No. samples collected	Min	Max	Average (Mean)	Limit of reporting
Raw Water	Arsenic	mg/L	4	<0.003	<0.003	<0.003	0.003
	Barium	mg/L	4	0.25	0.300	0.275	0.005
	Beryllium	mg/L	4	<0.0001	<0.0001	<0.0001	0.0001
	Cadmium	mg/L	4	<0.0001	<0.0001	<0.0001	0.0001
	Chromium	mg/L	4	<0.001	<0.001	<0.001	0.001
	Cobalt	mg/L	4	<0.001	<0.001	<0.001	0.001
	Copper	mg/L	4	<0.001	<0.001	<0.001	0.001
	Iron	mg/L	4	0.053	0.46	0.24	0.005
	Lead	mg/L	4	<0.001	<0.001	<0.001	0.001
	Manganese	mg/L	4	<0.005	0.098	0.046	0.005
	Mercury	mg/L	4	<0.00005	<0.00005	<0.00005	0.00005
	Nickel	mg/L	4	<0.001	<0.001	<0.001	0.001
	Selenium	mg/L	4	<0.003	<0.003	<0.003	0.003
	Vanadium	mg/L	4	<0.005	<0.005	<0.005	0.005
	Zinc	mg/L	4	<0.005	<0.005	<0.005	0.005

Analysed by SGS Cairns

Table 1.5 – Verification, All monitoring results (Treated Water) - Physical Chemical (NATA Lab Analysed)

Sample Period 1/7/2015 - 30/6/2016

Scheme component	Parameter Physical / Chemical	Units	Total No. samples collected	Min Recorded Value	Max Recorded Value	Average (Mean)	Limit of reporting	No. of samples exceeding water quality criteria for Health or Aesthetic Guidelines	No. of samples exceeding water ADWQ Guidelines
Treatment Plant Final Treated Water and Reticulation	Alkalinity as CaCO3	mg/L as CaCO3	8	74	98	78.8	5	-	-
	Calcium, Ca	mg/L	8	4.90	5.80	5.21	0.05	-	-
	Chloride, Cl	mg/L	8	24.0	30.0	27.25	1	0	-
	Colour Apparent	PCU	8	<5.0	<5.0	<5.0	5	0	-
	Conductivity @ 25°C	uS/cm	8	230.0	250.0	240.0	5	-	-
	Fluoride, by ISE	mg/L	8	0.140	0.190	0.160	0.05	0	0
	L.I.		8	-1.2	-0.7	-9.6	-10	-	-
	Magnesium, Mg	mg/L	8	0.87	1.00	0.91	0.05	-	-
	pH	pH units	8	7.50	8.00	7.73	0.1	0	-
	Potassium, K	mg/L	8	2.90	3.20	3.07	0.05	-	-
	Salinity	mg/L	8	150.0	170.0	158.7	10	-	-
	SAR		8	4.10	4.60	4.35			
	Silica	mg/L	8	19.0	23.0	20.7	0.05	-	0
	Sodium, Na	mg/L	8	37.0	43.0	40.6	0.5	0	-
	Sulphate, SO4	mg/L	8	3.70	4.30	3.96	0.5	-	-
	TDS	mg/L	8	140.0	150.0	143.7	10	-	0
	Total Hardness	mg/L as CaCO3	8	16.0	19.0	16.75	1	-	0
	Turbidity	NTU	8	<0.5	0.60	0.51	0.5	0	-

Analysed by SGS Cairns

Table 1.6 - Verification monitoring results (Treated Water) – Metals (NATA Lab Analysed)

Sample Period 1/7/2015 - 30/6/2016

Scheme component	Parameter Metals	Units	Total No. samples collected	Min Recorded Value	Max Recorded Value	Average (Mean)	Limit of reporting	No. of samples exceeding water quality criteria for Health or Aesthetic Guidelines	No. of samples exceeding water ADWQ Guidelines
Treatment Plant Final Treated Water and Reticulation	Arsenic	mg/L	7	<0.003	<0.003	<0.003	0.003	0	0
	Barium	mg/L	7	<0.017	0.320	0.257	0.005	0	0
	Beryllium	mg/L	7	<0.0001	<0.0001	<0.0001	0.0001	0	0
	Cadmium	mg/L	7	<0.0001	0.0002	0.0001	0.0001	0	0
	Chromium	mg/L	7	<0.001	<0.001	<0.001	0.001	0	0
	Cobalt	mg/L	7	<0.001	<0.001	<0.001	0.001	-	-
	Copper	mg/L	7	<0.001	0.037	0.016	0.001	0	0
	Iron	mg/L	7	<0.005	<0.005	<0.005	0.005	0	0
	Lead	mg/L	7	<0.001	<0.001	<0.001	0.001	0	0
	Manganese	mg/L	7	<0.005	<0.005	<0.005	0.005	0	0
	Mercury	mg/L	7	<0.00005	<0.00005	<0.00005	0.00005	0	0
	Nickel	mg/L	7	<0.001	<0.001	<0.001	0.001	0	
	Selenium	mg/L	7	<0.003	<0.003	<0.003	0.003	0	0
	Vanadium	mg/L	7	<0.005	<0.005	<0.005	0.005	-	-
	Zinc	mg/L	7	<0.005	0.029	0.009	0.005	0	0

Analysed by SGS Cairns

Table 1.7 - Verification monitoring results – Coliforms / E.coli

Sample Period 1/7/2015 - 30/6/2016

Scheme component	Parameter Coliforms / E.coli	Units	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria
Treatment Plant Final Treated Water and Reticulation	Coliforms	MPM / 100 ml	55	0	0
	E.coli	MPM / 100 ml	55	0	0

Analysed by CSC at the Annan T/Plant Lab.and SGS Cairns

Table 2 - Reticulation *E. coli* verification monitoring – Rolling Average

Sample Period 1/7/2015 - 30/6/2016

Drinking water scheme: Laura

Year	***2015/16***											
Month	***Jul***	***Aug***	***Sep***	***Oct***	***Nov***	***Dec***	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Jun***
No. of samples collected	5	5	5	4	5	8	4	9	4	4	8	4
No. of samples collected in which *E. coli* 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	56	56	56	56	57	59	59	63	62	62	65	65
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 refered 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).

Laura's rolling average for E.coli compliance is 100%, in any month of the reporting period

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

Scheme Component / Sub-component	Hazard/ Hazardous event	Priority	Action(s)			Target date/s	Progress to Completion
			interim	short-term	long-term		
Sodium Hypochlorite dosing	Only one dosing pump No duty / Standby arrangement	High	Maintain monitoring of Chlorine Residual at Treatment Plant	Maintain a new pump on site at all times and maintain stocks of spare parts	Install a second dosing pump with associated wiring, switchboard alterations and integration into the PLC and SCADA	Short term – Costings June 2014 (Inclusion in 2015-16 Budget) Completion - May 2016	Completed
Loss of Mains Power (No power utility network damage)	Periods of loss of mains power	High	Rely on the Ergon Energy Supply	Hire of suitable sized generator if power not available at the Treatment Plant	Purchase of suitable sized generator / investigate alternative power sources	June 2018	Due to Financial constraints no action taken on these 2 items as yet
Loss of Mains Power (Due to natural Disaster/s)	Extended periods of No mains Power due to power utilities distribution network severely damaged	High	Rely on the Ergon Energy Supply	Hire of suitable sized generator if power not available at the Treatment Plant	Purchase of suitable sized generator / installation of alternative power sources	June 2018	
Staff	Loss of Key & Trained Staff	High	Maintain existing recruitment practices	Offer further training within their field to try and encourage employees to develop and attain certification certificates so that positions can be filled from "In House"		On Going	A recent Council "Restructure" saw 3 Water operations staff members with nearly 30 years combined experience, including 2 with Cert 3 in "Water & Wastewater Operations" lost to Redundancy
Operational & Maintenance Procedures	N.A	Medium	Identify outdated procedures, update and obtain approval and implement	Identify new procedures needed, develop and obtain approval and implement		Dec 2017	Some procedures have been developed, but more are required CSC Recently rolled out the new SafePlan throughout the Shire

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 of Laura Membranes	High	Completion - June 2017	Completed