Drinking Water Quality Management Plan (DWQMP) Annual Report

2017 – 2018

SunWater

SPID: 204

PO Box 15536 City East Queensland 4002

Level 10/179 Turbot Street

Brisbane Queensland 4000

Phone: +61 7 3120 0000

Fax: +61 7 3120 0260

E-mail: SunWaterCustomerSupport@sunwater.com.au

Website: www.sunwater.com.au

LGA covered by this plan: Mareeba Shire Council, Southern Downs Regional Council, Burdekin Shire Council, Whitsunday Regional Council, Mackay Regional Council, Central Highlands Regional Council,

Water Supply Schemes (WSS) and Town Water Schemes (TWS) covered by this plan:

Far North Queensland

- Burdekin Haughton WSS – Burdekin Falls Dam TWS
- Burdekin Haughton WSS – Clare TWS
- Mareeba Dimbulah WSS – Mutchilba TWS

North Queensland

- Bowen Broken WSS – Eungella Dam TWS
- Proserpine River WSS – Peter Faust Dam TWS (decommissioned 28/06/2018)

Central Queensland

- Nogoa MacKenzie WSS – Fairbairn Dam TWS

South West Queensland

- Upper Condamine WSS – Leslie Dam TWS (transferred to the YMCA on 19/07/2018)

Glossary of terms

ADWG 2004	Australian Drinking Water Guidelines (2004). Published by the National Health and Medical Research Council of Australia
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
HACCP	Hazard Analysis and Critical Control Points certification for protecting drinking water quality
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
MPN/100mL	Most probable number per 100 millilitres
CFU/100mL	Colony forming units per 100 millilitres
<	Less than
>	Greater than
WTP	Water Treatment Plant
BGA	Blue Green Algae
WSS	Water Supply Scheme
TWS	Town Water Supply

Document history and status

Revision	Date	Description	By	Review	Approved
A	7/12/2018	Draft for SunWater Review	Thomas Hampton (Jacobs)	Nicholas Stanton (Jacobs)	Nicholas Stanton (Jacobs)
0	14/12/2018	Final	Thomas Hampton (Jacobs)	Nicholas Stanton (Jacobs)	Gordon Delaney (SunWater)

1. Introduction

This report documents the performance of SunWater'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 is for the period 1 July 2017 – 30 June 2018.

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.

This report has been prepared in accordance with the *Water Industry Regulatory Reform – drinking water quality management plan report factsheet* published by the Department of Energy and Water Supply, Queensland, accessible at www.dews.qld.gov.au.

2. Overview of Operations

This DWQMP annual report applies to seven (7) drinking water schemes owned and operated by SunWater across Queensland, however two of these schemes are no longer operated by SunWater. The Leslie Dam WTP was transferred to the YMCA on 19/07/2018 and the Peter Faust Dam WTP was decommissioned on 28/6/2018. The report for these plants is only for the period of 1/07/2018 until 19/7/2018 (Leslie Dam WTP) and 28/6/2018 (Peter Faust Dam WTP).

The Burdekin Falls Dam town water supply (TWS) sources water from the Burdekin Falls Dam. The treatment comprises of a package system incorporating a single-stage flocculation zone, followed by a standard up-flow lamella tube settler / clarifier tank to settle the suspended solids and other small foreign matter prior to filtration via an integrated suction media filter and then disinfection with sodium hypochlorite before reticulation.

The Clare TWS sources water from the Burdekin River / Burdekin Falls Dam via the Clare irrigation channel system. The treatment comprises of a standard clarifier tank to flocculate and settle the suspended solids and other small foreign matter prior to media filtration for removal of remaining suspended solids and algae and then disinfection with sodium hypochlorite before reticulation.

The Eungella Dam TWS sources water from the Eungella Dam. The treatment comprises of pre-filtering and the addition of coagulant to assist in the removal of suspended solids, algae and other small foreign matter prior to media and carbon filtration. Soda ash dosing is provided for pH balancing prior to disinfection with sodium hypochlorite before reticulation.

The Fairbairn Dam TWS sources water from the Fairbairn Dam. The treatment comprises of two (2) standard up-flow clarifiers to settle the suspended solids and other small foreign matter prior to media filtration and disinfection with sodium hypochlorite before reticulation.

The Leslie Dam TWS sources water from the Leslie Dam. The treatment comprises of pre-filtering and the addition of coagulant to assist in the removal of the suspended solids, algae and other small foreign matter prior to media and carbon filtration. Soda ash dosing is provided for pH balancing prior to disinfection with sodium hypochlorite before reticulation. On 19/07/2018 this WTP was transferred to the YMCA who are the sole user of the treated water.

The Mutchilba TWS sources water from the Tinaroo Dam via the Mareeba irrigation channel system. The treatment comprises of pre-filtering and the addition of coagulant to assist in the removal of suspended solids, algae and other small foreign matter to media and carbon filtration before reticulation.

The Peter Faust Dam TWS sources water from the Peter Faust Dam. The treatment comprises of the addition of coagulant to assist in the removal of the suspended solids through a single clarifier, algae and other small foreign matter prior to media filtration. Filtered water is disinfected with sodium hypochlorite before reticulation. This WTP was decommissioned on 28/6/2018.

3. Actions taken to implement the DWQMP

SunWater has implemented the DWQMP including setting operational limits, as defined in EM25 Water Treatment Plant Routine Inspection Checklist and EM25 – Water Treatment Operations. Non-compliances with limits are investigated using SunWater's QM2 Incident reporting.

Progress in implementing the risk management improvement program

Appendix A of the approved DWQMP outlines the Improvement Plan Actions. A brief status report of the progress of these actions is included in **Appendix B** of this document.

In general, all improvement items have been resolved, either by being completed or by being determined to be unnecessary and removed from the list. Some actions, such as the requirement for all operators to have a Certificate 3 in water treatment operations are ongoing. Due to staff turnover, this remains a continual process.

Revisions made to the operational monitoring program to assist in maintaining the compliance with water quality criteria[1] in verification monitoring.

The operational monitoring program has been reviewed and no revisions have been made over the past year.

Drinking water quality is tested in accordance with ADWG limits on a number of key parameters and monitored on two levels to ensure safe drinking water for consumers. The drinking water quality tests involve routine monthly testing of water chemistry (aesthetics) and micro-biology at a NATA accredited laboratory, and weekly / daily testing at the WTP laboratory of water chemistry (aesthetics) and residual chlorine.

Water quality test locations (test points) are routinely sampled within each of the distribution networks to provide a high level of confidence that a representative water quality analysis has been undertaken and to provide certainty that scheme is delivering safe drinking water quality to consumers. Each sampling point was selected based on providing the highest probability of finding non-compliant drinking water in order to prevent a worst case scenario for a public health incident. The sampling points at each scheme are located at the water treatment plant and end of the reticulation mains.

Amendments made to the DWQMP

No amendment were made to the DWQMP in the reporting period however SunWater are currently finalising an amendment application to remove the Leslie Dam and Peter Faust Dam WTPs, and improve the readability and practicality of the plan.

[1] Refer to *Water Quality and Reporting Guideline for a Drinking Water Service* for the water quality criteria for drinking water.

4. Compliance with water quality criteria for drinking water

SunWater TWS operate under quality management standards AM 28 for the production of safe drinking water. A series of quality control parameters for DWQ have been developed from acceptance criteria outlined in ADWG (2011). Key parameters for operator testing and water quality acceptance are shown below in Table 4 (a): Drinking Water Quality Control Parameters.

Table 4 (a): Drinking Water Quality Control Parameters

Parameter	Monitoring Frequency	Acceptable Limits
Raw water pH	Weekly	NA
Raw water turbidity	Weekly	NA
Treated water pH	Every 2-3 days	6.5 – 8.5
Treated water turbidity	Every 2-3 days	< 1 NTU
Residual chlorine (free)	Every 2-3 days	> 0.5 mg/L after 30 mins
Total chlorine	Every 2-3 days	< 5 mg/L
Aluminium	Weekly	< 0.2 mg/L
E.coli	Monthly	< 1 cfu / 100 mL
Total coliforms	Monthly	N/A - significant changes will be investigated[2]
Heterotrophic plate count	Monthly	N/A - significant changes will be investigated[3]

Note: Aluminium testing only performed at sites that have aluminium sulfate dosing.

A summary of compliance with water quality criteria is included in Appendix A. This includes the following information:

- parameter
- unit of measure
- total number of samples collected
- number of samples that did not meet the water quality criteria
- maximum concentration or count

The water quality results over the 2017/18 reporting period met the recommended values in the ADWG, with the following exceptions for each of the listed water schemes.

Burdekin Falls Dam TWS

- Eight (8) instances where treated water turbidity exceeded the DWQMP aesthetic limit of 5 NTU.
- One (1) instance where the treated water total chlorine exceeded the DWQMP limit of 5 mg/L (5.6 mg/L on 29/3/2017).
- SunWater sets a target limit of 0.5mg/L for free chlorine. There were 51 samples where free chlorine was recorded below 0.5mg/L. While these results remain within the ADWG they would be a prompt for the WTP operator to check operational settings.

Clare TWS

- One (1) instance where the treated water turbidity exceeded the aesthetic limit of 5 NTU

[2] *No guideline value has been set for total coliforms in drinking water. SunWater uses Total Coliforms as an indicator. Increased concentrations are investigated.*

[3] *No guideline value has been set for heterotrophic plate counts in drinking water. Immediately after disinfection, numbers would be expected to be low. SunWater uses HPC as an indicator of distribution system cleanliness. Marked increases in numbers after disinfection or within distribution systems are investigated.*

- SunWater sets a target limit of 0.5mg/L for free chlorine. There were 54 samples where free chlorine was recorded below 0.5mg/L. While these results remain within the ADWG they would be a prompt for the WTP operator to check operational settings.

Eungella Dam TWS

- There were twenty-one (21) instances where pH exceeded the ADWG aesthetic minimum limit of 6.5
- SunWater sets a target limit of 0.5mg/L for free chlorine. There were 67 samples where free chlorine was recorded below 0.5mg/L. While these results remain within the ADWG they would be a prompt for the WTP operator to check operational settings.

Fairbairn Dam TWS

- Three (3) instances where treated water total chlorine exceeded the DWQMP limit of 5 mg/L, refer to incident notification in **Section 5**.
- Seven (7) instances where pH was above the aesthetic limit of 8.5
- SunWater sets a target limit of 0.5mg/L for free chlorine. There were 52 samples where free chlorine was recorded below 0.5mg/L. While these results remain within the ADWG they would be a prompt for the WTP operator to check operational settings.

Peter Faust Dam

- Two (2) instances where treated water pH exceeded the ADWG aesthetic minimum limit of 6.5.
- SunWater sets a target limit of 0.5mg/L for free chlorine. There were 2 samples where free chlorine was recorded below 0.5mg/L. While these results remain within the ADWG they would be a prompt for the WTP operator to check operational settings.

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

Four (4) notifications to the regulator under sections 102 and 102A of the Act was made between 1 July 2017 and 30 June 2018. These were as follows:

- 23/10/2017 – Clare WTP – Turbidity > 5 NTU (incident);
- 15/3/2018 – Clare WTP – Plant shut down due to extreme raw water turbidity (event);
- 23/4/2018 – Clare WTP – Detection of *E.Coli* in reticulation system (incident);
- 14/5/2018 – Fairbairn Dam WTP – Total Chlorine > 5 mg/L (incident).

Two further events where water quality limits were exceeded were made during the reporting period, however notification to the regulator was not made:

- 31/7/2017 – Burdekin Falls Dam WTP – Alternative potable water provided to customers due to operational issues resulting in high turbidity;
- 29/3/2018 – Burdekin Falls Dam WTP – Total Chlorine > 5 mg/L;

Non-compliances with the water quality criteria and corrective and preventive actions undertaken

Clare WTP – Turbidity > 5 NTU (23/10/2017)

Due to a failure in the coagulant dosing pump during the night the WTP operated for a period without adequate flocculation of sediment in the clarifier which resulted in levels of elevated turbidity.

Immediate corrective actions involved providing bottled water to the Clare primary school, issuing a boiled water notice, undertaking microbiological testing and flushing the network with potable water provided by tanker truck.

As a long-term preventative action SunWater are in the process of installing an online turbidity analyser which will allow immediate notification to operators in the event of a similar incident in the future.

Clare WTP – *E.Coli* Detection (23/4/2018)

After routine mains flushing on 19/4/2018 elevated turbidity levels were detected in the reticulation network. An *E.Coli* sample was taken at the three regular sample points to assess the risk of contamination and this returned positive. This was accompanied with no detections of HPC, and with adequate free chlorine and pH levels.

Supplementary samples were taken and these all returned no further detections of *E.Coli*.

Fairbairn Dam WTP – Total Chlorine > 5 mg/L (14/5/2018)

Fairbairn Dam WTP experienced total chlorine levels exceeding 5 mg/L at the outlet of the treated water reservoir from the 7th to the 11th of May 2018. This resulted from a change in sodium hypochlorite batch from one which appears to have been at a reduced concentration, to a much stronger batch.

Since this incident steps have been taken to monitor the concentration of the sodium hypochlorite received, the treated water storage on site has been significantly reduce by isolating a 280kL reservoir to assist with water age and consistency of free chlorine levels, and a more accurate digital dosing pump has been installed.

Burdekin Falls Dam WTP – Operational issues resulting in high turbidity (6/8/2017 – 18/8/2017)

On 6/8/2017 operational issues at the Burdekin Falls Dam WTP resulted in elevated turbidity being produced by the WTP. This situation was managed by providing bottled water to the SunWater staff and visitors to the caravan park. Water was not supplied to customers until the water quality was returned to acceptable levels and confirmed with microbiological samples. Supply from the WTP was resumed on 18/8/2017.

Burdekin Falls Dam WTP – Total Chlorine > 5 mg/L (29/3/2018)

While compiling data for this annual report a total chlorine measurement of 5.6 mg/L was identified in the SAP data recording system from the Burdekin Falls Dam 'Office' sample point on 29/3/2018. However, on the same day the public access sample point recorded a total chlorine level of 4.5 mg/L and the WTP sample point recorded 4.5 mg/L. SunWater therefore concludes that the chlorine spike at the office location was a short term anomaly.

Subsequent to the total chlorine incident of 14/5/2018 at the Fairbairn Dam WTP SunWater has reminded all operators of the importance of immediate internal notification of exceedances of water quality criteria and has rolled out water quality monitoring wall charts to all WTP sites which clearly outline the reporting requirements for all parameters.

At no time in any of the above instances were any customer complaints received by SunWater, and there have been no reports (suspected or confirmed) of any illnesses.

Prescribed incidents or Events reported to the Regulator and corrective and preventive actions undertaken.

As outlined above, for this reporting period there was one (1) prescribed event which occurred in Clare on the 15/3/2018.

Non-compliance information

In March 2013, due to extreme rainfall and releases from the Burdekin falls dam causing major localised flooding there was a significant deterioration in raw water quality at the Clare WTP (up to 600 NTU).

Corrective actions undertaken

When it became apparent that the WTP was not capable of treating the raw water while maintaining the treated water quality requirements supply was ceased on 14/3/2018 to prevent delivery of out of spec water to the community. This resulted in an unplanned interruption to supply. The community was notified and free bottled water was supplied from the SunWater office. A tanker of potable water was used to supplement the network supply on 15/3/2018.

Preventive actions undertaken

SunWater has reviewed the circumstances leading to the event. The turbidity increase was more severe and more prolonged than expected. This has been noted and in future events a decision to provide an alternate supply of water will be made earlier to ensure that supply is not restricted to the township.

6. Customer complaints related to water quality

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

Throughout the year no complaints about water quality were received.

During the 2017/18 reporting period, there were no suspected or confirmed cases of illness arising from the water supply system.

7. Findings and recommendations of the DWQMP auditor

The DWQMP was audited against:

- Drinking Water Quality Management Plan Review and Audit Guideline (DEWS 2013)
- ISO19011:2014 – Guidelines for Auditing Management Systems
- Chapter 2 Infrastructure and service, Part 4 Service provider obligations, Division 2 Audit reports and reviews, Clauses 108 to 109 of the Act

The DWQMP auditor found that:

- SunWater demonstrated an acceptable level of compliance with the regular audit imposed by the *Water Supply (Safety and Reliability) Act* 2008 during the audit period.
- SunWater is continuously improving its drinking water framework, including the introduction of drinking water quality management related work instructions. Their management structure overlays the DWQMP's framework and in particular, integrates the incident management process displayed in the DWQMP.

The audit concluded that SunWater:

- Provided accurate monitoring and performance data to the regulator;
- Generally implemented its DWQMP to manage risks to public health; and,
- Generally maintained the relevance of the DWQMP.

A summary of overall compliance is shown below.

Compliance Code		Number of Findings
Compliant	Compliant	40
Compliant with Opportunity for Improvement	OFI	18
Minor Non-Compliant	Minor	2
Major Non-Compliant	Major	0
Critical Non-Compliant	Critical	0
Total		60

The DWQMP auditor provides the following recommendations for non-compliances:

- Undertake a series of tests for the presence of pesticides & agricultural fertilises as per the DWQMP risk assessment.
- Complete Improvement Plan Action Item No.2 – Complete base-line hydrocarbon testing of dam storages during a period of heavy recreational use and add hydrocarbon testing to annual heavy metal test regime.

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

After the completion of the third party audit SunWater undertook an internal review of the DWQMP, which was provided to the regulator. This plan includes actions based on the opportunities for improvement which were raised by the audit.

Appendix A – Summary of compliance with water quality criteria

Table 1 - Verification monitoring results

Scheme name	Parameter	Units	Frequency of sampling	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	DWQMP Limit	Laboratory name
Burdekin Falls	Treated water pH		Every 2-3 days	364	364	0	7.1	8.1	7.69	6.5-8.5	Burdekin Falls Dam WTP Laboratory
	Treated water turbidity	NTU	Every 2-3 days	364	364	8	0	97	0.87	<5 NTU	Burdekin Falls Dam WTP Laboratory
	Residual chlorine (free)	mg/L	Every 2-3 days	1090	1090	51	0.1	4.4	1.36	>0.5mg/L after 30 mins	Burdekin Falls Dam WTP Laboratory
	Treated water total chlorine	mg/L	Every 2-3 days	1095	1095	1	0	5.6	1.54	<5 mg/L	Burdekin Falls Dam WTP Laboratory
	E.coli	Cfu/100ml	Monthly	12	0	0	0	0	0.00	<1 cfu/100ml	NATA Accredited Laboratory
Clare	Treated water pH		Every 2-3 days	360	360	2	6.9	8.7	7.99	6.5-8.5	Clare WTP Laboratory
	Treated water turbidity	NTU	Every 2-3 days	360	360	0	0	4.97	0.60	<5 NTU	Clare WTP Laboratory
	Residual chlorine (free)	mg/L	Every 2-3 days	1437	1437	54	0.18	3.7	0.99	>0.5mg/L after 30 mins	Clare WTP Laboratory
	Treated water total chlorine	mg/L	Every 2-3 days	1436	1436	0	0.3	4.5	1.17	<5 mg/L	Clare WTP Laboratory
	E.coli	Cfu/100ml	Monthly	21	1	1	0	1	0.05	<1 cfu/100ml	NATA Accredited Laboratory
Eungella	Treated water pH		Every 2-3 days	115	115	21	0	7.1	6.38	6.5-8.5	Eungella Dam WTP Laboratory
	Treated water turbidity	NTU	Every 2-3 days	115	115	0	0	1.37	0.42	<5 NTU	Eungella Dam WTP Laboratory
	Residual chlorine (free)	mg/L	Every 2-3 days	435	435	67	0	4	0.76	>0.5mg/L after 30 mins	Eungella Dam WTP Laboratory
	Treated water total chlorine	mg/L	Every 2-3 days	46	46	0	0	4	2.76	<5 mg/L	Eungella Dam WTP Laboratory
	E.coli	Cfu/100ml	Monthly	24	0	0	0	0	0.00	<1 cfu/100ml	NATA Accredited Laboratory
Fairbairn dam	Treated water pH		Every 2-3 days	181	181	7	6.93	8.95	7.66	6.5-8.5	Fairbairn Dam WTP Laboratory
	Treated water turbidity	NTU	Every 2-3 days	182	182	0	0.32	3.77	1.06	<5 NTU	Fairbairn Dam WTP Laboratory
	Residual chlorine (free)	mg/L	Every 2-3 days	181	181	52	0	5.4	0.91	>0.5mg/L after 30 mins	Fairbairn Dam WTP Laboratory
	Treated water total chlorine	mg/L	Every 2-3 days	182	182	3	0.3	6.2	1.38	<5 mg/L	Fairbairn Dam WTP Laboratory
	E.coli	Cfu/100ml	Monthly	24	0	0	0	0	0.00	<1 cfu/100ml	NATA Accredited Laboratory

Mutchilba	Treated water pH		Every 2-3 days	150	150	0	6.5	7.5	7.12	6.5-8.5	Leslie Dam WTP Laboratory
	Treated water turbidity	NTU	Every 2-3 days	149	149	0	0	3	0.06	<5 NTU	Leslie Dam WTP Laboratory
	Residual chlorine (free)	mg/L	Every 2-3 days	150	150	0	0.57	3.7	1.54	>0.5mg/L after 30 mins	Leslie Dam WTP Laboratory
	Treated water total chlorine	mg/L	Every 2-3 days	150	150	0	0.74	4.3	1.82	<5 mg/L	Leslie Dam WTP Laboratory
	E.coli	Cfu/100ml	Monthly	12	0	0	0	0	0.00	<1 cfu/100ml	NATA Accredited Laboratory
Peter Faust Dam	Treated water pH		Every 2-3 days	104	104	2	2	8.8	7.83	6.5-8.5	Peter Faust Dam WTP Laboratory
	Treated water turbidity	NTU	Every 2-3 days	101	101	0	0	2	0.84	<5 NTU	Peter Faust Dam WTP Laboratory
	Residual chlorine (free)	mg/L	Every 2-3 days	725	725	2	0	10	1.63	>0.5mg/L after 30 mins	Peter Faust Dam WTP Laboratory
	Treated water total chlorine	mg/L	Every 2-3 days	361	361	0	1	4.5	2.44	<5 mg/L	Peter Faust Dam WTP Laboratory
	E.coli	Cfu/100ml	Monthly	2	0	0	0	0	0.00	<1 cfu/100ml	NATA Accredited Laboratory
Leslie Dam	Treated water pH		Every 2-3 days	5	5	0	7.3	7.4	7.34	6.5-8.5	Clare WTP Laboratory
	Treated water turbidity	NTU	Every 2-3 days	5	5	0	0.51	0.66	0.58	<5 NTU	Clare WTP Laboratory
	Residual chlorine (free)	mg/L	Every 2-3 days	5	5	0	2.02	2.27	2.15	>0.5mg/L after 30 mins	Clare WTP Laboratory
	Treated water total chlorine	mg/L	Every 2-3 days	5	5	0	2.15	2.39	2.27	<5 mg/L	Clare WTP Laboratory
	E.coli	Cfu/100ml	Monthly	1	0	0	0	0	0.00	<1 cfu/100ml	NATA Accredited Laboratory

Note: Samples from different locations of each site were combined for reporting.

Table 2 (a) - Reticulation *E. coli* verification monitoring at Burdekin Falls Dam 2017

Drinking water scheme: Burdekin Falls Dam

Year	2017											
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
No. of samples collected	2	2	2	2	2	2	2	1	1	1	1	1
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	23	23	23	24	24	24	24	23	22	21	20	19
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).

Table 3 (b) - Reticulation *E. coli* verification monitoring at Burdekin Falls Dam 2018

Drinking water scheme: Burdekin Falls Dam

Year	*2018*											
Month	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*June*	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*
No. of samples collected	1	1	1	1	1	1						
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	0	0	0						
No. of samples collected in previous 12 month period	18	17	16	15	14	13	11	10	9	8	7	6
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).

Table 4 (c) - Reticulation *E. coli* verification monitoring at Clare Water Treatment Plant 2017

Drinking water scheme: Clare Water Treatment Plant

Year	*2017*											
Month	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***June***	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
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	12	12	12	12	12	12	12	12	12	12	12	12
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).

Table 5 (d) - Reticulation *E. coli* verification monitoring at Clare Water Treatment Plant 2018

Drinking water scheme: Clare WTP

Year	2018											
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
No. of samples collected	1	1	1	7	1	1						
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	1	0	0						
No. of samples collected in previous 12 month period	12	12	12	18	18	18	17	16	15	14	13	12
No. of failures for previous 12 month period	0	0	0	1	1	1	1	1	1	1	1	1
% of samples that comply	100.0%	100.0%	100.0%	94.4%	94.4%	94.4%	94.1%	93.8%	93.3%	92.9%	92.3%	91.7%
Compliance with 98% annual value	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO

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).

Table 6 (g) - Reticulation *E. coli* verification monitoring at Eungella Dam 2017

Drinking water scheme: Eungella Dam

Year	*2017*											
Month	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*June*	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*
No. of samples collected	2	4	2	0	0	0	2	2	2	2	2	2
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	24	26	26	24	22	20	20	20	18	18	20	20
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).

Table 7 (h) - Reticulation *E. coli* verification monitoring at Eungella Dam 2018

Drinking water scheme: Eungella Dam

Year	***2018***											
Month	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***June***	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***
No. of samples collected	2	2	2	2	2	2						
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	0	0	0						
No. of samples collected in previous 12 month period	20	18	18	20	22	24	22	20	18	16	14	12
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).

Table 8 (i) - Reticulation *E. coli* verification monitoring at Fairbairn Dam Water Treatment Plant 2017

Drinking water scheme: Fairbairn Dam Water Treatment Plant

Year	*2017*											
Month	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***June***	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***
No. of samples collected	3	3	3	3	3	3	2	2	2	2	2	2
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	28	29	30	31	32	33	32	31	30	29	31	30
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).

Table 9 (j) - Reticulation *E. coli* verification monitoring at Fairbairn Dam Water Treatment Plant 2018

Drinking water scheme: Fairbairn Dam Water Treatment Plant

Year	2018											
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
No. of samples collected	2	2	2	2	2	2						
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	0	0	0						
No. of samples collected in previous 12 month period	29	28	27	26	25	24	22	20	18	16	14	12
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).

Table 10 (m) - Reticulation *E. coli* verification monitoring at Leslie Dam 2017

Drinking water scheme: Leslie Dam

Year	***2017***											
Month	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***June***	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***
No. of samples collected	1	1	1	1	1	1	1	*	*	*	*	*
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	0	0	0	0	*	*	*	*	*
No. of samples collected in previous 12 month period	12	12	12	12	12	12	12	11	10	9	8	7
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.

***Note that the Leslie Dam WTP was handed over to the YMCA on 19/7/2017 and therefore no sampling has been undertaken by SunWater since.**

Table 11 (o) - Reticulation *E. coli* verification monitoring at Mutchilba Township 2017

Drinking water scheme: Mutchilba Township

Year	2017											
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
No. of samples collected	4	2	2	2	2	2	1	1	1	1	1	1
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	31	31	31	31	31	31	26	25	24	23	21	20
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).

Table 12 (p) - Reticulation *E. coli* verification monitoring at Mutchilba Township 2018

Drinking water scheme:	Mutchilba Township

Year	***2018***											
Month	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***June***	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***
No. of samples collected	1	1	1	1	1	1						
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	0	0	0						
No. of samples collected in previous 12 month period	17	16	15	14	13	12	11	10	9	8	7	6
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).

Table 13 (q) - Reticulation *E. coli* verification monitoring at Peter Faust Dam 2017

Drinking water scheme: Peter Faust Dam

Year	*2017*											
Month	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***June***	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***
No. of samples collected	1	1	1	1	1	1	1	1	1	1	1	1
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	12	12	12	12	12	12	12	12	12	12	12	12
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).

Table 14 (r) - Reticulation *E. coli* verification monitoring at Peter Faust Dam 2018

Drinking water scheme: Peter Faust Dam

Year	2018											
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
No. of samples collected	1	1	2	1	1	1						
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	0	0	0						
No. of samples collected in previous 12 month period	12	12	13	13	13	13	12	11	10	9	8	7
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).

Appendix B – Implementation of the DWQMP Risk Management Improvement Program

Table 15 – Progress against the risk management improvement program in the approved DWQMP

Item No.	HACCP Control Area	Hazard / Event	Recommendation / Preventative Measure	Target date/s	Status as at 30 June 2017	(If implementing these actions will take longer than anticipated, please provide detail, as it may affect the approved DWQMP)
2015 – 2018 DWQMP						
1	*Data Collection / Retention*	*General*	*Improvements to be made to SunWater's data collection system (SAP) to improve the quality of data recording, this is to include limits for each parameter so that if an entry is input which is outside the limits the operator is alerted to check the data and if it is correct, raise an incident.*	*FY 15/16*	*Water quality data analysis support from specialist water consultant*	*SunWater continue to work with specialist water consultant to further improve data collection system.*
2	*Dam Catchment, Water Storage & Empoundment Area*	*Chemical hazards – Hydrocarbon contamination*	*Complete base-line hydrocarbon testing of dam storages during a period of heavy recreational use and add hydrocarbon testing to annual heavy metals test regime (Applicable for drinking water supplies sourcing water from dams).*	*FY 16/17*	*Ongoing*	*This action has been incorporated into the DWQMP review actions.*
3	*Water Treatment Plant*	*pH outside of guideline range*	*Investigate ways to improve final treated water pH at the following sites: Burdekin Falls Dam WTP and Clare WTP (examine ways to reduce pH), and Eungella and Mutchilba (examine ways to raise pH).*	*FY 17/18*	*Closed pH correction equipment has been installed in Clare. The remainder of sites are within pH specifications*	
4	*Water Treatment Plant*	*High Turbidity*	*Investigate ways to improve final treated water turbidity values at all sites.*	*FY 17/18*	*Ongoing*	
5	*All*	*General*	*Staff Training – ongoing*	*Ongoing*	*Training completed in 2016, conducted by specialist water consultant*	*SunWater to complete operator training every two years.*
6	*All*	*General*	*Create Emergency Action Plans (EAP) for all WTPs*	*FY 17/18*	*Work Instructions have been completed.*	