Drinking Water Quality Management Plan (DWQMP) Annual Report

2021 – 2022

Banana Shire Council

Service Provider ID: 504

62 Valentine Plains Road

PO Box 412

Biloela, QLD, 4715

(07) 4992 9500

enquiries@banana.qld.gov.au

Contents

Glossary of terms

ADWG 2011	Australian Drinking Water Guideline (V6) 2011. Published by the National Health and Medical Research Council of Australia (Version 3.6 Updated
BSC	Banana Shire Council
CCP	Critical Control Point. A critical control point is defined as a step which control can be applied and is essential to prevent or eliminate a water safety hazard or reduce it to an acceptable level.
Chlorate	
CFU/100ml	Colony Forming Units per 100 millilitres
DRDMW	Department of Regional Development, Manufacturing and Water
DWQMP	Drinking Water Quality Management Plan- The documents summarising how water service providers manage quality risks for consumers.
HACCP	Hazzard Analysis Critical Control Points certification for protecting drinking water quality
Mg/L	Milligrams per litre
ML/d	Megalitres per day
MPN/100ml	Most probable number per 100 millilitres
NTU	Nephelometric Turbidity Units, used to measure clarity of water
PFAS/PFOS	Per and Poly-fluoroalkyl substances, a group of man-made chemicals widely used in industrial, firefighting and household applications and are persistent in the environment
QLD Health	Public Health Regulator
SOPs	Standard Operating Procedures
THM	Trihalomethanes
UF	Ultrafiltration
The Act	The Water Supply and Reliability Act (2008)
WTP	Water Treatment Plant- processes raw water (sourced from a dam, river or bore) to make drinking water
<	Less Than
>	Greater than

1. Introduction

This report documents the performance of Banana 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

Banana Shire Council is a registered service provider with identification (SPID) 504.
Council operates a total of nine (9) drinking water supply schemes throughout the Shire consisting of:-

Scheme	*Water Source*	*Treatment processes*	*Treatment capacity (ML/d)*	*Towns supplied*
Banana	Dawson River (Moura Weir)	Treated at the Moura WTP Pumped from Moura, re-chlorinated	transfer	Banana
Baralaba	Dawson River (Neville Hewitt Weir)	Coagulation, flocculation, clarifiers, ultrafiltration, chlorination	1.1	Baralaba
Biloela	Callide Dam, Callide Valley Aquifer Bores	Coagulation, flocculation, clarifiers, filters, fluoridation, chlorination	10.3	Biloela, Callide Dam, Thangool
Callide Dam	Callide Dam	Treated at Biloela WTP. Coagulation, flocculation, clarifiers, filters, chlorination	transfer	Callide Dam
Goovigen	Callide Valley Aquifer Bores	Chlorination	0.2	Goovigen
Moura	Dawson River (Moura Weir)	Coagulation, flocculation, clarifiers, filters, fluoridation, chlorination	7.2	Moura, Banana
Taroom	Great Artesian Basin Bore	Aeration, Chlorination	4.3	Taroom
Thangool	Callide Dam, Callide Valley Aquifer Bores	Treated at Biloela WTP. Pumped from Biloela, re-chlorinated	transfer	Thangool
Theodore	Dawson River	Coagulation, flocculation, clarifiers, filters, chlorination	1.75	Theodore

Council also operates non-potable water supply schemes at Wowan and Cracow. The non-potable schemes are not covered by this report.

Council manages drinking water quality through its approved Drinking Water Quality Management Plan (DWQMP) which protects public health by ensuring the provision of a safe water supply.

Council operates treatment plants at Biloela (supplying Biloela, Thangool and Callide Dam communities), Moura (supplying Moura and Banana), Baralaba, Taroom and Theodore. Goovigen is a chlorinated bore supply. Council operates and maintains all water supply infrastructures in these schemes including intakes, pumping stations, treatment facilities, reservoir storages and reticulation mains.

3. Compliance with water quality criteria for drinking water

The water quality criteria mean health guideline values in the most current Australian Drinking Water Guidelines, as well as the standards in the Public Health Regulation 2005.

- The results of the verification monitoring have been summarised in Appendix A
- All schemes complied with the drinking water health guidelines throughout the financial year apart for the incidents notified to the regulator as per section 5 below.
- The Moura WTP Operations and Maintenance Manual (O & M) was reviewed and updated. This included Operator Training by an external consultant to implement the O& M Manual.

As part of the Queensland-wide testing for PFAS/PFOA in town water systems conducted in 2018, a detection was made for Perfluorohexanesulfonic acid (PFHxS) in the Biloela town water supply (sourced from groundwater bores). The detection was close the limit of what the laboratory could detect and was well below the recently established health guidelines. No adverse health effects are anticipated. A program of ongoing periodic testing commenced to monitor any changes.

In early 2021, PFAS was detected and reported publicly by CS Energy in the Callide Valley Aquifer upstream of Council's bores. Detections are widespread in several private bores and detections above the ADWG was noted in several non-Council bores within a 12.5km radius of the Callide Dam. There was no PFAS detected in the dam itself.

Council increased the periodic testing of PFAS to quarterly, and subsequently to monthly monitoring. Council has engaged a third-party environmental consultant to undertake this PFAS monitoring within the Council's water supply. While PFAS has been detected in Council bores, all sources have been well below the ADWG values for drinking water. As the trend has remained consistent, the frequency has now been reduced back to quarterly.

4. DWQMP Implementation

Progress in implementing the risk management improvement program

Key items of progress are highlighted in Appendix B

In summary the following items progressed during the reporting period:

- Infrastructure upgrades commenced at the Moura WTP to replace the existing oldest clarifier and filter.
- Administrative amendments to SOPs and procedures for water treatment processes are ongoing.
- Addressing the findings from the DWQMP Audit.

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

This financial year there were one (1) instance where the Regulator was notified under sections 102 or 102A of the Act.

Incident 1 (18/02/2022)

Microbiological samples for Taroom Treated Reticulation (Lion's Park, Sewage Plant and Council Administration Building), taken and sent via toll on the 16.02.2022 was delayed in delivery and arrived at QLD Health Laboratory outside of the 24hr time frame and above the ideal temperature.
QLD Health advised they would continue with the testing on E. coli and phone if a positive result was found. A negative result would not be accepted due to the circumstances.

Immediate Corrective Action:

- Taroom operators took a Readycult sample at midday 18.02.2022 from the Taroom Lion's Park, however due to only having 1 Readycult available, all 3 sites were unable to be tested.
- Formal complaint lodged with TOLL.

Investigation and Long-Term Corrective Action:

- Investigations found that the local Toll courier missed collection of the sample eskies when picking up other items from the designated premises.
- A Readycult sample was collected on the 18.02.22 and resamples were collected on 21.02.22. Both sets of samples provided clear results.
- Additional Readycult sample kits were ordered, so that more than 1 sample can be collected at any time.
- Investigations have been completed to review alternative courier options. However, Toll are the only providers of this service for the area.

6. Customer complaints related to water quality

Banana Shire Council is required to report on the number of complaints, general details of complaints, and the responses undertaken, and throughout the year the following complaints about water quality were received;

Table 1 – number of complaints about water quality, (including complaints per 1000 customers)

Scheme	Population	Pressure - drinking water	Suspected illness	Discoloured Water	Taste and Odour
Banana	377	0	0	0	0
Baralaba	314	0	0	1 (3.18)*	0
Biloela	5758	2 (0.34)*	0	5 (0.86)**	5 (0.86)*
Goovigen	215	0	0	1 (4.65)*	0
Moura	1899	0	0	1 (0.52)*	0
Taroom	869	0	0	1	0
Thangool	741	2 (2.69)*	0	0	0
Theodore	483	0	0	0	0
TOTAL		4	0	9	5

*These bracketed figures equated to complaints per 1000 customer's equivalent.

** Callide Dam incident has been captured under Biloela in this instance

Suspected Illness

Complaints are occasionally received from customers who suspect their water may be associated with an illness they are experiencing. Banana Shire Council investigates each complaint relating to alleged illness from our water quality, typically by inspecting and testing the customers tap.

During the 2021/2022 reporting period there were no complaints of suspected illness arising from the water supply system.

Discoloured water

A total of Nine (9) complaints about discoloured water were received from the below schemes during the reporting period.

One (1) complaint at Taroom was attributed to air scouring pipelines in the area. Mains were flushed until clear.

One (1) complaint at Baralaba was received after flushing of water mains had been completed. The operator returned to the area and flushed the main in front of the house. A sample was taken, and the operator spoke with the resident. The sample was clear.

One (1) complaint was received at Goovigen. An operator attended and spoke to the resident. The resident was happy with the water and did not want a sample taken. Initial issue may have been result of water sitting in internal pipelines while property owner was away.

One (1) complaint at Moura. There was a main break and water was being fed to the scheme from the Dawson View Reservoir. An operator attended and tested the water. The operator observed that discoloured water was visible in the hot water but not in the cold water. The results of the test confirmed this. There was an issue with the private hot water system. This feedback was provided to the resident.

Four (4) complaints were received at Biloela. Once complaint was received by letter dated 13 September 2021 regarding an incident that occurred on the 17th August 2021 where laundry was stained after being washed. As there was 4 weeks between the incident and the notification, no formal corrective action was taken, however a written response was provided to the resident.
The other 3 complaints were linked to maintenance work involving the diversion of water from Biloela WTP direct to Earlsfield Reservoir through the trunk mains network which caused disturbance of settled sediment in the mains. At each residence that reported discoloured water, samples were taken and mains flushed. There were found to be no issues with water quality, and the discolouration cleared after flushing.

One (1) complaint at Callide Dam that was linked to presence of soluble manganese in raw water drawn from Callide Dam and treated at Biloela WTP. The water main was flushed, and samples were taken. The results confirmed compliance with ADWG Guidelines.

Taste and odour

A total of five (5) taste and odour complaints were received during the reporting period.

One (1) complaint at Biloela was a report of high chlorine. An operator collected a sample and the result was 1.40mg/L, which was within our CCP and ADWG Guidelines. The customer was notified of the result.

One (1) complaint at Biloela was associated with a dead-end main where the regular flushing regime had not been maintained due to low levels of staffing.

One (1) complaint at Biloela was for water that was clear, but tasted dirty. The complaint was attended to by operators, a sample was taken and tested. The sample was compliant with ADWG guidelines.

Two (2) complaints at Biloela on separate occasions were reports of high chlorine odour/taste. In both instances an operator attended and collected a sample. The results were within CCP and ADWG Guidelines. The customers were notified of the results.

Pressure

There has been a total of four (4) complaints about low water pressure that were received this reporting period.

The two (2) complaints from Thangool were due to a line valve not being turned back on after air scouring had been completed.

One (1) complaint at Biloela related to issues with water pressure from the tap. Banana Shire Council staff attended and checked pressure at the water meter. The pressure was found to be acceptable at the meter. The resident was notified and advised to check internal pipes.

One (1) complaint at Biloela was associated with pressure from new internal plumbing and dripping water was leaving a blue stain. The pressure was tested before and after the meter, which showed pressure was acceptable in Council's network. The blue staining was attributed to corroded copper washed loose from the copper piping when the new plumbing was installed. The results of the investigation were communicated to the resident.

7. Findings and recommendations of the external DWQMP audit

Banana Shire Council completed the latest DWQMP audit in February 2021. This external audit covered the period from 2015 to 2020, with the latest DWQMP being updated in 2017. The purpose of the audit is to verify:

- the accuracy of the monitoring and performance data provided to the Regulator
- assess compliance with the DWQMP
- assess the relevance of the DWQMP in relation to the service provided

ES.3 Audit Conclusions

The audit concluded that BSC:

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

The overall summary of compliance is shown in Table ES1. In total 60 questions were asked. Where relevant, questions were repeated in the field to confirm that management requirements were promulgated and implemented.

Table ES.1 – Compliance Summary

Compliance Code		Number of Findings
Compliant	Compliant	25
Compliant with Opportunity for Improvement	OFI	28
Minor Non-Compliant	Minor	6
Major Non-Compliant	Major	0
Critical Non-Compliant	Critical	0
Not-applicable or combined with another observation.		1
Total		**60**

A summary of the Minor findings are listed below.

Section	Recommendation	FY 21-22 update
Parameter Coverage	Ensure that the chlorine residual is above the target value of 0.2mg/L in the reticulation systems.	Completed
Compliance with Approval conditions	Ensure that all obligations including an external audit are met by the due date. A calendar and regular meeting will assist with meeting these obligations	Commenced quarterly management reviews.
Vermin Control	Ensure that temporary activities avoid exposing the clear water storage tank to vermin risk; Ensure that the Taroom clear water storage tank has mesh covering the air vents.	New roof installed on CWT in Taroom
Reagent Management	Order new pH standards and ensure that they are used in anticipation of their use-by-date.	Completed
Instrument Calibration	Ensure that all instruments are included in the external calibration program. It is recommended that the daily calibrations be added to the daily operational sheets to ensure this is done.	Trialling a template in Biloela. If this works, will roll out to other sites.
RMIP Implementation	Actively review the RMIP to ensure that items are addressed, and their status is known.	Updated in the new FY

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

The Banana Shire Council Drinking Water Quality Management Plan was approved by Department of Regional Development, Manufacturing and Water on 24 December 2021.

Banana Shire Council has been operating under this new DWQMP since the end of December 2021, which contains updated and, in some cases, reduced monitoring sites. As this annual report runs over the financial year, the data reviewed below contains half of the old monitoring requirements under the previous DWQMP (July-December 2021) and the other half being from the new DWQMP monitoring requirements (January-June 2022).

Appendix A – Summary of compliance with water quality criteria

Pages 11 to 20 summarise the test results for microbiological sampling, specifically looking for *Escherichia coli*, a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk.

The reported statistics do not include results derived from repeat samples, or from emergency or investigative samples undertaken in response to an elevated result.

The results reported are 90% Nata approved verification testing and 10% Readycult internal approved testing, as per the DWQMP.

Drinking water scheme: Banana (BAN01, BAN02, BAN04)

Year	*2021 to 2022*											
Month	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Jun***
No. of samples collected	4	1	1	3	1	1	1	3	1	1	11	9
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	29	30	30	31	32	31	25	24	21	21	28	37
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

Drinking water scheme: Baralaba (BAR02, BAR03, BAR04, BAR05)

Year	*2021 to 2022*											
Month	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	5	2	9	2	2	2	7	6	6	13	14	9
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	27	27	34	35	35	35	40	44	48	59	71	77
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

Drinking water scheme: Biloela (BIL03, BIL04, BIL05, BIL06, BIL07, BIL08, BIL09, BIL10, BIL11, BIL12, BIL13, BIL14, BIL15, BIL16, BIL17, BIL18

Year	*2021 to 2022*											
Month	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	56	54	59	52	49	45	50	43	39	50	61	46
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	237	279	326	366	401	436	470	497	516	550	588	604
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

Drinking water scheme: Callide Dam (CAL01, CAL02)

Year	*2021 to 2022*											
Month	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Jun***
No. of samples collected	9	9	11	7	7	9	9	9	9	9	9	9
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	32	42	48	54	62	70	78	86	94	102	106
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

Drinking water scheme: Goovigen (GOOV03, GOOV04)

Year	*2021 to 2022*											
Month	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	9	13	6	9	9	9	9	2	5	9	10	9
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	30	42	47	55	63	71	79	80	84	92	97	99
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

Drinking water scheme: Moura (MOU03, MOU04, MOU06, MOU07, MOU08, MOU09, MOU11)

Year	*2021 to 2022*											
Month	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	32	15	9	7	15	9	14	28	22	28	35	34
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	239	242	239	234	236	229	210	206	189	204	223	248
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

Drinking water scheme: Taroom (TAR03, TAR04, TAR05 TAR06, TAR07, TAR14, TAR15, TAR16)

Year	*2021 to 2022*											
Month	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	4	8	7	8	7	7	6	5	4	3	3	3
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	108	110	111	113	110	110	109	108	102	84	77	65
No. of failures for previous 12 month period	1	1	1	1	1	1	1	1	1	0	0	0
% of samples that comply	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%	99.1%	99.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Drinking water scheme: Thangool (THAN01, THAN02, THAN03, THAN04, THAN05)

Year	*2021 to 2022*											
Month	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	12	17	15	11	11	13	13	13	13	13	14	14
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	39	56	69	78	87	98	109	120	131	140	150	159
No. of failures for previous 12 month period	1	1	1	1	1	1	1	1	1	0	0	0
% of samples that comply	97.4%	98.2%	98.6%	98.7%	98.9%	99.0%	99.1%	99.2%	99.2%	100.0%	100.0%	100.0%
Compliance with 98% annual value	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Drinking water scheme: Theodore (THEO03, THEO04, THEO05, THEO06, THEO08, THEO09)

Year	*2021 to 2022*											
Month	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Jun***
No. of samples collected	4	8	8	8	9	7	7	9	3	16	3	3
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	93	95	97	99	102	103	101	101	93	99	95	85
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

Table 3 B – Verification monitoring – Metals

SCHEME NAME	CHEMICAL PARAMETER #	UNITS OF MEASUREMENT	TOTAL COUNT OF TESTS	NO OF TEST PASSED	% COMPLIANCE	LABORATORY NAME	PLANNED COUNT
Baralaba	Metals	mg/L	10	10	100	QH	8
Biloela	Metals	mg/L	28	28	100	QH	30
Goovigen	Metals	mg/L	4	4	100	QH	4
Moura	Metals	mg/L	8	8	100	QH	8
Taroom	Metals	mg/L	5	5*	100	QH	12
Theodore	Metals	mg/L	2	2**	100	QH	8

Comments: Chemical parameters* - (Heavy Metal Analysis) - which includes - Aluminium, Arsenic, Boron, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Nickel and Zinc.

The schedule is quarterly monitoring. Most sites (bar Goovigen), have 2 or more sampling sites, therefore the planned count has included all sample sites multiplied by the frequency. Biloela also covers Thangool & Callide. Moura also covers Banana.

*Taroom and Theodore did not meet the planned count of samples for this year.

SCHEME NAME	PHYSICAL PARAMETER	TOTAL COUNT OF TESTS	NO OF TEST PASSED	% COMPLIANCE	LABORATORY NAME	PLANNED COUNT
Baralaba	Physical	10	10	100	QH	8
Biloela	Physical	30	30	100	QH	32
Goovigen	Physical	4	4	100	QH	4
Moura	Physical	8	8	100	QH	8
Taroom	Physical	9	9	100	QH	12
Theodore	Physical	2	2	100	QH	8

Table 3 C – Verification monitoring – Standard Water Analysis

Comments: Physical Parameters: includes - Conductivity, pH, Total Hardness*, Alkalinity, Residual Alkalinity, Total Dissolved Solids, Total Dissolved Ions, True Colour, Turbidity. *Total Hardness is an aesthetic property and has no health guideline value; any aesthetic considerations are not included in this table.

Biloela also covers Thangool & Callide. Moura also covers Banana.

Table 3 D – Verification monitoring – Herbicides / Pesticides

SCHEME NAME	PESTICIDES	TOTAL COUNT OF TESTS	NO OF TEST PASSED*	% COMPLIANCE	LABORATORY NAME	PLANNED COUNT
Baralaba	Herbicides / Pesticides	8	8	100	QH	8
Biloela	Herbicides / Pesticides	24	24	100	QH	26
Goovigen	Herbicides / Pesticides	2	2	100	QH	2
Moura	Herbicides / Pesticides	8	8	100	QH	8
Taroom	Herbicides / Pesticides	6	6	100	QH	2
Theodore	Herbicides / Pesticides	5	5	100	QH	8

Includes non-recordable detections of analytes. Biloela also covers Thangool & Callide. Moura also cover Banana.

** At Biloela each bore was sampled for herbicides and pesticides during the reporting period. Two bores did not meet the quarterly schedule, and were sampled once for the year instead of 2 times. This is due to some bores being offline during the monitoring period.

Table 3 E – Verification monitoring – Radiological

SCHEME NAME	RADIOLOGICAL PARAMETER	TOTAL COUNT OF TESTS	NO OF TEST PASSED	% COMPLIANCE	LABORATORY NAME	PLANNED FREQUENCY
Baralaba	Corrected Activity	1	1	100	QH	5 YEARLY
Biloela	Corrected Activity	7	7	100	QH	5 YEARLY – Source Water 2 YEARLY - Bores
Goovigen	Corrected Activity	2	2	100	QH	2 YEARLY
Moura	Corrected Activity	1	1	100	QH	5 YEARLY
Taroom	Corrected Activity	0	0	100	QH	2 YEARLY
Theodore	Corrected Activity	2	2	100	QH	5 YEARLY

* All sites were monitored this year
** Biloela also covers Thangool & Callide. Moura also cover Banana.
*** Source Water and Bores completed. BIL5B and 7D were not operational at the time of sampling

Table 3 F – Verification monitoring – Disinfection By-Products

SCHEME NAME	PARMETER	UNITS OF MEASUREMENT	TOTAL COUNT OF TESTS	% COMPLIANCE	LABORATORY NAME	NO OF TEST PASSED	PLANNED COUNT
Baralaba	THMS	µg/L	13	100	QH	100	12
Biloela	THMS	µg/L	20	100	QH	100	24
Goovigen	THMS	µg/L	5	100	QH	100	4
Moura	THMS	µg/L	10	100	QH	100	12
Taroom	THMS	µg/L	8	100	QH	100	12
Theodore	THMS	µg/L	7	100	QH	100	12

Appendix B – Implementation of the DWQMP Risk Management Improvement Program

Table 4 – Key items of progress against the risk management improvement program in the approved DWQMP

Task	Scheme	Plant	Process Step	Description	Action	Status 21-22 FY	Status 22-23 FY	Status 23-24 FY	Comments
1	Baralaba (BAR)	Baralaba WTP	Raw water intake	Intake of contaminated water during wet weather event and moderate or major flood	Consider installation of automatic level sensors connected to telemetry and automated plant shut down on increased raw water turbidity and river level	Completed			RW turbidimeter installed 2020
2	Baralaba (BAR)	Baralaba WTP	Treated Water	Treatment chemical storage needs to meet A/S	Upgrade chemical storage and bunding	Planned Capital Project			Included in 22/23 budget
3	Baralaba (BAR)	Baralaba WTP	Filtration	A 2nd Train installed to allow water production to continue while train 1 is turned off for any reason.	Finish the commissioning of the Train 2 UF	Completed			Installed 2021
4	Baralaba (BAR)	Baralaba WTP	Raw Water intake	Rerouting and redesigning the chemical lines to prevent sun exposed chemical lines failing.	Replacement of the chemical lines at the raw water tank	Completed			Rectified 2021
5	Baralaba (BAR)	Baralaba WTP	Treated Water	There is no current isolation on the CWT. Operators are unable to isolate the tank in an emergency, resulting in	Installation of clear water tank isolation valve.	Planned Capital Project.			Included in 22/23 budget
6	Biloela (BIL)	Biloela Bores	Monitoring	Investigation into PFAS concentrations in the surrounding groundwater to ensure ADWG are	Routine monitoring and evaluation of the results to ensure the water is safe.	In Progress			Routine monitoring was monthly, now quarterly.
7	Biloela (BIL)	Biloela WTP	Monitoring	Lack of ventilation in the laboratory poses a safety hazard during monitoring and the use of chemicals.	Install Fume hoods in the laboratory	Not completed	Laboratory bench refurbishment		Project redirected to Laboratory bench refurbishment
7	Biloela (BIL)	Biloela WTP	Treated Water	Filtered water pipe is corroding due to exposure to chlorine gas.	Replace the corroded pipework and implement preventatives to stop from recurring.	Completed 2022			Completed 2022
8	Biloela (BIL)	Biloela WTP	Clarified water	Monitor the water turbidity prior to entering the filters.	Install online turbidity meter at the clarified water outlet (before the filters)	Project underway			In progress
9	Biloela (BIL)	Biloela WTP	Backwash/clarified water	Increasing the flow of water to the ponds will allow quicker draining of the clarifiers and improve efficiency.	Upgrade the splitter box to increase the flow of water to the ponds.	Not going ahead.			Project redirected
10	Goovigen (GOOV)	Bores	Raw Water	The submersible pump is required to maintain the Goovigen water supply.	Replace the existing above ground motor with a submersible pump	Project underway			To be completed in 22/23
11	Moura (MOU)	Moura WTP	Filtration	Clarifier 2 refurbishment- completion	The existing clarifier 2 will be replaced with a new clarifier. The WTP capacity will increase to 110L/s which will meet	Project underway			To be completed in 22/23
12	Moura (MOU)	Moura WTP	Filtration	Installation of valves to run half of train 3 during cleaning or breakdowns	The ability to split train 3 clarifier will allow for water to be produced during cleaning and breakdowns, increasing	Project underway			To be completed in 22/23
13	Moura (MOU)	Moura WTP	Disinfection	Reducing the risk of chlorine injection failing due to pipe breaks.	Replace the underground poly section of Cl2 at train 2 that breaks.	Project underway			To be completed in 22/23
14	Moura (MOU)	Moura WTP	Filtration	6mm underground airlines have failed. It is impossible to track down multiple leaks. This has caused our	Renewal of air-lines for actuated valves both underground and inside the old lab pit.	Project underway			To be completed in 22/23
15	Moura (MOU)	Moura WTP	Filtration	Existing filters wil be refurbished to meet the new clarifier capacity.	Refurbish Filter 3 and 4 to include sandblast, patch, add new media and new nozzles.	Project underway			To be completed in 22/23
16	Moura (MOU)	Moura WTP	Treated	Refurbish ponds	Clean and clear vegetation	Planned Capital Project			To be commenced in 22/23
16	Taroom	Taroom WTP	Treated Water	Assess the structural integrity of the roof support for clear water tank	Roof support condition investigation and design proposal	Completed			Completed 2022
17	Taroom	Bore Intake	Raw water intake	Contamination of water	Improve onsite monitoring capability	Planning Commenced			To be commenced in 22/23
18	Taroom	Taroom WTP	Aeration	Contamination of water	Investigate enclosing aerator to prevent contamination	Not Yet Commenced			Reservoir Roof Condition assessment to be completed in 22/23
19	Taroom	Taroom WTP	Clear Water Tank	Poor water quality leaving clear water tank	Investigate implementing turbidity monitoring	Future Upgrade			To be included in future upgrade
20	Thangool (THA)	Biloela WTP	Treated Water	Strengthen the monitoring and control tank water levels.	Float backups for transducers for reservoir control/alarms	Project underway			To be completed in 22/23
21	Theodore (THE)	Theodore WTP	Raw water intake	Intake of contaminated water during wet weather even and moderate flood	Consider installation of automatic level sensors connected to telemetry and automated plant shut down on increased raw	Future Upgrade			Part of the future WTP automation project
22	Theodore (THE)	Theodore WTP	Raw water intake	Preliminary design and tender document for the construction of a new raw water intake	Design of a new RWPS.	Project underway	Tender and construction phase		Options Study & design Report & D&C Documentation for Tender to be completed in 22/23
23	Theodore (THE)	Theodore WTP	Coagulation / Flocculation	Underdose of coagulant	Install duty/standby coagulant dosing pump (Spare pump stored at the WTP)				Currently, one pump working, one spare - to Include in Future Tender Specs

Task	Scheme	Plant	Process Step	Description	Action	Status 21-22 FY	Status 22-23 FY	Status 23-24 FY	Comments
24	Theodore (THE)	Theodore WTP	Activated carbon adsorption	Underdose PAC, Inefficient algal toxin removal	Consider installing automatic PAC dosing system			Future Upgrade	To considered in Future WTP upgrade
25	Theodore (THE)	Theodore WTP	Activated carbon adsorption	Overdose PAC	Consider installing automatic PAC dosing system			Future Upgrade	To considered in Future WTP upgrade
26	Theodore (THE)	Theodore WTP	Filtration	Breakthrough and mud balls	Consider installing automatic backwash system			Future Upgrade	To considered in Future WTP upgrade
27	Theodore (THE)	Theodore WTP	Treated water	WHS	Extend the safety railing at the clear water tank to access the hatch and the water level.	Planned Capital Project			To be completed in 22/23
28	Theodore (THE)	Theodore WTP	Treated water	Eliminate dead zones within the clear water tank where no chlorine is present.	Clear water tank/Chlorine contact installation of baffle/ring main or mixer to prevent short circuiting of Cl2 dosed water.	Planned Capital Project			To be completed in 22/23
29	Theodore (THE)	Theodore WTP	Treated water	Assess the structural integrity of the roof support for clear water tank	Roof support condition investigation and design proposal	Project underway			To be completed in 22/23
30	General	General	General	Failure of equipment	Develop and implement maintenance management system including maintenance procedures, register of spares and requirements	Implemented (assetic)	Ongoing		Currently under way. O & M manuals used to develop maintenance procedures.
31	General	General	General	Failure of equipment	Develop register of spares and requirements	Underway			Currently working on - updated to Assetic program
32	General	General	General	Inadequate calibration leading to incorrect readings/operations	Review calibration methodologies and frequencies	Underway	Ongoing		Procedures for verification of calibration to be included in BSC Laboratory manual procedures.
33	General	General	General	DW Audit Report	Implement corrective and preventative action for all findings from the DW Audit	Underway	Ongoing		Focus on calibration
34	General	General	Reticulation	Contamination of water from use of contaminated spares	Specify requirements for mains installations for developers and contractors	Completed			Refer CMDG Guidelines
35	General	General	General	Maintaining staff knowledge and personnel	Retention drive, recruitment of trainees.	Ongoing			Strategy put forward to CEO

Appendix C – Summary of DWQMP review actions identified

Table 5 – Action status

Action	Detail	Complete	Comment
Amend stakeholders relevant to the management of drinking water Quality	Added chemical suppliers, updated phone numbers	Y	
Amended the authorities in section 1.4	Changed the titles of new roles that have commenced	Y	
Updated water quality data	Verification that the CCPs are appropriate and achievable for all the schemes	Y	
Included an appendix for drinking water treatment chemical contaminant	Calculation of the concentration for the residual contaminants found in drinking water after treatment	Y	
Updated the Incident and Emergency Response Plan	Completed the review for all sites	Y	
Updated the Laboratory Manual	Updated the procedure for sampling and testing of analytes	Y	
Updated the Risk Management Improvement Program	Included all the current and future projects occurring at all the sites.	Y	

Appendix D – Water Testing Summary Results.

The results from the verification monitoring program have been compared against the levels of the water quality criteria specified by the Regulator in the Water Quality and Reporting Guideline for a Drinking Water Service.

This report is best read in conjunction with the Australian Drinking Water Guidelines, the relevance of each parameter is explained in detail. The number of samples collected as part of the DWQMP includes all monitoring from raw water intakes, mixing, treated and reticulation.

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY21/22	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Biloela	pH	1816	1098	6.5-8.5		
	Turbidity	1816	1098	5 NTU		Taken from 2 x raw water sampling points, treated water, 8 bores, 8 reticulation locations and pre and post mixing.
	True Colour	1816	1095	Aesthetic: 15 HU		
	Total Iron	1816	1098	No health guidelines set		
	Soluble Iron	878	572			Taken from the bores only
	Conductivity	878	575			
	Total Manganese	1764	1523	0.5 mg/l		
	Alkalinity	1816	1535			
	Fluoride	1816	1492	1.5 mg/L		Fluoride dosing currently non-operational
	Total Phosphorus	730	453			
	Total Nitrogen	730	453			
	Apparent Colour	730	458			Issues with supply and delivery of reagents contributed to a reduction of Soluble and Total Mn results.
	Soluble Manganese	730	459			
	E.coli	636	547	0 MNP/100ml		

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY20/21	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Biloela	Total Coliforms	636	547			
	Trihalomethanes	24	20	0.250 mg/l		
	Salinity	148	119			
	Free Chlorine	938	971	5mg/l		
	Heavy Metals	30	28	ADWG 2011 Chapter 10 Table 10.6		
	Pesticide Residue	26	24	ADWG 2011 Chapter 10 Table 10.6		
	Standard Water Analysis	32	30	ADWG 2011 Chapter 10 Table 10.6		
Thangool Reticulation	pH	156	152	6.5-8.5		Taken from 3 sampling locations
	Free Chlorine	156	149	5mg/l		
	Turbidity	156	151	5 NTU		
	Total Iron	156	151	No health guidelines set		
	Alkalinity	156	151	NA		
	Total Manganese	156	120	0.5 mg/l		
	True Colour	156	129	15 HU		
	Total Coliforms	156	144			
	E.coli	156	144	0mpn/100ml		

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY20/21	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Callide Dam Village	pH	104	101	6.5-8.5		Taken from 2 sampling locations
	Free Chlorine	104	99	5mg/l		
	Turbidity	104	101	5 NTU		
	Total Iron	104	101	No health guidelines set		
	Alkalinity	104	101			
	Total Manganese	104	91	0.5 mg/l		
	True Colour	104	101	Aesthetic: 15 HU		
	Total Coliforms	104	94	NA		
	E.coli	104	94	0mpn/100ml		
Goovigen	pH	208	198	6.5-8.5		Taken from 4 sampling locations (raw and chlorinated)
	Free Chlorine	104	99	5mg/l		
	Turbidity	208	199	5 NTU		
	Apparent Colour	208	187			
	True Colour	104	199	Aesthetic: 15 HU		
	Total Iron	208	197	No health guidelines set		
	Conductivity	208	198			
	Alkalinity	208	191			
	Salinity	208	200			
	Total Manganese	208	85	0.5mg/l		
	E.coli	208	178	0mpn/100ml		
	Trihalomethanes	4	5	0.250mg/l		
	Standard Water Analysis	4	4	ADWG 2011 Chapter 10 Table 10.6		

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY20/21	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Goovigen	Heavy Metals	4	4	ADWG 2011 Chapter 10 Table 10.6		
	Pesticide Residue	2	2	ADWG 2011 Chapter 10 Table 10.6		
Banana	pH	208	82	6.5-8.5		Taken from 3 sampling locations for 6 months and then from 2 locations for the other 6 months.
	Free Chlorine	130	86	5mg/l		
	Turbidity	130	86	5 NTU		
	Total Iron	130	82	No health guidelines set		
	True Colour	130	86	Aesthetic: 15 HU		Samples were being done monthly not weekly as per the schedule. Verification samples taken monthly.
	E.coli	130	30	0mpn/100ml		
	Total Coliforms	130	30	NA		

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY20/21	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Baralaba	pH	312	296	6.5-8.5		Taken from 5 sampling locations
	Alkalinity	312	297			
	Apparent Colours	208	194			
	True Colour	312	299	Aesthetic: 15 HTU		
	Turbidity	312	299			
	E. coli	104	56	0 mpn/100ml		
	Coliforms	104	56			
	Free Chlorine	208	214	5mg/l		
	Soluble Manganese	208	177	0.5mg/L		
	Total Manganese	312	277	0.5mg/L		
	Total Iron	312	296	No Health Guideline set		
	Heavy Metals	8	10	ADWG 2011 Chapter 10 Table 10.6		
	Pesticide	8	8	ADWG 2011 Chapter 10 Table 10.6		
	Standard Water Analysis	8	10	ADWG 2011 Chapter 10 Table 10.6		
	Trihalomethanes	13	12	0.250mg/l		

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY21/22	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Theodore	pH	886	850	6.5-8.5		
	Turbidity	886	850	5NTU		
	True Colour	886	850	15HU		
	Total Iron	886	850	No guideline set		
	Alkalinity	886	850	No guideline set		
	Total Manganese	886	850	0.5mg/L		
	Free Chlorine	886	850	5mg/L		
	E.coli	208	37	0 MPN/100ml		No readycults taken on Treated water THE03. This has been rectified.
	Total Coliforms	208	37			No readycults taken on Treated water THE03. This has been rectified.
	Trihalomethanes	12	7	0.250mg/l		
	Standard Water Analysis	8	2	ADWG 2011 Chapter 10 Table 10.6		
	Pesticide Residue	8	5	ADWG 2011 Chapter 10 Table 10.6		
	Heavy Metals	12	5	ADWG 2011 Chapter 10 Table 10.6		

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY21/22	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Taroom	pH	886	881	6.5-8.5		
	Turbidity	886	878	5 NTU		
	True Colour	730	729	Aesthetic guideline:15 HU		
	Total Iron	886	878	No health guideline set		
	Total Manganese	886	865	0.5 mg/l		
	Alkalinity	521	491	NA		
	E.coli	156	7	0mpn/100ml		Reticulation not monitored weekly for readycults as per the schedule. This has been rectified.
	Coliforms	156	7			Reticulation not monitored weekly for readycults as per the schedule. This has been rectified.
	Free Chlorine	521	489	5mg/l		
	Heavy Metals	12	5	ADWG 2011 Chapter 10 Table 10.6		
	Pesticide Residue	2.5	6	ADWG 2011 Chapter 10 Table 10.6		
	Standard Water Analysis	12	9	ADWG 2011 Chapter 10 Table 10.6		
	Trihalomethanes	12	8	0.250mg/l		

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY20/21	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Moura	pH	938	837	6.5-8.5		
	Turbidity	938	836	5 NTU		
	Alkalinity	938	799	NA		
	E.coli	208	92	0mpn/100ml		
	Total Coliforms	208	92			
	Free Chlorine	573	505	5mg/l		
	True Colour	938	786	15HU		
	Total Manganese	938	699			
	Soluble Manganese	365	316			
	Total Iron	938	788	No health guidelines set		
	Phosphorus	365	324			
	Nitrogen	365	317			
	Conductivity	365	316			
	Fluoride	12	4	1.5mg/L		
	Trihalomethanes	12	10	0.250 mg/l		
	Heavy Metals	8	8	ADWG 2011 Chapter 10 Table 10.6		
	Pesticide Residue	8	8	ADWG 2011 Chapter 10 Table 10.6		
	Standard Water Analysis	8	8	ADWG 2011 Chapter 10 Table 10.6		