Drinking Water Quality Management Plan Report

Dumaresq-Barwon Border Rivers Commission (BRC)

SPID: 370

Financial Year: 2019 - 2020

Dumaresq-Barwon Border Rivers Commission (BRC), care of Sunwater.

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LGA covered by this plan: Southern Downs Regional Council

Water Supply Schemes covered by this plan:

- Glenlyon Dam drinking water scheme

This report has been prepared in accordance with the Drinking Water Quality Management Plan Report Guidance Note.

Sunwater Limited

Document Information

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Service Provider	Dumaresq-Barwon Border Rivers Commission (BRC). SPID: 370
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Document history and status

Revision	Date	Description	By	Review	Approved
A	27/11/2020	Draft for Sunwater Review	Kenny Liew (Jacobs)	Nicholas Stanton (Jacobs)	Nicholas Stanton (Jacobs)
0	15/12/2020	Final for Submission	Kenny Liew Nicholas Stanton (Jacobs)	Neil McCabe John Kelly (Sunwater)	Chris Delamont (Sunwater)

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1 Introduction

This report documents the performance of the Border River Commission's Glenlyon Dam 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 2019 – 30 June 2020.

Dumaresq-Barwon Border Rivers Commission (BRC) is a registered service provider with identification (SPID) number 370. BRC is operating under an approved DWQMP to ensure the consistent supply of safe quality drinking water to protect public health.

Sunwater is contracted for the asset management, operation and maintenance of the dam, the associated water treatment facilities and mains reticulation system for the provision of drinking water services. Jacobs is engaged by Sunwater to provide specialist technical services to assist with the operation and management of drinking water plants including the preparation of this report.

The report assists the Regulator with determining 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 Summary of Scheme Operated

The Glenlyon Dam drinking water scheme sources water from Glenlyon Dam. The dam is owned by the Department of Natural Resources and Mines and is managed by the Border Rivers Commission.

Sunwater is contracted for the asset management, operation and maintenance of the dam, the associated water treatment facilities and mains reticulation system for the provision of drinking water services to four houses, a small caravan park and day visitor / recreational areas together with associated toileting services (i.e. picnic area toilets).

The water treatment process comprises of a multi-barrier three step process of;

(i) Primary media filtration and storage

(ii) Secondary filtration with organics removal through activated carbon media; and

(iii) Two stage disinfection with UV and dosing by sodium hypochlorite.

The water treatment process, plant and equipment are essentially manually controlled by operations staff during day-light hours, with the exception of the automation of the sodium hypochlorite pump. This automatic chlorine dosing system maintains free chlorine residual levels above 0.5 mg/L in the clear water tanks as part of the water treatment process.

The treated drinking water is stored in above ground tanks for later use on a two or three day production cycle, depending on demand for drinking water at the caravan park and picnic facilities at Glenlyon Dam. Water is disinfected before reticulation.

The daily drinking water demand is very seasonal, typically ranging from 10 to 40 kL/day, with minimum and maximum demand values of 18 and 300 kL/week respectively.

A summary of this scheme is presented in Table 1 below.

Table 1 – Summary of schemes

Scheme	Water Source	Treatment processes	Treatment capacity	Towns supplied
Glenlyon Dam WTP	Glenlyon Dam	Primary filtration, secondary filtration and two stage disinfection with UV and dosing by sodium hypochlorite.	0.043 ML/d	Four houses, small caravan park and day visitor / recreational areas together with associated toileting services (i.e. picnic area toilets).

3 DWQMP Implementation

The actions undertaken to implement the DWQMP are summarised below.

Sunwater has implemented the DWQMP by setting operational limits and investigation into non-compliances, as defined in the DWQMP operational and verification monitoring programmes, and site specific work instructions.

Progress in implementing the risk management improvement program

Appendix C of the approved DWQMP outlines the Improvement Plan Actions. A brief status report of the progress of these actions is included in Table 2.

Of the three improvement actions, Action 1: THM Testing, has been completed during the reporting period. Of the two remaining actions, investigation into the feasibility of a new treatment process was due for completion in FY 2019/2020 however has been delayed due to an ongoing turbidity exceedance event described in further detail in Section 5. This feasibility investigation has now commenced and is due for completion in FY 2020/2021. Hydrocarbon testing of the dam storage was due for completion in FY 2018/2019 and has not yet commenced, however initial baseline testing will be undertaken in FY 2020/2021.

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

No revisions were made to the operational monitoring program during the reporting year.

Drinking water quality is tested in accordance with ADWG limits on a number of key parameters and monitored on three levels to test for water quality and micro-biological characteristics to ensure safe drinking water for consumers. The drinking water quality tests involve weekly testing at the WTP for water chemistry (aesthetics) and residual chlorine, monthly testing of micro-biology and annual testing of heavy metals and Trihalomethanes (THM's) at a NATA accredited Laboratory.

Three water quality sampling locations (test points) within the distribution system are utilised to provide high levels of overall confidence, guarantee and surety in the provision of safe drinking water quality to consumers.

The sampling points were selected based on providing the highest probability of finding non-compliant drinking water to prevent a worst case scenario for a public health incident. The three water quality sampling points are located at the water treatment plant and at the end of the reticulation mains at the clear water tank(s), Caravan Park (Office) and Haigh Cottage (kitchen tap).

As these mitigation measures reduce "high" risks to risks of "medium" or "low" public risk, Sunwater believes the current verification monitoring program is adequate.

Amendments made to the DWQMP

The DWQMP was updated in the previous reporting period (11/06/2019), with no further modifications occurring during the 2019 - 2020 reporting period.

The following amendments to the DWQMP were made:

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

- DWQMP was rewritten to align with the DNRME template.
- Water quality information was updated to reflect recent water quality.
- Risk assessment was reviewed and updated to identify any new or emerging risks, and to align with Sunwater's new risk framework.
- Risk Management Improvement Plan was updated to reflect the risks in the risk assessment update.
- Verification monitoring was updated to include annual THM testing, as per the Risk Management Improvement Program action.

Table 2 – Risk management improvement program implementation status

RMIP Action No.	Component	Hazard/Event	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
1	Source Water	Chemical & physical hazards due to climatic and seasonal variations in raw water quality, due to heavy rainfall and drought conditions.	Investigation on feasibility of a new treatment process or chemical dosing system for additional treatment during higher raw water turbidity/colour events.	FY2019/2020	Item delayed due to ongoing incident. Feasibility investigation commenced in FY2020/2021.	Commenced. Feasibility investigation to be finalised in FY2020/2021.	General Manager South
2	Source Water	Hydrocarbon contamination due to accidental large-scale fuel / petrol spillages from (capsized or sinking) fishing or ski boats.	Complete base-line hydrocarbon testing of dam storage during a period of heavy recreational use and add hydrocarbon testing to annual heavy metals test regime.	FY2018/2019	Not yet commenced. Initial baseline test to be undertaken to establish background hydrocarbon levels. Dependant on baseline levels, ongoing testing requirement to be determined (pending review of baseline results).	Not yet commenced. Baseline testing to be undertaken in FY2020/2021.	Storage Supervisor
3	Water Treatment Plant	High Total chlorine from overdosing chlorine and presence of THM's from failure to remove organic matter.	Commence annual THM testing. If levels are of concern more regular testing to be investigated and established as required.	FY2018/2019	THM testing completed for FY2019/2020.	Completed. THM testing to be continued annually.	Storage Supervisor

4 Verification Monitoring – Water Quality Information and Summary

Under the *Water Supply (Safety and Reliability) Act 2008,* the Dumaresq-Barwon Border Rivers Commission (BRC) (the entity responsible for Glenlyon Dam) is defined as a large water service provider.

The drinking water quality control parameters were developed from recommendations outlined in ADWG (2011). Key parameters for operator testing and water quality acceptance are identified in Table 3 (a): Drinking Water Quality Control Parameters. These parameters are tested at the WTP at the three-different water quality sampling points.

Table 3 (a) – Drinking Water Quality Control Parameters

Parameter	Monitoring Frequency	Acceptable Limits
Residual chlorine (free) (Note 1)	Every 3 – 4 days	> 0.5 mg/L after 30 mins
Total chlorine	Every 3 – 4 days	< 5 mg/L
Raw Water pH	Every 3 – 4 days	N/A
Raw Water Turbidity	Every 3 – 4 days	N/A
Treated Water pH	Every 3 – 4 days	6.5 – 8.5
Treated Water Turbidity (Note 2)	Every 3 – 4 days	< 1 NTU

Note 1: The minimum acceptable residual chlorine (free) limit of 0.5 mg/L is not a specific requirement of the ADWG and has been applied by Sunwater as an internal operational check for disinfection performance. Although residual chlorine (free) is outlined in the DWQMP as a drinking water quality control parameter to monitor operational performance, verification of the treatment process and particularly disinfection is by the monthly micro bacteriological sampling.

Note 2: The acceptable limit of < 1 NTU for turbidity is based on effective chlorination as described in the ADWG and has been applied by Sunwater as an internal critical limit to verify the treatment performance and check disinfection.

Micro-biological control testing is also required to ensure compliance with ADWG as well as the standards in the Public Health Regulation 2005. The parameters and frequency of the monitoring is shown below in Table 3 (b): Micro-biological control.

Table 3 (b) – Microbiological Control

Parameter	Monitoring Frequency	Acceptable Limits
E.Coli	Monthly	<1 CFU
Total Coliforms	Monthly	N/A – significant changes will be investigated
Total Plate Count	Monthly	N/A – significant changes will be investigated

Annual trihalomethanes and heavy metals testing is also tested annually to ensure compliance with ADWG as well as the standards in the Public Health Regulation 2005. The parameters and frequency of the monitoring is shown below in Table 3 (c): Trihalomethanes and Heavy Metal Testing.

Table 3 (c) – Trihalomethanes and Heavy Metal Testing

Parameter	Monitoring Frequency	Acceptable Limits
Trihalomethanes (THM)	Annually	< 0.25 mg/L
Zinc (Zn) (Note 1)	Annually	< 3 mg/L
Arsenic (As)	Annually	< 0.01 mg/L
Cadmium (Cd)	Annually	< 0.002 mg/L
Chromium (Cr)	Annually	< 0.05 mg/L
Copper (Cu)	Annually	< 2 mg/L
Nickel (Ni)	Annually	< 0.02 mg/L
Lead (Pb)	Annually	< 0.01 mg/L

Note 1: The acceptable limit of <3 mg/L for zinc is not a specific requirement of the ADWG and has been applied by Sunwater as an internal operational check for WTP performance.

A summary of compliance with water quality criteria is displayed in Table 4 and 5. 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

Due to confusion about the reportability of turbidity exceedances (given there is no health limit in the ADWG for this parameter), Sunwater's internal incident management procedure required reporting to the regulator at levels exceeding 5 NTU (ADWG aesthetic guideline). As discussed with DNRME (specifically the Queensland Water Supply Regulator) on 05/05/2020, Sunwater has updated the incident management procedures to provide more clarity around the management of drinking water events. The procedure clarifies the specific process to be followed for the management of incidents and events with reference to the ADWG health limits, potential risk to public health and operational control of the WTP.

The water quality results over the 2019/2020 financial year met the recommended health limits in the ADWG.

There were two events where treated water turbidity exceeded the Sunwater acceptable limit of 1 NTU, across twenty-three (23) samples at each sampling point (67 in total). The events are as follows:

- Four (4) samples (at each sampling point) exceeded the acceptable limit in the period of 30/08/2019 to 09/09/2019, where the maximum turbidity levels recorded were 1.7 NTU at the WTP, 1.5 NTU at Haigh Cottage and 1.6 NTU at the Caravan Park (Office).

- Nineteen (19) samples (at each sampling point) exceeded the acceptable limit in the period of 2/03/2020 and 5/06/2020. Refer to Section 5 for event details.
    - Fifteen (15) samples exceeded the acceptable limit in the period of 02/03/2020 to 24/04/2020 where the maximum turbidity levels recorded were 5.1 NTU at the WTP, 5.2 NTU at the Haigh Cottage and at the Caravan Park (Office).
    - Two (2) samples exceeded the acceptable limit in the period of 18/05/2020 to 22/05/2020, where the maximum turbidity levels recorded were 1.1 NTU at the WTP, 1.2 NTU at the Haigh Cottage and 1.1 NTU at the Caravan Park (Office).
    - Two (2) samples exceeded the acceptable limit in the period of 01/06/2020 to 05/06/2020, where the maximum turbidity levels recorded were 1.2 NTU at all sites.

Table 4 – Drinking water quality performance for Glenlyon Dam Scheme - verification monitoring

Parameter	Sampling Points	Units	No. of samples required to be collected (as per the approved DWQMP)	No. of samples actually collected and tested	Water quality criteria (i.e DWQMP or ADWG health guideline value)	Min	Max	Average (Mean)	No. of non compliant samples	Comments
pH	WTP, Haigh Cottage, Caravan Park	-	Every 2-3 days	104 at 3 sampling points (312 Total)	6.5-8.5	7.3	7.9	7.6	0	
Turbidity	WTP, Haigh Cottage, Caravan Park	NTU	Every 2-3 days	104 at 3 sampling points (312 Total)	<1 NTU	0.34	5.2	1.0	67	Regulator was notified on 23/03/2020 following the 5 NTU exceedance.
Residual Chlorine (Free)	WTP, Haigh Cottage, Caravan Park	mg/L	Every 2-3 days	104 at 3 sampling points (312 Total)	>0.5 mg/L after 30 mins	0.55	1.5	0.9	0	
Total Chlorine	WTP, Haigh Cottage, Caravan Park	mg/L	Every 2-3 days	104 at 3 sampling points (312 Total)	<5 mg/L	0.78	2.00	1.3	0	
E.Coli	Haigh Cottage, Caravan Park	Cfu/100ml	Monthly	22 at 2 sampling points (44 Total)	<1 cfu/100mL	< 1	< 1	< 1	0	
Arsenic (As)	Raw water, WTP	mg/L	Annually	1 at each sample point (2 Total)	< 0.01 mg/L	0.00089	0.00090	0.00090	0	
Cadmium (Cd)		mg/L		1 at each sample point (2 Total)	< 0.002 mg/L	<0.0001	<0.0001	<0.0001	0	
Chromium (Cr)		mg/L		1 at each sample point (2 Total)	< 0.05 mg/L	<0.0005	<0.0005	<0.0005	0	
Copper (Cu)		mg/L		1 at each sample point (2 Total)	< 2 mg/L	0.037	0.067	0.052	0	
Lead (Pb)		mg/L		1 at each sample point (2 Total)	< 0.01 mg/L	0.00010	0.00021	0.00015	0	
Nickel (Ni)		mg/L		1 at each sample point (2 Total)	< 0.02 mg/L	0.00076	0.0011	0.0009	0	
Zinc (Zn)		mg/L		1 at each sample point (2 Total)	< 3 mg/L	<0.0050	0.0052	0.0050	0	
Trihalomethanes (THM)	Haigh Cottage, Caravan Park	mg/L	Annually	1 at each sample point (2 Total)	< 0.25 mg/L	0.108	0.114	0.111	0	

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

Table 5 - E. coli compliance with annual value

Drinking water scheme: Glenlyon Dam Drinking Water Scheme

Year	**2019 – 2020**											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	2	2	2	2	2	2	2	2	2	8	8	10
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	24	24	24	24	24	24	24	24	30	36	44
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

5 Incidents Reported to the Regulator

One (1) notification to the regulator was made between 1 July 2019 and 30 June 2020. This was as follows:

- 23/03/2020 – Turbidity > 1 NTU (Notified following the 5 NTU exceedance) (event)

All micro-biological testing undertaken during the financial year revealed that there were no instances where Escherichia coli (E. Coli) exceeded the acceptable limit of <1 CFU/100ml.

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

Between 1 July 2019 and 30 June 2020, there were no instances that required notification to the Regulator under sections 102 or 102A of the Act.

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 incident or event reported to the regulator. Incidents / Events reported to the regulator are described in Table 6.

Table 6 – Incidents / Events reported to the regulator

Incident / Event date	Scheme / location	Parameter / issue	Preventive actions
Event 2 March 2020	Glenlyon Dam Water Treatment Plant	Turbidity > 1 NTU	Raw water turbidity levels increased due to inflows into the dam, exceeding 1 NTU initially on the 02/03/2020. Notification to the regulator was undertaken following the exceedance of 5 NTU on the 23/03/2020, where a turbidity of 5.1 NTU at the WTP and 5.2 NTU at the caravan park were detected. Immediate corrective actions included notifying all customers, issuing a boil water notice and increasing the frequency of backwashing. Weekly microbiological sampling was undertaken throughout the event, and at no point was E.Coli detected. The close-out of the incident occurred on 06/08/2020, where the boil water alert was lifted as a result of consistent turbidity readings <1 NTU and nil detections of E.Coli demonstrating the treated water quality consistently within DWQMP limits. It has been determined that the existing WTP processes were insufficient as an appropriate barrier to raw water turbidity above 5 NTU. As such, Sunwater is currently investigating improvements to the WTP to improve its turbidity removal capability. This feasibility investigation has now commenced and is due for completion in FY 2020/2021. Sunwater have also updated their incident management procedures to better define the management of incidents and events relating to drinking water supply. The Sunwater Wall Chart has also been updated and requires all operators to notify Jacobs and Sunwater Management when treated water turbidity exceeds 1 NTU.

6 Customer Complaints

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

Throughout the 2019/2020 reporting period, no complaints about water quality were received.

During 2019/2020 reporting period, there were no suspected or confirmed cases of illness arising from the water supply system

7 DWQMP Review Outcomes

No review was conducted during the reporting period 01/07/2019 to 30/06/2020.

8 DWQMP Audit Findings

No audit was conducted during the reporting period 01/07/2019 to 30/06/2020.