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Service Provider ID: 9

Drinking Water Quality Management Plan (DWQMP)

ANNUAL REPORT 2014/2015

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
<i>E. coli</i>	<i>Escherichia coli</i> , a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
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

1. Introduction

This report documents the performance of Barcoo 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.

This template 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

Barcoo Shire incorporates the towns of Jundah, Stonehenge and Windorah, and covers an expanse of 61,974 sq km. The population of the shire is approximately 365. The administration centre of Barcoo Shire is 220 km south of Longreach in the township of Jundah.

Barcoo Shire Council is a small drinking water service provider as defined under the Act and provides drinking water to a population of approximately 210 people. Each town is serviced by dual water reticulation, a treated, potable water supply as well as an untreated non-potable supply.

Barcoo Shire Council is responsible for the following water supply schemes:

- **Jundah**

Raw water is sourced from a nearby waterhole on the Thomson River. This river water is coagulated and treated by conventional sedimentation and rapid sand filtration in a package module. After chlorination it transfers to a ground level reservoir and from there it is pumped into a high level reservoir which supplies the town.

Bore water is stored in a small ground level reservoir prior to treatment in the reverse osmosis plant and transfers to the same ground level reservoir as the treated river water. The reverse osmosis plant hasn't been in operation since November 2014.

- **Windorah**

Raw water is sourced from two nearby waterholes on the Cooper Creek. This river water is coagulated and treated by conventional sedimentation and dual media rapid gravity filtration in a package plant. After chlorination it transfers to a ground level reservoir and from there it is pumped into a high level reservoir which supplies the town.

- **Stonehenge**

Raw water is sourced from a nearby waterhole on the Thomson River and is pumped to an off stream storage during river flows. Water from the off-stream storage is pumped, with addition of coagulant, to a small flocc-sed unit and then into a flow balance tank. The water then passes through a pressure filter and is chlorinated before being transferred to a ground level reservoir from which it is pumped into a high level reservoir which supplies the town.

3. Actions taken to implement the DWQMP

Progress in implementing the risk management improvement program

Refer to the Appendices for a summary of progress in implementing each of the Improvement Program actions.

The operational implementation of the DWQMP has been limited as the document is not written for ease of use by the Operational staff. This difficulty has been added to with two new water treatment plant operators starting with Council since the development of the DWQMP and having no prior involvement with the DWQMP.

The main progress Council has made in implementing the DWQMP is in the following areas:

- ability to test for turbidity by procuring second hand meters for all three water treatment plants
- development of key procedures for works undertaken on the potable water system.
- changes in chlorination at the Stonehenge water treatment plant to be post filtration

The ability to test for turbidity will allow for an expanded operational monitoring program to be considered as part of the review due by 31 December 2015. This is to include monitoring of the turbidity from the filter/s at each water treatment plant.

Significant implementation steps will result in 2016 from Council's participation in potential joint projects through the Outback Regional Water Alliance (ORWA) such as:

- Developing documents more relevant and fit for purpose for use by water treatment plant operators and involving them in workshops to review operational monitoring and targets
- Review of disinfection products and processes
- Procuring reservoir cleaning services and air scouring of the reticulation systems
- Procuring in line analysers for chlorine and turbidity
- Procuring of specialist external resources/consultants e.g. Peter Mosse

Revisions made to the operational monitoring program to assist in maintaining the compliance with water quality criteria¹ in verification monitoring.

Nil

Amendments made to the DWQMP

Nil

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

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. Refer to Appendix A for the monitoring results.

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

This financial year there were no instances where the Regulator was notified under sections 102 or 102A of the Act.

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

Nil

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

Nil

6. Customer complaints related to water quality

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

Throughout the year the following complaints about water quality were received:

Table 1 - complaints about water quality, (including per 1000 customers)

	Suspected Illness	Discoloured water	Taste and odour	Total
Jundah	0	0	0	0
Windorah	0	0	0	0
Stonehenge	0	0	0	0
Total	0	0	0	0

Suspected Illness

Nil

Discoloured water

Nil

Taste and odour

Nil

7. Findings and recommendations of the DWQMP auditor

No audit of the DWQMP has been undertaken to date. The first audit of the DWQMP is due by 30 June 2018.

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

The next internal review of the DWQMP is due before 31 December 2015. The outcome of this review will be covered in the Annual Report for 2015/16.

Appendix A – Summary of compliance with water quality criteria

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*.

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 verification monitoring was varied from that stated in the DWQMP as follows:

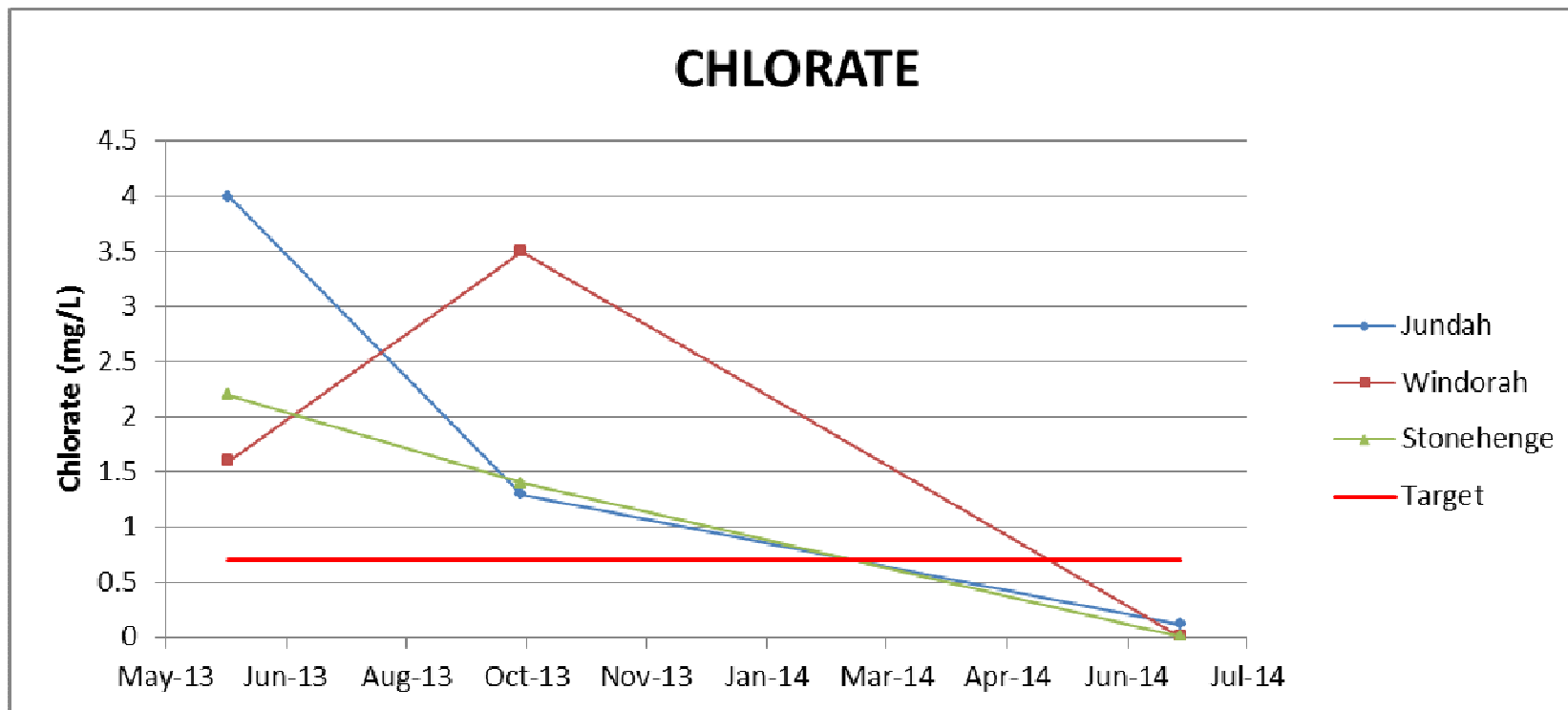
1. From 1 July 2014 to early 2015, monitoring of free chlorine residual was only undertaken for the reservoirs. This was a continuation of the historical monitoring program. Therefore, no data is available for free chlorine residual in the reticulation system during this time. Monitoring of free chlorine residual in the reticulation system was increased in frequency to be on a daily basis in early 2015. The daily monitoring has been undertaken at just one site in the reticulation system for each scheme rather than three separate sites. Some records of the monitoring of free chlorine residual in the reticulation system since early 2015 were unable to be located. The monitoring of total chlorine in the reticulation system has not historically been done and was omitted in 2014/15 to concentrate on the monitoring of free chlorine residual. The need for monitoring of total chlorine will be reviewed as part of a proposed joint project through the ORWA in 2016 to review all verification monitoring being undertaken.
2. The duplicate annual testing of E.coli and coliform by an external laboratory was only undertaken at one site per scheme rather than three separate sites. Testing for E.coli and coliforms in October 2014 was missed for all three towns, due to a changeover in staff.
3. Testing of chlorate for each scheme was undertaken in 2013/14 (refer Appendix A for results). A total of three separate tests per scheme were taken over the financial year with initial testing showing levels over 0.7 mg/L in all three schemes. The testing undertaken showed that operational changes made during this period brought the level of chlorate for each scheme below 0.7 mg/L. Further testing will be undertaken in 2015/16 to determine if the level of chlorate has remained below 0.7 mg/L. A changeover of staff occurred in mid-late 2014 and as a result, the continuity of the sampling program for chlorate was lost and not followed up by the Consulting Engineer. This resulted in no testing for chlorate in 2014/15.

The appropriateness of the verification monitoring program is to be reviewed as part of a proposed joint project through the ORWA in 2016.

Table 2 - Verification monitoring results

Scheme name	Scheme component	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)	Limit of reporting	Laboratory name
Jundah	Source Water	Antimony	mg/L	Annually	1	0	0				0.001	SAS - Darra
	Source Water	Arsenic	mg/L	Annually	1	1	0	0.0011	0.0011	0.0011		SAS - Darra
	Source Water	Barium	mg/L	Annually	1	1	0	0.27	0.27	0.27		SAS - Darra
	Source Water	Beryllium	mg/L	Annually	1	0	0				0.001	SAS - Darra
	Source Water	Boron	mg/L	Annually	1	0	0				0.05	SAS - Darra
	Source Water	Cadmium	mg/L	Annually	1	0	0				0.0002	SAS - Darra
	Source Water	Chromium	mg/L	Annually	1	1	0	0.007	0.007	0.007		SAS - Darra
	Source Water	Copper	mg/L	Annually	1	1	0	0.011	0.011	0.011		SAS - Darra
	Source Water	Lead	mg/L	Annually	1	1	0	0.005	0.005	0.005		SAS - Darra
	Source Water	Manganese	mg/L	Annually	1	1	0	0.11	0.11	0.11		SAS - Darra
	Source Water	Molybdenum	mg/L	Annually	1	0	0				0.001	SAS - Darra
	Source Water	Nickel	mg/L	Annually	1	1	0	0.008	0.008	0.008		SAS - Darra
	Source Water	Selenium	mg/L	Annually	1	0	0				0.001	SAS - Darra
Windorah	Source Water	Antimony	mg/L	Annually	1	0	0				0.001	SAS - Darra
	Source Water	Arsenic	mg/L	Annually	1	1	0	0.0013	0.0013	0.0013		SAS - Darra
	Source Water	Barium	mg/L	Annually	1	1	0	0.31	0.31	0.31		SAS - Darra
	Source Water	Beryllium	mg/L	Annually	1	0	0				0.001	SAS - Darra
	Source Water	Boron	mg/L	Annually	1	1	0	0.053	0.053	0.053		SAS - Darra
	Source Water	Cadmium	mg/L	Annually	1	0	0				0.0002	SAS - Darra
	Source Water	Chromium	mg/L	Annually	1	1	0	0.008	0.008	0.008		SAS - Darra
	Source Water	Copper	mg/L	Annually	1	1	0	0.01	0.01	0.01		SAS - Darra
	Source Water	Lead	mg/L	Annually	1	1	0	0.006	0.006	0.006		SAS - Darra
	Source Water	Manganese	mg/L	Annually	1	1	0	0.13	0.13	0.13		SAS - Darra
	Source Water	Molybdenum	mg/L	Annually	1	0	0				0.001	SAS - Darra
	Source Water	Nickel	mg/L	Annually	1	1	0	0.009	0.009	0.009		SAS - Darra
	Source Water	Selenium	mg/L	Annually	1	0	0				0.001	SAS - Darra
Stonehenge	Source Water	Antimony	mg/L	Annually	1	0	0				0.001	SAS - Darra
	Source Water	Arsenic	mg/L	Annually	1	1	0	0.0015	0.0015	0.0015		SAS - Darra
	Source Water	Barium	mg/L	Annually	1	1	0	0.31	0.31	0.31		SAS - Darra
	Source Water	Beryllium	mg/L	Annually	1	0	0				0.001	SAS - Darra
	Source Water	Boron	mg/L	Annually	1	1	0	0.065	0.065	0.065		SAS - Darra
	Source Water	Cadmium	mg/L	Annually	1	0	0				0.0002	SAS - Darra

Scheme name	Scheme component	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)	Limit of reporting	Laboratory name
	Source Water	Chromium	mg/L	Annually	1	1	0	0.007	0.007	0.007		SAS - Darra
	Source Water	Copper	mg/L	Annually	1	1	0	0.008	0.008	0.008		SAS - Darra
	Source Water	Lead	mg/L	Annually	1	1	0	0.004	0.004	0.004		SAS - Darra
	Source Water	Manganese	mg/L	Annually	1	1	0	0.076	0.076	0.076		SAS - Darra
	Source Water	Molybdenum	mg/L	Annually	1	0	0				0.001	SAS - Darra
	Source Water	Nickel	mg/L	Annually	1	1	0	0.007	0.007	0.007		SAS - Darra
	Source Water	Selenium	mg/L	Annually	1	0	0				0.001	SAS - Darra



FREE CHLORINE IN RETICULATION NETWORK

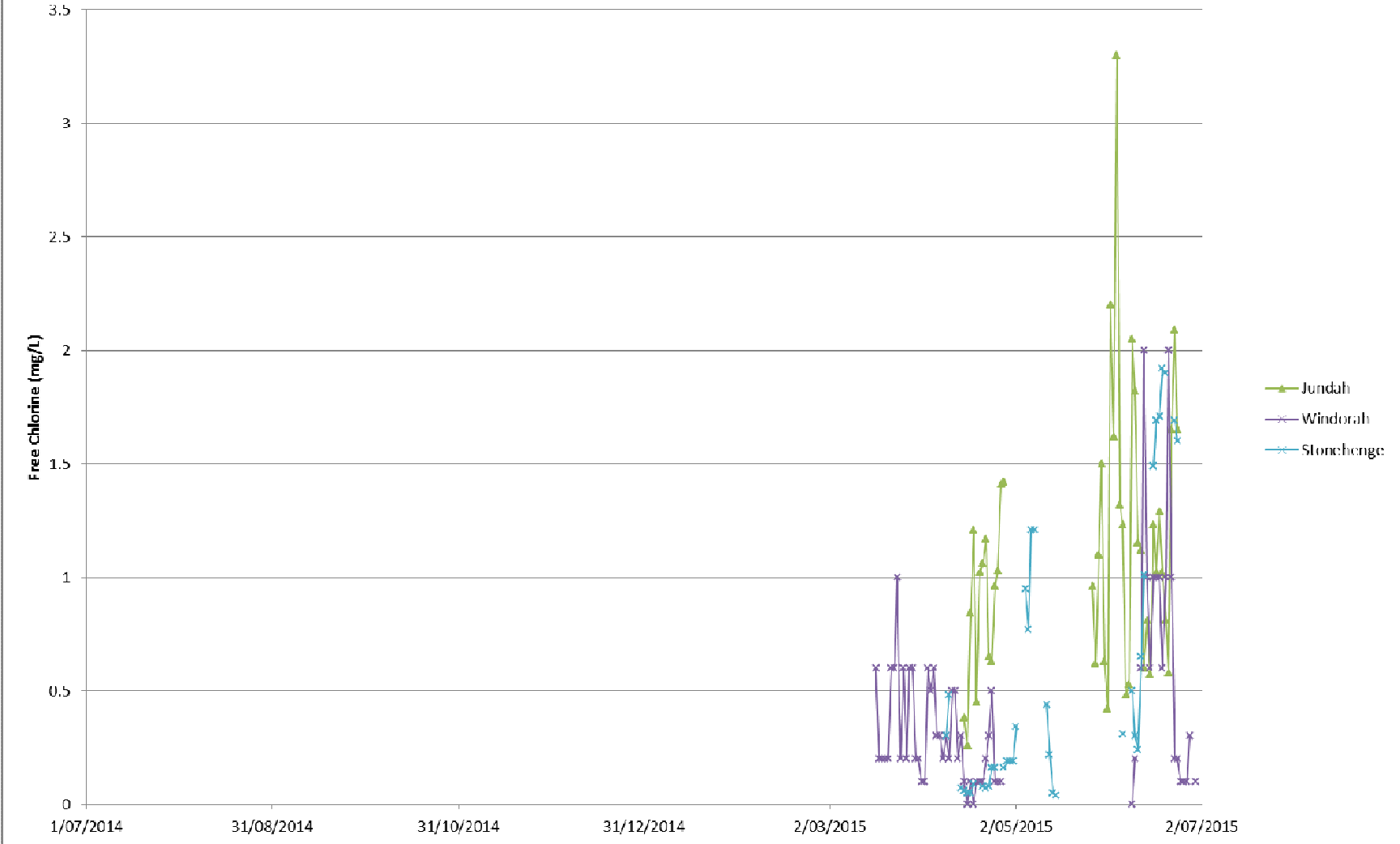


Table 3 - Reticulation *E. coli* verification monitoring

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

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

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

Drinking water scheme: Jundah

Year	2014											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected	3	3	3	3	3	3	3	3	3	0	3	3
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	36	36	36	36	36	36	36	36	36	33	33	33
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

<i>Year</i>	<i>2015</i>											
<i>Month</i>	<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>Aug</i>	<i>Sept</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>
No. of samples collected	4	3	3	3	3	3	3	3	3	4	8	
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	
No. of samples collected in previous 12 month period	34	34	34	34	34	34	34	34	34	38	43	40
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:

Windorah

Year	2014											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected	3	3	3	3	3	3	3	3	3	0	3	3
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	36	36	36	36	36	36	36	36	36	33	33	33
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

Year	2015											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected	6	3	3	3	3	3	3	3	3	3	8	
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	
No. of samples collected in previous 12 month period	36	36	36	36	36	36	36	36	36	39	44	41
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: Stonehenge

Year	2014											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected	3	3	3	3	3	3	3	3	3	0	3	3
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	36	36	36	36	36	36	36	36	36	33	33	33
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

Year	2015											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected	3	3	3	3	3	2	3	3	3	4	8	
No. of samples collected in which <i>E. coli</i> is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	
No. of samples collected in previous 12 month period	33	33	33	33	33	32	32	32	32	36	41	38
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

Appendix B – Implementation of the DWQMP Risk Management Improvement Program

Table 4 – Progress against the risk management improvement program in the approved DWQMP

Ref	Hazard/ Hazardous Event	Actions	Priority	Target Date	Status as at 30/6/2015	Status Comment
Catchment						
C1	Need to monitor effectiveness of treatment as a barrier to pathogens generally	Investigate purchasing turbidity meters with resolution of at least one decimal place for each plant for operational monitoring	high	31-Dec-14	Completed	Secondhand portable meters obtained for all three water treatment plants by December 2014.
C2	Inability of treatment to reliably remove protozoa	Develop strategy to minimise use of first run of the river water, consider alternative sources (eg off-stream storage) during storm events. Optimise the plant's operation during storm events to keep turbidity down.	medium	31-Dec-14	In progress	Current strategy is to not take raw water for the first few days of any 'first flush' of the river. Sufficient treated water storage is available to allow this. For Jundah, investigating the use of an existing ground level tank to store raw water prior to the 'first flush' of the river arriving.
C3	Pathogenic quality of raw water unknown	Investigate test program for E.coli in raw water supply	high	31-Dec-14	Incomplete	No test program developed to date. Look to include with monthly E.coli checks on reticulation system in early 2016.
C4	Dead animals in waterholes	Investigate routine inspections and removal	high	31-Dec-14	On going	Plant operators undertake daily inspections of the raw water source as part of their operational monitoring.
C5	Preparedness to deal with algal blooms if they should arise	Consider testing of dam water for algae species when raw water turbidity is low and pH rises above 9 and obtaining a stock of powdered activated carbon for use if required	medium	1-Jul-15	On going	No testing undertaken to date as conditions haven't reached the levels conducive for algal blooms.
C6	Significant levels of some metals were detected in raw river water in snapshot monitoring (but still <40% of health limits)	Investigate testing for metals in March each year until results indicate that metal levels are not an issue, eg <10% of health guideline values	medium	31-Dec-14	Completed/ On going	Further test results obtained in June 2014 and May 2015. New results to be included as part of the DWQMP review in late 2015.
C7	Variable raw water quality may warrant additional jar test equipment and operator training	Investigate cost/benefit of additional jar test equipment and training when sufficient treated turbidity history available	medium	31-Dec-15	On going	Training undertaken. Equipment still to be investigated.

Ref	Hazard/ Hazardous Event	Actions	Priority	Target Date	Status as at 30/6/2015	STATUS/Comment
Jundah						
J1	Incapable equipment or unit processes - salinity	Investigate external maintenance contract for RO plant	high	30-Jun-14	Completed	External maintenance contract in place with Veolia however the RO plant hasn't been in operation since November 2014.
J2	Inadequate backup	Check that spare dosing pumps are on hand	medium	31-Dec-14	Completed	Spare dosing pumps are available.
J3	Chemical dosing failures - turbidity	Investigate purchase of turbidity meter	high	31-Dec-14	Completed	Included in Item C1. Secondhand portable meters obtained for all three water treatment plants by December 2014.
J4	Ineffective disinfection - bacteria, viruses	Investigate upgrade to chlorine dosing / monitoring systems	high	31-Dec-14	Incomplete	Awaiting a joint project under the ORWA to progress this item. Consider funding any required works in the 2016/17 budget.
J5	Power failures - loss of supply	Investigate requirement to be able to connect generator to operate pumps and/or WTP in the extent of long power failure	medium	1-Jul-15	Incomplete	Investigation yet to commence.
J6	Disinfection byproducts - THMs	Test for THMs - if problem is indicated establish on-going testing program and/or reduction strategy	medium	31-Dec-14	Completed /On going	Testing has been undertaken. Levels at all three plants are below max. ADWG values. Council will continue to do some spot checks on this parameter.
J7	Disinfection byproducts - chlorate	Test for chlorate - establish on-going testing program if indicated. Investigate alternative chlorine chemicals. Minimise hypo holding time, UV exposure, temperature.	medium	30-Jun-14	Completed /On going	Testing was undertaken between June 2013 and June 2014. Following operational changes during this period, the level of chlorate was reduced to an acceptable level. Council will continue to do some spot checks on this parameter.

Ref	Hazard/ Hazardous Event	Actions	Priority	Target Date	Status as at 30/6/2015	STATUS/Comment
Windorah						
W1	Inadequate backup	Investigate backup dosing equipment	medium	31-Dec-14	Completed	Spare dosing pumps are available.
W2	Chemical dosing failures	Investigate purchase or turbidity meter for the operator	high	31-Dec-14	Completed	Included in Item C1. Secondhand portable meters obtained for all three water treatment plants by December 2014.
W3	Power failures - loss of supply	Investigate requirement to be able to connect generator to operate pumps and/or WTP in the extent of long power failure	medium	1-Jul-15	Incomplete	Investigation yet to commence.
W4	Disinfection byproducts - THMs	Test for THMs - establish on-going testing program and/or reduction strategy if warranted	low	30-Jun-14	Completed /On going	Testing has been undertaken. Levels at all three plants are below max. ADWG values. Council will continue to do some spot checks on this parameter.
W5	Disinfection byproducts - chlorate	Test for chlorate - establish on-going testing program if indicated. Investigate alternative chlorine chemical if warranted	medium	30-Jun-14	Completed /On going	Testing was undertaken between June 2013 and June 2014. Following operational changes during this period, the level of chlorate was reduced to an acceptable level. Council will continue to do some spot checks on this parameter.

Ref	Hazard/ Hazardous Event	Actions	Priority	Target Date	Status as at 30/6/2015	STATUS/Comment
Stonehenge						
S1	Inadequate backup	Confirm availability/suitability of spare pumps	medium	31-Dec-14	Completed	Spare dosing pumps are available.
S2	Chemical dosing failures	Investigate purchase of turbidity meter	high	31-Dec-14	Completed	Included in Item C1. Secondhand portable meters obtained for all three water treatment plants by December 2014.
S3	Ineffective disinfection - bacteria, viruses	Chlorination is at inlet to plant. Investigate moving chlorination to post filtration.	medium	30-Jun-14	Completed	Chlorination is now undertaken post filtration.
S4	Disinfection byproducts - THMs	Test for THMs - establish on-going testing program and/or reduction strategy if indicated (see also S3)	high	30-Jun-14	Completed /On going	Testing has been undertaken. Levels at all three plants are below max. ADWG values. Council will continue to do some spot checks on this parameter.
S5	Disinfection byproducts - chlorate	Test for chlorate - establish on-going testing program if indicated. Investigate alternative chlorine chemical if warranted	high	30-Jun-14	Completed /On going	Testing was undertaken between June 2013 and June 2014. Following operational changes during this period, the level of chlorate was reduced to an acceptable level. Council will continue to do some spot checks on this parameter.

Ref	Hazard/ Hazardous Event	Actions	Priority	Target Date	Status as at 30/6/2015	STATUS/Comment
Network/Systems						
N1	Repairs to reticulation water mains - contamination at work site	Develop work method statement, including hygiene measures and procedure for chlorination and flushing of affected area when required	medium	31-Dec-14	Completed	Various procedures developed by June 2015
N2	Ingress of contamination from cross-connection to untreated river water	Investigate purchase of turbidity meter for testing in conjunction with bacto sampling	high	31-Dec-14	Completed	Included in Item C1. Secondhand portable meters obtained for all three water treatment plants by December 2014.
N3	Water network drawings are still draft	Finalise drawings clearly identifying potable vs raw water supplies and make available to operational staff	medium	31-Dec-14	In Progress/ Ongoing	Drawings have been updated to include all new works during the past 5 years. Locations of older valves, hydrants etc. still to be confirmed through site inspections.
N4	Comprehensive data records are not readily available	Investigate adoption of recommendations in section 12 or similar	medium	31-Dec-14	Incomplete	Original system still in place. Improved system to be developed in 2015/16.
N5	Operation and maintenance procedures not documented	Prioritise and document key O&M functions required to minimise risk to drinking water quality	medium	1-Jul-15	Completed	Various procedures developed by June 2015
N6	Minimal operational monitoring currently undertaken	Review and upgrade operational monitoring and logging including identifying alert levels and corrective actions	medium	31-Dec-14	Completed /On going	An upgraded monitoring program was introduced in early 2015. Further refinements to be made as part of the DWQMP review due by 31 December 2015.
N7	Chlorine residual not routinely tested in the reticulation systems	Investigate testing for free chlorine residual whenever bacto samples are taken in the reticulation	medium	31-Dec-14	Completed /On going	Monitoring of free chlorine residual in the reticulation system has been included in the monitoring program with certain sites being tested on a daily basis.
N8	DEWS has requested a revised set of risk category descriptors and more detailed preventative measure descriptors	Revise the risk category descriptors, revisit the risk assessment and include more detailed preventative measure descriptors	medium	31-Dec-14	Incomplete	Will be done as part of the DWQMP review due by 31 December 2015.