GLADSTONE
REGIONAL COUNCIL

ABN: 27 330 979 106

DRINKING WATER QUALITY MANAGEMENT PLAN REPORT

2015.16

SPID: 483

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Glossary of terms

ADWG 2004	Australian Drinking Water Guidelines (2004). Published by the National Health and Medical Research Council of Australia
ADWG 2011	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
E. coli	*Escherichia coli*, a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
GRC	Gladstone Regional Councl
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
WTP	Water Treatment Plant
<	Less than
>	Greater than

1. Introduction

This report documents the performance of Gladstone Regional 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

The Gladstone Regional Council (GRC) provides water to its residents through four water schemes:

- **Lake Awoonga Scheme.** Under this scheme the Gladstone Area Water Board collects and treats raw water harvested from the Lake Awoonga Dam. The water is treated through a conventional water treatment plant before being sold to Gladstone Regional Council at a number of reservoir and supply points throughout Gladstone, Boyne Island, Tannum and Calliope. GRC distributes the water to approximately 22,800 connections.
- **Bororen Scheme.** GRC sources water from two production bores located to the west of Lagoon Creek within the Baffle Creek catchment. The groundwater is treated at the Bororen Water Treatment Plant (WTP) and disinfected before being reticulated to 90 connections within the Bororen Township.
- **Miriam Vale Scheme.** GRC sources water from Baffle Creek (~80%) and the Thorne Road bore. The water is mixed and treated through a conventional treatment process and disinfected before being reticulated to approximately 200 connections.
- **Agnes Water/1770 Scheme.** GRC sources water from seawater and 4 groundwater bores along Springs Road. The seawater is treated through a reverse osmosis desalination plant, and the bore water is treated through a conventional plant. Disinfected water is supplied to approximately 900 connections within the townships of Agnes Water and 1770. The treatment plants are operated and maintained under contract by Trility Pty Ltd.

GRC manages drinking water quality through an approved Drinking Water Quality Management Plan (DWQMP). This ensures that water supplied to its 23,900 customers is safe and public health is maintained.

3. Actions taken to implement the DWQMP

Progress in implementing the risk management improvement program

With the appointment of a new Water Services Manager in May 2015, attention has been refocused on delivering improvements to reduce risks associated with water delivery activities. 44% of the improvement actions identified in the initial drinking water quality management plan have been closed out, with implementation plans underway for the remaining actions.

Key initiatives implemented include:

- Awarding a contract to upgrade the water treatment plant at Miriam Vale under a design and construct contract. The contract was awarded in January 2016 and completion is expected in December 2016. The new treatment plant will address water quality risks including dirty water from iron and manganese as well as removal of toxin from blue green algae outbreaks.
- SCADA upgrade has been completed to allow GRC to view all reservoirs in the Lake Awoonga Scheme and bringing Bororen online.
- Updated emergency response plans incorporating water supply in October 2015.
- Reviewed chemical supply practices.
- Updated operational procedures including protocols for flushing mains, monitoring security at reservoirs, operating and maintaining plants,
- Developed catchment management plans for borefields.
- Employed a process overseer with extensive water quality experience to mentor and train operational staff on water treatment practices.

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

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

No changes have been made to the verification monitoring program. Network and zoning audit and modelling still ongoing and will be completed next reporting year (2016.17). A review of the monitoring programs will be completed as part of the audit and modelling project.

An inhouse Water Quality Management System has been built, which includes scheduling for verification monitoring (outward 2years), data recording, compliance verification (aesthetic and health based), and non-compliance notification. The System records all information and GPS data for each sample point and manages trend analysis. This system is now complete and will be used as part of the verification monitoring review.

Amendments made to the DWQMP

No amendments have been made to the DWQMP. Changes are anticipated to be incorporated following the 2016/17 review as the upgraded Miriam Vale WTP is brought on line, rezoning is undertaken in the network in response to a water quality modelling review and other capital works being completed.

4. Compliance with water quality criteria for drinking water

A summary of water quality performance over the four schemes is summarised in Tables 2 to 5 in Appendix A.

The Lake Awoonga, Bororen, Miriam Vale and Agnes Water/1770 water supply schemes were fully compliant against all health based water quality criteria. Non-compliant water quality results identified in Tables 2 to 5 have been generated from the GRC Water Quality Management System and reflect internal specification criteria and some aesthetic guidelines.

Fluoride dosing was carried out by Gladstone Area Water Board (GAWB) at the Gladstone Water Treatment Plant. Customer only in the Lake Awoonga Scheme received fluoridated water. GAWB advised of extended periods of fluoride outages as maintenance was carried out on the fluoride

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

dosing system. The non-compliant results indicated in the Awoonga scheme were for low fluoride levels, with no sample exceeding the ADWG levels for health (1.5mg/L).

It should be noted that Council resolved on 19 July 2016 to request GAWB to cease dosing fluoride into the Lake Awoonga scheme water. GAWB actioned this request on 25 August 2016.

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

This financial year there was zero (0) instances where the Regulator was required to be notified under sections 102 or 102A of the Act.

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

Not applicable.

Incident Description:

Not applicable.

Investigation and Cause:

Not applicable.

Corrective and Preventative Actions:

No prescribed incidents or events were reported to the Regulator.

6. Customer complaints related to water quality

Gladstone Regional 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
Lake Awoonga Scheme	0	7	36	43
Agnes Scheme	0	0	2	2
Miriam vale Scheme	0	0	0	0
Bororen Scheme	0	0	0	0
Total	**0**	**7**	**38**	**45**

Council has identified an opportunity to improve the way in which customer complaints relating to water quality are captured and recorded. Due to the improved reporting processes, including definition of a complaint, Council expects complaint statistics to increase

Suspected Illness

Complaints are sometimes received from customers who suspect their water may be associated with an illness they are experiencing. Gladstone Regional Council investigates each complaint relating to alleged illness from our water quality, typically by testing various sampling points in reticulation for the presence of *E. coli*.

During 2015.16, there were no confirmed cases of illness arising from the water supply system.

Discoloured water

Seven customer complaints were received in the Lake Awoonga scheme related to dirty water. In response to dirty water complaints, Council staff flush the relevant mains until the water runs clear. Council staff also makes contact with the customer to advise them of the actions taken. In response to previous dirty water complaints, particularly in the Miriam Vale and Bororen schemes, Council proactively flushes mains on a routine basis. This has reduced the number of complaints received.

It is standard practice for Council to flush mains after breaks and in response to elevated water quality sample results.

Taste and odour

Gladstone Regional Council investigates taste and odour complaints and devise plans for prompt resolution, which may include flushing the reticulation system. Investigation of each complaint found no public health risks.

7. Findings and recommendations of the DWQMP auditor

The first audit of the DWQMP must be conducted by 1 November 2017. No audit has been carried out this period.

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

The second internal review of the DWQMP is due before 1 November 2016.

The review undertaken in 2015 did not identify any significant changes to be implemented.

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.

Table 2 - Verification monitoring results - Lake Awoonga Scheme - Reticulation System

Parameter	Unit Of Measure	Test Type	Type	Total number of samples taken	Number of samples in which the parameter was detected	Number Non Compliance samples detected	Minimum concentration or count	Maximum concentration or count	Average (Mean) concentration or count
Alkalinity	mg/L CaCO3	GRC Lab	Chemical	145	145	0	45	96	73.593
Aluminium	mg/L	ALS	Chemical	146	145	0	0	0.18	0.044
Antimony	mg/L	ALS	Chemical	13	1	0	0	0.001	0.000
Barium	mg/L	ALS	Chemical	13	13	0	0.002	0.012	0.010
Beryllium	mg/L	ALS	Chemical	0	0	0	0	0	0.000
Boron	mg/L	ALS	Chemical	13	1	0	0	1.06	0.082
Bromate	mg/L	NULL	Chemical	6	0	0	0	0	0.000
Bromide	mg/L	NULL	Chemical	14	6	0	0	0.574	0.121
Bromodichloromethane	mg/L	ALS	Disinfectant	146	142	0	0	0.026	0.016
Cadmium	mg/L	ALS	Chemical	13	2	0	0	0.0001	0.000
Chlorate	mg/L	GRC Lab	Disinfectant	145	136	0	0	1.09	0.232
Chloride	mg/L	GRC Lab	Chemical	305	302	0	0	218	29.947
Chromium	mg/L	ALS	Chemical	13	0	0	0	0	0.000
Copper	mg/L	ALS	Chemical	13	13	0	0.001	0.041	0.012
Dibromochloromethane	mg/L	ALS	Disinfectant	146	141	0	0	0.016	0.009
Dissolved Oxygen	mg/L	GRC Lab	Physical	153	153	0	7.78	9.11	8.343
E. coli	MPN/100mL	GRC Lab	Bacteriological	637	0	0	0	0	0.000
Electrical Conductivity	uS/cm	GRC Lab	Physical	776	776	0	262	792	305.675
Fluoride	mg/L	GRC Lab	Chemical	565	564	149	0	1.08	0.445
Free Chlorine	mg/L	Field	Disinfectant	779	779	9	0.02	2.7	1.002
HPC	MPN/mL	GRC Lab	Chemical	203	43	1	0	1146	12.669
Iron	mg/L	ALS	Chemical	146	8	0	0	0.09	0.004
Lead	mg/L	ALS	Chemical	13	3	0	0	0.002	0.0003
Mercury	mg/L	ALS	Chemical	13	0	0	0	0	0.000

Parameter	Unit Of Measure	Test Type	Type	Total number of samples taken	Number of samples in which the parameter was detected	Number Non Compliance samples detected	Minimum concentration or count	Maximum concentration or count	Average (Mean) concentration or count
Molybdenum	mg/L	ALS	Chemical	13	0	0	0	0	0.000
Nickel	mg/L	ALS	Chemical	13	2	0	0	0.002	0.000
Nitrate	mg/l	GRC Lab	Chemical	305	302	0	0	4.34	0.118
Nitrite	mg/l	GRC Lab	Chemical	305	3	0	0	0.01	0.000
pH		GRC Lab	Physical	773	773	13	7.1	8.91	7.746
Phosphate	mg/L	GRC Lab	Chemical	302	6	0	0	27.8	0.0925
Selenium	mg/L	ALS	Chemical	13	0	0	0	0	0.000
Sulphate	mg/L	GRC Lab	Chemical	304	301	0	0	38	28.683
Temperature	oC	Field	Chemical	773	773	0	1.52	37.4	26.559
Total (Insoluble) Manganese	mg/L	GRC Lab	Bacteriological	146	33	0	0	0.054	0.001
Total Coliforms	cfu/100mL	GRC Lab	Bacteriological	637	20	0	0	99	0.305
Total Hardness	mg/L CaCO3	GRC Lab	Chemical	145	145	0	48	101	80.766
Tribromomethane	mg/L	ALS	Disinfectant	146	5	0	0	0.044	0.001
Trichloromethane	mg/L	ALS	Disinfectant	146	142	0	0	0.053	0.030
True Colour	HU	GRC Lab	Physical	774	444	0	0	8	0.857
Turbidity	NTU	GRC Lab	Physical	774	772	2	0	5.63	0.126
Zinc	mg/L	ALS	Chemical	13	10	0	0	0.026	0.009

Table 3 - Verification monitoring results - Bororen Scheme - Reticulation System

Parameter	Unit Of Measure	Test Type	Type	Total number of samples taken	Number of samples in which the parameter was detected	Number Non Compliance samples detected	Minimum concentration or count	Maximum concentration or count	Average (Mean) concentration or count
Alkalinity	mg/L CaCO3	GRC Lab	Chemical	8	8	0	225	245	235.625
Aluminium	mg/L	ALS	Chemical	8	0	0	0	0	0.000
Bromodichloromethane	mg/L	ALS	Disinfectant	8	8	0	0.007	0.13	0.025
Chlorate	mg/L	GRC Lab	Disinfectant	8	8	0	0.2	0.338	0.280
Chloride	mg/L	GRC Lab	Chemical	3	3	0	127	146	138.667
Dibromochloromethane	mg/L	ALS	Disinfectant	8	8	0	0.016	0.033	0.024
Dissolved Oxygen	mg/L	GRC Lab	Physical	8	8	0	7.32	8.9	8.334
E. coli	MPN/100mL	GRC Lab	Bacteriological	8	0	0	0	0	0.000
Electrical Conductivity	uS/cm	GRC Lab	Physical	8	8	5	861	878	868.875
Free Chlorine	mg/L	Field	Disinfectant	8	8	0	0.69	1.36	1.128
HPC	MPN/mL	GRC Lab	Chemical	3	0	0	0	0	0.000
Iron	mg/L	ALS	Chemical	8	8	0	0.05	0.1	0.069
Nitrate	mg/l	GRC Lab	Chemical	3	3	0	0.02	0.05	0.033
Nitrite	mg/l	GRC Lab	Chemical	3	0	0	0	0	0.000
pH		GRC Lab	Physical	8	8	0	7.55	7.91	7.701
Phosphate	mg/L	GRC Lab	Chemical	3	2	0	0	0.02	0.0100
Sulphate	mg/L	GRC Lab	Chemical	3	3	0	3	4.4	3.733
Temperature	oC	Field	Chemical	8	8	0	23.9	35.1	29.700
Total (Insoluble) Manganese	mg/L	GRC Lab	Bacteriological	8	6	0	0	0.003	0.001
Total Coliforms	cfu/100mL	GRC Lab	Bacteriological	8	0	0	0	0	0.000
Total Hardness	mg/L CaCO3	GRC Lab	Chemical	8	8	5	269	348	316.250
Tribromomethane	mg/L	ALS	Disinfectant	8	8	0	0.012	0.031	0.020
Trichloromethane	mg/L	ALS	Disinfectant	8	0	0	0	0	0.000
True Colour	HU	GRC Lab	Physical	8	5	0	0	2	0.750
Turbidity	NTU	GRC Lab	Physical	8	8	0	0.53	0.84	0.714

Table 4 - Verification monitoring results - Miriam Vale Scheme - Reticulation System

Parameter	Unit Of Measure	Test Type	Type	Total number of samples taken	Number of samples in which the parameter was detected	Number Non Compliance samples detected	Minimum concentration or count	Maximum concentration or count	Average (Mean) concentration or count
Alkalinity	mg/L CaCO3	GRC Lab	Chemical	33	33	0	51	129	75.636
Aluminium	mg/L	ALS	Chemical	34	32	0	0	0.27	0.043
Bromodichloromethane	mg/L	ALS	Disinfectant	34	34	0	0.011	0.035	0.022
Chlorate	mg/L	GRC Lab	Disinfectant	33	33	0	0.272	0.84	0.521
Chloride	mg/L	GRC Lab	Chemical	10	10	0	90.8	164	123.180
Dibromochloromethane	mg/L	ALS	Disinfectant	34	34	0	0.007	0.027	0.015
Dissolved Oxygen	mg/L	GRC Lab	Physical	35	35	0	7.11	9.14	8.378
E. coli	MPN/100mL	GRC Lab	Bacteriological	35	0	0	0	0	0.000
Electrical Conductivity	uS/cm	GRC Lab	Physical	35	35	0	414	655	536.257
Free Chlorine	mg/L	Field	Disinfectant	35	35	2	0.04	2.19	0.769
HPC	MPN/mL	GRC Lab	Chemical	11	3	0	0	48	11.182
Iron	mg/L	ALS	Chemical	34	16	0	0	0.26	0.054
Nitrate	mg/l	GRC Lab	Chemical	10	9	0	0	0.06	0.045
Nitrite	mg/l	GRC Lab	Chemical	10	0	0	0	0	0.000
pH		GRC Lab	Physical	35	35	0	6.56	8.13	7.140
Phosphate	mg/L	GRC Lab	Chemical	10	0	0	0	0	0.0000
Sulphate	mg/L	GRC Lab	Chemical	10	10	0	1	3.62	2.322
Temperature	oC	Field	Chemical	35	35	0	19.9	31.5	26.054
Total (Insoluble) Manganese	mg/L	GRC Lab	Bacteriological	34	33	0	0	0.11	0.027
Total Coliforms	cfu/100mL	GRC Lab	Bacteriological	35	3	0	0	200	5.857
Total Hardness	mg/L CaCO3	GRC Lab	Chemical	33	33	0	36	104	76.697
Tribromomethane	mg/L	ALS	Disinfectant	34	3	0	0	0.009	0.001
Trichloromethane	mg/L	ALS	Disinfectant	34	34	0	0.009	0.063	0.030
True Colour	HU	GRC Lab	Physical	35	20	0	0	9	1.257
Turbidity	NTU	GRC Lab	Physical	35	35	0	0.08	1.89	0.369

Table 5 - Verification monitoring results - Agnes Water/1770 - Reticulation System

Parameter	Unit Of Measure	Test Type	Type	Total number of samples taken	Number of samples in which the parameter was detected	Number Non Compliance samples detected	Minimum concentration or count	Maximum concentration or count	Average (Mean) concentration or count
Alkalinity	mg/L CaCO3	GRC Lab	Chemical	19	19	0	41	60	52.842
Aluminium	mg/L	ALS	Chemical	19	19	0	0.02	0.19	0.049
Antimony	mg/L	ALS	Chemical	1	0	0	0	0	0.000
Arsenic	mg/L	ALS	Chemical	1	0	0	0	0	0.00000
Barium	mg/L	ALS	Chemical	1	1	0	0.004	0.004	0.004
Boron	mg/L	ALS	Chemical	1	1	1	0.75	0.75	0.750
Bromate	mg/L	NULL	Chemical	2	0	0	0	0	0.000
Bromide	mg/L	NULL	Chemical	2	2	0	0.122	0.146	0.134
Bromodichloromethane	mg/L	ALS	Disinfectant	19	0	0	0	0	0.000
Cadmium	mg/L	ALS	Chemical	1	0	0	0	0	0.000
Chlorate	mg/L	GRC Lab	Disinfectant	19	19	0	0.13	0.398	0.223
Chloride	mg/L	GRC Lab	Chemical	26	26	0	57.8	238	155.838
Chromium	mg/L	ALS	Chemical	1	0	0	0	0	0.000
Copper	mg/L	ALS	Chemical	1	1	0	0.003	0.003	0.003
Dibromochloromethane	mg/L	ALS	Disinfectant	19	7	0	0	0.008	0.002
Dissolved Oxygen	mg/L	GRC Lab	Physical	22	22	0	8.03	9.46	8.457
E. coli	MPN/100mL	GRC Lab	Bacteriological	135	0	0	0	0	0.000
Electrical Conductivity	uS/cm	GRC Lab	Physical	75	75	0	468	808	608.893
Fluoride	mg/L	GRC Lab	Chemical	0	0	0	0	0	0.000
Free Chlorine	mg/L	Field	Disinfectant	75	75	0	0.68	1.52	1.050
HPC	MPN/mL	GRC Lab	Chemical	20	2	0	0	17	0.950
Iron	mg/L	ALS	Chemical	19	2	0	0	0.05	0.005
Lead	mg/L	ALS	Chemical	1	0	0	0	0	0.0000
Mercury	mg/L	ALS	Chemical	1	0	0	0	0	0.000
Molybdenum	mg/L	ALS	Chemical	1	0	0	0	0	0.000
Nickel	mg/L	ALS	Chemical	1	0	0	0	0	0.000
Nitrate	mg/l	GRC Lab	Chemical	26	26	0	0.01	0.16	0.088
Nitrite	mg/l	GRC Lab	Chemical	26	1	0	0	0.01	0.000
pH		GRC Lab	Physical	75	75	0	7.47	8.39	7.991
Phosphate	mg/L	GRC Lab	Chemical	26	2	0	0	0.29	0.0115

Parameter	Unit Of Measure	Test Type	Type	Total number of samples taken	Number of samples in which the parameter was detected	Number Non Compliance samples detected	Minimum concentration or count	Maximum concentration or count	Average (Mean) concentration or count
Selenium	mg/L	ALS	Chemical	1	0	0	0	0	0.000
Sulphate	mg/L	GRC Lab	Chemical	26	25	0	0	8	4.719
Temperature	oC	Field	Chemical	75	75	0	21.2	35.4	27.633
Total (Insoluble) Manganese	mg/L	GRC Lab	Bacteriological	19	18	0	0	0.009	0.003
Total Coliforms	cfu/100mL	GRC Lab	Bacteriological	136	0	0	0	0	0.000
Total Hardness	mg/L CaCO3	GRC Lab	Chemical	19	19	0	43	64	53.000
Tribromomethane	mg/L	ALS	Disinfectant	19	19	0	0.013	0.05	0.025
Trichloromethane	mg/L	ALS	Disinfectant	19	0	0	0	0	0.000
True Colour	HU	GRC Lab	Physical	75	32	0	0	5	0.747
Turbidity	NTU	GRC Lab	Physical	75	75	0	0.04	0.97	0.224
Zinc	mg/L	ALS	Chemical	1	1	0	0.014	0.014	0.014

Table 6 - Reticulation *E. coli* verification monitoring - Lake Awoonga Scheme

Drinking water scheme: Lake Awoonga

Year	*2016*											
Month	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*June*	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*
No. of samples collected	51	51	51	52	54	55						
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	0	0	0						
No. of samples collected in previous 12 month period	569	577	585	595	606	619	569	518	466	415	364	314
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

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

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

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

Table 7 - Reticulation *E. coli* verification monitoring - Bororen Scheme

Drinking water scheme: Bororen

Year	*2016*											
Month	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*June*	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*
No. of samples collected	1	1	1	1	1	1						
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	0	0	0						
No. of samples collected in previous 12 month period	12	12	12	12	12	12	11	10	9	8	7	6
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

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

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

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

Table 8 - Reticulation *E. coli* verification monitoring - Miriam Vale Scheme

Drinking water scheme: Miriam Vale

Year	*2016*											
Month	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*June*	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*
No. of samples collected	3	3	2	3	3	3						
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	0	0	0						
No. of samples collected in previous 12 month period	36	36	35	35	35	35	32	29	26	23	20	17
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

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

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

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

Table 9 - Reticulation *E. coli* verification monitoring - Agnes Water/1770

Drinking water scheme: Agnes Water/ Seventeen- Seventy

Year	*2016*											
Month	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*June*	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*
No. of samples collected	10	10	15	10	10	10						
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	0	0	0						
No. of samples collected in previous 12 month period	134	132	135	133	131	129	119	109	95	85	75	65
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

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

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

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

Appendix B – Implementation of the DWQMP Risk Management Improvement Program

Table 10 – Progress against the risk management improvement program in the approved DWQMP

Item No.	Scheme	Scheme component	Action / Task	Target Date	Comments	Status
1	Bororen	Catchment & Raw Water Bores	Investigate the boundaries of the Bororen bores recharge area to understand the risks better	Jun-16	Fourth year Engineering Student has identified a likely boundary of catchment and is looking at risk sites within the catchment area.	In progress.
2	Bororen	Catchment & Raw Water Bores	Investigate locations of dip sites within the catchment	Sep-16	No sites were registered on the Contaminated Land Register. Fourth year student has developed a survey to obtain additional information from landowners in the catchments.	In progress
3	Bororen	Catchment & Raw Water Bores	Increase monitoring during rain events to understand risks better, include arsenic and Standing Water Level testing where feasible.	Ongoing	Lagoon Creek has been added to the monitoring program. The same analyses will be undertaken as for the bored.	Monitoring commenced 2nd week of August 2015.
4	Bororen	Catchment & Raw Water Bores	Review fire management practices around bore field, such mowing frequency	Change to September 2016.	Risk profile has changed, in that the trees were cleared in 2013 and rock placed around the bores in November 2014. The bores were able to survive a grass fire. Access track is maintained and mowed,	Completed
5	Bororen	Catchment & Raw Water Bores	Review flood management practices including flood event monitoring and repair of damage	Ongoing	The weir is a local heritage site (steam locomotion). Access issues to the borefields are associated with gaining access by road from Agnes Water. Bores capped to prevent water ingress. No incidents reported following 1 in 2000 year event. Monitoring river height is not considered to be of value in managing the risk.	Completed
6	Bororen	Catchment & Raw Water Bores	Review the operating philosophy of the WTP and look into options for optimisation	Ongoing	New Overseer has joined the process team and has the necessary water treatment qualifications and experience to review the process and provide recommendations for optimisation.	In progress - due date can be extended
7	Bororen	Catchment & Raw Water Bores	Investigate through consultation with farmers and other land holders the presence of bores drawing from the aquifer and the condition of the bores. Consider mentoring the farmers on best practice to prevent aquifer contamination such as capping etc. and to ensure production security	Sep-16	Survey form has been developed. Internal resources to be used to consult with the landowners.	In progress

Item No.	Scheme	Scheme component	Action / Task	Target Date	Comments	Status
8	Bororen	Catchment & Raw Water Bores	Implement refurbishment of monitoring bore	Change to September 2016.	A review identified that the bores were refurbished/relined around 2011. GRC to liaise with Trility and combine inspections with Agnes bores.	In progress
9	Bororen	Catchment & Raw Water Bores	Carry out an in-depth desk top study and review of the soil and catchment characteristics for Bororen	Sep-16	Desktop study was completed by Sam Gorle.	Completed
10	Bororen	Oxidation	Develop SOP on changing of potassium permanganate dose and implement chain of authority process for changing of dose rate	Sep-16	A new process overseer has been employed to improve the operational performance of all treatment plants. An improvement program has been established to optimise the plant, including additional jar testing. The procedures will be updated as part of that program.	In progress
11	Bororen	Oxidation	Implement supply agreement with chemical supplier	Dec-15	Supply agreement has been set with Elite Chemicals for supply of Chlorine to WWTPs which can be extended to Rechlorination. Improvements have been identified for supply of hypo from local shops in Bororen and Miriam Vale.	Completed
12	Bororen	Oxidation	Develop SOP for the correct storage and use of potassium permanganate	Sep-16	Will be included in the Bororen optimisation project.	In progress
13	Bororen	All	Develop SOP for analysing SCADA trends	Sep-16	Will be included in the Bororen optimisation project.	In progress
14	Bororen	Clarification	Develop Plant Duty Checklist for operators to complete when attending site	Sep-16	A checklist exists and will be reviewed as part of the optimisation project.	In progress
15	Bororen	Clarification	Complete online turbidity meters installation for monitoring process steps performance	Sep-16	2 online meters to be installed on the outlet of filter and outlet of reservoir. The meters are being tested at Clinton. Number and location to be reviewed. If IO space is an issue need one at the outlet of the filter.	In progress
16	Bororen	Clarification	Develop SOP on changing of alum dose and implement chain of authority process for changing of dose rate	Sep-16	Will be included in the Bororen optimisation project.	In progress
17	Bororen	Filtration	Review filter design and maintenance requirements	Sep-16	A review has commenced - a program has been developed to implement identified improvements.	In progress
18	Bororen	All	Review WTP operating philosophy, including coagulant type and suitability	Sep-16	Will be included in the Bororen optimisation project.	In progress
19	Bororen	Disinfection	Complete installation of online chlorine & pH meter	Sep-16	Trialled a chlorine and pH meter at Auckland Creek booster - Same meter to be purchased and installed at Bororen.	In progress
20	Bororen	Catchment & Raw Water Bores	Register bores with EHP due to legal liability and possible supply issues as aquifer is not regulated.	Dec-15	Review identified that there is no benefit to registering the bores.	Completed
21	Bororen	Catchment & Raw Water Bores	Develop and implement a Catchment Management Plan	Dec-16	Catchment management plan developed.	Completed
22	Bororen	Catchment &	Obtain independent water samples for each of the two	Ongoing	September 2012: Included SWA for GRC#1 and GRC#3 in	In progress

Item No.	Scheme	Scheme component	Action / Task	Target Date	Comments	Status
		Raw Water Bores	production bores (GRC#1 and GRC#3). Conduct the standard water quality analysis to determine the extent of the variation between the two bores, on at least a monthly basis for two years.	Dec-14	sampling schedule on a monthly basis. Frequency to be reviewed.	
23	Bororen	Catchment & Raw Water Bores	Conduct testing of raw bore water for Cryptosporidium and Giardia at least quarterly. If detected testing interval should be increased to monthly.	Dec-18	Included in the 2016.17 monitoring program	In progress
24	Bororen	Catchment & Raw Water Bores	Unknown water quality of lagoon creek. Undertake investigation of water quality within Lagoon Creek, including Blue- green (cyanobacteria), herbicides and microbial analysis. Initially a detailed investigation is planned at multiple sampling locations to determine temporal and spatial variations.	Sep-16	Additional investigations being carried out to assess access safety along the creek	In progress
25	Bororen	Catchment & Raw Water Bores	Establish and maintain regular contact with the owner of the immediate area surrounding the bore field (previously owned by Elders and operated as a tree farm). It is critical that the owner of this property is aware that the Bororen water supply is drawn from an aquifer beneath this property.	Jun-16	To be addressed in property owner survey.	In progress
26	Bororen	All	Develop SOP for the chain authority in operating valves in the reticulation	Jun-16	Completed SOP on operating the valves for zoning.	Completed
27	All Schemes	All	Finalise Drinking Water Quality Policy Statement and put to Council for ratification	Jun-16	Been superseded by the Customer Service Standard.	Completed
28	All Schemes	All	Develop Customer Service Standards for the whole of Gladstone Regional Council Water and Sewage	Jul-16	Current Standards for Gladstone City Council (released in 2007). Other standards have been reviewed and draft options have been identified. Draft has been completed and endorsed by Council to place on website to seek feedback.	In progress
29	All Schemes	All	Develop Emergency Management Plan with whole of council and sub plan specifically for WS	Sep-15	Provided to the Disaster Management Coordinator (Brad Lutton) in Sept/Oct 2015.	Completed
30	All Schemes	All	Develop SOP for chemical acceptance and handling	Dec-16	Trility has provided an SOP - need to review and adopt/modify for GRC use.	In progress
31	All Schemes	All	Develop and implement chemical supplier agreements	Oct-16	Chlorine was signed in June 2015, Caustic, Alum and Polymers - purchased without agreement. Look to retender on finalisation of the new Miriam Vale WTP.	In progress
32	All Schemes	All	Develop SOP for testing chemicals for quality	Jul-16	Chlorine suppliers charge $100 for a chemical analysis. Look at setting up monitorng program for each chemical. SOP in place for testing chlorates in chlorine.	Completed

Item No.	Scheme	Scheme component	Action / Task	Target Date	Comments	Status
33	All Schemes	All	Unable to maintain knowledge about historical water quality. All historic and ongoing water data should be collated and maintained in a spread sheet to enable ready data analysis (e.g. 90%ile). This would facilitate plotting of control graphs to enable efficient interpretation of water quality data.	Ongoing	Include all historical data that can be verified. Refer Task 35 and 74. Work commenced developing a database prior to 2012 to enable all water quality monitoring to be located in one area and reports generated. Database is nearly complete and will be closed out 30/6/16. Waiting on network modelling to review the sampling. Training to be given.	In progress
34	All Schemes	All	Review operator training records and implement training where deemed necessary	Dec-15	An experienced overseer has been employed with Cert IV qualifications and experience. An additional WWTP operator has been employed who has experience and Cert III qualifications in water treatment. This has bolstered competencies. Peter Dann to resume certification (to a level III commencing October 2016).	Completed
35	All Schemes	All	Develop SOPs and review communication protocols	Jun-14	Part of information management system. Refer Task 33 and 74	
36	All Schemes	All	Review maintenance program and assets list	Dec-16	Bringing assets lists in as part of the asset verification process. Hydrants and Valves PM schedules have been included in share point.	In progress
37	All Schemes	All	Review mains repairs SOPs	Feb-16	Review has been completed by Russell Ellis.	Completed
38	Miriam Vale	Catchment & Raw Water Bores	Undertake water quality determination upstream of the Baffle Creek water extraction area, taking into account the observations of the physical survey which will inform the types of parameters appropriate for testing.	Dec-16	Refer Task 49 - included in research project conducted by CQU student's PHD project.	In progress
39	Agnes Water / 1770	Stakeholder Engagement	Initiate and open communications with the Sunrise Development 1770	Jun-15	Agreements available on ECM and need to be reviewed	To be commenced
40	Lake Awoonga	Stakeholder Engagement	Finalise the agreement with GAWB relating to information sharing	Dec-16	GAWB have provided GRC with a portal to view some GAWB data. Data is available on demand from GAWB. Formalised agreement still required.	In progress
41	Lake Awoonga	Reticulation	Finalise investigations into the unexplained high pH readings that have been recorded for Boyne Island.	Dec-16	Test during incidents, seasonal. No pH went out of exceedence - appears to be seasonal. Raw data to be obtained from GAWB.	In progress
42	Lake Awoonga	Reticulation	Review mains flushing program and ensure areas of concern regarding low free chlorine levels are included.	Jun-16	Will be directed by the MWH modelling - GRC to investigate automatic flushing units. In the meantime flush based on sample results.	In progress
43	All	Disinfection	Review result and investigate further to establish	Nov-15	Elite Chemicals have the tender and provide the chlorine	Completed

Item No.	Scheme	Scheme component	Action / Task	Target Date	Comments	Status
	Schemes		possible causes. Further detailed investigation including additional monitoring if required Implement best practice storage procedures to reduce impact of external influences such as temperature etc. Review and negotiate with supplier chemical characteristics to reduce formation of chlorate Investigate and communicate with bulk water supplier to further possible reduction of chlorate received in bulk water Further discussions with the Office of the Water Supply Regulator in regards to notifiable concentration levels		fresh as they produce in Gladstone and supply to GAWB as well. Issues are with Bororen & Miriam Vale where small quantities from local supplier. Review been completed and chlorate levels found to be below 0.7.	
44	All Schemes	All	Co-ordinate a program to add calibration data into H2OMAP software package to be able to reflect the existing conditions within the supply system	Sep-16	Council awarded water quality modelling project in 2015. Project 80% complete.	In progress
45	Bororen	Catchment & Raw Water Bores	Install a weather station including rain gauge, preferably with automatic logging capabilities and linked to the remote access SCADA system.		Meteorology weather stations have been installed by BOM. Rain guage installed at the Bororen bores.	Completed
46	Bororen	Reticulation	Develop SOP for flushing and returning to service the reticulation system after a fire event which required raw water to be connected through the reticulation system	Dec-14	Cross connection removed	Completed
47	Bororen	Catchment & Raw Water Bores	Review monitoring program with relation to Bororen bores and consider implementing total petroleum hydrocarbon monitoring	Dec-18	Extra monitoring included in 2016.17 monitoring program and will be monitored for 2 years.	In progress
48	Miriam Vale	Catchment & Raw Water Bores	Conduct physical survey upstream of the Baffle Creek water extraction area to assess vegetation condition, bank stability and cattle/wild deer access locations.	Mar-16	Task has been assigned to a student.	In progress
49	Miriam Vale	Catchment & Raw Water Bores	Undertake water quality determination upstream of the Baffle Creek water extraction area, taking into account the observations of the physical survey which will inform the types of parameters appropriate for testing.	Jul-16	Refer Task 38 To be included in research project conducted by CQU student's PHD project.PhD student should do his first paper in July 2016. First paper will be water quality items.	In progress
50	Miriam Vale	Catchment & Raw Water Bores	Further investigate the known occurrence and potential for toxicity of blue green algae (Cyanobacteria) with advice from local experts (e.g. Dr Larelle Fabbro, CQU and/or Howard Howell, Ecoscope).	Dec-16	Included in research project conducted by CQU student's PHD project. Risks identified and included in new design for treatment plant - ie Blue Green A	In progress

Item No.	Scheme	Scheme component	Action / Task	Target Date	Comments	Status
51	Miriam Vale	Catchment & Raw Water Bores	Develop and implement a Catchment Management Plan	Jul-16	Catchment management plan has been completed	Completed
52	Miriam Vale	Catchment & Raw Water Bores	Investigate locations of dip sites within the catchment	Jul-16	Desktop study completed. A survey has been developed to seek additional feedback from landowners.	In progress
53	Miriam Vale	Catchment & Raw Water Bores	Implement annual TPH monitoring	Dec-18	Additional monitoring included in 2016.17 monitoring program	Completed
54	Miriam Vale	Catchment & Raw Water Bores	Review monitoring program with relation to Miriam Vale raw water to enable better assessment of the risks	Jul-16	Included in research project conducted by CQU student's PHD project. PhD student complete his first paper in July 2016.	In progress
55	Miriam Vale	Catchment & Raw Water Bores	Distribute information pamphlets with annual rates notices to the community to educate the community on the importance of proper maintenance of septic tanks	Dec-15	Prepared a flyer and placed on website as FACT SHEET NO. 0050.	Completed
56	Miriam Vale	Catchment & Raw Water Bores	Consider undertaking a camera inspection of the bore to gain further information about bore construction and condition.	Dec-16	Pump was installed in 2015. GRC to add in list of critical spares to the works done by Stirloch.	In progress
57	Miriam Vale	Catchment & Raw Water Bores	Obtain further information about the Thorne's bore aquifer from DERM. Consider registering the bore with DERM.	Jun-16	No value in registering the bore. Bore information included in catchment management plan	Completed
58	Miriam Vale	WTP	Complete the disconnection and blanking off of the raw water by pass.	Nov-16	Will be removed with upgrade of WTP	Completed
59	Miriam Vale	WTP	Finalise improvement strategies for Miriam Vale WTP and begin implementation of upgrades	Jun-14	Contract for WTP upgrade awarded in December 2015. Completion expected Sep/Oct 2016.	Completed
60	Miriam Vale	Catchment & Raw Water Bores	E. coli, Cryptosporidium and Giardia testing to be implemented at least monthly for the raw waters of Baffle Creek and Thorne's Creek bore. The determination of other biological parameters such as Salmonella may also be considered.	Dec-15	Has been included in the 2016.17 monitoring program - due to cost going to be quarterly (06/16).	Completed
61	Miriam Vale	Catchment & Raw Water Bores	Implement annual radionuclide testing to assess the risk in Thorne's Road bore groundwater	Dec-16	Included in the schedule. - Tests reviewed 06/16 and no issues identified.	Completed
62	Agnes Water / 1770	Stakeholder Engagement	Establish legal documentation and/or Memorandum Of Understanding (MOU) with Sunrise@1770 Development regarding usage of water relating to management of bores to prevent contamination and managing water use to ensure viable ongoing use of aquifer.	Dec-15	Agreement to be reviewed .	To be commenced
63	Agnes Water /	Catchment & Raw Water Bores	Instigate annual inspection and water quality sampling of waste water treatment plants and septic tanks	Nov-16	Additional investigation required to identify what records are currently kept by Plumbing.	In progress

Item No.	Scheme	Scheme component	Action / Task	Target Date	Comments	Status
	1770		within the Cove Estate area.			
64	Agnes Water / 1770	Catchment & Raw Water Bores	Investigate options for upgrading the sewage system in Agnes Water and 1770		Low pressure sewer system at 1770, which is progressively being implemented. Service areas have been identified in planning scheme.	Completed
65	Agnes Water / 1770	Catchment & Raw Water Bores	Conduct water quality investigation of trenches and various ponds to include analysis for blue/green, arsenic and TPH in addition to standard parameters to determine temporal and rain event response.	Oct-15	Appropriate remedial action to be taken may include decommissioning of trenches Refer Task 78. Anna to confirm with Trility if the trenches have been decommissioned	In progress
66	Agnes Water / 1770	Catchment & Raw Water Bores	Implement regular analysis of TPH in raw water	Oct-15	Trility contract to be reviewed.	In progress
67	Agnes Water / 1770	WTP	Include THM's and Chlorates in monitoring program at WTP outlet	Oct-15	Trility contract to be reviewed.	In progress
68	Agnes Water / 1770	WTP	E. coli (monthly), Cryptosporidium and Giardia testing to be conducted at least quarterly for the raw and treated waters.	Oct-15	Monthly testing will commence in week 4 September 2012 for raw water, only. If detected in raw water treated water will be included in monitoring program - To review Trility monitoring program	In progress
69	All Schemes	All	Review and update monitoring program for all schemes and all components	Dec-16	Meeting scheduled for 15/9/15 to identify a strategy to review the monitoring program. Operational issues interfered with GRC staff ability to complete task in house. Variation sought from MWH water quality modelling project to review the water quality monitoring locations and parameters.	In progress
70	All Schemes	Disinfection	Implement upgrades of rechlorination facilities	Jul-16	MWH engaged to model the water quality within the network - 80% complete - works includes chlorine decay models and will identify areas for rechlorination (06/16).	In progress
71	All Schemes	Reticulation	Review mains flushing program and ensure correct procedures and protocols are in place.	Nov-15	Procedures developed for dirty water complaints and low free chlorine. Available on share point and ECM - Doc set ID 3269704	Completed
72	All Schemes	All	Complete upgrade of all SCADA systems and components	Dec-14	GRC now has visibility on all its own reservoirs. Bororen online. Miriam Vale will come on line with new WTP.	Completed
73	All Schemes	All	Review and update standard operating procedure for monitoring of drinking water for all schemes	Sep-16	Works were Completed - procedure decommissioned and contents divided between new SOPs, Laboratory Manual and Monitoring Program.	Ongoing reviews required
74	All Schemes	All	Review incident recording and response and records of actions undertaken. Review how changes are implemented to prevent reoccurrences.	Sep-16	Water quality incidents are recorded in GRC's ECM system as well as reported to DEWS. A few exceedences have come through and been questioned - this shows	Task completed

Item No.	Scheme	Scheme component	Action / Task	Target Date	Comments	Status
					that the system is working automatically. Aaron to train key staff July 2016 then run scenario in late August/September to test response (06/16).	
75	All Schemes	All	Review the risk methodology implemented including risk matrix and GRC's view on acceptable risk. As no "Extreme" or "High" consequence will result in an acceptable risk.	Oct-15	All future risk assessments will be carried out using the GRC risk matrix	Completed
76	Agnes Water / 1770	All	Review communication between Trility and GRC and how GRC manages Trility and ensures they are operating as per contractual requirements and as per legislative requirements. Also look at the reporting of incidents between the two parties.		Monthly reports provided by Trility along with monthly and quarterly meetings where performance is discussed.	Completed
77	All Schemes	All	Implement document management system		All documents in ECM or the cloud. Kiosks provided to allow field staff to access data.	Completed
78	Agnes Water / 1770	Catchment & Raw Water Bores	Consider filling in trenches	Dec-14	Refer Task 65	
79	Agnes Water / 1770	Catchment & Raw Water Bores	Review fire management practices around bore field, such mowing frequency	Jul-16	Confirmed part of monthly inspection	Completed
80	Agnes Water / 1770	Catchment & Raw Water Bores	Review flood management practices	Dec-14	Trility has a monitoring process in place and if water quality deteriorates they can swap to desalination mode.	Completed
81	All Schemes	All	Review reservoirs inspection and maintenance program	Jul-16	Reservoir data has collected and data being captured on share point. Program in inspect included in 2016.17 budget.	In progress
82	Miriam Vale	Catchment & Raw Water Bores	Review fire management practices around bore field, such mowing frequency	Mar-16	Bore low risk, part of maintenance activities.	Completed
83	Miriam Vale	Catchment & Raw Water Bores	Review flood management practices including flood event monitoring of bores	Nov-16	Remote control to be included as part of WTP upgrade and review design of infrastructure. Online turbidity monitoring downstream of where the bore and surface waters combine. The new plant is designed to respond to water quality changes	In progress
84	Miriam Vale	WTP	Develop Plant Duty Checklist for operators to complete when attending site	Mar-16	Completed for existing plant. A new one to be developed for the new plant.	In progress
85	Miriam Vale	Reservoir	Complete repairs to reservoir hatch	Mar-16	Hatch has been repaired	Completed
86	Lake	Reticulation	Develop SOP regarding the operation and chain of	Ongoing	Isolation process being finalised and due for completion	Completed

Item No.	Scheme	Scheme component	Action / Task	Target Date	Comments	Status
	Awoonga		authority for operating zone valves within the system		30/6/16.	
87	All Schemes	All	Review security for infrastructure, in particular look at reservoirs	Jun-16	Monthly inspection of the reservoirs has commenced which allows for early notification. Identified works will be completed as budget allows .	Completed
88	All Schemes	All	Develop SOP for mains flushing	Dec-14	See Task 71	Completed
88	All Schemes	All	Develop backflow register and inspection program	Dec-14	Plumbing Section - completed and done electronically on i-pad and in conquest.	Completed
89	Agnes Water / 1770	WTP	Monitor and collect water quality data on the desalination plant when it becomes operational. Re-assess risks when data is available.	Dec-15	Data provided by Trility and reviewed monthly with GRC. No noticeable changes to influent.	Completed
90	Lake Awoonga	Bulk water	Investigate through water quality modelling excerise being undertaken by MWH (2015) the need for chlorine monitoring on the inlet to GRC reservoirs from GAWB sites	Sep-16	MWH 80% complete	In progress
New	Bororen WTP	Disinfection	1. Cover window or move storage drums and metering drum to different location in shed to reduce effects of UV light and increased temperatures 2. Replace metering drum with 2 blue or black drums to reduce effects of UV light 3. Dilute chlorine with water on purchase reduces degradation rate 4. Ensure metering drums are filled only when empty to reduce the accumulation of settled solids 5. Discuss storage options with supplier	Jun-16	Refer to Anne-Maree's report on Sharepoint (search for chlorate)	Completed
New	Miriam Vale	Disinfection	Implement recommendations from Anne Maree's chlorate investigation report when designing and constructing the new WTP.	Jun-16	Refer to Anne-Maree's report on Sharepoint (search for chlorate)	Completed