



Drinking Water Quality Management Plan Report

Richmond Shire Council

SPID: 111

2018-19

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

Table of contents

1	Introduction.....	1
2	Summary of scheme/s operated.....	1
3	DWQMP implementation.....	2
4	Verification monitoring - water quality information and summary	45
5	Incidents reported to the regulator	68
6	Customer complaints.....	79
7	DWQMP review outcomes	84 10
8	DWQMP audit findings.....	104 12

Table of tables

Table 1 – Summary of schemes	1
Table 2 – Risk management improvement program implementation status	3
Table 3 – Drinking water quality performance - verification monitoring.....	45
Table 4. E. coli compliance with annual value	57
Table 5 – Incidents reported to the regulator	68
Table 6 – Example: customer complaints about water quality.....	79
Table 7 – DWQMP review outcomes	Error! Bookmark not defined. 10
Table 8 – DWQMP audit findings and status	Error! Bookmark not defined. 13

1 Introduction

This is the annual Drinking Water Quality Management Plan report for Richmond Shire Council for the 2018-19 financial year. RSC is a registered service provider with identification (SPID) 111 and operates under an approved DWQMP to ensure consistent and safe supply of quality potable water to protect public health.

The report documents the performance of Richmond Shire Council's Water Treatment Plant's drinking water service with respect to;

- Water quality summary
- DWQMP review findings
- Progress implementing the actions and improvements identified in the Risk Management Improvement plan detailed in the DWQMP as required under the Water Supply (Safety and Reliability) Act 2008 (the Act).

The report is submitted to the Regulator to fulfil our regulatory requirement and is made available to customers.

2 Summary of scheme/s operated

Table 1 – Summary of schemes

	<i>Water Source</i>	<i>Treatment processes</i>	<i>Treatment capacity</i>	<i>Towns supplied</i>
Richmond	Great Artesian Basin	Oxidation (chlorine and aeration), coagulation/flocculation, filtration & chlorination.	6.5ML/D (WTP), 3ML/d (bores)	Richmond

3 DWQMP implementation

The actions undertaken to implement the DWQMP are summarised below.

During the 2018-19 financial year Richmond Shire Council completed their external Audit of the DWQMP and its implementation as required under the regulations. The Audit took place in September 2018 and identified the following 'Major' non-compliances with implementation of the DWQMP.

- Failure to undertake verification analysis as per the schedule detailed in the DWQMP verification Monitoring Program.
- Failure to demonstrate active progression in addressing RMIP action items.

Further to the above, the below 'Minor' non-compliances were noted during the audit.

- Lack of calibration (or lack of records demonstrating calibration has occurred) of devices.
- Jar Testing was not undertaken routinely in accordance with 'recommended' frequency as stated in the DWQMP.
- Verification monitoring program not implemented (as above)
- Chain of Custody Forms out of date and not representative of verification monitoring requirements (linked to above).

Following the Audit RSC has addressed all major non-compliances, and minor non-compliances associated with the verification monitoring program and has made significant progress in the development of appropriate records to demonstrate compliance with other minor non-compliances such as demonstrated calibration of instruments. Progress has been updated in the biannual review of the DWQMP undertaken in through May – June 2019 and subsequently reported to the Regulator on subsequent amendment of the DWQMP following the Review (August 2019).

RSC also actioned a number of 'opportunities for improvement' suggested in the Audit, including the development of SWIM Local Data Base for water quality data storage and reporting including operational and verification monitoring data, tasks scheduling and reporting. The SWIM Local database has been established to reflect sample sites, and parameters for analysis as per the DWQMP and includes scheduling of key operations and maintenance tasks.

At this stage data is entered by an external contractor, and the automatic scheduling of tasks has not been implemented although the tasks have been established. It has been referenced in in the RMIP moving forward as a priority action for 2019-2020 for these activities to be transitioned to RSC personnel and a 'trial' of task scheduling to be undertaken to assess it's suitability for RSC operations (Refer Appendix A).

Richmond has also made progress on a number of procedures and record keeping documents to assist with future implementation of the DWQMP. These include but are not limited to;

- Operations procedures
- Site inspection record sheets
- Maintenance record sheets
- Calibration record sheets
- Sample collection and internal data (field verification) record sheets

RSC undertook a comprehensive review and update of the DWQMP. The review included risk assessment workshops facilitated by an external consultant which engaged RSC staff and were used as a training tool to improve awareness and understanding of regulatory requirements, risks and management practices for all levels of staff including operations, administration and management.

A revised DWQMP including updated Risk tables, RMIP actions, target dates and progress status against RMIP items has been submitted to DNRME. RSC is awaiting response and approval from DNRME on the amended DWQMP at this time.

The progress linked to “high priority” actions undertaken to implement the risk management improvement program are discussed in Table 2.

Table 2 – Risk management improvement program implementation status

Refer Appendix A.

4 Verification monitoring - water quality information and summary

This section discusses the compliance with the water quality criteria. The Verification monitoring program was implemented in October 2018, including both internal and external verification analysis. Due to floods in February 2019, the verification monitoring program scheduled sampling was missed due to the inability to transport samples to the laboratory.

Richmond Shire Council has commenced analysis in accordance with the DWQMP verification monitoring program detailed in the DWQMP. RSC Undertakes internal analysis for Ecoli and coliforms and on a monthly basis sends these samples ~~eto~~ an external INATA ~~accredited~~accredited laboratory for verification. The NATA laboratory also undertakes a range of chemical analysis on a monthly, quarterly and six monthly basis. This includes analysis of the raw water sources (not included in verification) to re-establish a level in confidence as to the quality of raw water and any risks that may be presented due to natural change in the source supply.

Table 3 – Drinking water quality performance - verification monitoring

Scheme name	Parameter	No. of samples required to be collected (as per the approved DWQMP)	No. of samples actually collected and tested	Water quality criteria (i.e ADWG health guideline value)	No. of non compliant samples	Comments
Richmond	Ecoli	24 (external) + 104 (Internal)	22 (external), 120 (internal)	Not detected	0	100% compliant
	Chemical Parameters	12 x External (varying parameters)	8 (began October, missed in February)	Various	0	100% compliant

Table 4. E. coli compliance with annual value

Drinking water scheme: Richmond

Year	2018 – 2019											
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	4	4	4	4	4	4	4	0	4	0	4	4
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	120	120	120	120	120	120	120	120	120	120	120	120
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	100	100	100	100	100	100	100	100	100	100	100
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

5 Incidents reported to the regulator

No incidents were reported to the regulator in 2018-19.

~~Any Bat An Canyon place confirmed the reduced flow supply pumps and bypassing the WTP was reported to DNRE? Am aware of during March (think) the WTP was bypassed back to compliance was included in the Reg. file.~~

Table 5 – Incidents reported to the regulator

Incident date	Scheme / location	Parameter / issue	Preventive actions

7 DWQMP review outcomes

A summary of the outcomes of the review and how issues/changes raised in the review, were actioned is provided in this section. Richmond Shire Council undertook a comprehensive update of the DWQMP. Key actions identified in the review in order to update the DWQMP and were addressed after the end of the 2018-19 financial reporting year as part of the Amendment submitted in August 2019.

- Update system schematics – simplify and identify control points
- Simplify system descriptions (all) – consider table format.
 - Update population – demand details
 - Update reticulation details with new main replacements
- Simplify Information gathering – dot point
 - Update to include SWIM Local data base data entry and alerts.
- Water Quality Data analysis and Interpretation
 - Update data – Chlorine – turbidity – Iron - Manganese
 - Simplify text – description
 - Include last years external data and compare to internal records
 - Update external verification monitoring data to reflect – post treatment plant results.
- Catchment Characteristics
 - Update E.coli – coliform data to include 18-19 data
 - Simplify catchment description
- Operations and Maintenance
 - Simplify text to focus on risk-based operation/controls – remove bulk of descriptive text and develop and refer to “operation manual” as a separate document
 - Change heading format of sections 6.2.6- 6.2.7, 6.2.8, as sub headings of 6.2.5 – Emergency Modes
 - Review – update operation and maintenance requirements table
- Update 6.3 with recent mains replacements – upgrades and any new mains
- Review and update if necessary – key stakeholders table
- Hazard Identification and management
 - Update risk review workshop attendees and schedule following workshops
 - Remove from document and Attach as appendix
 - Detail cyber security risks/controls and include in Risk Assessment tables
 - Summarise risk profile – with and without controls detailing low-medium-high and very high risks as a percentage of the risk profile.
 - Develop control point tables identifying target, medium alert and high alert levels and associated actions and reporting requirements for key WQ parameters.
- Risk Management Improvement Program
 - Update to detail status of RMIP actions – complete - % progress – Not started
 - Include RMIP actions as raised in September Audit – Including progress.
 - Review risk assessment matrix and risk scores to reflect completed actions
 - Update to include any actions identified/recommended in September 2018 Audit
- Operational and verification Monitoring plans
 - Revise external monitoring requirements following review of results obtained and correlation to historical results 2007 – 2015
 - Revise operational monitoring program to reflect resourcing capacity and ability to comply.
 - Update to include the use of SWIM local data base and establishment of alert limits for key water quality parameters.
- Appendix A: Risk Tables and RMIP – Update following risk review workshop

- Appendix B: Operational Documents Register – Update to reflect “current” documents associated with the maintenance of a safe water supply, new procedures – RSC corporate management plans (e.g. disaster management plan).

8 DWQMP audit findings

An audit was undertaken in September 2018. Findings are detailed below;

Compliance Statement

The auditor believes that RSC:

- Has demonstrated a moderately acceptable level of compliance with the regular audit imposed by the *Water Supply (Safety and Reliability) Act 2008* during the audit period;
- Needs to improve the management of implementing its DWQMP effectively and managing risks to drinking water quality and public health; and,
- Was found to have reasonable processes for managing drinking water incidents, however, has not progressed the risk management improvement plan.

There were 6 non-compliances identified. A number of opportunities for improvement were identified and are discussed later.

Audit Conclusions

The audit concluded that RSC:

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

The overall summary of compliance is shown below. In total 58 questions were asked. Where relevant, questions were repeated in the field to confirm that management requirements were promulgated and implemented.

Compliance Code		Number of Findings
Compliant	Compliant	33
Compliant with Opportunity for Improvement	OFI	19
Minor Non-Compliant	Minor	4
Major Non-Compliant	Major	2
Critical Non-Compliant	Critical	0
Total		58

The actions undertaken to address the audit recommendations are outlined in Appendix 1 Updated RMIP.

9 Appendix 1 – Updated RMIP Table

IP Action No	Risk Number, DWQMP section, or OFI/NC from audits	Hazardous Event	Residual Risk	Priority (Low, Med or High)	Action Description	Initial Date	Target Date	Estimate Costs	Responsibility	% complete (Aug 2019)	Actions completed (Aug 2019)
IP1	B4	Ingress of contaminates into Bores due to casing failure	Low	Low	Investigate with DNRM on the possibility of a bore inspection and preventative maintenance program.	11.10.2017	Completed		DoW/ Water Officer	100%	DNRM not forthcoming with any inspection or preventative program.
IP2	T6	Failure of oxidation of Bore 6 (mechanical)	Low	Low	Include the inspection of the Oxidation tanks in the operational checks and incorporate into maintenance /plant log sheets	11.10.2017	Completed		DoW/ Water Officer	100%	The Operational Task List is under development and this action is included in the site checks and plant log sheets.
IP3	B2 B3 B4 BC1 BC2 BC3 BC4 W6 W5 T1 T2 T3 T4 T5 T6 T9 T10 T11 T12 T13 T14 T15	Human error resulting in WQ failure/WTP processes failures	High	High	Develop WTP & Bore operating procedures (inspection, preventative maintenance, record keeping). Develop a standardised Council format for procedure development.	11.10.2017	Jun-20	\$20K	DoW/ Water Officer	40%	RSC WTP has a Operational Manual. The inspection of WTP and Bores are included in the Operational Task list. Bore maintenance has not progressed due to DNRME not responding to the request for ongoing preventative maintenance of Bore sites. The Bore 6 cooling system has been decommissioned. A

											procedure is in development.
IP4	W6	Insufficient resources dedicated to WTP operations leading to process failures	High	High	Council to review the water rates and budget allocation for future water operations.	11.10.2017	Jun-20		DoW/ Water Officer	10%	RSC have a number of job vacancies and are currently reviewing PD's and resourcing.
IP5	T8 T16	Power outages leading to loss of WTP control	Low	Low	Review the alarms and PLC set points that occur during 'brown outs' and/or power outages. Include generator maintenance and auto start up.	11.10.2017	Jun-21		DoW/ Water Officer	60%	Procedure and check sheet included in WTP Operational Task Sheet. Needs implementation.
IP6	T11 T12 T13 T14 T15 OFI	Process equipment failures resulting in off spec water supplied	Low	Med	Develop a cyclic maintenance program for filters, pressure sensors, pumps /pumps sets, including internal and external resource requirements. Calibration records to be maintained of online instrumentation.	11.10.2017	Jun-20	TBD	DoW/ Water Officer	60%	Plant equipment checks included in Operational Task list. Filter inspection requirement added to annual maintenance schedule check sheet and included in WTP Operational Task Sheet. External contractor support is required to assist with activity.

IP7	B1, B5, B6, B7, B8 B9, B10 W8 OFI	Insufficient external verification data to validate treatment processes and source water monitoring.	High	High	Review all the verification monitoring program and develop revised verification monitoring. Liaise with Laboratory Services for data transfer. Update DWMP Appendix F. Temperature to be recorded for process and verification samples.	11.10.2017	Completed		DoW/ Contractor	100%	External monitoring program initiated- Oct 2018. Temperature included on Plant Log sheets and field test sheets. Lab notify various staff and external contractor of results. See IP 27
IP8	W2 W6 OFI	Human error resulting in WQ failure/WTP processes failures	High	High	Review operator resource requirements (after appropriate procedures), training requirements and position descriptions. Council to participate in industry events/conferences and training programs to ensure up to date with current practises.	11.10.2017	Jun-20		DoW/ Water Officer	10%	Three staff positions are vacant and position descriptions currently under review. Operational procedures are under development.
IP9	BC1 BC2 BC3 BC4 D5 OFI	Human error resulting in WQ failure and or WTP processes failures	Mod	Med	Review drawings and update to reflect valve arrangements at Bore 6 and cooling system.	11.10.2017	Jun-20		DoW/ Water Officer	95%	Cooling system has been isolated due to defects. Drawings of Valve arrangement prepared. Permanent isolation is yet to be actioned
IP10	T9 OFI	Incorrect concentration or type of chemical delivered to site.	Mod	Med	Investigate & develop procedure and equipment for validating the chemical quality of supplied goods (e.g.. hydrometer).	11.10.2017	Dec-20	\$2K	DoW/ Contractor/ Water Officer	10%	Delivery dates recorded on IBC by operational staff. Council to source a quality batch certificate from the chemical supplier where available.
IP11	T7	Malicious activity at WTP site which	Mod	Low	Investigate the need of WTP site security requirements (security cameras/ site	11.10.2017	Completed		DoW/ Water Officer	100%	Cameras have been installed at the WTP.

		impacts on treatment and storage			alarms), include site security in daily check list.						
IP12	W4 T10 T12 OFI	Non compliant water produced and inaccurate internal testing	Mod	High	Develop online and portable instrument procedures including calibration and maintenance schedules (internal & or external contractors)	11.10.2017	Jun-20	\$5K	DoW/ Contractor/ Water Officer	20%	Contractor training provided (Aug2019) to Ops staff on calibration and instrument care. Manufactures instrument and calibration procedures available on site. Calibration record sheet has been developed and needs implementation.
IP13	D2 D3 D4 D6	Mains breaks or unsanitary repairs leading to WQ issues including cross contamination of main repair equipment e.g. Sewer/Water	High	Med	Develop distribution operating procedures (for mains breaks, new mains installation/commissioning, etc.) Investigate the use of portable instrument to verify disinfection levels after a main repair.	11.10.2017	Dec-20	\$5K	DoW/ Contractor/ Water Officer	30%	Main break repair draft procedure has been developed and requires field testing and finalisation. Field WQ monitoring equipment has been purchased for field testings.
IP14	D1 D7	Pathogens & WQ contamination due to backflow from customer connections and/or local industry	High	Low	Investigate the need for installation and maintenance of back flow prevention devices for services to customers and industry. Engage contractor to review number of high risk sites and prioritise the installation of back flow devices (where required) and include a budget estimate.	11.10.2017	Jun-21	TBD	DoW/ Water Officer	30%	Back flow maintenance program has been developed and requires implementation. RSC register is in development. Annual BFP Service Contract to be developed.

IP15	R5	Low chlorine levels in Reservoir	Low	Med	Develop Reservoir Hypo 'top up' dosing procedure for various water levels.	11.10.2017	Dec-20	\$1K	DoW/ Water Officer	50%	Inspection procedure and check list drafted and requires implementation. WTP outlet chlorine levels alarmed
IP16	R1 R2 R3 R4 R6	Malicious contamination/ Storm Damage / Ingress of faecal material/ disturbance of sediments on Reservoirs	Low	Low	Develop Reservoir Inspection check list and formalise appropriate record keeping. Include a reservoir cyclic maintenance program where required.	11.10.2017	Dec-20	\$2K	DoW/ Water Officer	50%	Inspection procedure and check list drafted and requires implementation
IP17	D2 D3	Mains breaks or unsanitary repairs leading to WQ issues.	High	Med	To investigate the purchase and supply of WQ instrumentation for recording WQ data following mains repair.	11.10.2017	Dec-20	\$12K	DoW/ Water Officer	30%	RSC have an industry example for a Mains Repair procedure and have been shown how to access WIOA online training video. Portable instrumentation exists.
IP18	D5 D3 D6	Dead ends in reticulation leading to stagnation of water	Mod	Low	Routine flushing sites and seasonal program to be formalised	11.10.2017	Dec-20	NA	DoW/ Water Officer	10%	Flushing program has ceased due to staffing restrictions. A program has not been prepared. Dead ends (racecourse and Hospital) have been included in verification monitoring program.

IP19	W9	Customer complaints and inaccurate record keeping	Low	Med	Customer complaints are to be categorised into DEWS WQ categories (T&O, coloured/dirty/ illness/air/ other) and service requests are to identify/validate the cause and action taken to rectify the complaint.	11.10.2017	Completed	\$2K	DoW/ Water Officer	100%	Residual Risk reduced from Mod to Low. Customer Services Request (action registry) has been allocated to water quality complaints. A customer complaints field record sheet has been established. Residual Risk lowered to D2-Low
IP20	W1	Loss of trained operators	High	Med	Develop internal staff skills and identify/document job requirements . Review and update Position Descriptions to reflect requirements. Include succession training/planning and involvement in industry training and information days.	11.10.2017	Dec-20	TBD (Subject to training needs and availability)	DoW/ Water Officer	10%	Residual Risk increased from Lod to High. At the time of review RSC have a number of job vacancies. The risk was increased to High. PD under review but RSC struggle to fill vacant positions.
IP21	W3 W7 OFI	Lack of emergency response procedures	Low	Low	Council to prepare an incident and response management plan to address water quality events in the supply. Council to run a WQ event mock exercise to test IERP procedures.	11.10.2017	Jan-21	\$5K	DoW/ Water Officer	0%	RSC are yet to prepare a IERP.
IP22	OFI	Lack of document control and management leading to loss of procedures, records and	Mod	High	Council to formalise document storage folder structure and location for all DWQMP related documents and records.Council to implement an assets register.	11.10.2017	Dec-19	\$5K	DoW/ Works Admin Officer	10%	RSC have industry examples of document storage structure and are yet to allocate document storage numbers to

		evidence of compliance with the DWQMP									prepared procedures and records.
IP23	W13 OFI	Materials used in water supply system are not approved for drinking water	Mod	Med	Council to ensure that stores staff understand and implement the requirement that goods used in the water supply comply with Australian Standards and are WaterMark approved.	6/08/2019	Jan-21		DoW / Stores Manager	0%	New action
IP24	W10, OFI	Cyber security risk to WTP control and RSC record keeping	Mod	Med	RSC to review local government and industry examples and determine implementing required control measures. SCADA reviews are to be conducted with appropriate configuration set point reports to be compiled.	6/08/2019	Jun-20		DoW	0%	New action
IP25	W11, OFI	Lack of control software and back up of WTP control logic (the code)	High	Med	RSC to engage with contractor to ensure that the backup systems are maintained and available where required. Contractor RSC to determine if a local backup on the council network is possible.	6/08/2019	Jun-20		DoW & Contractor	0%	New action
IP26	W12, OFI	Out of date software and virus security systems in use	Mod	Med	RSC to ensure that CITECT /SCADA software is updated with latest security patches (6 monthly). The CITECT and SCADA are to be kept up to date with latest versions.	6/08/2019	Jun-20		DoW	0%	New action

IP27	Major, OFI	Verification monitoring and water quality and testing and results are not responded to.	High	High	A task scheduling database is in use by council to ensure that sampling and viewing results is completed (- SWIMLocal). Operational Task Lists identify staff responsibilities.	6/08/2019	Jun-20		DOW / Water Officer	50%	New Action SWIMLocal database has been developed to record water quality tests, (100% complete) The task scheduling in the SWIM local has been populated for key task (collection treatment & distribution) and requires council to trial and further implement. Laboratory results are emailed to a council group (including external contractor) for notification.
------	---------------	-----------------------------------------------------------------------------------------	------	------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------	--------	--	---------------------	-----	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------