Narrandera Shire Council

Drinking Water Management System

Narrandera Shire Council
Amended April 2018
MagiQ # 460698

TECHNICAL FACILITATION SPECIALISTS

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Authors	Annalisa Contos
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EXECUTIVE SUMMARY

PLAN PURPOSE

This document and the supporting systems demonstrate Narrandera Shire Council's compliance with the requirement in the *Public Health Act* 2010 to develop a Quality Assurance Plan in line with the Framework for Drinking Water Quality Management in the Australian Drinking Water Guidelines. This document acts as a roadmap of the activities that Council undertakes to ensure the provision of safe drinking water to its customers.

CRITICAL CONTROL POINTS

The day to day safety of the water is maintained at critical control points (CCP) and it is a requirement of Drinking Water Management System (DWMS) development that CCPs are developed and critical limits assigned. The CCPs developed for the Narrandera water supply system are shown in Executive Summary Table 1.

EXECUTIVE SUMMARY TABLE 1. SUMMARY OF CRITICAL CONTROL POINTS

System	CCP	Target	Adjustment	Critical
Reservoirs	Distribution reservoirs	Secure and vermin proof	< 0.2 mg/L free chlorine Evidence of breaches	< 0.2 mg/L free chlorine more than 1 day Breach not rectified or serious breach
Bores	Wellhead protection	Not threatened by surface runoff	Threatened by surface runoff	Wellhead inundated
Chlorination	Chlorine dosing	1.5 mg/L	1.2 mg/L	0.8 mg/L

Note: *Chlorination CCP has been developed for use once the new aerators have been commissioned*

Two Standard Operating Procedures (SOP) for the Narrandera chlorination system were developed. These procedures are provided in Appendix B.

ACTION AND CONTINUOUS IMPROVEMENT PLAN

A number of actions were identified through the risk assessment and plan development. These have been assigned to staff members and contractors/consultants to follow-up. The Action and Continuous Improvement Plan is reviewed regularly as actions are completed and as part of the annual planning cycle.

SYSTEM REVIEW

This management system should be reviewed internally on an annual basis and by an independent party every 3 years (subject to NSW Health advice).

This document is designed for double sided printing

CONTENTS

FIGURES

TABLES

1 INTRODUCTION

The NSW *Public Health Act 2010* (the Act) was passed by Parliament at the end of 2010. The Act includes the requirement for water suppliers to produce a *Quality Assurance Program* (QAP). This document forms Narrandera Shire Council's response to the development of a QAP for the Narrandera Water Supply System and is based on the 12 Elements, 32 Components and 76 Actions of the Framework.

2 PURPOSE

This document acts as a roadmap of the activities that Council undertakes to ensure the provision of safe drinking water to its customers.

The document is supported by a range of procedures, registers, data management systems, flow diagrams and process and instrumentation diagrams which are all referenced at the appropriate points in this document.

This document and the supporting documentation are living documents that should be reviewed and updated in a timely manner.

3 Elements Roadmap

3.1 Element 1: Commitment to Drinking Water Quality Management

3.1.1 Drinking water quality policy

- Formulate a drinking water quality policy, endorsed by senior executives, to be implemented throughout the organisation.
- Ensure that the policy is visible and is communicated, understood and implemented by employees.

While Council does not have a formal drinking water quality policy, the Council Delivery Program (CDP) identifies:

- Strategy 3.4.2.2: Ensure a potable water supply that is sustainable in line with existing needs and potential growth
- Action 3.4.2.2.2: Plan for future water supply that meets community expectations

Council's Water Supply Asset Management Plan (AMP) identifies:

- Objective 3.3.1: Provide a consistent and reliable water supply that meets the community expectations
- Level of Service Objective: Provide high quality and pathogen free potable water supply

Action: Develop and document processes to communicate and implement Council's commitment to drinking water quality

3.1.2 Regulatory and formal requirements

- Identify and document all relevant regulatory and formal requirements.
- Ensure responsibilities are understood and communicated to employees.
- Review requirements periodically to reflect any changes.

The CDP has as Action 3.4.2.2.1 to: "*Maintain drinking water standards through regular testing",* with a measure that drinking water standards meet legislation.

The AMP lists legislative requirements that need to be met by Council, and states that maintenance and renewal work is carried out in accordance with relevant water treatment and quality standards. The plan also states as objectives for level of service:

- Physical water quality parameters conform to standards (odours, colour, taste, turbidity)
- Chemical water quality parameters conform to standards (pH, fluoride, residual chlorine, hardness, etc.)
- Provide quality water supply in line with relevant Australian Standards

Action: The key formal requirements shown in Table 3-1 should be reviewed and considered as part of the CDP and AMP

Table 3-1. Key formal requirements relating to water quality

Instrument	Jurisdiction	Type	Relevance
AS/NZS 3500.0 to 4:2003 - Plumbing and Drainage Set	National	Standard	Largely for management of the distribution system including standards for plumbing and drainage issues

Instrument	Jurisdiction	Type	Relevance
Plumbing Code of Australia (National Construction Code Series 2013)	National	Standard	Largely for management of the distribution system including standards for plumbing and drainage issues
Australian Drinking Water Guidelines 2011	National	Guideline	Sets frameworks and guidance for the provision of safe, quality drinking water
Local Government Act 1993	NSW	Statute	Urban water services and management/review of on-site sewage management systems; Have only persons licensed or certified under the Home Building Act 1989 (or supervised by such a person) carry out any water supply work, sewerage work or stormwater drainage work Preparation of Asset Management Plans
Public Health Act 2010	NSW	Statute	Protection of public health, follow any advice issued from the Chief of Health regarding drinking water safety to the public; sample drinking water in accordance with NSW Health recommendations. Prepare a drinking water management system
Public Health Regulation 2012	NSW	Regulation	Requirement to have a quality assurance program (QAP) in place that addresses the elements of the Framework as set out in the ADWG. A copy of the most recent QAP is to be provided to the Director-General who may arrange a review of the QAP at any time.
Protection of the Environment Operations Act 1997	NSW	Statute	Environment protection including licensed discharges
NSW Water and Sewerage Strategic Business Planning Guidelines	NSW	Guidelines	Prepare Strategic Business plans including a review of the operating environment and IWCM which should identify key water quality issues in the catchment.
NSW Health Drinking Water Monitoring Program	NSW	Guidelines	Free-of-charge testing for water supply system monitoring for indicator bacteria and health-related inorganic chemicals. Includes NSW Health Response Protocols for chemical and quality, treatment failure and *Cryptosporidium* and *Giardia.*
Fluoridation of Public Water Supplies Act 1957 No 58	NSW	Statute	Authorises and controls the addition of fluorine to public water supplies and for purposes connected to the supply.
Fluoridation of Public Water Supplies Regulation 2007	NSW	Statute	Made under the Fluoridation of Public Water Supplies Act 1957, relating to correct fluoride dosing equipment; collection, supply and analysis of water samples; provision of results monthly.
Environmental Planning and Assessment Act 1979 No 203	NSW	Statute	Proper management, development and conservation of resources including water for the welfare of the community and environment.

Action: Develop an up to date register of water quality regulatory and formal requirements
Action: Communicate regulatory and formal requirements to the staff and review requirements on an annual basis

3.1.3 ENGAGING STAKEHOLDERS

- Identify all stakeholders who could affect, or be affected by, decisions or activities of the drinking water supplier.
- Develop appropriate mechanisms and documentation for stakeholder commitment and involvement.
- Regularly update the list of relevant agencies.

Council does not currently have an up to date stakeholder register. Table 3-2 forms a preliminary stakeholder register:

TABLE 3-2. KEY STAKEHOLDER REGISTER

Organisation	Name	Role	Contact
Narrandera Shire Council	Frank Dryssen	Director Technical Services	0429 463 120
	Shane Squires	Water and Sewer Engineering Officer	0427 886 453
	Nick Ingram	Water and Sewer Project Coordinator	
	Bill Pope	Water Team Leader	
NSW Office of Water	Peter Ledwos	Acting Regional Manager (Urban Water)	(02) 4224 9731
	Bernie Barnes	Inspector	0429 604 409
	Algal Alert	-	1 800 999 457
NSW Health Hunter Greater Southern Area	Kevin Prior	Environmental Health Officer	0429 076 135
Murrumbidgee Catchment Management Authority	Head Office	-	(02) 6932 3232
NSW Department of Planning and Infrastructure	Western Region		(02) 6841 2180
Environmental Protection Agency	Griffith	-	(02) 6969 0700

3.2 ELEMENT 2 - ASSESSMENT OF THE DRINKING WATER SUPPLY SYSTEM

3.2.1 WATER SUPPLY SYSTEM ANALYSIS

- Assemble a team with appropriate knowledge and expertise.
- Construct a flow diagram of the water supply system from catchment to consumer.
- Assemble pertinent information and document key characteristics of the water supply system to be considered.

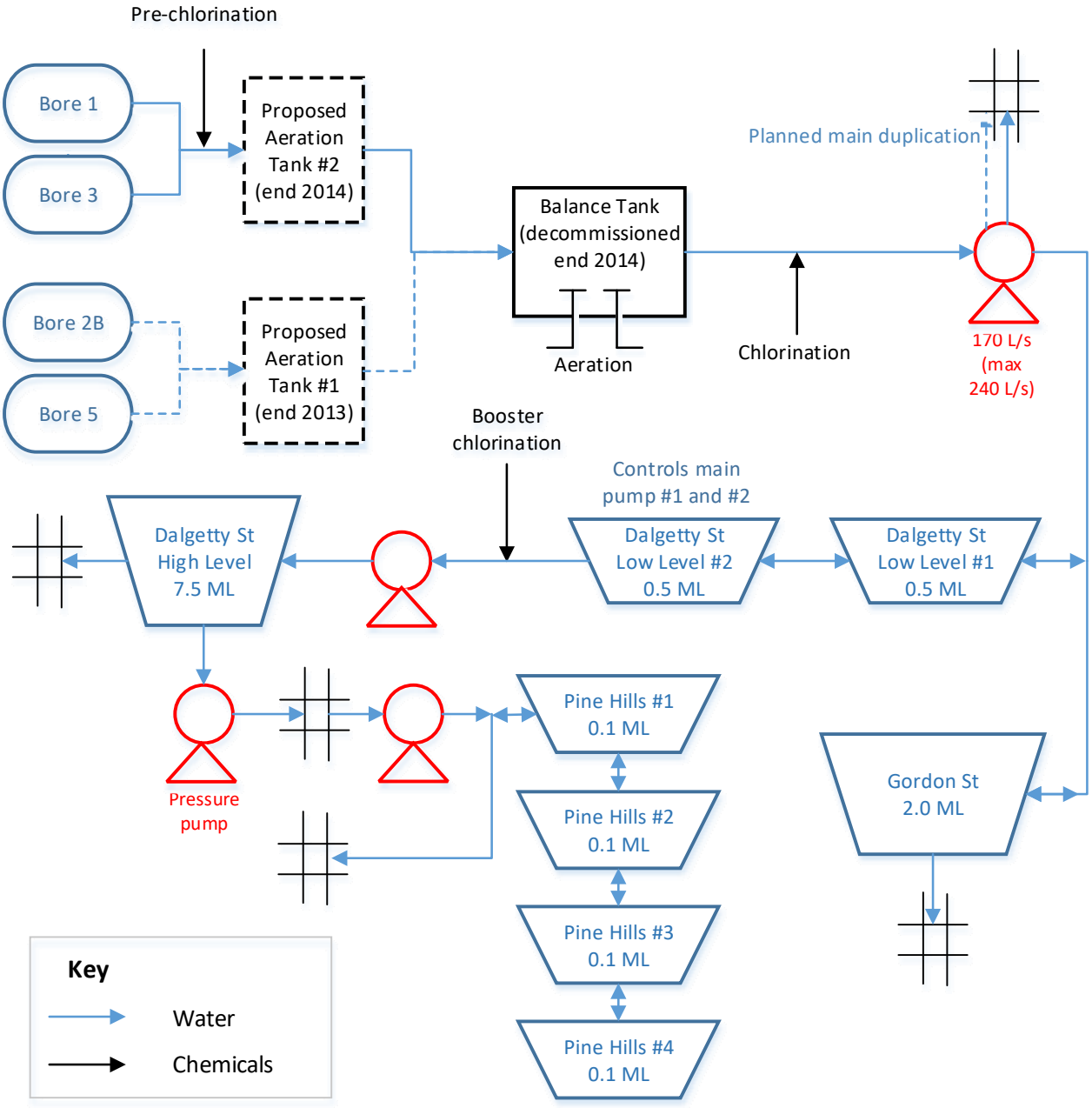
This was undertaken as part of the Risk Assessment Workshop on 15th November 2013. A summary of the drinking water supply system for Narrandera is shown in Table 3-3. See Appendix B for the workshop outcomes paper.

TABLE 3-3. NARRANDERA SYSTEM SUMMARY

Characteristic	Data
Extraction point	Narrandera Borefield
Treatment process	Aeration, chlorination
Maximum production capacity	12 ML/day
Customers	2,237 connections

The process flow diagram used for the risk assessment for Narrandera is shown in Figure 3-1.

FIGURE 3-1. NARRANDERA PROCESS FLOW DIAGRAM USED IN THE RISK ASSESSMENT



Action: Develop and implement a procedure for record keeping of water testing results
Action: Develop plant procedures and compile into a plant manual

3.2.2 ASSESSMENT OF WATER QUALITY DATA

- Assemble historical data from source waters, treatment plants and finished water supplied to consumers (over time and following specific events).
- List and examine exceedences.
- Assess data using tools such as control charts and trends analysis to identify trends and potential problems.

This was assessed as part of the Risk Assessment Workshop on 15th November 2013 (See Appendix B). Water quality data was extracted from the NSW Health verification monitoring database for testing carried out over the period 2001 – 2013. An analysis of the results against the Australian Drinking Water Guidelines (2011) are provided below, including statistics for common parameters. Narrandera Water Treatment Plant (WTP) is shown in Table 3-4.

TABLE 3-4. SUMMARY OF KEY WATER QUALITY PARAMETERS (NSW HEALTH) FOR NARRANDERA

Characteristic	Guideline Value	Min	5th %-tile	Median	95th %-tile	Max	# of samples	# of Exceed-ences
Aluminium (mg/L)	0.2	0.005	0.005	0.01	0.14	0.85	121	3
Copper (mg/L)	2	0.0003	0.0025	0.029	0.68	2.73	140	1
Iron (mg/L)	0.3	0.005	0.03	0.14	0.59	2.1	121	12
Lead (mg/L)	0.01	n.d.	n.d.	n.d.	0.01	0.05	140	8
pH	6.5-8.5	6.4	7.4	7.6	8.1	9.0	318	5
Turbidity (NTU)	1	0.05	0.215	1.19	4.35	98.7	310	175
E. coli (cfu/100 mL)	0.5	n.d.	n.d.	n.d.	n.d.	95	873	7
Free chlorine (mg/L)	0.2-5	0.01	0.17	0.45	0.77	1.2	178	15
Total coliforms (cfu/100 mL)	0	n.d.	n.d.	n.d.	n.d.	400	874	2

Source: *NSW Health Water Quality Monitoring Program*
Note: *Turbidity results are combined chemistry and microbiology sample results. Exceedences are based the guideline value of 1 NTU for effective disinfection.*
n.d. means not detected.

3.2.3 HAZARD IDENTIFICATION AND RISK ASSESSMENT

- Define the approach and methodology to be used for hazard identification and risk assessment.
- Identify and document hazards, sources and hazardous events for each component of the water supply system.
- Estimate the level of risk for each identified hazard or hazardous event.
- Evaluate the major sources of uncertainty associated with each hazard and hazardous event and consider actions to reduce uncertainty.
- Determine significant risks and document priorities for risk management.
- Periodically review and update the hazard identification and risk assessment to incorporate any changes.

This was assessed as part of the Risk Assessment Workshop on 15th November 2013 using bow tie analysis (See Appendix B for more information).

The workshop identified 33 causes and 11 consequences of these hazardous events. The consequences were assessed as having both maximum risk; those without identified controls in place, and controlled risk; those with identified controls in place. Participants ranked risks from a health, operational and aesthetic perspective using a risk assessment matrix (ADWG 2011).

It was seen that eight of the 11 risks identified remain as very high risks even with the identified control measures in place. Three of these are associated with an inability to maintain chlorine residual in the

distribution system, two with tested parameters being above ADWG health and aesthetic values, and three with ineffective operation of the chlorine disinfection system.

The ninth risk identified as a very high maximum risk was community illness from chlorine resistant pathogenic organisms. This risk was reduced to high with controls in place.

The risks of both chronic and acute health impacts due to tested parameters being above ADWG health and aesthetic values were both reduced to moderate after identified controls were in place.

3.3 Element 3: Preventive Measures for Drinking Water Quality Management

3.3.1 Preventive measures and multiple barriers

- Identify existing preventive measures from catchment to consumer for each significant hazard or hazardous event and estimate the residual risk.
- Evaluate alternative or additional preventive measures where improvement is required.

This was assessed as part of the Risk Assessment Workshop on 15th November 2013 (See Appendix B). A number of additional preventive measures were identified. The necessary actions are listed as part of Element 12.

3.3.2 Critical Control Points

- Assess preventive measures from catchment to consumer to identify critical control points.
- Establish mechanisms for operational control.
- Document the critical control points, critical limits and target criteria.

This was assessed as part of the Risk Assessment Workshop on 15th November 2013 (See Appendix B). The CCPs are provided in Appendix A in a form to be displayed at the WTP and a summary is shown in Table 3-5.

Table 3-5. Summary of critical control points for Narrandera

System	CCP	Target	Adjustment	Critical
Reservoirs	Distribution reservoirs	Secure and vermin proof	< 0.2 mg/L free chlorine Evidence of breaches	< 0.2 mg/L free chlorine more than 1 day Breach not rectified or serious breach
Bores	Wellhead protection	Not threatened by surface runoff	Threatened by surface runoff	Wellhead inundated
Chlorination	Chlorine dosing	1.5 mg/L	1.2 mg/L	0.8 mg/L

Note: *Chlorination CCP has been developed for use once the new aerators have been commissioned*

Two Standard Operating Procedures (SOP) for the Narrandera chlorination system were developed. These procedures are provided in Appendix B. These SOPs for the operation of the chlorination system outline the activities undertaken to minimise the public health risks that may arise through pathogenic contamination of the Narrandera water supply. The procedures both provide advice on optimising the chlorination system at Narrandera to achieve effective primary disinfection.

The SOP for weekly chlorine testing is ongoing. The SOP for the operation of the chlorination system should be used until the commissioning of the infrastructure upgrade to the plant.

Action: Display the CCP details given in Appendix A at the WTP
Action: Implement chlorination CCP once appropriate chlorine residual can be maintained
Action: Implement the Standard Operating Procedures for the Narrandera chlorination system

Action: Develop a procedure to identify and report water quality exceedences including near misses to CCPs

3.4 Element 4: Operational Procedures and Process Control

3.4.1 Identify procedures required for processes and activities from catchment to consumer

- Document all procedures and compile into an operations manual.

Documentation of procedures is mostly done informally by operators. Two SOPs for the Narrandera chlorination system were developed. These procedures are provided in Appendix B.

Action: Develop operational procedures
Action: Compile procedures into an operations manual

3.4.2 Operational Monitoring

- Develop monitoring protocols for operational performance of the water supply system, including the selection of operational parameters and criteria, and the routine analysis of results.
- Document monitoring protocols into an operational monitoring plan.

Operators complete daily report sheets for the water extraction and chlorination systems. Water quality issues are reported to the Water and Sewer Engineering Officer.

Action: Review monitoring procedures including the daily report sheet and the SOPs for the chlorination system with NSW Health by July 2014
Action: Establish processes for the weekly analysis of routine results

3.4.3 Corrective Action

- Establish and document procedures for corrective action to control excursions in operational parameters.
- Establish rapid communication systems to deal with unexpected events.

The key risks from the risk assessment were reviewed as part of the risk assessment workshop. CCPs were identified. Corrective actions were developed (Appendix A).

Two SOPs for the Narrandera chlorination system were developed. These procedures are provided in Appendix B. These SOPs for the operation of the chlorination system outline the activities undertaken to minimise the public health risks that may arise through pathogenic contamination of the Narrandera water supply. The procedures both provide advice on optimising the chlorination system at Narrandera to achieve effective primary disinfection.

The SOP for weekly chlorine testing is ongoing. The SOP for the operation of the chlorination system should be used until the commissioning of the infrastructure upgrade to the plant.

The disinfection C.t has been calculated as 15, as chlorine is used as the primary disinfectant for a chlorine residual of 0.8mg/L.

$$\text{C.t.} = \frac{\text{s}}{170\ \text{L}} \times \frac{1000\ \text{L}}{1\ \text{kL}} \times \frac{1\ \text{min}}{60\ \text{s}} \times 0.8 \frac{\text{mg Cl}}{\text{L}} \times 2000\ \text{kL} \times 0.1\ \text{baffle factor}$$

C.t. =15 mg.min/L

3.4.4 EQUIPMENT CAPABILITY AND MAINTENANCE

- Ensure that equipment performs adequately and provides sufficient flexibility and process control.
- Establish a program for regular inspection and maintenance of all equipment, including monitoring equipment.

Maintenance and repair logs are completed by the operator and kept in hardcopy at the plant. The greasing of pumps is scheduled every six months and the service of blowers every four months.

Action: Develop inspection and maintenance procedures including for monitoring equipment and formalise record keeping

3.4.5 MATERIALS AND CHEMICALS

- Ensure that only approved materials and chemicals are used.
- Establish documented procedures for evaluating chemicals, materials and suppliers.

Chlorine gas is purchased form spectrum (Orica). The Council Storeman orders the chemical when requested by the plant operator. This is the only chemical used at the plant and quality cannot be evaluated by operators.

3.5 ELEMENT 5: VERIFICATION OF DRINKING WATER QUALITY

3.5.1 DRINKING WATER QUALITY MONITORING

- Determine the characteristics to be monitored in the distribution system and in water as supplied to the consumer.
- Establish and document a sampling plan for each characteristic, including the location and frequency of sampling.
- Ensure monitoring data is representative and reliable.

Council has a daily and weekly sampling plan for following parameters:

- pH
- Turbidity
- Free chlorine
- Total chlorine

The sampling sites used by council are listed in Table 3-6.

TABLE 3-6. LIST OF COUNCIL SAMPLING SITES

Site No.	Sampling site	Site No.	Sampling site
1	Boat ramp (1st customer)	9	Reservoir Pine Hill Road
2	Bundigerry Road	10	Narrandera Library
3	Reservoir Dalgetty Street	11	Council Chambers
4	Narrandera Airport	12	Sewage Treatment Works
5	Sportsground	13	Narrandera Park
6	Narrandera Nursing Home	14	Lake Talbot Tourist Park
7	16 Kiesling Drive	15	Gillenbah
8	Cemetery Douglas Street		

NSW Health sampling of the distribution system provides ongoing independent verification of the treatment process. Sampling and testing of the following parameters is scheduled monthly at Narrandera:

- pH
- Turbidity
- Free chlorine
- Total chlorine

Sampling sites are selected at different parts of town and are listed in Table 3-7. Samples are taken at each of these sites six times per year, with a rotation of six sites per month.

TABLE 3-7. LIST OF NSW HEALTH SAMPLING SITES

Site No.	Sampling site	Site No.	Sampling site
1	20 Beckham Street	7	Lot 22 Pine Hill Road
2	28 Melbourne Street	8	East Street
3	19 Argyle Street	9	141 East Street
4	Chantilly Street	10	Augusta Street
5	Racecourse Road	11	Adams Street
6	131 Douglas Street	12	Broad Street

Action: Develop a procedure to identify and report water quality exceedences including near misses to CCPs

3.5.2 CONSUMER SATISFACTION

- Establish a consumer complaint and response program, including appropriate training of employees

Customers can raise water quality issues via letter, phone call or visit to Council offices. Administrative staff create a customer request in TRIM. This is allocated to the relevant personnel (Water and Sewer Engineering Officer or Water Team Leader) with an action. High priority issues are notified by a phone call. Non-urgent issues are allocated by print-out. Once the job is complete a follow-up note is added to the TRIM file describing how the issue was addressed. The Technical Services Administrative Assistant follows up on any outstanding issues with the Water Team Leader.

Outside business hours, customers can call the on-call phone. Cards are used to record after hours call outs. These are then logged in TRIM annually. There is no process to record calls to the on-call phone that are made during business hours.

Action: Formalise current consumer enquiry process, particularly to ensure calls to front office are logged in TRIM more frequently
Action: Develop a procedure to log calls that come to the on-call phone during business hours

3.5.3 SHORT TERM EVALUATION OF RESULTS

- Establish procedures for the daily review of drinking water quality monitoring data and consumer satisfaction.
- Develop reporting mechanisms internally, and externally, where required.

Sample testing for free chlorine is performed twice per week by the operator with results recorded on hard copy and sent to the Water and Sewer Engineering Officer. Any problems are recorded in the plant diary.

Action: Formalise process to identify and report water quality exceedences including near misses to CCPs

3.5.4 CORRECTIVE ACTION

- Establish and document procedures for corrective action in response to non-conformance or consumer feedback.
- Establish rapid communication systems to deal with unexpected events.

The NSW Health Drinking Water Monitoring program provides response protocols for the microbiological quality, physical and chemical quality, treatment failure and *Cryptosporidium* and *Giardia.*

Action: Develop and implement a policy for the installation and monitoring of backflow prevention devices including the use of the Backflow Prevention and Cross Connection Control Guidelines published by the Water Directorate

3.6 ELEMENT 6: MANAGEMENT OF INCIDENTS AND EMERGENCIES

3.6.1 COMMUNICATION

- Define communication protocols with the involvement of relevant agencies and prepare a contact list of key people, agencies and businesses.
- Develop a public and media communications strategy

Council does not have an up to date contact list for key people, agencies and businesses.

Council has a formal media policy ES250 that states that the Mayor is the official spokesperson on issues of policy, Council decisions and crisis management. The General Manager is also the official spokesperson for major issues, crisis management and operational issues.

Council has a Community Engagement Strategy that lists types of stakeholders.

NSW Health protocols are available from the NSW Health web site <http://www.health.nsw.gov.au/environment/water/Pages/drinking-water.aspx>. Council must follow these protocols where applicable for:

- Physical and chemical quality
- Treatment failure, *Cryptosporidium* and *Giardia*
- Microbiological quality

Action: Develop a contact list of key people, agencies and businesses

3.6.2 INCIDENT AND EMERGENCY RESPONSE PROTOCOLS

- Define potential incidents and emergencies and document procedures and response plans with the involvement of relevant agencies
- Train employees and regularly test emergency response plans
- Investigate any incidents or emergencies and revise protocols as necessary

A response plan for low chlorine residual has been developed as part of the DWMS (Appendix B)

The following equipment is available for use during an incident or emergency.

Item	Location
SBCA and	WTP
Escape kits	Chlorine room
Backhoe	Water Lock - up
Potable pumps	Water Lock - up
Traffic control (night signs)	Water Lock - up
Generator	Water Lock - up
Flood lighting	Water Lock - up
Spare pipe	Water Lock - up
Pipes and breakdown fittings	WTP
Chlorine cylinder	Leeton Shire Council
Pipe locator	WTP
Stihl Cutting Saw	WTP
Viega (hydraulic pipe joiner)	WTP

Action: Develop and document incident and emergency procedures
Action: Train staff in incident and emergency response procedures
Action: Develop a procedure for the investigation of any incidents and emergencies including the revision of protocols as necessary
Action: Ensure the procedures are included in the regular council review cycle

3.7 Element 7: Employee awareness and training

3.7.1 Employee awareness and involvement

- Develop mechanisms and communication procedures to increase employees' awareness of and participation in drinking water quality management

Council is a member of the Water Industry Operators Association of Australia (WIOA), whose primary role is facilitating the collection, development and exchange of quality information between people undertaking operational roles in the water industry.

Council is a member of the Riverina and Murray Regional Organisation of Councils (RAMROC) who provide discussion and action on issues of significance to local government.

3.7.2 Employee training

- Ensure that employees, including contractors, maintain the appropriate experience and qualifications
- Identify training needs and ensure resources are available to support training programs
- Document training and maintain records of all employee training

Position descriptions form the basis of the performance appraisals. The position descriptions are updated at the staff member's request or when the manager deems the position has changed as part of the annual performance appraisal.

Training needs are captured during the performance appraisal and used to set the training budget. The training needs may be identified by the manager or the staff member.

From the performance appraisal an individual training plan is developed. This plan documents:

- The employee's qualifications
- Training that has been requested
- Training that has been approved

- Training that has been deferred (and the reasons why).

The training plan also contains a table of training that has occurred and been renewed (e.g. Drivers Licence, first aid certificates, elevated platform ticket) and when they are due for renewal.

Council seeks registrations of interest for supply of labour and services annually to form a pre-approved panel. As part of the registration process suppliers must provide information on the training of their employees. Contractors who are engaged through a contract would submit this information as part of their tender. Contractors engaged throughout the year complete a registration brief.

Procurement training is held to explain responsibilities to all staff.

As part of the community engagement leading into the Community Engagement Strategic Plan, a community engagement training and information session was held for councillors, managers and employees.

3.8 Element 8: Community involvement and awareness

3.8.1 Community consultation

- Assess requirements for effective community involvement.
- Develop a comprehensive strategy for community consultation.

Council has a documented community communication strategy. A community engagement process was undertaken to inform the Community Engagement Strategic Plan. This involved:

- Mail out to all community groups informing them of the survey and encouraging community input
- Two focus groups held with secondary school students
- Four sessions at local primary schools
- Focus group conducted with residents of Teloca House Aged Care
- Community meetings to present the information gathered through surveys, comment boards etc.
- Community asked at community meetings to prioritise the actions and strategies going forward
- Community Strategic Plan draft made available for comment electronically and in hard copy from Council offices, Council website, and the library.
- Council has run programs with the Savewater Alliance and ran water efficiency programs including a showerhead exchange offered to residents.

3.8.2 Communication

- Develop an active two-way communication program to inform consumers and promote awareness of drinking water quality issues.

The following were undertaken as part of the community engagement process undertaken as part of the Community Engagement Strategic Plan:

- Advertising and marketing through the Council newsletter, flyers with rates notices, radio, the local newspaper and posters to explain the process of community consultation
- A survey made available to all households in the shire via the Council website, Council offices, community facilities and services
- Comment boards set up in areas of high community traffic with pages for community members to comment
- Two staff available to provide information and discussion at the comment boards
- One on one conversations held with business operators to help them better understand their priorities and needs for the future
- Workshops held with stakeholders, community leaders and service providers.

3.9 Element 9: Research and development

3.9.1 Investigative studies and research monitoring

- Establish programs to increase understanding of the water supply system.
- Use information to improve management of the water supply system.

The Water Team Leader attends the WIOA conferences. The Water Team Leader attends the machinery exhibition at CIVENEX (an annual infrastructure expo).

RAMROC has an Engineers Working Group of which the Water and Sewer Engineering Officer is a member and attends their meetings. The groups meet on a regular basis and discuss matters of interest and specific projects. The Water and Sewer Engineering Officer is also a member of Engineers Australia.

Council is a member of the Water Directorate, receiving informational e-mails and using the Water Directorate forum to seek information from peers in the water industry.

3.9.2 Validation of processes

- Validate processes and procedures to ensure that they are effective at controlling hazards.
- Revalidate processes periodically or when variations in conditions occur.

NSW Health sampling of the distribution system provides ongoing validation of the treatment process.

Free chlorine targets for the chlorine disinfection process have been set to ensure suitable C.t for inactivation of chlorine sensitive pathogens (see Section 3.4.3) and ensure sufficient residual throughout the reticulation system.

Action: Develop and implement a system to validate processes and procedures
Action: Timetable periodic review of processes

3.9.3 Design of equipment

- Validate the selection and design of new equipment and infrastructure to ensure continuing reliability.

A Section 60 approval for upgrade works also ensures validation of equipment and infrastructure.

3.10 Element 10: Documentation and record keeping

3.10.1 Management of documentation and records

- Document information pertinent to all aspects of drinking water quality management.
- Develop a document control system to ensure current versions are in use.
- Establish a records management system and ensure that employees are trained to fill out records.
- Periodically review documentation and revise as necessary.

Council uses TRIM for document control however many records for the water supply system are informally recorded on hard copy only and are kept at the plant.

Action: Develop and implement a procedure to document and electronically store information regarding drinking water quality management
Action: Develop and implement a document control procedure to ensure current versions are in use and have regular review
Action: Establish a records management system and ensure employees are trained to fill out records

3.10.2 REPORTING

- Establish procedures for effective internal and external reporting.
- Produce an annual report to be made available to consumers, regulatory authorities and stakeholders.

Water quality reports for the samples tested by NSW Health can be retrieved from the NSW Health Drinking Water Database.

Action: Develop procedures for effective reporting internally to the water supply team and Council, and externally to stakeholders
Action: Release an annual report for monitoring review to be made available externally

3.11 ELEMENT 11: EVALUATION AND AUDIT

3.11.1 LONG TERM EVALUATION OF RESULTS

- Collect and evaluate long-term data to assess performance and identify problems.
- Document and report results.

Council reviews and submits data as part of the NSW Office of Water annual performance reporting. Reports on water quality can be generated through the NSW Drinking Water Database. Council has records of historical data analysis and reports all data collected as part of the NSW Health Monitoring Program. Actions to improve compliance with this element are captured in the Action and Continuous Improvement Plan (Appendix C).

Action: Develop procedures for the long term review of raw, treated and reticulated water quality data
Action: Develop a procedure to document and report test results

3.11.2 AUDIT OF DRINKING WATER QUALITY MANAGEMENT

- Establish processes for internal and external audits.
- Document and communicate audit results.

A gap analysis audit of Narrandera Shire Council's water supply system was undertaken 23rd September 2013. The results of the gap analysis were used to facilitate development of this document. The NSW Health Drinking Water Database is used to document water quality results and was interrogated as part of the preparation for the risk assessment workshop on 15th November 2013.

Procedure based inspections of the system are carried out by operators. External inspections of the system are carried out by NSW Office of Water (NOW) inspectors. Council reviews its water quality results prior to a visit from the NOW inspector. These results are discussed as part of the inspection. Reports of findings are provided by the inspectors and are used to help direct works.

A preliminary internal audit schedule has been developed (Table 3-8).

TABLE 3-8. INTERNAL AUDIT SCHEDULE

Item verified	Method	Frequency	Responsibility	Objectives	Reference
Critical control points	Internal audit of operational activities identifies in the CCP information	Quarterly	Director Technical Services	Conformity between the CCP information and operational practices	Internal audit findings summary
Critical limit monitoring instruments	Cross-check of critical limit monitoring instruments with laboratory equipment	Quarterly [1]	Water and Sewer Officer	Accuracy of CCP monitoring equipment	Calibration sheets
DWMS	Internal audit of DWMS for sample of processes and systems	Annually	Director Technical Services	Conformity between the DWMS and practices	Internal audit findings summary

Note 1: *Frequency to be reviewed after one year and altered based on findings.*

Action: Implement internal audit schedule
Action: Independent audit undertaken before March 2015

3.12 ELEMENT 12: REVIEW AND CONTINUAL IMPROVEMENT

3.12.1 REVIEW BY SENIOR EXECUTIVE

- Senior executive review of the effectiveness of the management system.
- Evaluate the need for change.

This Drinking Water Management System and its implementation will be reviewed regularly (at least annually) to ensure that it maintains currency with the water supply operation and management.

Action: Develop a procedure and timetable for senior executive review and evaluation of the DWMS

3.12.2 DRINKING WATER QUALITY MANAGEMENT IMPROVEMENT PLAN

- Develop a drinking water quality management improvement plan.
- Ensure that the plan is communicated and implemented, and that improvements are monitored for effectiveness.

The Action and Improvement Plan is captured in Appendix C. The Director Technical Services is responsible for the implementation and oversight of the plan.

The Action and Improvement Plan is used by the Director Technical Services to monitor the implementation of the DWMS. The plan is subject to 12 monthly reviews with the General Manager.

Appendix A – Operational Information

CRITICAL CONTROL POINTS MONITORING SUMMARY - NARRANDERA

The critical parameter for the safe management of the Narrandera water supply system are shown below.

Ensure that these parameters are monitored regularly.

	Target Criteria	Adjustment Limit	Critical Limit
Distribution reservoirs	Secure and vermin proof	< 0.2 mg/L free chlorine Evidence of breaches	< 0.2 mg/L free chlorine for more than 1 day Breach not rectified or serious breach
Wellhead protection	Not threatened by surface runoff	Threatened by surface runoff	Wellhead inundated
Chlorine dosing	1.5 mg/L	1.2 mg/L	0.8 mg/L

Target Criteria This is where you should be operating.
Aim to keep the system operating at this value.

Adjustment Limit If you reach this limit, refer to CCP management sheet and try to get back to the operational target.
Increase monitoring until returned to normal.

Critical Limit If you reach this limit, you have lost control of your system.
Refer to CCP management sheet and try to return to operational target as a matter of urgency.

Appendix B – Risk Assessment Paper

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Appendix C – Action and Continuous Improvement Plan

Actions arising from the Gap Analysis and Risk Assessment are shown in the table below. The first two numbers of each action refer to the Element and the Component numbers for ease of cross-referencing back to the Framework

Action #	Follow-up actions	Person responsible	Timeframe	Action comment	Date complete	12 month review	Review sign off
1.1.1	Develop and document processes to communicate and implement Council's commitment to drinking water quality	Water and Sewer Engineering Officer	2016	Not Started			
1.2.1	The key formal requirements shown in Table 3-1 should be reviewed and considered as part of the CDP and AMP	Water and Sewer Engineering Officer	2016	Not Started			
1.2.2	Develop an up to date register of water quality regulatory and formal requirements	Water and Sewer Engineering Officer	2016	Not Started			
1.2.3	Communicate regulatory and formal requirements to the staff and review requirements on an annual basis	Water and Sewer Engineering Officer	2016	Not Started			
2.1.1	Develop and implement a procedure for record keeping of water testing results	Water and Sewer Engineering Officer	2016	Not Started			
2.1.2	Develop plant procedures and compile into a plant manual	Water and Sewer Engineering Officer	December 2015	In progress	N/A		
2.1-A1	Develop post aeration iron monitoring procedure for new aeration towers	Water and Sewer Engineering Officer	2016	Not started			
2.1-A2	Select appropriate aeration technology for new aeration towers	Water and Sewer Engineering Officer	December 2016	In progress	N/A		
2.1-A3	Obtain Section 60 approval for new aeration towers	Water and Sewer Engineering Officer	October 2015	Complete	October 2015		
2.1-A4	Obtain Section 60 approval for new Bores 2B and 5	Water and Sewer Engineering Officer	October 2015	Complete	October 2015		
2.1-A5	Develop maintenance procedures for iron removal in new aeration towers	Water and Sewer Engineering Officer	2016	Not started			
2.1-A6	Disconnect Bore 4 from potable water system to avoid backflow / cross-connection from recycled system	Water and Sewer Engineering Officer	2013	Complete	2013		
2.1-A7	Update register of backflow prevention devices	Water and Sewer Team Leader	2016	Not started			
2.1-A8	Annual assessment of properties with high risk of backflow / cross-connection	Water and Sewer Team Leader	2016	Not started			

Action #	Follow-up actions	Person responsible	Timeframe	Action comment	Date complete	12 month review	Review sign off
2.1-A9	Investigate how appropriate chlorine contact time can be achieved to address risk of insufficient chlorine C.t	Water and Sewer Engineering Officer	2015	In progress		October 2015	
2.1-A10	Develop reservoir maintenance program to address identified issues	Project Engineer	2016	In capital works program			
2.1-A11	Develop procedure for bringing bores back online after inundation to address threat of groundwater contamination	Water and Sewer Engineering Officer	2016	Not Started			
2.1-A12	Develop monitoring program for lead in source water	Water and Sewer Engineering Officer	2016	Not Started			
2.1-A13	Review ability to operate plant in a flood including the position of the transformer	Water and Sewer Engineering Officer	2014	Transformer raised as part of Essential Energy upgrade	2014		
2.1-A14	Develop procedure for bringing bores back online after inundation to address threat of chlorine resistant pathogens in source water	Water and Sewer Engineering Officer	2016	Not Started			
2.1-A15	Develop a bore protection and operation procedure for floods to address threat of chlorine resistant pathogens in source water	Water and Sewer Engineering Officer	2016	Not Started			
2.1-A16	Provide well head protection for Bore 3 to address threat of chlorine resistant pathogens in source water	Water and Sewer Engineering Officer	2017	Not Started			
2.1-A17	Develop maintenance program to address issues identified by reservoir inspections	Project Engineer	2016	In capital works program			
2.1-A18	Investigate portable disinfection unit to address the consequences of pipe breaks	Water and Sewer Engineering Officer	2015	Not feasible to purchase. Investigating possibility of sharing with other local councils	2015		
2.1-A19	Develop mechanisms to allow for reservoir isolation and maintenance to address corrosion impacts from reservoirs	Project Engineer	2016	In capital works program			

Action #	Follow-up actions	Person responsible	Timeframe	Action comment	Date complete	12 month review	Review sign off
2.1-A20	Update the Strategic Business Plan to consider long term asset maintenance and improvement programs	Water and Sewer Engineering Officer	2017	To be completed after IWCM			
2.1-A21	Develop a program to improve site security	Water and Sewer Engineering Officer	2016	Not Started			
2.1-A22	Develop a procedure for ordering chlorine to ensure continuous supply	Water and Sewer Team Leader	2015	Not Started			
2.1-A23	Install an online chlorine meter	Water and Sewer Project Coordinator	2015	In Progress			
2.1-A24	Develop a solution to the issue of power failure leading to chlorine overdosing	Water and Sewer Project Coordinator	2015	Not Started			
2.1-A25	Begin daily chlorine testing at plant to ensure correct chlorine dosing	Water and Sewer Team Leader	2015	Complete	2015		
2.1-A26	Ensure maintenance program and redundancy of main pumps	Water and Sewer Team Leader	2016	Not Started			
2.1-A27	Begin weekly chlorine testing in reticulation to avoid incorrect chlorine dosing	Water and Sewer Team Leader	2015	Complete	2015		
2.1-A28	Investigate how appropriate chlorine C.t can be achieved	Water and Sewer Engineering Officer	2015	In Progress. As part of Operations Manuals			
3.2.1	Display the CCP details given in Appendix A at the WTP	Water and Sewer Team Leader	2015	Complete	2015		
3.2.2	Implement chlorination CCP once appropriate chlorine residual can be maintained	Water and Sewer Team Leader	2015	Complete	2015		
3.2.3	Implement the Standard Operating Procedures for the Narrandera chlorination system	Water and Sewer Team Leader	2015	Complete	2015		
3.2.4	Develop a procedure to identify and report water quality exceedences including near misses to CCPs	Water and Sewer Team Leader	2016	Not Started			
3.2-CCP1	Implement the reservoir and wellhead CCP procedures	Water and Sewer Team Leader	2016	Not Started			

Action #	Follow-up actions	Person responsible	Timeframe	Action comment	Date complete	12 month review	Review sign off
3.2-CCP2	Implement the chlorination CCP procedure once the aerators are brought on-line	Water and Sewer Team Leader	2016	Not Started			
4.1.1	Develop operational procedures	Water and Sewer Engineering Officer	2015	In Progress. Operations Manual with SOPs being worked on by GHD			
4.1.2	Compile procedures into an operations manual	Water and Sewer Engineering Officer	2015	In Progress			
4.2.1	Review monitoring procedures including the daily report sheet and the SOPs for the chlorination system with NSW Health by July 2014	Water and Sewer Engineering Officer	2014	Complete	2014		
4.2.2	Establish processes for the weekly analysis of routine results	Water and Sewer Engineering Officer	2016	Not Started			
4.4.1	Develop inspection and maintenance procedures including for monitoring equipment and formalise record keeping	Water and Sewer Team Leader	2016	In Progress. As part of Operations Manual.			
5.1.3	Develop a procedure to identify and report water quality exceedences including near misses to CCPs	Water and Sewer Team Leader	2016	Not Started			
5.2.1	Formalise current consumer enquiry process, particularly to ensure calls to front office are logged in TRIM more frequently	Water and Sewer Engineering Officer	2016	In progress. To be reviewed as part of Customer Service Review.			
5.2.2	Develop a procedure to calls that come to the on-call phone during business hours	Water and Sewer Engineering Officer	2016	In progress			
5.3.1	Formalise process to identify and report water quality exceedences including near misses to CCPs	Water and Sewer Team Leader	2015	Complete	2015		

Action #	Follow-up actions	Person responsible	Timeframe	Action comment	Date complete	12 month review	Review sign off
5.4.1	Develop and implement a policy for the installation and monitoring of backflow prevention devices including the use of Backflow Prevention and Cross Connection Control Guidelines published by the Water Directorate	Water and Sewer Engineering Officer	2016	Staff require extensive training			
6.1.1	Develop a contact list of key people, agencies and businesses	Water and Sewer Engineering Officer	2016	Not Started			
6.2.1	Develop and document incident and emergency procedures	Water and Sewer Engineering Officer	2016	Not Started			
6.2.3	Train staff in incident and emergency response procedures	Water and Sewer Engineering Officer	2016	Not Started			
6.2.4	Develop a procedure for the investigation of any incidents and emergencies including the revision of protocols as necessary	Water and Sewer Engineering Officer	2016	Not Started			
6.2.5	Ensure the procedures are included in the regular council review cycle	Water and Sewer Engineering Officer	2015	In Progress			
9.2.1	Develop and implement a system to validate processes and procedures	Water and Sewer Engineering Officer	2016	In Progress			
9.2.2	Timetable periodic review of processes	Water and Sewer Engineering Officer	2016	In Progress			
10.1.1	Develop and implement a procedure to document and electronically store information regarding drinking water quality management	Water and Sewer Engineering Officer	2016	Not Started			
10.1.2	Develop and implement a document control procedure to ensure current versions are in use and have regular review	Water and Sewer Engineering Officer	2015	Complete	2015		
10.1.3	Establish a records management system and ensure employees are trained to fill out records	Water and Sewer Engineering Officer	2016	Awaiting adequate IT infrastructure and office space to enable staff to be involved in record keeping as required.			

Action #	Follow-up actions	Person responsible	Timeframe	Action comment	Date complete	12 month review	Review sign off
10.2.1	Develop procedures for effective reporting internally to the water supply team and Council, and externally to stakeholders	Water and Sewer Engineering Officer	2016	Not Started			
10.2.2	Release an annual report for monitoring review to be made available externally	Water and Sewer Engineering Officer	2016	Not Started			
11.1.1	Develop procedures for the long term review of raw, treated and reticulated water quality data	Water and Sewer Engineering Officer	2016	Not Started			
11.1.2	Develop a procedure to document and report test results	Water and Sewer Engineering Officer	2016	Not Started			
11.2.1	Implement internal audit schedule	Water and Sewer Engineering Officer	2015	In progress			
11.2.2	Independent audit undertaken before March 2015	Water and Sewer Engineering Officer	2016	DWMS adoption delayed. External audit to be conducted in 2016.			
12.1.1	Develop a procedure and timetable for senior executive review and evaluation of the DWMS	Water and Sewer Engineering Officer	2016	Not Started			

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Appendix D – Other Formal Requirements Relating to Water Quality

Instrument	Jurisdiction	Type	Relevance
Environment Protection and Biodiversity Conservation Act 1999	Commonwealth	Statute	Catchment management in particular for areas of national environmental significance
Competition and Consumer Act 2010	Commonwealth	Statute	Fitness for purpose of drinking water, evaluate capacity for third party access within Council's operations
Water Act 2007	Commonwealth	Statute	Under Part 7 of the *Water Act 2007*, the Bureau of Meteorology is required to collect, hold, manage, interpret and disseminate Australia's water information. Section 126 of the Act places an obligation on persons specified in the Regulations to give certain water information to the Bureau.
Water Regulations 2008	Commonwealth	Regulation	The Regulations define who must give specified water information to the Bureau and the time and format in which it must be supplied.
AS ISO 22000-2005 Food safety management systems-Requirements for any organisation in the food chain	National	Standard	Analogous to the ADWG Framework but would allow certification to that standard if sought
ISO31000:2009 Risk Management	National	Standard	Includes guidance on the use of risk assessment and management
Water Services Association of Australia Water Supply Codes	National	Best practice	Includes methodologies for undertaking a range of water supply works including distribution system management
Catchment Management Authorities Act 2003	NSW	Statute	Catchment management
Environmental Planning and Assessment Act 1979 No 203	NSW	Statute	Planning activities which require assessment
Fair Trading Act 1987	NSW	Statute	Includes provisions for goods (and services) to be fit for purpose
Fisheries Management Act 1994	NSW	Statute	Protection of fish habitats (including threatened and protected species management) and aquaculture management
Food Act 2003	NSW	Statute	Need to maintain water quality
Forestry Act 2012 No 96	NSW	Statute	Management of state forests
Mining Act 1992	NSW	Statute	Possible extraction of resources within catchment areas
Native Vegetation Act 2003	NSW	Statute	Native vegetation management (in the context of catchment management)

Instrument	Jurisdiction	Type	Relevance
Natural Resources Commission Act 2003	NSW	Statute	Catchment management
Plantations and Reafforestation Act 1999	NSW	Statute	Regional forest agreements
Local Government (General) Regulation 2005	NSW	Regulation	Audit and management of onsite sewage management systems (protects water quality from leaking sewage)
Protection of the Environment Operations Regulation 1998	NSW	Regulation	Submit annual National Pollutant Inventory (NPI) returns if any of the specified reporting thresholds are exceeded (water contamination issues)
Rivers and Foreshores Improvement Act 1948	NSW	Statute	Protection of rivers and lakes
Roads Act 1993	NSW	Statute	Planning of roads (and how they might impact on source waters)
Soil Conservation Act 1938	NSW	Statute	Soil management (in the context of catchment management)
Threatened Species Conservation Act 1995	NSW	Statute	Catchment management
Water Industry Competition Act 2006	NSW	Statute	Could allow a private company to access Council's reticulation systems
Water Industry Competition (General) Regulation 2008	NSW	Regulations	Sets out the requirements to be addressed in a WICA licence
Water Management Act 2000	NSW	Statute	Water management, drainage, water licences, water/river management committees, strategic business planning;
Wilderness Act 1987	NSW	Statute	Catchment management