

# Warrumbungle Shire Council Improvement Plan

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019	Short term actions
38	Mendoo	Catchment & Abstraction	Investigations	Continue to investigate sanitary quality and security of back-up bores aquifer.	3.1	Preventive Measures and Multiple Barriers	CWT report May-15		Jan-2015	Very High						Complete	(Section 4.1, p.6 of CWT report)				
43	BUG, KEN	Reservoirs	Operations	Inspect elevated water tanks and ensure that they are vermin proof/ secure them from contamination.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Sep-19		2-Oct was 30/9/19		In progress	2018-05: BUG: Operational staff used drone to inspect tank. This revealed a collapsed roof which was repaired. KBI: Reservoirs are due for	check with neighbouring Councils? Gil? Send email to all; AM to look at it (email); approach: inspect first, then act accordingly		BUG is secure KEN system to be replaced by end of September 2019 (ID 3)	
44	Bugaldie	Disinfection	Investigations	Establish the maximum flow rate and confirm CTs.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	29-Aug-18				Complete	2018-05: Refer to recommendation above. Bligh Tanner estimation re flow rate appears accurate.	doubling up from extreme			
45	Baradine	Reservoirs	Operations	Clean reservoir to remove sediment.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	29-Aug-18				Complete	2018-05: Planned to occur in week 18/06/18.	done			
46	Baradine	Disinfection	Operations	CT/clear water tank contamination: Discuss need for precautionary boil water alert with PHU/DPI Water OR increase chlorine concentration to 4 mg/L	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Jun-19				Complete	2016-10: None of this was done as considered not necessary by Manager WW-Operations & DTS after consultation with DPI Water (reason?).	Follow up discrepancy between chlorine measurements at plant and in retic --> SS; NaOCl absorption issue Fe/Mn - dose prior to clarifier (e.g. run into the	Need to measure clear water dimensions and inspect baffling system or find drawings	Integrity issues have been fixed (May 2019). Actions marked as complete. Separate action 326 to review CT.	
47	CLH, DUN	Catchment & Abstraction	Major works	Decommission the abandoned bore (CLH). Decommission the old well in the WTP building (DDO).	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high		29-Aug-18				Complete	2016-10: bore openings covered (photographic evidence available); 2018-05: Q - is 'decommissioning' different to 'sealing bores'?	what does decommission mean?; is the level off the bores? Not well??			
51	Baradine	Disinfection	Major works	re CT: Change reticulation configuration so all water must go through reservoir prior to delivery to town OR install new chlorine contact tank of sufficient size to provide adequate CT.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Jun-19				Closed	2016-10: Alternative and less costly suggestion to improve CT and guarantee appropriate disinfection: modify end of inlet pipe into clear water tank (e.g. perforated cap/pipe extension) for better distribution of inflowing water into tank. 2018-05: Need to measure clear water tank dimensions and assess current baffling system/find drawings to calculate CT more accurately; increase chlorine dosing to 2mg/L - need to notify residents in advance.	doubling up from extreme; an additional tank could be installed above ground between filters and underground clear water tank, dose chlorine in it --> increase CT (AM to investigate)		Action closed. Refer to action 326	
52	Mendoo	Catchment & Abstraction	Operations	Inspect the (back-up) bore and ensure integrity.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16			Very high	Supervisor South	27-Jun-19				Complete	Supervisor South - to check integrity 2016-10: Note - Intake is flood prone! 2018-05: Back-up bore not being used, control philosophy needs to be established.			Integrity of back up bore has been checked and is not an issue	
58	Baradine	Reservoirs	Minor works	re clear water tank: Establish integrity to prevent contamination/vermin ingress AND fix holes in WTP building to prevent vermin getting inside.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Jun-19				Complete	Photographic evidence available. Needs more sustainable solution			Completed May 2019	
59	CLH, DUN	Catchment & Abstraction	Minor works	Seal the bores (incl. covering the abandoned one - CLH).	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Aug-19		30/09/2019		Complete, follow up required	2016-10: Pictures with evidence/before-after comparison available. Expanding foam for operational CLH bore is only a temporary solution. 2018-05: Money included into capital budget FY18/19	is there a standard for capping/plugging bores (AS) -- MG (chase with Dale); WIS to seal bores		Coolah bore to capped (ID 15)	
60	Kenebr	Disinfection	Investigations	Determine configuration of tanks and re-configure to be in series if possible to increase CT.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Jun-19				Closed	2018-05: Tanks are currently not in series. The reservoirs require replacement. Replacement design will account for sufficient CT.	reservoirs require replacement, \$100k budgeted in FY2018/19, quote received; pump energy cost will increase with intended set-up		To be progressed 27/9/19: covered under ID 43 (new tanks should have sufficient CT - more than BUG)	
61	BUG, KEN	Catchment & Abstraction	Minor works	Seal the bore (BUG) borehead (KBI).	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	30-Jul-19				Closed	2016-10: Operational staff performed temporary sealing (photographic evidence available) 2018-05: More sustainable solution required (more	combine double ups?		Closed, covered by action 48	
62	Baradine	Reservoirs	Operations	re clear water tank: Thoroughly clean the WTP building to remove all bird faeces (care to be taken to not allow cleaning water to enter the clean water tank).	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Jun-19	19/20	31-Oct		In progress	2018-05: Note - inside of walls cannot be cleaned due to the wall material being asbestos + most areas located in very high places/inaccessible. Obtained a quote to upgrade clear water tank to comply with Circular 18, including cleaning, included in FY2018/19 capital budget.			Majority cleaned (all droppings around CWT have been removed, only high areas on asbestos). Have repaired holes to prevent further ingress by birds/vermin. Budget to replace external walls (FY19/20) to help prevent further ingress/WHS issues. 27/9/19: only double-walled at clear water tank?	Investigate option to clean internal walls with contractor (undertaking work on external walls)

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63	Baradine	Reservoirs	Minor works	Repair reservoir to prevent vermin ingress.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	WIS	27-Jun-19	2018/19			Complete	2018-05: Obtained quote to upgrade reservoir to comply with Circular 18 + included in FY2018/19 capital budget.			Completed May 2019	
65	Binnaway	Reservoirs	Minor works	Ensure that the reservoir is adequately sealed from vermin and rainwater ingress.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Manager Warrumbungle Water	27-Jun-19	19/20			In progress	2018-05: Obtained quote to upgrade reservoir to comply with Circular 18 + included in FY2018/19 capital budget.			Last inspected Feb 2019. Covered by action 333.	To be included as part of action 33, WHS upgrades and fencing of reservoirs.
66	CBN, MDN	Reservoirs	Minor works	Seal all points of ingress into the clear water tank AND Establish integrity of all reservoirs.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	WIS	30-Jul-19	2018/19			Complete	2016-10: Temporary sealing done by operational staff (photographic evidence present). 2018-05: Obtained quotes to upgrade tanks/reservoirs to comply with Circular 18 + included in FY2018/19 capital budget.			CBN and MDN clear water tank have been sealed Reservoirs integrity have been fixed	
67	CLH, DUN	Reservoirs	Minor works	Vermin proof the reservoirs.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	WIS TBD	30-Jul-19	2018/19			Complete	2018-05: Obtained quotes to upgrade reservoirs to comply with Circular 18 + included in FY2018/19 capital budget.			Dunedoo reservoirs complete. Marked as complete, as Coolah reservoirs covered by action 185	
69	Mendocran	Filtration	Critical control point	Review filtration CCP to be in line with ADGW recommendation (<0.2 NTU).	3.2	CCPs	CWT report May-15		May-2015	Very high		29-Aug-18				Complete	2016-10: (Section 3, p.5 of CWT report); CCP reviewed by Bligh Tanner (Jan-16); target reduced to <0.3 NTU (from <0.5), recommended: lower CCP 'with water quality triggers' (for BW?)				
70	CLH, DUN	Disinfection	Critical control point	Implement high level action and critical chlorine limits in CCPs	3.2	CCPs	Bligh Tanner report Feb-16		Feb-2016	Very high						Complete	Refer to current CCP reference guide				
77	Coonabarabran	Filtration	Critical control point	Review filtration CCP target and limits to be in line with ADGW recommendation (<0.2 NTU).	3.2	CCPs	CWT report May-15		May-2015	Very high	Supervisor North	27-Jun-19	19/20	30-Jun-20		Complete, follow up required	2016-10: (Section 2.1, p.4 of CWT report); CCP assessed by Bligh Tanner (Jan-16) but value not yet been lowered (currently target <0.8 NTU, recommended <0.3 'with water quality triggers') 2018-05: target set to <0.3 NTU in March 2018. Operators voiced concerns that this cannot be	filter inspection? NSW Health, Mark Nave to follow up; Hunter H2O BWY report to NSW Health; depends of funding from NSW Health, otherwise needs to come out of WTP renewal budget		Currently using emergency back up bores. Filter media inspection undertaken recently (never been replaced). Turbidity critical limit has been changed to 0.3 NTU. Will have difficulty in meeting limit when source water is changed to the dam water.	
78	Baradine	Filtration	Critical control point	Reduce CCP limits for turbidity AND initiate backwashes based on water quality	3.2	CCPs	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Jun-19		30/09/2019	Interim deadline was 30/9/19 (need to check with HH2O re their availability)	In progress	2016-10: CCP target got reduced to <0.2 NTU (from <0.8) 2018-05: Safe and Secure EOI submitted for 'Automation and Process Instrumentation Upgrade', including online instrumentation. Lab turbidity meter included in FY2018/19 capital			Limits previously reduced. Current iron and manganese issues (long term issue in winter) Limit of 0.2 NTU difficult to meet in winter. Started dosing chlorine dosing prior to clarifier, impact not yet seen. 27/9/19: HH2O will do filter inspection	Council to investigate further (super chlorinate filter Request NSW Health to fund filter inspection Get proposals for consultants to troubleshoot
79	Binnaway	Filtration	Critical control point	Set more challenging filtration CCP limits	3.2	CCPs	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor South	27-Jun-19				Complete	2016-10: CCP target got reduced to <0.6 NTU (from <0.8); BW needs optimising + filter media replacement (refer to recommendation under			CCP limit reduced to 0.2 NTU (March 2019?) Filter media replaced (June 2018) Generally meeting new limits.	
113	Coonabarabran	Manganese removal	Investigations	Monitor raw and treated water soluble and total manganese concentrations and determine optimum potassium permanganate dosing ratio and pH.	4.2	Operational Monitoring	CWT report May-15		May-2015	Very High		29-Aug-18				Complete	(Section 4.2.1, p.6/7), total Mn in treated water (0.4 - 0.7 mg/L) exceeds ADWG of 0.1 (many WTP prefer <0.02 to prevent dirty water complaints); additional lab equip. needed: Nalgene hand pump +	may need better quality KMnO4; pH will drop with chlorine gas as opposed to NaOCl			
115	Coonabarabran	Performance monitor	Documentation / Protocol	Improve WTP record keeping so that major plant changes/issues can be reviewed.	4.2	Operational Monitoring	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Jun-19				Closed	2018-05: not sure what this is referring to. The operators complete carbon copy books with daily operational data and keep a plant diary that is kept at the plant.			Action closed. Records kept in carbon copy book kept at WTP, including comments.	
123	Coonabarabran	Filtration	Minor works	Install a second turbidity meter on the outlet of filter 2.	4.2	Operational Monitoring	CWT report May-15		May-2015	Very High	Supervisor North	27-Jun-19				Closed	2016-10: (Section 4.2.4, p.12 of CWT report) 2018-05: part of S&S funding project 'Automation and Process Instrumentation' - EOI submitted 04/2018	check individual filters periodically - once a week? (AM) may need to install sampling points; put in comments on sheet		Closed, covered by action 130	

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125	Coonabarabran	Filtration	Minor works	Commission the turbidity meter to allow online monitoring of the filters.	4.2	Operational Monitoring	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Sep-19	19/20	31-Dec-19		In progress				Part of WTP upgrades 27/9/19: received HH2O quote, need to revise; need PLC replacement (quote R&D)	To be included as treatment plant upgrades
130	Coonabarabran	Filtration	Minor works	Install a second turbidity meter on the outlet of filter 2 and reconfigure the existing turbidity meter to monitor filter 1.	4.2	Operational Monitoring	CWT report May-15		May-2015	Very high	Supervisor North	27-Sep-19		31-Dec-19		In progress	2016-10: (Section 4.2.4, p.13 of CWT report) 2018-05: part of S&S funding application (Incident Review recommendation #)	currently monitoring both filters daily		Covered under automation project (action 328)	To be included as part of process monitoring, automation and instrumentation project (action 328)
150	Coonabarabran	Filtration	Investigations	Optimise filtration by investigating BW flow rate and BW water quality.	4.4	Equipment Capability & Maintenance	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Sep-19	19/20	31-Dec-19		In progress	2016-10: Filter performance is poor, carry-over of filter media, BW rate likely to be too high + BW duration may be too long; 2018-05: optimisation of manual backwash was performed by staff. Filter media replacement scheduled starting 25/06/18. Safe and Secure EOJ for			Filter inspection has been undertaken (FY18/19). Media replacement scheduled for FY19/20. Also refer to ID 91	
161	Coonabarabran	Fluoridation	Investigations	Discuss fluoridation issues with PHU/DPI Water.	4.4	Equipment Capability & Maintenance	Bligh Tanner report Feb-16		Feb-2016	Very high				29-Aug-18		Complete	2016-10: Unknown solid in saturator of significant volume; dosing pump turned up to 100% to try and maintain final concentration (still underdosing); resolved by adding new fluoride to saturator (unknown)	communicated to public that we are not dosing fluoride wait to hear back from NSW Health Water Unit following email from 24/08			
173	Binnaway	Fluoridation	Minor works	Arrange for cleaning of fluoride saturator (considering hazardous nature of material).	4.4	Equipment Capability & Maintenance	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor South	27-Jun-19			wait for HH2O	In progress	2018-05: Being arranged for by LMWUA			Covered by action 332 (NSW Health project)	To be included as part of action 332 (replace fluoridation systems)
178	Mendooran	Manganese removal	Minor works	Re-configure potassium permanganate dosing arrangement to allow 5 min contact with raw water prior to	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Very High	Project Engineer	30-Jul-19		31-Oct-19	Interim (scoping study) 31/10/2019	In progress	2016-10: (Section 4.2.1, p.8/9); currently dosing points not separated, suggestions: move KMnO4 to raw water pumping station			Covered under Mendooran upgrade project. Currently out for tender. First stage is a scoping study (ID 48). Could be covered under the raw water	
193	Mendooran	Manganese removal	Operations	Begin dosing chlorine into the filters, targeting a residual of 0.1 mg/L in the filtered water outlet.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Very High				29-Aug-18		Closed	(Section 4.2.4, p.15), multi-barrier approach to removing Mn (aim: keep MnO2 coating in oxidised state on filter media, prevent reduction back to soluble form)	Not required: WTP ops under control with regular jar testing + correct dosing rates; Fe/Mn efficiently removed		check filter inspection report from 2018	
195	Mendooran	Disinfection	Operations	Commence regular chlorine batch concentration monitoring.	4.5	Materials & Chemicals	CWT report May-15		May-2015	Very High	Supervisor South; Technical Officer	27-Sep-19		2-Oct-19	was 30/9/19	In progress	(Section 4.2.5, p.16 of CWT report) 2018-05: Operator requires on-site training; Supervisor South; SS do drop tests with Stephen Drew (do each time when dose rate is changed, e.g.	should test what we receive + do drop test on pump + check PLC; need updated operational sheet; check PLC code for correct dose rate		Operators are testing when chemicals received. 27/9/19: GR to notify SD + verify that there is room in log book (SS)	Procedure to be formalised (including space for test to be recorded and frequency)
223	All		Documentation / Protocol	Establish a rapid communication system (for internal and external communication) to deal with unexpected events. It is recommended this be included in the <b>Emergency Response Plan</b>	5.4	Corrective Action			Sep-2014	Very high	Manager Warrumbungle Water	30-Jul-19		31-Oct-19		In progress	Draft ERP developed by Bligher Tanner in Jan-16; ERP needs to tie in with BCP Get proposals from consultants (need key players); needs to fit in with BCP	BL: Narromine did something similar; NSW Health to follow up re funding?		Finalisation of ERP to be included as part of NSW Health project. Document responsibility to be allocated, including setting review times	To be included as part of ERP update (action 8)
300	ALL	Disinfection	Critical control point	It is recommended that Council confirm that the chlorine contact time for each system has been calculated. It is recommended that a comment be added into the			March 2018 ORANA meeting	WarrumSCMar 18.6	Mar-2018	Very high				27-Aug-19		Closed	Ongoing July 2018			Closed covered by action 326.	
328	All	Instrumentation		Process monitoring, automation and instrumentation project.			27 June 2019 Improvement Plan review meeting	A4	27-Jun	Very high	Project Engineer	27-Jun-19		30-Jun-20		In progress				Funding granted from Safe and Secure for scoping study of automation. Covers action 212	

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1	All		Documentation / Protocol	Gain formal endorsement and support of the policy from senior executive, including ensuring that organisation activities support effective water quality management such as providing appropriate staffing, financial and training resources and reporting	1.1	Drinking Water Quality Policy			Mar-2015	High	Manager Warrumbungle Water	30-Jul-19				Complete	Submitted report to DTS for discussion at MANEX on 1/04/2016, again on 18/05/2016 and again on 22/08/16.	Report to Council - need updating - to adopt DWMS; living document (constantly being updated); going to be in Public Health Act Oct 2018 (Ingo sent email to GMS)		Policy has been developed and was endorsed March 2019		
2	All		Training	Develop and implement a staff awareness program for the DWMS and make the DWMS visible to all employees.	1.1	Drinking Water Quality Policy			Mar-2015	High	Manager Warrumbungle Water; Technical Officer	01-Mar-15				Complete	Hardcopies distributed to DTS; Manager WW – Operational; Manager WW – Special Projects; Technical Officer; Supervisors South (Coolah/Dunedoo), Treatment Plants North (Coonabarabran, Bugaldie,					
3	Mendooran		Documentation / Protocol	That WSC prepare and formally adopts a "Drinking Water Quality Policy" and this policy is then "highly visible, continually communicated, understood and implemented by employees and contractors of the organisation".	1.1	Drinking Water Quality Policy	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water; Project Officer	27-Jun-19				Complete			A Drinking Water Quality Policy is in preparation		Policy has been developed and was endorsed March 2019	
8	All		Documentation / Protocol	Update stakeholder/relevant agencies list to comprehensively identify all stakeholders who could affect, or be affected by, decisions or activities of the	1.3	Engaging Stakeholders			Mar-2015	High	Manager Warrumbungle Water	30-Jul-19		31-Oct-19		In progress	A draft ERP was developed by Bligh Tanner in collaboration with Council. Contact registers were developed for each scheme that now need to be completed (need input from			Registers have been updated, further review still needed. Finalisation of ERP to be included as part of NSW Health project. ERP responsibility to be allocated,	Include as part of ERP review	
11	All		Operations	Enter all water quality monitoring data into electronic spreadsheets on a weekly basis. Allows for ease of data processing.	2.1	Water Supply System Analysis			Mar-2015	High	Technical Officer	30-Jul-19				Implemented	This being done by Council's Technical Officer.			All information is being entered electronically		
15	All	Performance monitoring	Monitoring	Develop a central electronic spreadsheet to record results of operational sampling and testing to allow these results to be easily reviewed and analysed.	2.2	Assessment of Water Quality Data			Mar-2015	High	Technical Officer	01-Mar-15				Complete	Operational data is entered by Technical Officer on a weekly basis.					
17	Coolah	Disinfection	Operations	Access to the safety shower/eye wash should remain unimpeded at all times. The safety shower eye/wash should be maintained in good working order. Breathing Apparatus should be immediately available on site but external to the chlorine room.	2.3	Hazard ID and Risk Assessment	DPI Inspections	DPI COH001	Jan-2019	High	Supervisor South	27-Sep-19		15-Oct-19 was 30/9/19		In progress				Breathing apparatus to be included as part of FY19/20 (replace chlorine room). Tender to be developed. Checklist has been developed for safety showers/eyewash. 27/9/19: GR to get prices on eyewash/safety shower outside chlorine room; check with WHS officer re feasibility/recent audit	To be included as part of chlorine upgrade project (see action 26). Eyewash station to be installed (see action 22)	
18	Mendooran	WTP	Minor works	A small leak in the main RPZ installation post service water pumps needs addressing for WHS reasons and because it is	2.3	Hazard ID and Risk Assessment	DPI Inspections	DPI MEN006	Jan-2019	High	Supervisor South	27-Aug-19		28-Aug-19 completed as 27-9-19		Complete		The main operator for the plant was unavailable on the day of inspection so a follow up inspection is planned to review		Leak has been completed	Confirm	
19	Mendooran	Service Water	Minor works	Repair service water system to supply water at pressure to the chemical dosing boards and	2.3	Hazard ID and Risk Assessment	DPI Inspections	DPI MEN009	Jan-2019	High	Supervisor South	27-Jun-19				Complete		The service water system at the water plant has not been functioning correctly since		Service water system has been repaired. Testable backflow prevention valve Alarm has been installed (incl. gas detector). Works still to be completed on chlorine room (FY19/20)	To be included as treatment plant upgrades	
23	Baradine	Disinfection	Minor works	Ensure the dosing room has adequate ventilation and install a chlorine gas leak detector	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BAR008	2014	High	Supervisor North	27-Jun-19	19/20	30/05/2020		In progress	The chlorine dosing room is well laid out, clean and kept in an excellent condition. However, there currently is not a chlorine gas leak detector installed			Alarm has been installed (incl. gas detector). Works still to be completed on chlorine room (FY19/20)	To be included as treatment plant upgrades	
24	Binnaway	Environmental	Minor works	- Redirect the drain flow from the soda ash/alum dosing room to the external alum bulk storage bund - Take measurements of the bund wall, the tank and determine the angle from the top of the tank to	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BIN012, BIN013, BIN014	2014	High	Supervisor South	27-Sep-19	19/20	30/03/2020 had no due date		In progress	- Any spilled chemical in the soda ash dosing and storage area can potentially drain to the stormwater drainage system - The alum bulk storage bund area may potentially not comply with Australian Standard AS with regard			Investigation still needed To be included in treatment plant upgrades Chlorine room items covered under action 324	To be included as treatment plant upgrades	
25	Coonabarabran	Lime dosing	Minor works	Ensure safety covers are installed that adequately cover all moving parts	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	COO010	2014	High	Supervisor North	27-Jun-19		31/12/2019	27/09/2019; were off at time of audit	Complete	Some equipment in the lime dosing room does not have appropriate covers that cover moving parts. This is a hazard for personnel injuring fingers etc.			Include in WTP upgrades FY19/20	To be included as treatment plant upgrades	

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26	Coolah	Disinfection	Minor works	<ul style="list-style-type: none"> <li>Organise for chains to be installed to secure the cylinders in place and reduce the risk of the cylinders falling over</li> <li>Investigate ventilation requirements as outlined in</li> </ul>	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	COH006, COH007, COH008	2014	High	Project Engineer	27-Jun-19		28/02/2020		In progress	<ul style="list-style-type: none"> <li>The chlorine gas cylinders are currently not stored in a secure manner. Gas cylinders should be stored securely on the site to reduce the risk of damage to the cylinder or other equipment dosing lines should</li> </ul>			Chains have been installed All other items to be addressed FY19/20 (replace chlorine room). Tender to be developed.	To be included as treatment plant upgrades	
27	Mendoo	Reservoir Hypochlorite	Minor works	<ul style="list-style-type: none"> <li>Cover and secure the dosing line and dosing point at the reservoir.</li> <li>Install a chemical bund in the hypochlorite dosing room. Consider constructing a bunded fill point for the delivery vehicle</li> </ul>	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	MEN014, MEN015	2014	High	Supervisor South	27-Jun-19				Complete	<ul style="list-style-type: none"> <li>The sodium hypochlorite dosing line and dosing point is: <ul style="list-style-type: none"> <li>Exposed and unsecured. There is the potential for damage for damage, contamination or vandalism</li> <li>Not currently bunded. Any chemical leaks/spills will be unable to be contained</li> </ul> </li> </ul>			Dosing line now in a covered pit. Tank is self bunded.		
28	BAR, CBN	Safety	Operations	Organise routine tagging of portable electrical equipment to reduce safety risks	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BAR014, COO015	2014	High	Manager Warrumbungle Water; WHS	27-Aug-19			Next WHS meeting	Not started	No schedule for electrical equipment tagging is currently in place			Manger sent email WHS representative - waiting for reply.	WHS representative to table at next committee meeting.	
29	Bugaldie	Safety	Minor works	<ul style="list-style-type: none"> <li>Re-route the dosing line to reduce the risk of chemical contact in the event of a leak in the dosing line.</li> <li>Remove redundant materials from the site shed and maintain housekeeping</li> </ul>	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BUG007, BUG09	2014	High	Supervisor North	30-Jul-19		31/07/2019		Complete	<ul style="list-style-type: none"> <li>The hypo dosing line runs across the top of the ceiling. This increases the chance of operator contact with the solution should a leak occur in the line</li> <li>The site shed contains material and objects that is untidy and can present</li> </ul>			Line has been moved and shed housekeeping has been complete		
30	Mendoo	Safety	R&D	<ul style="list-style-type: none"> <li>Investigate methods to maintain a higher pressure in the eyewash station water line. This may include: <ul style="list-style-type: none"> <li>Booster pump</li> </ul> </li> </ul>	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	MEN010	2014	High	Supervisor South	27-Jun-19				Complete	The eyewash station experiences low pressure.			No longer an issue following change from town water to service water		
31	Dunedoo	Safety	Minor works	<ul style="list-style-type: none"> <li>Ensure that open pits have appropriate handrailing/fencing/bollards installed around the pit perimeter</li> </ul>	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	DUN011, DUN012, DUN013	2014	High	Supervisor South	27-Jun-19				Closed	<ul style="list-style-type: none"> <li>There are various safety hazards on site relating to the following issues: <ul style="list-style-type: none"> <li>Valve pits</li> <li>Confined spaces</li> </ul> </li> </ul>			Open pits have been covered. Consultant to be engaged to develop register. Site has been tidied and redundant	Safety showers to be regularly tested (covered under action 336) Confined spaces to have	
32	Kenebrri	Safety	Minor works	<ul style="list-style-type: none"> <li>Ensure the water tank support structure integrity is inspected and repair as required</li> <li>Remove redundant materials from the site shed and maintain housekeeping</li> </ul>	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	KEN008	2014	High	Supervisor North	27-Jun-19	19/20	31/12/2019		In progress	<ul style="list-style-type: none"> <li>There are several site hazards that need to be controlled to reduce the potential for injury to personnel</li> </ul>			New reservoir to be established on the ground. Current system to be demolished and decommissioned.		
33	BUG, KEN	Safety	Minor works	Ensure the plant has an eyewash station or kit should an incident occur with the hypochlorite dosing system.	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	KEN009, BUG011	2014	High	Supervisor North	30-Jul-19		31/10/2019 was 30/9/19		In progress	There is no safety shower on site			Currently investigating all shower / eye washes (North)		
34	Bugaldie	Safety	Minor works	<ul style="list-style-type: none"> <li>Ensure the water tank support structure integrity is checked and repaired as required</li> <li>Install a fall arrest or ladder cage to reduce the chance of a fall when accessing the reservoir</li> <li>Install a lockable cover at the base of the ladder to prevent</li> </ul>	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BUG008	2014	High	Supervisor North	27-Jun-19		31/10/2019		Not started	<ul style="list-style-type: none"> <li>The reservoir ladder and support structure does not contain any of the following: <ul style="list-style-type: none"> <li>Fall arrest system</li> <li>Cage</li> <li>Lockable cover</li> <li>Handrail around the outside edge</li> </ul> </li> <li>These risks made higher given the</li> </ul>			Structural integrity to be investigated further. Rest of action covered by action 333 WHS access upgrades (does not include structural integrity of support structure) 27/9/19: ladder is off the ground -->	Structural integrity to be investigated further; decide on site security option (fencing?)	
35	BAR, DUN, KEN	Security		Ensure facility is securely locked, public access is prevented and all access ways are secured when the operators are not onsite	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BAR011, DUN010, KEN007	2014	High	Supervisor North; Supervisor South	30-Jul-19				Complete	The facility has poor security, is sometimes left unlocked with unattended and/or is easily accessible once inside the			All sites are locked, electronic keys have been installed for all sites.		
36	Mendoo	Security	Minor works	Install a lockable door and ensure access to the treated water tanks and/or pumps are	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	MEN011, MEN012	2014	High	Supervisor South	27-Jun-19				Complete	Critical equipment is currently exposed/unsecured			Completed April 2019		
37	BWY, BUG, CLH, MDN, KBI	Signage	Minor works	<ul style="list-style-type: none"> <li>Install signage on the front entrance to indicate Plant contact details and hazardous materials are stored on site.</li> <li>Install appropriate signage displayed that indicates the following information: <ul style="list-style-type: none"> <li>Chemical contained within the room</li> <li>Chemical UN no.</li> <li>Chemical category/classification with appropriate symbol</li> </ul> </li> <li>Install a fire extinguisher with appropriate signage on site and include an emergency contact list in case of an incident or emergency</li> </ul>	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BIN008, BIN015, BIN016, BUG010, COH011, MEN013	2014	High	Supervisor North; Supervisor South; Technical officer	27-Sep-19			Interim (advise of gaps) was 30/9/2019; Signage installed (31/12/2019)		In progress	<ul style="list-style-type: none"> <li>Insufficient signage on site entrance and/or chemical dosing and storage rooms</li> <li>The front entrance gate currently has no signs installed indicating that there are hazardous materials stored on site</li> <li>There is insufficient signage on the alum and soda ash chemical storage and dosing facilities</li> </ul>			MND, CLH entrances have signage; 27/9/19: SS not heard from supervisors; GR to advise on BWY; added KBI; BUG/KBI have liquid chlorine only; HAZCHEM signs at most places (BUG/KBI) + need SDS on site in folders (AM will do himself next week)	Supervisors to advise technical officer what signage still needs to be installed.

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40	BDN, DUN	Catchment & works	Minor works	Concrete capping of bores	3.1	Preventive Measures and Multiple Barriers	Risk assessment	1.03	Mar-2015	High	Supervisor North; Supervisor South	27-Sep-19		15-Oct-19	was 30/9/19 (new 15/10/19 DDO)	In progress	DDO bore has been sealed; BDN being capped; Note: <b>no concrete</b> was used to cap		Baradine to be capped (ID 4 of project plan) Other bores have already been capped/covered.	Related to (action 49) Investigate if any other measures are required at Dunedoo bore	
41	BIN, BUG, CBN, KEN	Catchment & works	Minor works	Timor Dam fence was damaged during the bushfires. Animal ingress is possible, fence to be replaced. Follow up with Council engineer the status of the fence replacement program. Some	3.1	Preventive Measures and Multiple Barriers	Risk assessment	1.05	Mar-2015	High	Supervisor North	30-Jul-19		31-Dec-19		In progress	Walked fence line to assess extent of damage; Started re-erecting fence in some places; budget ran out in FY15/16?		Most of the fence has been repaired. Remaining repairs have been scheduled (December 2019, ID 25)		
42	Coolah	Reservoirs	Investigations	It is recommended that Council assess the reservoir and determine whether the reservoir can be brought up to standard cost effectively. Some improvements were made to the roof/flashings several years ago but there remains significant security issues which would allow entry of birds and vermin into the reservoir. Assessment should evaluate whether the reservoir can be effectively bird/vermin proofed or whether the roof and roof structure need to be replaced. Part of this consideration will be accessibility for diving.	3.1	Preventive Measures and Multiple Barriers	DPI Inspections	DPI COH003	Jan-2019	High	Project Engineer	27-Aug-19		31-Oct-19		In progress			Entry hatches have been replaced (May 2019) Structural assessment has been undertaken. Tender to be prepared to undertake external concrete repairs. Reservoir to be replaced FY23/24	Tender to be prepared to undertake external concrete repairs.	
48	BUG, BAR, KEN	Catchment & works	Investigations	Bore investigations (integrity, capping, geology, exclusion zones - fencing)	3.1	Preventive Measures and Multiple Barriers	Risk assessment	1.03	Mar-2015	High	Supervisor North	27-Aug-19		30-Sep-19		In progress	integrity/capping being looked at; BUG no fence around bore (allocate budget); KBI/BUG septic on bore side of house --> septic tank register/inspection (regulatory services); NSW Health testing should start; BUG deep/KBI a bit	Martin St reservoir represents a high risk to the drinking water	Contractor to inspect first week of September, and provide quote to address integrity issues at bores (BUG, BAR, KEN)	Install cage at Bugaldie bore	
50	BUG, BAR, KEN	Catchment & works	Investigations	Private water bore inspections, bore register	3.1	Preventive Measures and Multiple Barriers	Risk assessment	1.03	Mar-2015	High	Manager Warrumbungle Water	30-Jul-19		15-Sep-19		Not started	Can we obtain a list of private bores from DPI? Bruce Lamont to advise if DOI can give us a list (Dough Moorby did similar exercise)	contamination from same aquifer		Media / comms for residents on importance of water security and contamination of bores, sustainability. Consider attaching to rates.	
53	All	Distribution	Investigations	Identify high risk areas for backflow prevention (i.e. STP)	3.1	Preventive Measures and Multiple Barriers	Risk assessment	10.01	Mar-2015	High	Manager Warrumbungle Water	30-Jul-19		31-Dec-19	Interim deadline (policy)	Not started	Need backflow prevention policy Regulatory services police (that they do it properly); need RPZ register (including inspection intervals) STPs, SPSs, dump points,	consultant to develop? Get proposals (e.g. Key environmental) Supervisor North to get proposals/funding (SS follow up with Mark Nave)?	Policy and register and inspection program still to be developed	Develop backflow prevention policy	
54	BAR, BIN, CBN, MDN	Coagulation & works	Minor works	Online interlocks for pH and turbidity on outlet for filters	3.1	Preventive Measures and Multiple Barriers	Risk assessment	3.02	Mar-2015	High	Manager Warrumbungle Water	30-Jul-19		30-Jun-20		Not started	MDN has interlock; rest discussed - will be with upgrades (SCADA/Automation)		Scheduled as part of automation project. Project plan ID 35	To be included as part of process monitoring, automation and instrumentation project (action 328)	
57	Mendoo	Catchment & works	Investigations	Assess the need for additional barriers to be implemented in the catchment area to protect raw water quality.	3.1	Preventive Measures and Multiple Barriers	CWT report May-15		May-2015	High		01-Mar-19				Closed	(Section 4.1, p.6) riparian zone next to river; educate farmers/pump up from river to troughs; stock routes? - rangers; cannot enforce	check this section out; 5km upstream from intake; unrealistic; procedure: high rain event switch over to bore to min risk!	Cannot do. Action closed		
68	Baradine	Clear water tank	Major works	Seal the clear water tank against vermin and contaminants. Install bunds around the chemical	3.1	Preventive Measures and Multiple Barriers	Hunter H2O Audit 2014	BAR010	2014	High	Supervisor North	30-Jul-19		31/10/2019		In progress	The clear water tank is not sealed/protected and is potentially exposed to chemical spills or vermin		CWT sealed. Bund has been purchased, waiting to be installed.	Bund to be installed, building modifications to be complete prior to	

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71	All		Documentation / Protocol	The HACCP Summary Tables should be made readily accessible to operators (e.g. pinned up at the treatment plants and Council offices).	3.2	CCPs			Mar-2015	High	Manager Warrumbungle Water; Technical Officer	30-Jul-19				Complete	CCP tables were supplied to supervisors/operators; however, only some plants (Binnaway, Kenebri, ...) had them displayed during Bligh Tanner's site visits in Jan-16. Manager WW - Special Projects provided updated CCP tables to Technical Officer for re-distribution to supervisors/operators again with clear instructions (Tech Officer to document this in spreadsheets).			CCP tables displayed at all sites. Laminated CCPs in trucks of distribution staff. Staff now also highlighting sheet entries (hardcopy) if outside target.	
80	All		Training	Relevant staff members must be trained to ensure they understand what the CCPs are and why they are important. This	3.2	CCPs			Mar-2015	High	Manager Warrumbungle Water	30-Jul-19				Implemented	Managers WW - Operations & Special Projects, HR, Supervisors			Staff are trained as part of inductions. When CCPs are changed, updated CCP tables are provided and discussed at quarterly meetings	
81	Mendooran		Critical control point	That WSC finalise draft CCPs provided the DWMS Implementation Report (Bligh Tanner, 2016) and include an additional WTP Final pH CCP	3.2	Critical Control Points	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	22-Jan-19				Implemented			pH COP introduced for Mendooran WTP. CCP cannot be implemented as pH cannot be controlled, only monitored. COP reference guide and introduction of final pH		
83	Coolah	Disinfection	Process	Implement process to identify when gas bottle is empty	4.1	Operational Procedures	Risk assessment	7.01	Mar-2015	High	Manager Warrumbungle Water; Supervisor North; Supervisor South	27-Jun-19				Complete	Automatic changeover between duty and standby bottle was implemented	follow up: scales for bottles (cost?)			
84	All	Reservoirs	Investigations	Assess compliance regarding reservoir access with Australian Standards and common sense	4.1	Operational Procedures	Risk assessment	9.01	Mar-2015	High	Manager Warrumbungle Water; Supervisor North;	30-Jul-19		30-Jun-20		In progress	Aqualift inspection was performed and report with recommendations supplied. BUG and KBI were not inspected. The report has been partially actioned on, further actions dependent on financial and staff			Contractor has been engaged to assist with working at heights access to reservoirs. Work to improve access ongoing.	
92	Coonabarabran	Disinfection	Investigations	Investigate the chlorine demand of the treated water in the reticulation to determine optimum chlorine dose at WTP.	4.1	Operational Procedures	CWT report May-15		May-2015	High	Supervisor South	27-Jun-19				Closed	2016-10: (Section 4.3, p.16 of CWT report)			No longer an issue (following mains replacement, flushing program etc.)	
95	Coonabarabran	Disinfection	Operations	Target a lower pH for disinfection.	4.1	Operational Procedures	CWT report May-15		May-2015	High	Supervisor South	27-Jun-19				Closed	2016-10: (Section 4.2.5, p.16 of CWT report)			Action closed. pH within target range, with adequate CT.	
97	Mendooran	Disinfection	Documentation / Protocol	That the EHO provides a copy of water quality results to WTP Operators at the time of onsite sampling and testing and/or leaves these results at the WTP. Any CCP exceedances or un-	4.1	Operational Procedures	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19				Complete					
101	ALL		DWMS Documentation / Protocol	Insert location of and quality information (i.e. version, last review date, Document owner) for existing operational procedures into the DWMS Document Register (Include review date, date created, responsible person, etc.) found in Appendix D of the DWMS.	4.1	Operational Procedures			Mar-2015	High	Manager Warrumbungle Water	27-Jun-19				Closed				Closed as covered by under new action 334, review and update DWMS.	Include as part of DWMS review and update (action 334)
102	Mendooran		Documentation / Protocol	That WSC review its current organisational structure with a view to ensure that the management of WTP Operators and reporting lines of communication actively support the ongoing implementation of its DWMS and CCPs. WSC should then formally document the adopted	4.1	Operational Procedures	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	22-Jan-19				Implemented				Draft structure water and wastewater has been developed, discussed and partially implemented	

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103	ALL	DWMS	Documentation / Protocol	Review operational procedures to determine what other procedures need to be developed in relation to managing drinking water quality (e.g. operational and	4.1	Operational Procedures			Mar-2015	High	Manager Warrumbungle Water	27-Jun-19		31-Dec-19		Not started	Waiting for standard SOPs being developed by NSW Health			Hunter H20 is developing 12 SOPs (NSW Health support project)	To be included as part of action 339 develop SOPs system wide	
104	Coonabarabran	Aeration & Oxidation	Operations	Implement SOP for batching and dosing	4.1	Operational Procedures	Risk assessment	2.02	Mar-2015	High	Supervisor North; Supervisor South	27-Jun-19				In progress				Hunter H20 is developing 12 SOPs (NSW Health support project)	To be included as part of action 339 develop SOPs system wide	
105	Coonabarabran	Filtration	Documentation / Protocol	Develop SOP for filter maintenance	4.1	Operational Procedures	Risk assessment	5.01	Mar-2015	High	Manager Warrumbungle Water; Supervisor	27-Jun-19		31-Dec-19		In progress				Hunter H20 is developing 12 SOPs (NSW Health support project)	To be included as part of action 339 develop SOPs system wide	
106	Coonabarabran	Reservoirs	Operations	Consider a routine reservoir inspection (checking locks etc.)	4.1	Operational Procedures	Risk assessment	9.01	Mar-2015	High	Manager Warrumbungle Water;	27-Jun-19				Closed				Closed. Weekly inspection, recorded in plant diary. Refer to action 310.		
107	Coonabarabran	Reservoirs	Documentation / Protocol	Develop SOP for the access of reservoirs	4.1	Operational Procedures	Risk assessment	9.01	Mar-2015	High	Manager Warrumbungle Water;	27-Jun-19		31-Dec-19		In progress				Hunter H20 is developing 12 SOPs (NSW Health support project)	To be included as part of action 339 develop SOPs system wide	
108	Coonabarabran	Distribution	Documentation / Protocol	Develop SOP around distribution failures such as main breaks, sufficient flushing, cleaning of tools	4.1	Operational Procedures	Risk assessment	10.02	Mar-2015	High	Manager Warrumbungle Water; Supervisor North; Supervisor South	27-Jun-19		31-Dec-19		In progress	Need to verify if SOPs exist for mains/service breaks/failures and if they are used (available to staff)			Hunter H20 is developing 12 SOPs (NSW Health support project)	To be included as part of action 339 develop SOPs system wide	
109	Coonabarabran	Distribution	Documentation / Protocol	Consider developing a notification procedure for mains breaks	4.1	Operational Procedures	Risk assessment	10.02	Mar-2015	High	Manager Warrumbungle Water; Supervisor	27-Jun-19		31-Dec-19		In progress				Hunter H20 is developing 12 SOPs (NSW Health support project)	To be included as part of action 339 develop SOPs system wide	
110	Coonabarabran	Distribution	Documentation / Protocol	Consider closing household property meters prior to recommissioning mains	4.1	Operational Procedures	Risk assessment	10.02	Mar-2015	High	Supervisor North; Supervisor South	27-Jun-19		30-Sep-19		Not started	Should be covered in relevant SOPs (Repair a water main break, Replace a water main) --> need to verify if this is the case			Review mains break procedure (refer to risk assessment ID)	To be included as part of action 339 develop SOPs system wide	
111	Coolah and Dunedoo	Distribution	Documentation / Protocol	Finalise flushing schedule for remaining systems (CLH, DDO nothing currently in place)	4.1	Operational Procedures	Risk assessment	10.03	Mar-2015	High	Supervisor South	30-Jul-19		31-Oct-19		Complete				Schedules for Coolah are to be printed first week of August. Dunedoo to still be developed. Action closed as covered by action 89.		
114	Mendooran	Process Control	Investigations	Review of processes controlled by the PLC by a suitably qualified person in conjunction with the PLC programmer to optimise the process and ensure the process functions as designed. Ensure alarms or telemetric functions leaving the plant are	4.2	Operational Monitoring	DPI Inspections	DPI MEN002	Jan-2019	High	Supervisor South	27-Aug-19		31-Dec-19		In progress				It is apparent that processes controlled by the PLC need to be reviewed to ensure proper plant function. An example of this is the filter backwash function which was allowing incorrect flow rates at drain down and backwash cycles.	PLC replacement as part of capital treatment plan upgrades.	To be included as treatment plant upgraded.
129	Mendooran	Disinfection	Minor works	That online turbidity and chlorine residual monitoring is installed at Mendooran WTP.	4.2	Operational Monitoring	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19				Implemented				Safe & Secure - draft funding deed is in preparation		



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131	All	Information / System	Documentation / Protocol	Develop operating procedures for the following tasks: · Laboratory water quality sampling and testing · Scheduled maintenance tasks · Daily rounds	4.2	Operational Monitoring	Hunter H2O Audit 2014	BAR002, BIN002, BUG001, COH003, COO003, DUN003,	2014	High	Manager Warrumbungle Water	27-Jun-19		31-Dec-19		In progress	No current standard operating procedures exist. General operating procedures are being developed in unison with the alliance			Hunter H2O is developing 12 SOPs (NSW Health support project)	To be included as part of action 339 develop SOPs system wide	
134	Binnaway	Sedimentation Ponds	Major works	Reline complete pond to effectively seal the pond to allow effective drying/desludging of the pond. Council is reminded to keep pond cycling times to twelve months to prevent excessive sludge build up which can lead to difficulty in effective drying of sludge.	4.3	Corrective Action	DPI Inspections	DPI BIN001	Jan-2019	High	Supervisor South	22-Jan-19				Closed	Pond No:1 (West) is currently offline and has been desludged. Staff report that a clay impregnated liner was used on the eastern side only of the lagoon. The excavator operator was unable to completely clean out sludge from the bottom of the			Closed covered by action 330		
135	Mendooran	Reservoirs	Investigations	That WSC investigates the operational control arrangements with a view to including the Standpipe reservoir level as part	4.3	Corrective Action	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19				Complete						
136	Mendooran	Reservoirs	Documentation / Protocol	That WSC review all reservoir inspection reports (2014 and 2017) to develop an Action Plan and urgently implement any	4.3	Corrective Action	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	27-Aug-19		30-Sep-19	Interim deadline	In progress		Obtaining quotes and confirming contractor			Reservoir upgrades undertaken in May 2019 for integrity. WHS and Internal works still to be undertaken.	Circular 18 report to be reviewed and submitted
137	Mendooran		Documentation / Protocol	That WSC review the LMWUA Water Treatment Plant Audit Report for the Mendooran WTP (September 2014), develop an Action Plan and urgently implement any outstanding recommendations. This Action Plan information should also be regularly reported back to DPI-Water.	4.3	Corrective Action	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	22-Jan-19				Implemented					6 of 15 completed, 8 in progress, 1 outstanding. All to be included in DWMS Improvement Plan	
138	Coonabarabran		Documentation / Protocol	Establish a rapid communication system to deal with unexpected events.	4.3	Corrective Action			Mar-2015	High	Manager Warrumbungle Water	27-Jun-19		31-Oct-19		In progress				Draft ERP Hunter H2O developing updated incident response plan (NSW Health project)	To be included as part of ERP update (action 8)	
139	Coonabarabran		Training	Train relevant staff in these procedures (rapid communication incident response) and maintain a record of training.	4.3	Corrective Action			Mar-2015	High	Manager Warrumbungle Water	27-Jun-19			Within 2 months of finalisation	Not started				Training once new plans are developed		
143	Coonabarabran	Sludge handling	Investigations	Have sludge tested prior to disposal to ensure it complies with legal requirements for disposal (waste classification guideline). The sludge should be tested for metals, organics, pH and moisture content	4.3	Corrective Action	Hunter H2O Audit 2014	BAR007, BIN007, COO008	2014	High	Technical Officer	30-Jul-19		30/09/2019		Closed	Sludge is excavated from the sedimentation ponds and disposed of at the local tip as required. No testing of the sludge samples currently occurs			Investigated biosolids requirements and do not take samples prior to disposing to landfill		

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019	Short term actions
144	Mendooran	Sludge handling	Investigations	Sample and test the sludge prior to removing from the lagoon to ensure it is appropriate to apply/dispose on site. The sludge should be tested for metals, organics, pH and moisture content	4.3	Corrective Action	Hunter H2O Audit 2014	MEN008	2014	High	Supervisor South	27-Jun-19				Closed				sludge disposed of off-site	
152	Mendooran	Reservoirs	Major works	A recirculation/rechlorination system should be considered to maintain a set concentration of free chlorine throughout the reservoirs.	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI MEN004	Jan-2019	High	Supervisor South; Project Engineer; Manager	27-Sep-19		31-Oct-19	Interim deadline (engage consultant for concept)	In progress		Vermin/bird proofing needs to be made permanent, foam fill is a temporary measure that has already been compromised leaving the reservoir susceptible.		Vermin/bird proofing - complete (May 2019) Site has been cleaned up and overhanging trees have been trimmed. 27/9/19: tender accepted as per Sept	Recirculation to be covered by Mendooran Plant upgrade project (currently out for tender) Interim - report to Council
153	Mendooran	Reservoirs	Major works	Consider replacing the roof with a platform roof. This would have several advantages, the whole roof becomes the access platform with surrounding handrail (removing some of the roof inspection concerns i.e. working at heights on a pitched roof), Access hatches installed to standard and remove pitched roof. Council should indicate how they intend to meet Circular 18	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI MEN005	Jan-2019	High	Supervisor South; Manager Warrumbungle Water	27-Aug-19		31-Oct-19	submit C18 report	In progress	An attempt has been made to seal the hatch lid on the stand pipe reservoir but the reservoir has not been sealed to prevent stormwater ingress. In it's current form it would be very difficult to seal effectively due to the way the roof and platform have been constructed. As recommended previously, Council should consider replacing the roof with a platform		Circular 18 (Contractor engaged to develop. Hatches have been replaced. Tender to be prepared to undertake external concrete repairs.	Circular 18 report to be reviewed and submitted. Recirculation to be covered by Mendooran Plant upgrade project (currently out for tender) Interim - report to Council on choice of contractor; refer to ID 152	
155	Binnaway	Distribution	Minor works	Repair/replace high lift pump	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI BIN003	Jan-2019	High	Supervisor South	27-Aug-19				Complete	One high lift pump is currently out of service. This should be repaired/replaced as soon as is practicable to avoid total plant failure in the event of the second		Pump has been replaced (August 2019)		
156	Binnaway	Filtration	Minor works	Replace filter outlet valve	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI BIN004	Jan-2019	High	Supervisor South	27-Aug-19				Closed	The filter outlet valve has not been effectively shutting off and the replacement valve has been on site for some time. This valve should be replaced as soon as practicable.		Closed as covered by action 327		
158	Binnaway	Sedimentation Lagoons	Operations	Ensure the desludging of the sedimentation lagoons and any necessary maintenance is carried out at the earliest opportunity to ensure the offline lagoon is available for service when required.	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI BIN007	Jan-2019	High	Supervisor South	27-Aug-19				Complete	The offline sedimentation lagoon has recently been brought online. Staff have indicated that the lagoon currently offline will now be pumped out to allow the lagoon to dry for sludge removal and maintenance.		Desludging has been completed, undertaken on an annual basis.		
160	Mendooran		Investigations	That WSC liaises with DPI-Water to prepare a program of capital	4.4	Equipment Capability and Maintenance	Mendooran Boil Water	MBWA2017	2017	High	Manager Warrumbungle Water	22-Jan-19				Complete					
177	Mendooran	Reservoirs	Minor works	That WSC investigates the installation of an inline booster pumping station on the outlet of the Standpipe reservoir to provide sufficient water pressure for a regular watermain flushing program to be implemented, to improve the water supply system's firefighting capacity and reduce overall water age by only storing water volumes sufficient to meet peak day demands.	4.4	Equipment Capability and Maintenance	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19				Implemented		Included in S&S funding (R1)			
179	Mendooran	Disinfection	Minor works	Provide increased pumping capacity for chlorine dosing for disinfection.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	High	Supervisor South	27-Jun-19				Closed	2016-10: (Section 4.2.5, p.16 of CWT report), dosing system (provide 5 mg/L @ 5%) not designed for diminishing chlorine strength --> pump max rate reached without reaching target dose		No longer an issue (following regular cleaning of pipes)		
180	Coonabarabran	Filtration	Investigations	Inspect the filter media and compare to design details (top up where necessary).	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	High	Supervisor North	27-Jun-19		31-Oct-19		Complete	2016-10: (Section 4.2.4, p.13 of CWT report)		Inspection complete		

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181	Coonabarabran	Disinfection	Minor works	Install standby rotameter and eductor for chlorine dosing system.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	High	Supervisor North	27-Jun-19				Complete	2016-10: (Section 4.2.5, p.15 of CWT report)			Chlorine room has been upgraded (April 2019)	
182	Binnaway	Filtration	Investigations	Check filter media depth against design requirements	4.4	Equipment Capability & Maintenance	Risk assessment	5.01	Mar-2015	High	Manager Warrumbungle Water; Supervisor South	27-Jun-19				Complete				Filter inspection undertaken (2017) and filter media replaced (June 2018)	
183	Dunedoo	Reservoirs	Minor works	Bullindah reservoir roof replacement (currently planned)	4.4	Equipment Capability & Maintenance	Risk assessment	9.01	Mar-2015	High	Supervisor South	27-Jun-19				Complete				Replaced late 2015 Entry hatch replaced, sealing works (May 2019)	
184	Mendooran	Reservoirs	Minor works	Coolabah requires vermin proofing	4.4	Equipment Capability & Maintenance	Risk assessment	9.01	Mar-2015	High	Supervisor South	27-Jun-19				Complete				Complete May 2019	
185	Coolah	Reservoirs	Minor works	Wentworth Ave and Martin St Reservoirs requires vermin proofing	4.4	Equipment Capability & Maintenance	Risk assessment	9.01	Mar-2015	High	Supervisor South	30-Jul-19		15-Sep-19	complete 27/9/19	Complete				Martin St has been vermin proofed Wentworth Ave needs investigation (e.g. overflow) 27/9/19: Wentworth Ave has a flap on O/F (on each tank)	
186	Coolah	Reservoirs	Minor works	Wentworth Ave Reservoir requires sealing	4.4	Equipment Capability & Maintenance	Risk assessment	9.01	Mar-2015	High	Project Engineer	27-Jun-19		31-Dec-19		In progress				Structural assessment undertaken. Waiting for tender documents from Hunter H20	
187	Baradine	Reservoirs	Minor works	Clear water tank requires vermin proofing	4.4	Equipment Capability & Maintenance	Risk assessment	9.01	Mar-2015	High	Supervisor South	27-Jun-19				Complete				CWT has been sealed	
190	BAR, BIN, BUG, CLH, DUN, KEN	Information / System	Documentation / Protocol	Identify critical equipment and develop procedures to maintain, repair and replace equipment as necessary	4.4	Equipment Capability and Maintenance	Hunter H2O Audit 2014	BAR003, BIN003, BUG003, COH005, DUN005, KEN03	2014	High	Manager Warrumbungle Water; Supervisor South	30-Jul-19		31/10/2019	interim (list of spares South); maintenance schedules (H2O timeline)	In progress	No current asset maintenance plan exists.			NSW Health project to include operation and maintenance schedules at WTPs. No asset management plan.	Identify current spares / replacement equipment at each site for South (Southern Supervisor). Clarify asset management plan progress / status (Manager) Confirm timeline for
191	BAR, BIN, CLH	Laboratory equipment	Operations	Perform appropriate scheduled maintenance and calibration of lab equipment according to the equipment manufacturer/supplier's recommendations	4.4	Equipment Capability and Maintenance	Hunter H2O Audit 2014	BAR013, COO014, BIN011	2014	High	Technical officer	27-Sep-19		10/10/2019	Interim was 13/09/19 (to arrange annual calibration)	In progress	Minimal or no maintenance is carried out by the operators			Annual maintenance and calibration is being carried of instruments and lab equipment, undertaken by contractors (last done in May - due to be completed) 27/9/19: AM had sent new bores equipment to SS but still need model numbers; SS to liaise with supervisors to that list for quotes can be compiled (excluding equipment that we calibrate ourselves)	Arrange calibrations to be undertaken. Schedule to be set up in InfoXpert. Investigate alternative contractors (contact Alliance)

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192	Baradine	Clarification		The council is in the process of engaging contractors to identify and implement an appropriate repair or upgrade	4.4	Equipment Capability and Maintenance	Hunter H2O Audit 2014	BAR005	2014	High	Project Engineer	27-Jun-19	19/20	30/06/2020		In progress	The clarifier is showing signs of deterioration and the wall thickness at various points is low due to corrosion.			Approval for funding for clarifier. Waiting for s60 endorsement and funding endorsement by DoI Water.	
200	Mendooran	Distribution	Operations	Operators should be filling out the plant record sheets. Where equipment is not working or requires replacement/repair, this should be done as a matter of priority. This includes the following: 1. pH meter. 2. pH buffers. 3. Chlorine	5.1	Drinking Water Quality Monitoring	DPI Inspections	DPI MEN010	Jan-2019	High	Supervisor South	27-Aug-19				Implemented				Plant records are now being filled out. Supervisor and Technical Officer review that sheets are completed.	
201	Binnaway	Iron and manganese issues	Operations	Reconfigure the chlorine dosing to allow for the installation of a calibration tube to facilitate the measurement and recording of chlorine dosages. The operator would also need to calculate hypochlorite strength in	5.1	Drinking Water Quality Monitoring	DPI Inspections	DPI BIN006	Jan-2019	High	Supervisor South	27-Aug-19				Complete	The iron and manganese treatment was discussed with the staff. Staff were requested to keep this office informed of progress with iron and manganese removal.			Dosing was reconfigured, for iron and manganese issues (early 2019)	
203	Binnaway	Minor Distribution	Minor works	Ensure that staff have the necessary testing equipment available on site to test for aluminium to ensure the process is maintaining aluminium residuals within drinking water guideline levels. W	5.1	Drinking Water Quality Monitoring	DPI Inspections	DPI BIN009	Jan-2019	High	Technical officer	27-Sep-19		4-Oct-19	Interim was 13/09/19	Not started	Water quality testing was carried out in Binnaway with the following results: The pH was noted as being slightly high in the sedimentation lagoon. A pH range of between 6 and 7 is expected with alum dosing. If there is no aluminium carry over from the settlement process then the higher pH is of no concern, however if aluminium carry over is detected this is expected to be remedied by lowering the pH in the sedimentation lagoon. The water samples sent for analysis will be tested for aluminium and Council will be advised of the result.			Equipment has capability to test for aluminium. Reagents not currently available on site. 27/9/19: assess what is required for testing and/or order reagents from HACH next week (check lab test equipment manual)	Ensure necessary reagents are available and operators are trained (to SOP)
205	ALL	Documentation / Protocol		That WSC develop and implement a "Drinking Water Quality Monitoring Plan" which formalise staff/role responsibilities, authorities reporting and communication protocols and review existing procedures for sampling and testing. The monitoring plan should be built based on the NSW Health Drinking Monitoring Plan (available on the NSW Health website).	5.1	Drinking Water Quality Monitoring	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	30-Jul-19		31-Dec-19		In progress				DWQ Monitoring Plan	To follow on from action 206
206	All	Documentation / Protocol		Formally document all drinking water quality monitoring protocols and combine into a formal Water Quality Verification Plan.	5.1	Drinking Water Quality Monitoring			Mar-2015	High	Technical Officer	27-Sep-19		31-Oct-19	Interim	In progress				Information for plan is in process of being collected. 27/9/19: info needs to go on T-drive; some photos still need to be taken; sample sites require updating (+photos added) + incident flowcharts added	Develop draft Water Quality Verification Plan with site locations (and photos). Investigate changing site numbers in NSW Health database.
207	BAR, BIN, CBN	Fluoridation	Operations	Confirm process on extracting data from NSW Health Water Quality Database	5.1	Drinking Water Quality Monitoring	Risk assessment	8.01	Mar-2015	High	Technical officer	30-Jul-19				Implemented				Data is downloaded from database and uploaded onto Councils website on a monthly basis by the Technical Officer	
209	BAR, BIN, CLH	Information Systems	Operations	Enter data at the plant on a daily basis. This will require a local pc with network connection. Data to be used for the following purposes: - Alarms generated if measured values are outside of required parameters (this includes water	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	BAR001, BIN001, COO002	2014	High	Supervisor North; Supervisor South	30-Jul-19				Closed	Daily data sheets are stored electronically at the shire office. Therefore the following is not possible: - Fast and easy access to historical results - Ability to use collected information for efficiency improvements			Data entered electronically. Closed as covered by automation project (action 328).	To be included as part of process monitoring, automation and instrumentation project (action 328)
210	Coolah	Information Systems	Operations	Implement routine monitoring of daily and instantaneous chlorine gas usage and plant flow rates. Perform calculations to determine instantaneous and daily chlorine dose rate. Installing scales for the	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	COH004	2014	High	Project Engineer	27-Jun-19		28/02/2020		In progress	Chlorine gas and treated water instantaneous flow rate measurements are not being recorded when operators are onsite. Measuring and monitoring of instantaneous chlorine dose rate and			Scales have been installed. Calculations have been complete. Daily monitoring in reticulation. Chlorine room replacement will include telemetry	

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211	Mendooran	Iron and manganese issues	Operations	Perform jar testing to determine optimum manganese removal dosing configurations	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	MEN009	2014	High	Supervisor South	27-Jun-19				Implemented	The plant experiences high manganese levels			Implemented from December 2017		
212	Binnaway	Online monitoring	Critical control point	Consider implementing online monitoring of critical water quality parameters including: · Raw water pH · Raw water turbidity · Filtered water turbidity · Treated chlorine residual	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	BIN010	2014	High	Supervisor South; Project Engineer; Manager Warrumbungle Water	27-Sep-19		30/03/2020	had no due date	In progress	Currently no online monitoring exists of the process. Issues with pH changes during weather events have historically caused operational issues			Funding granted from Safe and Secure for scoping study of automation. Action progressed under action 328. Have received quotes for online monitoring of chlorine; 27/9/10: GR consider online NTU meter (filtered water) for now - check with what CBN is getting	To be included as part of process monitoring, automation and instrumentation project (action 328)	
213	Coonabarabran	Process monitoring	Operations	Record and monitor 24-hr chemical usage and plant flow. This data will highlight plant performance and assist in identifying trends and possible dosing issues.	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	COO013	2014	High	Technical Officer	27-Jun-19			30/09/2019	In progress	24 hour chemical usage verse flow calculations are not performed			27/9/19: can be done before 30/09	Add calculation to spreadsheet	
214	BUG, KEN	Routine testing	Monitoring	Initiate daily sampling and testing of the town distribution system. Tests should include free chlorine residual, pH and	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	BUG005, KEN005	2014	High	Supervisor North	30-Jul-19			15/09/2019	In progress	To ensure treated water quality complies with the Australian Drinking Water Guidelines (ADWG), water quality monitoring of the town			Currently being undertaken 2-3/week. Chlorine analysers are installed, to be bought online.	Analysers to be bought online.	
215	Dunedoo	Routine testing	Monitoring	Collect water samples from the distribution system and test for: · Free chlorine residual · pH · Turbidity Results may dictate if dosing rate	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	DUN008	2014	High	Technical Officer	27-Sep-19			4/10/2019 was 31/8/19	In progress	Water quality testing of the distribution system is currently not being performed			Daily pH and chlorine recorded daily and entered into spreadsheet weekly. Weekly turbidity not yet entered. Some sheets still to be modified to include turbidity.	Turbidity data to be entered and sheets to be modified to include turbidity	
216	Coonabarabran	Sedimentation Ponds	Operations	Monitor the sedimentation ponds daily for contamination sources such as dead animals	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	COO012	2014	High	Supervisor North	27-Jun-19				In progress	Due to the sedimentation ponds being in an open area there is a risk of contamination from the wildlife			Daily walk around includes lagoons	To be included as part of action 339 develop SOPs system wide	
217	Dunedoo	Water Quality Targets	Operations	Monitor the chlorine residual daily and adjust the dose rate to maintain a consistent residual	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	DUN007	2014	High	Supervisor South	27-Jun-19				Complete	The chlorine dose rate is not regularly adjusted to control the treated water chlorine residual			Daily chlorine recorded daily and entered into spreadsheet weekly		
220	Mendooran	Distribution	Documentation / Protocol	That WSC update the daily water quality log sheets to include turbidity and temperature, and CCP limits and actions to be taken if the CCP limits are exceeded. This will prompt the WTP operator to take appropriate actions and notifications if results are above the alert or critical limits. That the WTP operators use a simple system, where they colour in the results (using highlighter pens) to identify	5.3	Short Term Monitoring of Results	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19				Complete						
222	All	Information Systems	Operations	Implement regime of regular (daily) review of raw and treated water quality results, and input operational data into an electronic spreadsheet to	5.3	Short-term evaluation of results			Mar-2015	High	Manager Warrumbungle Water	30-Jul-19				Implemented				Data entered electronically. Daily review of data by operator (manual highlighting of data outside trends) Fortnightly review of CCP data		
229	All	Distribution	Documentation / Protocol	Obtain list of dialysis patients for each system	6.1	Communication	Risk assessment	10.02	Mar-2015	High	Technical Officer	27-Aug-19			Interim was 17-Oct-19 6/9/19 (get list of patients)	In progress				Finalisation of ERP to be included as part of NSW Health project. List of dialysis patient previously investigated.	To be included as part of ERP update (action 8). Investigate if list has been developed. Develop process for distribution and allocate responsibility of keeping document current	
231	Mendooran	Documentation / Protocol	Documentation / Protocol	That WSC implement a simple "Water Quality Monitoring Incident Report" sheet for WTP operators to complete if any field results fall outside of the ranges	6.2	Incident and Emergency Response Protocols	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19				Complete						
232	Mendooran	Documentation / Protocol	Documentation / Protocol	That WSC review and finalise the DWMS Implementation Report (2016), so that the recommended "Emergency Response Plan" can be utilised for any future incidents and emergencies. It is	6.2	Incident and Emergency Response Protocols	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	22-Jan-19			31-Oct-19	In progress			ERP forms part of Councils DMNW and BCP.		Draft ERP Hunter H20 developing updated incident response plan (NSW Health project)	To be included as part of ERP update (action 8)
233	All	Documentation / Protocol	Documentation / Protocol	Identify possible water quality related incidents and emergency scenarios (the risk assessment should be used as a basis) and document these potential	6.2	Incident & Emergency Response Protocols			Mar-2015	High	Manager Warrumbungle Water	30-Jul-19			31-Oct-19	In progress				Finalisation of ERP to be included as part of NSW Health project.	To be included as part of ERP update (action 8)	

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234	All		Documentation / Protocol	Develop a process for investigation following incidents and emergencies and document this process. Include in this process a mechanism for revision	6.2	Incident & Emergency Response Protocols			Mar-2015	High	Manager Warrumbungle Water	30-Jul-19		31-Oct-19		In progress					To be included as part of ERP update (action 8)	
235	All		Documentation / Protocol	Develop a process for documenting and reporting of an incident or emergency.	6.2	Incident & Emergency Response Protocols			Mar-2015	High	Manager Warrumbungle Water	30-Jul-19		31-Oct-19		In progress						To be included as part of ERP update (action 8)
236	All		Training	Employees should be trained and protocols regularly tested in the emergency response plans. The requirement for this should be included in the ERP.	6.2	Incident & Emergency Response Protocols			Mar-2015	High	Manager Warrumbungle Water	30-Jul-19		31-Oct-19		Not started						To be included as part of ERP update (action 8)
238	Mendooran		Critical control point	The DWMS CCP summary tables are reviewed, finalised and posted on the noticeboards at the WTP, kept in work vehicles and included in regular training sessions/toolbox talks, incident response protocol/training and included in the water quality monitoring procedures and log sheets.	7.1	Employee Awareness and Involvement	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19				Complete						
242	Mendooran	Staff Training	Training	Ensure staff are adequately trained	7.2	Employee Training	DPI Inspections	DPI MEN001	Jan-2019	High	Manager Warrumbungle Water; HR	27-Aug-19		TBC following restructure		In progress		It is a requirement that water treatment plants be operated by suitably qualified staff i.e. Hold Cert 3 in Water Operations through TAFE or DoI Water operator training. The WTP is not a fully automated plant that requires no supervision. The plant (although some processes are automated) requires regular supervision.		Second operator from Binnaway is being trained to fill in for Mendooran staff. Structure is being finalised. Operators have Cert 3 in Water Operations.		Review training requirements for Mendooran staff following restructure.
249	CLH, DUN	Operator training	Training	Arrange for operators to undertake appropriate training	7.2	Employee Training	Hunter H2O Audit 2014	COH001, DUN001	2014	High	Manager Warrumbungle Water; HR	27-Aug-19		30/09/2019 Interim		In progress	Operators have not yet completed their fluoridation certification and/or require further training in WTP operations		Confined space and working at heights undertaken 2019. Other training gaps to be reviewed. Manager has requested training schedule from HR.		Review with HR and supervisor on WTP operator training plans	
258	All		Critical control point	Council should strongly consider investing in online monitoring at all CCPs. This would provide	9.1	Investigative Studies & Research Monitoring			Mar-2015	High	Manager Warrumbungle	30-Jul-19		30-Jun-20		In progress						To be included as part of process monitoring, automation and
259	Coonabarabran	Catchment & Abstraction		DDO to be tested prior to new bore installation. Results to be followed up.	9.1	Investigative Studies & Research Monitoring	Risk assessment	1.12	Mar-2015	High	Supervisor North	27-Jun-19		30-Sep-19		In progress						
262	All	CT	Investigations	Review and confirm the various data gaps in Table 11 to calculate CT for all supply systems.	9.2	Validation of Processes			Mar-2015	High	Supervisor; Technical Officer	27-Sep-19		15-Oct-19 was 30/9/19		Not started			27/9/19: engaged CWT to calculate CTs; supervisors/SS to provide info as required refer to ID 326		Collect information for CT, including reviewing calculation in Bligh Tanner Complete Table 11.	
271	BDN, CLH (MDN/ KBI?), BUG	Information Systems		Display the pressure vessel calibration certificates nearby the pressure vessels.	10.1	Management of Documentation and Records	Hunter H2O Audit 2014	MEN003, KEN004	2014	High	Supervisor North; Supervisor South	30-Jul-19		30/10/2019 interim (MDN certificates + check new bores)		Not started	Calibration certificates for pressure vessels are not stored on site; Plant pressure vessels currently do not have calibration certificates displayed		27/9/19: check new bore sites for pressure vessels; no progress on MDN (see ID 272) current pressure tanks are for water (bores) + compressor vessels at BDN, see ID 271		find out who does it (Newcastle Safety?)	
272	Mendooran	Information systems		Perform pressure vessel calibration and display certificates on site.	10.1	Management of Documentation and Records	Hunter H2O Audit 2014	MEN005	2014	High	Supervisor South	27-Aug-19		31/08/2019 closed 27/9/19		Closed	Plant pressure vessels currently do not have calibration certificates displayed					
273	Mendooran	Reservoirs	Documentation / protocol	That WSC urgently develop and implement a regular (weekly/monthly/annual) reservoir integrity inspection and reporting program for the Mendooran water supply system. This inspection and reporting program should be	10.2	Reporting	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	27-Aug-19		31-Oct-19		In progress		Finance assistance being sought through NSW Health for development of Standard Operating Procedures, including reservoir inspections. Reservoir access to be addressed through WHS training.		Engaging contractor to develop reservoir integrity checklist to undertake inspections. Including assessing WHS issues that are limiting inspections currently. Visuals inspections are currently recorded in diaries.		Contractor to provide checklists and scope of works for working at height upgrades.
274	Mendooran		Documentation / Protocol	That WSC undertake an annual internal review of its DWMS, using the HH2O revised NSW Health's annual report template and consult their local PHU to develop an appropriate external review/audit frequency.	10.2	Reporting	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	22-Jan-19				Implemented		Quarterly internal reviews undertaken				
276	All		Documentation / Protocol	Ensure all handwritten water quality data is captured in electronic spreadsheets.	11.1	Long-Term Evaluation of Results			Mar-2015	High	Manager Warrumbungle Water	30-Jul-19				Implemented						

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281	Mendooran		Documentation / Protocol	That WSC develop and implement a DWMS review and continual improvement program which is regularly reviewed by the Senior Executive Team and reported to Council.	12.1	Review by Senior Executive	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	22-Jan-19				Implemented		Improvement Plan is under review, to be discussed in details at next DWQ review meeting			
282	Mendooran		Documentation / Protocol	That notices received from DPI-Water should be regularly reported to senior management together with an Action Plan, Works Budget and Timeline for the rectification of issues raised during DPI-Water Inspections. This Action Plan information should also be regularly reported back to DPI-Water and NSW Health.	12.1	Review by Senior Executive	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	22-Jan-19				Implemented		List of outstanding recommendations has been created			
283	Mendooran		Documentation / Protocol	That WSC review and update the DWMS and the "DWMS Improvement Plan" is then kept up-to-date, recommended improvements are implemented in the order of identified urgency and progress of the "DWMS Improvement Plan" is reported regularly to the Senior Executive Team and Council. This	12.1	Review by Senior Executive	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	22-Jan-19		31-Oct-19		In progress	Improvement plan is being consolidated		Refer to R11 and R12	Improvement plan has been consolidated. Plan to be provided to NSW Health as part of annual review. Quarterly updates to be provided to Council.	
285	All		Documentation / Protocol	Develop and implement a process (including a schedule) for senior executive review of the effectiveness of the management system. The review process should include aspects such as:	12.1	Review by senior executive			Mar-2015	High	Manager Warrumbungle Water	27-Aug-19		30-Oct-19		In progress			Quarterly DWMS reviews undertaken in DWMS. Include as part of DWMS review and update (action 334)	Schedule to be formalised in DWMS. Include as part of DWMS review and update (action 334)	
289	All	Disinfection	Training	Training needs to be undertaken on the chlorine test kits to ensure operators are aware of the different testing ranges.			July 2018 ORANA meeting	WarrumSCJul18.3	Jul-2018	High	Technical Officer	27-Aug-19				Implemented			Technical officer provided SOPs, training and necessary reagents to operators.		
290	Mendooran	Filtration	Operations	online combined filtered water turbidity meter was reading consistently and significantly lower than the bench unit. WSC will require ongoing investigations, which may include external calibration of both the			July 2018 ORANA meeting	WarrumSCJul18.4	Jul-2018	High	Supervisor South	27-Aug-19		31-Oct-19 was 13/9/19		In progress			Has been externally calibrated. 27/9/19: confirm range of instrument; confirm bypass is not an issue (should be inline?); cleaned regularly?	To be investigated further	
295	CBN, BAR, BIN	Fluoridation	Critical control point	The fluoride critical limit for Coonabarabran and Baradine and Binnaway need to have the limit of <0.9mg/L for >72 hours (move from the alert limit)			March 2018 ORANA meeting	WarrumSCMar18.2	Mar-2018	High		27-Aug-19				Complete			CCP reference document updated		
301	Binnaway	Monitoring	Investigations	The Binnaway turbidity graph indicates that there are times when the filtered water turbidity results are higher than the clear water turbidity – investigate and			March 2018 ORANA meeting	WarrumSCMar18.7	Mar-2018	High		27-Aug-19				Complete	July 18: To be reviewed following filter media replacement Since the filter media has been changed the filter water data has been lower than clear water tank		Issue has been resolved following filter media inspection		
303	Coolah	Monitoring	Critical control point	The location of Coolah critical control point CLH1 needs to be moved to prior to the reservoirs.			March 2018 ORANA meeting	WarrumSCMar18.9	Mar-2018	High		27-Aug-19				Complete	July 18: Ongoing				
306	Dunedoo	Monitoring	Documentation / Protocol	There seemed to be some issues with the Dunedoo summary data in Table 5.3 (some rows not in correct locations, e.g. Bowman 28 Nott Street free chlorine and			March 2018 ORANA meeting	WarrumSCMar18.12	Mar-2018	High		01-Jul-18				Complete	Completed July 2018				
307	Coonabarabran	Filtration	Critical control point	Consider modifying for Coonabarabran CCP for filtered water turbidity: • Operational target < 0.2 NTU (current value <0.8 NTU)			October 2017 ORANA meeting	WarrumSCOct17.2	Oct-2017	High	Supervisor North; Technical Officer	27-Aug-19		1-Jun-20		In progress	Mar 18: Turbidity targets were slightly reduced. Plant not capable of lower performance – need to consider upgrade		Operational targets reduced to 0.3 NTU	To be reviewed following filter media replacement	
308	Coonabarabran	Fluoridation	Critical control point	A new lower limit needs to be added to the Coonabarabran fluoridation CCP of <0.9mg/L for >72 hours, to be in line with the NSW Health Form 5 requirements (Fluoride Dosing Incident Notification).			October 2017 ORANA meeting	WarrumSCOct17.5	Oct-2017	High	Technical Officer	27-Aug-19				Complete	Mar 18: Some changes were also made to the fluoride CCP limits. The critical limit needs to have the limit of <0.9mg/L for >72 hours (move from the alert limit).				
309	ALL	Reservoirs	Critical control point	There were no reservoir inspections undertaken during the reporting period. The Council needs to resolve access and training so that this CCP can be implemented.			October 2017 ORANA meeting	WarrumSCOct17.6	Oct-2017	High		27-Aug-19				Closed	Mar 18: Coolah and Dunedoo reservoirs inspected daily (walk around the ground). Checklists/SWMS/SOP needs to be developed		Covered by action 107 and 310.		

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019	Short term actions
310	ALL	Reservoirs	Documentation / Protocol	Council needs to develop reservoir inspection checklists for the operators and provide training on the important areas to check closely during the inspection.			October 2017 ORANA meeting	WarrumSCOct 17.7	Jun-2019	High	Manager Warrumbungle Water	30-Jul-19		30-Sep-19		In progress				Have queried contractor to assist with checklist	Outsource
311	Baradine	Monitoring	Critical control point	Review CCP limits for Baradine WTP, in particular, the turbidity targets are not in line with the ADWG (see action WarrumSCOct17.2 above)			October 2017 ORANA meeting	WarrumSCOct 17.10	Oct-2017	High	Supervisor North; Technical Officer	27-Aug-19				Closed	Mar 18: Limits are now: Target < 0.2 NTU Alert < 0.4 NTU Critical < 0.8 NTU This is still not as low as the ADWG – this may be OK as the source water is from bores – need to check			Closed. Covered by action 78	
312	Binnaway	Monitoring	Critical control point	Review CCP limits for Binnaway WTP, in particular, the turbidity targets are not in line with the ADWG (see action WarrumSCOct17.2 above).			October 2017 ORANA meeting	WarrumSCOct 17.11	Oct-2017	High		27-Aug-19				Complete	Mar 18: Filter media replacement planned for mid 2018. Review limits once new filter media performance monitoring data is available			Limits have been reduced in line with ADWG	
316	Mendooran	Sedimentation	Plant optimisation	Questions were also raised on the Mendooran sedimentation lagoons and short circuiting and increased risk of slug return of backwash water. This will be raised at the next DWCQM, Dec 2016			ORANA meetings pre October 2017	WarrumSCSep t16.6	Oct-2017	High		27-Aug-19		31-Dec-19		In progress					Included as part of treatment water supply upgrade
318	Binnaway	WTP	Investigations	Review the Bligh Tanner report on Binnaway WTP and initiate recommended actions (on-line monitoring, filter replacement, telemetry, vermin protection, etc)			ORANA meetings pre October 2017	WarrumSCMar 17.3	Oct-2017	High		27-Aug-19				Closed				Actions from Bligh Tanner report reviewed as part of this improvement plan	
321	Baradine	WTP	Major works	Baradine plant is old and in poor condition, particularly the clarifier. Upgrade work is recommended and DPI Water (Bill Ho) recommended installing sedimentation ponds (1 for sedimentation and 1 for sludge storage). NSW Health supports the installation of a clarifier.			ORANA meetings pre October 2017	WarrumSCMar 17.6	Oct-2017	High		27-Aug-19				Closed	Mar 18: Council submitted EOI for Safe and Secure funding			Approval for funding for clarifier. Waiting for s60 endorsement and funding endorsement by DoL Water. Closed, covered by action 192	
322	Baradine	Disinfection	Investigations	Baradine WTP - Council needs to recalculate the chlorine contact time with the lower plant flow (10L/s, not 16L/s) and determine the chlorine residual required for effective disinfection. A previous			ORANA meetings pre October 2017	WarrumSCMar 17.6	Oct-2017	High		27-Jun-19				Closed				Action closed. Refer to action 326	To be included as part of action 326 (review CT)
323	Coonabarabran	Raw water	Documentation / Protocol	Coonabarabran WTP- Water sourced from the Pound Yard weir and bores has not been through a raw water risk assessment process for each separate source (it has been assessed as a combined source). A risk assessment of each source needs to be undertaken and any			ORANA meetings pre October 2017	WarrumSCMar 17.6	Oct-2017	High		27-Jun-19		31-Dec-19		In progress				All the raw water from the bores has been tested (some radiological results outstanding). To be included as part of risk assessments (Hunter H20 NSW Health Project)	Risk assessment to include Pound Yard weir and bores
324	Baradine	Disinfection	Documentation / Protocol	NSW Health to review the report on Baradine that recommended a chlorine residual of 4mg/L or otherwise the issuing of a boil water alert and provide advice to Council (review in conjunction with the CCT calculation).			ORANA meetings pre October 2017	WarrumSCMar 17.6	Oct-2017	High	NSW Health	27-Aug-19				Closed				Closed, covered by action 46	
325	Baradine	Disinfection	Critical control point	Increase contact time for first customer (John Featherby), relocate service.			27 June 2019 Improvement Plan review meeting	A1	27-Jun	High	Supervisor North	30-Jul-19		15-Oct-19 was 30/9/19		In progress				To be undertaken with mains replacement works	



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326	All	Disinfection	Critical control point	Review CT for all systems			27 June 2019 Improvement Plan review meeting	A2	27-Jun	High	Manager Warrumbungle Water; Supervisor North; Supervisor South	27-Sep-19		15-Oct-19	had no due date	In progress				Refer to related actions 44, 46, 51, 60, 262, 309, 322 27/9/19: engaged CWT to review CTs	Review data gaps as per ID 262
329	Binnaway	Disinfection	Major works	Chlorine room upgrade			27 June 2019 Improvement Plan review meeting	A5	27-Jun	High	Supervisor South; Project Engineer; Manager Warrumbungle Water	27-Sep-19	19/20	30-Sep-19	interim (provide pics + info)	In progress				Quotes received, to include chlorine room upgrade 27/9/19: need info of equipment to be reused (alarming system + scales) + drone pictures	To be included as treatment plant upgrades
330	Binnaway	Sedimentation	Major works	Investigate restoring bank integrity of sedimentation lagoons (e.g. relining lagoons)			30 July 2019 Improvement Plan review meeting	A6	27-Jun	High	Supervisor South	27-Sep-19		31-Oct-19	Interim was 31/8/19 (chase consultants); new interim	In progress				Requested advice from HunterH20 27/9/19: asked CWT for advice, who provided advice - next stage: ? (contractor to give price for relining)	get contractor quotes
331	ALL	Reservoir	Documentation / Protocol	Council needs to develop reservoir SOP to inspect reservoir. Specific to individual reservoir requirements			27 June 2019 Improvement Plan review meeting	A7	27-Jun	High	Manager Warrumbungle Water	27-Jun-19		31-Dec-19		Not started				Operators have undertaken working at height training.	Outsource
332	All	Fluoridation		Replace fluoridation systems and staff training			27 June 2019 Improvement Plan review meeting	A8	27-Jun	High	Manager Warrumbungle Water	27-Jun-19	19/20	31-Dec-20		In progress				NSW Health support project	
333	All	Reservoirs		WHS upgrades and fencing of reservoirs, circular 18			27 June 2019 Improvement Plan review meeting	A9	27-Jun	High	Manager Warrumbungle Water	27-Jun-19	19/20	28-Feb-20		Not started				Funding FY19/20	
334	All	DWMS		Review and update DWMS			27 June 2019 Improvement Plan review meeting	A10	27-Jun	High	Manager Warrumbungle Water	27-Jun-19		31-Mar-20		Not started				External project	
335	Coonabarabran	Disinfection		Review location and replace safety shower and eyewash for chlorine room			30 July 2019 Improvement Plan review meeting	A11	27-Jun	High	Supervisor North	30-Jul-19		15-Oct-19	was 30/9/19	In progress				Met with safety officer to review location and determine number of safety showers.	
336	All			Develop a process to regularly monitor and test safety showers and eye washes, include developing a register			27 June 2019 Improvement Plan review meeting	A12	27-Jun	High	Technical Officer	27-Sep-19		31-Oct-19	no previous date set	In progress				27/09/19: SS prepared draft checklist (16/08/19); locations need to be added; created carbon copy book/record documentation for each site (1xDDO sewer, 1xDDO water;	
337	All			Ensure appropriate confined space signage is in place			27 June 2019 Improvement Plan review meeting	A13	27-Jun	High	Supervisor North; Supervisor South	27-Sep-19		31-Jan-20		In progress				Consultant to be engaged to develop register; 27/9/19: consultant cannot start before mid December	
338	Dunedoo	Reservoirs		Replace Rhodes Street reservoir roofs (reservoir rehabilitation project)			27 June 2019 Improvement Plan review meeting	A14	27-Jun	High	Manager Warrumbungle Water; Supervisor	27-Sep-19	19/20	4-Oct-20	interim (provide design to WEARS)	Not started				27/9/19: waiting on WEARS quote; need to provide them design of Bullinda St roof	
199a	Baradine	Safety/Signage	Minor works	· Install appropriate signage on the chemical dosing systems (tanks or walls adjacent to tanks) showing the name, volume, UN number, classification and hazards of the dosing systems	4.5	Materials and Chemicals	Hunter H2O Audit 2014	BAR009, BAR012	2014	High	Supervisor North; Technical Officer	27-Sep-19		31/10/2019	Interim was 31/08/19	Not started	· Chemical signage on the Soda Ash and PACL dosing systems is not installed on either the dosing systems or access to the compound · The dosing tanks and equipment are not banded and any chemical spills would not be contained			Investigating to confirm requirements (against safety requirements) 27/9/19: AM check BDN for signage (PACI needed) and SDSs	To confirm with WHS officer
199b	Baradine	Safety/Signage	Minor works	· Install an appropriate bund around the dosing tank and equipment. The volume of the must exceed the volume of the chemical dosing tank	4.5	Materials and Chemicals	Hunter H2O Audit 2014	BAR009, BAR012		High	Supervisor North	27-Jun-19	19/20	30-May-20		Not started					

# Warrumbungle Shire Council Improvement Plan

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4	All		Documentation / Protocol	Develop, document and implement a process for reviewing formal requirements every 12 months or where there are any changes to Council's	1.2	Regulatory and Formal Requirements			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19		31-Mar-20		Not started				Captured by action 334 DWMS review and update	To be included as part of DWMS review and update (action 334)
5	All		Training	Develop and implement a staff awareness program for relevant water quality obligations relating to their areas of responsibility.	1.2	Regulatory and Formal Requirements			Sep-2015	Medium	Manager Warrumbungle Water; Technical Officer	27-Aug-19		31-Jan-20		In progress				Quarterly review meeting to cover water quality obligations, alternate staff attendance at meetings.	Re-implement quarterly meetings (after finalisation of improvement plan). Process to be formalised in updated DWMS (Action 334)
6	All		Training	Formally document and communicate roles and responsibilities of staff relating to management of drinking water quality.	1.2	Regulatory and Formal Requirements			Sep-2015	Medium	Manager Warrumbungle Water	27-Aug-19		31-Mar-20		Not started					How this is documented to be reviewed in updated DWMS (Action 334)
9	All		Documentation / Protocol	Develop appropriate mechanisms for stakeholder commitment and involvement. Document the planned approach including partnership agreements or	1.3	Engaging Stakeholders			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19		31-Mar-20		Not started				Captured by action 334 DWMS review and update	To be included as part of DWMS review and update (action 334)
10	All		Documentation / Protocol	The water supply system analysis, including the flow charts and catchment characteristics, will be reviewed internally in 12 months, and upon any significant changes to any of the water supply systems. The review process and records of the outcomes of these reviews should be documented.	2.1	Water Supply System Analysis			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Implemented				Flow chart reviewed as part of quarterly meeting. Flow charts updates in progress	
12	Mendooran	Reservoirs	Investigations	That WSC investigates options to reduce water age in the Coolabah rural residential estate water supply zone. This could include isolation of individual reservoirs i.e. Reservoirs No. 1, No. 2 and/or No. 3, on a seasonal basis to only store water volumes	2.1	Water Supply System Analysis	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Supervisor South	22-Jan-19				Implemented				Included in S&S funding (R1)	
13	Binnaway	Backwashing	Operations	Perform regular testing of the following: · Filtered water turbidity immediately after a backwash · Wash water turbidity during a backwash · Filter headloss immediately after a backwash	2.1	Water Supply System Analysis	Hunter H2O Audit 2014	BIN009	2014	Medium	Supervisor South	27-Jun-19		19/20		Not started	Currently, water quality testing only occurs two hours after the backwash has completed. No testing is carried out on the filtered water after a backwash or wash water during the backwash sequence			Media replaced, reduced priority to medium. Covered by scoping study. Part of water treatment plant upgrades (FY19/20)	Investigate relevance and priority of action post media replacement.
14	All	Performance monitoring	Documentation / Protocol	The assessment of the water quality performance data should be reviewed every 12 months, and upon any significant changes	2.2	Assessment of Water Quality Data			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Implemented				Quarterly DWMS reviews undertaken Fortnightly review of CCP data (exceedance summaries), sent to Supervisors and Manager and Water quality data reviewed as part of quarterly meeting and annual DWMS review report	
16	All	Performance monitoring	Monitoring	Council to include new operational data prior to review of the DWMS.	2.2	Assessment of Water Quality Data			Sep-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Implemented					

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20	All		Documentation / Protocol	The hazard identification and risk assessment should be internally reviewed 12 months. Every five years (or upon any significant changes to any of the water supply systems) Council should undertake a comprehensive review. The review process and records of the outcomes of these reviews should be documented.	2.3	Hazard Identification & Risk Assessment			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19			TBC	In progress				Review of risk assessment to be undertaken as part of NSW Health DWMS project risk assessment review		
21	Dunedoo	Disinfection	Minor works	Install the chlorine dosing pump on the existing wall mounted bracket	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	DUN004	2014	Medium	Supervisor South	22-Jan-19				Complete		The chlorine dosing pump is currently sitting on a bucket and not firmly attached to an appropriate support bracket		Dosing pump has been mounted on the wall (late 2018)		
22	Coolah	Safety	Minor works	Relocate the safety shower/eyewash station to outside of the dosing room. The safety shower must be: · Located within 10 seconds reach of the hazard · Located on the same level as the hazard and free from	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	COH009, COH010	2014	Medium	Supervisor South	27-Aug-19		31/08/2019		In progress		· The chlorine safety shower/eyewash station is currently located inside the chlorine dosing room. In the event of a chlorine leak, the unit would not be able to be used. This does not comply with Australian Standard AS4775-		Evacuation assembly point to be allocated and sign posted.	Eyewash station to be installed. Site induction to include designated evacuation site. Interim - Confirm /designate assembly point	
49	Baradine	Catchment & Abstraction	Minor works	Cap the abandoned bore.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Medium		29-Aug-18				Complete		2018-05: One bore has been capped, two other openings have been closed with rubbered flanges. 2019-05: need to investigate (considering depth of bore) how concrete capping can be realised				
55	All	Whole of System	Investigations	Electronic key system currently being investigated	3.1	Preventive Measures and Multiple Barriers			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Complete	Manager WW - Operations/ Manager Property & Risk?			Complete first week of August 2019		
56	Bugaldie	Distribution	Investigations	Consider options to improve water pressure to limit risk of ingress into reticulation mains.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Medium	Technical Officer	30-Jul-19				Closed				Not considered viable.		
64	Baradine	Catchment & Abstraction	Minor works	Seal the operational bore.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Medium		27-Aug-19				Closed				2018-05: Temporary sealed by operational staff (with silicone), more sustainable solution required. 2019-05: part of WEAS	Closed, covered by Action 48	
72	All		Critical control point	The identification of CCPs and Critical Limits should be reviewed every year, and upon any significant changes to any of the water supply systems. The formal review process and records of	3.2	CCPs			Sep-2015	Medium	Manager Warrumbungle Water	29-Aug-18				Implemented	Complete 2016, due Jan-17			CCP review was performed by Bligh Tanner in January 2016 and documented in the DWMS Implementation Report		
73	BAR, BIN, CBN	Fluoridation	Critical control point	Council to include a fluoride CCP at Binnaway, Baradine and Coonabarabran, upon next review of DWMS.	3.2	CCPs			Sep-2015	Medium	Manager Warrumbungle Water	29-Aug-18				Complete	Bligh Tanner consultant, Manager WW - Special Projects			Was done by NSW Health consultant from Bligh Tanner in collaboration with Council.		
74	BWY, CBN, MDN	Sedimentation	Documentation / Protocol	Establish an Operational Control Point (OCP) for the settling lagoon	3.2	CCPs	Bligh Tanner report Feb-16		Feb-2016	Medium	Manager Warrumbungle Water; Technical	30-Jul-19		31-Dec		Not started				2016-10: Undertake jar tests and confirm the appropriate coagulant dose; base change over between lagoons on outlet	27/9/19: turbidity; pH (e.g. should be 6-7 if alum is used)	Discuss setting OCP at quarterly review meeting. Technical officer to prepare long term trends
75	CBN, MDN	Sedimentation	Documentation / Protocol	Establish an OCP for the sedimentation lagoons.	3.2	CCPs	Bligh Tanner report Feb-16		Feb-2016	Medium	Manager Warrumbungle Water; Technical officer	27-Sep-19		31-Dec		Closed				2016-10: CBN: Introduce action limits on water quality requiring actions such as jar testing, optimising alum/polymer dose rates, switch between lagoons.	27/9/19: refer to ID 74	Discuss setting OCP at quarterly review meeting. Technical officer to prepare long term trends

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76	BIN, CBN, MDN, CLH, DUN	Catchment & Abstraction	Critical control	If sand bed demonstrates effective filtration consider making this a CCP	3.2	CCPs	Risk assessment	1.02	Mar-2015	Medium	Manager Warrumbungle Water	29-Aug-18				Closed		Comments: Raw water can only be accessed for testing pre- and post- natural sand bed filtration in BWY, CBN and MDN. The sand bed filtration is a natural			
82	Mendooran	Wash water	Investigations	Consider a sedimentation stage with long residence times prior to returning the wash water to the inlet works. This may be achieved through installing baffles in the lagoon to reduce short circuiting	3.2	Critical Control Points	Hunter H2O Audit 2014	MEN007	2014	Medium	Project Engineer	27-Aug-19		31/10/2019	Interim deadline	In progress		Wash water is directed to the sedimentation ponds for recovery. A concentration of contaminants unable to be removed in the sedimentation process may occur increasing the load on the filters		Covered by Mendooran water supply modification upgrade. Currently at concept design stage. Further funding will be needed for construction.	Engage consultant to undertake concept design.
85	All		Documentation / Protocol	Formally document any procedure related to existing control measures identified in the risk assessment that are not currently documented. Involve relevant staff in the development of these procedures.	4.1	Operational Procedures			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Not started			Hunter H2O is developing 12 SOPs (NSW Health support project)	To be included as part of action 339 develop SOPs system wide	
86	All		Documentation / Protocol	Compile all SOPs into an operations manual	4.1	Operational Procedures			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19			See A15	Not started			Hunter H2O is developing 12 SOPs (NSW Health support project)	To be included as part of action 339 develop SOPs system wide	
87	Mendooran	Sedimentation	Investigations	Investigate pH increase between raw and settled water.	4.1	Operational Procedures	CWT report May-15		May-2015	Medium	Supervisor South; Project Engineer	30-Jul-19			31-Oct-19	Not started			(Section 4.2.3, p.11)	To be investigated	Refer to action 88 and 171
88	Mendooran	Disinfection	Investigations	Consider switching to chlorine gas disinfection.	4.1	Operational Procedures	CWT report May-15		May-2015	Medium	Project Engineer	30-Jul-19			31-Oct-19	In progress			(Section 4.2.5, p.16)	Included as part of Mendooran upgrade	Refer to other action 171. Include pH and settled water investigations (action 87)
89	Mendooran	Distribution	Documentation / Protocol	Implement a pro-active mains flushing program.	4.1	Operational Procedures	CWT report May-15		May-2015	Medium	Supervisor South; Technical Officer	27-Sep-19			31-Oct-19	Not started			(Section 4.3, p.17)	Schedules for Dunedoo still be developed. 27/9/19: waiting on Graham (flushing points DDO+MDN)	Develop Dunedoo mains flushing schedules.
90	All	Distribution	Documentation / Protocol	Develop a communication protocol around monitoring data (i.e. distribution data feeding back to WTP)	4.1	Operational Procedures	Risk assessment	10.01	Mar-2015	Medium	Manager Warrumbungle Water	01-Sep-15				Complete		Communication protocol is described in CCP document			
91	Coonabarabran	Filtration	Investigations	Confirm adjustments to backwash regime onsite to ensure they are effective.	4.1	Operational Procedures	CWT report May-15		May-2015	Medium	Manager Warrumbungle Water; Supervisor	27-Sep-19			31-Dec-19	Closed			(Section 4.2.4, p.13)	Filter inspection undertaken identifying filter control issues. Refer to ID 150	Consultant to provide proposal to investigate. To be included as part of process monitoring, automation and

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 27/8/2019; 27/09/2019	Short term actions
93	All	Clarification / Sedimentation	Investigations	Strategy needs to be developed for continued supply during times of significant maintenance (e.g. utilising the lagoons temporarily)	4.1	Operational Procedures	Risk assessment	4.01	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				No longer considered necessary	
94	Mendooran	Distribution	Documentation / Protocol	The water supply system diagram (Figure 2.1.9 Mendooran System Flow Diagram) from the WSC DWMS (17 <sup>th</sup> Oct 2014).he	4.1	Operational Procedures	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Supervisor South	22-Jan-19				Complete					
96	Coonabarabran	Filtration	Operations	Consider periodic inspection on filter media	4.1	Operational Procedures	Risk assessment	5.01	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Implemented				Filter inspection carried out in June 2019	
98	All	Reservoirs	Investigations	Consider reviewing mixing options for reservoirs with common inlet/outlet	4.1	Operational Procedures	Risk assessment	9.01	Mar-2015	Medium	Manager Warrumbungle Water; Supervisor North; Supervisor	30-Jul-19		31-Dec-19	Interim (priority and options) 31/12/2019	Not started					Identify reservoirs where this is required. Prioritise reservoirs (e.g. CT/population). Develop options for mixing. Reference Action 262 (review and confirm CT)
99	Coonabarabran	Distribution	Monitoring	Consider sampling and testing program following mains repairs	4.1	Operational Procedures	Risk assessment	10.01	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19		31-Dec-19	Interim deadline	In progress		This should be covered in relevant SOPs (Repair a water main break, Replace a water main) --> need to verify if this is the case		SWMS has been developed for main repairs. Testing is being undertaken for chlorine and turbidity following repairs.	SOP to be developed for pipe break repairs (and include monitoring) To be included as part of Action 339.
100	Coonabarabran	Distribution	Operations	Consider tanker filling from dead ends (if backflow prevention available)	4.1	Operational Procedures	Risk assessment	10.03	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Implemented		Note: Especially relevant during times of water restrictions		Weekly flushing program in Coonabarabran (while high level restrictions are in place)	
112	Coonabarabran	Distribution	Documentation / Protocol	Consider scouring program, including prioritisation of mains to be scoured	4.1	Operational Procedures	Risk assessment	10.03	Mar-2015	Medium	Manager Warrumbungle Water; Supervisor North; Supervisor South	27-Jun-19		31-Dec-19		In progress				Scouring types investigated. Need for scouring to be evaluated. Priority reduced to medium, flushing has resulted improvements.	Need for scouring to be evaluated.

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019	Short term actions
116	Coonabarabran	Monitoring	Documentation / Protocol	Develop formal monitoring protocols which identify target criteria for each of the preventive measures being monitored (including CCPs), monitoring records to be kept, responsibilities, authorities and required communication protocols. Combine documented protocols into a formal Operational Monitoring Plan.	4.2	Operational Monitoring			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19		31-Dec-19		Not started				Schedules are captured currently on operational carbon copy books	Develop operational monitoring plan
117	Coonabarabran		Documentation / Protocol	Ensure all operational procedures are documented and referenced in the DWMS document register	4.2	Operational Monitoring			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				Closed refer to action 334 and 339	Include as part of DWMS review and update (action 334)
118	Coonabarabran	Catchment & Abstraction	Monitoring	Consider turbidity monitoring of infiltration well water and river water on event basis to determine effectiveness of filtration	4.2	Operational Monitoring	Risk assessment	1.02	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Implemented				Combined raw water testing daily undertaken of current water source (NTU, pH, colour). Raw water quality assurance program in place (micro, chemicals) for all bores as part of NSW Health funding.	
119	Coonabarabran	Catchment & Abstraction	Monitoring	Consider testing for E. coli in raw water	4.2	Operational Monitoring	Risk assessment	1.04	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Implemented				Raw water quality assurance program in place (micro, chemicals) for all bores as part of NSW Health funding.	
120	Coonabarabran	Catchment & Abstraction	Operations	Monitor raw water organics and nutrient loading.	4.2	Operational Monitoring	CWT report May-15		May-2015	Medium	Technical Officer	27-Aug-19		4-Oct-19	Interim deadline was 30/9/19 (review RWQ assurance program)	In progress		(Section 4.1, p.6), note: additional treatment processes may be required due to contamination through agricultural activities (farming, fertiliser application, cattle)		Raw water quality assurance program in place (micro, chemicals) for all bores as part of NSW Health funding. Combined raw water testing daily undertaken of current water source (NTU, pH, colour).	Review action against raw water quality assurance plan
121	Coonabarabran	Coagulation & Flocculation	Monitoring	Monitor algae concentrations in the raw water and sedimentation lagoon.	4.2	Operational Monitoring	CWT report May-15		May-2015	Medium	Supervisor North	27-Sep-19		5-Nov-19	was 30/9/19, start testing first week Nov	In progress		(Section 4.2.2, p.10)		BGA testing during summer period in raw water. 27/9/19: will test monthly in lagoons over summer	Consider testing in the sedimentation lagoon
122	CBN, BDN	Reservoirs	Monitoring	Consider implementing sampling regime for CBN, BDN for chlorine residual in the reservoirs	4.2	Operational Monitoring	Risk assessment	9.02	Mar-2015	Medium	Technical Officer	27-Sep-19		31-Oct-19	Interim deadline was 13/9/19	In progress				Coonabarabran now (August 2019) recording chlorine residual testing of reservoirs (recorded weekly). 27/9/19: BDN flushing sheet not yet printed	Baradine monitoring flushing sheet to be amended to include chlorine residual monitoring of reservoirs.
124	Coonabarabran	Whole of System	Investigations	Consider online monitoring where CCPs have been identified	4.2	Operational Monitoring	Risk assessment	11.01	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				Closed, covered by Action 258 and 328.	To be included as part of process monitoring, automation and instrumentation project (action 328)
126	Coonabarabran	Disinfection	Critical control point	Install continuous online chlorine meter to ensure continual effective disinfection/control of chlorination CCP.	4.2	Operational Monitoring	Bligh Tanner report Feb-16		Feb-2016	Medium	Supervisor North	30-Jul-19		31-Dec-19		In progress				Chlorine analyser has been installed, not yet online. Refer to action 258 and 328.	To be included as part of process monitoring, automation and instrumentation project (action 328)
127	Baradine	Filtration	Minor works	Install online turbidity meters for filtration (AND sedimentation after/during clarifier upgrade).	4.2	Operational Monitoring	Bligh Tanner report Feb-16		Feb-2016	Medium	Supervisor North	27-Aug-19		30-May-20		In progress		2018-05: Safe and Secure EOJ submitted for 'Automation and Process Instrumentation'. 2019-05: Automation Upgrade scoping study funding granted		Location changed to BDN Covered part of automation project (scoping study).	To be included as part clarifier upgrade or treatment plant upgrade

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 27/8/2019; 27/09/2019	Short term actions
128	Coonabarabran	Filtration	Minor works	Install online turbidity meters for each filter.	4.2	Operational Monitoring	Bligh Tanner report Feb-16		Feb-2016	Medium	Supervisor North	27-Sep-19		31-Dec-19		Closed				Combined inline online analyser; refer to ID 130	Consider part of automation project (scoping study) or plant of treatment plant upgrade
132	Mendoo		Minor works	Desludge off line lagoon	4.3	Corrective Action	DPI Inspections	DPI MEN007	Jan-2019	Medium	Supervisor South	27-Aug-19				Complete				Lagoon was desludged	
		Sedimentation Lagoons																			
133	Mendoo		Operations	Maintain vegetation control throughout the water plant grounds and particularly around the sedimentation lagoons.	4.3	Corrective Action	DPI Inspections	DPI MEN008	Jan-2019	Medium	Supervisor South	27-Aug-19				Implemented				Vegetation is mowed, weeds pulled. Lagoon weeds removed with excavator when desludge	
		Vegetation Control																		Cumbungi particularly should be kept out of the lagoons by ph	
140	BUG, DUN, KEN	Environmental	Minor works	Install an appropriate containment bund around the dosing tank to capture any chemical leaks or spills during pump operation or transfer of hypo	4.3	Corrective Action	Hunter H2O Audit 2014	BUG006, DUN009, KEN006	2014	Medium	Supervisor North; Supervisor South	27-Aug-19		31/12/2019		Not started				Dunedoo - 19/20 FY chlorine upgrade to gas 27/9/19: BUG/KBI: 200L mix tanks (diluted 20:1, 10:1 in summer with 20L 13% drums)	Investigate installing self bunded tanks (DUN, BUG, KEN)
																				There is no chemical bund in the chlorine dosing/bore room. Chemical leaks and spills will not be contained and increases the risk of release to the environment.	
141	Coonabarabran	PAC dosing	Minor works	Replace the dosing lines and check the operation of the unit. Cover or store the unit in an area that reduces the chance of damage and systematically test its operation to ensure it remains	4.3	Corrective Action	Hunter H2O Audit 2014	COO011	2014	Medium	Supervisor North	27-Aug-19				Complete				Has been recently moved closer to the wall. Currently in use (for algae in the lagoon) for taste and odour.	
142	Coonabarabran	Filtration	Investigations	Determine the filter media height and compare against the design levels Sample the filter media and test for sludge content	4.3	Corrective Action	Hunter H2O Audit 2014	BAR006 COO007	2014	Medium	Supervisor North	30-Jul-19	22/01/2019			Closed				Complete as part of filter inspection. Filter media to be replaced by end of FY. Closed as covered by other action (77 and 150)	
151	Mendoo	Distribution	Major works	Replace service water pumps Install appropriate back flow prevention vales Run a service water line across to the laboratory to test treated	4.4	Equipment Capability & Maintenance	DPI Inspections	DPI MEN003	Jan-2019	Medium	Supervisor South	27-Aug-19				Closed				The service water system at the water plant has not been functioning correctly since construction. The service water pumps need to	Alternative arrangements have been undertaken to address the reasons for the requirement
157	Coonabarabran	Filtration	Investigations	Consider need to replace filter media.	4.4	Equipment Capability & Maintenance	Bligh Tanner report Feb-16		Feb-2016	Medium		25-Jun-18				Complete				2016-10: Underdrains may also need refurbishment 2018-05: Replacement scheduled to start 25/06/18. 2019-05: replacement completed as scheduled (06/2018)	
159	Check location - BUG, KEN, DUN	Disinfection	Minor works	Install duty/standby chlorine dosing pumps.	4.4	Equipment Capability & Maintenance	Bligh Tanner report Feb-16		Feb-2016	Medium	Supervisor North; Supervisor South	27-Aug-19				Closed	2018-05: Note - spare pumps are available			Spare pumps considered adequate for sites, duty/stand by not considered necessary due to site size and intended upgrades (DUN).	

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162	Mendooran	Coagulation & Flocculation	Operations	Remove algae from flocculator chamber and aerator surface.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Medium	Manager Warrumbungle Water; Supervisor South	27-Aug-19		31-Oct-19	confirm with HH2O	In progress		(Section 4.2.2, p.10), remove by skimming and application of NaOCl liquid when required to prevent release of toxins		Cleaned on an annual basis (lagoon changeover)	Cleaning to be included as part of maintenance schedules (Hunter H2O NSW Health project)
163	Coonabarabran	Organics Removal (catchment)	Investigations	Check mixing profile of the WEARS mixer in Timor Dam.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Medium				30-Jul-19		Closed		(Section 4.1, p.6)		No longer required, mixer is working fine (previously upgraded)	
164	Coonabarabran	Organics Removal	Major works	Upgrade existing PAC system with a new automated batching and dosing system.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Medium	Supervisor North	27-Sep-19		30-Apr-20		Closed		(Section 4.2.1.1, p.8)		27/9/19: not required, dosing is adequate (batching); replaced pump recently	Investigate the need for upgrading the PAC dosing system, as part of treatment plant upgrade
165	Coonabarabran	Disinfection	Minor works	Install scales for chlorine gas cylinders and connect to SCADA.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Medium	Supervisor North	27-Aug-19		31-Dec-19		In progress		(Section 4.2.5, p.15)		Scales are installed, not connected to SCADA	To be included as part of treatment plant upgrade (PLC replacement).
166	Coonabarabran	Fluoridation	Operations	Check service water for fluoride system is within required quality limits and softener in working effectively.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Medium	Manager Warrumbungle Water	27-Aug-19		30-Jun-20		In progress		(Section 4.2.6, p.16)			To be included as part of task 4 Hunter H2O NSW Health project
167	Coonabarabran	Fluoridation	Minor works	Modify fluoride saturator outlet pipework.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Medium	Manager Warrumbungle Water	27-Aug-19		30-Jun-20		In progress		(Section 4.2.6, p.16)			To be included as part of task 4 Hunter H2O NSW Health project
168	BAR, BIN, CBN, MDN	Filtration	Operations	Consider maintenance program for the filters	4.4	Equipment Capability & Maintenance	Risk assessment	5.01	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19		31-Oct-19		In progress					To be included as part of task 4 Hunter H2O NSW Health project
169	BAR, BIN, CBN, MDN	Filtration	Investigations	Consider online turbidity meter with interlocks at BWY, BDN Consider interlocks for meters at CBN and MDN	4.4	Equipment Capability & Maintenance	Risk assessment	5.01	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				Closed, as part of automation project (action 328)	To be included as part of process monitoring, automation and instrumentation project (action 328)
170	All	Disinfection	Operations	Consider program of analyser calibration	4.4	Equipment Capability & Maintenance	Risk assessment	7.01	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Closed				Closed, covered by action 191	
171	Mendooran	Disinfection	Investigations	Investigate installation of chlorine mixer for batching or replacement with chlorine gas	4.4	Equipment Capability & Maintenance	Risk assessment	7.01	Mar-2015	Medium	Supervisor South	30-Jul-19		30-Sep-19		In progress				Considering changing to chlorine gas.	Part of Mendooran upgrade project (action 178). Confirm current mixing process.
172	Mendooran	Documentation / Protocol	Investigations	That WSC investigate and implement a formalised preventative maintenance program for all the WTP, reticulation and reservoir assets.	4.4	Equipment Capability and Maintenance	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Manager Warrumbungle Water; Supervisor North; Supervisor South	27-Aug-19			Following H2O project to develop schedules	In progress		NSW Health has advised their intention to engage a consultant to develop a WTP Maintenance Schedule.		Maintenance schedules to be developed for WTP by Hunter H2O (NSW Health project).	Preventative maintenance program to be formalised for reticulation and reservoir.
174	BAR, CBN, MDN	Reservoirs	Investigations	Consider investigating the status of other reservoirs (MDN, BDN, CBN)	4.4	Equipment Capability & Maintenance	Risk assessment	9.02	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				Closed as covered by actions action 63, 66, 136	



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175	All	Distribution	Major works	Replace old water meters with new water meters including backflow prevention devices	4.4	Equipment Capability & Maintenance	Risk assessment	10.01	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Implemented				Program of replacement of water meters in place (1/3 to be completed FY19/20)		
176	Baradine	Clarification	Major works	Replace the clarifier.	4.4	Equipment Capability & Maintenance	Bligh Tanner report Feb-16		Feb-2016	Medium		27-Aug-19				Closed		2018-05: Safe and Secure EOI approved for 'Baradine WTP Upgrade'. 2019-05: SSWP funding granted		Approval for funding for clarifier. Waiting for s60 endorsement and funding endorsement by DoI Water. Closed, covered by action 192		
188	BUG, DUN, MDN	Information / System	Documentation / Protocols	Develop a list of equipment for the site and obtain operation and maintenance manuals from equipment suppliers. Store manuals on site	4.4	Equipment Capability and Maintenance	Hunter H2O Audit 2014	BUG004, DUN006, MEN004	2014	Medium	Supervisor North; Supervisor South	30-Jul-19	22/01/2019			Closed	Equipment operation and maintenance manuals are currently not stored onsite. This can delay equipment repair and troubleshooting times when required.			Closed covered by action 340	To be included as part of action 340 (development of WTP maintenance schedules)	
189	Binnaway	Filtration	Operations	Ensure DP cells are functional and reading correctly. Modify PLC code to allow filter backwashes to be initiated by either filter run time, filter headloss or filtered water turbidity	4.4	Equipment Capability and Maintenance	Hunter H2O Audit 2014	BIN006	2014	Medium	Supervisor South	27-Aug-19		30/03/2020		Not started				Filter backwashes are only initiated by the filter run time setpoint regardless of the filter performance	To be included as part of treatment plant upgrade	
196	All		Documentation / Protocol	Confirm whether Council's supplier contracts include chemical quality compliance.	4.5	Materials & Chemicals			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19		30-Sep-19		Not started					Investigate contracts	
197	All		Documentation / Protocol	Develop a program to undertake spot checks for chemical quality compliance.	4.5	Materials & Chemicals			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				Not considered to be required due to use of reputable and operator monitoring. Issues investigated as required.		
198	All	Disinfection	Investigations	Consider testing of hypochlorite strength	4.5	Materials & Chemicals	Risk assessment	7.01	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				Undertaken at Mendooran. Chlorine analyser to be installed, no longer necessary at other sites.		
202	Binnaway	Disinfection	Minor works	Install a larger calibration tube to allow for the volumes required over a three minute test (based on current dose rates). It is estimated that a five hundred or thousand millilitre calibration tube would be appropriate. Whilst the current calibration tube allows for a very quick snapshot of dose rates a larger tube would facilitate more	5.1	Drinking Water Quality Monitoring	DPI Inspections	DPI BIN008	Jan-2019	Medium	Supervisor South	27-Sep-19			had no due date		Not started				27-9-19: GR to order equipment as required (SS can help if required)	Larger calibration tube to be installed

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204	Mendooran		Operations	A new sampling site be created for the correct monitoring locations in Bandulla street. Sample site 123 (57 Bandulla	5.1	Drinking Water Quality Monitoring	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Supervisor South	22-Jan-19				Complete					
208	Mendooran	WTP	Operations	Perform jar tests to determine optimum coagulant dose rates and mixing configurations. Investigate (by performing jar tests) using separated dosing diffusers for improved efficiency of both coagulation and metal removal	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	MEN006	2014	Medium	Supervisor South	27-Aug-19				Implemented	Poly aluminium chloride and potassium permanganate are both dosed through the same diffuser into the top of the aeration stairway			Currently undertaking jar tests. Draft jar testing SOP has been developed. Jar testing training to be undertaken at Coonabarabran (September 2019)	
219	Mendooran	Distribution	Monitoring	That the onsite sampling and testing conducted by the EHO includes turbidity and these field results are provided to the WTP operators on the same day that FASS samples are collected.	5.3	Short Term Monitoring of Results	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Supervisor South	22-Jan-19				Complete					
221	BUG, KEN		Documentation / Protocol	Record customer complaints in water quality monitoring spreadsheets for Bugaldie and Kenebri water supply systems.	5.3	Short-term evaluation of results			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Complete				All customers complaints are recorded in a database 'Complaints and Enquiries'.	
225	All		Documentation / Protocol	Define communication protocols with the involvement of relevant agencies and include in the protocols a contact list of relevant agencies and businesses and their relevant key people.	6.1	Communication			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Not started				Include as part of DWMS review and update (action 334)	
226	All		Documentation / Protocol	Review and update contact details listed in Table 10.	6.1	Communication			Jun-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Not started				Include as part of DWMS review and update (action 334)	
227	All		Documentation / Protocol	Develop a comprehensive public and media communications strategy and include draft public and media notifications.	6.1	Communication			Jun-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Not started				Include as part of DWMS review and update (action 334)	
228	All		Training	Identify an appropriate person to handle all incident and emergency communications and ensure they are appropriately trained.	6.1	Communication			Jun-2015	Medium	Manager Warrumbungle Water	27-Aug-19		13-Sep-19 Interim		Not started			To included as part of updated incident response plan	To request to Hunter H2O (NSW Health project) that more detailed communication protocols be included in Incident response plan (e.g. media releases responsibility, contacts list etc)	
230	Mendooran		Training	That WSC staff with NSW Health staff undertake regular, at least annually, familiarisation and/or training in the implementation of NSW Health's drinking water quality incident response protocols.	6.2	Incident and Emergency Response Protocols	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Manager Warrumbungle Water; HR	22-Jan-19				Complete					
237	Mendooran		Documentation / Protocol	That WSC develop and implement procedures for all staff involved in sampling and monitoring which clearly reflect responsibilities in accordance with the DWMS, CCP limits and NSW Health protocols for	7.1	Employee Awareness and Involvement	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Manager Warrumbungle Water	22-Jan-19				Complete					
239	Mendooran	Distribution	Operations	That the WSC include WTP operators and other staff involved in water supply activities to attend the Drinking Water Quality Meetings.	7.1	Employee Awareness and Involvement	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Supervisor South	22-Jan-19				Complete					

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240	All		Training	All water management stakeholders must read and agree to abide by the principles of this DWMS. This includes adding this requirement to the role descriptions for Council employees moving forward.	7.1	Employee Awareness and Involvement			Jun-2015	Medium	Manager Warrumbungle Water	27-Aug-19		13-Sep-19	Interim	Not started					Confirm if position descriptions now include reference to DWMS
241	All		Documentation / Protocol	Consider developing operators communication strategy	7.1	Employee Awareness and Involvement			Jun-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Not started					Include as part of DWMS review and update (action 334)
243	Mendooran		Training	That WSC investigate and implements a process of its WTP operators to be certified under the National Certification Framework.	7.2	Employee Training	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Manager Warrumbungle Water; HR	27-Aug-19		31-Dec-19		In progress				Ongoing with HR	Referred to HR
244	Mendooran	Disinfection	Documentation / Protocol	That the Human Resources records for relevant staff are reviewed, and that training is undertaken for all water supply operational staff, WTP operators	7.2	Employee Training	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Manager Warrumbungle Water; HR	22-Jan-19				Implemented					Referred to HR
245	All		Training	Formalise internal on-the-job training processes, documenting the training content, processes and attendance.	7.2	Employee Training			Jun-2015	Medium	Manager Warrumbungle Water	27-Aug-19		31-Jan-20		In progress				Process not yet formalised. Informal current process includes on the job training, competency document, annual review against competency document. Consultant has been engaged to	Formalise process following induction material development.
246	Mendooran	Reservoirs	Training	Consider working at heights training for staff	7.2	Employee Training	Risk assessment	9.01	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Complete				Training undertaken for water treatment staff (May 2019)	
247	BIN, BAR, MDN	Whole of System	Documentation / Protocol	Review staff structure of water services team, PHU and NOW to provide support	7.2	Employee Training	Risk assessment	11.06	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19		20-Jun-20		In progress				Review on staff structure has been undertaken and revised structure is being implemented.	
248	CBN, BIN, MDN	Organisations	Training	Operators to re-familiarise themselves with BGA Management Protocols and related response actions.	7.2	Employee Training	CWT report May-15		May-2015	Medium	Supervisor North; Supervisor South; Technical officer	27-Sep-19		31-Aug-19	Interim was 31/08/19	In progress	(Section 4.1, p.6)			Action changed to cover CBN, BWY, MDN systems (from just CBN) and distributed to CBN, BWY, MDN(?); CW to check with Supervisors if operators have familiarised themselves	Provide current BGA protocols to plants. Review protocols for currency.
251	All		Documentation / Protocol	Develop a consumer information program providing details on the DWMS, Emergency Response Plan, consumer responsibilities, how drinking water quality may	8.2	Communication			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				In progress					Include as part of DWMS review and update (action 334)
253	All	Catchment & Abstraction	Investigations	Consider instigating a pesticide monitoring program	9.1	Investigative Studies & Research Monitoring	Risk assessment	1.01	Mar-2015	Medium	Technical Officer	27-Sep-19		4-Oct-19	Interim deadline was 13/9/19 (review RWQ assurance)	In progress					Review raw water assurance program against this requirement see also items 120, 287, 313, 315)
254	BIN, BUG, CBN, DUN, KEN,	Catchment & Abstraction	Investigations	STP effluent review (i.e. quality, quantity from EPA report) to determine typical characteristics in effluent and the quality of treatment. Consider testing for	9.1	Investigative Studies & Research Monitoring	Risk assessment	1.04	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed					STP are being upgraded, BIN and MDN are being sewerred (options study).
255	All	Catchment & Abstraction	Investigations	Consider undertaking chemical testing on groundwater supplies to establish baseline water quality	9.1	Investigative Studies & Research Monitoring	Risk assessment	1.07	Mar-2015	Medium	Manager Warrumbungle Water; EHO;	30-Jul-19				Implemented					Raw water testing regime program has been developed and implemented.
256	Baradine, Kenebrine, Coonabarbine	Catchment & Abstraction	Investigations	Review of existing coal seam gas investigations in the area (i.e. EPA)	9.1	Investigative Studies & Research Monitoring	Risk assessment	1.07	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				Discussed at quarterly meeting. Raw water pH tested daily at Baradine and Coonabarabran, to be used as a potential indicator	
257	Mendooran	Disinfection	Investigations	Monitor the strength of the chlorine over a period of 6 months	9.1	Investigative Studies & Research Monitoring	Risk assessment	7.01	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed					Covered by action 198
261	Coonabarabran	Catchment & Abstraction	Investigations	Review PAC dosing effectiveness. Detention time for PAC limiting factor	9.2	Validation of Processes	Risk assessment	1.1	Mar-2015	Medium	Supervisor North; Technical	27-Aug-19		30/09/2019	Interim	In progress				Calculations previously performed, to be reviewed and effectiveness considered as part of PAC upgrade	Find calculations and review. Consider results during

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 27/8/2019 & 27/09/2019	Short term actions	
265	Mendoo	Distribution	Documentation / Protocol	That WSC review and regularly revise these water supply reticulation plans (Figures 4 & 5) as required to maintain an up to date records.	10.1	Management of Documentation and Records	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Supervisor South; GIS Officer	22-Jan-19				Implemented		In collaboration with Council's GIS Officer				
266	All		Documentation / Protocol	Continue to document information pertinent to all aspects of drinking water quality management.	10.1	Management of Documentation & Records			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Implemented						
267	All		Documentation / Protocol	Develop a procedure that manages document control for all DWMS documentation (i.e. ensure the currency, accessibility and appropriate review DWMS documents).	10.1	Management of Documentation & Records			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Not started					Include as part of DWMS review and update (action 334)	
268	All		Documentation / Protocol	Develop a records management process to ensure appropriate storage and accessibility of DWMS related records.	10.1	Management of Documentation & Records			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Not started					Include as part of DWMS review and update (action 334)	
269	All		Documentation / Protocol	Update details for existing documentation in the DWMS document register.	10.1	Management of Documentation & Records			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Not started					Include as part of DWMS review and update (action 334)	
270	ALL	Information Systems	Operations	· Generate a list of equipment contained on site and store equipment operation and maintenance manuals on site. · Routinely (daily) measure the instantaneous chemical dose rate and daily chemical usage. Also	10.1	Management of Documentation and Records	Hunter H2O Audit 2014	BIN004, BUG002, COH002, DUN003, KEN002,	2014	Medium	Supervisor North; Supervisor South	27-Aug-19		31/10/2019		In progress	· Instantaneous chemical dose rates, daily chemical usage, instantaneous and daily plant flow rate data is currently not being recorded. This data is important for plant operation, optimisation and troubleshooting		Development of schedules covered under action 340. Calculations to be undertaken for chemical dose and usage rate (In conjunction with action 213)		Calculations to be undertaken for chemical dose and usage rate MDN calibration tube to be replaced	
275	All		Documentation / Protocol	Develop inhouse evaluation of long-term water quality performance procedures (outside external monitoring requirements)	11.1	Long-Term Evaluation of Results			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Implemented					Annual review 6 monthly level of service report (non compliances, boil water alerts etc.) Quarterly DWMS reviews undertaken	
284	All		Documentation / Protocol	Amend/update the DWMS where it is evaluated that there is a need for change.	12.1	Review by senior executive			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed					Covered by DWMS update (action 334) Include as part of DWMS review and update (action 334)	
286	All		Documentation / Protocol	Update and review Implementation Plan when necessary. Follow up actions to ensure deadlines are met and responsible parties are capable	12.2	Drinking Water Quality Management Improvement Plan			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Implemented						Plan has been compiled and in process of reviewing.
287	All	Bores	Monitoring	Monitoring of ALL WSC bores be increased which includes: <input type="checkbox"/> Turbidity <input type="checkbox"/> pH <input type="checkbox"/> Microbiological <input type="checkbox"/> Temperature <input type="checkbox"/> Pesticides <input type="checkbox"/> Heavy Metals <input type="checkbox"/> Radiological <input type="checkbox"/> Fluoride			July 2018 ORANA meeting	WarrumSCJul1 8.1	Jul-2018	Medium	Technical Officer	27-Sep-19		7-Oct-19	Interim deadline was 13/9/19 (review RWQ assurance program)	In progress					Raw water quality assurance program has been developed. To be implemented. 27-9-19: similar to ID 120	Check requirements of this action as part of raw water monitoring plan review.

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288	All	Raw water	Monitoring	It should be noted that radiological tests are generally recommended every 2 years for bore waters and every 5 years for surface water. As these tests are infrequent, they can often fall out of a routine sampling program and it would be prudent for WSC to check if these test have been undertaken for both bores and surface waters.		July 2018 ORANA meeting	WarrumSCJul1 8.2	Jul-2018	Medium		27-Aug-19				Complete				Radiological testing has been undertaken (July 2019) and is included in raw water monitoring assurance plan.	
291	Mendoo	WTP	Documentation / Protocol	Within the new package of works planned for this plant it is recommended that a new set of P&IDs be created and the current plant along with upgrades go through the HAZOP process.		July 2018 ORANA meeting	WarrumSCJul1 8.5	Jul-2018	Medium	Project Engineer	27-Aug-19		31/12/2019		Not started					To be included as treatment plant upgrades
292	Coonabarabran, Mendoo	Monitoring	Operations	Due to an increasing taste and odour issue, it was recommended that WSC look at additional testing in the sedimentation lagoons including MIB and		July 2018 ORANA meeting	WarrumSCJul1 8.6	Jul-2018	Medium	Supervisor North; Supervisor South Technical	27-Sep-19		30-Sep-19	Interim was 30-9-19; now: 31/10/19 for algae tests (establish	In progress				27/9/19: PAC has been dosed to control taste and odour issues; PAC dosing also improved filtered water NTU; SS find results from algae testing and	Confirm if tests were undertaken. Refer to action 121.
293	BUG, KEN	Raw water	Investigations	There was discussion relating to fracking activity in the area of Pilliga Forrest. It is recommended that WSC discuss these concerns with NSW Health to determine the best testing parameters to ensure there has been no impact on groundwater.		July 2018 ORANA meeting	WarrumSCJul1 8.7	Jul-2018	Medium		27-Aug-19				Complete				Has been investigated, pH should be used as a parameter, which is already being tested for.	
294	ALL	Reticulation	Documentation / Protocol	There was discussion around who collects the reticulation samples and analyses them before they are sent to FASS. The Councils Environmental Health Office collects and tests the samples. There have been some issues with samples being		March 2018 ORANA meeting	WarrumSCMar 18.1	Mar-2018	Medium	Manager Warrumbungle Water	27-Aug-19		31-Dec-19		In progress	July 18: Ongoing. This was discussed and the newly appointed EHO is managing this project.				Undertaken in conjunction with action 205, 206 and 296.
296	ALL	Monitoring	Monitoring	Council to review sample locations. It may be worthwhile changing some sample locations to monitor in the main rather than a household tap.		March 2018 ORANA meeting	WarrumSCMar 18.3	Mar-2018	Medium		27-Aug-19				Closed	Not feasible				
297	ALL	Reticulation	Major works	There are a number of old cast iron mains that cause issues (corrosion, low chlorine residuals). Some of these mains are being replaced, consider developing a program/funding for replacing more of these sections of these mains.		March 2018 ORANA meeting	WarrumSCMar 18.4	Mar-2018	Medium		27-Aug-19				Implemented					Program of replacement of mains is in place
298	ALL	Reticulation	Investigations	Flushing of mains to assist with maintaining chlorine residuals is problematic during water restrictions (customers see that water is being wasted). Consider ways to collect and reuse the water (e.g. tankers).		March 2018 ORANA meeting	WarrumSCMar 18.5	Mar-2018	Medium		01-Jul-18				Complete	Complete July 2018				
299	Baradine	Reservoir	Minor works	There is a significant amount of sediment in the Baradine reservoir and this needs to be removed during winter.		March 2018 ORANA meeting	WarrumSCMar 18.5	Mar-2018	Medium		01-Jul-18				Complete	Complete July 2018				

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302	Coolah	Disinfection	Documentation / Protocol	The process flow diagram for Coolah needs to be modified to chlorine gas (rather than sodium hypochlorite) for disinfection.		March 2018 ORANA meeting	WarrumSCMar 18.8	Mar-2018	Medium	Technical Officer	27-Aug-19		6-Sep-19	completed mid Sept-19	Complete	July 18: Ongoing				PFD to be updated
304	CLH, DUN, MDN	Disinfection	Critical control point	Council could consider lowering the lower limit on Coolah, Mendooran and Dunedoo critical control point from <0.5 mg/L to <0.2mg/L once the chlorine		March 2018 ORANA meeting	WarrumSCMar 18.10	Mar-2018	Medium	Technical Officer	27-Sep-19				Complete	July 18: Ongoing				Confirm this has occurred
305	Dunedoo	Monitoring	Critical control point	Critical control point for Dunedoo DD01 needs to be moved on the process flow diagram to after the reservoir.		March 2018 ORANA meeting	WarrumSCMar 18.11	Mar-2018	Medium	Technical Officer	27-Sep-19				Complete					Confirm this has occurred
313	Coolah	Raw water	Monitoring	Coolah has a new bore "Back Bore" which is located 50m upstream of a previous dump site (near Pound yard and tip) in depth water quality testing should		ORANA meetings pre October 2017	WarrumSCSep t16.2	Oct-2017	Medium	Technical Officer; Manager Warrumbungle Water	27-Sep-19		4-Oct-19	interim was 13/9/19	In progress			Confirm if current testing (NSW Health project) is sufficient; what else should be tested for if not?	check RWQ assurance program (refer IDs 120, 287)	
314	Binnaway	Filtration	Investigations	Filter media has been washing out of filters, further investigations could be undertaken to ensure the filter media and design is appropriate		ORANA meetings pre October 2017	WarrumSCSep t16.3	Oct-2017	Medium	Supervisor South	27-Aug-19		31-Dec-19		In progress			Media has been replaced.	Confirm if filter media is still washing out of filters	
315	CLH, MDN		Investigations	Coolah and Dunedoo bores may have a risk due to flooding and local land use this should be reviewed and additional monitoring could be requested from NSW Health during high rainfall/flood periods. It was recommended that a memo be created.		ORANA meetings pre October 2017	WarrumSCSep t16.4	Oct-2017	Medium	Technical Officer	27-Sep-19		4-Oct-19	Interim deadline was 30/9/19 (review RWQ assurance program)	In progress					Review action against raw water quality assurance plan (see also items 120, 287, 313)
317	Coonabarabran	WTP	Plant optimisation	Further optimisation and investigation is to be undertaken at Coonabarabran WTP.		ORANA meetings pre October 2017	WarrumSCSep t16.7	Oct-2017	Medium		27-Aug-19				Closed				Covered by a variety of other specific actions	
319	Binnaway		Plant optimisation	Review the pH target for Binnaway and set based on optimum for pH and calcium carbonate precipitation potential.		ORANA meetings pre October 2017	WarrumSCMar 17.4	Oct-2017	Medium	Supervisor South	27-Aug-19		1-Feb-21		In progress			To be further investigated	Request advice as part of upgrade project. Potentially using RO treatment for partial stream	
320	Baradine	Reservoir	Minor works	Council to check if replacement of the ladder on the Baradine Reservoir is included in the Lower Macquarie Alliance reservoir work.		ORANA meetings pre October 2017	WarrumSCMar 17.5	Oct-2017	Medium		27-Aug-19				Complete				Internal ladder has been replaced. External ladder to be investigated as part of reservoir upgrades.	
339	All			Develop system wide SOPs		30 July 2019 Improvement Plan review meeting	A15	Jul-2019	Medium	Manager Warrumbungle Water; Supervisor	30-Jul-19		31-Dec-19	Interim	Not started			Refer to related actions 85, 86, 103, 105, 107, 108, 109, 110, 131, 103, 216 27/9/19: supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get	Compile existing SWMS Develop list of required SOPs (including those to be developed by Hunter	
340	All			Development of WTP maintenance schedules		30 July 2019 Improvement Plan review meeting	A16	Jul-2019	Medium	Manager Warrumbungle Water; Supervisor	27-Aug-19		30-Oct-19	confirm with HH2O	In progress			Operation and maintenance schedules to be prepared by HunterH2O as part of NSW Health DWMS project.	To be included as part of Hunter H2O NSW health Project.	

# Warrumbungle Shire Council Improvement Plan

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7	All		Documentation / Protocol	Develop a regular review process to update the list of stakeholders. Ensure contact details are current and all relevant parties are involved in	1.3	Engaging Stakeholders			Sep-2016	Low	Manager Warrumbungle Water	27-Aug-19		31-Mar-20		Not started					To be reviewed as part of DWMS review and update (action 334)	
39	All		Documentation / Protocol	The identification and evaluation of preventive measures should be internally reviewed 12 months. Every five years (or upon any significant changes to any of the water supply systems) Council should undertake a comprehensive review. The	3.1	Preventive Measures and Multiple Barriers			Sep-2016	Low	Manager Warrumbungle Water	27-Aug-19		31-Dec-19		Not started					Risk assessment review to be completed as part of NSW Health DWMS project (Hunter H2)	Schedule to be reviewed as part of DWMS review and update (action 334)
145	Coonabarabran		Documentation / Protocol	Continue developing the existing asset registers to develop an electronic database that includes details such as; age of infrastructure; expected life; last service date; maintenance frequency; manufacturer; recorded failures; responsibility for maintenance; operational procedures; and records for maintenance of equipment (including calibration). This should include any monitoring instrumentation.	4.4	Equipment Capability & Maintenance			Sep-2016	Low	Manager Warrumbungle Water	27-Aug-19		31-Dec-19		In progress					Asset register is updated annually following completed capital projects. 5 yearly evaluation of asset evaluations (last FY16/17)	asset management plan to be developed following IWCM finalisation and update of strategic business plan. Interim IWCM completion.
146	Coonabarabran	Filtration	Investigations	Review current filter bed depth against design depth and consider increasing media layers for better size to depth ratio.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Low	Supervisor North	27-Aug-19		30-Jun-20		In progress					Filter inspection undertaken.	To be included as part of filter media replacement
147	Mendocarra	Disinfection	Investigations	Consider insulating the chemical storage shed to lesson chlorine degradation.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Low	Project Engineer	27-Aug-19		31-Oct-19	Interim deadline	In progress					To be upgraded to gas	
148	Coonabarabran	Organics Removal (catchment)	Investigations	Consider planting vegetation in/around Timor Dam to absorb organic contaminants used by algae for growth.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Low		27-Aug-19				Closed					Vegetation surrounding dam currently. Mixer installed.	
149	Coonabarabran	Fluoridation	Investigations	Analyse scale forming in fluoride system and on dosing spear.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Low	Manager Warrumbungle Water	27-Aug-19		31-Dec-19		In progress						Included as part of task 4 Hunter H20 NSW Health project
154	Bin	Laboratory	Major works	Consider a transportable building to provide adequate laboratory space with storage cupboards and lab sinks to facilitate daily testing. This would be an opportunity to	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI BIN002	Jan-2019	Low	Supervisor South	27-Aug-19				Closed					The current laboratory space is inadequate for housing the necessary laboratory equipment to carry out the required daily testing regime.	Required daily testing is being carried out. Additional building not considered necessary at this stage.
194	Coonabarabran	pH correction (pre-coagulation)	Investigations	Investigate the need for raw water softening and possible alternate chemicals for pH correction.	4.5	Materials & Chemicals	CWT report May-15		May-2015	Low	Supervisor North	27-Jun-19		31-Dec-19	interim	Not started	2016-10: (Section 4.2.1.2, p.10 of CWT report)				27/9/19: meanwhile bore water in use, which is very soft; however most dosing problems overcome (maintenance, different pumps); investigate changing to soda ash from lime (lime cheaper but soda ash	Check CWT for action details; get costs for soda ash to compare + investigate cost/requirements for change over
218	All		Monitoring	Consider providing water quality data in water rate notices to customers	5.3	Short-term evaluation of results			Sep-2016	Low	Manager Warrumbungle Water	27-Aug-19				Closed					Currently provided on Council website.	
224	All		Documentation / Protocol	Consider implementing a procedure in consultation with local hospitals to ensure dialysis patient details remain up to date.	6.1	Communication			Jun-2016	Low	Manager Warrumbungle Water	27-Aug-19		31-Oct-19		Not started					Finalisation of ERP to be included as part of NSW Health project. List of dialysis patient previously investigated.	To be included as part of ERP update (action 8). Investigate if list has been developed Refer to action 229 (obtain
250	All		Documentation / Protocol	Council may consider providing water quality data on residents rates notices and/or publishing some of this data on their website and in Council's Annual Report	8.2	Communication			Sep-2016	Low	Manager Warrumbungle Water	27-Aug-19				Complete					Currently provided on Council website.	
252	All	Performance monitoring	Monitoring	Increase review of water quality performance and utilisation of water quality data to improve understanding of the effectiveness of treatment and to	9.1	Investigative Studies & Research Monitoring			Sep-2016	Low	Manager Warrumbungle Water	27-Aug-19				Implemented					Quarterly DWMS reviews undertaken Fortnightly review of CCP data (exceedance summaries), sent to Supervisors and Manager and reviewed in operations meeting.	
260	All		Documentation / Protocol	As part of Council's review of the DWMS risk assessment, review and discuss the effectiveness of	9.2	Validation of Processes			Sep-2015	Low	Manager Warrumbungle Water	27-Aug-19				Closed					Covered by review of DWMS review and update (action 334)	

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263	All		Documentation / Protocol	Develop a policy on validation of new or upgraded water supply infrastructure. This should include witness, demonstration and commissioning requirements that are designed to ensure the infrastructure delivers the expected water quality results.	9.3	Design of Equipment			Sep-2015	Low	Manager Warrumbungle Water	27-Aug-19		30-Sep-19		In progress				In progress, no documents yet developed	Draft document
264	All		Documentation / Protocol	Review existing documentation on the water supply systems and ensure all are captured on Council's document management system. Verify documents are up to date.	10.1	Management of Documentation & Records			Sep-2015	Low	All	27-Sep-19		31-Oct-19	was 30-9-19; revise next month	In progress				InfoXpert used as document management system. Incoming correspondents are documented. Staff have received training. Implementation still ongoing. 27/9/19: added to supervisor checklists; Jacinta provided current location + procedure	Water project information to be put on InfoXpert (all)
277	All		Documentation / Protocol	Develop internal audit procedures and schedules appropriate to functionality of council and the water supply systems.	11.2	Audit of Drinking Water Quality Management			Sep-2015	Low	Manager Warrumbungle Water	27-Aug-19		31-Mar-20		Not started					Review schedule as part of DWMS project update (action 334)
278	All		Investigations	Identify appropriate personnel to undertake the internal audit and provide training in auditing.	11.2	Audit of Drinking Water Quality Management			Sep-2015	Low	Manager Warrumbungle Water	27-Aug-19		TBC		Not started				Wait until NSW Health audit guidance is audits	
279	All		Critical control point	Document and report results of CCP exceedances in annual report for Council	11.2	Audit of Drinking Water Quality Management			Sep-2015	Low	Manager Warrumbungle Water	27-Aug-19		31-Oct-19		In progress				CCP results reported monthly to General Manager. Annual report being developed (to go to Council)	
280	All		Documentation / Protocol	Develop external audit procedures in consultation with NSW Public Health Unit.	11.2	Audit of Drinking Water Quality Management			Sep-2015	Low	Manager Warrumbungle Water	27-Aug-19		TBC		Not started				Wait until NSW Health audit guidance is audits	
327	Binnaway	Filtration		Investigate filter outlet valve replacement (spare valve sitting on site)			27 June 2019 Improvement Plan review meeting	A3	27-Jun	Low	Supervisor South	27-Sep-19		30-Mar-20	was 30/9/19	Not started				Not yet installed.	To be included as treatment plant upgrades