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	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
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 performance to the board or chief executive.	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, Kenebri), Mains North (Coonabarabran), Baradine, Binnaway, Mendooran . For future review versions: Manager WW – Special Projects to inform Technical Officer who is to distribute copies and keep record of this(under comments section in the spread sheets).				
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		
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 activities or formal requirements.	1.2	Regulatory and Formal Requirements			Sep-2015	Medium	Manager Warrumbungle Water	28-Feb-20	31-Mar-20		Closed			13/12/19: Consultant has provided proposal to review and update DWMS 28/2/20: Closed as included as part of action 334	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	30-Jul-21	20-Dec-21	implement WQ meetings	In progress			Quarterly review meeting to cover water quality obligations, alternate staff attendance at meetings. 28/2/20: To consider schedule of to re-implement water quality meetings 30/7/21: monthly all WW staff meetings held with relevant items brought up on agenda; fortnightly water quality summary circualted to relevant staff; DWMS being updated; WQ still to be re-implemented	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	28-Feb-20	31-Mar-20		Closed			13/12/19: Consultant has provided proposal to review and update DWMS 28/2/20: Closed as included as part of action 334	How this is documented to be reviewed in updated DWMS (Action 334)	
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 engagement processes.	1.3	Engaging Stakeholders			Sep-2016	Low	Manager Warrumbungle Water	28-Feb-20	31-Mar-20		Closed			13/12/19: Consultant has provided proposal to review and update DWMS 28/2/20: Closed as included as part of action 334	To be reviewed as part of DWMS review and update (action 334)	
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 drinking water supplier. Where possible, this list should also identify the accountabilities and responsibilities of relevant agencies in support of the water supplier. This list will be included in this DWMS (in the main body) and maintained as a separate document referenced in Appendix D. It is also recommended that the contact register be inserted on a separate page so that it may be easily printed and posted on workplace walls.	1.3	Engaging Stakeholders			Mar-2015	High	Supervisor Treatment	30-Jul-21	30-Sep-21	complete key suppliers	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 operational staff).		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, including setting review times 13/12/19: Confirmed that development of ERP is to be undertaken as part of Hunter H20 NSW Health project. 20/2/20 - Lists to be included in DWMS when updated 24/7/20: IRPs workshop held on 2/7; Bligh Tanner work to be provided to HH2O 24/3/21: CW to ask CN to add to her task list including finalisation (info from supervisor) + annual or six-monthly review/update 30/7/21: Supervisor Treatment to complete key supplier lists	Following finalisation of ERP, stakeholder lists to be included in DWMS	
9	All		Documentation / Protocol	Develop appropriate mechanisms for stakeholder commitment and involvement. Document the planned approach including partnership agreements or Memorandum of Understanding (MoU).	1.3	Engaging Stakeholders			Sep-2015	Medium	Manager Warrumbungle Water	28-Feb-20	31-Mar-20		Closed			13/12/19: Consultant has provided proposal to review and update DWMS 28/2/20: Closed as included as part of action 334	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		
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		
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 sufficient to meet peak day demands.	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 --> 24/11/20: no DP measurement device currently installed	2.1	Water Supply System Analysis	Hunter H2O Audit 2014	BWY009	2014	Medium	Supervisor Treatment	24-Nov-20	30/06/2021		Closed	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) 28/2/20: Consider online turbidity FY20/21 in advance of automation project 24/11/20: online NTU include under (A328 - Automation)		
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 to any of the water supply systems. Review will assess any seasonal trends, consistent exceedances or other potential water quality issues. The formal review process and records of the outcomes of these reviews should be documented.	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 reviewed in operations meeting. Monthly report to General Manager of CCP exceedances		
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.				
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			Water quality data reviewed as part of quarterly meeting and annual DWMS review report		
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 Treatment	24-Apr-20	13-Mar-20		Complete			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 27/9/19: need info of equipment to be reused (alarming system + scales) + drone pictures (Coolah) 13/12/19: Breathing apparatus still to be made available. Project management resources - proposal has been sought 28/2/20: Eyewash not yet installed and breathing apparatus still to be made available. 24/4/20: Eyewash installed and breathing apparatus available.	Upgrade project also to include. Need info of equipment to be reused (alarming system + scales) + drone pictures (Coolah)	

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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 inundating an access pit for the backwash flow meter.	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 the plant operation. It was noted that back flow prevention valves have been installed to prevent the reoccurrence of chemical backflows to the clear water tank. A small leak in the main RPZ installation post service water pumps needs addressing for WHS reasons and because it is inundating an access pit for the backwash flow meter. The day log for water quality data showed the	Leak has been completed		
19	Mendooran	Service Water	Minor works	Repair service water system to supply water at pressure to the chemical dosing boards and safety showers. A backflow prevention valve should be installed post last connection for eyewash/safety showers to prevent this situation reoccurring. Council should satisfy themselves as to whether this should be a testable device. Consider running a service water line across to the laboratory for the purpose of treated water testing.	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 construction. The system is currently running off the town water supply which is not at a high enough pressure to efficiently run the eyewash/safety showers.	Service water system has been repaired. Testable backflow prevention valve has been installed (2018). Service water line to no longer considered necessary.		
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	28-Feb-20		TBC	Closed			Review of risk assessment to be undertaken as part of NSW Health DWMS project risk assessment review 24/7/20: closed as included in new action A351		
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 obstructions The location and installation of the safety shower eyewash must comply with Australian Standard AS4775-2007 Designate an evacuation assembly point for the site. The assembly point is to be sign posted and discussed in contractor/personnel inductions to site. The assembly point is to take into account proximity of chlorine dosing facility. More than one assembly point may be needed (depending on wind direction, one may be more appropriate than the other)	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	CLH009, CLH010	2014	Medium	Supervisor Treatment	24-Nov-20	6/03/2020		Complete		· 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 AS4775-2007. · There is no designated evacuation assembly point for the site in the event of an emergency	Evacuation assembly point to be allocated and sign posted. 13/12/19: Still to confirm if eye wash station has been installed. Signs have been ordered (evacuation and meeting point) and waiting to be delivered. 28/2/20: Eyewash station has not been installed. Signs have not been delivered. 24/11/10: complete (incl. BA installation)	Signs to be installed following delivery Investigate portable eyewash station	
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 Treatment	24-Jul-20	30/05/2020		Complete	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) 13/12/19: Dependent on outcomes of review of need for plant upgrade/replacement 28/2/20 Quotes to undertake work are being reviewed 24/7/20: completed		
24	BWY	Environmental	Minor works	· Redirect the drain flow from the soda ash/alum dosing room to the external alum bulk storage bund --> **complete** · Take measurements of the bund wall, the tank and determine the angle from the top of the tank to the bund wall and ensure the bund complies with Australian Standard AS3780 --> measurements taken, volume is suff sufficient however angle might not · Ensure the chlorine room ventilation complies with the requirements of Australian Standard AS2927 --> **complete** · Investigate if the forced ventilation fan needs to be larger to provide adequate ventilation --> **complete**	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BWY012, BWY013, BWY014	2014	High	Supervisor Treatment	30-Jul-21	30-Sep-21	check bunding compliance	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 bunded area may potentially not comply with Australian Standard AS with regard to appropriate angle from the top of the storage tank to the top of the bund wall · There is limited ventilation in the chlorine dosing room which is a potential safety hazard		Investigation still needed To be included in treatment plant upgrades Chlorine room items covered under action 329 13/12/19: Have received quotes, sizing to be confirmed. HunterH20 audit to be undertaken next week, HunterH20 to confirm requirements 28/2/20- see update action 23 24/7/20: chlorine room items addressed (see also action 23); soda ash/alum bunidng outstanding 24/11/20: soda ash/alum bunding still required 24/3/21: need to put a sump in dosing room, put sump in and redirect to bunding or to future fluoride room when the chemical tank for it gets installed; compliane with AS3780 for bunding still to be confirmed 30/7/21: compliance with AS3780 still to be confirmed (assing to TL Treatment Nth); in case of non-compliance a self-bunded tank would need to purchased, which could be covered under future funded upgrade works		
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	CLH	Disinfection	Minor works	· Organise for chains to be installed to secure the cylinders in place and reduce the risk of the cylinders falling over · Investigate ventilation requirements as outlined in Australian Standard AS2927. Implement ventilation modification if required to comply with the Australian Standard. This may be achieved through improved forced ventilation or modification to the vents for cross ventilation · Chlorine gas is an oxidising agent and sources of fuel should not be stored in the same room. · Items stored on the ground in the room poses a trip hazard and should be removed or store in a more tidy manner.	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	CLH006, CLH007, CLH008	2014	High	Project Engineer	30-Jul-21	31-Dec-21		In progress	· 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 a cylinder topple over. · There is currently no forced ventilation in the chlorine dosing room. · Redundant equipment and boxes are contained in the chlorine dosing room		Chains have been installed All other items to be addressed FY19/20 (replace chlorine room). Tender to be developed. 27/9/19 & 13/12/19: need info of equipment to be reused (alarming system + scales) + drone pictures (Coolah) 24/4/20: Cylinders have chains so can be secured 24/7/20: outstanding only is chlroine room upgrade 24/11/20: as above 24/3/21: AM reviewing previously prepared Tech Specs to be able to call RFQs 30/7/21: Project Engineer sent out and receive back RFQs, however insufficient budget - BP report to August 2021 meeting		
27	Mendooran	Reservoir Hypochlorite	Minor works	· Cover and secure the dosing line and dosing point at the reservoir. · Install a chemical bund in the hypochlorite dosing room. Consider constructing a bunded fill point for the delivery vehicle	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	MEN014, MEN015	2014	High	Supervisor South	27-Jun-19			Complete	The sodium hypochlorite dosing line and dosing point is: · Exposed and unsecured. There is the potential for damage for damage, contamination or vandalism · Not currently bunded. Any chemical leaks/spills will be unable to be contained		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	Supervisor Treatment; Director Environment Services	24-Apr-20	31/03/2020		Implemented	No schedule for electrical equipment tagging is currently in place		Manger sent email WHS representative - waiting for reply. 13/12/19: Baradine tagging has been complete. CBN still to be done 28/2/20: CBN still to be done. All depots have been done. Electrician to be engaged for CBN. 24/4/20: Electrician has been engaged	WHS representative to table at next committee meeting. Organise tagging for CBN Director to raise at senior level for issue across Council.	
29	Bugaldie	Safety	Minor works	· Re-route the dosing line to reduce the risk of chemical contact in the event of a leak in the dosing line. · Remove redundant materials from the site shed and maintain housekeeping	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BUG007, BUG09	2014	High	Supervisor North	30-Jul-19	31/07/2019		Complete	· 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 · The site shed contains material and objects that is untidy and can present a trip hazard		Line has been moved and shed housekeeping has been complete		
30	Mendooran	Safety	R&D	Investigate methods to maintain a higher pressure in the eyewash station water line. This may include: · Booster pump · Constance pressure valve	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	· Ensure that open pits have appropriate handrailing/fencing/bollards installed around the pit perimeter · Ensure confined spaces have appropriate signage installed · Remove redundant material from the site shed and ensure it is kept tidy and de-cluttered · Remove redundant signage from the site relating to chlorine gas and install signage appropriate to hypochlorite · Routinely (weekly) test operate the safety shower to flush the line and ensure that it is operating reliably. · Test and monitor the safety shower water temperature to ensure that it complies with the appropriate Australian Standard. · Tidy switch room and either dispose of redundant equipment or store at the council depot. · Cover and lock the below ground access to the decommissioned bore.	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	DUN011, DUN012, DUN013	2014	High	Supervisor South	27-Jun-19			Closed	There are various safety hazards on site relating to the following issues: · Valve pits · Confined spaces · Housekeeping · Signage The safety shower is located outdoors and in an area exposed to sunlight		Open pits have been covered. Consultant to be engaged to develop Confined Space register. Site has been tidied and redundant equipment removed. Hypochlorite signage has been added, gas signage removed. Decommissioned bore has been covered and locked Action closed, with outstanding items covered by action 336 and 337	Safety showers to be regularly tested (covered under action 336) Confined spaces to have appropriate signage (action 337)	
32	Kenebri	Safety	Minor works	· Ensure the water tank support structure integrity is inspected and repair as required · Remove redundant materials from the site shed and maintain housekeeping · Install signage on the access gate and chlorine dosing room indicating that hypochlorite is stored and in use · Install a fire extinguisher on site and appropriate signage, including a contact list in case of an incident or emergency	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	KEN008	2014	High	Supervisor Treatment	24-Jul-20	30/06/2020		Complete	There are several site hazards that need to be controlled to reduce the potential for injury to personnel		New reservoir to be established on the ground. Current system to be demolished and decommissioned. 13/12/19: New reservoir is in place. Demolition of old reservoir being arranged 28/2/20: Getting quotes for removal of old reservoir. Signage is being organised. Fire extinguisher to be installed and added to schedule to inspect (Property Officer) 24/4/20: Signs ordered for all sites, hazmat tubes to be installed. Fire extinguishers planned to be installed in May 24/7/20: old reservoir demolished; shed repaired; signage & HAZMAT info installed; fire extinguisher installed (as well as BUG) with 6-monthly service this month		
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	13-Dec-19	31/10/2019 was 30/9/19		Complete	There is no safety shower on site		Currently investigating all shower / eye washes (North) 13/12/19: Portable eyewash station has been purchased		
34	Bugaldie	Safety	Minor works	Ensure the water tank support structure integrity is checked and repaired as required Install a fall arrest or ladder cage to reduce the chance of a fall when accessing the reservoir Install a lockable cover at the base of the ladder to prevent unauthorised access Install a handrail around the tank platform	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BUG008	2014	High	Supervisor Treatment	24-Jul-20	30/06/2021		Closed	The reservoir ladder and support structure does not contain any of the following: · Fall arrest system · Cage · Lockable cover · Handrail around the outside edge These risks made higher given the fact that the site is easily accessible to the public		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 --> manproof fence? WEARS looked at tank stand integrity 13/12/19: Still to be investigated 28/2/20: Consider replacement of tank with onground reservoir with pump and back-up generator to remove working at height risk. Consider as part of risk assessment 24/7/20: do similar set-up to KBI - approx. $20k; quote for fencing received; closed as included in new action A352	Consider as part of reservoir upgrade program.	
35	BAR, DUN, KEN	Security		Ensure facility is securely locked, public access is prevents 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 compound		All sites are locked, electronic keys have been installed for all sites.		
36	Mendooran	Security	Minor works	Install a lockable door and ensure access to the treated water tanks and/or pumps are secured and locked to reduce risk of damage	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	Install signage on the front entrance to indicate Plant contact details and hazardous materials are stored on site. Install appropriate signage displayed that indicates the following information: · Chemical contained within the room · Chemical UN no. · Chemical category/classification with appropriate symbol Install a fire extinguisher with appropriate signage on site and include an emergency contact list in case of an incident or emergency	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BIN008, BIN015, BIN016, BUG010, COH011, MEN013	2014	High	Supervisor Treatment; Technical officer	24-Jul-20	31/03/2020		Complete	Insufficient signage on site entrance and/or chemical dosing and storage rooms The front entrance gate currently has no signs installed indicating that there are hazardous materials stored on site There is insufficient signage on the alum and soda ash chemical storage and dosing facilities		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) 28/2/2020: HAZCHEM signs installations are being installed. Fire extinguishers to be arranged. 24/4/20: Fire extinguishers planned to be installed in May. All have HAZCHEM boxes, signs are been ordered. 24/7/20: complete		
38	Mendooran	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)				
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 review should also consider whether existing control measures are being undertaken, their effectiveness and whether they are appropriately documented and formalised. The review process and records of the outcomes of these reviews should be documented.	3.1	Preventive Measures and Multiple Barriers			Sep-2016	Low	Manager Warrumbungle Water	24-Apr-20	31-Oct-20		Closed			Risk assessment review to be completed as part of NSW Health DWMS project (Hunter H20) 24/4/20: As part of NSW Health project, commencing, dependent on COVID restrictions for initial site visits 24/7/20: closed as included in new action A351	Schedule to be reviewed as part of DWMS review and update (action 334)	
41	BIN, BUG, CBN, KEN	Catchment & Abstraction	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 funding is available from insurance claim.	3.1	Preventive Measures and Multiple Barriers	Risk assessment	1.05	Mar-2015	High	Supervisor North	13-Dec-19	31-Dec-19		Complete	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) 13/12/19: Fencing has been complete		
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 contractors, whether hatches meet current standards and how any level sensors/telemetry cables or other roof penetrations can be weather proofed. Hatches/entry points should extend a minimum of 100mm above the roof line to exclude stormwater and should be able to be locked to prevent unauthorised entry. As the reservoir is showing signs of leakage some consideration should also be given to structural soundness and whether the reservoir can be lined/waterproofed. A young tree growing immediately adjacent to the reservoir should be removed to prevent any potential damage by roots. Other trees in the immediate vicinity that could drop branches onto the roof should have branches removed that pose a foreseeable threat. This would also help to reduce potential contamination of the reservoir from leaf drop.	3.1	Preventative Measures and Multiple Barriers	DPI Inspections	DPI COH003	Jan-2019	High	Project Engineer	27-Aug-19	31-Oct-19		Complete		Martin St reservoi	Entry hatches have been replaced (May 2019) Structural assessment has been undertaken. Integrity issues complete Tender to be prepared to undertake external concrete repairs. Reservoir to be replaced FY23/24	Tender to be prepared to undertake external concrete repairs.	

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
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	13-Dec-19			Complete	2018-05: BUG: Operational staff used drone to inspect tank. This revealed a collapsed roof which was repaired. KBI: Reservoirs are due for replacement due to structural issues of the tank stand.	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) 13/12/19: Kenebri system has been replace with two tanks and pump (completed in October 2019)		
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 to maximise CT.	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?). 2018-05: The CCP target for disinfection was 1.4 - 1.5 mg/L as of 3/2018 but is higher on average (1.55), new target after DWMS meeting: 1.4 - 1.8 mg/L. Reservoir mixer will be installed in FY2017/18.	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 launder) BUT increased clarifier corrosion --> AM; recalc/confirm current CT (tank dimensions); install inline static mixer (increase baffle factor??? NO); relocate service to retic main; next customer; increase baffle factor in tank by modification if still required; WIS circular 18 (including bunding of chemical tank/reduce size of tank); self bunding tank -	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??			
48	BUG, BDN, KBI	Catchment & Abstraction	Investigations	Bore investigations (integrity, capping, geology, exclusion zones - fencing)	3.1	Preventive Measures and Multiple Barriers	Risk assessment	1.03	Mar-2015	High	Supervisor Treatment	24-Jul-20	30-Jun-21		Closed	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 shallower 31/10/2018: Supervisor North; quotes for BUG fencing; Manager talk to regulatory services		Contractor to inspect first week of September 19, and provide quote to address integrity issues at bores (BUG, BAR, KEN) 13/12/19: Inspections have been carried. 28/2/20: Works still to be undertaken. Oriana project to review and fix bore casings. 24/7/20: fencing BUG see item 34; assume no (updated) septic tank rgister or mgt system within Council; bore integrity covered as part of reservoir upgrade project - WEARS to provide quotes; OWUA project: need update from OWUA (issue PO for our contribution); closed as included in new action A352	Consider as part of reservoir upgrade program.	
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			
50	BUG, BDN, KBI	Catchment & Abstraction	Investigations	Private water bore inspections, bore register	3.1	Preventive Measures and Multiple Barriers	Risk assessment	1.03	Mar-2015	High	Manager Warrumbungle Water; Technical Officer	30-Jul-21	31-Aug-21	Media Release	In progress	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	13/12/19: Discussion at Oriana meeting and with NSW Health advised against providing any such communication due to perceived risk. Still considered to be a risk. Comms notice to also consider water security. 24/7/20: no progress; media release recommended 24/3/21: Media release to be prepared; Tech Officer to liaise WaterNSW re bore register & Doug Moorby 30/7/21: private bore inspections not intended; some bore information can be obtained from Water NSW; Media release to be prepared	Consider Media / comms for residents on importance of water security and contamination of bores, sustainability. Investigate information available on the subject (Tech Officer)	
51	Baradine	Disinfection	Major works	re CT: Change reticulation configuration so all water must go though 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	Mendooran	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		
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; Supervisor Retic; Technical Officer	30-Jul-21	31-Aug-21	ELT report	In progress	Need backflow prevention policy Regulatory services police (that they do it properly); need RPZ register (including inspection intervals) STPs, SPSs, dump points, parks/gardens (chemicals) - standards? Hospitals, dentists,	consultant to develop? Get proposals (e.g. Key environmental) Supervisor North to get proposals//funding (SS follow up with Mark Nave)? Check with regulatory services if this is done	Policy and register and inspection program still to be developed 13/12/19: Engaged consultant, to review documents produced 28/2/20: Policy and procedure produced and reviewed. Council to adopt. Consultant also developing register, which should identify high risk areas. 24/7/20: backflow policy and register drafted, however finalisation cannot occur until fees/charges are clarified and Council internal register set-up + admin resources allocated (Tech Officer positon currently vacant) 24/11/20: as above 25/3/21: Tech Officer to finalise register in collaboration with Supervisor Retic (currently vacant); Manager to draft ELT report re implentation recommendations 30/7/21: Backflow policy to be finalised incl backflow register; then communcation to owners need to occur re implementation; requires admin support	Tech Officer liaise with consultant and investigate setup register in council systems (Authority)	
54	BAR, BIN, CBN, MDN	Coagulation & Flocculation	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	28-Feb-20	30-Jun-21		Closed	MDN has interlock; rest discussed - will be with upgrades (SCADA/Automation)		Scheduled as part of automation project. Project plan ID 35 28/2/20: Scoping study is underway Closed, as part of automation project (action 328)	To be included as part of process monitoring, automation and instrumentation project (action 328)	

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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?	In FY16/17 budget for CBN **sewer** sites only	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		2018-05: Note - in light of this comment, replacement of KBI system with BUG like system is not advisable?	Not considered viable.		
57	Mendooran	Catchment & Abstraction	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!			
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 Treatment	24-Apr-20	6/03/2020		Complete	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 to seal operational CLH bore (within frame of reservoir upgrade) and concrete cap abandoned bore, which has already been welded shut.	is there a standard for capping/plugging bores (AS) -- MG (chase with Dale); WIS to seal bores	Coolah bore to be capped (ID 15) 13/12/19: Current bores in Coolah have been sealed. Contractor has been engaged to cap bore at Coolah. 28/2/20: Dunedoo in a raised shed, is enclosed in shed. No gaps in integrity. 24/4/20: CBN has been sealed, Coolah sealed 24/4/20		
60	Kenebri	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 durable/flexible/resistant sealant)	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	31-Oct		Complete	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. 13/12/19: External work to remove asbestos has been differed. Waiting on clarifier status. Majority has been cleaned, action closed, no other short term actions available		
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			Complete	2018-05: Obtained quote to upgrade reservoir to comply with Circular 18 + included in FY2018/19 capital budget.		Completed May 2019		
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 engagement (confirm in scope)	Closed, covered by Action 48		
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	24-Jul-20	31-Dec-20		Complete	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. 13/12/19: Have a quote for works to fix integrity. Contractor to be engaged 28/2/20: Purchase order given to contractor. Waiting for contractor to schedule site visits. 24/4/20: Have manufactured required hatches, postponed due to COVID restrictions (unable to cross border) 27/4/20: WEARS been on-site and installed new hatch; reservoir sealed (however WEARS needs to come back to replace again due to slight error in measurements)		
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			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			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		
68	Baradine	Clear water tank	Major works	Seal the clear water tank against vermin and contaminants. Install bunds around the chemical dosing systems.	3.1	Preventative Measures and Multiple Barriers	Hunter H2O Audit 2014	BAR010	2014	High	Supervisor Treatment	24-Jul-20	13/04/2021		Closed	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. 13/12/19 & 28/2/20: Bund installation waiting on recommendations for WTP upgrades/replacements (related to action 78) 24/7/20: see last comment; installation of bund + sump required in chem dosing arae (to put ot alum tank bund); installation of self bunded soda ash tank still outstanding; closed as included in new action A350	Bund to be installed, building modifications to be complete prior to installation.	
69	Mendooran	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?) 2018-05: CCP of <0.2 NTU has been adopted.				
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				
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.		

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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 the outcomes of these reviews should be documented. The DWMS documentation should also be updated accordingly.	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, BWY, 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	Supervisor Treatment	30-Jul-21	30-Sep-21	13/3 (long term trends)	In progress		2016-10: Undertake jar tests and confirm the appropriate coagulant dose; base change over between lagoons on outlet turbidity CBN: Introduce action limits on water quality requiring actions such as jar testing, optimising alum/polymer dose rates, switch between lagoons. MDN: enhanced management, e.g. when to undertake jar tests and switch between lagoons	27/9/19: turbidity; pH (e.g. should be 6-7 if alum is used) 28/2/20: Supervisor to propose OCP (>3 NTU, pH dependent on coagulant) 25/3/21: values determined for each lagoon system; need to be added to CCP reference guide 30/7/21: paper form list (with NTU and pH setpoints) to be forwarded to consultant to include in updated CCP reference guide		
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. MDN: enhanced management, e.g. when to undertake jar tests and switch between lagoons	27/9/19: refer to ID 74	Discuss setting OCP at quarterly review meeting. Technical officer to prepare long term trends	
76	BIN, CBN, MDN, CLH, DUN	Catchment & Abstraction	Critical control point	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 process and cannot be controlled. Therefore, it will not be considered as CCP.			
77	Coonabarabran	Filtration	Critical control point	Review filtration CCP target and limits to be in line with ADWG recommendation (<0.2 NTU).	3.2	CCPs	CWT report May-15		May-2015	Very high	Supervisor Treatment	24-Jul-20	30-Jun-20		Complete	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 achieved once raw water turbidities increase. Requested funding through NSW Health to perform a filter media inspection to assess if media requires replacement.	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 target limit has been changed to 0.3 NTU, operational limit 0.5 NTU. Will have difficulty in meeting limit when source water is changed to the dam water. 13/12/19: Following improvements to filter, reduced critical limit should be able to be achieved when source water is changed 28/2/2020: Filter needs to be refurbished prior to media replacement. Have repaired area where there was bypassing. Result have improved. HunterH20 is providing a proposal to assist with replacement with sourcing and quantities. 24/7/20: NTU constantly < 0.1 (previous gullet repair); however media replacement still required but target met	Filter upgrade	
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 Treatment	24-Jul-20	31-Dec-20		Closed	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 budget. 2018-11: NTU meter purchased and in use		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 and trouble-shoot (Health project); settled water and filtered water NTU are currently the same(!); BW done every day, if increase in NTU another one is done 13/12/19: Filter inspection are complete, waiting on report. Filters need replacing. 28/2/20: Waiting on clarifier project to be resolved. NSW Health have been involved in discussions are reviewing with DPIE 24/4/20: Budget for filter replacement, however this needs to be replaced at same time as clarifier. 9 April 2020 teleconference held to discus Baradine clarifier with DPIE, waiting for DPIE to provide their advice in writing. 24/7/20: closed as included in new action A350	Waiting on clarifier and filter replacement	

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
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 'Equipment Calibration & Maintenance') 2018-05: Filter media replacement planned starting 25/06/18. 2018-07: filter media replaced		CCP limit reduced to 0.2 NTU (March 2019?) Filter media replaced (June 2018) Generally meeting new limits.		
80	All		Training	Relevant staff members must be trained to ensure they understand what the CCPs are and why they are important. This training should include use of the HACCP Summary Tables, associated target, Alert and Critical Limits, as well as the monitoring requirements to ensure the CCPs remain in control.	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 (Supervisor/Team Leaders). Changes are passed on to operators via tool box talks.		
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 CCPs/COPs for Shire outstanding		
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	Manager Warrumbungle Water	24-Apr-20	30-Sep-20	Interim (finish concept design)	Closed	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. 13/12/19: Consultant engaged to undertake concept design (site visit has already been undertaken - Nov 2019) 24/4/20: Consultant has submitted documentation (site constraint and design report). Have had meeting with Consultant on progress this week. Consultant to submit further information needed to progress. Action closed, as now covered into new combined Action 345	Find funding following concept design finalisation (liaise with DPIE)	
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 Treatment	28-Feb-20	30-Jun-20		Closed	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 resources (safely access issue)		Contractor has been engaged to assist with working at heights access to reservoirs. Work to improve access ongoing. 13/12/19: Engaged WEARS to undertake this work 28/20/20: Action closed as covered by new action 343	Follow up with WEARS	
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			Closed			Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote f to develop the rest 28/2/20:Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required SOP/SWMS	
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	Closed			Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote f to develop the rest 28/2/20:Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required SOP/SWMS	
87	Mendooran	Sedimentation	Investigations	Investigate pH increase between raw and settled water.	4.1	Operational Procedures	CWT report May-15		May-2015	Medium	Supervisor Treatment; Manager Water	24-Apr-20	30-Sep-20	Interim (finish concept design)	Closed	(Section 4.2.3, p.11)		24/4/20: Consultant (CWT) has looked at issue current concept design, probably due to algae. Action closed, as now covered into new combined Action 345	Check that this issue is covered in recent CWT report and if any recommendations	
88	Mendooran	Disinfection	Investigations	Consider switching to chlorine gas disinfection.	4.1	Operational Procedures	CWT report May-15		May-2015	Medium	Manager Warrumbungle Water	24-Apr-20	30-Sep-20	Interim (finish concept design)	Closed	(Section 4.2.5, p.16)		Included as part of Mendooran upgrade 13/12/19: Consultant engaged to undertake concept design (site visit has already been undertaken - Nov 2019) 24/4/20: Consultant (CWT) has looked at issue current concept Action closed, as now covered into new combined Action 345	Refer to other action 171. Include pH and settled water investigations (action 87) Find funding following concept design finalisation (liaise with DPIE)	
89	MDN	Distribution	Documentation / Protocol	Implement a pro-active mains flushing program.	4.1	Operational Procedures	CWT report May-15		May-2015	Medium	Supervisor Reticulation; Technical Officer	30-Jul-21	31-Oct-21	Interim (order and print books)	In progress		(Section 4.3, p.17)	Schedules for Dunedoo still be developed. 27/9/19: waiting on Graham (flushing points DDO+MDN) 24/4/20: Flushing has been undertaken (exc Coolah and Dunedoo), but not formalised. Marty has picked points for a flushing program for all sites. Schedule to be put into a carbon copy book for each site for implementation 30/7/21: Carbon copy books still to be finalised	Order and print books	
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 North	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 instrumentation project (action 328)	
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.)		
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 (17th Oct 2014) be corrected and updated to accurately reflect the operational arrangement of the Mendooran Water Supply System.	4.1	Operational Procedures	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Supervisor South	22-Jan-19			Complete					

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
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.		
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		
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-usual results recorded by the EHO are to be immediately reported to WTP Operators and W&S Manager.	4.1	Operational Procedures	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19			Complete					
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 Treatment	30-Jul-21	30-Jun-20	Interim (determine reservoirs & engage)	Closed			24/4/20: Consultant has provided a proposal to look at mixing options. Binnaway reservoir has issues with water age. Other reservoirs with issues are included as part of other projects or are scheduled to be replaced. Reservoirs with C.t issue to be considered. 30/7/21: BDN res had a mixer installed in 2018; MDN Coolabah res are being looked at as part of funded future plant upgrade; BWY has diffent inlet to outlet; CLH Martin St res to be replaced in FY23/24 and Wentworth Ave res are looked at then (as potential new main site); DDO Rhodes St are being looked at re replacement (current CAPEX), Bullinda St has separte in/out; CBN res all have separate in/out; KBI/BUG have separate in/out --> new actions for Coolah and Dunedoo reservoirs A355 and A356		
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	24-Apr-20	31-Dec-19	Interim deadline	Closed		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. 24/4/20:Action closed as requirements of this action have been included in action 339 Develop System wide SOPs	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)		
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 organisational structure, clearly communicating roles and responsibilities of all staff relating to the management of drinking water quality.	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			
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 maintenance processes for main breaks)	4.1	Operational Procedures			Mar-2015	High	Manager Warrumbungle Water; Supervisors	28-Feb-20	31-Mar-20		Closed	Waiting for standard SOPs being developed by NSW Health		Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote f to develop the rest 28/2/20:Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required SOP/SWMS	
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	28-Feb-20	31-Mar-20	Interim	Closed			Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote f to develop the rest 28/2/20:Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required SOP/SWMS	
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 North; Supervisor South	28-Feb-20	31-Mar-20		Closed			Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote f to develop the rest 28/2/20:Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required SOP/SWMS	
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; Supervisor North; Supervisor South	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; Supervisor North; Supervisor South	28-Feb-20	31-Mar-20		Closed			Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote f to develop the rest 28/20/20: Action closed as covered by new action 343	To be included as part of action 343	

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
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	28-Feb-20	31-Mar-20		Closed	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) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote f to develop the rest 28/2/20:Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required SOP/SWMS	
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 North; Supervisor South	28-Feb-20	31-Mar-20		Closed			Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote f to develop the rest 28/2/20:Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required SOP/SWMS	
110	All	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	28-Feb-20	28-Feb-20	Interim (action 339)	Closed	Should be covered in relevant SOPs (Repair a water main break, Replace a water main) --> need to verify if this is the case		Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote f to develop the rest 28/2/20:Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required SOP/SWMS	
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.		
112	CBN	Distribution	Documentation / Protocol	Consider scouring program, including prioritisation of mains to be scoured	4.1	Operational Procedures	Risk assessment	10.03	Mar-2015	Low	Manager Warrumbungle Water; Supervisor Reticulation	24-Mar-21	31-Dec-20	Risk assessments	Complete			Scouring types investigated. Need for scouring to be evaluated. Priority reduced to medium, flushing has resulted improvements. 13/12/19: Due to improvements seen from flushing program, scouring program may not be immediately needed 24/4/20; A number of areas with previous problems, mains have been replaced. With flushing program improvements priority reduced to low. Issue to be discussed at risk assessment. 25/3/21: budget for Shire wide over the next years	Re-evaluate the need in the risk assessment	
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 + vacuum flask with filter + 0.2mm filter papers; typical dosing ratio KMnO4:soluble Mn = 2:1, if organics present 10:1, pH >8.5 favours oxidation	may need better quality KMnO4; pH will drop with chlorine gas as opposed to NaOCl		
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 reviewed and addressed as a priority so that operators can respond quickly to alarm situations in the plant and so that managers have the capability of monitoring plant performance and trends.	4.2	Operational Monitoring	DPI Inspections	DPI MEN002	Jan-2019	High	Supervisor South	28-Feb-20			Complete		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. A suitably qualified person who understands the process needs to work in conjunction with the PLC programmer to optimise the process and ensure the process functions as designed. It is also noted that currently there are no alarms or telemetric	28/2/20: Looked at PLC setup, external text message alarms have been added. Filter backwash function has been corrected in PLC. A number of issues were also rectified in the PLC program.		
115	Coonabarabran	Performance monitoring	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.		
116	CBN	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-21	31-Aug-21	review proposal	In progress			Schedules are captured currently on operational carbon copy books 24/4/20: Consultant has provided proposal to develop operational monitoring plan for all systems 310/7/21: get separate proposal & review	Review proposal to develop 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.		

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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	24-Apr-20	29-May-20	Interim deadline was 30/9/19 (review RWQ assurance program)	Closed		(Section 4.1, p.6), note: additional treatment processes may be required due to contamination through agricultural activities (farming, fertiliser application, cattle access to waterway)	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). BGA testing during summer period. 13/12/19: Some baseline samples still to be taken (Health officer has since left). RWQ plan still to be reviewed for this requirement 24/4/20: Still to be reviewed and sampling plan developed	Review raw water assurance program against this requirement see items 120, 253, 287, 313)	
121	CBN	Coagulation & Flocculation	Monitoring	Monitor algae concentrations in the raw water and sedimentation lagoon. --> part of RWQ procedure (algae torch to be purchased) Action 248: Operators to re-familiarise themselves with BGA Management Protocols and related response actions. --> **part complete** (charts on CBN WTP wall) Action 292: Consider additional testing for taste and odour issues (MIB and Geosmin, chlorophyll-a (algae), pH, organic loadings and nutrient levels)	4.2	Operational Monitoring	CWT report May-15		May-2015	Medium	Supervisor Treatment	30-Jul-21	30-Sep-21		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 13/12/19: Have been using PAC. Testing not yet undertaken 24/4/20: Only raw water testing undertaken. Testing of lagoon not yet tested. No taste and odour complaints. PAC being dosed at Coonabarabran. Further investigation into taste issues needed. 30/7/21: algae torch purchased in FY20/21, operation to be implemented and recording to be added to spreadsheet prior to spring; BGA charts still to displayed at BWY/MDN WTPs; A292 still outstanding, however carbon implemented for taste & odour in CBN	Add testing of sedimentation lagoons in warmer months (from December) as per BGA tests in raw water quality monitoring program. To be included in operational monitoring plan. Operators to re-familiarise themselves with BGA Management Protocols and related response actions. Further investigation needed for taste and odour issues	
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	30-Jul-21	30-Jun-21		Implemented			Coonabarabran now (August 2019) recording chlorine residual testing of reservoirs (recorded weekly). 27/9/19: BDN flushing sheet not yet printed (waiting on sheets from Dunedoo) 24/4/20: BDN flushing sheets still to be printed 25/3/21: chlorine recorded as part of weekly reservoir inspections; slot to be added on Ops carbon copy books to record chlorine residual 30/7/21: updated carbon book still outstanding for BDN (meanwhile weekly recordings on comments section of ops log sheet)	Baradine monitoring flushing sheet to be amended to include chlorine residual monitoring of reservoirs.	
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		
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	28-Feb-20			Closed			Closed, covered by Action 258 and 328.	To be included as part of process monitoring, automation and instrumentation project (action 328)	
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 Treatment	24-Jul-20	30-Jun-20		Complete			Part of WTP upgrades 27/9/19: received HH2O quote, need to revise; need PLC replacement (quote R&D) 13/12/19: Have once quote, expecting more quotes in early 2020. HunterH20 to install individual filter analyser (only currently on one filter) 28/2/20: Dual turbidity meters to be installed and replacement of PLC. PLC has been ordered. 24/4/20: Proposal received from HunterH20 for filter upgrade 24/7/20: covered under item 328; will be completed on 26/7/20	Waiting on project timeline for PLC. Liaise with HunterH20 on turbidity analyser.	
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	28-Feb-20	31-Jan-20	interim	Complete			Chlorine analyser has been installed, not yet online. Refer to action 258 and 328. Part of WTP upgrades 27/9/19: received HH2O quote, need to revise; need PLC replacement (quote R&D) 13/12/19: Have one quote, expecting more quotes in early 2020. unterH20 to install individual filter analyser (only currently on one filter) Closed, as part of automation project (action 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 Treatment	24-Apr-20	30-Aug-20		Closed		2018-05: Safe and Secure EOI 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). 24/4/20: Recent meeting on upgrade project with DPIE, no current resolution. Spare online analyser being considered for use at Baradine at Binnaway. Supervisor to look at online analyser. Hunter H20 are currently doing an automation scoping study that should identify sites where analysers are required. 24/7/20: closed as included in new action A350	To be included as part clarifier upgrade or treatment plant upgrade	
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		2018-05: Safe and Secure EOI submitted for 'Automation and Process Instrumentation'. 2019-05: Automation Upgrade scoping study funding granted	Combined inline online analyser; refer to ID 130	Consider part of automation project (scoping study) or plant of treatment plant upgrade	
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			
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 Treatment	24-Nov-20	6-Mar-20	interim	Complete	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) Part of WTP upgrades 27/9/19: received HH2O quote, need to revise; need PLC replacement (quote R&D) 13/12/19: Have once quote, expecting more quotes in early 2020. HunterH20 to install individual filter analyser (only currently on one filter) 28/2/20: Dual turbidity meters to be installed and replacement of PLC. PLC has been ordered. Closed, as part of automation project (action 328)	To be included as treatment plant upgrades. Waiting on project timeline for PLC. Liaise with HunterH20 on turbidity analyser.	

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
131	All	Information Systems	Documentation / Protocol	Develop operating procedures for the following tasks: · Laboratory water quality sampling and testing · Scheduled maintenance tasks · Daily rounds · Plant operations	4.2	Operational Monitoring	Hunter H2O Audit 2014	BAR002, BIN002, BUG001, COH003, COO003, DUN003, KEN001, MEN002	2014	High	Manager Warrumbungle Water	28-Feb-20	31-Dec-19		Closed	No current standard operating procedures exist. General operating procedures are being developed in unison with the alliance		Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote f to develop the rest 28/2/20:Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required SOP/SWMS	
132	Mendooran	Sedimentation Lagoons	Minor works	Desludge off line lagoon	4.3	Corrective Action	DPI Inspections	DPI MEN007	Jan-2019	Medium	Supervisor South	27-Aug-19			Complete		The off line lagoon has dried out and is ready for desludging. Council is encouraged to carry out the desludging as soon as possible. If Council delays this work the risk is wet weather may further delay desludging which potentially could lead to the on line lagoon reaching full sludge capacity prior to the off line lagoon being ready.	Lagoon was desludged		
133	Mendooran	Vegetation Control	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		Cumbungi particu	Vegetation is mowed, weeds pulled. Lagoon weeds removed with excavator when desludge		
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. Staff report that ponds have been cycled at twelve month intervals.	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 lagoon due to water ingress lifting the liner	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 of the start/stop control of the clear water pumps, so that either the Coolabah reservoirs or Standpipe reservoirs can start/stop the clear water pumps.	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 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; Supervisor Treatment	24-Nov-20	31-Aug-20	interim	Closed		Obtaining quotes and confirming contractor	Reservoir upgrades undertaken in May 2019 for integrity. WHS and Internal works still to be undertaken. Captured in annual report in DPIW Circular 18 (Contractor engaged) and in ASAM. 13 December 19: Not yet submitted. 6 reservoirs still to be inspected, difficulties in getting Aqualift to undertake inspection. To get WEARS to undertaken inspections/cleans for remaining reservoirs. 28/2/20: Contractor has been engaged to fix remaining 6 reservoirs (WEARS). Circular 18 report has been submitted. 24/7/20; received excel sheet from WEARS incl source reports and priorities (excl 2014 ASAM); for MDN CWT compiled a list incl. 2014 ASAM reports but no prioritisation --> WEARS to provide cost to provide complet list (incl. 2014 ASAM/corroded internal structures) 24/11/20: finalisation of implementation still required --> included in Action 352 (A136 closed now)	Liaise with WEARS to provide quote on updated list.	
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	28-Feb-20	31-Mar-20		Closed			Draft ERP Hunter H20 developing updated incident response plan (NSW Health project) 20/2/20 - Closed and included as part of new action 341	To be included as part of ERP update (action 341)	
139	Coonabarabran		Training	Train relevant staff in these procedures (rapid communication incident response) and maintain a record of training. (A139)	4.3	Corrective Action			Mar-2015	High	Manager Warrumbungle Water	24-Jul-20		Within 2 months of finalisation	Closed			Training once new plans are developed 13/12/19: Confirmed that development of ERP is to be undertaken as part of Hunter H20 NSW Health project. 20/2/20- Training to be developed following development of ERP (Action 341) 24/7/20: closed as included in action A341	As part of HH2O IRP project (see action 341)	
140	BUG, DDO, KBI	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, DDO009, KBI006	2014	Medium	Supervisor Treatment	30-Jul-21	31-08-21 28-02-22	KBI DDO dending on CLH chlroine room upgrade	In progress		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.	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) 24/4/20: DDO moving to chlorine gas. 30/7/21: not enough room in BUG to fit bund tank (shed could be replaced with a bigger one or extended); DDO will be upgraded with currently existing equipment from Coolah once the chlorine room has been replaced (A?); KBI to purchase bund tank to install under dosing tank	Purchase bunding for tanks (BUG, KEN)	

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
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 functional.	4.3	Corrective Action	Hunter H2O Audit 2014	COO011	2014	Medium	Supervisor North	27-Aug-19			Complete		The current portable dosing skid is outside and the condition is deteriorating. The unit will require some refurbishment work before it can be used	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 · Continue to monitor filter media height to determine if there is any filter media loss · Perform a sludge content analysis of the filter media. · Investigate the condition of the air scour and filter underdrain pipework to determine the root cause of the issue · Top-up the filter media to the original design media level.	4.3	Corrective Action	Hunter H2O Audit 2014	BAR006 COO007	2014	Medium	Supervisor North	30-Jul-19			Closed		Filter media levels are currently unknown and media loss is apparent inside the filter	Complete as part of filter inspection. Filter media to be replaced by end of FY. Closed as covered by other action (77 and 150)		
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		
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		
145	CBN		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	30-Jul-21	TBD		In progress			5 yearly evaluation of asset evaluations (last FY16/17) 24/4/20: Asset register is updated annually following completed capital projects. 24/11/20: Warrumbungle Water has no AMPs and currenty no steps are taken for those to be developed, this however has been a recommendation fo the S430 OLG investigation report 30/7/21: as above; it has	Asset management plan & registers to be developed.	
146	CBN	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 Treatment	24-Mar-21	28-Feb-21		Complete		(Section 4.2.4, p.13)	Filter inspection undertaken. 24/4/20: Quote received from Hunter H20 for filter media replacement 24/11/20: media replacement schedule for Feb 2021 25/3/21: specs for media replacement incl. filter media changes complete; media replacement will be undertaken this FY	To be included as part of filter media replacement	
147	Mendooran	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	24-Apr-20	30-Sep-20	Interim (finish concept design)	Closed	(Section 4.2.5, p.16)		24/4/20 To be upgraded to gas Action closed, as now covered into new combined Action 345		
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		(Section 4.1, p.6)	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	24-Apr-20	31-Dec-19		Closed		(Section 4.2.6, p.16)	24/4/20: Closed, included under Action 346	Close ADD fluoridation	
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	13-Dec-19	31-Jan-20	Interim	Closed	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 EOI for 'Automation and Process Instrumentation' submitted.		Filter inspection has been undertaken (FY18/19). Media replacement scheduled for FY19/20. Also refer to ID 91 13 December 2013: Issue with bypass was identified and rectified which has improved BW flow rates. To confer with HunterH20 if filter replacement is still necessary. 28/2/20 - Action now closed, covered under action 77		
151	Mendooran	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 water	4.4	Equipment Capability and 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 be replaced with correctly sized pumps to supply water to the chemical dosing boards and safety showers. Operators have noted previously an incident where sodium hypochlorite has backflowed into the eyewash/safety showers. More recently coagulant was able to bypass a check valve into the service water line and make its way into the reticulation system (via the clear water	Alternative arrangements have been undertaken to address the reasons for the requirement		
152	Mendooran	Reservoirs	Major works	A recirculation/rechlorination system should be considered to maintain a set concentration of free chlorine throughout the reservoirs. Vermin/bird proofing to be made permanent, access covers bought up to standard, overflow pipes made vermin proof Clean up of the site to remove cut vegetation is required as well as trimming back overhanging trees if needed. (A152)	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI MEN004	Jan-2019	High	Supervisor Treatment; Project Engineer; Manager Warrumbungle Water	24-Nov-20	31-Oct-19	Interim deadline (engage consultant for concept design)	Complete		Vermin/bird proofing needs to be made permanent, foam fill is a temporary measure that has already been compromised leaving the reservoir susceptible. Access covers should be brought to standard by ensuring they are sealed to the roof to prevent stormwater ingress, have a 100mm riser and a lockable lid. Overflow pipes should be vermin proofed. The rechlorination system on site was turned off on the day of inspection and is only rechlorinating delivery flows to the reticulation	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 Council meeting, letter of offer prepared: future funding for D&C doubtful 13/12/19: Consultant engaged to undertake concept design (site visit has already been undertaken - Nov 2019) 20/2/20: To report to Council on choice of contractor 24/7/20: closed as included in ation A345	Recirculation to be covered by Mendooran Plant upgrade project (currently out for tender) Interim - report to Council on choice of contractor Find funding following concept design finalisation (liaise with DPIE)	

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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 (issued by DOI Water) requirements for reservoir maintenance and inspections. Council should consider either a recirculation/rechlorination system to maintain the chlorine level at a set point in this reservoir or install a mixer to destratify the reservoir. It is understood Council is considering pressure booster pumps to address previously noted water pressure issues from this reservoir.	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI MEN005	Jan-2019	High	Supervisor South; Manager Warrumbungle Water	28-Feb-20	28-Feb-20	submit C18 report	Complete		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. 28/2/20: Circular 18 submitted January 2020. Closed, refer to other action 152 for consideration of recirculation/rechlorination system	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	
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 include updated staff amenities in the new building such as toilet, shower, and lunch room as well as provide a space for administration/record keeping i.e. desk and computer with internet access. Given the current water quality issues of iron and manganese it is recommended that Council provide test equipment in the laboratory that is capable of testing for those parameters. A spectrophotometer should be considered due to the wide range of parameters that can be tested.	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.		
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 high lift pump failing.	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		
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)			
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.		
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).		
160	Mendooran		Investigations	That WSC liaises with DPI-Water to prepare a program of capital works required to address current water treatment plant and water supply issues identified in this report, with the aim of obtaining funding under the "Safe & Secure Water Program" to complete these works.	4.4	Equipment Capability and Maintenance	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	22-Jan-19			Complete					
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 substance still present) -> analyse solid to determine if it originates from a reaction with the source water. 2018-05: Removal of solid and replacement of saturator scheduled.	communicated to public that we are not dosing fluoride wait to hear back from NSW Health Water Unit following email from 24/08		

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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 Treatment	24-Apr-20	31-Mar-20	confirm with HH2O	Complete		(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) 13/12/19: Confirmed that maintenance schedules is to be undertaken as part of Hunter H20 NSW Health project (Task 4) 24/4/20: Included as a maintenance item		
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 project.	
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 Treatment	24-Apr-20	31-Mar-20		Complete		(Section 4.2.5, p.15)	Scales are installed, not connected to SCADA 24/4/20: Marked as complete, scale installed. Connection to SCADA included as part of action 328)		
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	24-Apr-20	30-Jun-20		Closed		(Section 4.2.6, p.16)	24/4/20: Within HunterH20 project. Project is progressing. Closed, included under Action 346. Change to LOW	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	24-Apr-20	30-Jun-20		Closed		(Section 4.2.6, p.16)	24/4/20: Within HunterH20 project. Project is progressing. Closed, included under Action 346. Change to LOW	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	24-Apr-20	31-Mar-20	confirm with HH2O	Closed			13/12/19: Confirmed that maintenance schedules is to be undertaken as part of Hunter H20 NSW Health project (Task 4) 24/4/20: Within HunterH20 project. Will follow fluoridation project. Action closed and includes as part of action 340	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	28-Feb-20			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 Treatment	24-Apr-20	30-Sep-20	Interim (finish concept design)	Closed			24/4/20 To be upgraded to gas Action closed, as now covered into new combined Action 345	Part of Mendooran upgrade project (A345) Confirm current mixing process.	
172	Mendooran		Documentation / Protocol	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	24-Apr-20		Following H2O project to develop schedules	Closed		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). 24/4/20: HunterH20 project only looking at treatment. Action closed and includes as part of action 340	Preventative maintenance program to be formalised for reticulation and reservoir.	
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	Manager	24-Apr-20	31-Mar-20	wait for HH2O	Closed	2018-05: Being arranged for by LMWUA		Covered by action 332 (NSW Health project) 13/12/19: HunterH2O project (Task 4a) 80% complete, waiting for approval from DPIE to complete works 28/2/20: Internal meeting today with Health on design. Scheduled a workshop in March to present design 24/4/20: Action closed and included as part of action 346	To be included as part of action 332 (replace fluoridation systems) ADD and close	
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		
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		
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)			
178	Mendooran	Manganese removal	Minor works	Re-configure potassium permanganate dosing arrangement to allow 5 min contact with raw water prior to addition of PACl.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Very High	Manager Warrumbungle Water	24-Apr-20	30-Sep-20	Interim (finish concept design)	Closed	2016-10: (Section 4.2.1, p.8/9); currently dosing points not separated, suggestions: move KMnO4 to raw water pumping station OR install 5000L oxidation tank above aerator (cascades) 2018-05: part of S&S funding application (Incident Review recommendation #)		Covered under Mendooran upgrade project. Currently out for tender. First stage is a scoping study (ID 48). Could be covered under the raw water blend tank from left over funding 13/12/19: Consultant engaged to undertake concept design (site visit has already been undertaken - Nov 2019) 28/2/20: Have provided a report. Project manager has been engaged to review the documents. Have engaged with DPIE on funding options. Have not yet been advised if funding has been allocated. Action closed, as now covered into new combined Action 345		
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		
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: Wentwoth 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	Manager Warrumbungle Water	24-Apr-20	30-Jun-20		Complete			28/2/20 - Wentworth Ave has been sealed, one spot still to be fixed (WEARS are coming back to be fixed) 24/4/20; Area has been backfilled.		
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		

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
188	BUG, DUN, MDN	Information Systems	Documentation / Protocol	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			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	BWY	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	BWY006	2014	Medium	Supervisor Treatment	30-Jul-21	31-Dec-21		In progress		Filter backwashes are only initiated by the filter run time setpoint regardless of the filter performance	24/4/20: PLC upgrades in budget for next financial year. Can add headloss, this will require metering. 30/7/21: PLC upgraded, however additional programming/harware purchase (DP cells) not yet undertaken	To be included as part of treatment plant upgrade	
190	BDN, BWY, BUG, CLH, DDO, KBI	Information Systems	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	BDN003, BWY003, BUG003, CLH005, DDO005, KBI03	2014	Medium	Manager Warrumbungle Water; Supervisor Treatment	30-Jul-21	31-Oct-21		Closed	No current asset maintenance plan exists.		NSW Health project to include operation and maintenance schedules at WTPs. No asset management plan. 13/12/2019: To complete a criticality assessment, North is known (but not formalised) 28/2/20: Director Technical Services and Director Corporate and community Services are responsible for the asset management plan. Not yet looked at water. Current spares are known informally. Priority reduced to medium, as this is a matter of formalising what is known. 24/4/20: Critical spare list in development. All sites have whiteboards, with daily, monthly, yearly maintenance. Are arranging servicing of pumps with contractors 30/7/21: Critial spares list developed (on paper), needs to be recorded digially/formalised within DWMS -> record under Asset Mgt and update when equipment is being serviced (sewer pumps); item added to A340	Identify current spares / replacement equipment at each site (Treatment Supervisor). Clarify asset management plan progress / status (Manager) Confirm timeline for schedules (Manager) Criticality assessment (to identify critical spares) Get quotes to undertake assessment (Manager)	Consultant; Project Management resourced needed
191	BAR, BWY, 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	Supervisor Treatment; Technical officer	24-Jul-20	30/04/2020	To undertake calibrations	Implemented	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) 13/12/19: Quote has been received, Partial list has been compiled. SS to add remaining locations and check with Supervisors 28/2/20: Internal board set up at CBN of frequency of maintenance and calibrations for operators to undertake and sign off on. To be set up at all sites. Photos to be taken regularly of board to ensure records of compliance. List has been compiled and quotes received. Contractor to be engaged and date scheduled for works 24/7/20: IPAC calibrations completed in March	Take photos (Supervisor) of calibration and maintenance boards and setup folder for photos in InfoXpert, e.g. "instrument and equipment maintenance' under DWMS (Tech Officer) --> will go Jacinta's task list	
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	Manager Warrumbungle Water	24-Jul-20	30/06/2020		Closed	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. 13/12/19: Dependent on outcomes of review of need for plant upgrade/replacement 28/2/20: See action 78 & 68 24/7/20: closed as included in new action A350		
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			
194	CBN	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 Treatment	30-Jul-21	30-Sep-20	interim	Complete	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 dissolves in water); changed priority to LOW 24/4/20: Still to be investigated 30/7/21: can be done but greater ops cost with soda ash vs lime + capital to implement; no apparent benefit with equipment being maintenained regularly	Check CWT for action details; get costs for soda ash to compare + investigate cost/requirements for change over	
195	MDN	Disinfection	Operations	Commence regular chlorine batch concentration monitoring.	4.5	Materials & Chemicals	CWT report May-15		May-2015	Very High	Supervisor Treatment	30-Jul-21	30-Sep-21		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. when swap river/bore water; min weekly)	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) 13/12/19: Investigating equipment to test batch chlorine 28/2/20: Still to be investigated, procedure to be developed and staff to be trained. Long term to be replaced by gas. 24/7/20: HH2O sent through an easy procedure, however implemenation/operator training outstanding [result will be put in comments section on spreadsheet]; to be done weekly 24/11/20: no progress 23/3/21: further operator training required + to be scheduled 30/7/21: TL Treatment Nth to follow up on/continue operator training	Procedure to be formalised (including space for test to be recorded and frequency); Supervisor to review action plan on a regular basis, at least monthly	
196	All		Documentation / Protocol	Confirm whether Council's supplier contracts include chemical quality compliance.	4.5	Materials & Chemicals			Sep-2015	Medium	Supervisor Treatment	30-Jul-21	30-Jun-20		Complete			13/12/19: Contracts to be investigate 24/4/20: CW has sent request for contract, have not yet had response 30/7/21: delivery docket provides concentration spec of delivered chemical as per purchase order, operator checks on receipt	Contact appropriate person to get a copy of procurement contract	
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.		
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 test reagents, 4. On line raw water turbidity meter.	5.1	Drinking Water Quality Monitoring	DPI Inspections	DPI MEN010	Jan-2019	High	Supervisor South	27-Aug-19			Implemented		The current level of plant performance recording at the plant is unsatisfactory.	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 order to calculate the chlorine dosage.	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)		
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 accurate setting of dose rates and data recording.	5.1	Drinking Water Quality Monitoring	DPI Inspections	DPI BIN008	Jan-2019	Medium	Supervisor Treatment	24-Nov-20	30-May-20	had no due date	Closed		A drop test was carried out to check the alum dosage. The calibration tube should be sized to allow for three minute drop tests to facilitate accuracy of measurement.	27-9-19: GR to order equipment as required (SS can help if required) 24/4/20: Equipment still to be ordered 24/11/20: covered under (A349)	Equipment to be ordered and installed	

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
203	Binnaway	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	13-Dec-19	4-Oct-19	Interim was 13/09/19	Complete		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	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) 13/12/19: Reagents have been delivered. Operators to review SOP.	Ensure necessary reagents are available and operators are trained (to SOP)	
204	Mendooran		Operations	A new sampling site be created for the correct monitoring locations in Bandulla street. Sample site 123 (57 Bandulla Street) can then be archived.	5.1	Drinking Water Quality Monitoring	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Supervisor South	22-Jan-19			Complete					
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-21	TBD		In progress		DWQ Monitoring Plan	13/12/19: Consultant has provided a proposal to develop verification proposal 24/7/20: dependant on 206 25/3/21: as above (can get consultant to do DWQ Monitoring Plan once we have Verifcation Plan)	To follow on from action 206 Engage consultant to develop verification monitoring plan	Consultant
206	All		Documentation / Protocol	Formally document all drinking water quality monitoring protocols and combine into a formal Water Quality Verification Plan. Including (A294): 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 collected at the wrong location. It was recommended that Council develop a procedure that includes photos and GPS locations to ensure that samples are always collected at the correct location.	5.1	Drinking Water Quality Monitoring			Mar-2015	High	Environmental Compliance Officer	30-Jul-21	TBD	Interim (new sampling sites)	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 13/12/19: Proposal from consultant to develop verification proposal 28/2/20: No progress 24/7/20: Jacinta Green (consultant) to address - CW needs to engage, meanwhile WQ monitoring protocol to be updated by JG (Tech Officer interim) with AM and Jesse R 25/3/21: Supervisor Treatment/Retic (currently vacant) to liaise with EHO (currently vacant) and NSW Health on new sampling sites (sampling at mains); from it the WQ Verifcation Plan can be developed/finalised by Tech Officer/EHO; refresher on DW sampling for rangers and other Ops staff being arranged	Develop draft Water Quality Verification Plan with site locations (and photos). Investigate changing site numbers in NSW Health database. Engage consultant to develop verification monitoring plan (A205)	
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		
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)		
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 quality and chemical stock levels) · Monitor chemical dose rates and usage and compare to plant performance and water quality to identify potential efficiency improvements	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	BAR001, BIN001, COO002	2014	High	Supervisor North; Supervisor South	28-Feb-20			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 · Automated alarms based on water quality parameters		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	CLH	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 chlorine cylinders to stand on will allow for daily chlorine usage to be measured. --> **complete**	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	CLH004	2014	High	Supervisor Treatment; Technical officer	30-Jul-21	31-Oct-21		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 plant flow can provide confirmation of chlorine dose rate		Scales have been installed. Daily monitoring in reticulation. 28/2/20: Flow is being recorded when operators are onsite (has been for some time). Coolah flow is not variable unless change bore source (diff pump). 24/7/20: to be included in next update of carbon copy books, can be recorded in comments section meanwhile - for this new calculation in spread sheet required 24/11/20: chlorine gas bottle weights meanwhile recorded on daily ops sheets; Ops sheet to be update (+ down the track: carbon copy books) 25/3/21: with currently recorded data, daily usage can be recorded; operators to record instaneous chlorine dose rate on site --> Supervisor to liase with Tech Officer for spreasheet calculations; future carbon copy books have been agreed on; will be easier with telemetry in place 30/7/21: formula for daily usage to be added to Tech Officer ops record sheet; rotameter on site for instantaneous rate - need to set up another colum on carbon copy book	Bottle weights to be recorded on sheet and calculation added. Supervisor and Tech Officer to review and update sheet.	
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	28-Feb-20	30/03/2020	had no due date	Closed	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 13/12/19: Will need a new PLC to purchase/install online analysers 28/2/20: Teleconference workshop in December 2019 (automation project). Closed as covered under A328.	To be included as part of process monitoring, automation and instrumentation project (action 328) Receive audit report from consultant	
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	13-Dec-19	31/01/2020		Complete	24 hour chemical usage verse flow calculations are not performed		27/9/19: can be done before 30/09 13/12/19: Calculation still to be added. 28/2/20: Calculation to be added		
214	BUG, KBI	Routine testing	Monitoring	Initiate daily sampling and testing of the town distribution system. Tests should include free chlorine residual, pH and turbidity. This will improve response times to water quality issues. Data collected can also be used for future planning and adjustments to the daily operating set points.	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	BUG005, KBI005	2014	High	Supervisor Treatment, Technical Officer	30-Jul-21	31-Dec-21		In progress	To ensure treated water quality complies with the Australian Drinking Water Guidelines (ADWG), water quality monitoring of the town distribution system must occur. Currently chlorine residual levels are measured weekly		Currently being undertaken 2-3/week. Chlorine analysers are installed, to be bought online. 13 December 2013: Analysers have been installed, not yet linked to shut pump down 28/2/20: Analysers to be linked to telemetry at the end of next week and text message alarm sent. 24/7/20: BDN operator going out 3 x week to test water at bore + 1 x week in retic (pH/chlorine; NTU to be added - instrument to be provided & to be recorded on spreadsheet); chlorine analysers set-up to send txt message alarms (interlock with bore pump hence not required) 24/11/20: NTU meter availalbe now (as well as pH meters), Tech Officer to create carbon copy books for BUG/KBI (currently only one space on CBN sheet for chlorine read weekly); bore flow reading will be recorded as well 25/3/21: AM to liase with FS (new Tech Officer) on the proposed new books 30/7/21: once telemtry is up and running, chlorine, pH and temperatru will be online; turbity will be mearbe measured on site once/week (templates done for new carbon copy books) as the small scheme does not justify operator involvement more than that.	Develop new carbon copy book for BUG/KBI each with pH/chlorine/NTU (can be left on site + include flow meter in future) - AM will forward draft to Tech Officer	

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
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 changes are required to be made at the treatment plant.	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	DUN008	2014	High	Technical Officer	13-Dec-19	4/10/2019	was 31/8/19	Complete	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. 13/12/19: Spreadsheet has been modified and turbidity is being entered		
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	28-Feb-20	28-Feb-20	Interim	Closed	Due to the sedimentation ponds being in an open area there is a risk of contamination from the wildlife		Daily walk around includes lagoons 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote f to develop the rest 28/2/20:Closed as covered by new action 339	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		
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.		
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					
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 where the results lie within the CCP ranges.	5.3	Short Term Monitoring of Results	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	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'.		
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 spread sheet to facilitate analysis and reporting.	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 (exceedance summaries), sent to Supervisors and Manager and reviewed in operations meeting. Quarterly DWMS reviews undertaken Monthly report to General Manager of CCP exceedances. Action to formalise schedule covered under action 285.		
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 **Emergency Response Plan** that is addressed below.	5.4	Corrective Action			Sep-2014	Very high	Manager Warrumbungle Water	28-Feb-20	31-Mar-20		Closed	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 13/12/19: Confirmed that development of ERP is to be undertaken as part of Hunter H20 NSW Health project. 28/2/20 - Progress delayed (prioritised filter inspection)	To be included as part of ERP update (action 341)	
224	All		Documentation / Protocol	Consider implementing a procedure in consultation with local hospitals to ensure dialysis patient details remain UpToDate.	6.1	Communication			Jun-2016	Low	Technical Officer	24-Mar-21	31-Mar-19	Interim	Closed			Finalisation of ERP to be included as part of NSW Health project. List of dialysis patient previously investigated. 28/2/20: List developed in liaison with Dubbo Hospital (A229). Process still to be developed 24/04/20: Contact list still to be added as a register in authority 24/7/20: referred to in **action A341**	Refer to action 229 (obtain list of patients) Develop process for distribution and allocate responsibility of keeping document current. Add register to Authority.	
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	24-Apr-20			Closed			24/4/20: Closed, included as part IERP development under Action 341.		
226	All		Documentation / Protocol	Review and update contact details listed in Table 10.	6.1	Communication			Jun-2015	Medium	Manager Warrumbungle Water	24-Apr-20			Closed			24/4/20: Closed as included under 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; Admin Support	03-Aug-21	TBD		In progress			24/4/20: Carol (Admin support) to arrange the development of a communications strategy (to include restriction advice) 3/8/21: with resignation of Coolah admin officer no admin support available any longer to WW --> will need to outsource to consultant in liaison with Manager Corporate		
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	28-Feb-20	31-Mar-20	Interim (Hunter H2O proposal not yet scoped)	Closed			To included as part of updated incident response plan 13/12/19: Confirmed that development of ERP is to be undertaken as part of Hunter H20 NSW Health project. 20/2/20 - Closed and included as part of new action 341	Ensure that Hunter H20 (NSW Health project) ERP identifies appropriate person to handle incident and emergency communications	
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	28-Feb-20	14-Mar-20	Interim was 6/9/19 (get list of patients)	Complete			Finalisation of ERP to be included as part of NSW Health project. List of dialysis patient previously investigated. 13/12/19: Couldn't find existing list. SS is liaising with hospital to develop list 28/2/20: List developed in liaison with Dubbo Hospital.	Develop process for distribution and allocate responsibility of keeping document current. Add register to Authority (A224)	
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					
231	Mendooran		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 set out on the field monitoring log sheets.	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	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 recommended that an exercise of the incident response plan be organised with the PHU (mid-2018).	6.2	Incident and Emergency Response Protocols	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	28-Feb-20	31-Mar-20		Closed		ERP forms part of Councils DMNW and BCP.	Draft ERP Hunter H20 developing updated incident response plan (NSW Health project) 20/2/20 - Closed and included as part of new action 341 & 342	To be included as part of ERP update (action 341 & 342)	
233	All		Documentation / Protocol	Identify possible water quality related incidents and emergency scenarios (the risk assessment should be used as a basis) and document these potential scenarios in an Incident and Emergency Response Plan. Document procedures and response plans to address these incidents (can refer to guideline protocols from NSW Health as provided in the DWMS). Add to the ERP particular processes that are required to address severe hazard / emergency scenarios, such as algal blooms, fuel spills, bushfire etc. The development of these protocols should involve relevant agencies.	6.2	Incident & Emergency Response Protocols			Mar-2015	High	Manager Warrumbungle Water	28-Feb-20	31-Mar-20		Closed			13/12/19: Confirmed that development of ERP is to be undertaken as part of Hunter H20 NSW Health project. 20/2/20 - Closed and included as part of new action 341	To be included as part of ERP update (action 341)	
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 of any emergency protocols, where an investigation demonstrates it is required.	6.2	Incident & Emergency Response Protocols			Mar-2015	High	Manager Warrumbungle Water	28-Feb-20	31-Mar-20		Closed			13/12/19: Confirmed that development of ERP is to be undertaken as part of Hunter H20 NSW Health project. 20/2/20 - Closed and included as part of new action 341	To be included as part of ERP update (action 341)	
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	28-Feb-20	31-Mar-20		Closed			13/12/19: Confirmed that development of ERP is to be undertaken as part of Hunter H20 NSW Health project. 20/2/20 - Closed and included as part of new action 341	To be included as part of ERP update (action 341)	
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	24-Jul-20	31-Mar-20		Closed			24/7/20: closed as included in action A341	To be included as part of ERP update (action 8)	
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 monitoring water quality incidents. This would include investigations and appropriate remedial actions of any Total Coliform detections and to also follow CCP corrective actions for any free chlorine level exceedances.	7.1	Employee Awareness and Involvement	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Manager Warrumbungle Water	22-Jan-19			Complete					
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					
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					
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	OD	03-Aug-21			In progress			13/12/19: Previous quarterly water quality meeting have discussed importance DWMS. More recently facilitated improvement meetings have been undertaken for Supervisors/Managers. 24/4/20: Some position descriptions include reference to ADWG. Water quality awareness training to be carried out. Proposal received by consultant. 25/3/21: DWMS reference has been added to all PDs as part of re-structure 3/8/21: Final PDs did not appear to have relevant requirement in them - OD to adjust		

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
241	All		Documentation / Protocol	Consider developing operators communication strategy	7.1	Employee Awareness and Involvement			Jun-2015	Medium	Manager Warrumbungle Water	03-Aug-21	TBD		In progress			24/4/20: Proposal received by consultant. Roadmap to be developed about how information is handed over to operators. E.g, what information requires formal handover and documentation. 3/8/21: formalisation of strategy outstanind		
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	13-Dec-19	30/03/2020	Interim	Closed		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, monitoring and maintenance by suitably qualified staff who report to the Manager of Water and Sewer.	Second operator from Binnaway is being trained to fill in for Mendooran staff. Structure is being finalised. Operators have Cert 3 in Water Operations. 13/12/19: Currently reviewing competencies and aligning with national certification framework, processes to identify any shortfalls in training 28/02/20: Are progressing the review with NCF. Have determined competency requirement for each plant determined by plant complexity/treatment. Gap analysis and training plan still to be completed. Closed as covered by action 249.	Review training requirements for Mendooran staff following restructure.	
243	MDN		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	OD	03-Aug-21	TBD		In progress			Ongoing with HR 13/12/19: Currently reviewing competencies and aligning with national certification framework, processes to identify any shortfalls in training 24/4/20; Review has been undertaken and training plans have been developed. Sign off still to occur. 24/11/20: CK?? covered under other action 3/8/21: update from 04-2021 was 'Sourcing certification training was impacted by Covid in 2020 however Council believes it has not sourced a suitable provided and expects to have the training delivered to staff and have met or be close to meeting its certification target by the end of the 2020-2021 FY		
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 and relief staff to upskill and to be appropriately trained in WTP processes (i.e. DPI-Water Part 1 and 2 as a minimum). It is also recommended that all staff involved with water quality sampling, testing and monitoring, undergo training and are involved in developing procedures for their work tasks.	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	24-Nov-20	31-Jul-20		Complete			Process not yet formalised. Informal current process includes on the job training, competency document, annual review against competency document. Consultant has been engaged to provide site induction material (currently scheduled to start mid Dec 19). 24/4/20: Consultant has provided a proposal for induction materials. 24/11/20: documentation created/formalisation completed; implementation required		
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	24-Apr-20	20-Jun-20		Implemented			Review on staff structure has been undertaken and revised structure is being implemented. 24/4/20: Restructure in Dec 2020. Issue from 2014 risk assessment on reporting have been rectified, action considered to be implemented.		
248	CBN, BIN, MDN	Organics Removal (catchment)	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 Treatment	24-Apr-20	31-Dec-19		Closed	(Section 4.1, p.6)		Action changed to cover CBN, BWY, MDN systems (from just CBN) 27/9/19: SS printed and laminated (A3) and distributed to CBN, BWY, MDN(?); CW to check with Supervisors if operators have familiarised themselves 13/12/19: Latest BGA has been provided to plants (laminated) 24/4/20: Plants are displayed at CBN & MDN. Closed as covered under action 121	Supervisor to review BGA plan onsite with operators, prior to lagoon sampling.	
249	All	Operator training	Training	Arrange for operators to undertake appropriate training	7.2	Employee Training	Hunter H2O Audit 2014	COH001, DUN001	2014	High	Supervisors/ Manager /HR	24-Nov-20	31/03/2021		Implemented	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. 13/12/2019 Currently reviewing competencies and aligning with national certification framework, processes to identify any shortfalls in training 28/02/20: Are progressing the review with NCF. Have determined competency requirement for each plant determined by plant complexity/treatment. Gap analysis and training plan still to be completed. action 242 closed as considered as covered by this action. 24/7/20: requirements as per NCF included in PDs; fluoridation going to be covered as part of funded NSW Health/HH2O project; HR developed training plan 24/11/20: implemented	Review training requirements for Mendooran staff following restructure (action 242)	
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.		
251	All		Documentation / Protocol	Develop a consumer information program providing details on the DWMS, Emergency Response Plan, consumer responsibilities, how drinking water quality may be affected in household distribution and drinking water uses etc.	8.2	Communication			Sep-2015	Medium	Manager Warrumbungle Water	24-Apr-20			Implemented			24/4/20: Four monthly improvement plan update reports are made available on Councils website. General information included on water treatment, including micro, chemical data; water complaint procedure.		
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 identify water quality trends and patterns.	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. Monthly report to General Manager of CCP exceedances. Annual review report		
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	13-Dec-19	28-Feb-20	Interim deadline was 13/9/19 (review RWQ assurance program)	Closed			13/12/19: Can confirm pesticides are monitored as part of raw water assurance program Action closed, included as part of new action A347	Review raw water assurance program against this requirement see items 120, 253, 287, 313)	
254	BIN, BUG, CBN, DUN, KEN, MDN	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 E.coli in raw water.	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 sewered (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; Technical Officer	30-Jul-19			Implemented			Raw water testing regime program has been developed and implemented.		
256	Baradine, Kenebri, Coonabarabran	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		

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
258	All		Critical control point	Council should strongly consider investing in online monitoring at all CCPs. This would provide greater process control, as immediate notification would be provided in the event an alert limit is exceeded. Importantly, it would also provide the opportunity of an immediate response in the event a critical limit is exceeded (such as triggering a plant shut down). Online monitoring would also provide useful data for analysis of performance of processes used to control hazards at CCPs and would improve understanding of the WTP's effectiveness more generally.	9.1	Investigative Studies & Research Monitoring			Mar-2015	High	Manager Warrumbungle Water; Project Engineer	28-Feb-20	30-Jun-20		Closed			Funding granted from Safe and Secure for scoping study of automation. 13/12/19: PLC are needed to install online analysers 28/2/20: Closed as covered under A328.	To be included as part of process monitoring, automation and instrumentation project (action 328)	
259	DDO	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	Technical officer	03-Aug-21		Intermin (Tech Officer develop schedule)	Closed			13/12/19: Bore is being used. Raw water quality assurance plan includes bore testing. Have NSW Health funding to take baseline sampling, some still to be taken, (Health officer has since left) 28/2/20; Schedule to be developed 24/7/20: labels for Sth bore background testing got lost (AM follow up with Health); RWQ procedure requires updating re CBN hydrogeological report (JG); RW sampling schedule to be developed (JG) 24/11/20: new Sth labels received; 2 lots of samples taken at DDO, CLH, MDN. BWY; one last lot outstanding (to spread tests out) - some results received back, given to JG for entry in RW database 25/3/21: FS to develop schedule in line with RWQ procedure for bore background testing (CN/admin officer to assist) 3/8/21: DDO bore was installed in 2014 and is in use since; meanwhile a RWQ assurance program incl background testing has been developed --> see atcion A347	Supervisors to take samples for the bore baseline sampling program. Tech Officer to create schedule (baseline and ongoing)	
260	All		Documentation / Protocol	As part of Council's review of the DWMS risk assessment, review and discuss the effectiveness of existing processes and procedures in managing water quality. The review should draw on external research and information, the risk assessment, water quality analysis and organisational experience. With any changes in conditions, processes and procedures should be revalidated.	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)		
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 Officer	13-Dec-19			Closed			Calculations previously performed, to be reviewed and effectiveness considered as part of PAC upgrade investigations. 13/12/19: Calculations have been reviewed detention time can be improved by moving dosing point upstream. PAC currently used as an aid in flocculation and detention time is sufficient for flocculation (not for algae). If there is an algae bloom, source water can now be switched over to bores (previously not a option). Action has been closed.		
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	Supervisors; Technical Officer	13-Dec-19	15-Oct-19	was 30/9/19	Complete			27/9/19: engaged CWT to calculate CTs; supervisors/SS to provide info as required refer to ID 326 13/12/19: CTW were engaged to calculate CT. Report has been provided		
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	Medium	Manager Warrumbungle Water	24-Nov-20	30-Sep-20		Complete			In progress, no documents yet developed 24/4/20: Increased priority to Medium. Consulting provided proposal 24/11/20: Validation policy created, implementation required	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 UpToDate.	10.1	Management of Documentation & Records			Sep-2015	Low	All	24-Nov-20	30-Nov-20	was 30-9-19; revise next month	Closed			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 24/4/20: Ongoing action for staff to put documentation 24/11/20: included in (A268)	Water project information to be put on InfoXpert (all)	
265	Mendooran	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	24-Apr-20			Closed			24/4/20: Closed as covered by under new action 334, review and update DWMS.	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. Including (A264): Review existing documentation on the water supply systems and ensure all are captured on Council's document management system. Verify documents are UpToDate.	10.1	Management of Documentation & Records			Sep-2015	Medium	Manager Warrumbungle Water	03-Aug-21	TBD		In progress			24/4/20: Procedure (Drinking water management system document register procedure) has been developed. Still to be reviewed and implemented 3/8/21: additional admin support required to implement and abide by formalised DWMS records requirements	Procedure to be reviewed and implemented	
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	24-Apr-20			Closed			24/4/20: Closed as covered by under new action 334, review and update DWMS.	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 record instantaneous and daily plant flow rates to determine actual chemical dose rates. This is useful for chemical and plant optimisation and future troubleshooting and operations. · Install a calibration tube to allow instantaneous chemical dose rates to be measured.	10.1	Management of Documentation and Records	Hunter H2O Audit 2014	BIN004, BUG002, COH002, DUN003, KEN002,	2014	Medium	Supervisor Treatment	24-Apr-20	TBC	Prioritised under automation scoping project	Closed		· 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 · Equipment operation and maintenance manuals are currently not stored onsite. Access to equipment manuals can assist in equipment troubleshooting and operator training.	Development of schedules covered under action 340. Calculations to be undertaken for chemical dose and usage rate (In conjunction with action 213) Calibration tube - MDN to be replaced (others all have them) 24/4/20: Chemical dose rate being calculated. Cannot currently measure daily chemical usage. Ability to enable chemical usage included as part of automation scoping study recommendations. Additional equipment needed. MDN calibration tube still needs cleaning Action closed, *Development of schedules covered under action 340. *Chemical dose rate being calculated. *New actions for outstanding items 348 and 349	Chemical usage equipment required, dependent on priorities in Hunter H20 scoping study automation project	
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 Treatment; Technical officer	24-Jul-20	30/06/2020		Complete	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, CBN, MDN 13/12/19: Clarifying which contractors do this 28/2/20: Australian Boilers Services undertake this for Dubbo. 24/4/20: Received quote from contractor (MDN, CBN, BAR) 24/7/20: certificaton has occurred in June; required every two years; on Supervisor Treatment list		
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		see ID 271		
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 used to develop an Action Plan in order to urgently address all the existing integrity issues at the Mendooran water supply system. Annual reservoir integrity reports to be submitted to DPI-Water in accordance with LWU Circular No. 18.	10.2	Reporting	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	28-Feb-20	28-Feb-20		Closed		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. 13/12/19: Engaged WEARS to develop reservoir integrity checklist to undertake inspections 28/20/20: Action closed as covered by new action 343	Follow up with WEARS	
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			

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
275	All		Documentation / Protocol	Develop inhouse evaluation of long-term water quality performance procedures (outside external monitoring requirements) and implement these procedures. These procedures could be incorporated into the preparation process for the annual management review or as part of the internal audit process.	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 Fortnightly review of CCP data (exceedance summaries), sent to Supervisors and Manager and reviewed in operations meeting. Monthly report to General Manager of CCP exceedances		
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					
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	28-Feb-20	31-Mar-20		Closed			13/12/19: Consultant has provided proposal to review and update DWMS 28/2/20: Closed as included as part of action 334	Review schedule as part of DWMS project update (action 334)	
278	All		Investigations	Identify appropriate personal to undertake the internal audit and provide training in auditing.	11.2	Audit of Drinking Water Quality Management			Sep-2015	Low	Manager Warrumbungle Water	24-Apr-20	TBD		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	24-Apr-20	31-Oct-19		Complete			CCP results reported monthly to General Manager. Annual report being developed (to go to Council) 24/4/20: Annual report complete and sent to NSW Health		
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	24-Apr-20	TBD		Not started			Wait until NSW Health audit guidance is audits		
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 information should also be passed onto NSW Health and DPI-Water for advice, review and comment. (Noting that actions from many of the other Recommendations in this report would need to be included in this DWMS Improvement Plan)	12.1	Review by Senior Executive	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	13-Dec-19	31-Oct-19		Implemented	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. 13/12/19: Improvement plan and annual review report have been provided to NSW Health		
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)	
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; reports from audits, water quality performance, previous reviews, concerns from consumers and regulators and impacts of changes to internal or external conditions (e.g. regulatory, technology, organisational activities).	12.1	Review by senior executive			Mar-2015	High	Manager Warrumbungle Water	28-Feb-20	30-Jun-20		Closed			Quarterly DWMS reviews undertaken Fortnightly review of CCP data (exceedance summaries), sent to Supervisors and Manager and reviewed in operations meeting. Monthly report to General Manager of CCP exceedances. Draft schedule has been drafted. To be implemented 28/2/20 No longer reporting monthly to General Manager. Annual update to Council (DWMS annual review report and improvement plan tabled). Review schedule to be formalised in DWMS update. Closed as included as part of action 334	Schedule to be formalised in DWMS. 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 to undertake these actions.	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: □ Turbidity □ pH □ Microbiological □ Temperature □ Pesticides □ Heavy Metals □ Radiological □ Fluoride			July 2018 ORANA meeting	WarrumSCJul18.1	Jul-2018	Medium	Technical Officer	13-Dec-19	28-Feb-20	Interim deadline was 13/9/19 (review RWQ assurance program)	Closed			Raw water quality assurance program has been developed. To be implemented. 27-9-19: similar to ID 120 13/12/19: RWQ plan still to be reviewed for this requirement Action closed, included as part of new action A347	Review raw water assurance program against this requirement see items 120, 253, 287, 313)	
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	WarrumSCJul18.2	Jul-2018	Medium		27-Aug-19			Complete			Radiological testing has been undertaken (July 2019) and is included in raw water monitoring assurance plan.		
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 online and bench unit to confirm what the true turbidity values are and to resolve the discrepancy between the units.			July 2018 ORANA meeting	WarrumSCJul18.4	Jul-2018	High	Supervisor Treatment	24-Nov-20	31-Aug-20		Complete			Has been externally calibrated. 27/9/19: confirm range of instrument; confirm bypass is not an issue (should be inline?); cleaned regularly? 13/12/19: Issue not resolved 28/02/20: Issue not resolved. Test against hand held unit. Similar issues at other plant. 24-7-20: IPAC instrument calibrations were done in March 2020; online NTU meter being cleaned daily; benchtop one calibrating ourselves weekly 24/11/20: still a light discrepancy but not major since calibrations and bench-top instrument replacement + additional staff training + proper cleaning units/techniques for instruments + adjustments with set-up + regular future services by supplier (Hach) --> complete	To be investigated further Get calibration kit (low)	
291	Mendooran	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	WarrumSCJul18.5	Jul-2018	Medium	Project Engineer	24-Apr-20	30-Sep-20	Interim (finish concept design)	Closed			24/4/20: Preliminary hazard assessment included in current engagement, scheduled for 14 May 2020. Concept design workshop to be held in following with to hazard assessment. Not at stage for HAZOP. Action closed, as now covered into new combined Action 345		
292	Coonabarabran, Mendooran, Binnaway	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 Geosmin, chlorophyll-a (algae), pH, organic loadings and nutrient levels. It was noted that WSC had used PAC in the past, however it is not currently in use. This could be re-established if required, however it would be prudent to understand the cause of the taste and odour and also undertake PAC testing to determine what type and amount of PAC would be the most effective.			July 2018 ORANA meeting	WarrumSCJul18.6	Jul-2018	Medium	Supervisor Treatment	24-Apr-20	31-Jan-20	Interim was 30-9-19; now: 31/1/20 for algae tests (establish location for algae - put in operational sheet)	Closed			27/9/19: PAC has been dosed at Coonabarabran to control taste and odour issues; PAC dosing also improved filtered water NTU; SS find results from algae testing and put on T-drive (for dam, weir, sedimentation lagoon) added BWY + MDN (river/lagoons) 13/12/19: Some result have been added, still to confirm if all results have found. PAC can only be dosed at Coonabarabran. 24/4/20: No taste and odour complaints. PAC being dosed at Coonabarabran. Action closed, Coonabarabran taste and odour issues added to action 121 for further investigation		
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	WarrumSCJul18.7	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 collected at the wrong location. It was recommended that Council develop a procedure that includes photos and GPS locations to ensure that samples are always collected at the correct location.			March 2018 ORANA meeting	WarrumSCMar18.1	Mar-2018	Medium	Technical Officer	24-Nov-20	30-May-20	Interim (Found and reviewed)	Closed	July 18: Ongoing, This was discussed and the newly appointed EHO is managing this project.		Information for plan is in process of being collected. 27/9/19 & 13/9/19 & 24/4/20: info needs to go on T-drive; some photos still need to be taken; sample sites require updating (+photos added) + incident flowcharts added 24/4/20: Find procedure and photos on G drive (Simone who developed them has left) and review status. Scott to talk to Mark Nave (PHU) about changing site numbers. 24/11/20: covered under (A206)	Undertaken in conjunction with action 205 and 206 (Develop a verification monitoring plan)	
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		
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	WarrumSCMar18.3	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	WarrumSCMar18.4	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	WarrumSCMar18.5	Mar-2018	Medium		01-Jul-18			Complete	Complete July 2018				
299	Baradine	Reservoirs	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	WarrumSCMar18.5	Mar-2018	Medium		01-Jul-18			Complete	Complete July 2018				
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 report (under the CCP table) to advise that the chlorine residual measured at AA must be maintained above x mg/L at y plant flowrate to meet the chlorine contact time requirement.			March 2018 ORANA meeting	WarrumSCMar18.6	Mar-2018	Very high		27-Aug-19			Closed	Ongoing July 2018		Closed covered by action 326.		

No	Location	Process step	Category	Action	ADWG No. ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
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 check data.		March 2018 ORANA meeting	WarrumSCMar 18.7	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 then clear water tank		Issue has been resolved following filter media inspection		
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	
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	WarrumSCMar 18.9	Mar-2018	High		27-Aug-19			Complete	July 18: Ongoing				
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 contact time for the system is confirmed.		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	
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 pH lines were swapped?). Also need to check the lower limit on figures 5.2. Review and correct		March 2018 ORANA meeting	WarrumSCMar 18.12	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) • Adjustment Limit < 0.5 NTU (current value >0.9 NTU)		October 2017 ORANA meeting	WarrumSCOct 17.2	Oct-2017	High	Supervisor North; Technical Officer	13-Dec-19	1-Jun-20		Complete	Mar 18: Turbidity targets were slightly reduced. Plant not capable of lower performance – need to consider upgrade		Currently using emergency back up bores. Filter media inspection undertaken recently (never been replaced). Turbidity target limit has been changed to 0.3 NTU, operational limit 0.5 NTu. Will have difficulty in meeting limit when source water is changed to the dam water. 13/12/19: Following improvements to filter, reduced limits should be able to be achieved when source water is changed		
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	WarrumSCOct 17.5	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	WarrumSCOct 17.6	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.		
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	28-Feb-20	31-Mar-20		Closed			Have queried contractor to assist with checklist 13/12/19: Engaged WEARS to undertake this work 28/20/20: Action closed as covered by new action 343	Follow up with WEARS	
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 the raw water quality risk assessment		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). Consider ways to improve the plant performance		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		
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 be considered, this could be requested from NSW Health		ORANA meetings pre October 2017	WarrumSCSep t16.2	Oct-2017	Medium	Technical Officer; Manager Warrumbungle Water	24-Apr-20	28-Feb-20	Interim deadline was 13/9/19 (review RWQ assurance program)	Closed			Confirm if current testing (NSW Health project) is sufficient; what else should be tested for if not? 13/12/19: RWQ plan still to be reviewed 24/4/20: Scott to review record of test results for "back bore" records Action closed, included as part of new action A347	Review raw water assurance program against this requirement see items 120, 253, 287, 313)	
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	13-Dec-19	31-Dec-19		Complete			Media has been replaced. 13/12/19: No washout has been occurring	Confirm if filter media is still washing out of filters	
315	CLH, DDO		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	Supervisor Treatment	03-Aug-21	30-Sep-20		Closed			13/12/19: RWQ plan still to be reviewed for this requirement 24/4/20: To be included as part of an operational monitoring plan testing (A…) 24/11/20: DPIE/SSWP risk prioritisation acknowledges this, awaiting advice on (further) funding; meanwhile added NTU measurements for disinfected water at bore; regular testing part of RWQ monitoring + CLH/DDO bores included in Health funded RWQ baseline testing (recorded in RWQ database) - include (A315) here at next review; A315 can then be closed		
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	Manager Warrumbungle Water	28-Feb-20	30-Sep-20	Interim (finish concept design)	Closed			13/12/19: Consultant engaged to undertake concept design (site visit has already been undertaken - Nov 2019) 28/2/20 Quotes to undertake work are being reviewed	Included as part of treatment water supply upgrade	
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		
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 Blight Tanner report reviewed as part of this improvement plan		
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 Treatment	24-Apr-20	1-Feb-21		Closed			To be further investigated 24/4/20: Not considered to be a current issue		
320	Baradine	Reservoirs	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.		
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. Council to discuss further with DPI Water and NSW Health		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 DoI 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 report by Blyth Tanner advised that a residual of 4mg/L was required.		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 changes documented in the Drinking Water Management Plan		ORANA meetings pre October 2017	WarrumSCMar 17.6	Oct-2017	High	Manager Warrumbungle Water, Supervisor Treatment, Tech Officer	24-Jul-20	31-Mar-21		Closed			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) 28/2/20 - Radiological test undertaken (bores) 24/7/20: needs to be done as part of RWQ assurance program; updated risk assessment for individual systems still to be done 24/7/20: closed as included in new action A351	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 Reticulation	24-Jul-20	6-Mar-20	was 30/9/19	Complete			To be undertaken with mains replacement works (take off rising main) 13/12/19: Works are being undertaken currently 28/2/20: Still in progress 24/7/20: completed		
326	All	Disinfection	Critical control point	Review CT for all systems		27 June 2019 Improvement Plan review meeting	A2	27-Jun-19	High	Supervisor Treatment	03-Aug-21	31-Oct-21		In progress			Refer to related actions 44, 46, 51, 60, 262, 309, 322 27/9/19: engaged CWT to review CTs 13/12/19: CWT report to be reviewed 28/2/20: Report still to be reviewed. To be reviewed at next operational meeting. 24/11/20: report had been reviewed and identified furhter input from the field (e.g. pipe diameters, pump sizes) --> pick back up once Technical Officer position is filled 3/8/21: Supervisor Treatment to follow up	Complete review of CWT report and revise chlorination CCPs lower critical limit	
327	BWY	Filtration		Investigate filter outlet valve replacement (spare valve sitting on site)		27 June 2019 Improvement Plan review meeting	A3	27-Jun-19	Low	Supervisor Treatment	03-Aug-21	30-Sep-21		In progress			Not yet installed. 24/4/20: In progress (wiring done) 3/8/21: electrical control cabinet installed near filter, requires interal filter level sensors to actuate valve; local electrician consulted		

No	Location	Process step	Category	Action	ADWG No. ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
328	All	Instrumentation		Process monitoring, automation and instrumentation project. *Council should strongly consider investing in online monitoring at all CCPs (A13 - BWY NTU, A124& A258) --> 24/11/20: only looking at filtration (NTU) and disinfection CCP, for CLH/DDO currently only considering retic CCP - all **expected to be complete by 31/12/21** *Consider implementing online monitoring of critical water quality parameters including (A212): · Raw water pH · Raw water turbidity --> 24/11/20: RW **not a priority** at this stage · Filtered water turbidity [included in dot point above] · Treated chlorine residual [included in dot point above] *Online interlocks for pH and turbidity (NTU) on outlet for filters (A54) --> 24/11/20: **in place in MDN for NTU; BDN/CBN/MDN/BWY require pH probes; BDN requires newPLC; CBN/BWY can have interlocks in place for NTU by 31/12/21** *~~Consider online turbidity meter with interlocks at BWY, BDN~~ --> removed 24/11/20 as double up from dot point above *~~Consider interlocks for meters at CBN and MDN~~ (A169) --> removed 24/11/20 as double up from dot point above *CBN - Install a second turbidity meter on the outlet of filter 2 and reconfigure the existing turbidity meter to monitor filter 1.(A130) --> 24/11/10: **complete** *CBN_Install continuous online chlorine meter to ensure continual effective disinfection/control of chlorination CCP.(A126) --> 24/11/20: **previously completed** *CBN-Connect scales for chlorine gas cylinders to SCADA. (part A165) --> 24/11/20: **previously completed** A13 - BWY: · Perform regular resting of filter headloss immediately after a backwash --> 24/11/20: no DP measurement device currently installed		27 June 2019 Improvement Plan review meeting (Compilation of actions)	A4	27-Jun-19	Very high	Manager Warrumbungle Water	23-Mar-21	31-Mar-21	Interim (gas chlorine DDO)	In progress			Funding granted from Safe and Secure for scoping study of automation. Covers action 212 13/12/19: Consultant engaged and is coming on site next week 13/12/19: PLC are needed to install online analysers 28/2/20: Teleconference workshop in December 2019. A number of actions have been included under this action (A 54, 124, 126, 258, 258, 165) Coonabarabran - Dual turbidity meters to be installed and replacement of PLC. PLC has been ordered. H20 to install individual filter analyser (only currently on one filter) 24/4/20 Quote received from Hunter H20 for filter media replacement. Consultant has submitted. Have had meeting with Consultant on progress this week. Consultant to submit further information needed to progress. 27/4/20: received automation audit report, need to review (CW , AM) to finalise; future funding for next steps of concept design and installation/constsruction uncertain; PLC in CBN being installed, BWY ordered; BDN/BWY online chlorine analysers ordered; old online CBN NTU meter being moved to BDN; CBN filter control upgrade being done this week incl dual NTU meters; SCADA upgrade progressing; BDN PLC being looked at (included in clarifier/filter replacement) 24/11/20: Autmation upgrade - draft report peer reviewed, awaiting DPIE comments, BP report to Council scheduled for Feb 2021; online monitoring implemented for NTU and chlroine at CBN (no external alarms until SCADA upgrade complete) and MDN (has external alarms), for chlorine at BWY and BDN by 4/12/20 (no external alarms until SCADA upgrade complete), for BDN & BWY NTU by 31/12/21 (no external alarms until SCADA upgrade complete), for retic chlorine at CLH and DDO (external alarms), DDO disinfection chlorine by 31/12/20 (no external alarms until SCADA upgrade complete), CLH new chlorine room expected by 31/12/21 (will enable online monitoring of disinfection CCP), chlorine and pH in BUG and KBI - interlocks are in place for BUG/KBI (shut down bore pump, external alarm once reservoir level low), can be put in place in BWY, CBN and MDN now with new PLCs (wiring required), ; pH online monitiring can be done for filtered water at BDN, BWY, DDO, CBN and MDN (need to buy & install additional probes that hook to the combined chlorine analyser); RW pH/NTU only measured online in MDN - currently not affordable for any other sites/not a CCP therefore lower priority, however DPIE advised that furhter funding based on risk priotisation is likely to become available 23/3/21: BDN and BWY have online chlorine meters now + new PLC at BWY (SCADA upgrade required for external alarms; SDACA tender recommendation going to Council in April 2021); oniine NTU meters on order for BDN & BWY, to be installed by 30/4/21; gas chlrorination for DDO by 31/3/21		Review audit report from consultant	
329	BWY	Disinfection	Major works	Chlorine room upgrade		27 June 2019 Improvement Plan review meeting	A5	27-Jun	High	Supervisor Treatment; Project Engineer; Manager Warrumbungle Water	24-Nov-20	4-Dec-20		Complete			Quotes received, to include chlorine room upgrade 13/12/19: Have received quotes, sizing to be confirmed. HunterH20 audit to be undertaken next week, HunterH20 to confirm requirements 28/2/20 Quotes to undertake work are being reviewed 24/7/20: New chlroine room on order 24/11/20: expect completion by 4/12/20 xx/xx/xx: COMPLETE		To be included as treatment plant upgrades	
330	BWY	Sedimentation Lagoons	Major works	Investigate restoring bank integrity of sedimentation lagoons (e.g. relining lagoons)		30 July 2019 Improvement Plan review meeting	A6	27-Jun-19	High	Supervisor Treatment	03-Aug-21	31-Dec-21		In progress			Requested advice from HunterH20 27/9/19: asked CWT for advice, who provided advice - next stage: ? (contractor to give price for realigning) 28/2/20: Further investigation needed 24/7/20: Capital item in FY 20/21 (relining WTP lagoon - scoping) 25/3/21: lagoon assessment undertaken by contractor; $30k budgeted in FY21/22 to undetake works 3/8/21: waiting for lagoon to dry out		Review previous advice and consider options	
331	ALL	Reservoirs	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	28-Feb-20	31-Mar-20		Closed			Operators have undertaken working at height training. 13/12/19: Engaged WEARS to undertake this work 28/20/20: Action closed as covered by new action 343		Follow up with WEARS	
332	All	Fluoridation		Replace fluoridation systems and staff training		27 June 2019 Improvement Plan review meeting	A8	27-Jun	High	Manager Warrumbungle Water	24-Apr-20	31-Dec-20		Closed			13/12/19: Confirmed to be undertaken as part of Hunter H20 NSW Health project. 28/2/20: Internal meeting today with Health on design. Scheduled a workshop in March to present design 24/4/20: Action closed and included as part of action 346			
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, Supervisor Treatment	24-Jul-20	30-Jun-21		Closed			Funding FY19/20 13/12/2019: Circular 18 not yet submitted. 6 reservoirs still to be inspected, difficulties in getting Aqualift to undertake inspection. To get WEARS to undertaken inspections/cleans for remaining reservoirs. 28/2/20: Circular 18 submitted January 2020. 24/7/20: closed as included in new action A352		To arrange quote to get WEARS to undertake reservoir inspections/cleans for remaining 6 reservoirs.	
334	All	DWMS		Review and update DWMS *Develop, document and implement a process for reviewing formal requirements every 12 months or where there are any changes to Council's activities or formal requirements (A4) * Formally document and communicate roles and responsibilities of staff relating to management of drinking water quality. (A6) * Develop a regular review process to update the list of stakeholders. Ensure contact details are current and all relevant parties are involved in engagement processes.(A7) *Develop appropriate mechanisms for stakeholder commitment and involvement. Document the planned approach including partnership agreements or Memorandum of Understanding (MoU). (A9) * Ensure all operational procedures are documented and referenced in the DWMS document register (A117) * As part of Council's review of the DWMS risk assessment, review and discuss the effectiveness of existing processes and procedures in managing water quality. The review should draw on external research and information, the risk assessment, water quality analysis and organisational experience. With any changes in conditions, processes and procedures should be revalidated. (A260) * Describe process for document control for all DWMS documentation (i.e. ensure the currency, accessibility and appropriate review DWMS documents).(A267) * Update details for existing documentation in the DWMS document register.(A269) * Develop internal audit procedures and schedules appropriate to functionality of council and the water supply systems.(A277) * 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; reports from audits, water quality performance, previous reviews, concerns from consumers and regulators and impacts of changes to internal or external conditions (e.g. regulatory, technology, organisational activities).(A285) * Review and update contact details listed in Table 10.(A334)		27 June 2019 Improvement Plan review meeting (Compilation of actions)	A10	27-Jun-19	High	Manager Warrumbungle Water	03-Aug-21	30-Sep-21		In progress			External project 13/12/19: Consultant has provided proposal to review and update DWMS 28/2/20: To update follow the risk assessment review (A20) No longer reporting monthly to General Manager. Annual update to Council (DWMS annual review report and improvement plan tabled). Review schedule to be formalised in DWMS update. 24/7/20: as per comment 28/2/20 24/11/20: Monthly reporting to GM resumed; still waiting on HH2O to commence Health funded risk assessment review 25/3/21: engaged ATOM to undertake DWMS update, had inception meeting, site visits scheduled for 19 + 20/04/21 3/8/21: received DWMS Update draft			Consultant
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 Treatment	24-Nov-20	next week		Complete			Met with safety officer to review location and determine number of safety showers. 13/12/19: Shower and eyewash purchase, waiting to install 28/02/2020: to be installed by 6 March 24/7/20: landing still do and then to install eyewash 24/11/20: complete			
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-19	High	Supervisor Treatment, Technical Officer	03-Aug-21	30-Sep-21		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; 1xCLH water, 1xCLH sewer; 1xMDN water; 1xBWY water; 1xCBN sewer, 1xCBN water; 1xBDN water, 1xBDN sewer?) - check with supervisors what is practical 13/12/19: SS to add remaining locations and check with Supervisors 28/2/20: Register still being finalised, Supervisors to review once finalised. 24/11/20: Technical Officer position vacant since July 2020, hence no progress, however item is listed on site maintenance whiteboards 3/8/21: Tech officer to develop carbon copy books for weekly checks in liaison with Supervisor		Tech Officer to add remaining locations and check with Supervisors	
337	All			Ensure appropriate confined space signage is in place		27 June 2019 Improvement Plan review meeting	A13	27-Jun	High	Supervisor Treatment	24-Nov-20	31-Aug-20		Complete			Consultant to be engaged to develop register: 27/9/19: consultant cannot start before mid December 13/12/19: Consultant scheduled for mid Jan 2020 28/2/20 Consultant is preparing confined space register. Signage to be purchased and installed following development of register. 24/7/20: register completed - confirm if signage installed everywhere (AM to check) 24/11/20: AM confirmed all complete (compared against register) except signs for new lids at CBN WTP (got stickers but need something more permanent)			
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 Treatment	24-Jul-20	8-Apr-21		Closed			27/9/19: waiting on WEARS quote; need to provide them design of Bullinda St roof 13/12/19: WEARS have provided estimate 28/20/20: Final design needed to confirm costing 24/7/20: closed as included in new action A352			

No	Location	Process step	Category	Action	ADWG No.	ADWG Element	Source	Haz ID / Source number	Date added	Priority	Action Owner	Date reviewed	Due date (revised)	Due date notes	Status	Comments	Comments 29/08/18	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020; 24/7/20; 24/11/20	Short term actions	Resource requirements
339	All			Develop system wide SOPs * 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.(A85 & 103) * Compile all SOPs into an operations manual (A86) Develop SOPs for: * Laboratory water quality sampling and testing (A131) * Scheduled maintenance tasks (A131) * Daily rounds (A131) * Plant operations (A131)batching and dosing (A104) * filter maintenance (A105) * distribution failures such as main breaks, sufficient flushing, cleaning of tools (A108) notification procedure for mains breaks (A109), closing household property meters prior to recommissioning mains (A110) * Monitor the sedimentation ponds daily for contamination sources such as dead animals(A216) * Consider sampling and testing program following mains repairs -SOP to be developed for pipe break repairs (and include monitoring) (A99) DWMS documentation: * Ensure all operational procedures are documented and referenced in the DWMS document register (A117)			30 July 2019 Improvement Plan review meeting	A15	30-Jul-19	High	Supervisors	03-Aug-21	30-Jun-21		In progress			Refer to related actions 85, 86,103,104, 105, 107, 108, 109, 110, 131, 103, 216 27/9/19 & 13/12/19: supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote from them to develop those/the rest 28/2/20 - Staff meeting scheduled for 9 March 20, Supervisors still to identify SOPs required 24/11/20: AM to request quote from CWT for development of (selected/prioritised) outstanding procedures 25/3/21: this item has now also become part of WW Acition Plan (employee engagement survey) 3/8/21: Supervisor/s to follow up with consultant (Peter Mosse)	Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required SOP/SWMS	Consultant
340	All		Documentation / Protocol	That WSC investigate and implement a formalised **preventative maintenance program** for all the WTP, reticulation and reservoir assets. Including maintenance schedules (Action 168 and 172) *Identify critical equipment and develop procedures to maintain, repair and replace equipment as necessary (A190)	4.4	Equipment Capability and Maintenance	30 July 2019 Improvement Plan review meeting (compilation of actions)	A16	Jul-2019	Medium	Supervisors	03-Aug-21	TBD		In progress			Operation and maintenance schedules to be prepared by HunterH20 as part of NSW Health DWMS project. 13/12/19: Confirmed that maintenance schedules for WTP are to be undertaken as part of Hunter H20 NSW Health project. Will follow fluoridation project. 3/8/21: received O&M schedules for WTPs from HH2O in June 2020; formalised program outstanding as well as schedules fro retic and reservoirs (reservoir items covered in weekly checklists - A 343) A190: 30/7/21: Critial spares list developed (on paper), needs to be recorded digially/formalised within DWMS --> record under Asset Mgt and update when equipment is being serviced (sewer pumps)		Consultant
341	All	All	Documentation / Protocol	Develop an Emergency Response Plan (ERP)/Incident Response Plans (IRPs), including: *Review and finalise ERP in DWMS Implementation Report (2016)(A232) * Establish a rapid communication system to deal with unexpected events (A138 & 223) * Train relevant staff in these procedures (rapid communication incident response) and maintain a record of training. (A139) *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.(A225) * Identify an appropriate person to handle all incident and emergency communications and ensure they are appropriately trained (A228) * Develop a process for documenting and reporting of an incident or emergency.(A235) *Employees should be trained and protocols regularly tested in the emergency response plans. The requirement for this should be included in the ERP.(A236) *Develop a process for investigation following incidents and emergencies and document this process. Include in this process a mechanism for revision of any emergency protocols, where an investigation demonstrates it is required.(A234) * Identify possible water quality related incidents and emergency scenarios (the risk assessment should be used as a basis) and document these potential scenarios in an Incident and Emergency Response Plan. Document procedures and response plans to address these incidents (can refer to guideline protocols from NSW Health as provided in the DWMS). Add to the ERP particular processes that are required to address severe hazard / emergency scenarios, such as algal blooms, fuel spills, bushfire etc. The development of these protocols should involve relevant agencies.(A233) *Reference dialysis process in ERP (A229/224) *Undertake an exercise of the incident response plan with PHU following finalisation of ERP (A232)			Febray and July 2020 review meeting (compiled action)		Feb-2020	High	Manager Warrumbungle Water	03-Aug-21	31-Dec-21		In progress			28/2/20: Confirmed that development of ERP is to be undertaken as part of Hunter H20 NSW Health project. Actions 8, 138, 139. 223, 225, 228, 232, 233, 234, 235 closed and are now covered under this action. Progress delayed (prioritised filter inspection) 24/7/20: added actions 139, 236 and 342 to this item; Also refer to Action 224/229 (dialysis list/notification procecure; low priority) 3/8/21: IRPs developed in draft by HH2O in Oct-2020; mock events scheduled for 24/25 August 2021		
342				Undertake an exercise of the incident response plan with PHU following finalisation of ERP (A232)					Feb-2020	High	Manager Warrumbungle Water	24-Jul-20	30-Jun-20		Closed			28/2/20: New action created, to be undertaken following completion of 341 (ERP)		
343	All			Development of document to undertake regular reservoir inspections: * Consider a routine reservoir inspection (checking locks etc.), A106 *develop reservoir SOP (specific to individual reservoir requirements((A334 & 107) *develop reservoir inspection checklists for the operators (A310) *Train operators in reservoir inspections (A310) *Develop regular (weekly/monthly/annual) reservoir integrity inspection and reporting program (A273) * Assess compliance regarding reservoir access with Australian Standards and common sense (A84)			Febray 2020 review meeting (compiled action)		28-Feb-20	High	Supervisor Treatment	03-Aug-21	31-Dec-21		In progress			28/2/20: New action created to compile a number of related actions (A334, 107, 310, 273, 84) Visuals inspections are currently recorded in diaries. Engaging contractor (WEARS) to develop reservoir integrity checklist to undertake inspections. Including assessing WHS issues that are limiting inspections currently. 24/7/20: WEARS to redevelop (got lost) 24/11/20: reminded WEARS 3/8/21: checklists still outstanding from WEARS	Follow up with WEARS	
344				Review and respond to NSW Health cryptosporidium risk model letter			April 2020 review meeting			High	Manager Warrumbungle Water; Supervisor Treatment; Technical Officer	24-Jul-20	30-May-20		Complete			24/4/2020: Letter received by NSW Health 20 December 2019, request still to be reviewed and responded to	Internal to meeting to complete	