Drinking Water Management System

Annual Report 2023/24

Goldenfields Water County Council

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Version: 3.5

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Document Control

Date	Version	Change made	Person	Date submitted to NSW Health
August 2017	2.0	Drinking Water Management System annual report created	Chris Breen/Geoff Veneris	March 2017
October 2019	3.0	Updated annual report with relevant data	Chris Breen/Geoff Veneris	October 2019
October 2020	3.1	Updated annual report with relevant data	Chris Breen/Geoff Veneris	October 2020
September 2021	3.2	Updated annual report with relevant data for 2020/21 reporting period	Chris Breen/Geoff Veneris	September 2021
October 2022	3.3	Updated annual report with relevant data for 2021/22 reporting period	Chris Breen/Geoff Veneris	November 2022
July 2023	3.4	Updated annual report with relevant data for 2022/23 reporting period	Mitchell Farlow/Chris Breen/Geoff Veneris	December 2023
July 2024	3.5	Updated annual report with relevant data for 2023/24 reporting period	Mitchell Farlow/Chris Breen/Geoff Veneris	December 2024

Guidance

This report is designed to address the reporting (Element 10), evaluation (Element 11) and review and continual improvement (Element 12) requirements of Goldenfields Water County Council's Drinking Water Management System (DWMS).

The NSW Guidelines for Drinking Water Management Systems (2013) recommends review of the following areas:

- Performance of critical control points
- Water quality review (raw, treated and distribution water quality including verification monitoring in the NSW Health Drinking Water Database)
- Levels of Service (including consumer complaints)
- Incident and emergencies (including follow up)
- Drinking Water Management System implementation
- Continuous improvement plan implementation

Review of system performance should be against ADWG, levels of service, NSW Water Supply and Sewerage Performance Monitoring Reports and other regulatory requirements (Element 1).

Shortcomings should be captured in the Improvement Plan (Element 12).

Executive Summary

Critical Control Points

The following tables provide the total number of CCP exceedances registered throughout the 2023/24 financial year with the corresponding CCP number for each scheme.

Table 1. Number of CCP exceedances in the Jugiong supply scheme.

Jugiong	CCP1	CCP2	CCP3	CCP4	CCP5	OCP6
Number of CCP exceedances	0	0	1	5	0	2

Table 2. Number of CCP exceedances in the Oura supply scheme.

Oura	CCP1	CCP2	CCP3	CCP4
Number of CCP exceedances	0	2	0	0

Table 3. Number of CCP exceedances in the Mt Daylight supply scheme.

Mt Daylight	CCP1	CCP2
Number of CCP exceedances	0	0

Table 4. Summary of CCPs across all schemes.

CCP Number	Monitoring Parameter	Target Criterion	Adjustment Limit	Critical Limit
1 - Jugiong	Turbidity (Continuous online) Raw Water	Dependant on raw Water Quality		20% above set point for > 20minutes
2 - Jugiong	Turbidity (Continuous online) Filter Outlet	≤ 0.2 NTU	≥ 0.5 NTU	≥ 1.0 NTU
3 - Jugiong	Free Chlorine residual (Continuous online & alarmed) Finished Water	1.8mg/L	≤ 1.2mg/L or ≥ 2.0mg/L	**Summer**: ≤ 0.8mg/L for > 30min or ≥ 5.0mg/L **Winter**: ≤ 0.5mg/L for > 30min or ≥ 5.0mg/L
4 - Jugiong	Fluoride (Daily) Finished Water	1.0mg/L	< 0.95mg/L or > 1.05mg/L	< 0.9mg/L for > 72hrs or > 1.5mg/L
5 - Jugiong	System Integrity (monthly) Reservoir inspection	Secure, no evidence of break in or vermin	Visual identification of breach or vermin access to reservoir	Visual identification of vermin or containment in reservoir
6 - Jugiong	Free chlorine residual (continuous online & alarmed) Prunevale and Cootamundra	0.8mg/L	≤ 0.5mg/L or ≥ 2.0mg/L	≤ 0.2mg/L or ≥ 5.0mg/L

CCP Number	Monitoring Parameter	Target Criterion	Adjustment Limit	Critical Limit
1 - Oura	Free Chlorine residual (Daily) Treated Water	0.5mg/L	≤ 0.3mg/L or ≥ 1.0mg/L	≤ 0.2mg/L or ≥ 5.0mg/L
2 – Oura	Fluoride (Daily) Treated Water	1.0mg/L	< 0.9mg/L or > 1.2mg/L	< 0.9mg/L for > 72hrs or ≥ 1.5mg/L
3 – Oura	System Integrity (monthly) Reservoir inspection	Secure, no evidence of break in or vermin	Visual identification of breach or vermin access to reservoir	Visual identification of vermin or containment in reservoir
4 - Oura	Chlorine Residual (weekly) Wyalong and Thanowring Rd	0.5mg/L	≤ 0.35mg/L	≤ 0.25mg/L
1 – Mt Arthur	Free Chlorine residual (3 x weekly) Tank 4 Outlet	0.8mg/L	≤ 0.5mg/L or ≥ 2.0mg/L	≤ 0.3mg/L or ≥ 5.0mg/L
2 – Mt Arthur	System Integrity (monthly) Reservoir inspection	Secure, no evidence of break in or vermin	Visual identification of breach or vermin access to reservoir	Visual identification of vermin or containment in reservoir
1 – Mt Daylight	Free Chlorine Residual (continuous Online) Naradhan Reservoir	0.8mg/L	≤ 0.5mg/L or ≥ 2.0mg/L	≤ 0.3mg/L or ≥ 5.0mg/L
2 – Mt Daylight	System Integrity (monthly) Reservoir Inspection	Secure, no evidence of break in or vermin	Visual identification of breach or vermin access to reservoir	Visual identification of vermin or containment in reservoir

Water Quality

Verification monitoring has been undertaken over the entire GWCC scheme during the reporting period. Majority of data is compliant with the Australian Drinking Water Guidelines and limits set by public Health (NSW Health) with exceedances summarised in Table 1, 2 and 3.

GWCC did record one incident of E. coli detected at the Wyalong school in Wyalong reservoirs as detailed in Table 26, which were communicated at the time to NSW Health and retesting completed. Internal testing, chlorine results and retesting results determined that the detection was due to human error in sampling techniques.

Operational monitoring has also been conducted over the entire scheme with some non-compliances reported at the extremities of our systems. These non-compliances have been summarised in Table 24. The non-compliances have been mainly for low residual chlorines and elevated temperatures in the furthest extremities in each of the water source systems. GWCC standard protocol for low chlorine residuals is to manual dose hypo when low results are evident.

With the emergence of PFAS, 'Forever Chemicals' GWCC had already implemented a monitoring program to test for these chemicals within its raw water catchments for Jugiong and Oura, noting the historical issues with Riverina Water. Goldenfields has also been a member of the Technical Working Group that consists of DCCEW, Members of Defence,

Jacobs and Public Works Advisory, in developing response protocols and guidance to the Governance Group.

PFAS testing has occurred during the 2023/24 reporting period. With all Bores at Oura and the source water and finished water at the Jugiong Water Treatment Plant being tested. Results of these samples are in Appendix F: PFAS Sampling Results. Mt Arthur and Mt Daylight bores have also been tested but in the 2024/25 reporting period so results will be reported in next years DWMS report. (Results available if required).

Continuous Improvement Plan

GWCC review and update their Action and Implementation Plan as per Appendix B - Continuous Improvement Plan of this report. A summary of items that have been addressed or ongoing are detailed in the below Table 5.

The main outstanding item for GWCC to complete is the automation and upgrade of the Mt Arthur system. This system is earmarked for an entire new automated SCADA system that should be completed by June 2025. Once completed, this will allow us to receive online monitoring results and establish automated CCP requirements similar to our other systems. As can be seen within our historical DWMS reviews, data is limited for this scheme and manually registered within our Wateroutlook system.

Table 5. Summary of Council's Action and Implementation Plan.

	Completed or closed	In progress	Not Started	Implemented/Ongoing	Items added
Number of actions	80	0	0	2	0

*Note that the 3 items that haven't been counted above have been rolled into other action items. Full Continuous Improvement Plan can be seen in Appendix B.

DWMS Reviews

The 2017/18 DWMS was the first to be undertaken by GWCC. The 2017/18 report was conducted using only the data available at the time. The dataset used was limited to only a few months' worth of information.

This DWMS report is our latest annual review and has utilised the entire 2023/24 data for the Jugiong, Oura and Mt Daylight water supply systems. The Mt Arthur supply system will be included in the 2024/25 DWMS report as it is currently being updated into the GWCC SCADA system. This data was made available from the implementation of WaterOutlook and ClearSCADA. Data is also utilised from NSW Health's Drinking Water Database.

In addition to the general progression of the DWMS, GWCC engaged its internal Auditor (National Audits Group) in 2019 to review the DWMS and provide recommendations for improvement.

A key finding was that more transparency of data reported and adopted by the Board should occur. A full list of audit findings can be found in Appendix D - External Auditor Report Summary. These actions have since been carried out.

Review	Scope	Findings	Actions taken
26/09/2019	*Internal Audit*	*Listed in Appendix D*	*Responses noted in Appendix D and added to continuous improvement plan for GWCC to action*

In addition to this GWCC will be undertaking a review of its DWMS risk profile and an audit readiness program within the 2024/25 period. This is intended to establish a new risk assessment and Actions & Implementation program.

Reservoir Inspections

A total of 126 reservoirs, 8 surge tanks and 2 Break Pressure tanks are visually inspected weekly via a weekly 'drive-by'. A more comprehensive inspection conducted on the above is conducted on a quarterly basis. The findings of the inspections are summarised in the section headed Reservoir Inspections (page 68). A more comprehensive reservoir inspection report has been downloaded from the ASAM website and/or utilised from other third party specialists, this is the database that Aqualift provide when undertaking GWCC reservoir cleaning and maintenance, the report for reservoirs inspected during the 2023/24 FY is available in Appendix C of this report. Additional internal inspection and structural reports are completed and submitted to the Engineering division for corrective action on prioritisation of issued works.

Report Purpose

The purpose of the report is to inform and keep up to date New South Wales Department of Health (NSW Health) of Goldenfields Water County Councils (GWCC) implementation and ongoing assessment of its Drinking Water Management System. It also demonstrates that GWCC is compliant with requirement s25 Public Health Act 2010 to develop a Quality Assurance Program (QAP) in line with the framework for Drinking Water Quality Management in the Australian Drinking Water Guidelines.

Scheme Summary

GWCC provides the essential water requirements of approximately 40,000 people spread over an area in excess of 22,000 sq. km, between the Lachlan & Murrumbidgee Rivers in the Southwest of NSW.

GWCC's water supply system consists of five separate water schemes, Jugiong, Oura, Mt Arthur, Mt Daylight and Hylands Bridge. GWCC carries out water supply functions within the Local Government areas of Bland, Coolamon, Cootamundra-Gundagai Regional Council, Junee, Temora, Hilltops Council previously (Harden, Young), parts of Narrandera and Wagga Wagga.

Harden and Young Councils, now Hilltops Council are retailers who purchase bulk water from GWCC and supply the water to retail customers in their respective local government areas. Cootamundra-Gundagai Regional Council receives bulk supply from GWCC and retails water to customers in the township of Cootamundra, with GWCC supplying water to retail customers in the Cootamundra Shire outside the urban centre. GWCC also supplies small quantities of bulk water to Riverina Water County Council to service their northern supply areas.

At the end of the 2023/24 reporting period, there were 12043 water connections across the entire drinking water scheme, broken down in Table 6. This is an increase of 267 new connections across the Goldenfields County Council Drinking Water scheme. It should be noted that the bulk connections are identified as single connections only.

Table 6. Total GWCC connections, broken down by scheme.

Oura	Jugiong	Mt Arthur	Daylight	Hylands Bridge (non-potable)	Total
8896	713	1590	271	90	12043

A number of projects were also undertaken that encompassed the entirety of all Drinking Water schemes; these projects and current costings are summarised below:

Buildings Goldenfields Wide	$	222881
Pump Stations Goldenfields Wide	$	93083
Reservoir Sites Goldenfields Wide	$	100413
Mains - Rural (Outside Town) Goldenfields Wide	$	811
Mains - Reticulation (In Town) Goldenfields Wide	$	5425
Treatment Plant Goldenfields Wide	$	218
Mains - Trunk (Town to Town) Goldenfields Wide	$	1258
Information Technology Goldenfields Wide	$	22005
Microwave Goldenfields Wide	$	257483
Plant and Equipment Goldenfields Wide	$	1695995
Pump Stations Goldenfields Wide	$	91273

Jugiong Scheme

The Jugiong drinking water supply system is one of the largest water supply systems managed by Goldenfields Water. Most of the water produced in the Jugiong system supplies the bulk water Councils of Cootamundra Gundagai and Hilltops. Water is also delivered to a small number of retail customers in rural properties and the villages of Stockinbingal, Wallendbeen and Springdale. Approximately 18,000 people are supplied water from the Jugiong system.

Source Water

Goldenfields Water is licenced to extract water from the Murrumbidgee River via two submersible pumps operated in a duty / stand-by configuration. The submersible pumps are fixed speed; pump 1 operates at 185 L/s and pump 2 operates at 300 L/s.

The Jugiong source has been categorised as having a “Low” risk regarding Cryptosporidium. NSW Public Health’s preliminary outcome assessment for Cryptosporidium for the Jugiong scheme was reported to GWCC on 27th November 2019. A listed action for the Jugiong Scheme was:

‘Maintaining the operation and monitoring (ideally continuously) of individual filters to consistently reduce turbidity to <0.2 NTU’

Goldenfields can confirm that individual turbidity meters have since been installed during the 2021/22 financial year. Commissioning was completed in the 2022/23 financial year.

In addition to the NSW Public Health’s preliminary advice in 2019, GWCC undertook a review of catchment assessments for all of its water supply sources as part its current development of an Integrated Water Cycle Management Strategy (IWCM). This has concluded that Jugiong is a high-risk category 4 catchment under the utilisation of the Public Works Advisory assessment tool.

Water Treatment Process

The Jugiong Water Treatment Plant (WTP) is located on Waterworks Road in the township of Jugiong. The plant is a conventional WTP with a nominal capacity of 40 ML/day. It should be noted that the current pump arrangements at the plant can only produce around 23.8ML a day. Recent stress testing of the plant indicated that the plant is only capable of achieving an estimated 29ML of process whilst trying to achieve Health Based Targets (HBT’s) and all CCP’s for a 22-hour run time. This is due to a limitation within clarification of the process

The treatment process at Jugiong WTP comprises of the following process steps:

- Water from the Murrumbidgee River is pumped via 120 m rising main to Jugiong WTP (capacity 23.8 ML/day) by two pumps in a duty/standby configuration
- Water passes through a flow meter, where a flow of greater than 101 L/s starts the chlorine and soda ash pre-dosing systems for oxidisation of metals and pH adjustment, respectively. The chlorine pre-dose is optional, and is switched on or off by the operator, depending on water quality conditions
- The pre-dosed water enters the rapid mix tank which consists of baffles and two mixers in series. Polymer and aluminium sulphate are dosed into the rapid mix tank to aid flocculation
- Water then flows into the two flocculation tanks which has three mixers in series operating at declining speeds to allow for floc formation
- Flocculated water then enters the two clarifiers and sludge is removed by a travelling sludge rake. Sludge is sent to the duty sludge lagoon
- Clarified water enters the filter block, where it is dosed with chlorine and subsequently distributed across six gravity sand filters
- Filtered water enters a common channel. When flow in the filtered water channel is above 101 L/s, post-dosing of soda ash and chlorine are activated for pH adjustment and increased disinfection capacity, respectively. Water is also dosed with fluoride in the filtered water channel
- Flow from the filtered water channel enters the 3 ML clear water tank through a mid-level inlet and bottom outlet configuration
- Water from the clear water tank proceeds to clear water pumping station 1 (CWPS1), which has two 680 kW pumps and a smaller 400 kW pump that operate in a duty/standby/standby mode. CWPS1 distributes water to Jugiong drinking water supply system
- Treated water is distributed through 14 reservoirs and by 8 pumping stations. There are 138 km of trunk mains and 182 km of reticulation mains in the Jugiong system

Connections

The Jugiong drinking Water scheme has 688 retail connections. The system also supplies GWCCs bulk customers, Hilltops and Cootamundra-Gundagai. Jugiong GWCC retail Connections are broken down as follows:

- 20mm = 536
- 25mm = 165
- 32mm = 3
- 40mm = 4
- 50mm = 3

Included in this data are 3 stand pipe connections: 1 x 32mm, 1 x 40mm and 1 x 50mm.

For the Hilltops and Cootamundra-Gundagai Regional Council (CGRC) connections that are supplied via bulk service, Table 7 shows the breakdown of connections as sourced from Hilltops and Coota-Gundagai Regional Councils. (Spreadsheet located in CM9 Doc. 21/13324). When we get new connections Special Schedule 7 can give us a further breakdown:

Table 7. Breakdown of bulk service connections based off size.

Bulk Customer	20mm	25mm	32mm	40mm	50mm	63mm	65mm	80mm	100mm	150mm	Sub Total
Hilltops Council	6058	360	32	38	48	0	3	5	10	0	6554
Bulk Customer	**20mm**	**25mm**	**32mm**	**40mm**	**50mm**	**63mm**	**75mm**	**80mm**	**100mm**	**150mm**	**Sub Total**
CGRC	3994	124	33	45	58	1	3	2	8	0	4269

Upgrade to the System/System Improvements

GWCC staff have undertaken works to upgrade several assets within the Jugiong Drinking water scheme a summary of those works are provided below:

Temora - Little Crowley Street Pipeline Replacement	$24704
Jugiong Raw Water Pumps replacements - Replace 2 x Raw water pumps at Jugiong	$198107
Demondrille Pump 3 Overhaul	$18926
Rosehill to Harden Bypass	$223
Site Fencing - New or replacement of fencing around reservoirs and pump stations to improve security	$4,348
Cooney's Creek Replacement - Replace approx 60m of exposed pipeline through Cooney's creek and rock armour section of erosion	$1,126
Jugiong CWPS1 P1 and P2 Inlet Manifold 2022	$2,539
Wombat BT to Young TS Pipeline Upgrade	$220,405
Jugiong CWPS1 Pump 1 - 2022	$234
Jugiong Raw Water Well Renewal	$19,761
Wombat BT Renewal	$3,154
Jugiong WTP - Valve & Pneumatic Upgrade	$26,392
Jugiong High Voltage	$3,783,763
Pump Station Valve Renewals - Jugiong	$4,682
Mains Valve Renewals - Jugiong	$137
Jugiong Compressor	$32,716
PRV Replacement - Jugiong	$7,549
Rosehill Pipeline Replacement	$70,359
Water Service Renewals - Jugiong	$1,495

A total of $4,279,908 has been spent on the Jugiong scheme for the 2023/24 Financial year.

Oura Scheme

The Oura drinking water supply system is one of the largest water supply systems managed by Goldenfields Water. The majority of water is delivered to retail customers; however, a small amount is supplied to Riverina Water in bulk to customers along the Goldenfields Water pipeline. Approximately 15,000 people are supplied water from the Oura system. The Oura drinking water supply system can be connected to Goldenfields Water's Mt Arthur drinking water supply scheme at Coolamon and Ganmain, as well as the Hyland's Bridge non-drinking water supply at Barellan.

Source Water

Water is sourced from the Oura Borefield, which is located at Gumly Gumly Island to the north of Murrumbidgee River. Goldenfields Water is licensed to draw from four groundwater bores: Bore 2, Bore 3, Bore 4 and Bore 6. Bores are located in bore huts.

Water in the Murrumbidgee Inland Alluvial Aquifer is recharged by the Murrumbidgee River and is managed by the Natural Resource Access Regulator in NSW. There are two alluvial formations in this region: the Lachlan formation is a confined aquifer system that is overlain by the semi-confined to unconfined Cowra formation (NSW Dept. of Water and Energy, 2007).

According to the DPI Water (NSW Office of Water, 2011), groundwater in the Oura system is fresh, with total dissolved solids (TDS) ranging from zero to 500 mg/L and is suitable for domestic stock, some irrigation purposes and municipal use. NSW Public Health has issued preliminary advice regarding the risk of the Gumly Gumly source which has been deemed "protected". The Oura source has been categorised as having a "Low" risk regarding Cryptosporidium. NSW Public Health's preliminary outcome assessment for Cryptosporidium for the Oura scheme was reported to GWCC on 27th November 2019. In addition to this GWCC has undertaken additional assessment of the catchment as part of its IWCM Strategy development, utilising Public Works Advisory assessment tool and confirmed that a category 1 classification is deemed appropriate for this system.

Water Treatment Process

Water for the Oura drinking water supply system undergoes aeration, disinfection and fluoridation prior to distribution.

The treatment process for Oura drinking water supply system comprises of the following process steps:

- Groundwater is pumped from the Oura Borefield by line shaft bore pumps in each bore. The bores are operated in sequential mode where increased water demand will increase the number of bores online. The order of bore start up is operator adjustable, with the current order of preference set as: Bore No. 4, 6 and 3. Bore 2 was placed into service in November 2020, however, less than desirable water quality was achieved and it was decided to remove the bore from production until such time as it can be cleaned and flushed properly. The bore was removed from service and cleaned by an external contractor in early 2021 with a substantial amount of sand removed. It has since been placed back into service and is currently only used as a secondary pump. It is unable to be utilised as the lead pump due to high iron, manganese which reduces the ability to hold residual.
- The groundwater is dosed with chlorine prior to entering a cascade tray aerator. The aerator serves to oxidate dissolved iron and manganese from the raw water.

- After aeration, water is transferred to the Oura Contact Tank (2.2 ML), where chlorine contact time is achieved before being pumped by Oura pumping station to Marrar Pinnacle (Marrar Pinnacle 1.6 ML, 1 reservoir) or the Junee BT Reservoir (Junee 17 ML, 3 reservoirs).
- The Oura pumping station consists of two 605 kW pumps and a smaller 400 kW pump that operate on a duty/duty/standby configuration.
- Fluoride is dosed on the outlet of the Oura pumping station.

The Oura drinking water supply system is one of the largest distribution systems managed by Goldenfields Water.

Treated water is distributed through 35 reservoirs and by 19 pumping stations. There are 201km of trunk mains and 1,055km of reticulation mains in the Oura system. There are two chlorine booster pumping stations located at Thanowring Road and Reefton pumping stations to ensure adequate free chlorine residual is maintained throughout the system.

Connections

The Oura drinking water scheme has 9159 connections. This scheme also supplies bulk water to Riverina Water County Council. The Oura connections are broken down as follows:

- 20mm = 7849 connections
- 25mm = 817 connections
- 32mm = 92 connections
- 40mm = 65 connections
- 50mm = 56 connections
- 80mm = 8 connections
- 100mm = 6 connections
- 200mm = 1 Connection

Included in this data are 19 standpipe connections: 8 x 32mm, 5 x 40mm, 2 x 50mm and 4 x 80mm.

Upgrade to the System/System Improvements

GWCC staff have undertaken works to upgrade several assets within the Oura Drinking water scheme a summary of those works are provided below:

Milvale Road Pipe Extension Dead End Removal	$4,071
Oura Bore 4	$56,894
Duke St Junee - Developer Mains Extension - Allen	$2,518
Hoskins Street Pipeline Replacement - Polaris to Kitchener	$115,239
94 Blythe St Wyalong reconnect to new service line	$971
Barellan Mains Replacements	$35,6731
Bland Historical Society Mains Extension	$2,976
Oura Bore 3 - Cleaning and relining Oura Bore 3	$249,855
Marinna Pump Station - Investigation, design and installation of new pumps at Marinna, pipework and operation	$67,077
Marinna Pump 1 2023	$7,934
Temora Transfer Pump 2 2023	$1,143
Stinson Street Coolamon Replacement	$20,564
Oura to Junee COnnection Upgrades	$25,836

Junee Silos Pump 2023	$213
Marrar Urban Renewal - Replacement of old sections of pipeline within Marrar township and trunk main downstream of PRV	$90,747
Oura Bore 3 - 2022	$1,694
Wyalong Reliability Project Pipeline Construction	$1,460,141
Bygoo Road Replacement - Ardlethan	$22,432
West Wyalong Standpipe Reservoir	$623,583
West Wyalong Transfer Pump Station	$401,074
Oura Pump Station Renewal	$2,208,444
Rural Meter and Taggle Replacement Program	$56,027
Urban Meter & Taggle Replacement Program	$34,017
Oura New Connections from Riv Water (50% Contribution)	$3,338
Oura Reservoir & Aerator	$12,114,555
Pump Station Valve Renewals - Oura	$388
Mains Valve Renewals - Oura	$1,346
Wyalong Reliability Project Pre Work	$42,860
Oura HV Elec Upgrade	$100,824
PRV Replacement - Oura	$36,357
Thanowring Road Temora Pipeline Upgrade	$2,134,458
Water Service Renewals - Oura	$995
New Water Service Connections - Oura	$7,776

A total of $20,253,094 has been spent on the Oura scheme for the 2023/24 financial year.

Oura Water Scheme – Periodic inspection

The Oura Drinking Water Scheme was inspected by the Department of Planning, Industry and Environment (DPIE) Senior Inspector Mark Bradshaw. This inspection was in accordance with statutory requirements of the Local government Act 1993. At the time of inspection (9th May, 2024) the system was reported as “performing satisfactorily” and “CCPs were adequately understood and monitored”. A further comment was made stating “it is pleasing to see Councils water infrastructure being upgraded”. The onsite water quality results taken at time of inspection are as per Table 8 Table 9below.

Table 8. Water quality results from Oura inspection by DPIE.

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

				Sample ID	Goldenfields Water Oura WTP Raw Water - GFW1	Goldenfields Water Oura WTP Treated Water - GFW2
				Sampling date / time	07-May-2024 00:00	07-May-2024 00:00
Compound	CAS Number	LOR	Unit		CA2402988-001	CA2402988-002
					Result	Result
EA005CA: pH						
pH	----	0.01	pH Unit		7.30	7.87
EA010CA: Conductivity						
Electrical Conductivity @ 25°C	----	2	µS/cm		341	253
EA041CA: Colour - True						
Colour (True)	----	1	PCU		<1	<1
EA045CA: Turbidity						
Turbidity	----	0.1	NTU		1.0	0.6
EA043CA: UV Absorbance - Filtered						
ø UV Absorbance @ 254nm	----	0.01	AU		<0.01	<0.01
ED037CA: Alkalinity						
Hydroxide Alkalinity as CaCO3	DMO-210-001	0.1	mg/L		<0.1	<0.1
Carbonate Alkalinity as CaCO3	3812-32-6	0.1	mg/L		<0.1	<0.1
Bicarbonate Alkalinity as CaCO3	71-52-3	0.1	mg/L		93.9	104
Total Alkalinity as CaCO3	----	1	mg/L		94	104
EP002CA: Dissolved Organic Carbon						
ø Dissolved Organic Carbon (as NPOC)	----	1	mg/L		<1	<1
ED009CA: Anions						
Chloride	16887-00-6	0.1	mg/L		36.0	19.9
EG005CA: Total Metals by ICP-OES						
Aluminium	7429-90-5	0.02	mg/L		<0.02	<0.02
Iron	7439-89-6	0.02	mg/L		<0.02	<0.02
EG020CA: Total Metals by ICP-MS						
Manganese	7439-96-5	0.5	µg/L		60.7	57.1
EA066CA: Calcium Hardness as CaCO3						
ø Calcium Hardness as CaCO3	----	1	mg/L		46	36
EA065CA: Total Hardness						
ø Total Hardness as CaCO3	----	1	mg/L		100	76

These results indicate that the treatment process was being managed well and the quality of the water complies with ADWG (for parameters tested).

Mt Arthur Scheme

The Mt Arthur drinking water supply system supplies approximately 2,300 people. The Mt Arthur System can be supplemented by the Oura drinking Water supply system through Coolamon and Ganmain, however this is not common practice.

Water for the Mt Arthur drinking water supply system is drawn from the Lachlan Fold Belt fractured rock aquifer system, near the Murrumbidgee River at Matong. According to the DPI Water (NSW Office of Water, 2011), groundwater in this region is of moderate quality with TDS between 500 to 1500mg/L and is suitable for domestic stock and some irrigation purposes.

Source Water

Water is sourced from Mt Arthur Borefield, which is located near the Murrumbidgee River at Matong. GWCC is licenced to draw 762ML per annum from two groundwater bores. These bores are located in Bore Huts on the corner of Old Narrandera Rd and Matong Rd.

The Mt Arthur source has been categorised as having a "Low" risk regarding Cryptosporidium. NSW Public Health's preliminary outcome assessment for Cryptosporidium for the Mt Arthur scheme was reported to GWCC on 27th November 2019. In addition to this GWCC has undertaken additional assessment of the catchment as part of its IWCM Strategy development, utilising Public Works Advisory assessment tool and confirmed that a category 1 classification is deemed appropriate for this system

Water Treatment Process

The Water treatment of the Mt Arthur drinking water supply system comprises of the following steps:

- Groundwater is pumped to the surface by two 94kW bore pumps in a duty/standby configuration
- Water is injected with chlorine prior to entering the four Ganmain Low Level Reservoirs where iron and manganese are settled out.
- The water is then distributed to retail customers in Coolamon, Ganmain, Matong and Grong Grong

The Mt Arthur Drinking Water Supply system distributes water to the areas of Ganmain, Coolamon, Grong Grong and Matong. Treated Water is distributed through 9 reservoirs and by 6 pumping stations. There are 76km of trunk mains and 67km of reticulation mains in the Mt Arthur system.

Connections

The Mount Arthur drinking water scheme has 1577 connections; the Mount Arthur connections are broken down as follows:

- 20mm = 1484 connections
- 25mm = 57 connections
- 32mm = 35 connections
- 40mm = 7 connections
- 50mm = 7 connections

Included in this data are 2 standpipe connections: 1 x 32mm and 1 x 40mm

Upgrades to the System/System Improvements

GWCC staff have undertaken works to upgrade several assets within the Mt Arthur drinking water scheme a summary of those works are provided below:

Mt Arthur Aeration Tower - Investigation, design and construction of an aeration tower at Ganman for the Mt Arthur Scheme	$573
Coolamon Town Retic - Replacement of old pipeline assets within Coolamon township	$371,100
Supply and install new Switchboard to improve site to minimum standards	$58,129
Matong Pump Station - 2022	$4,630
Lonsdale Control Panel	$144
Ganmain Pump Station Switchboard Renewal	$5,607

Matong Bore 2 Switchboard Renewal	$76,581
Pump Station Valve Renewals - Mt. Arthur	$1,974
Mains Valve Renewals - Mt Arthur	$46
PRV Replacement - Mt Arthur	$12,707
New Water Service Connections - Mr Arthur	$5,891

A total of $528,127 has been spent on the Mt Arthur scheme for the 2023/24 financial year.

Mt Arthur Water Scheme – Periodic inspection

The Mt Arthur Drinking Water Scheme was inspected by the Department of Planning, Industry and Environment (DPIE) Senior Inspector Mark Bradshaw. This inspection was in accordance with statutory requirements of the Local government Act 1993. At the time of inspection (9th May, 2024) the system was reported as “performing satisfactorily” and was being “well managed”. The onsite water quality results taken at time of inspection are as per Table 9 below.

Table 9. Water quality results from Mt Arthur inspection by DPIE.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Goldenfields Water GFW1 MT Aurther Bore Pump 2	Goldenfields Water GFW2 Gong Gong Reservoir	Goldenfields Water GFW3 Ganmain Depot
				Sampling date / time	09-May-2024 00:00	09-May-2024 00:00	09-May-2024 00:00
Compound	CAS Number	LOR	Unit		CA2403035-001	CA2403035-002	CA2403035-003
					Result	Result	Result
EA005CA: pH							
pH	----	0.01	pH Unit		7.63	7.66	7.54
EA010CA: Conductivity							
Electrical Conductivity @ 25°C	----	2	µS/cm		348	307	276
EA041CA: Colour - True							
Colour (True)	----	1	PCU		5	<1	<1
EA045CA: Turbidity							
Turbidity	----	0.1	NTU		2.6	1.0	1.0
EA043CA: UV Absorbance - Filtered							
ø UV Absorbance @ 254nm	----	0.01	AU		0.01	<0.01	<0.01
ED037CA: Alkalinity							
Hydroxide Alkalinity as CaCO3	DMO-210-001	0.1	mg/L		<0.1	<0.1	<0.1
Carbonate Alkalinity as CaCO3	3812-32-6	0.1	mg/L		<0.1	<0.1	<0.1
Bicarbonate Alkalinity as CaCO3	71-52-3	0.1	mg/L		95.8	86.3	90.7
Total Alkalinity as CaCO3	----	1	mg/L		96	86	91
EP002CA: Dissolved Organic Carbon							
ø Dissolved Organic Carbon (as NPOC)	----	1	mg/L		<1	<1	<1
ED009CA: Anions							
Chloride	16887-00-6	0.1	mg/L		38.7	35.0	28.6
EG005CA: Total Metals by ICP-OES							
Aluminium	7429-90-5	0.02	mg/L		<0.02	<0.02	<0.02
Iron	7439-89-6	0.02	mg/L		0.50	0.10	0.13
EG020CA: Total Metals by ICP-MS							
Manganese	7439-96-5	0.5	µg/L		70.8	16.1	29.6
EA066CA: Calcium Hardness as CaCO3							
ø Calcium Hardness as CaCO3	----	1	mg/L		21	25	20
EA065CA: Total Hardness							

These results indicate that the treatment process was being managed well and the quality of the water complies with ADWG (for parameters tested).

Mt Daylight System

The Mt Daylight drinking water is a water supply system that supplies approximately 125 people in the villages and surrounds of Naradhan, Weethalle and Tallimba.

The Mt Daylight drinking water supply system draws its ground water from the lower Lachlan alluvium, located in the Lachlan River Catchment. The aquifers surrounding Lake Ballyrogan (Lake Brewster) from which the Mt Daylight system draws its water. This is hydraulically connected to surface waters. Meaning, that ground water quality in the daylight system is connected to surface water quality, although it is expected that the ground water turbidity would be much better due to filtration through subsurface flows. Both DPI Water (NSW Office of Water 2011) and Natural Resources Commission (2006) report that the groundwater in the Mt daylight scheme is relatively fresh with low salinity, making it suitable for municipal use.

Source Water

Water is sourced from the Daylight Borefield which consists of two bores located in the Carathool Shire local government area, between Lake Brewster and the Lachlan River. The bores are jointly owned and operated by Carathool Shire Council and GWCC. GWCC owns 71% of the assets in value and Carathool owns 29%. Carathool is responsible for the maintenance, repair, and replacement of all bores. Additionally, Carathool is the water entitlement licence holder without having GWCC listed as an entitled party. GWCC is the only provider of municipal potable water supply from this scheme.

The Mt Daylight source has been categorised as having a “Low” risk regarding Cryptosporidium. NSW Public Health’s preliminary outcome assessment for Cryptosporidium for the Mt Daylight scheme was reported to GWCC on 27th November 2019. In addition to this GWCC has undertaken additional assessment of the catchment as part of its IWCM Strategy development, utilising Public Works Advisory assessment tool and confirmed that a category 1 classification is deemed appropriate for this system.

Water Treatment Process

The treatment of the water in the Mt Daylight System comprises of the following:

- Groundwater is pumped to the surface by two 30kW pumps in a duty/standby configuration to the daylight reservoirs
- Water is injected with Chlorine at the inlet to the Mt daylight reservoirs
- Water is distributed to retail customers in Naradhan, Weethalle and Tallimba.

Treated Water is distributed through 7 reservoirs and by 5 pumping stations. There are 308km of trunk mains and 8 km of reticulation mains in the Mt Daylight system.

Connections

The Mount Daylight Drinking water supply has 266 connections, these connections are broken down as follows:

- 20mm = 144 connections
- 25mm = 122 connections
- 32mm = 2 connection
- 40mm = 1 connection
- 50mm = 1 Connection
- 150mm = 1 Connection

Included in this data are 1 standpipe connections: 1 x 32mm.

Upgrades to the System/System Improvements

Carrathool/Ballyrogan Bore - 2022	$68,198

Mt Daylight Water Scheme – Periodic inspection

The Mt Daylight Drinking Water Scheme was inspected by the Department of Planning, Industry and Environment (DPIE) Senior Inspector Mark Bradshaw. This inspection was in accordance with statutory requirements of the Local government Act 1993. At the time of inspection (8th May, 2024) the system was reported as "performing satisfactorily" and was being "well managed". The onsite water quality results taken at time of inspection are as per Table 10 below.

Table 10. Mt Daylight Periodic Inspection

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Goldfields Water Mt. Daylight Bore Pump 1 - GFW1	Goldfields Water Mt. Daylight P/S + Res - GFW2	Goldfields Water Weethalk Pioneer Park - GFW3	Goldfields Water Tallimba Park - GFW4
				Sampling date / time	08-May-2024 09:10	08-May-2024 10:15	08-May-2024 12:20	08-May-2024 13:40
Compound	CAS Number	LOR	Unit		CA2403017-001	CA2403017-002	CA2403017-003	CA2403017-004
					Result	Result	Result	Result
EA005CA: pH								
pH	----	0.01	pH Unit		7.35	7.59	7.70	7.77
EA010CA: Conductivity								
Electrical Conductivity @ 25°C	----	2	µS/cm		681	701	692	682
EA041CA: Colour - True								
Colour (True)	----	1	PCU		1	1	2	1
EA045CA: Turbidity								
Turbidity	----	0.1	NTU		2.2	1.0	0.5	0.3
EA043CA: UV Absorbance - Filtered								
ø UV Absorbance @ 254nm	----	0.01	AU		<0.01	0.02	<0.01	0.01
ED037CA: Alkalinity								
Hydroxide Alkalinity as CaCO3	DMO-210-001	0.1	mg/L		<0.1	<0.1	<0.1	<0.1
Carbonate Alkalinity as CaCO3	3812-32-6	0.1	mg/L		<0.1	<0.1	<0.1	<0.1
Bicarbonate Alkalinity as CaCO3	71-52-3	0.1	mg/L		149	145	160	142
Total Alkalinity as CaCO3	----	1	mg/L		149	145	160	142
EP002CA: Dissolved Organic Carbon								
ø Dissolved Organic Carbon (as NPOC)	----	1	mg/L		<1	2	<1	2
ED009CA: Anions								
Chloride	16887-00-6	0.1	mg/L		84.6	84.1	83.7	83.9
EG005CA: Total Metals by ICP-OES								
Aluminium	7429-90-5	0.02	mg/L		<0.02	<0.02	<0.02	<0.02
Iron	7439-89-6	0.02	mg/L		0.25	0.03	<0.02	<0.02
EG020CA: Total Metals by ICP-MS								
Manganese	7439-96-5	0.5	µg/L		118	109	6.0	<0.5
EA066CA: Calcium Hardness as CaCO3								
ø Calcium Hardness as CaCO3	----	1	mg/L		58	61	67	62
EA065CA: Total Hardness								
ø Total Hardness as CaCO3	----	1	mg/L		139	149	152	150

Rural Backflow Prevention Program

GWCC rural Backflow prevention Program sees a Reduced Pressure Zone Device (RPZD) installed on rural water connections to prevent the cross contamination of water supply.

An RPZD is a device that stops the reverse flow of contaminated water in rural areas from entering our rural water supply system.

All rural connections have been classified as high risk of cross contamination due to the use of hazardous chemicals and livestock on rural properties. Cross contamination caused by these factors can travel back into rural customers' water mains which can potentially harm health or cause death. Due to the risk, the installation of a testable RPZD is required to ensure compliance in accordance with the Australian Standard (AS3500 Part 1: Plumbing and Drainage Section 4).

GWCC adopted the Backflow Prevention policy (PP06) in August 2016 and works began in May 2017 to install backflow devices on all rural properties. As per Table 11, GWCC installed 50 new RPZDs in the 23/24 financial year bringing the total number of installations to 1644.

There remains approximately 68 RPZDs outstanding, or no certificate has been found and/or completed for their install, with no outstanding installations in the Hilltops Council. Additional RPZD installs may be required if new service connections in rural areas come online.

In October 2024, the GWCC Board resolved to update the backflow prevention policy which included having the testing regime of RPZDs be completed biennially, as it is not possible for us to achieve the testing regime without significant staffing level increase. As such, Council have commenced an audit and testing program to re-certify existing backflow devices and have previously been replacing any non-conforming devices.

Table 11. Breakdown of total RPZDs within GWCC scheme.

# of RPZD Installed at Beginning of 23/24 FY	**1594**
# of RPZD Existing – GWCC Owned	*1461*
# of RPZD Existing – Hilltops Council Owned	*133*
# of RPZD Installed during 23/24 FY	**50**
# of RPZD Installed – GWCC Owned	*50*
# of RPZD Installed – Hilltops Council Owned	*0*
Total RPZD Count	**1644**
# of GWCC Owned RPZDs	*1511*
# of Hilltops Council Owned RPZDs	*133*
# of RPZD Installs Outstanding	*68*
# of RPZD Tested during 23/24 FY	**33**

Critical Control Points

No changes have been made to the CCP's during the 2023/24 reporting period.

Table 12. Summary of critical control points.

CCP Number	Monitoring Parameter	Target Criterion	Adjustment Limit	Critical Limit
1 - Jugiong	Turbidity (Continuous online) Raw Water	Dependant on raw Water Quality		20% above set point for > 20minutes
2 - Jugiong	Turbidity (Continuous online) Filter Outlet	≤ 0.2 NTU	≥ 0.5 NTU	≥ 1.0 NTU
3 - Jugiong	Free Chlorine residual (Continuous online & alarmed) Finished Water	1.8mg/L	≤ 1.2mg/L or ≥ 2.0mg/L	**Summer**: ≤ 0.8mg/L for > 30min or ≥ 5.0mg/L **Winter**: ≤ 0.5mg/L for > 30min or ≥ 5.0mg/L
4 - Jugiong	Fluoride (Daily) Finished Water	1.0mg/L	< 0.95mg/L or > 1.05mg/L	< 0.9mg/L for > 72hrs or > 1.5mg/L
5 - Jugiong	System Integrity (monthly) Reservoir inspection	Secure, no evidence of break in or vermin	Visual identification of breach or vermin access to reservoir	Visual identification of vermin or containment in reservoir
6 - Jugiong	Free chlorine residual (continuous online & alarmed) Prunevale and Cootamundra	0.8mg/L	≤ 0.5mg/L or ≥ 2.0mg/L	≤ 0.2mg/L or ≥ 5.0mg/L
1 - Oura	Free Chlorine residual (Daily) Treated Water	0.5mg/L	≤ 0.3mg/L or ≥ 1.0mg/L	≤ 0.2mg/L or ≥ 5.0mg/L
2 – Oura	Fluoride (Daily) Treated Water	1.0mg/L	< 0.9mg/L or > 1.2mg/L	< 0.9mg/L for > 72hrs or ≥ 1.5mg/L
3 – Oura	System Integrity (monthly) Reservoir inspection	Secure, no evidence of break in or vermin	Visual identification of breach or vermin access to reservoir	Visual identification of vermin or containment in reservoir
4 - Oura	Chlorine Residual (weekly) Wyalong and Thanowring Rd	0.5mg/L	≤ 0.35mg/L	≤ 0.25mg/L
1 – Mt Arthur	Free Chlorine residual (3 x weekly) Tank 4 Outlet	0.8mg/L	≤ 0.5mg/L or ≥ 2.0mg/L	≤ 0.3mg/L or ≥ 5.0mg/L
2 – Mt Arthur	System Integrity (monthly) Reservoir inspection	Secure, no evidence of break in or vermin	Visual identification of breach or vermin access to reservoir	Visual identification of vermin or containment in reservoir
1 – Mt Daylight	Free Chlorine Residual (continuous Online) Naradhan Reservoir	0.8mg/L	≤ 0.5mg/L or ≥ 2.0mg/L	≤ 0.3mg/L or ≥ 5.0mg/L

CCP Number	Monitoring Parameter	Target Criterion	Adjustment Limit	Critical Limit
2 – Mt Daylight	System Integrity (monthly) Reservoir Inspection	Secure, no evidence of break in or vermin	Visual identification of breach or vermin access to reservoir	Visual identification of vermin or containment in reservoir

Critical Limit Exceedances

A breakdown of what each CCP represents can be seen in Table 12 above. Note that OCP1 relates to pH which is an operational control point with associated critical limits (<7 and >8) and is not a critical control point. However, exceedances related to this operational control point have been included in Table 13. Critical limit exceedances - Jugiong.

Table 13. Critical limit exceedances - Jugiong

Date	CCP 1	CCP 2	CCP 3	CCP 4	CCP 5	CCP 6	OCP 1	Reason	Immediate Correction	Preventive Action
1/8/2023							8.04	Previous day maintenance on filters, filter washes, minimal pumping, unusually high raw water pH. Plant didn't run long from previous night shutting down on high pH.	Increase alum dose and reduce soda ash dose.	Monitor plant shut down when not manned.
22/8/2023				0.8mg/L				Weight Scales needed calibrating, output reading that hopper has fluoride when in fact the hopper was empty	Fill hopper with fluoride	Regular calibration of scales and manually check hopper
23/8/2023				0.85 mg/L				Low fluoride reading due to minimal water pumped for the day	Monitor results	Small pump repaired and on duty again soon
27/8/2023			0.66 mg/L					Not an exceedance. Alarm was triggered as plant had not ran and chlorine decay bought level down to 0.66mg/l over extended detention time.	Inhibit alarm to run plant for chlorine dosing to commence to elevate levels again.	Nil required.
9/9/2024				0.1mg/L				Fluoride Plant Fault	No Incident Report received, assumed another blockage	Ensure incident reports are completed

Date	CCP 1	CCP 2	CCP 3	CCP 4	CCP 5	CCP 6	OCP 1	Reason	Immediate Correction	Preventive Action
19/9/2024							8.12	High pH due to excessive filter dumps and backwashing during commissioning works with only 1 clarifier in operation, caused by higher flow through clarifier and polymer dosing failure	Monitor filters and operation was resolved with polymer system fixed and having 2 clarifiers operating	Clean clarifier and put back in service
12/11/2023				0.8mg/L				Electrical Outage due to storm approx 7:30pm om 11/11/23	No Incident Report received	Ensure incident reports are completed in wateroutlook
16/5/2024				0.87 mg/L				Low fluoride result 0.87mg/L due to fluctuating raw water flows. Fluctuations occurring due to manually operated raw water valve awaiting automation install.	Advise workshop of flow issue	Valve becoming redundant due to install of raw water pump VSD's.

Table 14. Critical limit exceedances - Oura

Date	CCP1	CCP2	CCP3	CCP4	Reason	Immediate Correction	Preventative Action
26/4/2024		0.28mg/L			Low fluoride level, "hopper level 98kg	No incident report received assumed usual blockage and failure.	New system being purchased for plant upgrade
7/6/2024		0.87mg/L			No incident report or reason given in report	No incident report or reason given in report.	Ensure incident reports completed

Table 15. Critical limit exceedances - Mt Daylight

Date	CCP1	CCP2	Reason	Immediate Correction	Preventative Action
There have been no Critical Control Point Exceedances for the Mt Daylight Borefield for 2023/24					

Fluoride Critical Limit exceedance

See Table 13. Critical limit exceedances - Jugiong and Table 14. Critical limit exceedances - Oura.

Table 16. Fluoride critical limit exceedances – summary all results in (mg/L)

Date	Scheme	Recorded Concentration (mg/L)	Amount Exceeded By (mg/L)
22/8/2023	Jugiong	0.80	-0.10
23/8/2023	Jugiong	0.85	-0.05
9/9/2023	Jugiong	0.1	-0.85
12/11/2023	Jugiong	0.8	-0.1
16/5/2024	Jugiong	0.87	-0.03
26/4/2024	Oura	0.28	-0.62
7/6/2024	Oura	0.87	-0.03

Other Reportable CCP Events

Oura Scheme

Two CCP breaches were reported for the 2023/24 reporting period, these are outlined in table 14.

Mt Daylight Scheme

No CCP events have been recorded for the 2023/24 period.

Jugiong Scheme

Six CCP breaches were reported for the 2023/24 reporting period, these are outlined in table 13.

Critical Control Point Graphs

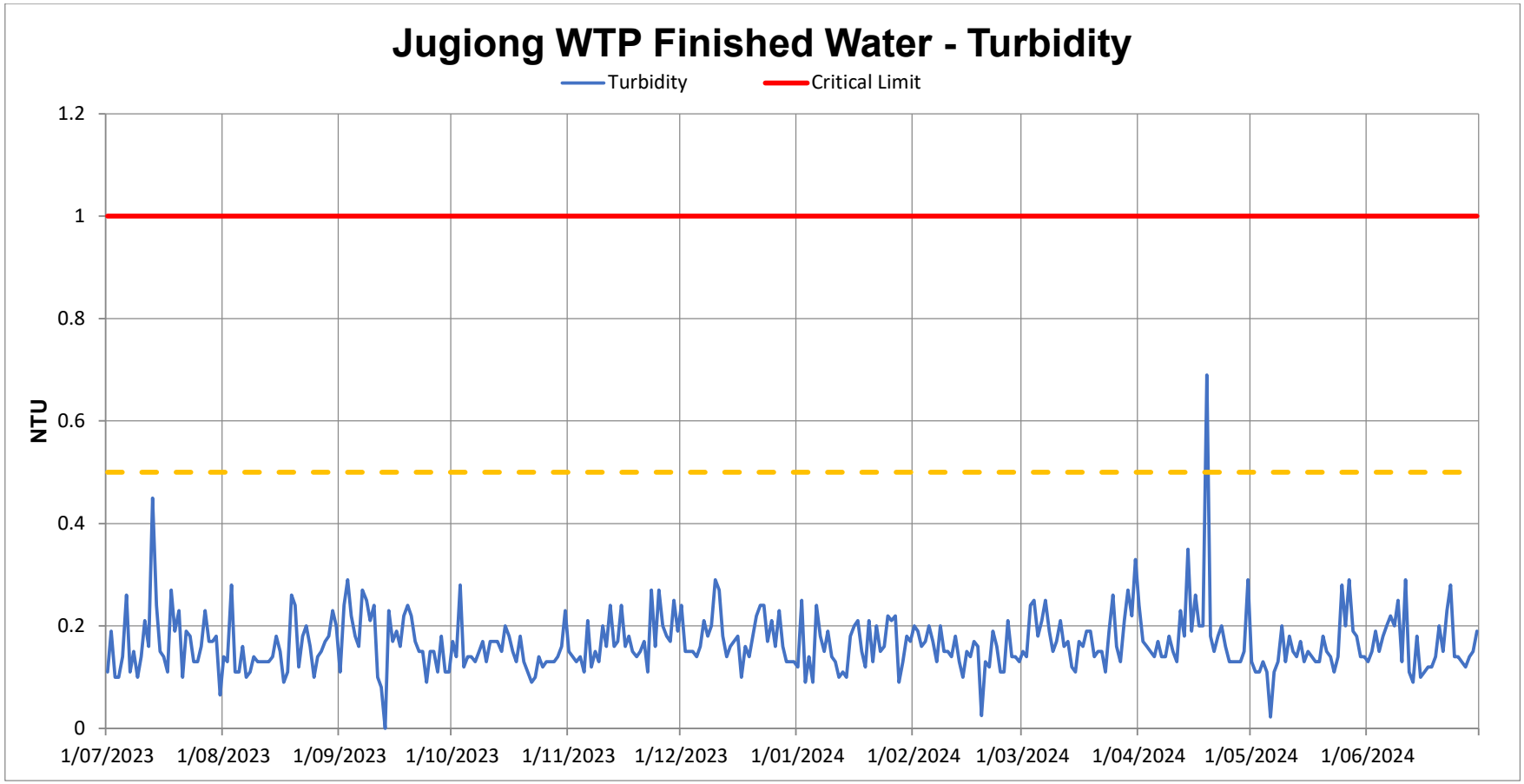


Figure 1. Jugiong water treatment plant CCP1 - filter outlet turbidity.

Figure 1 above is a representation of turbidity in the water leaving the Jugiong Water Treatment Plant. The red lines are our Critical Control Points (CCP) for the turbidity in the water and the orange lines are our Operational Control Points. As is indicated above, GWCC is consistently within the current CCP throughout the year with no exceedances.

Figure 2. Jugiong water treatment plant CCP3 - free chlorine.

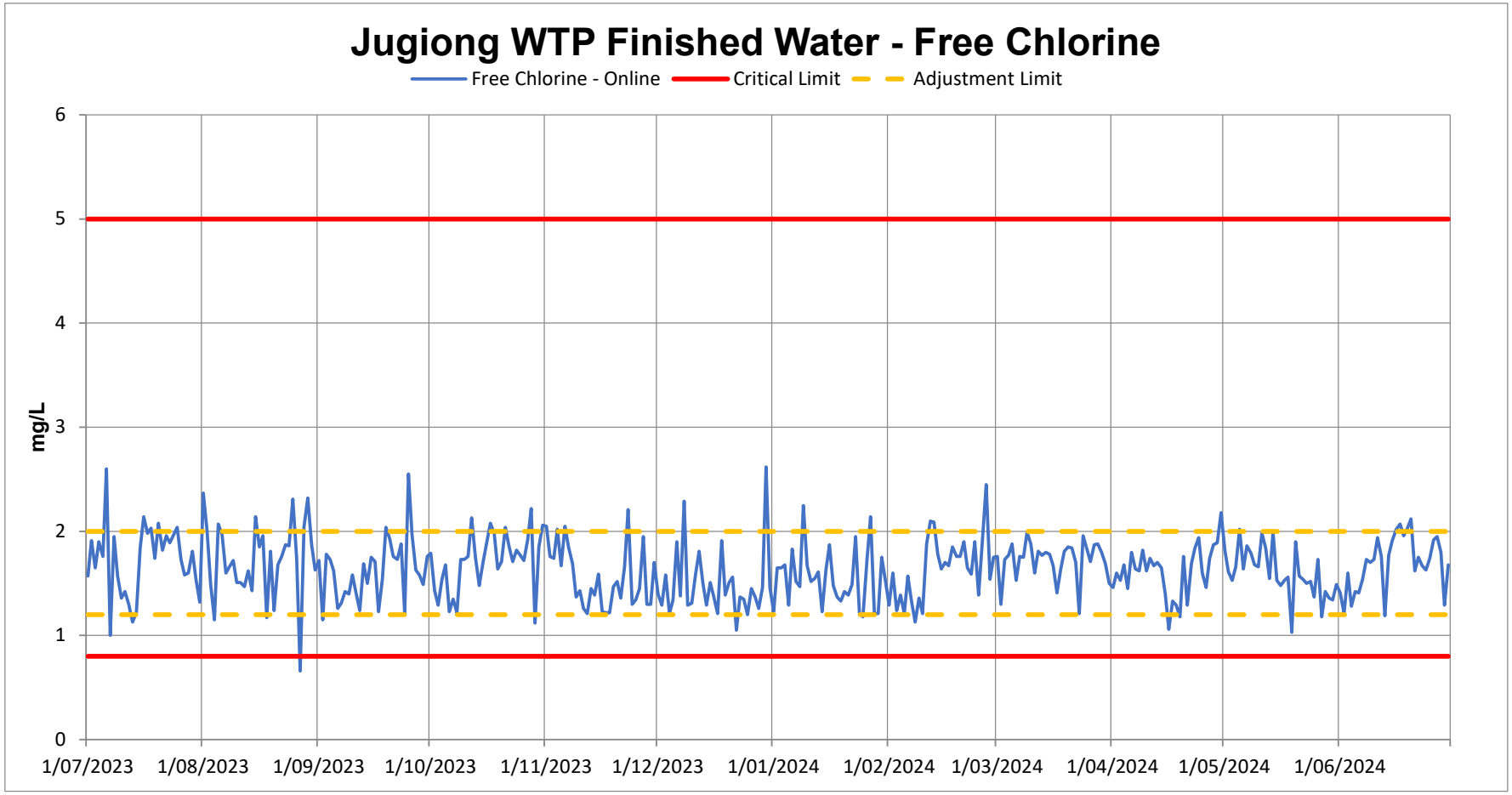


Figure 2 above is a representation of free chlorine in the water leaving the Jugiong Water Treatment Plant. The red lines are our Critical Control Points (CCP) for the concentration of chlorine in the water and the orange lines are our Operational Control Points. As is indicated above, GWCC is consistently within the CCP throughout the year except for 1 exceedance. This exceedance is explained in Table 13 above.

Figure 3. Jugiong water treatment plant CCP4 - finished fluoride.

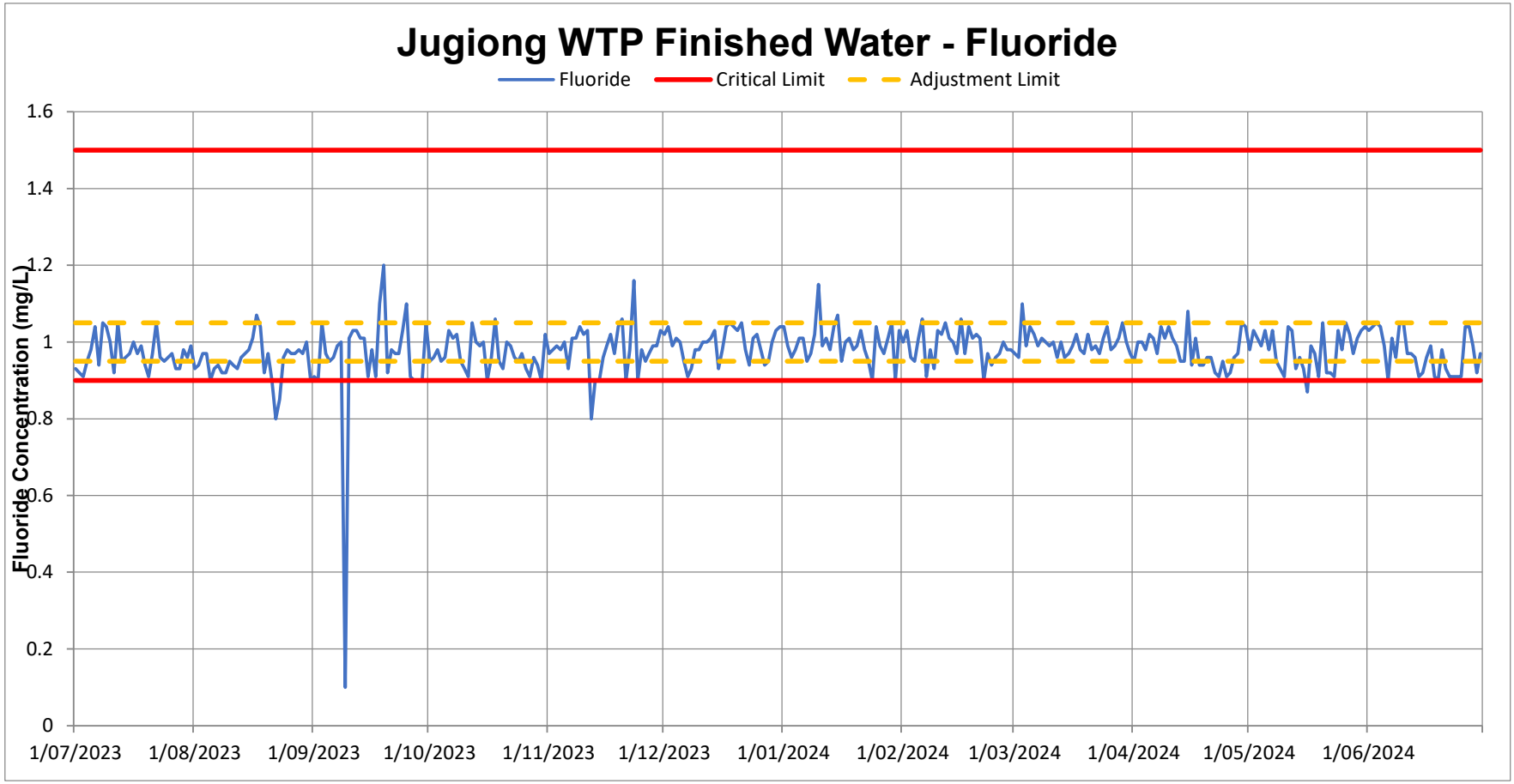


Figure 3 is a representation of the Finished Water Fluoride in the water leaving the Jugiong Water Treatment Plant. The red lines are our Critical Control Points (CCP) limits for the concentration of fluoride in the water and the orange lines are our Operational Control Points. As is indicated above, GWCC is generally within the CCP throughout the year with the exception of 4 exceedances as indicated above. These exceedances are explained in Table 13 above.

Figure 4. Oura water treatment plant CCP1 - finished water free chlorine.

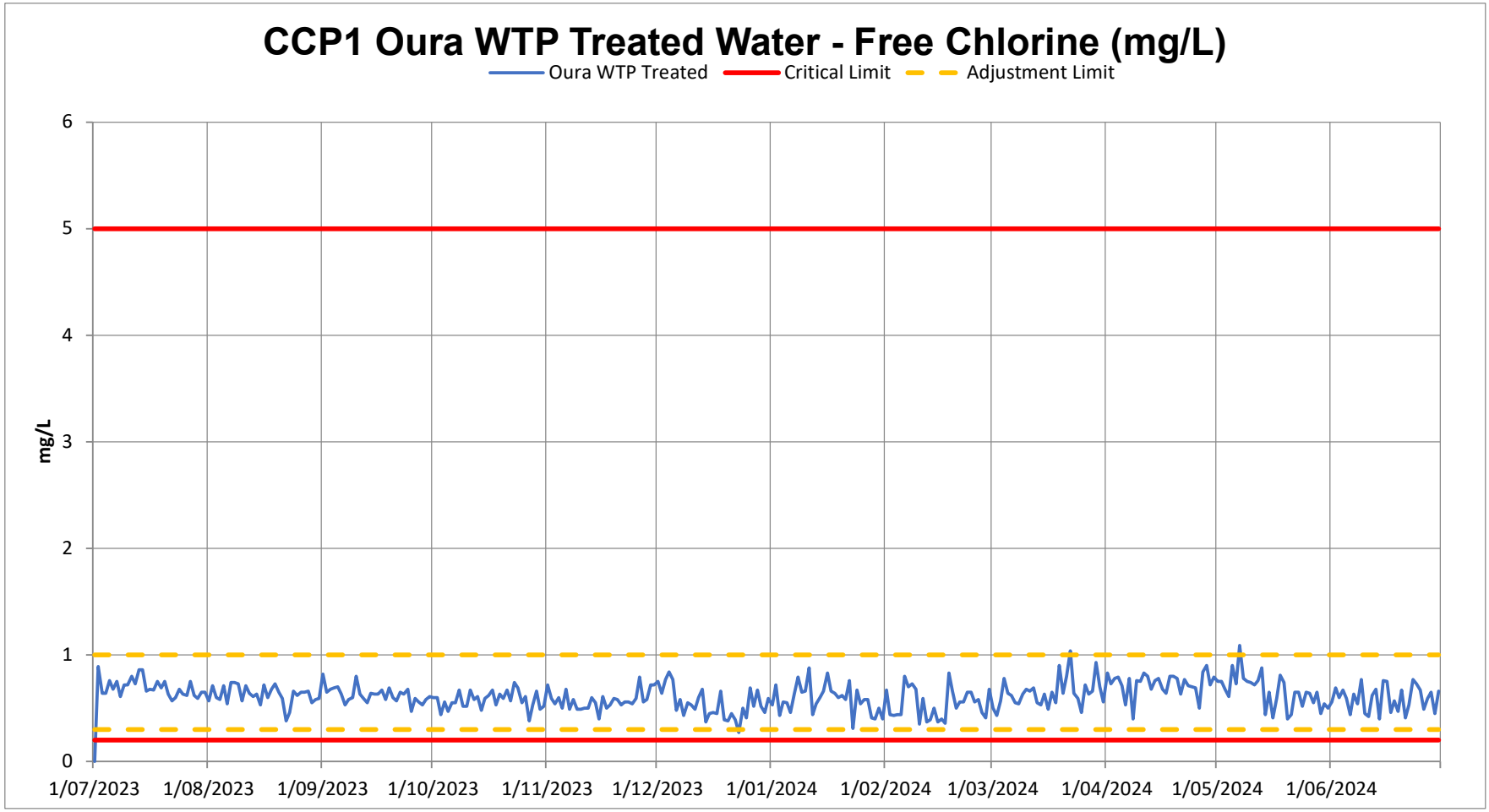


Figure 4 above is a representation of free chlorine in the water leaving the Oura Water Treatment Plant. The red lines are our Critical Control Points (CCP) for the concentration of chlorine in the water and the orange lines are our Operational Control Points. As is indicated above, GWCC is consistently within the CCP throughout the year with 0 exceedances.

Figure 5. Oura water treatment plant CCP2 - treated water fluoride.

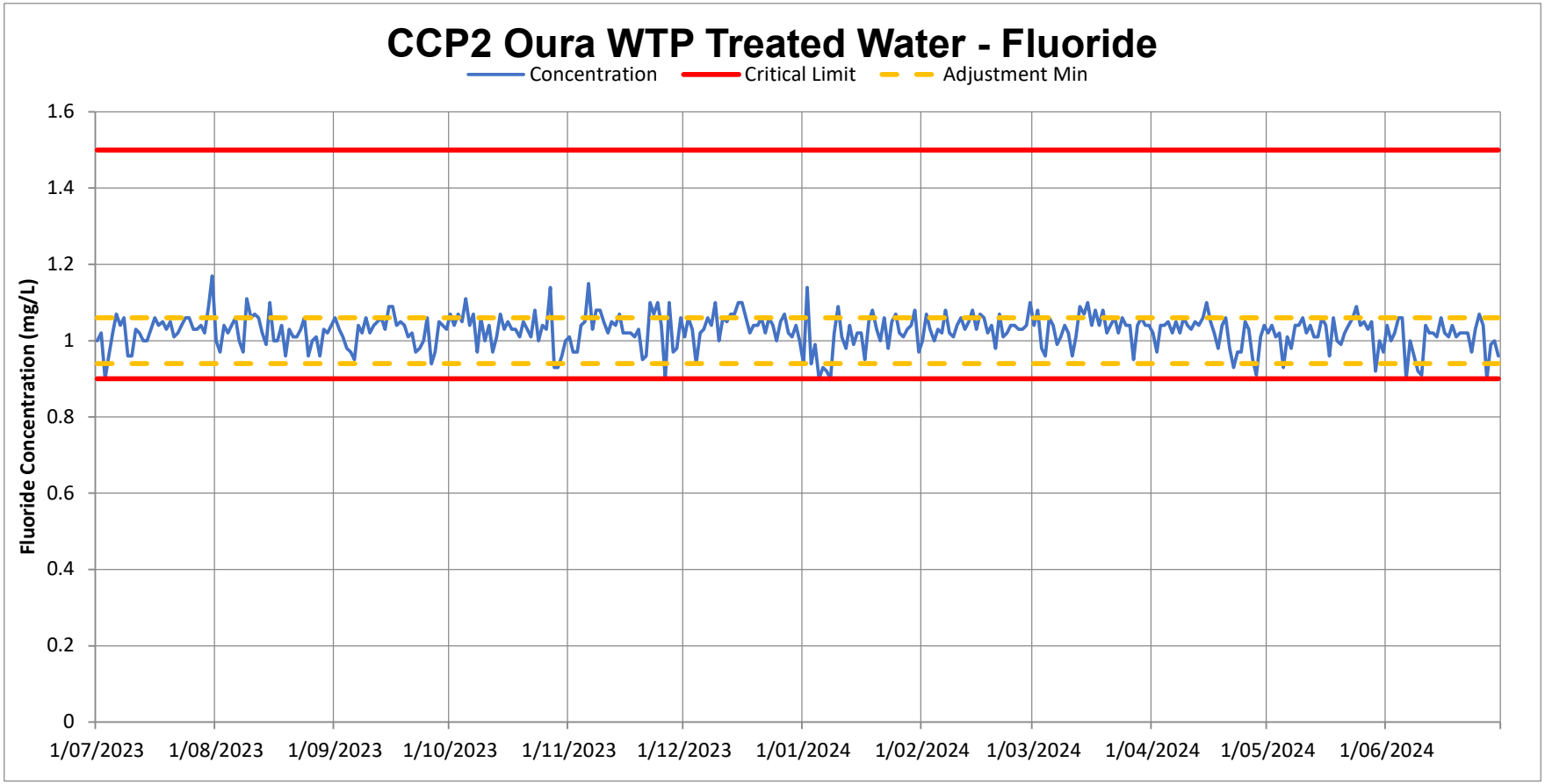


Figure 5 above is a representation of the Finished Water Fluoride in the water leaving the Oura Water Treatment Plant. The red lines are our Critical Control Points (CCP) limits for the concentration of Fluoride in the water and the orange lines are our Operational control points. As is indicated above, there have been 0 critical exceedances throughout the reporting period. These exceedances if any, have been explained in Table 14 above.

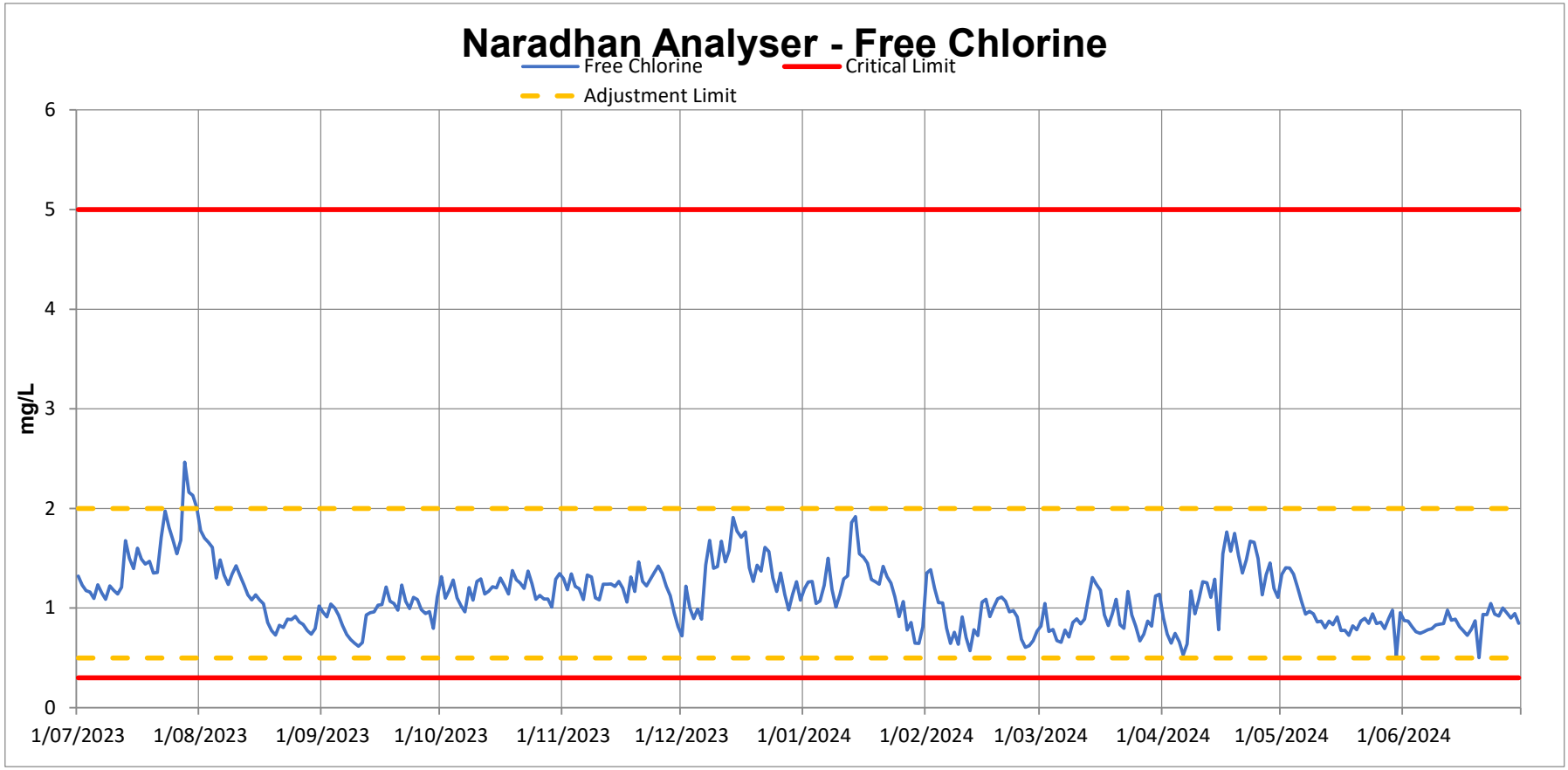


Figure 6. Mt Daylight CCP1 – finished water free chlorine.

Figure 6 above is representative of the finished water free chlorine for the Mt Daylight system. The red lines are our CCPs and the orange lines are the operational limits. As is indicated above, GWCC is consistently within the CCPs with no exceedances reported.

Water Quality Discussion

Throughout the reporting period GWCC have undertaken numerous water samples for both operational and verification monitoring. These samples are tested at the GWCC laboratory or an external NATA accredited laboratory for operational monitoring or NSW Health's FASS lab for verification or compliance purposes. GWCC also conducted a number of onsite tests for operational purposes which are presented below.

Water samples are tested for Physical, Chemical and Microbial properties in the water.

Throughout the reporting period GWCC have conducted a total of 902 microbial water samples to be either tested by NSW Health or tested 'in-house' by GWCC Water Quality staff.

The drinking water is tested throughout the period by an independent party for chemical elements which may be present in the water. A total of 151 water samples were carried out during the reporting period, and all were tested by NSW Health's FASS laboratory. From the 151 total samples collected and tested, 53 were treated water samples taken in the distribution system and 98 were raw or bore water samples.

GWCC also undertake pesticide sampling of the drinking water across the entire scheme. These samples are tested by a NATA accredited laboratory for the 2023/24 FY a total of 16 samples were tested for the presence of pesticides. All sample results were compliant with parameters set in the ADWGs, all results indicating an 'ND' nothing detected.

It is also a requirement for GWCC to test for Radiological characteristics in the ground water supplies every 2 years. For the 2023/24 FY, 4 Radiological samples were taken and tested by Australian Nuclear science and Technology Organisation (ANSTO). Results and locations can be seen in table 22.

Another initiative undertaken by GWCC is the monitoring of chlorine within the distribution system networks across the entire drinking water scheme. These tests are conducted routinely by the distribution staff and a total of 2450 chlorine test were conducted onsite throughout the year. These tests include both Total and Free chlorine. A running spreadsheet of results was previously updated by office staff once data was received by the distribution staff and is now located in GWCC new database Content Manager (doc 18/1344). Water Outlook (WO) has since been rolled out to the distribution staff to upload the results of the chlorine tests. Since this implementation of Wateroutlook to staff, there has been 13,444 operational chlorine test results uploaded into the database. See table 21 below.

It is noted that whilst the Jugiong WTP has individual filter turbidity analysers, the current DWMS CCP is still only 1 NTU at the outlet of the filters. A review of the current DWMS is being undertaken with an audit readiness program. It is assumed this will result in individual CCP's for each filter as well as the outlet in the future.

Additional works with Atom Consulting regarding the facilitation of service level agreements with our Bulk Councils has been undertaken and we have Draft water quality parameters identified for final agreement. A Draft SLA has been developed by a legal advisor with reviews being complete by each Council. It is intended that the Draft document will be presented to both CGRC and Hilltops Councils for resolution over the coming 12 months for finalisation.

GWCC has undertaken historical testing of Per- and poly-fluoroalkyl substances (PFAS) of its raw water sources. Nil detection for all historical results has been recorded.

Data Collection

GWCC have conducted numerous monitoring samples throughout the distribution system as well as a number of verification samples that are tested by independent Forensic Analytical Science Services (FASS) laboratories. Below is a summary of Micro samples taken and tested throughout GWCC distribution system as well as tests conducted onsite and at GWCC Water Treatment plants.

Table 17. Micro sampling summary

	Microorganisms Summary				
Tests conducted	**Tested by Pathology**	**Non-compliant samples**	**Tested In House**	**Non-compliant samples**	**(Total)**
Jugiong	80	0	192	0	270
Oura	264	0	215	0	479
Mt Arthur	64	0	64	0	138
Mt Daylight	23	0	0	0	23
Total	431	0	471	0	902

New South Wales Health – Micro Monitoring

New South Wales Health Drinking Water Monitoring Program outlines the number and allocation of samples within a Drinking Water System. These numbers are based on population served and the complexity of the system. Currently GWCC have 431 water samples tested by FASS for E.coli and Faecal Coliforms across the entire drinking water scheme. These numbers can be further broken down into water supply systems:

- Jugiong Drinking Water Scheme 80 samples annually for E.coli and Faecal Coliforms
- Oura Drinking Water Scheme 270 samples annually for E.coli and Faecal Coliforms, this is 6 more than is required by NSW Health and can be attributed to doing 6 ‘Additional Samples’, additional samples are sometimes required when the original sample indicates an anomaly.
- Mount Arthur Drinking Water Scheme 64 samples annually for E.coli and Faecal Coliforms
- Mount Daylight Drinking Water Scheme 26 samples annually for E.coli and Faecal Coliforms, this is 3 more than is required by NSW Health and can be attributed to doing 3 ‘Additional Samples’, additional samples are sometimes required when the original sample indicates an anomaly

Comprehensive Chemical Sample Summary

Table 18. Comprehensive chemical sample results - summary

	Tested by FASS (Verification and Operational)	Non-compliant samples	Samples with an indicator not compliant with ADWG e.g. Iron or Manganese or pH	Reason/Notes:
Comprehensive chemical Samples Treated Water	53	See Table 19	1	See list below Some samples are Non-Compliant for more than 1 parameter
Comprehensive Chemical for Raw and/or Bore Data	98			

GWCC conduct both Verification and Operational monitoring of potential chemicals in the drinking water over all of the drinking water scheme. Raw water or untreated water samples are taken from all duty bores from Mt Arthur, Mt Daylight and Oura on a monthly basis. Treated water samples are also taken in the distribution system of all of these schemes. As can be seen from table 18 &19 above, GWCC has conducted 53 comprehensive chemical samples for our treated water and 98 samples for our raw and/or bore water. A breakdown of how many samples were taken and tested by the FASS lab for each drinking water scheme is presented below:

- **Oura** – 30 raw water samples were taken from the duty bores and 36 Treated water samples taken from the distribution system.
- **Jugiong** – 33 raw water samples taken from the Murrumbidgee River and 12 Treated water samples were taken from the distribution system.
- **Mt Daylight** – 18 Raw water samples were taken from the bores and 2 Treated water samples taken from the distribution system.
- **Mt Arthur** - Raw water samples were taken from the duty bore each month, a total of 17 samples for the reporting period and 5 Treated water samples taken from the distribution system.

Table 19. Breakdown of number of samples with parameters exceeding ADWG values – Treated Water only.

Site	Indicator Non-Compliant							
	Copper	Iron	Manganese	Colour	Turbidity	pH	Fluoride	Lead
Distribution – Oura Scheme						1		
Distribution – Jugiong Scheme								
Distribution – Mt Arthur Scheme*		1 Only aesthetic					NA	
Distribution – Mt Daylight Scheme*							NA	

Note: Only shows treated water samples taken from the distribution systems. **Non Fluoridated system*

Source water (Ground Water) monitoring has also been increased during the reporting period. All bores are sampled every month and samples sent to FASS for testing. A total of 65 samples were taken during the reporting period from a combination of Oura Bores, Mt Arthur Bores and Mt Daylight bores.

Chlorine Distribution Summary

Table 20. GWCC entire distribution system chlorine management

Chlorine Distribution System Monitoring	in Situ tests for chlorine from spreadsheet and Water Outlook for (2023/24)	in Situ test results for chlorine - since implementation of Water Outlook (not including current FY)
Entire Scheme	2450	13444

Every week GWCC distribution staff conduct Chlorine Analysis of the water distribution system at GWCC. Above is a summary of how many samples are tested for free and total Chlorine as well as Temperature, Turbidity and pH throughout the entire distribution system.

Radiological Sampling

NSW Health Drinking Water Monitoring Program indicates that ground water supplies are to be tested every 2 years for radiological characteristics. Table 21 below shows the results of these tests. All samples are within ADWG guidelines.

Table 21. Results of radiological sampling

Sample description	Sample Date	ANSTO ID	Gross Alpha (Bq/L)	Gross Beta (Bq/L)	Calculated ^{40}K
Oura Bore 2	30/5/2024	C1003	<0.03	0.03 ± 0.01	0.029
Oura Bore 6	30/5/2024	C1004	0.04 ± 0.01	<0.03	0.038
Mt Arthur Bore 1	28/5/2024	C1002	<0.03	<0.03	0.033
Mt Daylight Bore 1	27/5/2024	C1001	0.08 ± 0.02	0.03 ± 0.01	0.099

Algal monitoring

GWCC undertakes regular monitoring of its surface water catchments for algal counts. This is only undertaken to develop a baseline representation of any potential future issues that may be incurred in future years.

Water Treatment Plants

GWCC have two main Water Treatment Plants (WTPs) located at Jugiong and Oura. A number of operational water sample results are taken and used on daily basis to help with the operation of the plants and to determine correct amounts of chlorine and fluoride that need to be injected into the water to make it suitable for consumption. Below is a list of the tests conducted and where within the treatment process they are taken.

Along with the operational monitoring conducted at the WTPs, verification monitoring is also undertaken, specifically for fluoride. A fluoride sample is taken from both WTPs every month and sent to FASS for testing. Results can be seen in the Fluoride Compliance Summary report in appendix C.

Table 22. Jugiong water treatment plant in-house testing.

Raw Water	Dosed Water	Settled Water	Finished Water
Fluoride	pH	Turbidity	Turbidity - online
Turbidity - online		Colour	Turbidity - Offline
Turbidity - Offline		pH	Colour
Colour			pH
pH			Alkalinity
Alkalinity			Hardness
Hardness			Temperature
Temperature			Free Chlorine
			Total Chlorine
			Fluoride

Table 23. Oura water treatment plant in-house testing.

Raw Water	Treated Water	Oura Collection tank
Temperature	Free Chlorine	Turbidity
Fluoride	Total Chlorine	
pH	Temperature	
	Fluoride	
	pH	

Non-Compliant Data

Operational monitoring indicates there have been some incidences of high pH and low residual chlorine in the extremities of the Jugiong, Oura, Mt Daylight and Mt Arthur drinking water schemes. Results are indicated in Table 24 below.

Table 24. Summary of non-compliant water quality data from operational monitoring.

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
Jugiong Scheme						
17/7/2023	*Young Terminal Storage*	*FCl*	*0.02*	*Reservoir Dosing*	*New chlorine analyser at Prunevale*	
16/1/2024	*Young Terminal Storage*	*FCl*	*0.02*	*Reservoir Dosing*	*New chlorine analyser at Prunevale*	
18/1/2023	*Young Terminal Storage*	*FCl*	*0.1*	*Reservoir Dosing*	*New chlorine analyser at Prunevale*	
12/3/2023	*Young Terminal Storage*	*FCl*	*0.02*	*Reservoir Dosing*	*New chlorine analyser at Prunevale*	
10/5/2024	*Young Terminal Storage*	*FCl*	*0.03*	*Reservoir Dosing*	*New chlorine analyser at Prunevale*	
10/10/2023	*Harden Town offtake Meter*	*FCl*	*0.14*	*Reservoir Dosing*		
6/12/2023	*Cowangs Reservoir*	*FCl*	*0.09*	*Reservoir Dosing*		
19/7/2023	*New Horizon, Gundagai Rd*	*FCl*	*0.04*	*Upstream Reservoir dosing*	*Check chlorine tablets in Brawlin res more often*	
16/8/2023	*New Horizon, Gundagai Rd*	*FCl*	*0.02*	*Upstream Reservoir dosing*	*Check chlorine tablets in Brawlin res more often*	
10/10/2024	*New Horizon, Gundagai Rd*	*FCl*	*0.12*	*Upstream Reservoir dosing*	*Check chlorine tablets in Brawlin res more often*	
9/11/2023	*New Horizon, Gundagai Rd*	*FCl*	*0.12*	*Upstream Reservoir dosing*	*Check chlorine tablets in Brawlin res more often*	
6/12/2023	*New Horizon, Gundagai Rd*	*FCl*	*0.02*	*Upstream Reservoir dosing*	*Check chlorine tablets in Brawlin res more often*	

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
19/1/2024	New Horizon, Gundagai Rd	FCI	0.05	Upstream Reservoir dosing	Check chlorine tablets in Brawlin res more often	
6/2/2024	New Horizon, Gundagai Rd	FCI	0.06	Upstream Reservoir dosing	Check chlorine tablets in Brawlin res more often	
26/3/2024	New Horizon, Gundagai Rd	FCI	0.07	Upstream Reservoir dosing	Check chlorine tablets in Brawlin res more often	
29/4/2024	New Horizon, Gundagai Rd	FCI	0.11	Upstream Reservoir dosing	Check chlorine tablets in Brawlin res more often	
19/4/2024	New Horizon, Gundagai Rd	FCI	0.07	Upstream Reservoir dosing	Check chlorine tablets in Brawlin res more often	
15/2/2024	Cootamundra Depot	Temperature	25.8	Upstream Reservoir dosing		
23/2/2024	Cootamundra Depot	Temperature	27.3	Upstream Reservoir dosing		
19/7/2023	Stockinbingal Bowling Club	FCI	0.06	Upstream Reservoir dosing		
16/8/2023	Stockinbingal Bowling Club	FCI	0.02	Upstream Reservoir dosing		
21/5/2024	Stockinbingal Bowling Club	FCI	0.02	Upstream Reservoir dosing		
19/6/2024	Stockinbingal Bowling Club	FCI	0.02	Upstream Reservoir dosing		
6/12/2023	PRV Pit, Cnr Dirnaseer and Olympic Hwy	FCI	0.1	Upstream Reservoir dosing		

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
28/2/2024	PRV Pit, Cnr Dirnaseer and Olympic Hwy	Temperature	25.4			
28/2/2024	Dirnaseer Reservoir	Temperature/FCl	25.4/0.1	Reservoir Dosing		
29/4/2024	Dirnaseer Reservoir	FCl	0.16	Reservoir Dosing		
19/6/2024	Dirnaseer Reservoir	FCl	0.07	Reservoir Dosing		
6/2/20224	Wallendbeen Roundabout	pH	8.52			
16/8/2023	Town Offtake, Springvale	FCl	0.02	Upstream Reservoir Dosing		
28/2/2024	Town Offtake, Springvale	FCl/pH	0.02/8.54	Upstream Reservoir Dosing		
29/4/2024	Town Offtake, Springvale	FCl	0.04	Upstream Reservoir Dosing		
21/5/2024	Town Offtake, Springvale	FCl	0.02	Upstream Reservoir Dosing		
19/6/2024	Town Offtake, Springvale	FCl	0.05	Upstream Reservoir Dosing		
17/1/2024	Wallendbeen School	FCl	0.02	Upstream Reservoir Dosing		
28/2/2024	Wallendbeen School	pH	8.7			
16/1/2024	Wallendbeen Reservoir	FCl	0.1	Upstream Reservoir Dosing		
10/7/2023	Brawlin Reservoir	FCl	0.09	Reservoir Dosing	Check chlorine tablets in Brawlin res more often	

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
17/7/2023	Brawlin Reservoir	FCl	0.06	Reservoir Dosing	Check chlorine tablets in Brawlin res more often	
16/1/2024	Brawlin Reservoir	FCl	0.03	Reservoir Dosing	Check chlorine tablets in Brawlin res more often	
19/1/2024	Brawlin Reservoir	FCl	0.05	Reservoir Dosing	Check chlorine tablets in Brawlin res more often	
28/2/2024	Brawlin Reservoir	FCl/pH	0.05/27.3	Reservoir Dosing	Check chlorine tablets in Brawlin res more often	
25/3/2024	Brawlin Reservoir	FCl	0.05	Reservoir Dosing	Check chlorine tablets in Brawlin res more often	
3/6/2024	Brawlin Reservoir	FCl	0.09	Reservoir Dosing	Check chlorine tablets in Brawlin res more often	
25/6/2024	Brawlin Reservoir	FCl	0.02	Reservoir Dosing	Check chlorine tablets in Brawlin res more often	
17/1/2024	Coota No. 2 Offtake	FCl	0.02	Reservoir Dosing		
14/8/2024	Stockinbingal Reservoir	FCl	0.08	Reservoir Dosing		

Oura Scheme

Date	Location	Parameter	Exceedance	Correction	Preventative Action	Notes
30/11/2023	Tara Pump Station	FCl	0.04	Upstream Reservoir Dosing		
21/12/2023	Tara Pump Station	Temperature	26			
10/1/2024	Tara Pump Station	FCl	0.17	Upstream Reservoir Dosing		
22/2/2024	Tara Pump Station	Temperature	27.3			
21/12/2023	Ariah Park Town Reservoir	Temperature	26			
2/2/2024	Ariah Park Town Reservoir	Temperature	26			
30/1/2024	Ariah Park Town Reservoir	Temperature	26			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
20/2/2024	*Ariah Park Town Reservoir*	*Temperature*	*28*			
4/3/2024	*Ariah Park Town Reservoir*	*Temperature*	*26*			
18/3/2024	*Ariah Park Town Reservoir*	*Temperature*	*26*			
30/1/2024	*17 Wellmans St, Ariah Park*	*Temperature*	*29*			
30/1/2024	*Beckom Hotel*	*Temperature*	*25.2*			
20/2/2024	*Beckom Hotel*	*Temperature*	*26.1*			
19/1/2024	*Ardlethan Town Reservoir*	*Temperature*	*26*			
16/2/2024	*Ardlethan Town Reservoir*	*Temperature*	*26*			
4/3/2024	*Ardlethan Town Reservoir*	*Temperature*	*26*			
18/3/2024	*Ardlethan Town Reservoir*	*Temperature*	*26*			
20/3/2024	*Ardlethan Town Reservoir*	*Temperature/pH*	*25.7/8.55*			
30/1/2024	*34 Parkes St, Ardlethan*	*Temperature*	*29.8*			
17/11/2023	*Barellan Town Reservoir*	*FCl*	*0.15*	*Upstream Chlorine Dosing*		
30/11/2023	*Barellan Town Reservoir*	*FCl*	*0.12*	*Upstream Chlorine Dosing*		
10/1/2024	*Barellan Town Reservoir*	*FCl/Temperature*	*0.02/27.3*	*Upstream Chlorine Dosing*		
19/1/2024	*Barellan Town Reservoir*	*FCl/Temperature*	*0.15/26*	*Upstream Chlorine Dosing*		
4/3/2024	*Barellan Town Reservoir*	*Temperature*	*26*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
14/3/2024	*Barellan Town Reservoir*	*Temperature*	*29.5*			
18/3/2024	*Barellan Town Reservoir*	*Temperature*	*26*			
20/3/2024	*Barellan Town Reservoir*	*Temperature*	*25.2*			
16/4/2024	*Barellan Town Reservoir*	*FCl*	*0.18*	*Upstream Chlorine Dosing*		
8/1/2024	*Temora Balance Tank*	*Temperature*	*26*			
22/1/2024	*Temora Balance Tank*	*Temperature*	*26*			
26/2/2024	*Temora Balance Tank*	*Temperature*	*26*			
8/1/2024	*Temora Town Reservoir*	*Temperature*	*26.3*			
22/1/2024	*Temora Town Reservoir*	*Temperature*	*26*			
5/2/2024	*Temora Town Reservoir*	*Temperature*	*26*			
26/2/2024	*Temora Town Reservoir*	*Temperature*	*26*			
14/1/2024	*Temora High School*	*Temperature*	*26.4*			
20/2/2024	*Temora High School*	*FCl*	*0.19*	*Upstream Chlorine Dosing*		
25/7/2023	*22 Beattie St, Temora*	*FCl*	*0.08*	*Upstream Chlorine Dosing*		
20/9/2023	*22 Beattie St, Temora*	*FCl*	*0.02*	*Upstream Chlorine Dosing*		
14/12/2023	*22 Beattie St, Temora*	*Temperature*	*28.6*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
24/1/2024	*22 Beattie St, Temora*	*Temperature*	*28.7*			
2/4/2024	*22 Beattie St, Temora*	*FCl/Temperature*	*0.12/26.5*			
1/5/2023	*22 Beattie St, Temora*	*FCl*	*0.03*	*Upstream Chlorine Dosing*		
20/9/2023	*Temora West School*	*FCl*	*0.1*	*Upstream Chlorine Dosing*		
14/12/2023	*Temora West School*	*Temperature*	*28.2*			
24/1/2024	*Temora West School*	*Temperature/pH*	*28.2/8.52*			
5/3/2024	*Temora West School*	*Temperature*	*27*			
2/4/2024	*Temora West School*	*Temperature/pH*	*25.8/8.57*			
1/5/2024	*Temora West School*	*Chlorine*	*0.11*			
15/11/2023	*Temora Caravan Park*	*Temperature*	*26*			
14/12/2023	*Temora Caravan Park*	*Temperature*	*28*			
24/1/2024	*Temora Caravan Park*	*Temperature*	*31*			
5/3/2024	*Temora Caravan Park*	*Temperature*	*27.6*			
2/4/2024	*Temora Caravan Park*	*Temperature*	*28.2*			
25/6/2024	*Temora Caravan Park*	*pH*	*8.54*			
11/12/2023	*Cartwrights Hill Reservoir Outlet*	*Temperature*	*26*			
8/1/2024	*Cartwrights Hill Reservoir Outlet*	*Temperature*	*26*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
22/1/2024	*Cartwrights Hill Reservoir Outlet*	*Temperature*	*26*			
13/12/2023	*Marrar Park*	*Temperature*	*29.1*			
22/1/2024	*Marrar Park*	*Temperature*	*26.1*			
13/2/2024	*Marrar Park*	*Temperature*	*27.8*			
4/3/2024	*Marrar Park*	*Temperature*	*25.1*			
13/2/2024	*Marrar Pinnacles*	*Temperature*	*27.5*			
21/9/2023	*Junee Public School*	*Chlorine*	*0.15*	*Upstream Dosing*		
22/1/2024	*Junee Public School*	*Temperature*	*26*			
22/1/2024	*Junee High School*	*Temperature*	*25.5*			
13/2/2024	*Junee High School*	*Temperature*	*25.6*			
21/9/2023	*18 Prince St Junee*	*Chlorine*	*0.13*			
13/12/2023	*Mariina Pump Station*	*Temperature*	*25.4*			
14/11/2023	*Illabo Hotel*	*Chlorine*	*0.1*			
13/12/2023	*Illabo Hotel*	*Temperature*	*27*			
22/1/2024	*Illabo Hotel*	*Temperature*	*26.1*			
13/2/2024	*Illabo Hotel*	*Chlorine/Temperature*	*28.4*			
24/6/2024	*Illabo Hotel*	*Chlorine*	*0.17*			
21/9/2023	*Wantabadgery Hall*	*Chlorine*	*0.15*			
2/11/2023	*Wantabadgery Hall*	*Chlorine*	*0.15*			
13/2/2024	*Wantabadgery Hall*	*Chlorine*	*0.18*			
4/3/2024	*Wantabadgery Hall*	*Chlorine*	*0.19*			
30/11/2023	*Palace Hotel, Ardlethan*	*Temperature*	*26*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
10/1/2024	*Palace Hotel, Ardlethan*	*Chlorine/Temperature*	*0.04/27.2*			
20/2/2024	*Palace Hotel, Ardlethan*	*Temperature*	*26.8*			
20/3/2024	*Golf Club, Ariah Park*	*Temperature*	*25.5*			
21/9/2023	*Memorial Park, Bethungra*	*Chlorine*	*0.02*			
22/1/2024	*Memorial Park, Bethungra*	*Chlorine*	*0.06*			
13/2/2024	*Memorial Park, Bethungra*	*Chlorine/Temperature*	*0.14/25.6*			
14/3/2024	*Memorial Park, Bethungra*	*Temperature*	*26.6*			
8/1/2024	*Barmedman Park*	*Temperature*	*27*			
15/1/2024	*Barmedman Park*	*Temperature*	*26.1*			
23/1/2024	*Barmedman Park*	*Temperature*	*25.4*			
19/2/2024	*Barmedman Park*	*Temperature*	*27.8*			
15/3/2024	*Barmedman Park*	*Temperature*	*26.9*			
19/2/2024	*Wyalong Meter Pit*	*Chlorine/Temperature*	*0.18/26.4*			
12/3/2024	*Wyalong Meter Pit*	*Temperature*	*25.5*			
3/6/2023	*Wyalong Meter Pit*	*pH*	*8.53*			
28/11/2023	*Wyalong School*	*Chlorine*	*0.18*			
14/2/2024	*Wyalong School*	*Temperature*	*25.1*			
12/3/2024	*Wyalong School*	*Temperature*	*27.3*			
19/10/2023	*35 Perseverance St, Wyalong*	*Chlorine*	*0.19*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
14/2/2024	*35 Perseverance St, Wyalong*	*Temperature*	*28*			
12/3/2024	*35 Perseverance St, Wyalong*	*Temperature*	*31.1*			
8/5/2024	*35 Perseverance St, Wyalong*	*pH*	*8.72*			
3/6/2024	*35 Perseverance St, Wyalong*	*pH*	*8.7*			
19/10/2023	*West Wyalong Public School*	*Chlorine*	*0.06*	*Upstream Dosing*		
19/2/2024	*West Wyalong Public School*	*Chlorine/Temperature*	*0.06/26.7*			
14/2/2024	*West Wyalong Public School*	*Chlorine/Temperature*	*0.18/26.7*			
12/3/2024	*West Wyalong Public School*	*Chlorine/Temperature*	*0.07/27.1*			
8/1/2024	*Wyalong Terminal res*	*Temperature*	*25.2*			
16/2/2024	*Wyalong Terminal Res*	*Temperature*	*26.5*			
12/3/2024	*Wyalong Terminal Res*	*Temperature*	*27.2*			
15/3/2024	*Wyalong Terminal Res*	*Temperature*	*28.6*			
3/6/2024	*Wyalong Terminal Res*	*Chlorine/pH*	*016/8.62*			
3/6/2024	*Wyalong Terminal Res*	*pH*	*8.58*			
19/10/2023	*Calleen Reservoir Outlet*	*pH*	*8.82*			
19/10/2023	*Calleen Reservoir Outlet*	*pH*	*8.52*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
15/1/2024	*Calleen Reservoir Outlet*	*Temperature*	*25.7*			
16/2/2024	*Calleen Reservoir Outlet*	*Temperature*	*25.9*			
19/2/2024	*Calleen Reservoir Outlet*	*Temperature*	*25.5*			
26/2/2024	*Calleen Reservoir Outlet*	*Temperature*	*26.2*			
1/3/2024	*Calleen Reservoir Outlet*	*Temperature*	*25.7*			
11/3/2024	*Calleen Reservoir Outlet*	*Temperature*	*26.5*			
12/3/2024	*Calleen Reservoir Outlet*	*Temperature/pH*	*26.4/8.7*			
22/3/2024	*Calleen Reservoir Outlet*	*Temperature*	*25.4*			
8/5/2024	*Calleen Reservoir Outlet*	*pH*	*8.68*			
3/6/2024	*Calleen Reservoir Outlet*	*pH*	*8.84*			
19/10/2023	*Ungarie Town reservoir*	*pH*	*8.82*			
15/1/2024	*Ungarie Town reservoir*	*Temperature*	*25.7*			
16/2/2024	*Ungarie Town reservoir*	*Temperature*	*26.9*			
19/2/2024	*Ungarie Town reservoir*	*Temperature*	*26.7*			
19/2/2024	*Ungarie Town reservoir*	*Chlorine/Temperature*	*0.13/26.7*			
14/2/2024	*Ungarie Town reservoir*	*Chlorine/Temperature*	*0.11/26.6*			
26/2/2024	*Ungarie Town reservoir*	*Temperature*	*25.6*			
1/3/2024	*Ungarie Town reservoir*	*Temperature*	*27.6*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
11/3/2024	*Ungarie Town reservoir*	*Temperature*	*26.6*			
12/3/2024	*Ungarie Town reservoir*	*Temperature/pH*	*28.7/8.95*			
15/3/2024	*Ungarie Town reservoir*	*Temperature*	*26.5*			
22/3/2024	*Ungarie Town reservoir*	*Temperature*	*25.6*			
8/5/2024	*Ungarie Town reservoir*	*pH*	*8.65*			
3/6/2024	*Ungarie Town reservoir*	*pH*	*9.28*			
28/11/2023	*Bing Wallder Park, Ungarie*	*Chlorine/temperature/pH*	*0.12/27.1/8.7*			
4/12/2023	*Bing Wallder Park, Ungarie*	*Temperature*	*26.9*			
19/12/2023	*Bing Wallder Park, Ungarie*	*Temperature*	*27.1*			
29/12/2023	*Bing Wallder Park, Ungarie*	*Temperature*	*26.9*			
12/1/2024	*Bing Wallder Park, Ungarie*	*Temperature*	*25.5*			
15/1/2024	*Bing Wallder Park, Ungarie*	*Temperature*	*34*			
2/2/2024	*Bing Wallder Park, Ungarie*	*Temperature*	*32*			
9/2/2024	*Bing Wallder Park, Ungarie*	*Temperature*	*28.8*			
16/2/2024	*Bing Wallder Park, Ungarie*	*Temperature*	*32.8*			
19/2/2024	*Bing Wallder Park, Ungarie*	*Temperature*	*31*			
26/2/2024	*Bing Wallder Park, Ungarie*	*Temperature*	*31.1*			
1/3/2024	*Bing Wallder Park, Ungarie*	*Temperature*	*34*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
11/3/2024	*Bing Wallder Park, Ungarie*	*Temperature*	*28.1*			
12/3/2024	*Bing Wallder Park, Ungarie*	*Temperature/pH*	*31.8/8.95*			
15/3/2024	*Bing Wallder Park, Ungarie*	*Temperature*	*32*			
22/3/2024	*Bing Wallder Park, Ungarie*	*Temperature*	*27.5*			
8/4/2024	*Bing Wallder Park, Ungarie*	*Temperature*	*25.9*			
3/6/2024	*Bing Wallder Park, Ungarie*	*pH*	*9.18*			
19/10/2023	*Central School, Ungarie*	*pH*	*8.87*			
14/2/2024	*Central School, Ungarie*	*Chlorine/pH*	*0.12/8.82*			
8/5/2024	*Central School, Ungarie*	*pH*	*9.03*			
10/7/2023	*Temora East*	*Chlorine*	*0.16*			
14/7/2023	*Temora East*	*Chlorine*	*0.19*			
20/9/2023	*Temora East*	*Chlorine*	*0.09*			
22/9/2023	*Temora East*	*Chlorine*	*0.13*			
20/10/2023	*Temora East*	*Chlorine*	*0.15*			
30/10/2023	*Temora East*	*Chlorine*	*0.07*			
20/11/2023	*Temora East*	*Chlorine*	*0.16*			
15/11/2023	*Temora East*	*Chlorine*	*0.12*			
11/12/2023	*Temora East*	*Chlorine/Temperature*	*0.16/25.3*			
2/1/2024	*Temora East*	*Chlorine*	*0.11*			
22/1/2024	*Temora East*	*Chlorine/Temperature*	*0.09/28*			
24/1/2024	*Temora East*	*Chlorine*	*0.16*			
12/2/2024	*Temora East*	*Chlorine*	*0.14*			
26/2/2024	*Temora East*	*Temperature*	*26*			
4/3/2024	*Temora East*	*Chlorine*	*0.15*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
5/3/2024	Temora East	Chlorine	0.04			
12/3/2024	Temora East	Temperature	27			
2/4/2024	Temora East	Chlorine	0.13			
1/5/2024	Temora East	Chlorine	0.02			
28/5/2024	Temora East	Chlorine	0.11			
14/6/2024	Temora East	Chlorine	0.1			
25/6/2024	Temora East	Chlorine	0.11			
21/12/2023	Ariah Park No. 1	Temperature	26			
2/2/2024	Ariah Park No. 1	Temperature	26			
16/2/2024	Ariah Park No. 1	Temperature	26			
4/3/2024	Ariah Park No. 1	Temperature	26			
18/3/2024	Ariah Park No. 1	Temperature	26			
15/1/2024	Ariah Park No. 2	Temperature	26			
4/3/2024	Ariah Park No. 2	Temperature	26			
15/1/2024	Ardlethan Booster Pump	Temperature	26			
19/1/2024	Ardlethan Booster Pump	Temperature	26			
16/2/2024	Ardlethan Booster Pump	Temperature	26			
4/3/2024	Ardlethan Booster Pump	Temperature	26.7			
18/3/2024	Ardlethan Booster Pump	Temperature	26.8			
15/1/2024	Barellan LL	Temperature	26			
19/1/2024	Barellan LL	Temperature	26			
4/3/2024	Barellan LL	Temperature	26			
18/3/2024	Barellan LL	Temperature	26			
19/1/2024	Barellan Club	Temperature	26			
18/3/2024	Barellan Club	Temperature	26			
8/1/2024	Ampol Wyalong	Temperature	27.3			
8/1/2024	Wyalong Park	Temperature	29			
16/2/2024	Wyalong Park	Temperature	32			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
11/3/2024	Wyalong Park	Temperature	31.7			
11/12/2023	Eurollie Res	Temperature	26			
21/12/2023	Eurollie Rd Res	Temperature	26			
22/1/2024	Eurollie Rd Res	Temperature	26			
26/2/2024	Eurollie Rd Res	Temperature	26			
8/1/2024	Wyalong Depot	Temperature	27.3			
15/1/2024	Wyalong Depot	Temperature	25.9			
8/1/2024	Bectric Res	Temperature	26			
22/1/2024	Bectric Res	Temperature	26			
2/4/2024	Bectric Res	Temperature	26			
1/12/2023	Mirrool Res	Chlorine	0.14			
21/12/2023	Mirrool Res	Temperature	26			
8/1/2024	Mirrool Res	Chlorine	0.13			
2/2/2024	Mirrool Res	Temperature	26			
4/3/2024	Mirrool Res	Temperature	26			
18/3/2024	Mirrool Res	Temperature	26.3			
31/7/2023	Ungarie Rural	Chlorine	5.7			
21/8/2023	Ungarie Rural	Chlorine	5.1			
15/1/2024	Ungarie Rural	Temperature	27			
2/2/2024	Ungarie Rural	Temperature	26			
16/2/2024	Ungarie Rural	Temperature	26.5			
19/2/2024	Ungarie Rural	Temperature	25.9			
23/2/2024	Ungarie Rural	Temperature	26			
26/2/2024	Ungarie Rural	Temperature	25.8			
1/3/2024	Ungarie Rural	Temperature	29.5			
11/3/2024	Ungarie Rural	Temperature	26.7			
15/3/2024	Ungarie Rural	Temperature	26.8			
Mt Daylight						
Date	***Location***	***Parameter***	***Exceedence***	***Correction***	**Preventative Action**	**Notes**
15/1/2024	Hannan Res	Temperature	29.7			
2/2/2024	Hannan Res	Temperature	27.2			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
9/2/2024	*Hannan Res*	*Temperature*	*25.8*			
16/2/2024	*Hannan Res*	*Temperature*	*29.7*			
19/2/2024	*Hannan Res*	*Temperature*	*29.4*			
14/2/2024	*Hannan Res*	*Chlorine/Temperature*	*0.15/27.8*			
23/2/2024	*Hannan Res*	*Temperature*	*27.6*			
26/2/2024	*Hannan Res*	*Temperature*	*29*			
4/3/2024	*Hannan Res*	*Temperature*	*31.3*			
11/3/2024	*Hannan Res*	*Temperature*	*28.1*			
13/3/2024	*Hannan Res*	*Temperature*	*29.3*			
15/3/2024	*Hannan Res*	*Temperature*	*30*			
22/3/2024	*Hannan Res*	*Temperature*	*25.5*			
15/1/2024	*Naradhan Concrete Res*	*Temperature*	*27.5*			
2/2/2024	*Naradhan Concrete Res*	*Temperature*	*26.5*			
9/2/2024	*Naradhan Concrete Res*	*Temperature*	*25.4*			
16/2/204	*Naradhan Concrete Res*	*Temperature*	*29.3*			
19/2/2024	*Naradhan Concrete Res*	*Temperature*	*27.8*			
14/2/2024	*Naradhan Concrete Res*	*Chlorine/Temperature*	*0.19/28.7*			
23/2/2024	*Naradhan Concrete Res*	*Temperature*	*29*			
26/2/2024	*Naradhan Concrete Res*	*Temperature*	*28.6*			
11/3/2024	*Naradhan Concrete Res*	*Temperature*	*28.2*			
13/3/2024	*Naradhan Concrete Res*	*Temperature*	*29.3*			
15/3/2024	*Naradhan Concrete Res*	*Temperature*	*29.1*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
22/3/2024	*Naradhan Concrete Res*	*Temperature*	*26*			
19/10/2023	*North Weethalle Res*	*Chlorine*	*0.02*			
15/1/2024	*North Weethalle Res*	*Temperature*	*28*			
2/2/2024	*North Weethalle Res*	*Temperature*	*26.5*			
16/2/2024	*North Weethalle Res*	*Temperature*	*28.3*			
19/2/2024	*North Weethalle Res*	*Temperature*	*27.6*			
19/2/2024	*North Weethalle Res*	*Chlorine/Temperature*	*0.02/28.6*			
14/2/2024	*North Weethalle Res*	*Chlorine/Temperature*	*0.02/28.3*			
23/2/2024	*North Weethalle Res*	*Temperature*	*27.1*			
26/2/2024	*North Weethalle Res*	*Temperature*	*28*			
1/3/2024	*North Weethalle Res*	*Temperature*	*30.1*			
11/3/2024	*North Weethalle Res*	*Temperature*	*28.7*			
13/3/2024	*North Weethalle Res*	*Chlorine/Temperature*	*0.11/29.5*			
15/3/2024	*North Weethalle Res*	*Chlorine/Temperature*	*0.18/29*			
2/4/2024	*North Weethalle Res*	*Temperature*	*25.1*			
5/4/2024	*North Weethalle Res*	*Temperature*	*25.1*			
8/4/2024	*North Weethalle Res*	*Chlorine*	*0.19*			
2/8/2023	*Russell Trading Weethalle*	*Chlorine*	*0.17*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
26/9/2023	*Russell Trading Weethalle*	*Chlorine*	*0.12*			
26/10/2023	*Russell Trading Weethalle*	*Chlorine*	*0.14*			
19/10/2023	*Russell Trading Weethalle*	*Chlorine*	*0.09*			
4/12/2023	*Russell Trading Weethalle*	*Temperature*	*25.2*			
19/12/2023	*Russell Trading Weethalle*	*Chlorine/Temperature*	*0.09/25.8*			
29/12/2023	*Russell Trading Weethalle*	*Chlorine*	*0.18*			
12/1/2024	*Russell Trading Weethalle*	*Chlorine/Temperature*	*0.14/25.4*			
15/1/2024	*Russell Trading Weethalle*	*Temperature*	*30.5*			
2/2/2024	*Russell Trading Weethalle*	*Temperature*	*28.5*			
9/2/2024	*Russell Trading Weethalle*	*Temperature*	*26.8*			
16/2/2024	*Russell Trading Weethalle*	*Temperature*	*31.1*			
19/2/2024	*Russell Trading Weethalle*	*Temperature*	*29.8*			
14/2/2024	*Russell Trading Weethalle*	*Chlorine/Temperature*	*0.02/30.5*			
26/2/2024	*Russell Trading Weethalle*	*Chlorine/Temperature*	*0.16/30.9*			
1/3/2024	*Russell Trading Weethalle*	*Chlorine/Temperature*	*0.14/32*			
11/3/2024	*Russell Trading Weethalle*	*Temperature*	*31*			
13/3/2024	*Russell Trading Weethalle*	*Chlorine/Temperature*	*0.02/32.4*			
15/3/2024	*Russell Trading Weethalle*	*Chlorine/Temperature*	*0.1/32.7*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
22/3/2024	*Russell Trading Weethalle*	*Chlorine/Temperature*	*0.13/28.4*			
2/4/2024	*Russell Trading Weethalle*	*Chlorine/Temperature*	*0.15/25.7*			
9/4/2024	*Russell Trading Weethalle*	*Chlorine*	*0.12*			
11/4/2024	*Russell Trading Weethalle*	*Chlorine*	*0.13*			
26/4/2024	*Russell Trading Weethalle*	*Chlorine*	*0.12/0.09*			
8/5/2024	*Russell Trading Weethalle*	*Chlorine*	*0.08*			
5/6/2024	*Russell Trading Weethalle*	*Chlorine*	*0.08*			
16/2/2024	*Narriah Res*	*Temperature*	*26*			
14/2/2024	*Narriah Res*	*Temperature*	*25.6*			
23/2/2024	*Narriah Res*	*Temperature*	*26.5*			
26/2/2024	*Narriah Res*	*Temperature*	*26.7*			
1/3/2024	*Narriah Res*	*Temperature*	*27.5*			
13/3/2024	*Narriah Res*	*Temperature*	*27.3*			
15/3/2024	*Narriah Res*	*Temperature*	*26.5*			
19/9/2023	*Tallimba Park*	*Chlorine*	*0.18*			
26/10/2023	*Tallimba Park*	*Chlorine*	*0.11*			
6/11/2023	*Tallimba Park*	*Chlorine*	*0.11*			
19/12/2023	*Tallimba Park*	*Temperature*	*26.7*			
12/1/2024	*Tallimba Park*	*Temperature*	*25.5*			
15/1/2024	*Tallimba Park*	*Temperature*	*26.3*			
2/2/2024	*Tallimba Park*	*Temperature*	*27.8*			
9/2/2024	*Tallimba Park*	*Temperature*	*27.8*			
16/2/2024	*Tallimba Park*	*Temperature*	*27.3*			
19/2/2024	*Tallimba Park*	*Temperature*	*31.5*			
26/2/2024	*Tallimba Park*	*Temperature*	*28.9*			
1/3/2024	*Tallimba Park*	*Chlorine/Temperature*	*0.12/30.6*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
11/3/2024	*Tallimba Park*	*Temperature*	*28.3*			
15/3/2024	*Tallimba Park*	*Temperature*	*30.3*			
22/3/2024	*Tallimba Park*	*Temperature*	*25.5*			
11/4/2024	*Tallimba Park*	*Chlorine*	*0.12*			
18/12/2023	*Tallimba School*	*Chlorine*	*0.02*			
14/2/2024	*Tallimba Inn*	*Temperature*	*27.3*			
13/3/2024	*Tallimba Inn*	*Chlorine/Temperature*	*0.11/28.7*			
26/9/2023	*Tallimba Inn*	*Turbidity*	*7.31*			May have been entered incorrectly as pH is also 7.31
29/12/2023	*Nobbies Res*	*Chlorine*	*0.1*			
15/1/2024	*Nobbies Res*	*Temperature*	*28.5*			
2/2/2024	*Nobbies Res*	*Temperature*	*26.5*			
16/2/2024	*Nobbies Res*	*Temperature*	*28.5*			
19/2/2024	*Nobbies Res*	*Temperature*	*27.9*			
23/2/2024	*Nobbies Res*	*Chlorine/Temperature*	*0.1/28.6*			
26/2/2024	*Nobbies Res*	*Temperature*	*27.6*			
1/3/2024	*Nobbies Res*	*Temperature*	*30.7*			
4/3/2024	*Nobbies Res*	*Temperature*	*28*			
11/3/2024	*Nobbies Res*	*Temperature*	*27.8*			
15/3/2024	*Nobbies Res*	*Temperature*	*29*			
22/3/2024	*Nobbies Res*	*Chlorine*	*0.1*			
2/4/2024	*Nobbies Res*	*Temperature*	*25.4*			
15/1/2024	*Weethalle Res*	*Temperature*	*27.8*			
2/2/2024	*Weethalle Res*	*Temperature*	*25.4*			
9/2/2024	*Weethalle Res*	*Temperature*	*25.2*			
16/2/2024	*Weethalle Res*	*Temperature*	*27.5*			
19/2/2024	*Weethalle Res*	*Temperature*	*27.5*			
23/2/2024	*Weethalle Res*	*Temperature*	*27.4*			
26/2/2024	*Weethalle Res*	*Temperature*	*27.7*			
4/3/2024	*Weethalle Res*	*Temperature*	*30.3*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
11/3/2024	Weethalle Res	Temperature	28.5			
15/3/2024	Weethalle Res	Chlorine/Temperature	0.12/29			
22/3/2024	Weethalle Res	Temperature	26.2			
2/4/2024	Weethalle Res	Temperature	25.2			
15/1/2024	Naradhan Steel res	Temperature	27.5			
2/2/2024	Naradhan Steel res	Temperature	25.9			
16/2/2024	Naradhan Steel res	Temperature	28.9			
19/2/2024	Naradhan Steel res	Temperature	27.9			
23/2/2024	Naradhan Steel res	Temperature	29			
26/2/2024	Naradhan Steel res	Temperature	29			
1/3/2024	Naradhan Steel res	Temperature	30.2			
11/3/2024	Naradhan Steel res	Temperature	28.2			
15/3/2024	Naradhan Steel res	Temperature	29			
22/3/2024	Naradhan Steel res	Temperature	25.6			
6/11/2023	Naradhan Park	Temperature	25.5			
4/12/2023	Naradhan Park	Temperature	26			
29/12/2023	Naradhan Park	Temperature	25.4			
12/1/2024	Naradhan Park	Temperature	25.2			
15/1/2024	Naradhan Park	Temperature	32			
2/2/2024	Naradhan Park	Temperature	28.5			
9/2/2024	Naradhan Park	Temperature	25.6			
16/2/2024	Naradhan Park	Temperature	31.7			
19/2/2024	Naradhan Park	Temperature	28.9			
23/2/2024	Naradhan Park	Temperature	28.9			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
26/2/2024	*Naradhan Park*	*Temperature*	*31.2*			
1/3/2024	*Naradhan Park*	*Temperature*	*32.4*			
11/3/2024	*Naradhan Park*	*Temperature*	*29.5*			
15/3/2024	*Naradhan Park*	*Temperature*	*32.1*			
22/3/2024	*Naradhan Park*	*Temperature*	*28.8*			
2/4/2024	*Naradhan Park*	*Temperature*	*26*			
8/4/2024	*Naradhan Park*	*Temperature*	*25.5*			
15/1/2024	*Mt Daylight PS*	*Temperature*	*27*			
2/2/2024	*Mt Daylight PS*	*Temperature*	*25.6*			
16/2/2024	*Mt Daylight PS*	*Temperature*	*26.1*			
19/2/2024	*Mt Daylight PS*	*Temperature*	*25.9*			
23/2/2024	*Mt Daylight PS*	*Temperature*	*25.8*			
26/2/2024	*Mt Daylight PS*	*Temperature*	*26*			
1/3/2024	*Mt Daylight PS*	*Temperature*	*25.3*			
15/1/2024	*Naradhan PS*	*Temperature*	*27.5*			
2/2/2024	*Naradhan PS*	*Temperature*	*25.9*			
9/2/2024	*Naradhan PS*	*Temperature*	*25.1*			
16/2/2024	*Naradhan PS*	*Temperature*	*28.5*			
19/2/2024	*Naradhan PS*	*Temperature*	*28.2*			
23/2/2024	*Naradhan PS*	*Temperature*	*26.8*			
26/2/2024	*Naradhan PS*	*Temperature*	*27.9*			
1/3/2024	*Naradhan PS*	*Temperature*	*27.4*			
11/3/2024	*Naradhan PS*	*Temperature*	*27.6*			
15/3/2024	*Naradhan PS*	*Temperature*	*28.5*			
22/3/2024	*Naradhan PS*	*Temperature*	*25.5*			

Mt Arthur

Date	*Location*	*Parameter*	*Exceedance*	*Correction*	Preventative Action	Notes
8/8/2023	*Public School Matong*	*Chlorine*	*0.18*	*Upstream Dosing*		
9/1/2024	*Public School Matong*	*Chlorine/Temperature*	*0.11/25.7*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
19/3/2024	*Public School Matong*	*Temperature*	*25.7*			
28/8/2023	*High Level Ganmain*	*Chlorine*	*0.19*			
19/2/2024	*High Level Ganmain*	*Temperature*	*26*			
14/3/2024	*Hay Industry Centre Ganmain*	*Chlorine/Temperature*	*0.14/29.1*			
19/2/2024	*Allowah Lodge, Coolamon*	*Temperature*	*27.1*			
14/3/2024	*Allowah Lodge, Coolamon*	*Chlorine/Temperature*	*0.08/27.9*			
19/3/2024	*Allowah Lodge, Coolamon*	*Temperature*	*25.5*			
19/2/2024	*Central School, Coolamon*	*Temperature*	*30.3*			
19/3/2024	*Central School, Coolamon*	*Temperature*	*28.3*			
15/5/2024	*High Level North, Coolamon*	*Chlorine*	*0.17*			
19/2/2024	*Public School, Ganmain*	*Temperature*	*29.7*			
19/3/2024	*Public School, Ganmain*	*Temperature*	*26*			
6/12/2023	*Grong Grong Park*	*Chlorine/Temperature*	*0.06/25.2*			
9/1/2024	*Grong Grong Park*	*Chlorine/Temperature*	*0.02/26.5*			
19/2/2024	*Grong Grong Park*	*Chlorine/Temperature*	*0.02/30.9*			
19/2/2024	*Grong Grong Park*	*Chlorine/Temperature*	*0.09/29.4*			
14/3/2024	*Grong Grong Park*	*Chlorine/Temperature*	*0.02/29.1*			
19/3/2024	*Grong Grong Park*	*Chlorine/Temperature*	*0.02/26.8*			

Date	Location	Parameter	Exceedance	Correction	Preventive action	Notes
15/4/2024	*Grong Grong Park*	*Chlorine*	*0.1*			
15/5/2024	*Grong Grong Park*	*Chlorine*	*0.06*			
12/6/2024	*Grong Grong Park*	*Chlorine*	*0.13*			
14/12/2023	*Ganmain T3*	*Temperature*	*25.1*			
19/3/2024	*Ganmain T3*	*Temperature*	*26.1*			
14/8/2023	*Matong Low Res*	*Chlorine*	*0.18*			
17/10/2023	*Matong Low Res*	*Chlorine*	*0.15*			
14/12/2023	*Matong Low Res*	*Temperature*	*25.4*			
26/2/2024	*Matong Low Res*	*Temperature*	*26.4*			
14/12/2023	*Matong High Res*	*Temperature*	*26.5*			
26/2/2024	*Matong High Res*	*Temperature*	*26.9*			

Customer Complaints

Table 25. Customer complaints registered in the 2023/24 reporting period.

Month	Total Complaints	Discoloured Water	Burst Main	Taste/Odour Related	No Supply/Low Pressure	Leaking Meter	Messy or unsafe jobsite	Unable to Isolate meter	Other
Jul-23	7	5				1	1		
Aug-23	22	21			1				
Sep-23	28	22	1	1	3		1		
Oct-23	19	14			5				
Nov-23	26	21			5				
Dec-23	38	31			3				4
Jan-24	17	16							1
Feb-24	33	25			4		1		3
Mar-24	23	20			2				1
Apr-24	18	15		1	1	1			
May-24	29	21			3	2			3
Jun-24	15	11	1						3

There was a total of 275 complaints made during the reporting period 2023/24. The majority of complaints that were made pertained to dirty or discoloured water totalling 222; this is an increase of 20 compared to 255 complaints recorded in 2022/23. These complaints allowed staff to determine that the townships of Coolamon, Junee and Temora require attention. To mitigate against complaints, GWCC invests in cleaning reservoirs and flushing dead ends regularly; however, GWCC are looking to invest and trial new mains cleaning technology in the coming years.

In previous years (2019 & 2022), GWCC has procured the services of No-Des, a contractor that has the ability to clear water mains with no loss of water to the environment. These contractors cleaned approximately 65 km of water mains in the Coolamon and nearby townships during each run. Whilst undertaking this flushing/cleaning, turbidity's throughout the town were recorded as high as 171 NTU, with an average of approximately 25 NTU. Comparing against historical records of the number of complaints, this method has drastically reduced the number of customer complaints received from these areas.

As illustrated within the following graphics, pre and post chem testing was undertaken to validate the utilisation of the system. As is depicted the reduction in turbidity was significant after utilisation and the spike detailed from 32-34 due to a burst that occurred at the time. This then correlated into the chlorine residual consistency detailed in lower graphic.

Figure 7 – Pre & Post testing for NTU in Coolamon Retic

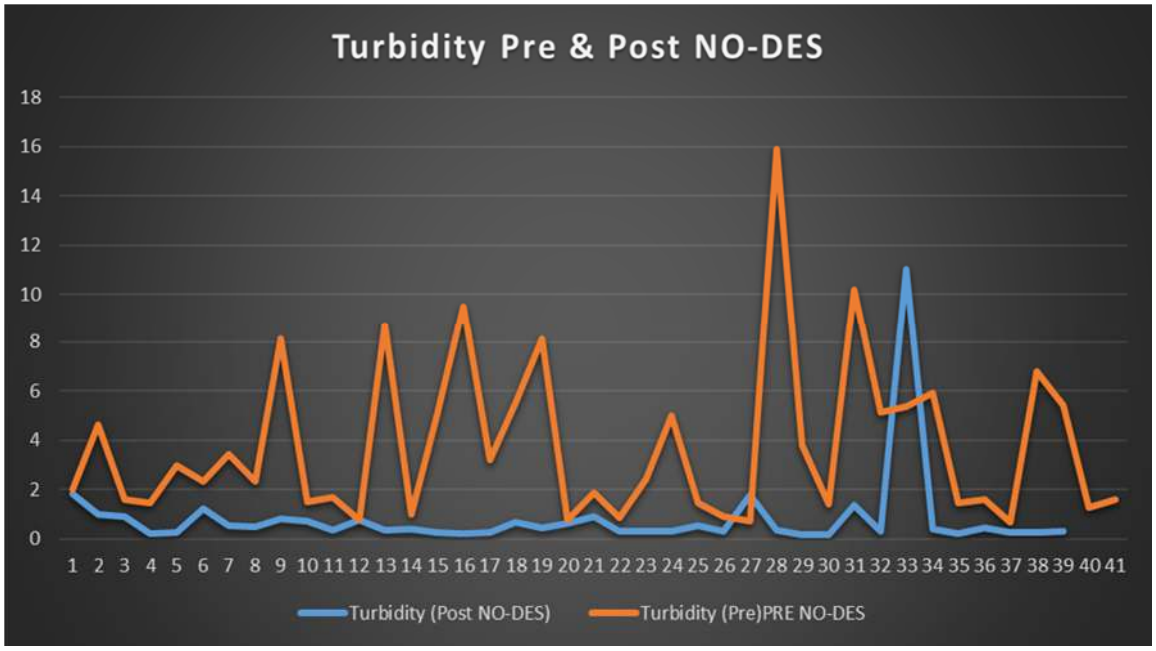
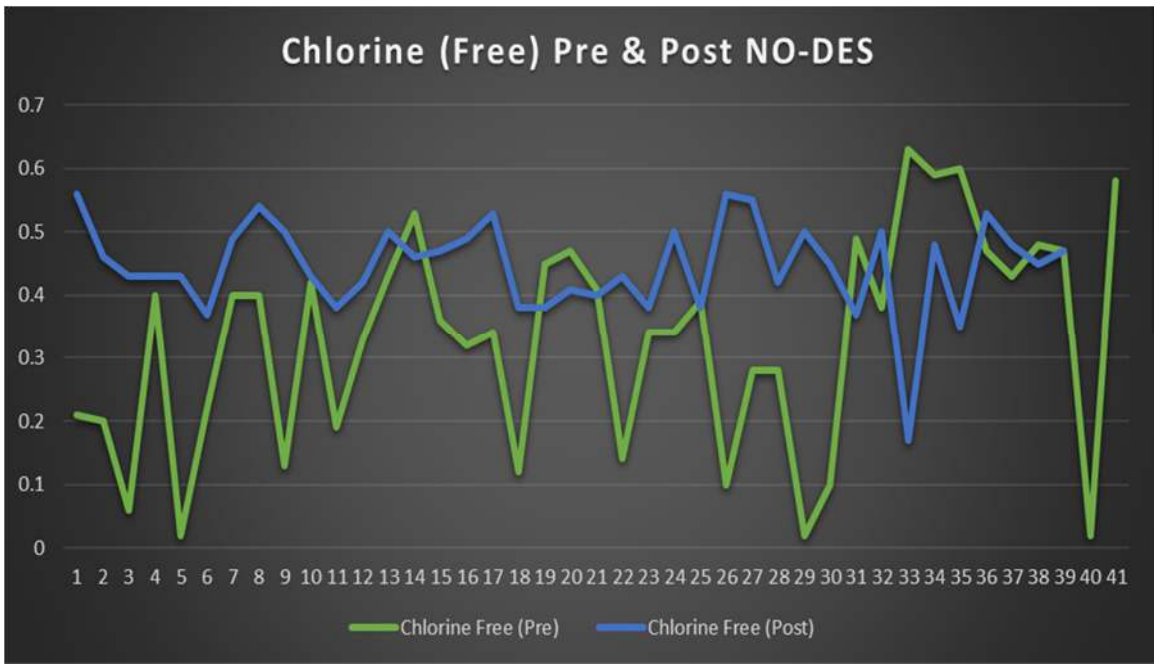


Figure 8 – Pre & Post testing of chlorine residuals in Coolamon retic



GWCC did not engage the services of No-Des this financial year 2023/24, which is believed to has resulted in an increase in complaints. GWCC is looking to regularly implement these services, via the current negotiation on the procurement of a unit for in-house utilisation. This will allow Council to clean pipes more often across all of Council's drinking water scheme as when and as required.

Further to the implementation of automated flushing system on the notorious dead end Kingdom Drive in February 2019, GWCC has received no complaints from customers serviced on this pipeline since. As such, the flushing system installed has now been rolled out to three locations within the township.

A study into discoloured water events (2020) found iron and manganese to be the primary cause of complaints in the Coolamon township it is not yet recommended to undertake the development of a new water treatment process to reduce discoloured water events; however the economic feasibility of installing a treatment plant will next be explored if the management of the reticulation system via the utilisation of a No-Des unit proves unsuccessful.

Water Quality Incidents

Table 26. Summary of incidents and emergencies, recommendations and preventative actions.

Details of Incident/Emergency	Investigation Recommendations	Preventive Action Undertaken
One incident of E. coli was detected at the Wyalong school in Wyalong in February 2024. It was noted that 2 mpn/100mL was detected in a single sample, however no other samples or reason supported this finding, with free chlorine of the sample measuring 0.3mg/L.	The same location was sampled the following day which had no E. coli results. Internal testing also had no E. coli detected and hence believed the cause to be due to human error.	Reinforce sampling procedures.

Staff Development and Training

Incident and Emergency Response Training

GWCC have implemented and completed Incident and Emergency response training. This training has been undertaken by relevant staff and stakeholders. GWCC Management had also issued a request to NSW Health for funding for scenario training which was completed in conjunction with our Bulk Councils.

NOTE: currently internal training is undertaken by Water Quality staff at the Jugiong Water Treatment plant for emergency response management as part of the Pollution Incident Response Management Plan requirements (PIRMP).

Table 27 below indicates all of the training that GWCC staff have undertaken during the reporting period of 2023/24. In addition to this list GWCC's Manager Production & Services & the Water Quality Technical Officer completed a Statement of Attainment in 'How to Plan and Implement a World Class Water Quality Management System Audit' in April 2024 via Risk Edge.

Table 27. Full list of staff training for the 2023/24 reporting period.

Name	Course	Completion date
Dilrosh Jayawardene	HV Switching	11/07/2023
Blake Hingerty	CPR	20/07/2023
Chris Scott	CPR	20/07/2023
Christopher Fealy	CPR	20/07/2023
Daniel Flack	CPR	20/07/2023
Jack Fuller	CPR	20/07/2023

Liam Welch	CPR	20/07/2023
Michael Lewis	CPR	20/07/2023
Rodney Ryan	CPR	20/07/2023
Sean Tiernan	CPR	20/07/2023
Shane Hartshorn	CPR	20/07/2023
Stephen Ledgard	CPR	20/07/2023
Drew Matthews	Confined Spaces	23/08/2023
Isaac Reardon	CPR	18/09/2023
Isaac Reardon	First Aid	18/09/2023
James Carr	CPR	18/09/2023
James Carr	First Aid	18/09/2023
Joshua Hale	CPR	18/09/2023
Joshua Hale	First Aid	18/09/2023
Liam Moston	CPR	18/09/2023
Liam Moston	First Aid	18/09/2023
Liam Pattison	CPR	18/09/2023
Liam Pattison	First Aid	18/09/2023
Mark Carroll	CPR	18/09/2023
Mark Carroll	First Aid	18/09/2023
Matthew Bett	CPR	18/09/2023
Matthew Bett	First Aid	18/09/2023
Neil Boyton	CPR	18/09/2023
Neil Boyton	First Aid	18/09/2023
Ray McCarthy	CPR	18/09/2023
Ray McCarthy	First Aid	18/09/2023
Andrew Derrick	CPR	19/09/2023
Andrew Derrick	First Aid	19/09/2023
Bradley Moye	CPR	19/09/2023
Bradley Moye	First Aid	19/09/2023
Brendon Ford	CPR	19/09/2023
Brendon Ford	First Aid	19/09/2023
Lewis Allen	CPR	19/09/2023
Lewis Allen	First Aid	19/09/2023
Matthew Cooper	CPR	19/09/2023
Matthew Cooper	First Aid	19/09/2023
Michael Diggins	CPR	19/09/2023
Michael Diggins	First Aid	19/09/2023
Ray McCarthy	LVR	12/10/2023
Adam Ward	CPR	23/02/2024
Nathan Gardiner	Working at Heights	1/03/2024
Andrew Derrick	Work Safely at Heights	11/04/2024
Lewis Allen	Work Safely at Heights	11/04/2024

Mark Carroll	Work Safely at Heights	11/04/2024
Matthew Cooper	Work Safely at Heights	11/04/2024
Michael Diggins	Work Safely at Heights	11/04/2024
Shane Hartshorn	Work Safely at Heights	11/04/2024
Blake Hingerty	Work Safely at Heights	1/05/2024
Chris Fealy	Work Safely at Heights	1/05/2024
David Chandler	Work Safely at Heights	1/05/2024
Dilrosh Jayawardene	Work Safely at Heights	1/05/2024
Jack Fuller	Work Safely at Heights	1/05/2024
James Butler	Working at Heights	1/05/2024
Liam Pattison	Work Safely at Heights	1/05/2024
Matt Bett	Working at Heights	1/05/2024
Neil Boyton	Work Safely at Heights	1/05/2024
Ray McCarthy	Work Safely at Heights	1/05/2024
Shane Baldry	Work Safely at Heights	1/05/2024
Sonya Kovacevic	Working at Heights	1/05/2024
Brendan Nilsen	Work Safely at Heights	2/05/2024
Chris Scott	Work Safely at Heights	2/05/2024
Jeremy Coleman	Work Safely at Heights	2/05/2024
Liam Welch	Work Safely at Heights	2/05/2024
Mitchell Farlow	Work Safely at Heights	2/05/2024
Rob Drummond	Work Safely at Heights	2/05/2024
Rod Ryan	Work Safely at Heights	2/05/2024
Neil Boyton	Confined Spaces	4/06/2024
Barry Shepherd	CPR	25/06/2024
Brendon Ford	CPR	25/06/2024
Chris Fealy	CPR	25/06/2024
Daniel Flack	CPR	25/06/2024
Isaac Reardon	CPR	25/06/2024
Josh Hale	CPR	25/06/2024
Liam Moston	CPR	25/06/2024
Liam Pattison	CPR	25/06/2024
Matt Cooper	CPR	25/06/2024
Michael Diggins	CPR	25/06/2024
Stephen Ledgard	CPR	25/06/2024
Adam Ward	CPR	27/06/2024
Andrew Derrick	CPR	27/06/2024
Brad Moye	CPR	27/06/2024
Chris Breen	CPR	27/06/2024
Chris Scott	CPR	27/06/2024
Ian Basham	CPR	27/06/2024
Jack Fuller	CPR	27/06/2024

James Carr	CPR	27/06/2024
Lewis Allen	CPR	27/06/2024
Mark Carroll	CPR	27/06/2024
Mike Read	CPR	27/06/2024
Mitchell Farlow	CPR	27/06/2024
Neil Boyton	CPR	27/06/2024
Nicol Kelly	CPR	27/06/2024
Rob Drummond	CPR	27/06/2024
Sean Tiernan	CPR	27/06/2024

Continuous Improvement Plan

Table 28 below is a summary of all items in the Continuous Improvement plan that have been completed or actioned during the 2023/24 reporting period.

Table 28. Continuous improvement plan activities that have progressed, been completed, or been added during the period 2022/23.

Action no.	Item	Progress	Date for completion	Who is responsible
29	*GWCC to consider installing online chlorine residual analyser at outlet of settling tanks to ensure 30 minutes contact time (Mt Arthur system)*	*magflow and analysers installed however not connected to clearscada system – Mt Arthur SCADA/Telemetry network to commence upgrade in 2022/23 financial year. Connection of water quality instrumentation to be completed after this. In progress*	*July 2023*	*Manager Engineering*
76	*Bulk Service Level Agreements (SLA)*	*Draft SLA completed and currently under review. Change in staff at Bulk councils has made it difficult to resolve outstanding items for agreement – In progress*	*July 23*	*Manager Production and Services*

Review of DWMS Implementation

Adoption of the Drinking Water Management System occurred in February 2018 and the implementation has been reviewed annually. GWCC has engaged Atom Consulting to undertake a review of the DWMS risk assessment and to undertake an audit readiness review of councils system. This will be utilised for updating the current Actions & Implementation plan for future delivery.

In addition to our regular annual reviews and the detail above, GWCC engaged their Internal Auditor, National Audits Group to undertake a review of Councils DWMS and its associated governance and reporting requirements. Results of this Audit are provided in Appendix D below.

Table 29. Summary of internal reviews.

Date	Reviewer	Scope	Findings	Actions
3/10/2019	*Geoff Veneris and Chris Breen*	*Drinking Water Policy*	*Fully Compliant – Council reviewed and endorsed the water policy on 23/08/19.*	*No Action required*

Date	Reviewer	Scope	Findings	Actions
FY 2019/20	*Geoff Veneris and Chris Breen*	*Verification Monitoring*	*Council has undertaken all required verification monitoring*	*Continual compliance with NSW Health*
FY 2020/21	*Geoff Veneris and Chris Breen*	*Operational Monitoring*	*GWCC has conducted extensive Operational Monitoring of all Water Source schemes (see Water Quality Section for breakdown of monitoring)*	*Continued Monitoring of all water source scheme Review of current sampling runs are needed*
FY 2021/22	*Geoff Veneris and Chris Breen*	*Operational Monitoring*	*GWCC has conducted extensive Operational Monitoring of all Water Source schemes (see Water Quality Section for breakdown of monitoring)*	*Continued Monitoring of all water source scheme Review of current sampling runs are needed*
FY 2022/23	*Geoff Veneris, Chris Breen and Mitchell Farlow*	*Operational Monitoring*	*GWCC has conducted extensive Operational Monitoring of all Water Source schemes (see Water Quality Section for breakdown of monitoring)*	*Continued Monitoring of all water source scheme Review of current sampling runs are needed*
FY 2023/24	*Geoff Veneris, Chris Breen and Mitchell Farlow*	*Operational Monitoring*	*GWCC has conducted extensive operational monitoring of all Water Source schemes (see Water Quality Section for breakdown of monitoring and results)*	*Continued monitoring of all water source schemes. Review of current sampling runs are needed and updating of Drinking Water Database*

Table 30. Summary of external reviews.

Date	Reviewer	Scope	Findings	Actions
June 2019	*National Audits Group*	*To review the effectiveness of Council's water quality systems and monitoring procedures and to assess compliance with the ADWG*	*Table 39*	*Complete*

Reservoir inspections

GWCC conducted regular reservoir inspections throughout the reporting period. They have a schedule for weekly 'drive by' inspections, as well as a more detailed inspection regime that is carried out on a quarterly basis. Any issues found with the weekly or quarterly inspections are entered into a spreadsheet/database (CM9 doc number, 20/4023) and the appropriate section is notified of the works that will need to be carried out.

Reservoir inspections are given a priority ranking between 1 and 5, a ranking of 1 being the worst and needing immediate attention, a ranking of 5 being of lowest criticality. (At this point an

electronic database has not been kept for all inspections). GWCC is currently working to implement the reservoir inspections in WaterOutlook so that all information can be gathered electronically and acted on accordingly.

For this reporting period, no reservoir inspections were conducted by Aqualift (Councils contracted divers for cleaning and inspection). Condition assessments were completed by an additional third-party contractor (FITT Resources) on nine reservoirs for the assessment of concrete condition and additional structural integrity, with the full report of their findings located in Appendix. C.

Appendix A – Water quality data

Water Quality Graphs

Jugiong Water Treatment Plan

Jugiong Water Treatment Plant data has been represented in the following graphs and commentary. The following data has been taken from the new Water outlook Database that GWCC is currently building with an external party, Safegroup.

Data relevant to Critical Control and Operational Control is reported as follows:

Chlorine is the main Critical Control Point of the Jugiong WTP used to eliminate chlorine sensitive pathogens, Disinfection.

- The chlorine target leaving the WTP is 1.8mg/L with amber alerts sent if chlorine drops below 1.2mg/L or goes over 2mg/L.
- The alert becomes critical with DWMS protocols implemented when chlorine levels drop below 0.8mg/L in summer and 0.5mg/L in winter. Figure 9 7 below represents the finished water chlorine at the Jugiong WTP, both Free and Total. As can be seen, GWCC has only exceeded its lower critical limit (<0.5mg/L, winter, <0.8mg/L summer) or its upper critical limit (>5.0mg/L) for Free Chlorine 1 time throughout the reporting period.
- A free/residual chlorine of 0.66mg/L was the lowest recorded result on the 26/08/2023. The highest total chlorine recorded was on the 3/9/2023 with a value of 3.01mg/L.
- The average Free Chlorine for the reporting year was 1.64mg/L and average Total chlorine reading was 2.06mg/L.

Figure 9 7. Jugiong chlorine levels for the 2023/24 reporting period

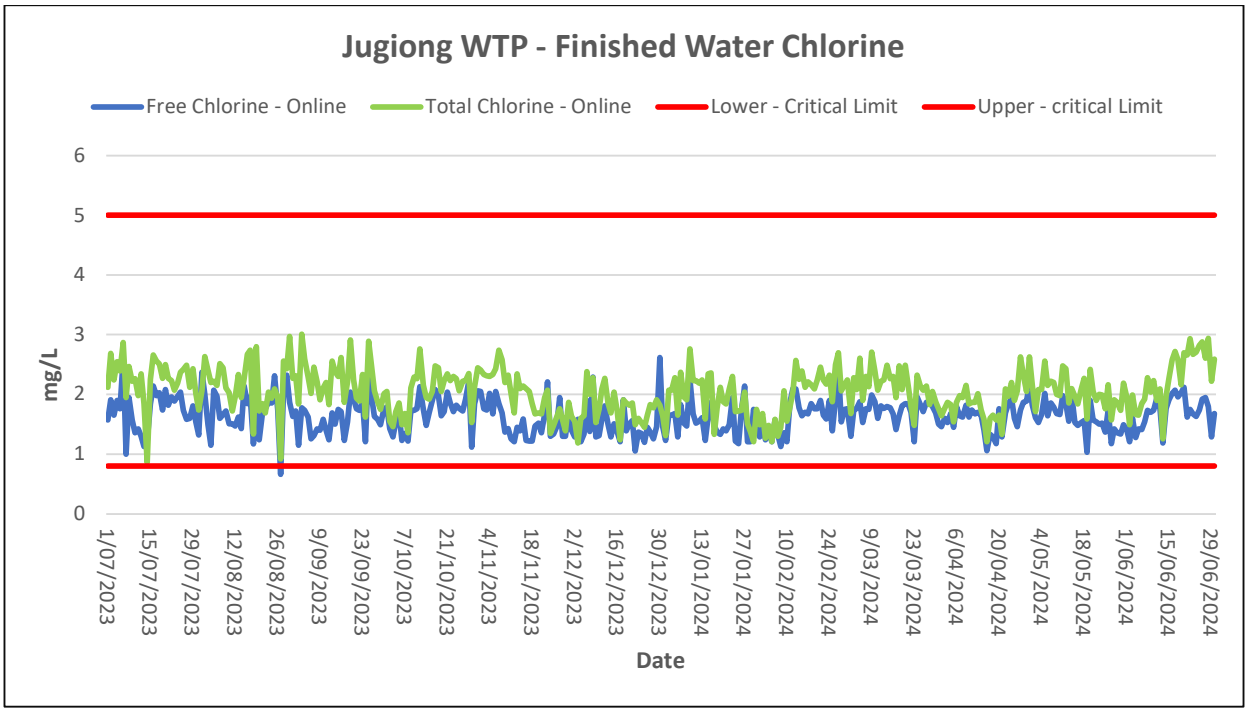


Figure 10 8 represents the finished water fluoride (Blue line) and Raw Water Fluoride (Green Line) for the Jugiong water treatment plant. Fluoride levels both Raw and Finished has remained consistent throughout the reporting period with a minimum value of 0.1 mg/L (Finished Water concentration) and a maximum value of 1.2 mg/L (Finished water Concentration). The Finished water Fluoride at the Jugiong Water Treatment Plant has exceeded its minimum value of 0.95mg/L on several occasions throughout the reporting period. These exceedances were due to equipment failure or breakdown.

Figure 10 8. Jugiong fluoride levels for the 2023/24 reporting period

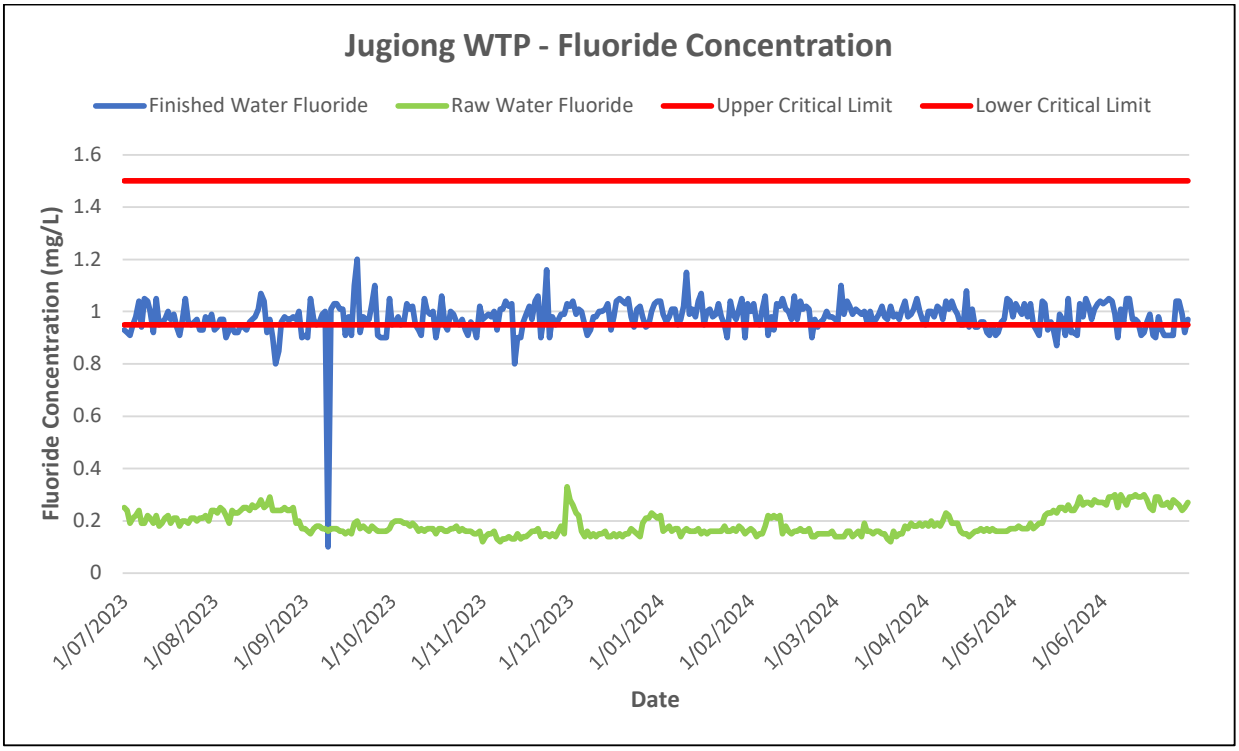


Figure 11 9. Jugiong raw water turbidity for the 2023/24 reporting period

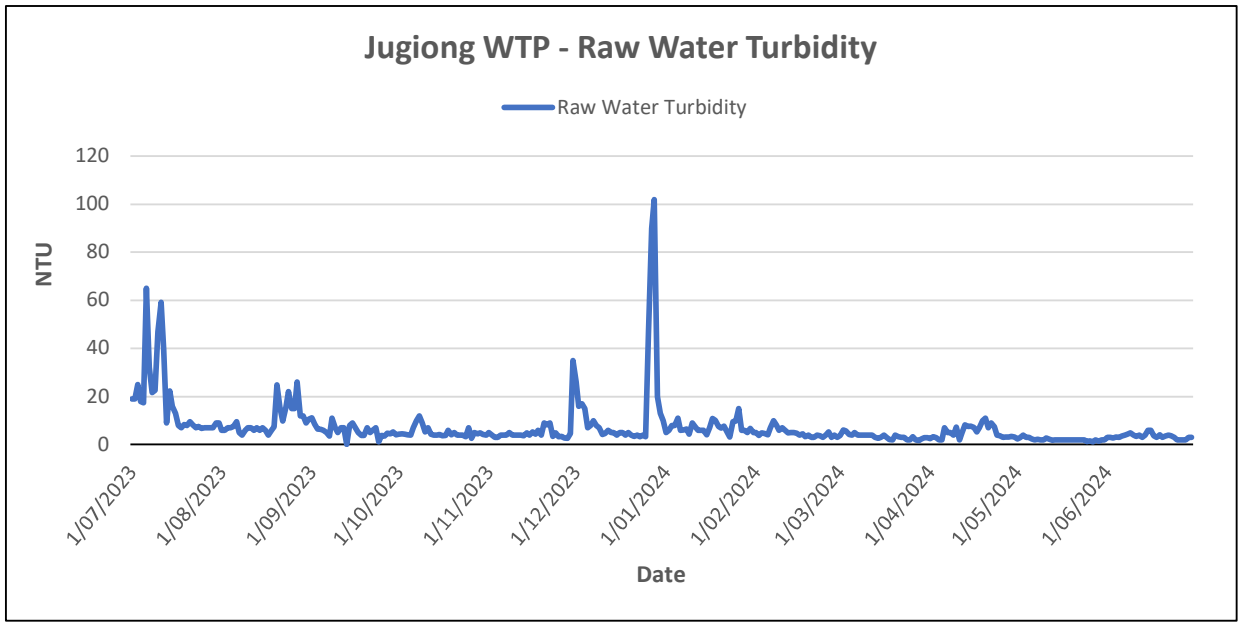


Figure 1210. Jugiong finished water turbidity for the 2023/24 reporting period

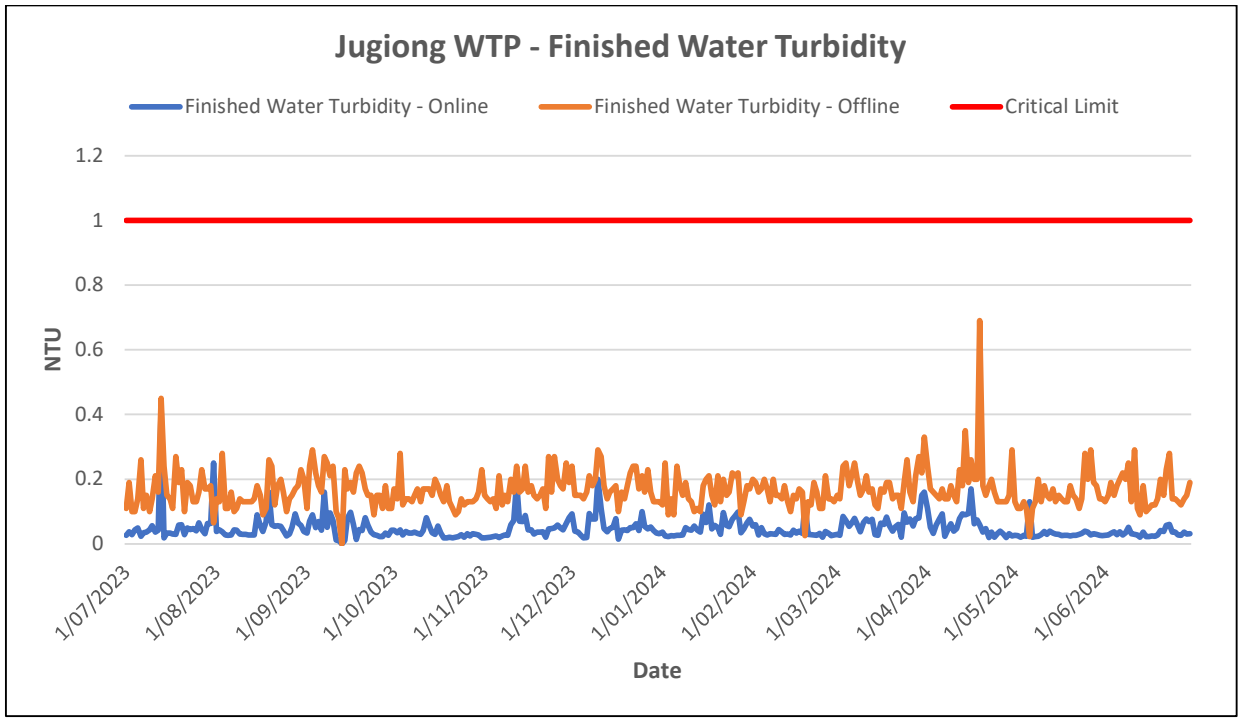
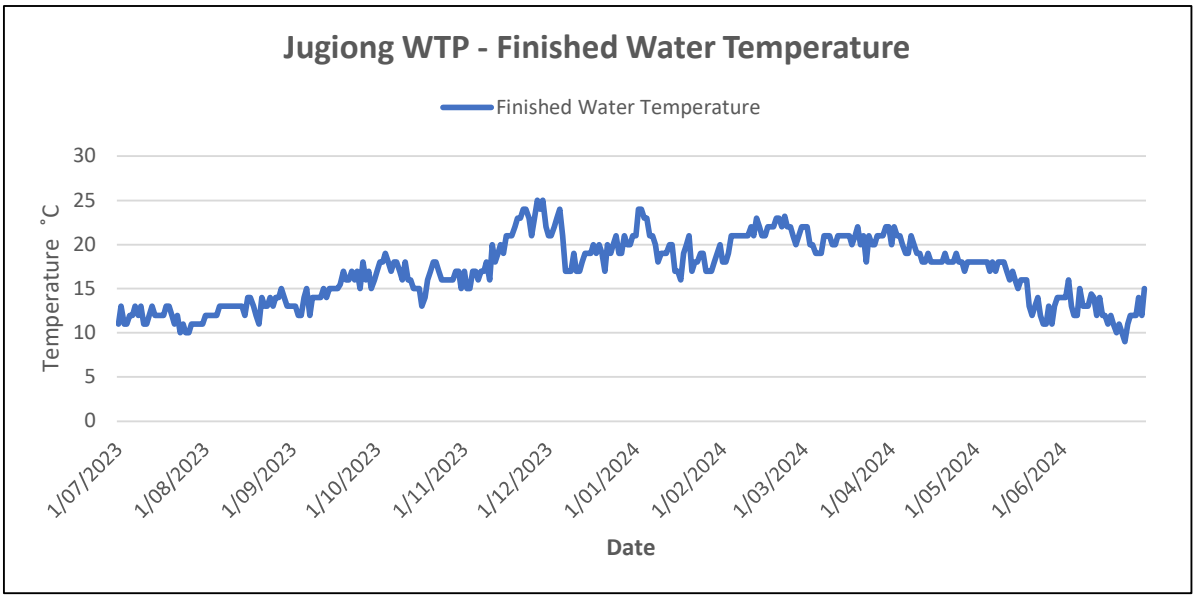


Figure 1311. Jugiong finished water temperature for the 2023/24 reporting period



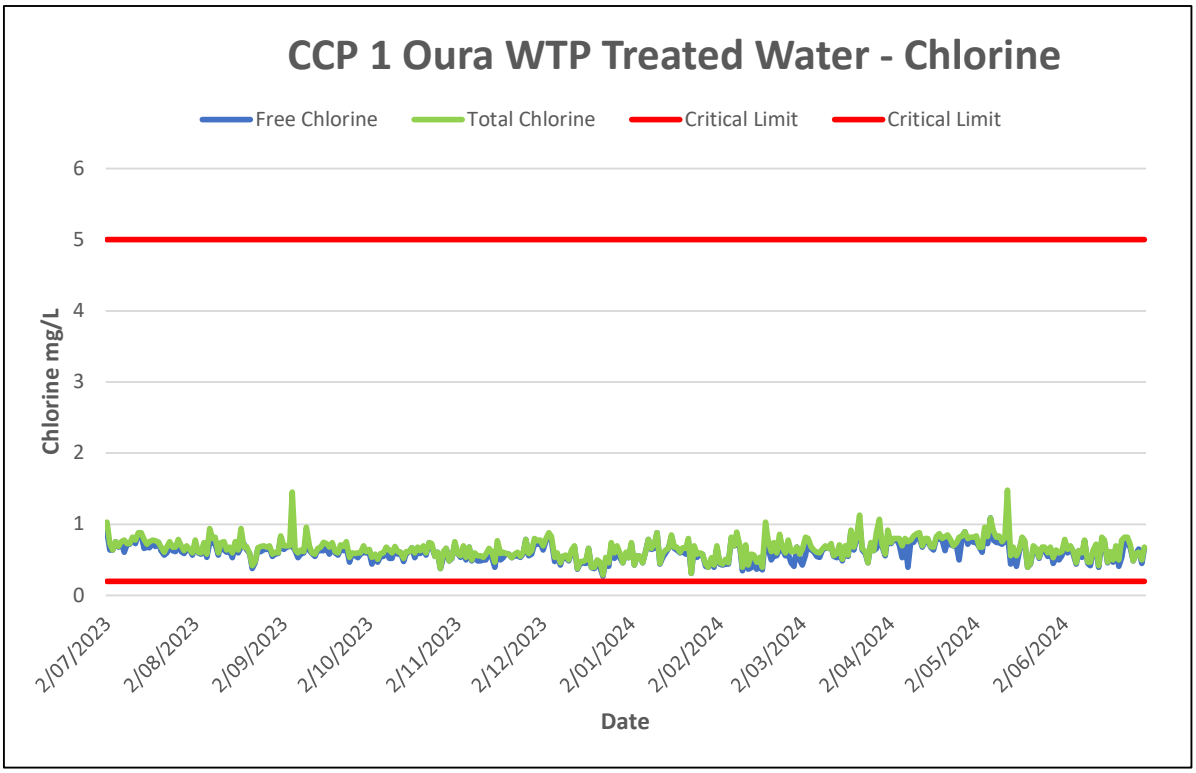
Oura Treatment Plant

Since the implementation of Water Outlook at the Oura WTP some valuable data has been produced. This data is represented in the following graphs produced for the WTP's CCP's.

Chlorine is used at the Oura WTP for disinfection of the ground water extracted from bores in Gumly Borefield. It is used to eliminate chlorine sensitive pathogens, for disinfection. The chlorine target for GWCC exiting the Oura WTP is 0.5 mg/L. An amber alert is issued through WaterOutlook when chlorine levels drop below 0.3 mg/L and when they rise above 1.0 mg/L. A critical alarm and plant shutdown is issued when chlorine levels drop below 0.2 mg/L and rise above 5mg/L.

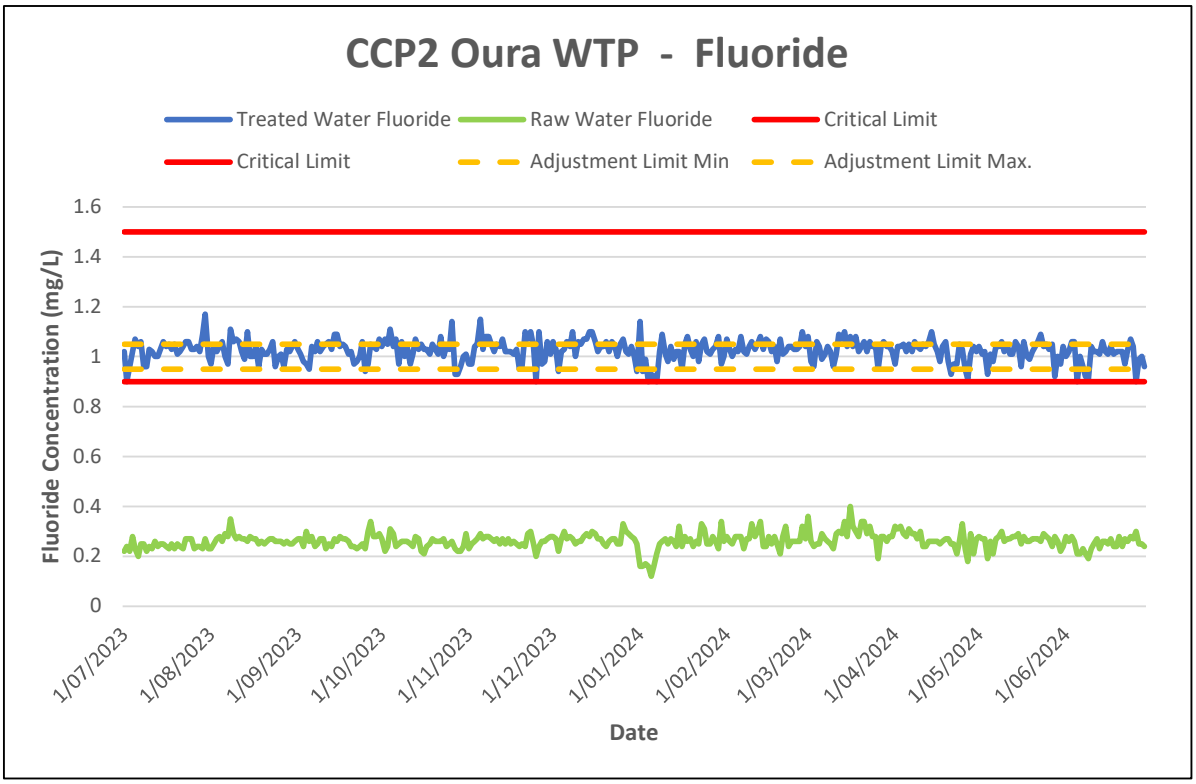
Fluoride is also added to the water at the Oura WTP. There is natural Fluoride detected in the water, therefore more is added to meet the NSW Health target range of 0.95mg/L to 1.05mg/L. this information is represented in the graphs below.

Figure 14 12. Oura chlorine levels for the 2023/24 reporting period



As can be seen in Figure 14 12, which uses a logarithmic scale on the vertical axis, the injection of chlorine into the Oura bore water has been extremely consistent throughout the reporting period. Averaging approx. 0.62mg/L (FCl) and 0.69mg/L (TCl) for the 12 months this is slightly higher than our target of 0.5mg/L but well within our CCP range of 0.2mg/L and 5mg/L.

Figure 15 13. Oura fluoride levels for the 2023/24 reporting period



As can be seen in Figure 15 13, the raw fluoride content from the Oura Bores is very consistent remaining between 0.12mg/L and 0.4mg/L for the reporting period 2023/24. Raw water fluoride averaged 0.26mg/L for the 2023/24 period. Treated Water Fluoride averaged 1.03mg/L for the 2023/24 reporting period.

The treated water fluoride was very consistent over the reporting period **recording 0 critical exceedances.**

Figure 16 14. Oura collection tank turbidity levels for the 2023/24 reporting period

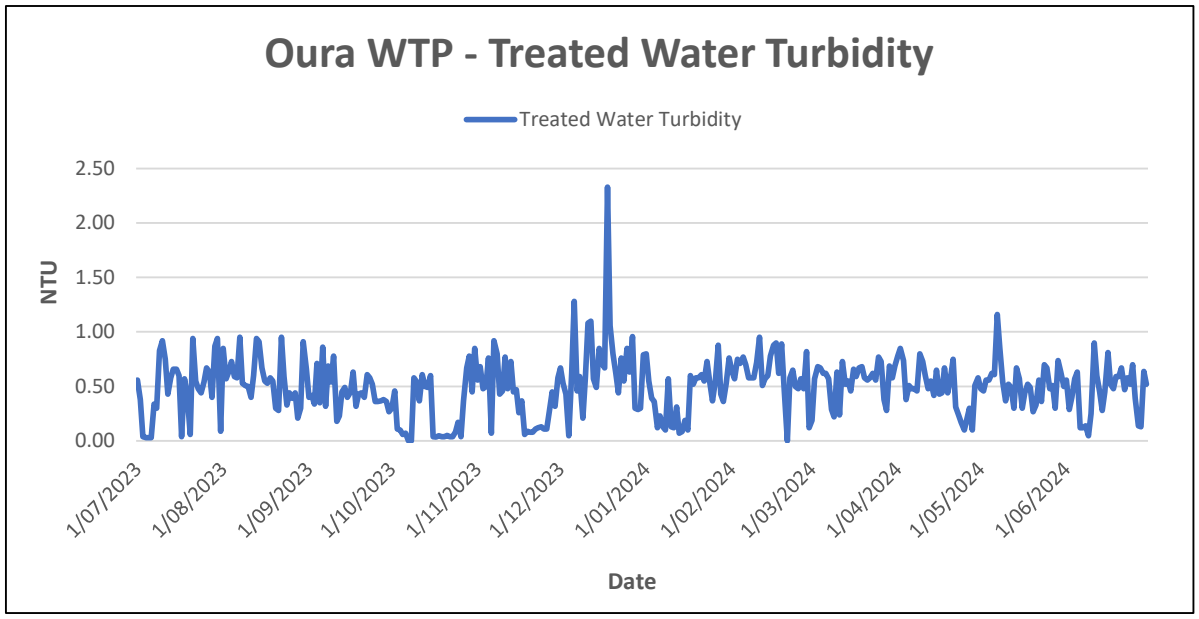


Figure 16 14 shows the turbidity at the Oura collection tank. Australian Drinking Water Guidelines (ADWG) indicates that turbidity should be <5 NTU (Nephelometric Turbidity Units). As can be seen, there have been **0 exceedances** of this limit for the 2023/24 reporting period.

Figure 17 15. Oura treated water temperature for the 2023/24 reporting period

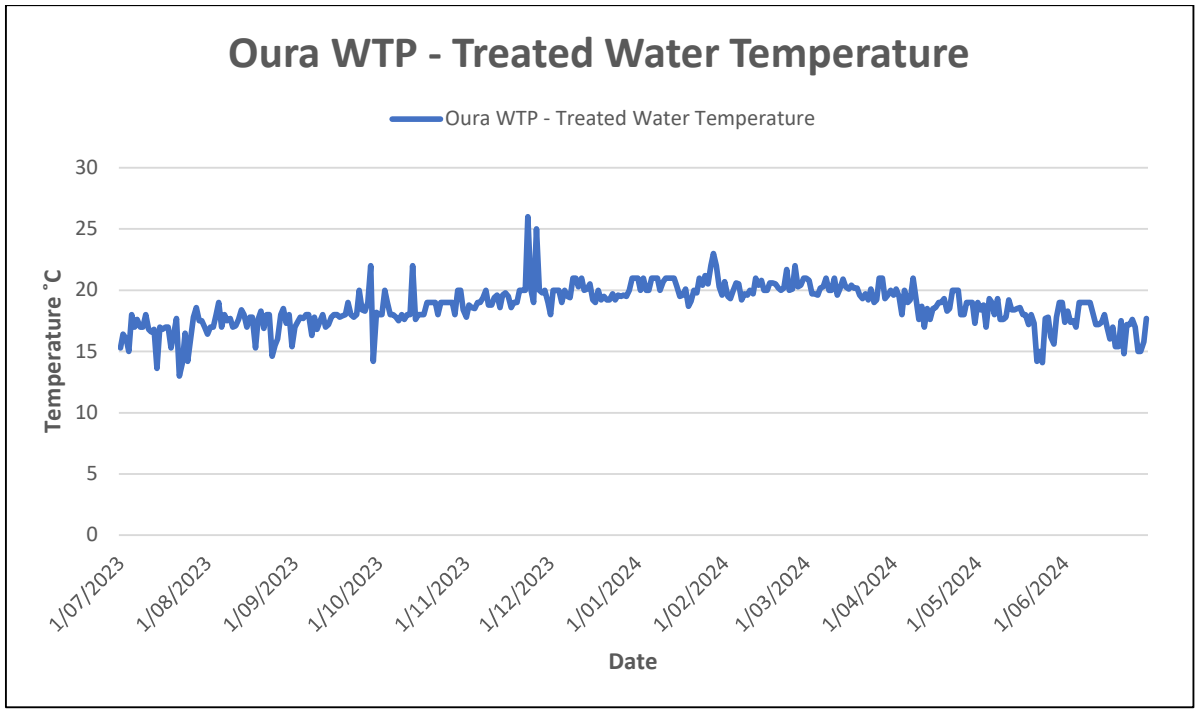


Figure 17 157 shows the relationship between the temperatures of the treated water with time over the reporting period. As you would surmise, it follows a seasonal trend in that the treated water is

warmer in summer and colder in winter despite being extracted from groundwater sources. Two high readings were detailed within the data, and this was due to human error.

Water Quality Data Summary

Table 31. Raw water measured parameters pertaining to water quality in the 2023/24 reporting period - Jugiong

Parameter	Minimum	Average	Maximum	Lower Critical Limit	Upper Critical Limit	No. Samples
Fluoride	0.12	0.19	0.33			365
Turbidity - Online	1.03	7.18	102			365
Turbidity Offline	1.27	7.94	113			365
Colour	3	47.7	425			365
pH	7.36	7.86	8.33			365
Alkalinity	40	106.4	190			365
Hardness	0	104.3	240			365
Temperature	9	17	25			365

Table 32. Raw water measured parameters pertaining to water quality in the 2023/24 reporting period - Oura

Parameter	Minimum	Average	Maximum	Lower Critical Limit	Upper Critical Limit	No. Samples
Fluoride	0.12	0.26	0.4		1.5	365
pH	6.08	6.77	8.01			365
Temperature	17.3	19.86	22.1			363
Turbidity	0.03	0.52	2.5			365

Table 33. Treated water measured parameters pertaining to water quality in the 2023/24 reporting period - Jugiong

Parameter	Minimum	Average	Maximum	Lower Critical Limit	Upper Critical Limit	No. Samples
Turbidity SCADA	0.011	0.037	0.196		1	365
Turbidity – Offline	0	0.17	0.69		1	365
Colour	0	2.9	20			365
pH	7.06	7.49	8.12			365
Temperature	9	17	25			365
Alkalinity	40	101.7	190			365
Hardness	40	105.2	210			365
Free Chlorine – Online	0.66	1.73	2.44			365
Total chlorine – Online	0.86	2.1	3.01	**Summer**: ≤ 0.8mg/L for > 30min **Winter**: ≤ 0.5mg/L for > 30min	≥ 5.0mg/L	365
Fluoride	0.8	0.98	1.2			365

Table 34. Treated water measured parameters pertaining to water quality in the 2023/24 reporting period - Oura

Parameter	Minimum	Average	Maximum	Lower critical limit	Upper critical limit	No. samples
Fluoride	0.28	1.02	1.17	0.9	1.5	365
pH	7.13	7.58	8.06			365
Free Chlorine	0.27	0.62	1.09	0.2	5	363
Total Chlorine	0.28	0.67	1.48			365
Temperature	13	18.71	26			363

Reticulation Water Quality Reporting

Table 35. Water quality parameters in Jugiong reticulation - Chemistry

Characteristic	Guideline Value	Units	Mean	Median	Min	Max	Sample Count	% meeting guideline values
Aluminium	0.2000	mg/L	0.0350	0.0350	0.03	0.04	2	100.00
Antimony	0.0030	mg/L	0.0001	0.0001	0.00005	0.0001	2	100.00
Arsenic	0.0100	mg/L	0.0005	0.0005	0.0005	0.0005	2	100.00
Barium	2.0000	mg/L	0.0219	0.0219	0.0219	0.0219	2	100.00
Boron	4.0000	mg/L	0.0076	0.0076	0.0068	0.0083	2	100.00
Cadmium	0.0020	mg/L	0.0001	0.0001	0.00005	0.00005	2	100.00
Calcium	10000.0000	mg/L	17.6000	17.6000	17	18.2	2	100.00
Chloride	250.0000	mg/L	27.5000	27.5000	22	33	2	100.00
Chromium	0.0500	mg/L	0.0008	0.0008	0.0005	0.001	2	100.00
Copper	2.0000	mg/L	0.0035	0.0035	0.003	0.004	2	100.00
Fluoride	1.5000	mg/L	0.9800	0.9800	0.94	1.02	2	100.00
Fluoride (WU result)	1.5000	mg/L	1.0000	1.0000	1	1	1	100.00
Fluoride Ratio	0.8 - 1.2		0.9800	0.9800	0.98	0.98	1	100.00
Iodine	0.5000	mg/L	0.0150	0.0150	0.01	0.02	2	100.00
Iron	0.3000	mg/L	0.0050	0.0050	0.005	0.005	2	100.00
Lead	0.0100	mg/L	0.0002	0.0002	0.0001	0.0002	2	100.00
Magnesium	10000.0000	mg/L	10.4250	10.4250	9.16	11.69	2	100.00
Manganese	0.5000	mg/L	0.0123	0.0123	0.012	0.0126	2	100.00
Mercury	0.0010	mg/L	0.0004	0.0004	0.0004	0.0004	2	100.00
Molybdenum	0.0500	mg/L	0.0003	0.0003	0.0003	0.0003	2	100.00
Nickel	0.0200	mg/L	0.0019	0.0019	0.0002	0.0036	2	100.00
Nitrate	50.0000	mg/L	1.5000	1.5000	1	2	2	100.00
Nitrite	3.0000	mg/L	0.0500	0.0500	0.05	0.05	2	100.00
pH	6.5 - 8.5		7.6500	7.6500	7.6	7.7	2	100.00
Selenium	0.0100	mg/L	0.0035	0.0035	0.0035	0.0035	2	100.00
Silver	0.1000	mg/L	0.0001	0.0001	0.0001	0.0001	2	100.00
Sodium	180.0000	mg/L	38.5000	38.5000	36	41	2	100.00
Sulfate	250.0000	mg/L	52.0000	52.0000	44	60	2	100.00
Total Dissolved Solids (TDS)	10000.0000	mg/L	155.0000	155.0000	129	181	2	100.00
Total Hardness as CaCO3	200.0000	mg/L	86.9000	86.9000	80.2	93.6	2	100.00
True Colour	15.0000	Hazen Units (HU)	1.0000	1.0000	1	1	2	100.00
Turbidity	5.0000	NTU	0.2500	0.2500	0.1	0.4	2	100.00
Uranium	0.0200	mg/L	0.0001	0.0001	0.0001	0.0001	2	100.00
Zinc	3.0000	mg/L	0.0100	0.0100	0.01	0.01	2	100.00

Table 36. Water quality parameters in Oura reticulation - Chemistry

Characteristic	Guideline Value	Min	Mean	Max	Sample Count	% meeting guideline values
Aluminium	0.2000		0.005	0.0054	0.01	13
Antimony	0.0030		0.00005	0.0001	0.00005	13
Arsenic	0.0100		0.001	0.0010	0.001	13
Barium	2.0000		0.0131	0.0173	0.0216	13
Boron	4.0000		0.0145	0.0178	0.0222	13
Cadmium	0.0020		0.00005	0.0001	0.00005	13
Calcium	10000.0000		12	17.1077	20.9	13
Chloride	250.0000		18	43.4615	72	13
Chromium	0.0500		0.0005	0.0010	0.002	13
Copper	2.0000		0.002	0.0029	0.007	13
Fluoride	1.5000		0.91	1.0785	1.27	13
Fluoride (WU result)	1.5000		0.94	1.0225	1.07	12
Fluoride Ratio	0.8 - 1.2		0.74	0.9667	1.14	12
Iodine	0.5000		0.01	0.0292	0.04	13
Iron	0.3000		0.01	0.0338	0.12	13
Lead	0.0100		0.0001	0.0002	0.0005	13
Magnesium	10000.0000		10.56	13.6985	16.08	13
Manganese	0.5000		0.0059	0.0415	0.0704	13
Mercury	0.0010		0.0004	0.0004	0.0004	13
Molybdenum	0.0500		0.0001	0.0002	0.0003	13
Nickel	0.0200		0.0002	0.0021	0.0065	13
Nitrate	50.0000		1	1.2308	2	13
Nitrite	3.0000		0.05	0.0500	0.05	13
pH	6.5 - 8.5		7.5	7.7385	7.9	13
Selenium	0.0100		0.0035	0.0035	0.0035	13
Silver	0.1000		0.0001	0.0001	0.0001	13
Sodium	180.0000		20	32.0000	41	13
Sulfate	250.0000		4	12.8462	21	13
Total Dissolved Solids (TDS)	10000.0000		96	142.9231	203	13
Total Hardness as CaCO3	200.0000		73.5	99.1231	118.4	13
True Colour	15.0000		0.5	0.6923	1	13
Turbidity	5.0000		0.1	0.4000	1.1	13
Uranium	0.0200		0.0003	0.0004	0.0005	13
Zinc	3.0000		0.01	0.0108	0.02	13

Table 37. Water quality parameters in Mt Arthur reticulation - Chemistry

Characteristic	Guideline Value	Min	Mean	Max	Sample Count	% meeting guideline values
Aluminium	0.2000	0.005	0.0075	0.01	2	100.00
Antimony	0.0030	0.00005	0.0001	0.00005	2	100.00
Arsenic	0.0100	0.0005	0.0005	0.0005	2	100.00
Barium	2.0000	0.0116	0.0125	0.0133	2	100.00
Boron	4.0000	0.0381	0.0392	0.0402	2	100.00
Cadmium	0.0020	0.00005	0.0001	0.00005	2	100.00
Calcium	10000.0000	11.9	12.1000	12.3	2	100.00
Chloride	250.0000	54	59.0000	64	2	100.00
Chromium	0.0500	0.0005	0.0008	0.001	2	100.00
Copper	2.0000	0.03	0.0395	0.049	2	100.00
Fluoride	1.5000	0.42	0.4350	0.45	2	100.00
Iodine	0.5000	0.03	0.0350	0.04	2	100.00
Iron	0.3000	0.12	0.1350	0.15	2	100.00
Lead	0.0100	0.0002	0.0003	0.0003	2	100.00
Magnesium	10000.0000	8.98	9.4250	9.87	2	100.00
Manganese	0.5000	0.0122	0.0142	0.0161	2	100.00
Mercury	0.0010	0.0004	0.0004	0.0004	2	100.00
Molybdenum	0.0500	0.0002	0.0005	0.0008	2	100.00
Nickel	0.0200	0.0002	0.0013	0.0024	2	100.00
Nitrate	50.0000	0.5	0.5000	0.5	2	100.00
Nitrite	3.0000	0.05	0.0500	0.05	2	100.00
pH	6.5 - 8.5	7.6	7.6000	7.6	2	100.00
Selenium	0.0100	0.0035	0.0035	0.0035	2	100.00
Silver	0.1000	0.0001	0.0001	0.0001	2	100.00
Sodium	180.0000	46	47.5000	49	2	100.00
Sulfate	250.0000	9	10.0000	11	2	100.00
Total Dissolved Solids (TDS)	10000.0000	147	158.0000	169	2	100.00
Total Hardness as CaCO3	200.0000	67.7	69.0500	70.4	2	100.00
True Colour	15.0000	0.5	0.5000	0.5	2	100.00
Turbidity	5.0000	0.1	0.2000	0.3	2	100.00
Uranium	0.0200	0.00005	0.0001	0.00005	2	100.00
Zinc	3.0000	0.01	0.0100	0.01	2	100.00

Table 38. Water quality parameters in the Mt Daylight reticulation- Chemistry

Characteristic	Guideline Value	Min	Mean	Max	Sample Count	% meeting guideline values
Aluminium	0.2000	0.005	0.0050	0.005	2	100.00
Antimony	0.0030	0.00005	0.0001	0.00005	2	100.00
Arsenic	0.0100	0.002	0.0025	0.003	2	100.00
Barium	2.0000	0.0684	0.0784	0.0883	2	100.00
Boron	4.0000	0.0375	0.0379	0.0383	2	100.00
Cadmium	0.0020	0.00005	0.0001	0.00005	2	100.00
Calcium	10000.0000	27	27.2000	27.4	2	100.00
Chloride	250.0000	111	114.5000	118	2	100.00
Chromium	0.0500	0.0005	0.0008	0.001	2	100.00
Copper	2.0000	0.003	0.0055	0.008	2	100.00
Fluoride	1.5000	0.53	0.5650	0.6	2	100.00
Iodine	0.5000	0.13	0.1300	0.13	2	100.00
Iron	0.3000	0.005	0.0075	0.01	2	100.00
Lead	0.0100	0.0001	0.0004	0.0007	2	100.00
Magnesium	10000.0000	23.19	24.3400	25.49	2	100.00
Manganese	0.5000	0.0006	0.0016	0.0026	2	100.00
Mercury	0.0010	0.0004	0.0004	0.0004	2	100.00
Molybdenum	0.0500	0.0022	0.0025	0.0027	2	100.00
Nickel	0.0200	0.0005	0.0006	0.0006	2	100.00
Nitrate	50.0000	0.5	0.5000	0.5	2	100.00
Nitrite	3.0000	0.05	0.0500	0.05	2	100.00
pH	6.5 - 8.5	7.2	7.3500	7.5	2	100.00
Selenium	0.0100	0.0035	0.0035	0.0035	2	100.00
Silver	0.1000	0.0001	0.0001	0.0001	2	100.00
Sodium	180.0000	92	92.5000	93	2	100.00
Sulfate	250.0000	41	44.5000	48	2	100.00
Total Dissolved Solids (TDS)	10000.0000	302	315.5000	329	2	100.00
Total Hardness as CaCO3	200.0000	163.9	168.1500	172.4	2	100.00
True Colour	15.0000	0.5	0.7500	1	2	100.00
Turbidity	5.0000	0.1	0.1000	0.1	2	100.00
Uranium	0.0200	0.0028	0.0033	0.0037	2	100.00
Zinc	3.0000	0.01	0.0150	0.02	2	100.00

Table 39. Microbiological results - Jugiong

Characteristic	Guideline Value	Units	Mean	Median	Standard Deviation	Min	Max	Sample Count	Exception Count	95th Percentile	5th Percentile	% meeting guideline values
E. coli	0.0000	mpn/100 mL	0.0000	0.0000	0.0000	0	0	78	0	0	0	100.00
Free Chlorine	0.2 - 5	mg/L	0.4187	0.3200	0.4278	0.02	1.96	78	27	1.47	0.02	65.38
pH	6.5 - 8.5		7.8105	7.7450	0.3625	7.23	8.7	78	4	8.52	7.36	94.87
Temperature	30.0000	C	18.2115	18.3500	4.6247	8.7	25.4	78	0	25	11	100.00
Total Chlorine	5.0000	mg/L	0.6135	0.4500	0.5505	0.02	2.2	78	0	1.78	0.04	100.00
Total Coliforms	0.0000	mpn/100 mL	0.2821	0.0000	1.8155	0	14	78	2	0	0	97.44
Turbidity	5.0000	NTU	0.6341	0.5200	0.4097	0.23	2.4	78	0	1.48	0.25	100.00

Table 40. Microbiological results - Oura

Characteristic	Guideline Value	Units	Mean	Median	Standard Deviation	Min	Max	Sample Count	Exception Count	95th Percentile	5th Percentile	% meeting guideline values
E. coli	0.0000	mpn/100 mL	0.0076	0.0000	0.1233	0	2	263	1	0	0	99.62
Free Chlorine	0.2 - 5	mg/L	0.4949	0.4600	0.2944	0.02	1.82	263	33	1.03	0.1	87.45
pH	6.5 - 8.5		8.0739	8.1000	0.3735	7.13	9.18	262	27	8.7	7.5	89.69
Temperature	30.0000	C	19.8487	19.8000	5.2402	9.9	32.2	263	4	28.4	12.4	98.48
Total Chlorine	5.0000	mg/L	0.5834	0.5000	0.3591	0.06	2.84	258	0	1.15	0.16	100.00
Total Coliforms	0.0000	mpn/100 mL	0.0418	0.0000	0.6195	0	10	263	2	0	0	99.24
Turbidity	5.0000	NTU	2.0383	0.5800	21.7519	0.09	352	261	2	1.25	0.29	99.23

Table 41. Microbiological results – Mt Arthur

Characteristic	Guideline Value	Units	Mean	Median	Standard Deviation	Min	Max	Sample Count	Exception Count	95th Percentile	5th Percentile	% meeting guideline values
E. coli	0.0000	mpn/100 mL	0.0000	0.0000	0.0000	0	0	64	0	0	0	100.00
Free Chlorine	0.2 - 5	mg/L	0.3909	0.3700	0.2509	0.02	1.1	64	13	0.86	0.02	79.69
pH	6.5 - 8.5		7.4744	7.4950	0.2735	7.03	8.3	64	0	7.94	7.09	100.00
Temperature	30.0000	C	20.2344	20.6500	5.8115	10.9	30.3	64	1	29.4	12.5	98.44
Total Chlorine	5.0000	mg/L	0.4725	0.4200	0.2790	0.03	1.32	64	0	0.93	0.08	100.00
Total Coliforms	0.0000	mpn/100 mL	0.2500	0.0000	2.0000	0	16	64	1	0	0	98.44
Turbidity	5.0000	NTU	0.6523	0.5600	0.3198	0.24	2.28	64	0	1.3	0.35	100.00

Table 42. Microbiological results – Mt Daylight

Characteristic	Guideline Value	Units	Mean	Median	Standard Deviation	Min	Max	Sample Count	Exception Count	95th Percentile	5th Percentile	% meeting guideline values
E. coli	0.0000	mpn/100 mL	0.0000	0.0000	0.0000	0	0	24	0	0	0	100.00
Free Chlorine	0.2 - 5	mg/L	0.1983	0.1200	0.1765	0.01	0.52	24	14	0.5	0.02	41.67
pH	6.5 - 8.5		7.3846	7.4050	0.2146	6.8	7.68	24	0	7.61	7.05	100.00
Temperature	30.0000	C	22.2375	22.3500	5.7349	12.5	32.4	24	3	31.1	13.3	87.50
Total Chlorine	5.0000	mg/L	0.3152	0.2500	0.2285	0.025	0.71	24	0	0.68	0.04	100.00
Total Coliforms	0.0000	mpn/100 mL	0.0417	0.0000	0.2041	0	1	24	1	0	0	95.83
Turbidity	5.0000	NTU	0.6538	0.4500	0.6211	0.21	3.2	24	0	1.28	0.23	100.00

Appendix B - Continuous Improvement Plan

GWCCC DWMS Action and Improvement Plan

Table 43. GWCC DWMS Action and Improvement Plan

No.	Action	Type	Status	Date completed/ closed	Comments	Priority	Responsibility	Action reference
1	GWCC to consider installing an online free chlorine analyser at Oura disinfection point (after 30 min contact time).	Capital works	Complete		25/11/2016 - 9 analysers purchased. As Oura is not disinfecting for primary kill, the analyser should be located as close as practical to the disinfection point. 15/10/2019 - Blueeye analyser installed; however has been found to be unreliable. Analyser has not be implemented for control however is registering trends. A new Burket system will now be installed as a replacement. 1/9/2021 - Burkert Analyser has been	Very High	Manger Production and Services	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)

					installed and operating since early 2020			
2	GWCC to consider training staff in backflow prevention	Training	Complete	Sep-16				GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
3	GWCC to consider conducting internal training on chlorine residual testing	Training	Complete	2017				GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
4	GWCC to conduct internal training (or refresher training) on correct sampling techniques	Training	Complete	2017	25/11/2016 - Register needs to be updated to capture internal training completed 15/10/2019 - All Water Qual staff have been inducted into proper sampling techniques; however a role out of all staff across the organisation whom may require sampling as part of their role will need to	Low		GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)

					be undertaken. 25/8/2020 All new distribution staff inducted internally however; a register is yet to be developed. 1/9/2021 - all compliance sampling is conducted by Water Quality Staff now who are trained and specialised. The only testing that occurs from distribution staff is now just chlorine operational samples. Water Quality Staff continue development and all maintain their cert 3 in water treatment plant operations.		
5	GWCC to consider conducting a community education program on backflow prevention	Community engagement	Closed	25-Nov	25/11/2016 - Action closed due to changed process. Refer to action 33 (implement backflow prevention program)		GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
6	GWCC to conduct bacto sampling after storm event if visual check of	Monitoring	Closed	25-Nov	25/11/2016 - Action closed due to changed process. Refer to action 33 (implement backflow prevention program)		GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)

	bores show signs of being compromised						
7	GWCC to install an online turbidity meter in Murrumbidgee River to predict water quality decline	Capital works	Closed	Nov-16	25/11/2016 - Turbidity meter purchased. However this action is no longer required. Controls for WTP are established at the plant through the upgrade to ClearScada control system. Raw water turbiditity is already measured and shuts the plant down if variation >20% occurs. Contact with WaterNSW will also provide any release changes that may impact on river turbidity.		GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
8	GWCC to roll out system of different levels of key access to increase security	Operations and maintenance	Complete	2016	25/11/2016 - Keys purchased 25/8/2020, majority of all sites now completed with only remote site remaining		GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
9	GWCC to consider performing preventative maintenance on solenoid valves leading into	Operations and maintenance	Closed	Nov	25/11/2016 - Considered as part of maintenance		GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)

	fluoride batching tank					
10	GWCC to check data entry to ensure no errors and record all incidents and causes of high readings (e.g. data entry error, human error, etc.)	Monitoring	Closed	2017	the implementation of a new water quality database (Wateroutlook) has allowed for the centralisation of all test results and automated reporting for any non-conformances.	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
11	GWCC to consider purchasing electronic chlorine analyser to eliminate manganese interference with chlorine residual testing as per DPI Water recommendation (e.g. chloro-sense kits)	Capital works	Closed	2014	25/11/2016 - One at Jugiong and one at Oura	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
12	GWCC to consider increasing monitoring of chlorine residual throughout system during power outages	Monitoring	Closed	25-Nov	25/11/2016 - Covered within incident management. 9 chlorine analysers to be installed 15/10/2019 - multiple sites now online via	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)

				SCADA with battery backup operations.		
13	GWCC to consider installing online chlorine analysers at Oura PS	Capital works	Closed	25/11/2016 - analyser purchased. Currently being installed and connected to SCADA 2017. 15/10/2019 - Analyser installed in lab. Reliability of the Blueeye unit is not good and a new unit will be installed in 2019. System is currently operating however no controls have been engaged from the analyser due to reliability f the unit. Trends are however being obtained. 1/9/2021 works were complete and commissioned in early 2020		GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)

14	GWCC to develop a register for water carters	Procedures and documentation	Closed		2017 - Letters issued to all known water carters within supply area. No responses received from water caters regarding potable water services. Process will be controlled greater via the installation of automated filling stations which will be delivered as an ongoing capital delivery project. 15/10/2019 - Filling stations installed at Temora, Bardmedman and West Wyalong. No commercial water carters for potable services have been registered.	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
15	GWCC to develop and maintain a register of RPZs within distribution system	Procedures and documentation	Closed		To be completed as part of *Action33 Implement backflow prevention program*	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)

16	GWCC to consider and investigate and install the most suitable BFPD on the connection between Oura and Hylands Bridge (e.g. RPZ, break tank with air gap, etc.)	Capital works	Complete		2017 risk assesment and report developed on the non-pot system and its potential for cross contamination. Further projects to progress to investigation stage in 2018. 15/10/2019 - Works still outstanding 25/8/2020 Works still outstanding 1/1/2022 A stop valve and non-return valve has been put in place to reduce any risk of backflow	High	Manager Engineering	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
17	GWCC to ensure all hatches on reservoirs comply with AS/NZS	Operations and maintenance	Rolled into other action		To be completed as part of *Action 36 To complete and submit circular 18*			GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
18	GWCC to implement a formal water quality monitoring regime at Mt Arthur to monitor pH, turbidity, free, and total chlorine	Monitoring	Rolled into other action		To be completed as part of *Action 37 Complete formal review of monitoring plan, against ADWG, NSW Health*			GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)

19	GWCC to implement a formal water quality monitoring regime at Mt Daylight to monitor pH, turbidity, free, and total chlorine	Monitoring	Rolled into other action		To be completed as part of *Action 37 Complete formal review of monitoring plan, against ADWG, NSW Health*	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
20	GWCC to install a backflow prevention device between the GWCC reservoir and the reservoir managed by Carathool Shire Council to protect water quality in the Mt Daylight drinking water supply	Capital works	Closed		25/11/2016 - Part of broader discussion on governance with Carathool Shire Council 25/8/2020 there is an airgap between water in reservoir and inlet therefore restricting any backflow	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
21	GWCC to consider purging reservoir as part of emergency response if contamination is suspected	Operations and maintenance	Closed		25/11/2016 - Considered as part of emergency procedures	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)

22	GWCC to consider alarming all reservoir hatch doors in case of sabotage or vandalism. Mt Daylight reservoir is a priority, which is the most remote	Operations and maintenance	Closed		25/11/2016 - Been considered, but currently not practical. Managed with weekly and quarterly inspections.			GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
23	GWCC to complete live chlorine monitoring system for reticulation system (in progress)	Capital works	Complete		25/11/2016 - analyser purchased 15/10/2019 - analysers will be installed on demarcation boundaries for Bulk customers retics. No considerations for online retic monitoring is being considered at this stage as water quality team are building data to inform future decisions such as apporpriate locailities that warrant online monitoring. 25/8/2020 as per previous note on 15/10/2019 - 1/9/2021 as per previous advice and note that staff undertake significant	Low	Manager Production & Services	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)

					amount of additional operational testing for the retic systems.			
24	GWCC to consider developing SOP for fluoride hopper cleaning	Procedures and documentation	Complete		15/10/2019 - External training consultant required to facilitate, training and development of an SOP for Trades. This will occur upon completion of the new Code of Practice. 25/8/2020 SOP has been drafted and induction to be provided for all trades and WTP operators - 1/9/2021 new induction procedure was completed and implemented in 2020	Very High	Manager Production & Services	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
25	GWCC to consider developing SOPs for chlorine testing to include	Procedures and documentation	Closed	30/06/2019	15/10/2019 - consideration of developing SOP's has been determined as not required.			GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)

	manganese interference with reagent							
26	GWCC to develop SOPs for operational and supporting activities, such as plant operation, mains break repair, mains flushing, etc.	Procedures and documentation	Complete		15/10/2019 - SOPS for WTP's and Water Quality division have been completed. Distribution SOP's now required in line with relevant training 25/8/2020 distribution staff to develop SOPS for their activities e.g. mains breaks - 1/9/2021 GWCC have now established a WHS committee and officers, continual improvement processes are in place and managed as part of this process. This includes all WHS documentation and SOP needs for the organisation	Medium	Manager Operations	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
27	GWCC to include drinking water quality management in the annual report, as recommended in Element 10 of the ADWG	Procedures and documentation	Complete	2018	First report and submitted in October 2018.			GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)

28	Educate community member that owns the private bore in close proximity to Oura Borefield to ensure they are aware that the bore accesses the drinking water aquifer	Community engagement	Complete	30/06/2020	25/11/2016 - Refer to new action 38	High	Manager Engineering	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)
29	GWCC to consider installing online chlorine residual analyser at outlet of settling tanks to ensure 30 minutes contact time (Mt Arthur system)	Capital works	In progress		25/11/2016 - Analyser purchased. Unit has been installed at Ganmain; however just waiting on connection for discharge water to sewer before commissioning occurs. 15/10/2019 - Analysers and Maglows to be installed in the Mt Arthur System to provide more data for potential treatment requirements. Investigations to Occur from January 2020 as part of MIPPS student placement. -25/8/2020 MIPPS student investigation	Low	Manager Production & Services	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)

					project complete June 2020, further investigations in treatment options to occur - 1/9/2021 magflow and analysers installed however not connected to clearscada system. - 1/11/2022 Mt Arthur SCADA/Telemetry network to commence upgrade in 2022/23 financial year. Connection of water quality instrumentation to be completed after this. 27/11/2024 – Upgrade has commenced and new and improved WQ instrumentation has been purchased for installation and integration			
30	GWCC to consider changing location of online chlorine analyser in the Mt Daylight system to ensure free chlorine	Capital works	Closed	30/06/2020	Consider as part of analyser installation. 15/10/2019 - Analyser installed at Naradhan Res's providing residual levels 15km down stream of dosing point. Anlayser needs to include controls to	Medium	Manager Production & Services	GWCC DWMS Technical Note 2 Risk Assessment and Critical Control Point Workshop (HydroScience, 2015)

	measurement after 30 min contact time. Both the chlorine dosing and the chlorine analyser are located at the reservoir inlet				inhibit Daylight pumps if residuals or CL2 dosing stops.			
31	Determine the level of water quality training required for new staff and add to induction program	Training	Complete		15/10/2019 - Consideration of training will need to be developed in accordance with each individuals role. However in terms of induction and competancy based requirements for all field staff, this needs to be developed. 25/8/2020 all new starter within WQ and distribution teams have been provided relevent inductions where required however formal register yet to be developed. - 1/9/2021 water quality staff now managing all compliance requirements of the DWMS. Their training is	Medium	Human Resource Coordinator	Added as part of action and improvement plan review (25 November 2016)

					being developed in line with the National Training Package 2020. We are working with the NSW Water Directorate and TWRRP Team for access to new training providers which has delayed our continual development requirements. Staff undertake a review of their Staff Development Plans every 6 months			
32	Develop and implement competency checklist/schedule on sampling methodology	Training	Closed	30/06/2020	15/10/2019 - Will be considered as part of an induction and training program for water quality testing. Internally competency sign off required 25/8/2020 has been considered and will form part of induction process and register - 1/9/2021 All compliance sampling conducted by Quality staff now whom hold a minimum of cert 3 in water treatment operations.	Low	Manager Production & Services	Added as part of action and improvement plan review (25 November 2016)

33	Implement backflow prevention program, including developing register of RPZs	Capital works	Closed	30/06/2020	25/11/2016 - Budget approved, project underway. 15/10/2019 - Program has commenced and is nearing its completion for all rural high risk connections.25/8/2020 RPZD register of high risk connections has been completed	Very High	Manager Engineering	Added as part of action and improvement plan review (25 November 2016)
34	Develop a microbiological sampling SOP when bore head integrity has been potentially compromised (maintenance, flooding, vandalism)	Procedures and documentation	Closed	30/06/2019	15/10/2019 - in line with action item 6 above. Emergancy Response SOP's have been developed. Routine raw water testing now undertaken.			Added as part of action and improvement plan review (25 November 2016)
35	Investigate options for electronic card systems on standpipes to record water carter access	Capital works	Closed	30/06/2019	Temora and West Wyalong have been determined as priority locations for installation during the 18/19 financial year. 15/10/2019 - West Wyalong, Temora and Barmedman now installed and operational.			Added as part of action and improvement plan review (25 November 2016)

36	To complete and submit circular 18	Operations and maintenance	Complete		The development of routine inspections and standard operating procedures have been completed in 2017. Work on the development of a centralised database that can issue out work orders and retain asset corrective action data is now being developed through Wateroutlook. 15/10/2019 - formal submission Circular 18 has not recieved any feedback from 2017. Consideration of new submission to be made. 25/8/2020 No change still no feedback from DPIE	High	Manager Engineering	Added as part of action and improvement plan review (25 November 2016)
37	Complete formal review of monitoring plan, against ADWG, NSW Health	Monitoring	Complete	2017	Works completed with independent review completed by Atom consulting in 2017. 15/10/2019 - Annual DWMS review is undertaken in October of every year and reported to NSW Health upon completion.			Added as part of action and improvement plan review (25 November 2016)

38	Investigate bore 5 private ownership and licensing, in liaison with DPI Water. Considering water quality contamination risks from bore	Investigative studies	Closed	30/06/2019	15/10/2019 - contact with Land Holder and DOI Water to occur 25/8/2020 no indication of active bore, GWCC to continue to monitor raw water of existing borefield	High	Manager Engineering	Added as part of action and improvement plan review (25 November 2016)
39	Ensure bore 1 wellhead security e.g. secure gaps in casement	Capital works	Closed	2019	contact with land holder to gain access and investigate bore closure to occur in 2018 15/10/2019 - 100% confirmation is not possible. Continued monitoring of our borefield raw water will identify any issues if such shall arise.			Added as part of action and improvement plan review (25 November 2016)
40	Review operational monitoring data	Monitoring	Complete	ongoing	Independent monitoring report completed by Atom Consulting with internal review also undertaken for development of better operational data gathering for population of Wateroutlook system.			Added as part of action and improvement plan review (25 November 2016)
41	Formulate a Drinking Water Quality Policy	Procedures and documentation	Closed	2018	Formulate a drinking Water Policy, to be completed before		Manger Production and Services	Added as part of review/development of DWMS

					August council meeting. 15/10/2019 - now complete			
42	Ensure Drinking Water Quality policy is communicated and understood by staff	Training	Closed	2018	Once policy has been adopted by council it is to communicated and understood by staff 15/10/2019 - all policies are submitted to the Consultative Committee for review and made available online for all staff.	Manger Production and Services	Added as part of review/development of DWMS	
43	construct Flow diagrams of water supply system from catchment to consumer	Procedures and documentation	Complete	2017	flow diagrams were updated to be placed into DWMS			
44	Assemble pertinent information and document key characteristics of the water supply system	Procedures and documentation	Complete	2017	Information was generated for production of DWMS	Manger Production and Services		
45	Assemble a team with appropriate knowledge and expertise	Procedures and documentation	Closed	2019	Asset management asset required. 15/10/2019 - Water Quality team now established with more room to grow trainees in future years.	Manger Production and Services		

					Engineering team has gone from 3 to 5 staff with an independant manager.	
46	Identify existing preventive measures from catchment to consumer for each significant hazard or hazardous event and estimate the residual risk	Investigative studies	Complete	ongoing	Ongoing risk reviews and actions are undertaken upon incident reporting/lessons learnt scenarios. As the organisations asset and operational maturity increases so to will the levels of assessment and outcomes. - 1/9/2021 GWCC staff monitor and maintain its raw water systems via monthly monitoring lab results. In addition to that we are altered by any changes to Murrumbidgee discharges from Water NSW.	Low
47	Evaluate alternative or additional preventive measures where		Closed	ongoing	25/8/2020 as per item 46 above	

	improvement is required						
48	Document all procedures and compile into an operations manual	Procedures and documentation	Closed	2019	SOPs have been generated and reviewed; they will need to be finalised. SWMS are currently being developed 15/10/2019 - All SOP's for WTP operations have now been complete. All documents have been made available on WaterOutlook. An operations manual is not deemed required at this stage.		Manger Production and Services
49	Identify procedures required for processes and activities from catchment to consumer	Procedures and documentation	Complete		See point 48 above. 15/10/2019 - This needs to be investigated and developed into a management plan for each supply scheme. - 1/9/2021 this is documented and managed as part of our DWMS and associated annual reviews.	Medium	Manger Production and Services

50	Ensure monitoring data is representative and reliable	Monitoring	Complete	ongoing	Ongoing data auditing every 12 months will help confirm data is representative of water supplies. 15/10/2019 - Wateroutlook provides monthly data reports for review by the water quality team. All data is reviewed annually for consideration of any new improvements required for data and operational consistancy.		Manger Production and Services
51	Determine the characteristics to be monitored in the distribution system and in water as supplied to the customer	Monitoring	Complete	2017	monitoring is carried out as per NSW Health drinking water Monitoring Program and operational requirments of GWCC.		
52	Establish and document a sampling plan for each characteristic, including the location and frequency of sampling	Monitoring	Complete	2017	Monitoring program to be audited every 12 months to ensure data is representative of the drinking water system		

53	Establish a consumer complaint and response program, including appropriate training of employee	Community engagement	Complete	2017	A register of customer complaints and outcomes and feedback to be developed. 15/10/2019 - CRM processes and indicators to be developed over the next 12 months with data recording and reporting mechanisms to be developed as well. This is an outstanding item in both Internal audit and NPR Audit. 25/8/2020 Draft operating proceedure for complaints handling completed - 1/9/2020 process is now business as usual with utilisation of councils customer service complaints system utilised to log and report on issues	Medium	Manger Production and Services
54	Define communication protocols with the involvement of relevent agencies and prepare a contact list of key people,	Procedures and documentation	Closed	2018	A register of conacts has been completed and Emergency Response Management Plan will need to be reviewed to add the list. 15/10/2019 - works now complete and reviewed annually.		

	agencies and businesses						
55	develop a public and media communuications strategy	Community engagement	Complete	2019	See Ryan for update. 15/10/2019 - complete		
56	Develop mechanisms and communication procedures to increase employees awareness of and participation in drinking water quality management	Procedures and documentation	Complete		Suggested by GM to have all staff trained in Cert II Water Operations. 15/10/2019 - induction based training should be undertaken by operational staff. Discussions with HR Coordinator to occur to develop long term plan. - 1/9/2021 GWCC issue relevant update emails, SOP's and guidelines to all staff when changes occur. Additional training including scenario training is undertaken as well. Scenario training was conducted with Bulk Councils involved in late 2020.	High	Manger Production and Services

57	Develop a comprehensive strategy for community consultation	Community engagement	Closed	2019	Have communications officer develop comms strategy. 15/10/2019 - Complete		
58	Assess requirements for effective community involvement	Community engagement	Complete	2019	15/10/2019 - As per Local Government Act, IP&R Framework and the Best Practice requirements for Water & Sewer.		
59	Use information to improve management of the Water Supply system	Investigative studies	Implemented	ongoing	Information will help GWCC to evolve with the requirements of its customers	Low	Manger Production and Services
60	establish programs to increase understanding of the water supply system	Community engagement	Complete	ongoing	Programs may include education of water quality, treatment processes, distribution works, new capital works etc - 1/9/2021 GWCC continue to develop hydraulic models, P&ID, and validation systems for Councils networks. Council have also developed and undertaken an education program called "Depth Days" which provides tours of Jugiong WTP and gives	Medium	Manger Production and Services

					an overview of catchment to tap process for students and/or community groups if requested.	
61	Validate processes and procedures to ensure that they are effective at controlling hazards	Procedures and documentation	Implemented		Ongoing assessment current procedures will help produce and highlight the need for new or additional processes or information	
62	Revalidate processes periodically or when variations in conditions occur	Procedures and documentation	Implemented		See Action and Improvement Plan Action item 61 above	
63	Validate the selection and design of new equipment and infrastructure to ensure continuing reliability	Investigative studies	Implemented	2017	Ongoing	
64	Periodically review documentation and revise as nessesary	Procedures and documentation	Implemented	2017	Ongoing document will be review and updated as per the document review dates	

65	develop a document control system to ensure current versions are in use	Procedures and documentation	Complete		Systematic approach with all review documents and their respective review dates to be determined and a suitable timeline developed to make sure all docs are updated as required 25/8/2020 all systems built into Water Outlook	High	Manger Production and Services
66	Establish a records management system and ensure that employees are trained to fill out records	Procedures and documentation	Implemented	2018	Wateroutlook is being developed by Safe group with a number of avenues of data collection to be made availble once fully rolled out. 15/10/2019 - Additional CRM system is avaialble for registering all documents, emails and correspondance		Manger Production and Services
67	Document information pertinent to all aspects of drinking water quality mangement	Procedures and documentation	Implemented		This will evolve as GWCC move forward, relevant information e.g. reservoir inspection sheets to be enetered into a database for reporting and so that any works can be followed up on and actioned if not complete	Very High	Manger Production and Services

68	produce an annual report to be made available to customers, regulatory authorities and stakeholders	Procedures and documentation	Implemented		DWMS Report may be made available once Water Quality Technical Officer has completed in July/August. 15/10/2019 - The annual report will be completed, submitted and made available to all relevant authorities in October of every year.	High	Manger Production and Services
69	establish procedures for effective internal and external reporting	Procedures and documentation	Closed	2017	The DWMS annual report to NSW Health will but completed for the first time by GWCC and the annual performance report will also be undertaken by GWCC staff as usual on an annual basis		
70	Document and report results	Monitoring	Complete	2017	This will an evolving and ongoing		
71	Collect and evaluate longterm data to assess performance and identify problems	Monitoring	Complete	2017	This will an evolving and ongoing		
72	Document and communicate audit results	Monitoring	Complete	2017	Audit results are always documented and communicated so that any issues can be attended to or so that		

					good results are communnicated for good reason			
73	Establish processes for internal and external audits	Procedures and documentation	Complete	2019	15/10/2019 - Internal Audit undertaken this year and shoulld be completed every 3 years. Consideration of external audits should be undertaken at least every 5 years.			
74	Evaluate the need for change	Investigative studies	Closed	ongoing				
75	Senior Executive review of the effectiveness of the management system	Investigative studies	Complete		15/10/2019 - Manex to review the Annual report and provide advice on any required changes. 25/8/2020 MANEX and council review annual report			
76	Bulk User Service Level Agreement	Procedures and documentation	In Progress	Ongoing	Formal Service level agreement be developed and implemented for councils bulk water users; and b) This action be included into action and improvement plan within DWMS 25/8/2020 Funding has been awarded for the facilitation and development of WQ SLA	Medium	Manager production and Services	Part B has been added to action and improvements plan (Oct 2019); PART A is in progress, Staff have submitted a request to Public Health for the engagement of an external facilitator to undertake the development of a new Service Level Agreement between GWCC and its Bulk Customers. Project to commence upon approval from Public Health for funding of the Consultant.

					between GWCC- Hilltops and GWCC and Coota Gundagai - 1/9/2021 Water Qual component has been completed and a draft is currently being developed by Lindsay Taylor Lawyers. - 1/11/22 draft SLA completed and currently under review. Change in staff at bulk councils has made it difficult to resolve outstanding items for agreement. - 27/11/2024 SLA are complete GWCC is just waiting on CGRC to sign off and also waiting on Hilltops for their council to adopt via council resolution			
77	Complaints Mangement System	Procedures and documentation	Implemented	Ongoing	Investigate options for a complaints handling system that integrates with Council's Asset Management and GIS Systems, and meets the requirements of the framework for the management of drinking	Medium	Manager production and Services	Management is unaware if a fully integrated complaints management system exists that could be implemented within GWCC cost effectively. However, Management will seek to improve its current capture of complaints through a more secure reporting system. This could be undertaken

				water and Council's performance.			through tools such as Civica or WaterOutlook
78	Emergency Training response traiing	Complete	ongoing	Incident and emergency response traiing to be developed and refererred to in DWMS and undertaken by relevent employees and stakeholders. (To be Included in DWMS) 25/8/2020 - Health have funded the facilitation of Emergency response training including bulk councils to occur 2020/21 - 1/9/2020 GWCC and Hilltops and CGRC all participated within a scenario training workshop held late 2020 at Jugiong WTP. Council also has developed Incident Protocols for water quality incidents that are to be used for management.	Medium	Manager production and Services	Managemet have issued a request for this scenario training to be funded and facilitated through Public Health. If funding and facilitated by Health GWCC will seek to undertake the training as soon as practicably possible. It should be noted that internal training is undertaken annualy for emergancy reponse maement at the Jugiong Water Treatment Plant as part of Council's Pollution Incident Response Management Plan. (HAS been included into DWMS under Traing)

79	Backflow Prevention	Procedures and documentation	Complete	2019	a) The Backflow Prevention Policy be referred to within the Drinking Water Management System; (COMPLETE under sectionRural Backflow Prevention Program) and b) Backflow device register be updated as required in accordance with the Backflow Prevention Policy (PP06). (Kevin will need to familiarise himself with this)	Medium	Manager production and Services	Staff will include Backflow Prevention commentary within the DWMS Annual Report which is set to be completed and submitted to Council by December 2019.
80	Water Quality reporting	Procedures and documentation	Complete	2019	Consideration be given to making water quality information publicly available. For example, through the formal reporting to Council meetings, and/or making the DWMS Annual Reporting information available on Council's website.	Low	Manager Production and Services	Staff will submit the Annual DWMS Report to Council for acknowledgment between October and December every year. (Report will be submitted to December Council meeting and subsequently displayed on the public website for the public to see

81	Drinking Water Management System review	Procedures and documentation	Closed	30/06/2020	a) Following the annual review, the Drinking Water Management System be updated to reflect any changes that have been made; and b) Evidence of any review be retained such as meeting minutes, investigative studies, and reports to Council's Senior Management Team and/or Board Members.	low	Manager production and Services	As above
82	Evaluation and audit	Procedures and documentation	Complete	2019	a) Consult with the Local Public Health Unit to clarify their expectations regarding independent audit requirements; and b) Detail the scope and frequency of the independent audit of the Drinking Water Management System (DWMS) in the DWMS.	Low	Manager production and Services	Management are constantly engaged with Public Health and have formally requested a recommendation for a fixed auditing period. No fixed period has been provided, with feedback stating that a requirement for an independant and external audit will be required when Health direct GWCC to do so.

Appendix C - Full Reservoir Inspection Report 2023/24

For the reporting period 2023/24 no reservoirs were inspected or cleaned by ASAM Divers and as such no inspection reports are available for reporting. However FITT Resources have conducted some inspection of reservoirs and their findings are as follows.

MARINNA RESERVOIR

INSPECTION DETAILS

- Inspected By – Jasper Watt
- Inspected On – Mon 19th Feb 2024

SCOPE OF SERVICES

Scope of services included the following:

- Carry out Visual inspection of the External and Internal surfaces of the Reservoir limited to those parts of the structure that is readily and safely accessible.

- Limited diagnostic testing - Concrete cover meter test, Carbonation drill test and rebound hammer

Tests (approx. 3 tests each) on selected wall locations

- Preparation and submission of Condition Assessment Report including Photos & Rating

The reporting will generically document the Reservoir condition and/or defects and risk issues.

INSPECTION METHODOLOGY

Visual Inspection

A systematic visual inspection on the external wall, internal wall and Floor of the Reservoir was undertaken in an attempt to record locations or features associated with deterioration or distress. The purpose of the visual inspection was both to record the general condition of the structure and also specific defects observed.

Diagnostic Testing

Diagnostic testing i.e. Concrete cover meter test, Carbonation drill test and rebound hammer tests were carried out on selected wall locations.

FINDINGS & OBSERVATIONS

Minor repairs noted as below

- Internal access platform is starting to rust slightly – No action required at this time

Following components appears visually to be in sound condition

- Metal Roof
- Roof Access Hatch
- External Valves & Pipework
- Internal Wall – General
- Internal Wall - Concrete/Reo
- Internal Wall & Floor Joints
- Internal Access Ladder

Diagnostic testing indicated sound results as below

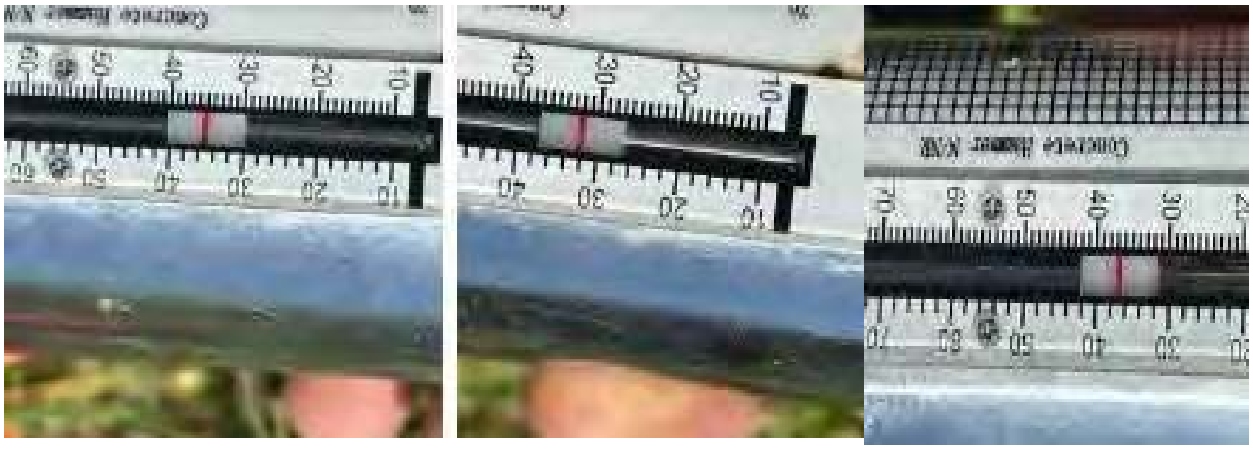
- Carbonation Test – 3 tests - All Pink
- Cover meter Test- 71mm & 67mm
- Rebound hammer Test – 37Mpa, 32Mpa & 36Mpa

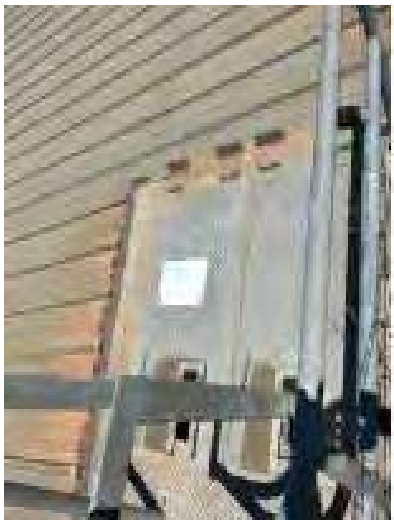
CONDITION ASSESSMENT RATING

SL NO	ITEM DESCRIPTION	DEFECTS	GRADING KEY	REMARKS
1	External Wall - General		6 - N/A	Unable to see external walls – Reservoir is under ground
2	External Wall - Concrete/Reo		6 - N/A	Unable to see external walls – Reservoir is under ground
3	External Access Ladder		6 - N/A	Unable to see external walls – Reservoir is under ground
4	Metal Roof		2 - Good	
5	Roof Access Hatch	Slight Rust Present	2 - Good	First Platform starting to rust
6	External Valves & Pipework		2 - Good	
7	Internal Wall - General		2 - Good	
8	Internal Wall - Concrete/Reo		2 - Good	
9	Internal Wall & Floor Joints		2 - Good	
10	Internal Access Ladder		2 - Good	
11	Internal Pipework		6 - N/A	Unable to see external walls – Reservoir is under ground
12	Floor Inlet & Scour point		6 - N/A	Unable to see external walls – Reservoir is under ground

1- Excellent	No visible defects
2 - Good	Slightly defective or deteriorated components
3 - Fair	Moderately defective or deteriorated components
4 - Poor	Defective or deteriorated components in need of repair/replacement
5 - Bad	Seriously damaged components in need of immediate repair/replacement
6 – N/A	Not Applicable

SITE PHOTOS

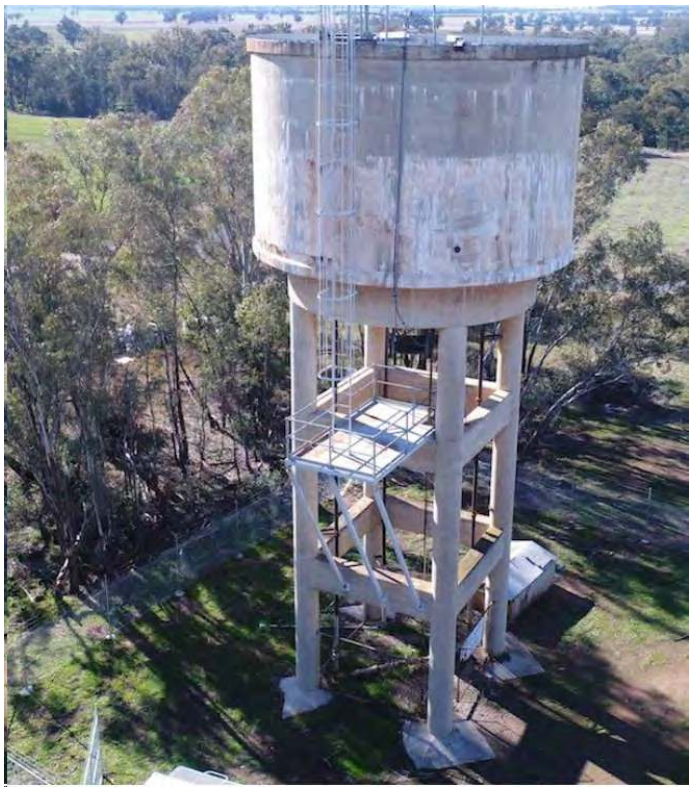




MIRROOL RESERVOIR

INSPECTION DETAILS

- Inspected By – Jasper Watt
- Inspected On – Tuesday 20th February 2024



SCOPE OF SERVICES

Scope of services included the following:

- Carry out Visual inspection of the External and Internal surfaces of the Reservoir limited to those parts of the structure that is readily and safely accessible.

- Limited diagnostic testing - Concrete cover meter test, Carbonation drill test and rebound hammer Tests (approx. 3 tests each) on selected wall locations

- Preparation and submission of Condition Assessment Report including Photos & Rating - The reporting

The reporting will generically document the Reservoir condition and/or defects and risk issues.

INSPECTION METHODOLOGY

Visual Inspection

A systematic visual inspection on the external wall, internal wall and Floor of the Reservoir was undertaken in an attempt to record locations or features associated with deterioration or distress. The purpose of the visual inspection was both to record the general condition of the structure and also specific defects observed.

Diagnostic Testing

Diagnostic testing i.e. Concrete cover meter test, Carbonation drill test and rebound hammer tests were carried out on selected wall locations.

FINDINGS & OBSERVATIONS

Repairs noted as below

- External cross beam is severely damaged and requires repairs
- Injection to stop any water leaks
- External Pipework has dropped slight but no action is required – Council should Reinspect in a year
- Rust Repairs to access platform

Following components appears visually to be in sound condition

- External Access Ladder
- Metal Roof
- Internal Wall – General
- Internal Wall - Concrete/Reo

Diagnostic testing indicated sound results as below,

BOTTOM CROSS BEAM	TOP CROSS BEAM
Carbonation Test – 3 tests- all pink	Carbonation Test – 3 tests- 2- 3mm before pink
Cover meter Test – Front face - 62mm, underside 25mm, 32mm 27mm	Cover meter Test – Front face - 58mm underside 16mm,15mm,14mm
Rebound hammer Test – Front Face Upper side - 56mpa 60mpa, 66mpa	Rebound hammer Test – Front Face 50mpa No rebound test on underside - too damaged

CONDITION ASSESSMENT RATING

SL NO	ITEM DESCRIPTION	DEFECTS	GRADING KEY	REMARKS
1	**External Wall - General**	Significant water leaks	**4 - Poor**	Reservoir was full of water
2	**External Wall - Concrete/Reo**	1 x Cross beam has bad spalling	**5 - Bad**	
3	**External Access Ladder**	Slight Rust present	**2 - Good**	
4	**Metal Roof**		**2 - Good**	
5	**Roof Access Hatch**		**2 - Good**	

6	External Valves & Pipework		3 - Fair	Pipework has dropped slightly
7	Internal Wall - General		2 - Good	
8	Internal Wall - Concrete/Reo		2 - Good	
9	Internal Wall & Floor Joints		6 N/A	Unable to see
10	Internal Access Ladder		6 - N/A	Unable to see
11	Internal Pipework		6 - N/A	Unable to see
12	Floor Inlet & Scour point		6 - N/A	Unable to see

1- Excellent	No visible defects
2 - Good	Slightly defective or deteriorated components
3 - Fair	Moderately defective or deteriorated components
4 - Poor	Defective or deteriorated components in need of repair/replacement
5 - Bad	Seriously damaged components in need of immediate repair/replacement
6 – N/A	Not Applicable

DEFECTS & REPAIRS BASED ON ASSET INSPECTION

Top beam spalling Concrete repairs

- Remove old concreate and blast reo
- Treat exposed reo with Zinc rich Primer
- Reinstate to original level using High strength Repair mortar

Rust Repairs to Platform

- Abrasive Grit Blast and apply anti corrosive Epoxy Primer

Spot Injection on reservoir where needed

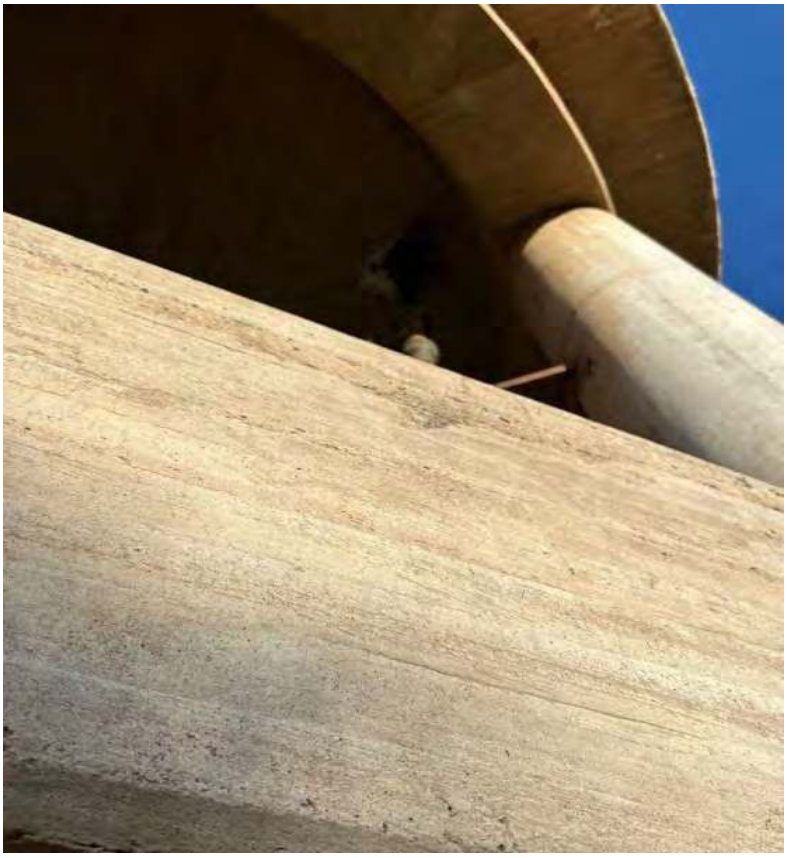
- Carry out Leak Sealing as required using Polyurethane injection

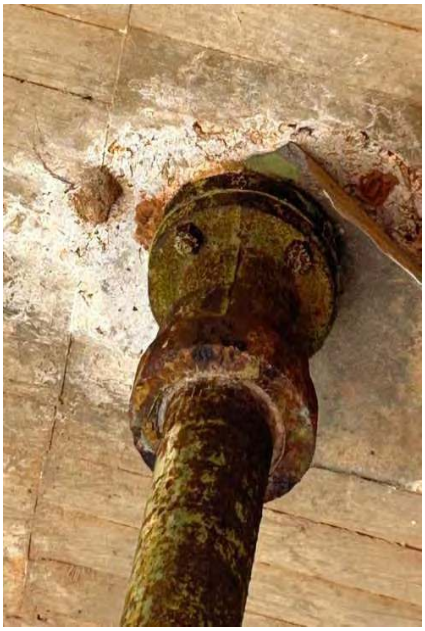
SITE PHOTOS

BOTTOM BEAM

TOP BEAM


10 20 30 40 50 60 70 80 90 100
Concrete Hammer N/NR





Goldenfields Water

Drinking Water Management System

Annual Report 2023/24

TOTALSEAL®

Certified System Quality ISO 9001 SAI GLOBAL

Certified System OHS ISO 45001 SAI GLOBAL

TENANDRA RESERVOIR 1

INSPECTION DETAILS

- Inspected By – Jasper Watt
- Inspected On – Mon 19th February 24

SCOPE OF SERVICES

Scope of services included the following:

- Carry out Visual inspection of the External and Internal surfaces of the Reservoir limited to those parts Of the structure that is readily and safely accessible.

- Limited diagnostic testing - Concrete cover meter test, Carbonation drill test and rebound hammer Tests (approx. 3 tests each) on selected wall locations

- Preparation and submission of Condition Assessment Report including Photos & Rating

The reporting will generically document the Reservoir condition and/or defects and risk issues.

INSPECTION METHODOLOGY

Visual Inspection

A systematic visual inspection on the external wall, internal wall and Floor of the Reservoir was undertaken in an attempt to record locations or features associated with deterioration or distress. The purpose of the visual inspection was both to record the general condition of the structure and also specific defects observed.

Diagnostic Testing

Diagnostic testing i.e. Concrete cover meter test, Carbonation drill test and rebound hammer tests were carried out on selected wall locations.

FINDINGS & OBSERVATIONS

Minor repairs noted as below

- Small cracks and slight water leaking on external walls of Reservoir that require repairs.

Following components appears visually to be in sound condition

- Metal Roof
- Internal Access Ladder
- Metal Roof
- Roof Access Hatch

Diagnostic testing indicated sound results as below

- Carbonation Test – **3 tests - all pink**
- Cover meter Test - **76mm, 51mm, 71mm**
- Rebound hammer Test – **38mpa, 40mpa, 34mpa**

CONDITION ASSESSMENT RATING

SL NO	ITEM DESCRIPTION	DEFECTS	GRADING KEY	REMARKS
1	External Wall - General	Spalling concrete	3 - Fair	
2	External Wall - Concrete/Reo	Small cracks visible	3 - Fair	Reservoir is mostly under ground
3	External Access Ladder		6 – N/A	
4	Metal Roof		2 - Good	
5	Roof Access Hatch		2 - Good	
6	External Valves & Pipework	2 mtr deep MH	3 - Fair	
7	Internal Wall - General	Aggregate exposed moderately	2 - Good	
8	Internal Wall - Concrete/Reo		6 - N/A	Unable To See reservoir is full of water
9	Internal Wall & Floor Joints		6 - N/A	Unable To See reservoir is full of water
10	Internal Access Ladder		2 - Good	
11	Internal Pipework		6 - N/A	Unable To See reservoir is full of water
12	Floor Inlet & Scour point		6 - N/A	Unable To See reservoir is full of water

1- Excellent	No visible defects
2 - Good	Slightly defective or deteriorated components
3 - Fair	Moderately defective or deteriorated components
4 - Poor	Defective or deteriorated components in need of repair/replacement
5 - Bad	Seriously damaged components in need of immediate repair/replacement
6 – N/A	Not Applicable

SITE PHOTOS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Concrete Hammer N/NR


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TENANDRA RESERVOIR 2

INSPECTION DETAILS

- Inspected By – Jasper Watt
- Inspected On – Mon 19th February 2024

SCOPE OF SERVICES

Scope of services included the following:

- Carry out Visual inspection of the External and Internal surfaces of the Reservoir limited to those parts of the structure that is readily and safely accessible.

- Limited diagnostic testing - Concrete cover meter test, Carbonation drill test and rebound hammer Tests (approx. 3 tests each) on selected wall locations

- Preparation and submission of Condition Assessment Report including Photos & Rating

The reporting will generically document the Reservoir condition and/or defects and risk issues.

INSPECTION METHODOLOGY

Visual Inspection

A systematic visual inspection on the external wall, internal wall and Floor of the Reservoir was undertaken in an attempt to record locations or features associated with deterioration or distress. The purpose of the visual inspection was both to record the general condition of the structure and also specific defects observed.

Diagnostic Testing

Diagnostic testing i.e. Concrete cover meter test, Carbonation drill test and rebound hammer tests were carried out on selected wall locations.

FINDINGS & OBSERVATIONS

Minor repairs noted as below

- Leaking observed and Aggregate exposed on external and internal walls of Reservoir that require repairs.

Following components appears visually to be in sound condition

- Metal Roof
- Internal Access Ladder
- Metal Roof
- Roof Access Hatch

Diagnostic testing indicated sound results as below

- Carbonation Test – **3 tests done turned pink**
- Cover meter Test- **64mm, 65mm, 47mm**
- Rebound hammer Test – **48mpa, 40mpa, 46mpa**

CONDITION ASSESSMENT RATING

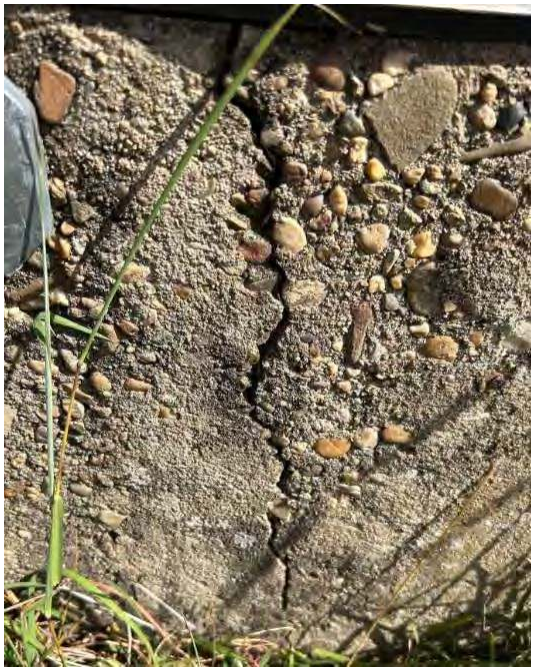
SL NO	ITEM DESCRIPTION	DEFECTS	GRADING KEY	REMARKS
1	**External Wall - General**	Moderate spalling concrete	**3 - Fair**	
2	**External Wall - Concrete/Reo**	Small cracks visible	**3 - Fair**	
3	**External Access Ladder**		**6 – N/A**	
4	**Metal Roof**		**2 - Good**	
5	**Roof Access Hatch**		**2 - Good**	
6	**External Valves & Pipework**		**4 - Poor**	
7	**Internal Wall - General**	Aggregate exposed moderately	**2 - Good**	
8	**Internal Wall - Concrete/Reo**		**6 - N/A**	Unable To See reservoir is full of water
9	**Internal Wall & Floor Joints**		**6 - N/A**	Unable To See reservoir is full of water
10	**Internal Access Ladder**		**2 - Good**	
11	**Internal Pipework**		**6 - N/A**	Unable To See reservoir is full of water
12	**Floor Inlet & Scour point**		**6 - N/A**	Unable To See reservoir is full of water

1- Excellent	**No visible defects**
2 - Good	**Slightly defective or deteriorated components**
3 - Fair	**Moderately defective or deteriorated components**
4 - Poor	**Defective or deteriorated components in need of repair/replacement**
5 - Bad	**Seriously damaged components in need of immediate repair/replacement**
6 – N/A	**Not Applicable**

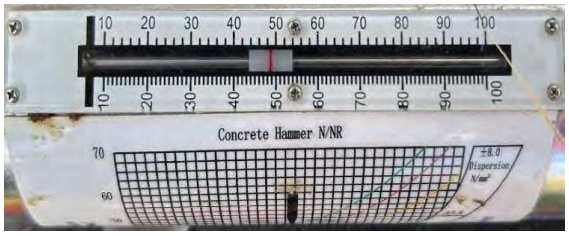
DEFECTS BASED SITE INSPECTION

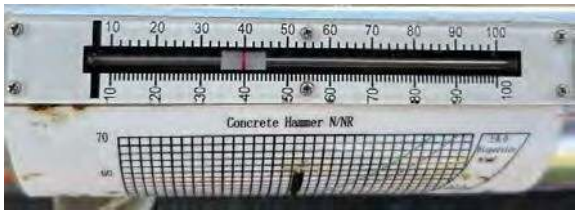
- Spalling Concrete Repairs
- Crack Injection for Water Leaks

SITE PHOTOS



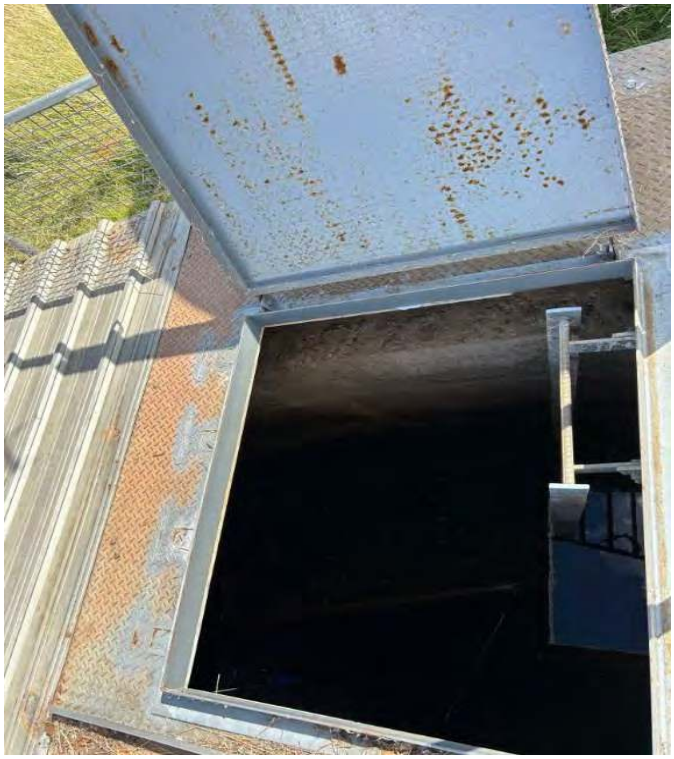

Concrete Hammer N/NR

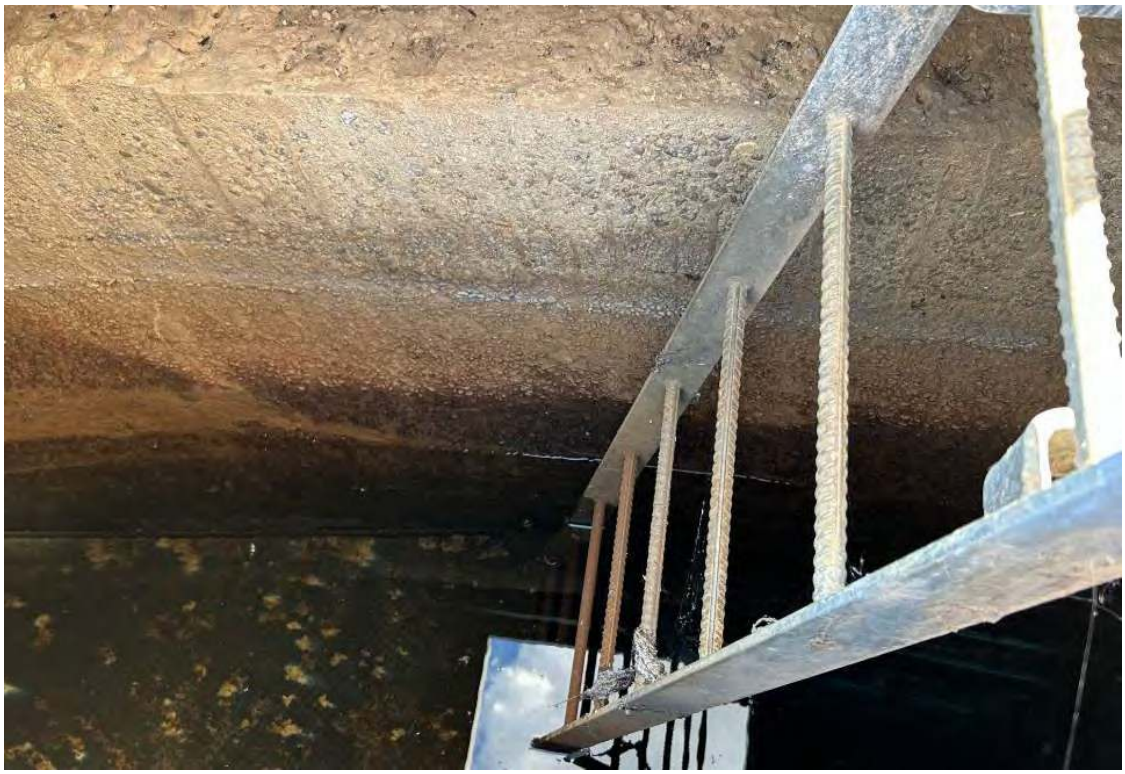

Concrete Hammer N/NR


Concrete Hammer N/NR


65
BAR
ZERO


47
ZERO

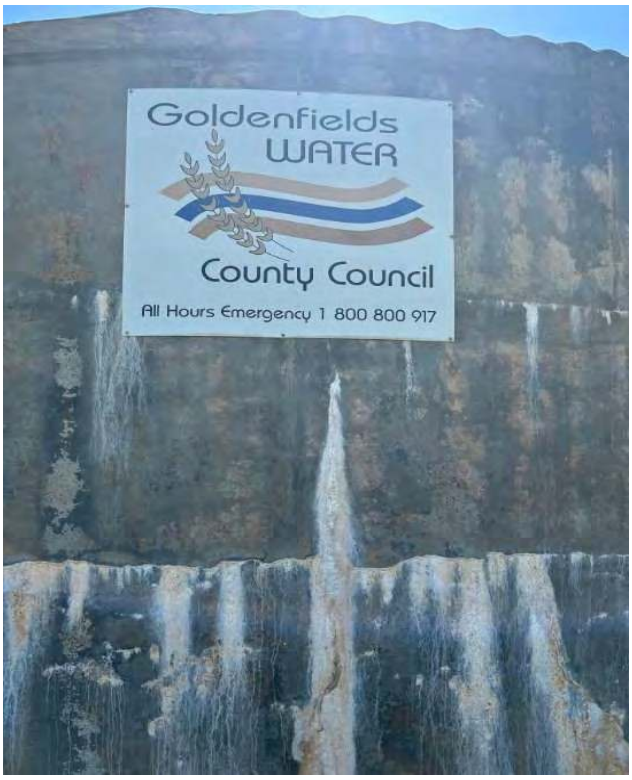




WALLENDBEEN RESERVOIR

INSPECTION DETAILS

- Inspected By – Jasper Watt
- Inspected On – Tuesday 20th February 2024



SCOPE OF SERVICES

Scope of services included the following:

- Carry out Visual inspection of the External and Internal surfaces of the Reservoir limited to those parts of the structure that is readily and safely accessible.

- Limited diagnostic testing - Concrete cover meter test, Carbonation drill test and rebound hammer Tests (approx. 3 tests each) on selected wall locations

- Preparation and submission of Condition Assessment Report including Photos & Rating

The reporting will generically document the Reservoir condition and/or defects and risk issues.

INSPECTION METHODOLOGY

Visual Inspection

A systematic visual inspection on the external wall, internal wall and Floor of the Reservoir was undertaken in an attempt to record locations or features associated with deterioration or distress. The purpose of the visual inspection was both to record the general condition of the structure and also specific defects observed.

Diagnostic Testing

Diagnostic testing i.e. Concrete cover meter test, Carbonation drill test and rebound hammer tests were carried out on selected wall locations.

FINDINGS & OBSERVATIONS

Minor repairs noted as below

- External Wall has various cracks and Leaks that require repairs
- External Access Ladder is rusted and requires rust to be treated
- 4 x Internal roof Beams are very rusted and require repairs
- Internal pipework hooks are rusted and council should replace them soon

Following components appears visually to be in sound condition

- Roof Access Hatch
- Internal Walls

Diagnostic testing indicated sound results as below

- Carbonation Test – **3 tests done - all pink**
- Cover meter Test - **55mm, 47mm, 65mm, 38mm, 43mm, 50mm, 36-66 range**
- Rebound hammer Test – **40 Mpa, 36 Mpa, 44 Mpa, 36 Mpa**

CONDITION ASSESSMENT RATING

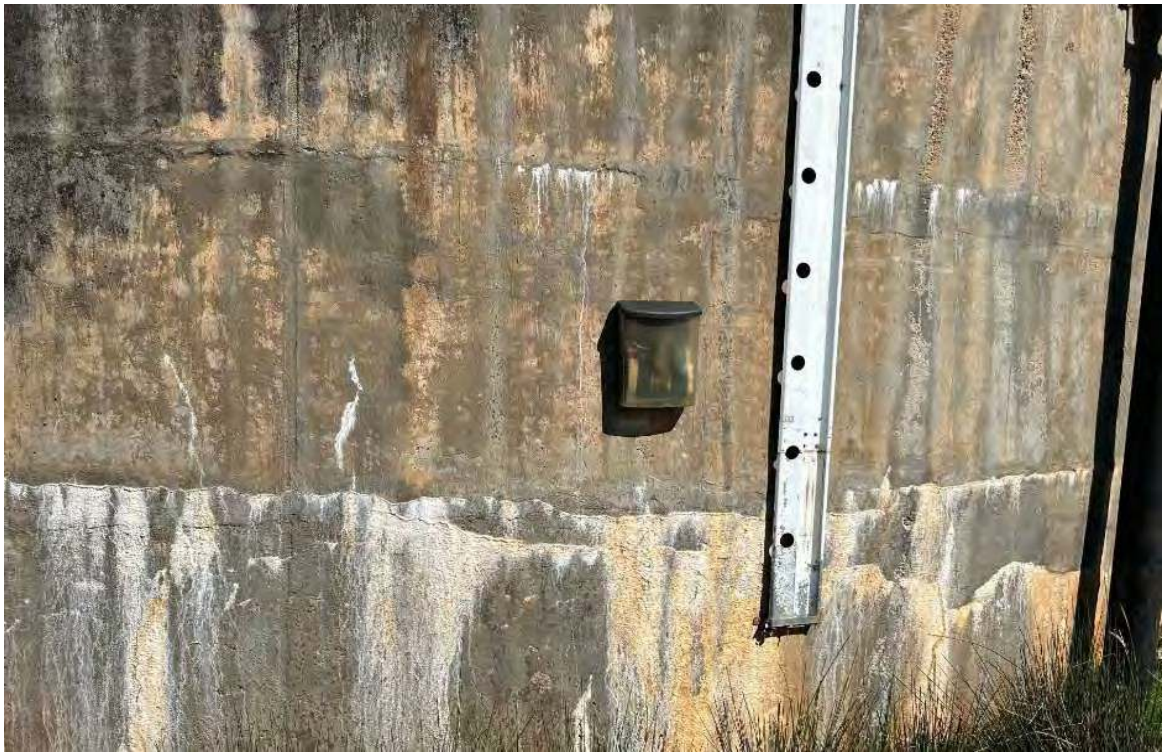
SL NO	ITEM DESCRIPTION	DEFECTS	GRADING KEY	REMARKS
1	**External Wall - General**	Various cracks and Leaks	**4 - Poor**	5 x Leak points
2	**External Wall - Concrete/Reo**		**3 - Fair**	
3	**External Access Ladder**		**6 – N/A**	
4	**Metal Roof**	4 x Internal Beams are Rusted	**5 - Bad**	External roof condition is good
5	**Roof Access Hatch**		**2 - Good**	
6	**External Valves & Pipework**	Slight rust present	**3 - Fair**	
7	**Internal Wall - General**		**2 - Good**	
8	**Internal Wall - Concrete/Reo**		**6 - N/A**	Unable To See reservoir is full of water
9	**Internal Wall & Floor Joints**		**6 - N/A**	Unable To See reservoir is full of water
10	**Internal Access Ladder**		**6 - N/A**	Unable To See reservoir is full of water
11	**Internal Pipework**	Significant Rust present	**4 - Poor**	
12	**Floor Inlet & Scour point**		**6 - N/A**	Unable To See reservoir is full of water

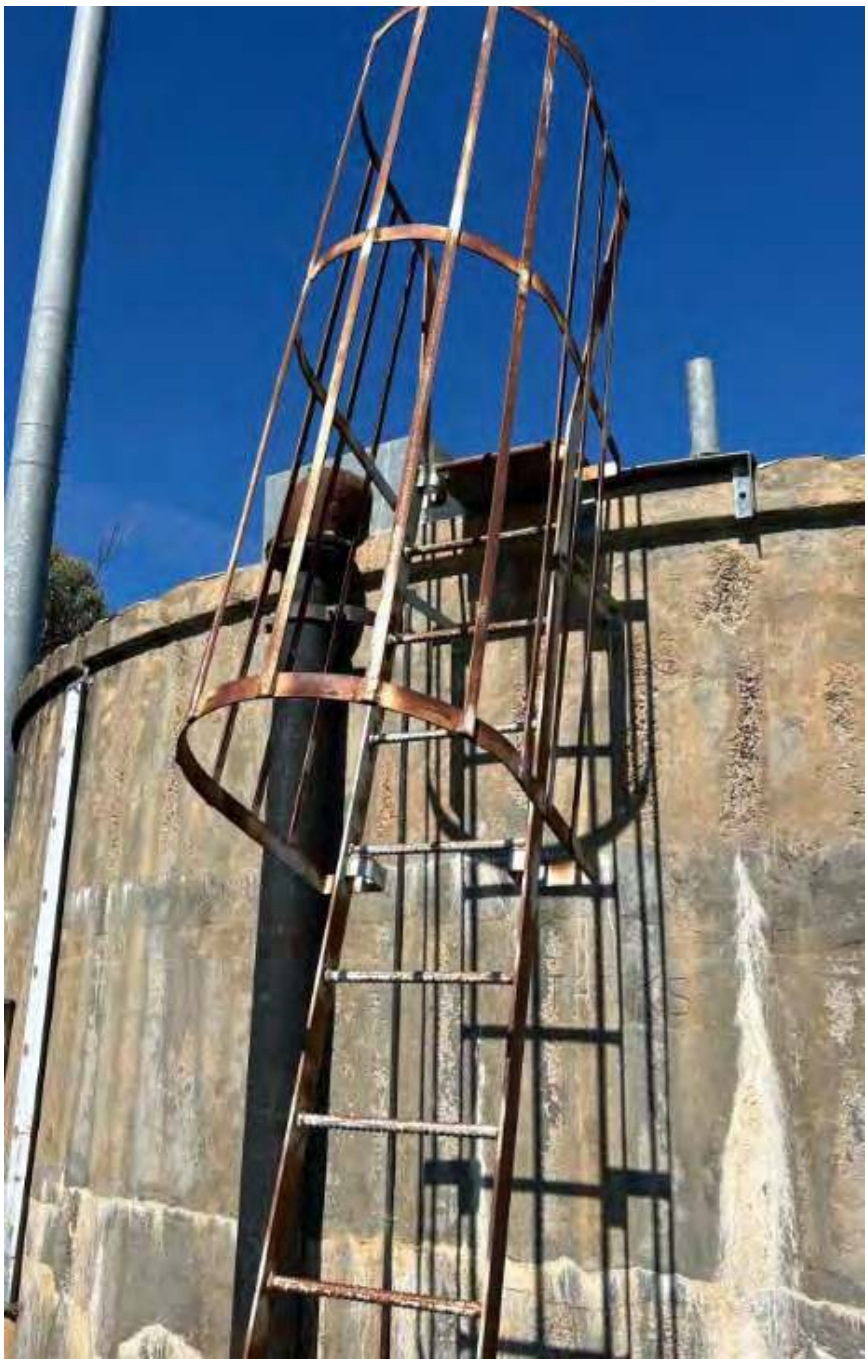
1- Excellent	**No visible defects**
2 - Good	**Slightly defective or deteriorated components**
3 - Fair	**Moderately defective or deteriorated components**
4 - Poor	**Defective or deteriorated components in need of repair/replacement**
5 - Bad	**Seriously damaged components in need of immediate repair/replacement**
6 – N/A	**Not Applicable**

DEFECTS & REPAIRS BASED ON SITE INSPECTION

- **Roof beam Repairs for Rust Damage -** Abrasive Grit Blast and Coat with Anti corrosive coating
- **Crack Injection For Water Leaks -** Carry out Leak Sealing as required using Polyurethane injection

SITE PHOTOS






60


57


47

WATABADGERY RESERVOIR 1

INSPECTION DETAILS

- Inspected By – Jasper Watt
- Inspected On – Wednesday 21st February 2024

SCOPE OF SERVICES

Scope of services included the following:

- Carry out Visual inspection of the External and Internal surfaces of the Reservoir limited to those parts of the structure that is readily and safely accessible.

- Limited diagnostic testing - Concrete cover meter test, Carbonation drill test and rebound hammer - Tests (approx. 3 tests each) on selected wall locations

- Preparation and submission of Condition Assessment Report including Photos & Rating
-

The reporting will generically document the Reservoir condition and/or defects and risk issues.

INSPECTION METHODOLOGY

Visual Inspection

A systematic visual inspection on the external wall, internal wall and Floor of the Reservoir was undertaken in an attempt to record locations or features associated with deterioration or distress. The purpose of the visual inspection was both to record the general condition of the structure and also specific defects observed.

Diagnostic Testing

Diagnostic testing i.e. Concrete cover meter test, Carbonation drill test and rebound hammer tests were carried out on selected wall locations.

FINDINGS & OBSERVATIONS

Minor repairs noted as below

- External Wall has visible cracks that is 4 meters long that need to be repaired
- External Valves & Pipework is slightly rusted

Following components appears visually to be in sound condition

- External Wall - Concrete/Reo
- External Access Ladder
- Metal Roof
- Roof Access Hatch
- Internal Wall - General
- Internal Wall - Concrete/Reo
- Internal Wall & Floor Joints
- Internal Access Ladder
- Internal Pipework
- Floor Inlet & Scour point

Diagnostic testing indicated sound results as below

- Carbonation Test – **3 tests - all pink**
- Cover meter Test- **47mm, 52mm, 64mm**
- Rebound hammer Test – **52mpa, 54mpa, 52mpa**

CONDITION ASSESSMENT RATING

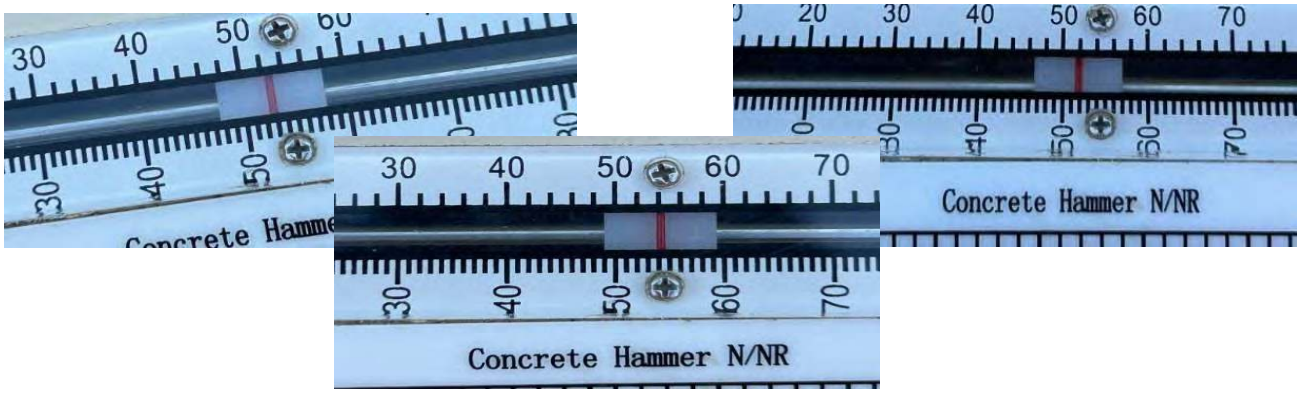
SL NO	ITEM DESCRIPTION	DEFECTS	GRADING KEY	REMARKS
1	External Wall - General	1 large crack is visible	3 - Fair	
2	External Wall - Concrete/Reo		2 - Good	
3	External Access Ladder		2 - Good	
4	Metal Roof		2 - Good	
5	Roof Access Hatch		2 - Good	
6	External Valves & Pipework	Slight rust present	3 - Fair	
7	Internal Wall - General		2 - Good	
8	Internal Wall - Concrete/Reo		6 - N/A	Unable To See reservoir is full of water
9	Internal Wall & Floor Joints		6 - N/A	Unable To See reservoir is full of water
10	Internal Access Ladder		2 - Good	
11	Internal Pipework		6 - N/A	Unable To See reservoir is full of water
12	Floor Inlet & Scour point		6 - N/A	Unable To See reservoir is full of water

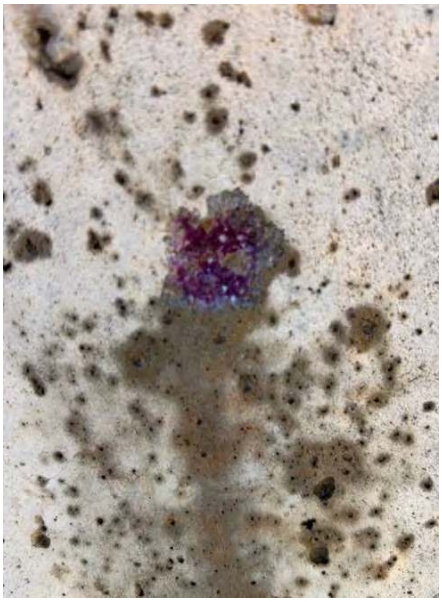
1- Excellent	No visible defects
2 - Good	Slightly defective or deteriorated components
3 - Fair	Moderately defective or deteriorated components
4 - Poor	Defective or deteriorated components in need of repair/replacement
5 - Bad	Seriously damaged components in need of immediate repair/replacement
6 – N/A	Not Applicable

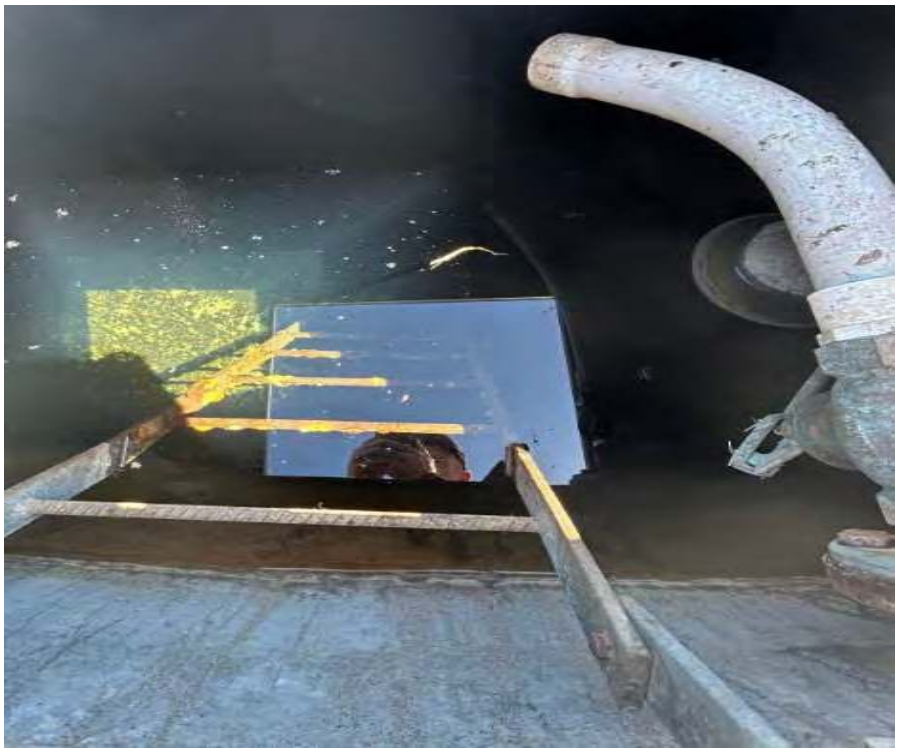
DEFECTS & REPAIRS BASED ON SITE INSPECTION

- **Crack Injection Repairs on External wall -** Carry out Leak Sealing as required using Polyurethane injection
- **Rust Repairs on External Valves & Pipework -** Abrasive Grit Blast and Coat with Anti corrosive coating

SITE PHOTOS







WATABADGERY RESERVOIR 2

INSPECTION DETAILS

- Inspected By – Jasper Watt
- Inspected On – Wednesday 21st February 2024

SCOPE OF SERVICES

Scope of services included the following:

- Carry out Visual inspection of the External and Internal surfaces of the Reservoir limited to those parts of the structure that is readily and safely accessible.

- Limited diagnostic testing - Concrete cover meter test, Carbonation drill test and rebound hammer - Tests (approx. 3 tests each) on selected wall locations

- Preparation and submission of Condition Assessment Report including Photos & Rating

The reporting will generically document the Reservoir condition and/or defects and risk issues.

INSPECTION METHODOLOGY

Visual Inspection

A systematic visual inspection on the external wall, internal wall and Floor of the Reservoir was undertaken in an attempt to record locations or features associated with deterioration or distress. The purpose of the visual inspection was both to record the general condition of the structure and also specific defects observed.

Diagnostic Testing

Diagnostic testing i.e. Concrete cover meter test, Carbonation drill test and rebound hammer tests were carried out on selected wall locations.

FINDINGS & OBSERVATIONS

Minor repairs noted as below

- External Valves & Pipework is slightly rusted

Following components appears visually to be in sound condition

- External Wall
- External Wall - Concrete/Reo
- External Access Ladder
- Metal Roof
- Roof Access Hatch
- Internal Wall - General
- Internal Wall - Concrete/Reo
- Internal Wall & Floor Joints
- Internal Access Ladder
- Internal Pipework
- Floor Inlet & Scour point

Diagnostic testing indicated sound results as below

- Carbonation Test – **3 tests - all pink**
- Cover meter Test- **50mm, 45mm, 46mm**
- Rebound hammer Test – **57mpa, 44mpa, 45mpa**

CONDITION ASSESSMENT RATING

SL NO	ITEM DESCRIPTION	DEFECTS	GRADING KEY	REMARKS
1	External Wall - General		2 - Good	
2	External Wall - Concrete/Reo		2 - Good	
3	External Access Ladder		2 - Good	
4	Metal Roof		2 - Good	
5	Roof Access Hatch		2 - Good	
6	External Valves & Pipework	Slight rust present	3 - Fair	
7	Internal Wall - General		2 - Good	
8	Internal Wall - Concrete/Reo		6 - N/A	Unable To See reservoir is full of water
9	Internal Wall & Floor Joints		6 - N/A	Unable To See reservoir is full of water
10	Internal Access Ladder		2 - Good	
11	Internal Pipework		6 - N/A	Unable To See reservoir is full of water
12	Floor Inlet & Scour point		6 - N/A	Unable To See reservoir is full of water

1- Excellent	No visible defects
2 - Good	Slightly defective or deteriorated components
3 - Fair	Moderately defective or deteriorated components
4 - Poor	Defective or deteriorated components in need of repair/replacement
5 - Bad	Seriously damaged components in need of immediate repair/replacement
6 – N/A	Not Applicable

DEFECTS & REPAIRS BASED ON SITE INSPECTION

- **Rust Repairs on External Valves & Pipework -** Abrasive Grit Blast and Coat with Anti corrosive coating

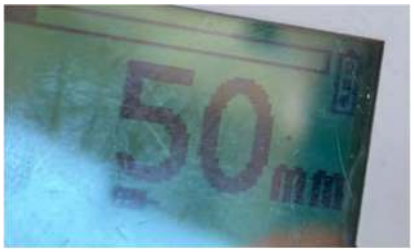
SITE PHOTOS


40
50
60
70


30
40
50
60
Concrete Hammer N/NR


30
40
50
60
Concrete Hammer N/NR


45mm


50mm


46mm

CARTWRIGHTS HILL RESERVOIR

INSPECTION DETAILS

- Inspected By – Jasper Watt
- Inspected On – Mon 19th February 2024

SCOPE OF SERVICES

Scope of services included the following:

- Carry out Visual inspection of the External and Internal surfaces of the Reservoir limited to those parts of the structure that is readily and safely accessible.
- Limited diagnostic testing - Concrete cover meter test, Carbonation drill test and rebound hammer - Tests (approx. 3 tests each) on selected wall locations
- Preparation and submission of Condition Assessment Report including Photos & Rating

The reporting will generically document the Reservoir condition and/or defects and risk issues.

INSPECTION METHODOLOGY

Visual Inspection

A systematic visual inspection on the external wall, internal wall and Floor of the Reservoir was undertaken in an attempt to record locations or features associated with deterioration or distress. The purpose of the visual inspection was both to record the general condition of the structure and also specific defects observed.

Diagnostic Testing

Diagnostic testing i.e. Concrete cover meter test, Carbonation drill test and rebound hammer tests were carried out on selected wall locations.

FINDINGS & OBSERVATIONS

Minor repairs noted as below

- 4 mtr of weeping areas are visible at base of reservoir.
- External surface of the Metal roof and Access hatch is in good condition with few rust spots.
- General corrosion observed on External Pipework and Valves.
- 2 x Support H-Beams causing spalling concrete

Following components appears visually to be in sound condition

- External Access Ladder
- Metal Roof
- Internal Walls
- Internal Concrete/Reo

Diagnostic testing indicated sound results as below

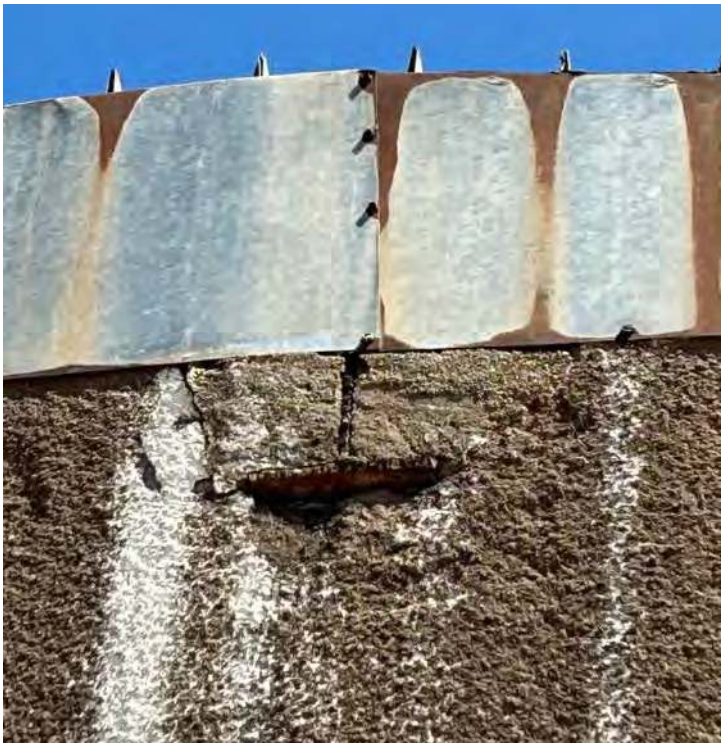
- Carbonation Test – **3 tests - all slightly pink**
- Cover meter Test- **17mm, 24mm, 22mm**
- Rebound hammer Test – **42mpa, 46mpa, 46mpa**

CONDITION ASSESSMENT RATING

SL NO	ITEM DESCRIPTION	DEFECTS	GRADING KEY	REMARKS
1	External Wall - General	Spot leaking around reservoir base	2 - Good	
2	External Wall - Concrete/Reo	2 x Roof Support beams are causing spalling concrete	3 - Fair	
3	External Access Ladder		2 - Good	
4	Metal Roof		2 - Good	
5	Roof Access Hatch	Moderate Rust Present	3 - Fair	
6	External Valves & Pipework	Surface Rust	2 - Good	
7	Internal Wall - General		2 - Good	
8	Internal Wall - Concrete/Reo		2 - Good	
9	Internal Wall & Floor Joints		6 - N/A	Unable To See reservoir is full of water
10	Internal Access Ladder		2 - Good	
11	Internal Pipework		6 - N/A	Unable To See reservoir is full of water
12	Floor Inlet & Scour point		6 - N/A	Unable To See reservoir is full of water

1- Excellent	No visible defects
2 - Good	Slightly defective or deteriorated components
3 - Fair	Moderately defective or deteriorated components
4 - Poor	Defective or deteriorated components in need of repair/replacement
5 - Bad	Seriously damaged components in need of immediate repair/replacement
6 – N/A	Not Applicable

SITE PHOTOS




30
40
50
60
70
Concrete Ham

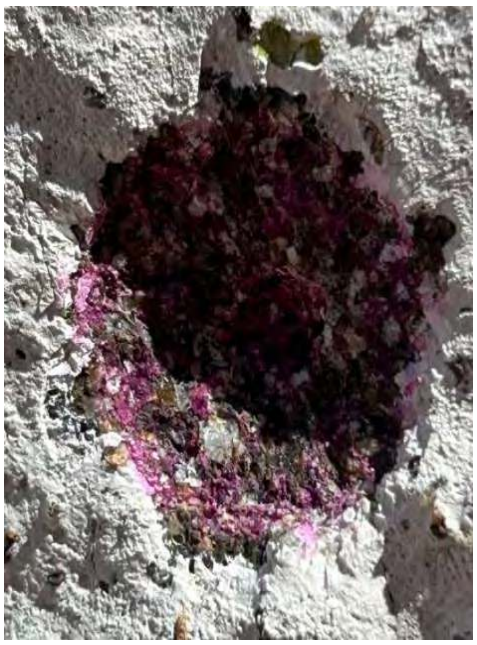

20
30
40
50
60
Concrete Hammer N/NR

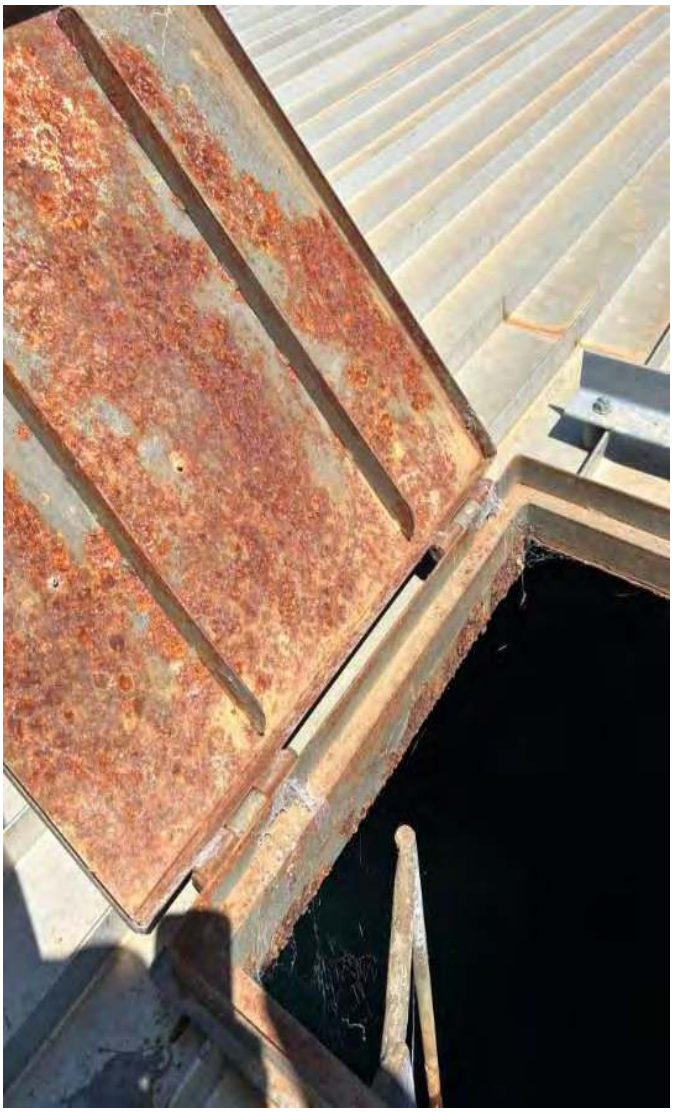

20
30
40
50
60
Concrete Hammer N/NR

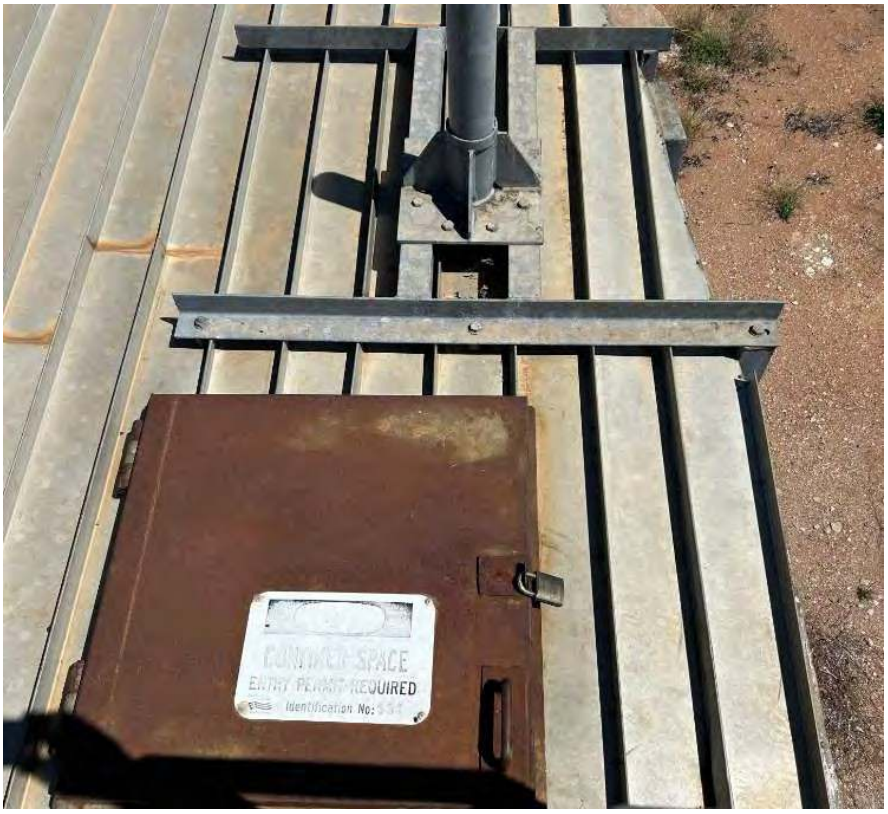

17

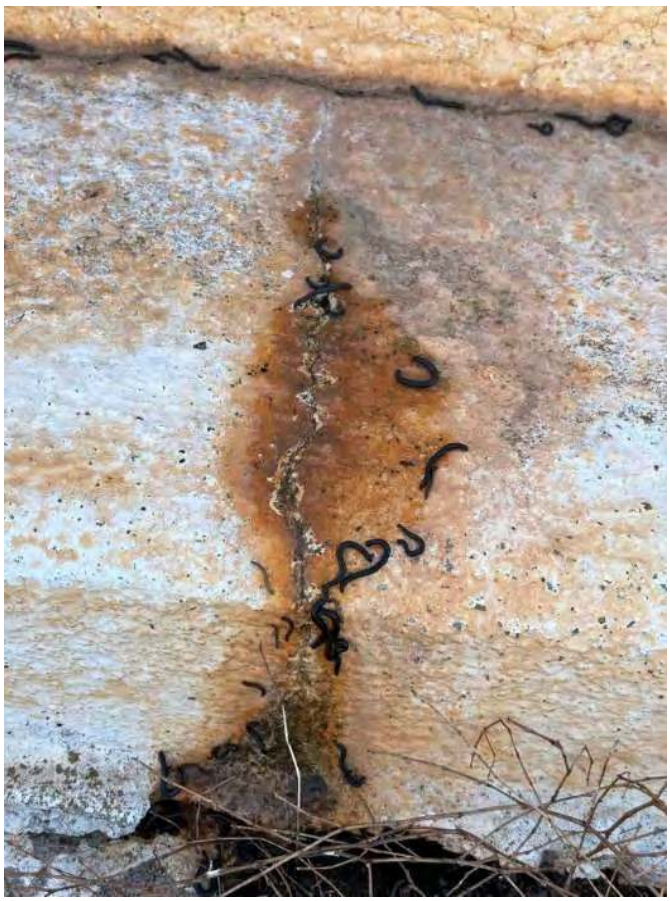

24


22






CONFINED SPACE
ENTRY PERMIT REQUIRED



MATONG RESERVOIR

INSPECTION DETAILS

- Inspected By – Jasper Watt
- Inspected On – Tuesday 20th February 2024

SCOPE OF SERVICES

Scope of services included the following:

- Carry out Visual inspection of the External and Internal surfaces of the Reservoir limited to those parts of the structure that is readily and safely accessible.
- Limited diagnostic testing - Concrete cover meter test, Carbonation drill test and rebound hammer - Tests (approx. 3 tests each) on selected wall locations
- Preparation and submission of Condition Assessment Report including Photos & Rating

The reporting will generically document the Reservoir condition and/or defects and risk issues.

INSPECTION METHODOLOGY

Visual Inspection

A systematic visual inspection on the external wall, internal wall and Floor of the Reservoir was undertaken in an attempt to record locations or features associated with deterioration or distress. The purpose of the visual inspection was both to record the general condition of the structure and also specific defects observed.

Diagnostic Testing

Diagnostic testing i.e. Concrete cover meter test, Carbonation drill test and rebound hammer tests were carried out on selected wall locations.

FINDINGS & OBSERVATIONS

Repairs noted as below

- Construction Joint failed and needs to be repaired

Following components appears visually to be in sound condition

- External Access Ladder
- Metal Roof
- Roof Access Hatch
- External Valves & Pipework
- Internal Wall – General
- Internal Wall - Concrete/Reo

Diagnostic testing indicated sound results as below

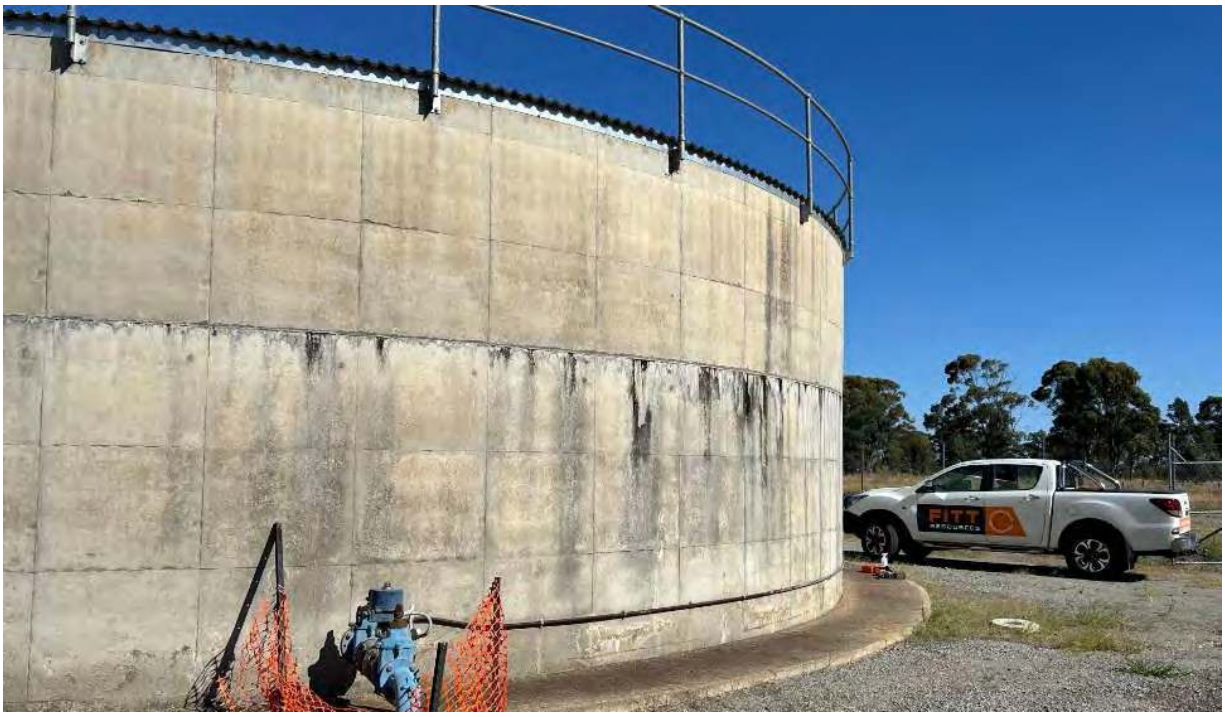
- Carbonation Test – **3 test - 7mm deep - still not pink**
- Cover meter Test – **63mm, 59mm, 66mm**
- Rebound hammer Test – **46mpa, 44mpa, 46mpa**

CONDITION ASSESSMENT RATING

SL NO	ITEM DESCRIPTION	DEFECTS	GRADING KEY	REMARKS
1	External Wall - General		2 - Good	
2	External Wall - Concrete/Reo	Construction Joint failed	4 - Poor	
3	External Access Ladder		2 - Good	
4	Metal Roof		2 - Good	
5	Roof Access Hatch	Slight Rust present	3 - Fair	
6	External Valves & Pipework		2 - Good	
7	Internal Wall - General		2 - Good	
8	Internal Wall - Concrete/Reo		2 - Good	
9	Internal Wall & Floor Joints		6 N/A	Unable to see Reservoir was full of water
10	Internal Access Ladder		6 - N/A	Unable to see Reservoir was full of water
11	Internal Pipework		6 - N/A	Unable to see Reservoir was full of water
12	Floor Inlet & Scour point		6 - N/A	Unable to see Reservoir was full of water

1- Excellent	No visible defects
2 - Good	Slightly defective or deteriorated components
3 - Fair	Moderately defective or deteriorated components
4 - Poor	Defective or deteriorated components in need of repair/replacement
5 - Bad	Seriously damaged components in need of immediate repair/replacement
6 – N/A	Not Applicable

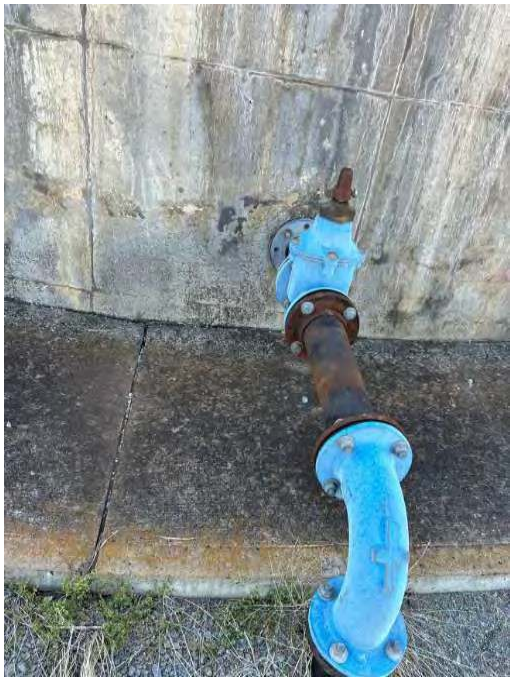
SITE PHOTOS

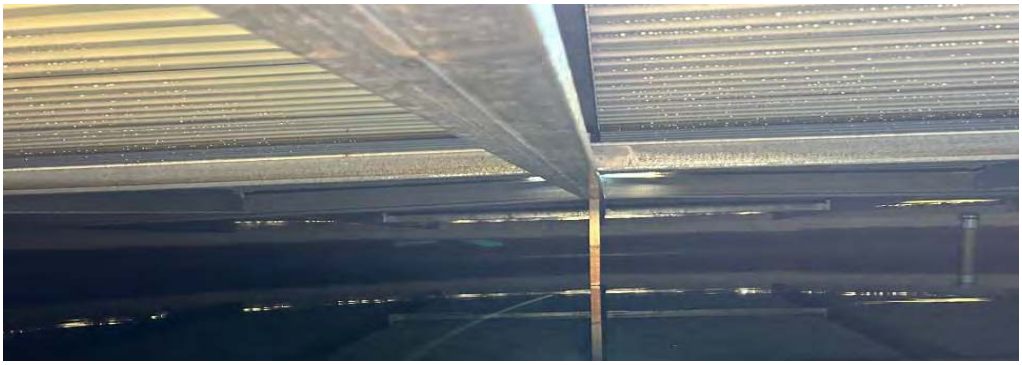

FITT


Concrete Hammer N/NR


Concrete Hammer N/NR


63
66
59





Appendix D - External Auditor Report Summary

Table 44. External auditor report summary

Number	Issue	Risk Rating	Recommendation	Management Response	Responsible Person	Action Date
1	Bulk User Service Level Agreements	Medium	a) Formal service level agreements be developed and implemented for Council's bulk water users; and b) This action be included in the Action and Improvement Plan within the Drinking Water Management System	Staff have submitted a request to Public Health for the engagement of an external facilitator to undertake the development of a new Service Level Agreement between GWCC and its Bulk Customers. Project to commence upon approval from Public Health for funding of the Consultant.	Manager Production & Services	Aug-20
2	Complaints Management	Medium	Investigate options for a complaints handling system that integrates with Council's Asset Management and GIS Systems, and meets the requirements of the framework for the management of drinking water and Council's performance.	Management is unaware if a fully integrated complaints management system exists that could be implemented within GWCC cost effectively. However, Management will seek to improve its current capture of complaints through a more secure reporting system. This could be undertaken through tools such as Civica or WaterOutlook	Manager Corporate Services	Jun-21

Number	Issue	Risk Rating	Recommendation	Management Response	Responsible Person	Action Date
3	Emergency Response Training	Medium	Incident and emergency response plan training be developed and referred to in the Drinking Water Management System and undertaken by relevant employees and external stakeholders.	Management have issued a request for this scenario training to be funded and facilitated through Public Health. If funding and facilitated by Health GWCC will seek to undertake the training as soon as practicably possible. It should be noted that internal training is undertaken annually for emergency response management at the Jugiong Water Treatment Plant as part of Council's Pollution Incident Response Management Plan.	Manager Production & Services	Dec-20
4	Backflow Prevention	Medium	a) The Backflow Prevention Policy be referred to within the Drinking Water Management System; and b) Backflow device register be updated as required in accordance with the Backflow Prevention Policy (PP06).	Staff will include Backflow Prevention commentary within the DWMS Annual Report which is set to be completed and submitted to Council by December 2019.	Manager Production & Services	Ongoing

Number	Issue	Risk Rating	Recommendation	Management Response	Responsible Person	Action Date
5	Water Quality Reporting	Low	Consideration be given to making water quality information publicly available. For example, through the formal reporting to Council meetings, and/or making the DWMS Annual Reporting information available on Council's website.	Staff will submit the Annual DWMS Report to Council for acknowledgment between October and December every year.	Manager Production & Services	Ongoing
6	Drinking Water Management System Review	Low	a) Following the annual review, the Drinking Water Management System be updated to reflect any changes that have been made; and b) Evidence of any review be retained such as meeting minutes, investigative studies, and reports to Council's Senior Management Team and/or Board Members.	As per item 5 above. Staff will submit the Annual report to Council between the October and December period. The report will highlight any issues, modifications and achievements gained throughout the year.	Manager Production & Services	Ongoing

Number	Issue	Risk Rating	Recommendation	Management Response	Responsible Person	Action Date
7	Evaluation and Audit	Low	a) Consult with the Local Public Health Unit to clarify their expectations regarding independent audit requirements; and b) Detail the scope and frequency of the independent audit of the Drinking Water Management System (DWMS) in the DWMS.	Management are constantly engaged with Public Health and have formally requested a recommendation for a fixed auditing period. No fixed period has been provided, with feedback stating that a requirement for an independent and external audit will be required when Health direct GWCC to do so.	Manager Production & Services	Complete

PFAS results in water quality results section

Appendix E: Water Quality Monitoring Program

Below is the 2024 Water Quality Monitoring Program for Pesticides, Comprehensive Chemical and Radiological Analysis for all Drinking Water Schemes

GOLDENFIELDS WATER COUNTY COUNCIL

WATER SAMPLING PROGRAM (JAN. 2024).

PESTICIDE – BI-ANNUAL CHEMICAL ANALYSIS – MONTHLY BORES & ALGAL.

PESTICIDE ANALYSIS.

January ----- 13 Grong Grong
February ----6 Weethalle, 7 Barmedman,8 Calleen.
April ---- All Bores; Oura, Mt Arthur, Mt Daylight and 5 Jugiong W.T.P. Raw Water intake.
July ----9 Ungarie, 11 Wyalong, Hylands Bridge.

BI-ANNUAL CHEMICAL ANALYSIS.

February ---- (424Weethalle allocated sample) 17 Temora retic,19 Barmedman,20 Calleen,21 Ungarie. 22 West Wyalong retic, 23 Wyalong retic.

March ---- 25 Junee retic,26 Barellan, 27 Bethungra, 29 Ganmain,30 Matong, 31 Grong Grong, 32 Stockinbingal and 33 Wallendbeen. (213Coolamon allocated sample)

April ---- 3 Junee B/T No1. inlet, 4 Temora B/T inlet, 5 Wyalong B/T inlet, 12 Ardlethan, 13 Beckom,14 Marrar,15 Aria Park,16 Illabo, (Jugiong c.w.Pump Station outlet allocated sample) 8 Cowangs Reservoir Outlet, 9 Coota Bradman st, 10 Harden Town Meter Offtake,11 Young T/S.

July ----(424Weethalle allocated sample) 17 Temora retic,19 Barmedman,20 Calleen, 21 Ungarie, 22 West Wyalong retic, 23 Wyalong retic.

September ----25 Junee,26 Barellan,27 Bethungra, 29 Ganmain,30 Matong,31 Grong Grong, 32 Stockinbingal and 33 Wallendbeen. (213Coolamon allocated sample)

October ---- 3 Junee B/T No1. inlet, 4 Temora B/T inlet, 5 Wyalong B/T, 12 Ardlethan, 13 Beckom, 14 Marrar, 15 Aria Park, 16 Illabo, (Jugiong c.w. Pump Station outlet, allocated sample) 8 Cowangs Reservoir Outlet, 9 Coota Bradman st, 10 Harden Town Meter Off take, 11 Young T/S.

Oura Pump station outlet, allocated sample collected monthly in conjunction with Fluoride testing.
Jugiong Raw and finish water during poor quality instances in river.
Jugiong monthly river, raw water, clarified, filtered, finished.

Raw Water SAMPLING (comprehensive Chemical)

Monthly - Oura Bores, Matong Bores Mt Daylight Bores,
Six Monthly - Hylands Bridge.
Blue green Algae testing Jugiong, Hylands Bridge seasonal (summer monthly)

RADIOLOGICAL TESTING: - BORES every 2 years. SURFACE WATER every 5 years.

GOLDENFIELDS WATER COUNTY COUNCIL

Microbiological Analysis Sampling 2024

MONTH	DAY	DATE	SOURCE	NUMBERS DELIVERY TO Wagga Wagga	NUMBERS DELIVERY TO Temora	RUN No
JANUARY	WESNESDAY	10	Ariah Park--Coolamon	11	15	1
	WEDNEADAY	17	Young Cootamundra	6	15	1
	WEDNESDAY	17	Temora--Junee	9	21	1
	Wednesday	24	Wyalong--Daylight	8	15	1
	WEDNESDAY	31	Ariah Park--Coolamon	11	15	2
FEBRUARY	WEDNESDAY	7	Young--Cootamundra	6	15	2
	WEDNESDAY	14	Temora--Junee	9	21	2
	WEDNESDAY	14	Wyalong--Daylight	8	15	2
	WEDNESDAY	21	Ariah Park--Coolamon	11	15	3
	WEDNESDAY	28	Young--Cootamundra	6	15	3
MARCH	WEDNESDAY	6	Temora--Junee	9	21	3
	WEDNESDAY	13	Wyalong--Daylight	8	15	3
	WEDNESDAY	20	Ariah Park--Coolamon	11	15	1
	WEDNESDAY	27	Young--Cootamundra	6	15	1
April	WEDNESDAY	3	Temora--Junee	9	21	1
	WEDNESDAY	9	Wyalong--Daylight	8	15	1
	WEDNESDAY	16	Ariah Park--Coolamon	11	15	2
	WEDNESDAY	24	Young--Cootamundra	6	15	2
MAY	WEDNESDAY	1	Temora--Junee	9	21	2
	WEDNESDAY	8	Wyalong--Daylight	8	15	2
	WEDNESDAY	15	Ariah Park--Coolamon	11	15	3
	WEDNESDAY	22	Young--Cootamundra	6	15	3
	WEDNESDAY	29	Temora--Junee	9	21	3
JUNE	WEDNESDAY	5	Wyalong--Daylight	8	15	3
	WEDNESDAY	12	Ariah Park--Coolamon	11	15	1
	WEDNESDAY	19	Young--Cootamundra	6	15	1
	WEDNESDAY	26	Temora--Junee	9	21	1
JULY	WEDNESDAY	3	Wyalong--Daylight	8	15	1
	WEDNESDAY	10	Ariah Park--Coolamon	11	15	2
	WEDNESDAY	17	Young--Cootamundra	6	15	2
	WEDNESDAY	24	Temora--Junee	9	21	2
	WEDNESDAY	31	Wyalong--Daylight	8	15	2
AUGUST	WEDNESDAY	7	Ariah Park--Coolamon	11	15	3
	WEDNESDAY	14	Young--Cootamundra	6	15	3
	WEDNESDAY	21	Temora--Junee	9	21	3
	WEDNESDAY	28	Wyalong--Daylight	8	15	3
SEPTEMBER	WEDNESDAY	4	Ariah Park--Coolamon	11	15	1
	WEDNESDAY	11	Young--Cootamundra	6	15	1
	WEDNESDAY	18	Temora--Junee	9	21	1
	WEDNESDAY	25	Wyalong--Daylight	8	15	1
OCTOBER	WEDNESDAY	2	Ariah Park--Coolamon	11	15	2
	WEDNESDAY	9	Young--Cootamundra	6	15	2
	WEDNESDAY	16	Temora--Junee	9	21	2
	WEDNESDAY	23	Wyalong--Daylight	8	15	2
	WEDNESDAY	30	Ariah Park--Coolamon	11	15	3
NOVEMBER	WEDNESDAY	6	Young--Cootamundra	6	15	3
	WEDNESDAY	13	Temora--Junee	9	21	3
	WEDNESDAY	20	Wyalong--Daylight	8	15	3
	WEDNESDAY	27	Ariah Park--Coolamon	11	15	1
DECEMBER	WEDNESDAY	4	Young--Cootamundra	6	15	1
	WEDNESDAY	11	Temora--Junee	9	21	1
	TUESDAY	17	Wyalong--Daylight	8	15	1

Numbers to Temora local lab will increase with the additions of Mirrool and Mandamah on runs

Additionally Routine Raw Water source testing with Jugiong tested monthly.

NOTE Samples for Health Department are on a four weekly cycle Minor variations will occur due to Laboratory closures etc. samples delivered to Wagga base hospital Greater Murray Water testing Laboratory

Robert Johnson

Senior Hospital Scientist/Microbiology | **NSW Health Pathology**

Wagga Wagga Base Hospital, Edward St, Wagga Wagga NSW 2650

Tel (02) 69336737| Fax (02) 336744 | mailto:robert.johnson@health.nsw.gov.au

Tony Coby

Appendix F: PFAS Sampling Results

Sample Reference 24Jun-0150 = Oura Bore 2

Sample Reference 24Jun-0151 = Oura Bore 3

Sample Reference 24Jun-0152 = Jugiong River

Sample Reference 24Jun-0153 = Jugiong Clear Water

Attention	: MICHAEL GLAZIER	**Sampled By**	: CLIENT
Project Name :			
Your Client Services Manager	: Danny Slee	**Phone**	: 02 9449 0169

Lab Reg No.	Sample Ref	Sample Description
N24/014205	24JUN-0150	WATER 19.06.24
N24/014206	24JUN-0151	WATER 21.06.24
N24/014207	24JUN-0152	WATER 18.06.24
N24/014208	24JUN-0153	WATER 18.06.24

Lab Reg No.		N24/014205	N24/014206	N24/014207	N24/014208	
Date Sampled		19-JUN-2024	21-JUN-2024	18-JUN-2024	18-JUN-2024	
Sample Reference	Units	24JUN-0150	24JUN-0151	24JUN-0152	24JUN-0153	Method
PFAS (per-and poly-fluoroalkyl substances)						
PFBA (375-22-4)	ug/L	<0.05	<0.05	<0.05	<0.05	NR70
PFPeA (2706-90-3)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
PFHxA (307-24-4)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFHpA (375-85-9)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFOA (335-67-1)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFNA (375-95-1)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFDA (335-76-2)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFUdA (2058-94-8)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFDoA (307-55-1)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFTrDA (72629-94-8)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
PFTeDA (376-06-7)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
PFHxDA (67905-19-5)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
PFODA (16517-11-6)	ug/L	<0.05	<0.05	<0.05	<0.05	NR70
FOUEA (70887-84-2)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFDS (335-77-3)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFPeS (2706-91-4)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFHxS (355-46-4)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFHpS (375-92-8)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFOS (1763-23-1)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
PFNS (68259-12-1)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFBS (375-73-5)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFOSA (754-91-6)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
N-MeFOSA (31506-32-8)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
N-EtFOSA (4151-50-2)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
N-MeFOSAA (2355-31-9)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
N-EtFOSAA(2991-50-6)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
N-MeFOSE (24448-09-7)	ug/L	<0.05	<0.05	<0.05	<0.05	NR70

Report No. RN1433795

Lab Reg No.	Units	N24/014205	N24/014206	N24/014207	N24/014208	Method
Date Sampled		19-JUN-2024	21-JUN-2024	18-JUN-2024	18-JUN-2024	
Sample Reference		24JUN-0150	24JUN-0151	24JUN-0152	24JUN-0153	
PFAS (per-and poly-fluoroalkyl substances)						
N-EtFOSE (1691-99-2)	ug/L	<0.05	<0.05	<0.05	<0.05	NR70
4:2 FTS (757124-72-4)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
6:2 FTS (27619-97-2)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
8:2 FTS (39108-34-4)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
10:2 FTS (120226-60-0)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
8:2 diPAP (678-41-1)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
PFBA (Surrogate Recovery)	%	120	126	125	121	NR70
PFPeA (Surrogate Recovery)	%	123	129	133	138	NR70
PFHxA (Surrogate Recovery)	%	122	127	120	123	NR70
PFHpA (Surrogate Recovery)	%	114	124	124	118	NR70
PFOA (Surrogate Recovery)	%	116	119	129	127	NR70
PFNA (Surrogate Recovery)	%	96	108	113	98	NR70
PFDA (Surrogate Recovery)	%	92	101	105	99	NR70
PFUdA (Surrogate Recovery)	%	59	71	82	73	NR70
PFDoA (Surrogate Recovery)	%	43	56	63	52	NR70
PFTeDA (Surrogate Recovery)	%	49	60	63	45	NR70
PFHxDA (Surrogate Recovery)	%	68	80	86	82	NR70
FOUEA (Surrogate Recovery)	%	65	77	79	87	NR70
PFBS (Surrogate Recovery)	%	118	120	114	118	NR70
PFHxS (Surrogate Recovery)	%	116	115	119	127	NR70
PFOS (Surrogate Recovery)	%	106	118	114	125	NR70
PFOSA (Surrogate Recovery)	%	53	79	61	47	NR70
N-MeFOSA (Surrogate Recovery)	%	26	35	28	25	NR70
N-EtFOSA (Surrogate Recovery)	%	24	35	26	24	NR70
N-MeFOSAA (Surrogate Recovery)	%	42	52	56	46	NR70
N-EtFOSAA (Surrogate Recovery)	%	40	54	52	40	NR70
N-MeFOSE (Surrogate Recovery)	%	44	58	43	43	NR70
N-EtFOSE (Surrogate Recovery)	%	43	59	44	42	NR70
4:2 FTS (Surrogate Recovery)	%	109	105	139	120	NR70
6:2 FTS (Surrogate Recovery)	%	92	86	114	111	NR70
8:2 FTS (Surrogate Recovery)	%	75	100	88	85	NR70
8:2 diPAP (Surrogate Recovery)	%	52	69	74	64	NR70
Dates						
Date extracted		3-JUL-2024	3-JUL-2024	3-JUL-2024	3-JUL-2024	
Date analysed		3-JUL-2024	3-JUL-2024	3-JUL-2024	3-JUL-2024	

N24/014205
to
N24/014208

Sample Reference 24May-0309 = Oura Bore 2

Sample Reference 24May-0310 = Oura Bore 4

Client	: CHARLES STURT UNIVERSITY BOOROOMA STREET WAGGA WAGGA NSW 2678	**Job No.**	: CHAR06/240605
		Quote No.	: QT-02257
		Order No.	: PU151787
		Date Received	: 05-JUN-2024
Attention	: MICHAEL GLAZIER	**Sampled By**	: CLIENT
Project Name	:		
Your Client Services Manager	: Danny Slee	**Phone**	:

Lab Reg No.	Sample Ref	Sample Description
N24/012579	24MAY-0309	WATER 30.05.24
N24/012580	24MAY-0310	WATER 30.05.24

Lab Reg No. Date Sampled Sample Reference	Units	N24/012579 30-MAY-2024 24MAY-0309	N24/012580 30-MAY-2024 24MAY-0310			Method
PFAS (per-and poly-fluoroalkyl substances)						
PFBA (375-22-4)	ug/L	<0.05	<0.05			NR70
PFPeA (2706-90-3)	ug/L	<0.02	<0.02			NR70
PFHxA (307-24-4)	ug/L	<0.01	<0.01			NR70
PFHpA (375-85-9)	ug/L	<0.01	<0.01			NR70
PFOA (335-67-1)	ug/L	<0.01	<0.01			NR70
PFNA (375-95-1)	ug/L	<0.01	<0.01			NR70
PFDA (335-76-2)	ug/L	<0.01	<0.01			NR70
PFUdA (2058-94-8)	ug/L	<0.01	<0.01			NR70
PFDoA (307-55-1)	ug/L	<0.01	<0.01			NR70
PFTrDA (72629-94-8)	ug/L	<0.02	<0.02			NR70
PFTeDA (376-06-7)	ug/L	<0.02	<0.02			NR70
PFHxDA (67905-19-5)	ug/L	<0.02	<0.02			NR70
PFODA (16517-11-6)	ug/L	<0.05	<0.05			NR70
FOUEA (70887-84-2)	ug/L	<0.01	<0.01			NR70
PFDS (335-77-3)	ug/L	<0.01	<0.01			NR70
PFPeS (2706-91-4)	ug/L	<0.01	<0.01			NR70
PFHxS (355-46-4)	ug/L	<0.01	<0.01			NR70
PFHpS (375-92-8)	ug/L	<0.01	<0.01			NR70
PFOS (1763-23-1)	ug/L	<0.02	<0.02			NR70
PFNS (68259-12-1)	ug/L	<0.01	<0.01			NR70
PFBS (375-73-5)	ug/L	<0.01	<0.01			NR70
PFOSA (754-91-6)	ug/L	<0.01	<0.01			NR70
N-MeFOSA (31506-32-8)	ug/L	<0.02	<0.02			NR70
N-EtFOSA (4151-50-2)	ug/L	<0.02	<0.02			NR70
N-MeFOSAA (2355-31-9)	ug/L	<0.01	<0.01			NR70
N-EtFOSAA(2991-50-6)	ug/L	<0.01	<0.01			NR70
N-MeFOSE (24448-09-7)	ug/L	<0.05	<0.05			NR70
N-EtFOSE (1691-99-2)	ug/L	<0.05	<0.05			NR70
4:2 FTS (757124-72-4)	ug/L	<0.01	<0.01			NR70

Report No: NW1431729

Lab Reg No.	Units	N24/012579	N24/012580			Method
Date Sampled		30-MAY-2024	30-MAY-2024			
Sample Reference		24MAY-0309	24MAY-0310			
PFAS (per-and poly-fluoroalkyl substances)						
6:2 FTS (27619-97-2)	ug/L	<0.01	<0.01			NR70
8:2 FTS (39108-34-4)	ug/L	<0.01	<0.01			NR70
10:2 FTS (120226-60-0)	ug/L	<0.01	<0.01			NR70
8:2 diPAP (678-41-1)	ug/L	<0.02	<0.02			NR70
PFBA (Surrogate Recovery)	%	106	114			NR70
PFPeA (Surrogate Recovery)	%	99	111			NR70
PFHxA (Surrogate Recovery)	%	104	115			NR70
PFHpA (Surrogate Recovery)	%	104	106			NR70
PFOA (Surrogate Recovery)	%	104	114			NR70
PFNA (Surrogate Recovery)	%	85	88			NR70
PFDA (Surrogate Recovery)	%	72	74			NR70
PFUdA (Surrogate Recovery)	%	55	58			NR70
PFDoA (Surrogate Recovery)	%	49	56			NR70
PFTeDA (Surrogate Recovery)	%	50	52			NR70
PFHxDA (Surrogate Recovery)	%	58	82			NR70
FOUEA (Surrogate Recovery)	%	65	65			NR70
PFBS (Surrogate Recovery)	%	103	111			NR70
PFHxS (Surrogate Recovery)	%	101	105			NR70
PFOS (Surrogate Recovery)	%	81	88			NR70
PFOSA (Surrogate Recovery)	%	48	54			NR70
N-MeFOSA (Surrogate Recovery)	%	33	33			NR70
N-EtFOSA (Surrogate Recovery)	%	32	34			NR70
N-MeFOSAA (Surrogate Recovery)	%	50	49			NR70
N-EtFOSAA (Surrogate Recovery)	%	52	48			NR70
N-MeFOSE (Surrogate Recovery)	%	51	54			NR70
N-EtFOSE (Surrogate Recovery)	%	49	60			NR70
4:2 FTS (Surrogate Recovery)	%	99	97			NR70
6:2 FTS (Surrogate Recovery)	%	92	86			NR70
8:2 FTS (Surrogate Recovery)	%	54	62			NR70
8:2 diPAP (Surrogate Recovery)	%	36	57			NR70
Dates						
Date extracted		12-JUN-2024	12-JUN-2024			
Date analysed		12-JUN-2024	12-JUN-2024			

N24/012579
to
N24/012580

PFOS and PFHxS are quantified using a combined branched and linear standard,

Sample Reference 23 Nov-0048 = Oura Bore 2

Sample Reference 23 Nov-0049 = Oura Bore 3

Sample Reference 23 Nov-0050 = Oura Bore 4

Sample Reference 23 Nov-0051 = Oura Bore 6

Client	: CHARLES STURT UNIVERSITY BOOROOMA STREET WAGGA WAGGA NSW 2678	**Job No.**	: CHAR06/231103/1
		Quote No.	: QT-02232
		Order No.	:
		Date Received	: 03-NOV-2023
Attention	: MICHAEL GLAZIER	**Sampled By**	: CLIENT
Project Name	:		
Your Client Services Manager	: Danny Slee	**Phone**	: 02 9449 0169

Lab Reg No.	Sample Ref	Sample Description
N23/023078	23NOV-0048	WATER 30.10.23
N23/023079	23NOV-0049	WATER 30.10.23
N23/023080	23NOV-0050	WATER 30.10.23
N23/023081	23NOV-0051	WATER 30.10.23

Lab Reg No.		N23/023078	N23/023079	N23/023080	N23/023081	
Date Sampled		30-OCT-2023	30-OCT-2023	30-OCT-2023	30-OCT-2023	
Sample Reference	Units	23NOV-0048	23NOV-0049	23NOV-0050	23NOV-0051	Method
PFAS (per-and poly-fluoroalkyl substances)						
PFBA (375-22-4)	ug/L	<0.05	<0.05	<0.05	<0.05	NR70
PFPeA (2706-90-3)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
PFHxA (307-24-4)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFHpA (375-85-9)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFOA (335-67-1)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFNA (375-95-1)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFDA (335-76-2)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFUdA (2058-94-8)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFDoA (307-55-1)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFTrDA (72629-94-8)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
PFTeDA (376-06-7)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
PFHxDA (67905-19-5)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
PFODA (16517-11-6)	ug/L	<0.05	<0.05	<0.05	<0.05	NR70
FOUEA (70887-84-2)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFDS (335-77-3)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFPeS (2706-91-4)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFHxS (355-46-4)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFHpS (375-92-8)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFOS (1763-23-1)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
PFNS (68259-12-1)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFBS (375-73-5)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
PFOSA (754-91-6)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
N-MeFOSA (31506-32-8)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
N-EtFOSA (4151-50-2)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
N-MeFOSAA (2355-31-9)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
N-EtFOSAA(2991-50-6)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
N-MeFOSE (24448-09-7)	ug/L	<0.05	<0.05	<0.05	<0.05	NR70

REPORT OF ANALYSIS

Report No. RN1410892

Lab Reg No.		N23/023078	N23/023079	N23/023080	N23/023081	
Date Sampled		30-OCT-2023	30-OCT-2023	30-OCT-2023	30-OCT-2023	
Sample Reference	Units	23NOV-0048	23NOV-0049	23NOV-0050	23NOV-0051	Method
PFAS (per-and poly-fluoroalkyl substances)						
N-EtFOSE (1691-99-2)	ug/L	<0.05	<0.05	<0.05	<0.05	NR70
4:2 FTS (757124-72-4)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
6:2 FTS (27619-97-2)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
8:2 FTS (39108-34-4)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
10:2 FTS (120226-60-0)	ug/L	<0.01	<0.01	<0.01	<0.01	NR70
8:2 diPAP (678-41-1)	ug/L	<0.02	<0.02	<0.02	<0.02	NR70
PFBA (Surrogate Recovery)	%	111	108	104	106	NR70
PFPeA (Surrogate Recovery)	%	101	101	101	101	NR70
PFHxA (Surrogate Recovery)	%	115	113	104	115	NR70
PFHpA (Surrogate Recovery)	%	109	105	106	112	NR70
PFOA (Surrogate Recovery)	%	109	108	103	108	NR70
PFNA (Surrogate Recovery)	%	102	97	93	104	NR70
PFDA (Surrogate Recovery)	%	93	98	88	99	NR70
PFUdA (Surrogate Recovery)	%	92	93	84	96	NR70
PFDoA (Surrogate Recovery)	%	83	87	77	88	NR70
PFTeDA (Surrogate Recovery)	%	83	81	72	90	NR70
PFHxDA (Surrogate Recovery)	%	116	106	94	110	NR70
FOUEA (Surrogate Recovery)	%	93	87	78	91	NR70
PFBS (Surrogate Recovery)	%	126	116	111	122	NR70
PFHxS (Surrogate Recovery)	%	117	116	108	117	NR70
PFOS (Surrogate Recovery)	%	119	106	108	107	NR70
PFOSA (Surrogate Recovery)	%	85	93	79	88	NR70
N-MeFOSA (Surrogate Recovery)	%	77	81	71	82	NR70
N-EtFOSA (Surrogate Recovery)	%	76	79	67	82	NR70
N-MeFOSAA (Surrogate Recovery)	%	81	82	68	78	NR70
N-EtFOSAA (Surrogate Recovery)	%	85	81	72	76	NR70
N-MeFOSE (Surrogate Recovery)	%	98	97	90	104	NR70
N-EtFOSE (Surrogate Recovery)	%	90	92	80	93	NR70
4:2 FTS (Surrogate Recovery)	%	121	116	119	122	NR70
6:2 FTS (Surrogate Recovery)	%	106	93	96	102	NR70
8:2 FTS (Surrogate Recovery)	%	100	85	79	88	NR70
8:2 diPAP (Surrogate Recovery)	%	80	81	73	95	NR70
Dates						
Date extracted		10-NOV-2023	10-NOV-2023	10-NOV-2023	10-NOV-2023	
Date analysed		10-NOV-2023	10-NOV-2023	10-NOV-2023	10-NOV-2023	

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to
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