Coliban WATER

2022-2023

Safe Drinking Water Act

Annual Report

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1 Overview

This report, to the Secretary to the Department of Health (DH), has been prepared to satisfy the annual reporting requirement under Section 26 of the *Safe Drinking Water Act 2003* (the Act), for Coliban Water, as a Water Supplier, to produce an annual water quality report.

Coliban Water is one of the major urban water corporations in Victoria. Led by our vision of *Water to Live, Grow and Enjoy*, we manage, maintain and operate 35 reservoirs and water storage basins across North-Central Victoria, and provide water and wastewater services to rural and urban customers across an area of 16,550 square kilometres.

Our service region includes 49 towns, extending from Cohuna and Echuca in the north, to Kyneton and Trentham in the south. The western boundary incorporates Boort, Wedderburn, Bealiba and Dunolly, and the eastern boundary includes Heathcote and Tooborac.

Raw water is sourced from eight individual water supply systems: the Coliban, Campaspe, Wimmera, Loddon, Goulburn and Murray River systems, and two groundwater sources. Coliban Water has 19 water treatment plants (WTPs), providing drinking water to 42 separate water sampling localities. We also have seven regulated water supply systems.

Figure 1: Coliban Water Service Region

Coliban Water is committed to the provision of safe drinking water as outlined in our Drinking Water Quality Policy Statement. This policy statement is reviewed every three years.

Our Drinking Water Quality Policy Statement is as follows:

Drinking Water Quality Policy Statement

This Policy Statement recognises that the region's Traditional Owners have been the custodians of the land and water for thousands of generations. Coliban Water acknowledges that Traditional Owners have unique knowledge and connection to this land and water. We actively seek strong partnerships with Traditional Owners so that our decisions are better informed to help deliver the goals and aspirations that they hold for their culture and country.

Coliban Water is responsible for providing safe, aesthetically pleasing drinking water which consistently meets the *Safe Drinking Water Act 2003* and Safe Drinking Water Regulations 2015. We will work collaboratively with our staff and operational partners to:

1. Manage water quality from catchment to tap through a multiple barrier approach using our Drinking Water Quality Risk Management Plan.
2. Consult and integrate the needs and expectations of our customers into our planning processes.
3. Undertake regular monitoring of the quality of drinking water at barriers and regular reporting to promote confidence in our water supply and its management.
4. Ensure we have and maintain treatment and distribution assets that are capable of delivering safe drinking water now and into the future having regard for climate change related risks.
5. Undertake appropriate contingency planning and have adequate incident response protocols.
6. Be involved in research and development activities to understand emerging water quality issues and performance.
7. Continually improve our water systems management practices in line with the principles set out in the Australian Drinking Water Guidelines 2011.
8. Ensure that our staff and operational partners have the appropriate training to make decisions that ensure our systems are operated to produce and supply safe drinking water to our customers.

We will engage all staff and/or partners involved in the supply of drinking water to implement the policy and continually improve the drinking water quality management system.

Bob Cameron
Board Chairperson

Damian Wells
Managing Director

Effective Date: 12 January 2023

Coliban WATER

1.1 Characterisation of the system

Coliban Water operates various types of water supply systems. Bendigo, Castlemaine and Kyneton are supplied with water harvested from headwork reservoirs on the Coliban River (Upper Coliban, Lauriston and Malmsbury Reservoirs) that are managed by Coliban Water.

Water is transported to Bendigo and Castlemaine by open channel and stored in the Sandhurst and McCay Reservoirs, which are both off-stream storages managed by Coliban Water. Water for Kyneton is supplied via a pipeline direct from Lauriston Reservoir. The three water treatments plants (WTPs) servicing these areas are owned and operated by Bendigo Water Services Pty Ltd (Veolia Water), and treated water is supplied to Coliban Water under a 25-year contract, which commenced in 2001.

Supply to Bendigo is supplemented by water from both Lake Eppalock (a major reservoir on the Campaspe River, managed by Goulburn-Murray Water) and the Waranga Western Channel (Goulburn System, also managed by Goulburn-Murray Water).

WTPs servicing the other 16 systems are owned by Coliban Water and are operated by Service Stream. Service Stream operate the WTPs under an operations and maintenance service contract, which commenced 1 July 2013.

Two of these systems rely on groundwater supplies, and the other systems receive raw water by diversions from either water courses, irrigation channels or pipelines directly managed by Coliban Water, or managed by Grampians Wimmera Mallee Water or Goulburn-Murray Water, as bulk water suppliers to Coliban Water.

For the purposes of the Act, Grampians Wimmera Mallee Water and Goulburn-Murray Water are water storage managers for Coliban Water. The water storage managers work closely with Coliban Water, communicating raw water data regularly, with direct contact when issues are identified, enabling water treatment plant operators to be prepared for managing the changes to raw water.

All raw water supplied to Coliban Water's water treatment plants is sourced from open catchments. All identified catchment risks are included in the risk register that forms part of Coliban Water's Drinking Water Quality Risk Management Plan, and they are managed as required.

The Safe Drinking Water Regulations 2015 requires water suppliers to detail the methodology used to quantify microbial hazards in source waters. Since the introduction of this regulatory requirement Coliban Water has applied the Microbial Health Based Targets manual, developed by Water Services Association of Australia (WSAA), to meet this requirement. This work required all catchments supplying water to water treatment plants to be assessed, together with analysis of raw water data, to identify the appropriate source water category. Each source water category has an associated level of potential pathogen risk that the water treatment plants need to manage. The processes at each water treatment plant are then aligned with the source water category to identify the level of pathogen risk post treatment.

In September 2022, the National Health and Medical Research Council (NHMRC) released an update in the Australian Drinking Water Guidelines (ADWG), Chapter 5 specific to assessing microbial risk. The next microbial review of each WTP will be undertaken applying the ADWG information.

The information from the catchment/source water/treatment plant review enables Coliban Water to identify which of its water treatment plants and their processes may require enhancement to manage the potential pathogen risk in the source water. Where a potential pathogen risk has been identified, options to reduce the risk are assessed, which can result in a treatment plant upgrade, or asset modifications. All of our water treatment plants have critical control points throughout the process, which will firstly alarm the operators if outside the required range, and then stop the process if certain critical limits are exceeded.

Coliban Water also supplies seven townships with water that is classified as Regulated Water, as detailed in Section 6 of the Act (see part 7 of this report for more details). Regulated Water is water that is not intended for drinking, but which could be reasonably be mistaken as drinking water.

1.2 Source water protection

Coliban Water works in partnership with the North Central Catchment Management Authority, local government, Goulburn Murray Water, Grampians Wimmera Mallee Water and Landcare Groups to address issues affecting water quality in the catchments (Coliban, Campaspe, Loddon, Wimmera and Murray River catchments) from where drinking water is sourced.

Our catchments and operational areas are closely managed to ensure we monitor our land for fire and tree hazards, manage our pest plant obligations, whilst also protecting water quality in our storages. We also work to enhance river health and support biodiversity across our lands and catchments.

Through our fire hazard management programs, we take a proactive approach to reducing fuel loads to minimise risks to adjacent landowners, high value assets, as well as public areas. We also work collaboratively with other agencies through regional forums to prepare for upcoming and future fire seasons.

Coliban Water engages with Traditional Owner enterprises such as Djandak (Dja Dja Wurrung Enterprises Pty Ltd) to deliver land and natural resource management outcomes on Country and identify opportunities to work together collaboratively. This includes sensitively managing access to areas around the storages and across sites that contain cultural heritage.

Since the release in February 2015 of our Drinking Water Storages and Land Management Plan, numerous Catchment Works Agreements have been entered into with adjoining landowners, effectively removing stock access from adjoining private property to raw water supplies around the Malmsbury and Upper Coliban Reservoirs. Negotiations with landowners with respect to fencing at Lauriston Reservoir are ongoing, with positive progress being made towards the protection of water quality from 'Catchment to Tap'.

We are responsible for providing statutory and strategic land use planning engagement with municipalities where sewerage is not connected, and we are a determining referral authority under section 55 of the Planning and Environment Act 1987. As part of our role in special water supply catchments, declared under the Catchment and Land Protection Act 1994, we provided responses to planning permit applications referred to us by local government under clause 66.02-5 – 'Special Water Supply Catchment' of the Victorian Planning Provisions and relevant municipal planning schemes.

Our responses provide support to local government, by recommending conditions to applications for the use and development of privately-owned land in open water supply catchments, to ensure minimal impacts on the quality and quantity of water available to the environment and for use in water supply to the townships that we service. We have, on occasions, objected to the issuing of a planning permit, where we consider there is potential for adverse impacts.

In September 2017, former Department of Environment, Land, Water and Planning (DELWP), now Department of Energy, Environment and Climate Action (DEECA), released a Statewide Framework for Catchment Partnership Agreements. The purpose of Catchment Partnership Agreements is to strengthen coordination, collaboration and accountability, reduce duplication, and provide clarity on roles and responsibilities between key catchment management partners. Coliban Water is a partner organisation, established through the Catchment Partnership Agreement, which was signed in June 2018 with the North Central Catchment Management Authority (North Central CMA) and other partner organisations.

In 2023 the Catchment Partner Forum Agreement will be evaluated and reviewed to enable renewal. Our ongoing role as a partner organisation has seen our continued participation on the regional Catchment Partnership Forum and provided us representation on the Steering Committee convened by North Central CMA for the renewal of the North Central Regional Catchment Strategy.

The Memorandum of Understanding (MoU) between Coliban Water and North Central CMA was reviewed and an updated 2021-22 Action Plan that supports the Coliban Water – North Central CMA MoU formulated. It is anticipated the MoU Action Plan will be updated in 2023 following Coliban Water organisation restructure. The MoU enables the protection and enhancement of the beneficial uses of catchment areas and the environment, with a focus on risks to water security from climate change and land-use change. A key action outlined in the MoU addendum Action Plan was the continued development and implementation of the Upper Coliban Catchment Integrated Catchment Management Plan (ICMP).

In addition to the collaborative work undertaken under the MoU, North Central CMA has continued work under the monitoring and maintenance phase of the Kyneton Offsets Project. This includes pest plant management of revegetated sites and replanting of revegetation to ensure an 80% survival rate for planted vegetation. These works are re-establishing riparian zones and will prevent nutrients and pathogens from entering the waterway where the works were undertaken. Floods in October 2022 impacted on various riparian enhancement measures such as fencing and revegetation, with works undertaken to repair and replace affected areas.

The ICMP was developed from work that commenced in 2015/16, in response to various threats facing the Upper Coliban Catchment (UCC). Through active participation by a range of stakeholders, including Djaara, landholders within the catchment, local Landcare groups, local and Victorian government agencies, and Goulburn-Murray Water, the ICMP is a comprehensive analysis of the benefits and costs of protecting and enhancing the UCC. The ICMP is a key step in the delivery of safe drinking water supply and a key principle of 'Catchment to Tap' multi-barrier approach for the production of safe drinking water.

The ICMP will enable the provision of a safe and secure water supply for communities in central and northern Victoria, along with enhanced river, biodiversity and catchment health outcomes. The ICMP has a 20-year horizon, and has been developed around three specific, measurable, achievable, realistic and time-bound goals which address future development pressures, waterway protection and habitat connectivity goals.

Delivery and implementation of the ICMP is through a Coliban Water, North Central CMA and TO Djaara partnership program, now entering its sixth year of operation, called 'A Healthy Coliban Catchment' (AHCC). The commencement of the second pricing period for the AHCC program (PS23) included funding for the operational program, which will support the ongoing implementation of the program for a further five years. The program involves a range of on-ground actions (stock exclusion from waterways, riparian regeneration and revegetation, willow removal) and strategic planning through municipal planning scheme amendments and the development of Environmental Significance Overlay controls to protect and enhance source water supplies.

Whilst the easing of COVID related restrictions made it easier to undertake on-ground works, during the latter half of 2022, on ground works were severely impacted by floods across the region. Catchment restoration staff were redeployed for a six-month period across the region to assist in the flood recovery programs. This resulted in a major reduction in outputs for on-ground works component of the AHCC program. However, the program continued to deliver strong participation in catchment community engagement and workshops through a partner program, Healthy Landscapes, which is designed to help large and small landholders to improve soil health, enhance biodiversity, reduce exposure to climate risk and increase on-farm productivity and resilience.

Whilst the delivery of on-ground works was severely delayed by flood events, interest in the program is still strong. North Central CMA's Project Manager and Catchment Restoration Officer are currently working through a backlog of landholders who wish to participate in the program.

Branded farm gate signage has been produced for distribution to program participants across the Upper Coliban catchment. These are being distributed by North Central CMA's Catchment Restoration Officer.

The table below summarises both the 2022-23 outputs, and the five-year outputs for the AHCC program.

Table 1: 2022/23 and overall outputs for the AHCC program

Activity	Units	2022/23 Outputs	Total Outputs
Fence Installed	km	2	37.35
Weed Control	ha	1.3	296.2
Grazing Management Change	ha	0	117
Native Vegetation Established	ha	7	96.36
Off Stream Watering	OSWP	6	78
Workshops	No. Participants	0	131
Field Days	No. Participants	106	208
Training Events	No. Participants	6	108

1.2.1 Raw water monitoring parameters

The following table details the parameters for which monitoring is undertaken in all the raw water sources from which water is extracted, treated, and then supplied as drinking water. The program is reviewed every year (or more frequently, depending on seasonal conditions). All monitoring is performed by an independent National Association of Testing Authorities, Australia (NATA)-accredited laboratory.

The raw water monitoring is conducted for the purposes of managing risks to the water treatment process. The sampling frequency for each parameter can vary depending on the identified risk for the different raw water, for example *E. coli* is sampled weekly for some locations and monthly for others. The data from the raw water monitoring program does not represent the quality of drinking water supplied to customers.

Table 2: Raw water monitoring parameters and frequency

Group	Parameter	Sampling frequency[1]
Bacteria	Coliforms	Weekly September to April and monthly remainder of year or Monthly or Quarterly
	E. coli	Weekly, Weekly September to April and, monthly remainder of year, Fortnightly, Monthly or Quarterly
	Enterococci	Weekly, Fortnightly or Monthly
Protozoa	*Cryptosporidium*	Weekly, Fortnightly or Monthly
	Giardia	
Physical and chemical	pH	Weekly September to April and, monthly remainder of year or Monthly or Quarterly
	Turbidity	
	Colour	
	Electrical conductivity	
	Alkalinity	Quarterly
	Hardness	
Inorganic	Arsenic	Quarterly
	Cadmium	
	Chromium	
	Cyanide	
	Mercury	
	Nitrate	
	Selenium	
	Sodium	
	Sulphate	
	Chloride	
	Antimony	Quarterly or Annually
	Barium	
	Boron	
	Beryllium	
Organic	MIB	Weekly or Fortnightly September to April and monthly remainder of year or Monthly September to April, or Monthly or Fortnightly
	Geosmin	
	TOC (Total Organic Carbon)	Monthly or Quarterly
Corrosion Products	Iron	Fortnightly or Monthly or Quarterly
	Manganese	
	Copper	Quarterly
	Lead	
	Zinc	
	Nickel	
Cyanobacteria (Blue Green Algae)	BGA count	Weekly – September to April, monthly remainder of the year or Fortnightly – September to April, monthly remainder of the year
	BGA ID	
	Biovolume	
Green Algae	Green Algae	Weekly September to April and monthly remainder of year
Bromide	Bromide	Monthly
Fluoride	Fluoride	Quarterly
Nutrients	Total phosphorus	Weekly September to April and monthly remainder of year
	Total nitrogen	
Organic (Fungicides/Herbicides/Insecticides)	Numerous (refer Appendix B)	Six monthly or Annual

Note:
1 Water sampling localities are assessed individually and the sampling frequencies for each parameter are allocated depending on the risk.

1.3 Water Supply Systems

A summary of general water supply system information is presented in Table 3.

Table 3: Water Sampling Locality, Population, Source Water, Storage & Water Treatment Plant information for 2022-23

Water Sampling Locality	Population supplied[1]	Source Water	Raw Water Storage	Water Treatment Plant (WTP)
Axedale	420	Upper Coliban Reservoir Lauriston Reservoir Malmsbury Reservoir Lake Eppalock Waranga Western Channel	Sandhurst Reservoir	Bendigo WTP
Bendigo Northern	35440			
Bendigo Southern	40410			
Bendigo Spring Gully	12670			
Bendigo Raywood	200			
Bendigo Sebastian	180			
Big Hill	890			
Epsom - Huntly	10510			
Junortoun	3390			
Maiden Gully - Marong	7210			
Strathfieldsaye	7120			
Boort	830	Waranga Western Channel	Boort Basin	Boort WTP
Bridgewater-Inglewood	1360	South West Loddon Pipeline Loddon River	Bridgewater Basins	Bridgewater WTP
Castlemaine	11420	Upper Coliban Reservoir Lauriston Reservoir Malmsbury Reservoir	McCay Reservoir	Castlemaine WTP
Fryerstown	180			
Guildford	270			
Harcourt	1100			
Maldon	1740			
Newstead	810			
Taradale - Elphinstone	500			
Cohuna	2460	Gunbower Creek	Nil	Cohuna WTP
Echuca	15010	Murray River	Nil	Echuca WTP
Elmore	840	Groundwater Bore No.3 Groundwater Bore No.4	Nil	Elmore WTP
Goornong	430	Campaspe River	Goornong Basin	Goornong WTP
Gunbower	340	Taylors Creek	Nil	Gunbower WTP
Heathcote	2220	Caledonia Reservoir Lake Eppalock Waranga Western Channel Upper Coliban Reservoir Lauriston Reservoir Malmsbury Reservoir	Caledonia Reservoir	Heathcote WTP
Tooborac	110			
Korong Vale	210	Grampian Wimmera Mallee Pipeline South West Loddon Pipeline	Korong Vale Basins	Korong Vale WTP
Wedderburn	880			
Kyneton	6590	Lauriston Reservoir Upper Coliban Reservoir	Lauriston Reservoir	Kyneton WTP
Malmsbury	760			
Tylden	320			
Bealiba	150	Loddon River	Nil	Laanecoorie WTP
Dunolly	770			

Water Sampling Locality	Population supplied[1]	Source Water	Raw Water Storage	Water Treatment Plant (WTP)
Laanecoorie	70			
Tarnagulla	190			
Leitchville	380	Gunbower Creek Cohuna Channel	Nil	Leitchville WTP
Lockington	490	Waranga Western Channel	Lockington Basins	Lockington WTP
Pyramid Hill	580	Pyramid Hill Channel	Pyramid Hill Basin	Pyramid Hill WTP
Rochester	2960	Waranga Western Channel Campaspe River	Nil	Rochester WTP
Serpentine	150	East Loddon stock and domestic pipeline	Serpentine Raw Water Tank	Serpentine WTP
Trentham	1510	Groundwater Reservoir 1 and 2	Trentham Reservoir 1 and 2	Trentham WTP

Note:

1 Population is calculated using property connection numbers multiplied by mean household size from the 2021 census.

2 Drinking water treatment processes

2.1 Water treatment

The following table provides a summary of the water treatment processes used to produce drinking water for each water sampling locality[1] and the chemicals that are added during the various water treatment processes. There were no changes to the water sampling localities during 2022/23.

Appendix C contains a more detailed version of the table below.

Table 4: Water treatment processes

Water Sampling Locality	Treatment Plant	Treatment Processes	Added Substances	Comments
Axedale Bendigo Northern Bendigo Southern Bendigo Spring Gully Bendigo Raywood Bendigo Sebastian Big Hill Epsom - Huntly Junortoun Maiden Gully - Marong Strathfieldsaye	Bendigo WTP	Oxidation Coagulation/flocculation Microfiltration Ozonation BAC filtration Fluoridation pH correction Chloramination	Potassium permanganate Carbon dioxide Aluminium chlorohydrate Ozone Hydrofluorosilicic acid Lime Chlorine gas Ammonia	Water mains cleaning was undertaken by changing the chlorine disinfection method from chloramination to chlorination. This program commenced in mid-January 2023, and is anticipated to be completed by October 2023.
Boort	Boort WTP	Coagulation/flocculation Clarification Dual-media filtration pH correction Chlorination	Powdered activated carbon[2] Aluminium sulphate Polyelectrolyte Caustic soda Chlorine gas	
Bridgewater-Inglewood	Bridgewater WTP	Coagulation/flocculation Clarification Dual-media filtration GAC filtration UV radiation pH correction Chlorination/ Chloramination[3]	Sulphuric acid Powdered activated carbon Ultrion Caustic soda Chlorine gas Ammonia	
Castlemaine Fryerstown Guildford Harcourt Maldon Newstead Taradale - Elphinstone	Castlemaine WTP	Coagulation/flocculation Microfiltration Ozonation BAC filtration Fluoridation pH correction Chlorination	Carbon dioxide Aluminium chlorohydrate Ozone Hydrofluorosilicic acid Lime Chlorine gas	

Water Sampling Locality	Treatment Plant	Treatment Processes	Added Substances	Comments
Cohuna	Cohuna WTP	Coagulation/flocculation Clarification Oxidation Dual-media filtration pH correction Chlorination	Powdered activated carbon Caustic soda Aluminium sulphate Polyelectrolyte Chlorine gas Sodium hypochlorite Sodium Fluoride	
Echuca	Echuca WTP	Coagulation/flocculation Clarification Oxidation Dual-media filtration Fluoridation pH correction Chlorination	Powdered activated carbon Caustic soda Aluminium sulphate Polyelectrolyte Hydrofluorosilicic acid Chlorine gas Sodium hypochlorite	
Elmore	Elmore WTP	pH correction UV radiation	Caustic soda	
Goornong	Goornong WTP	Coagulation/flocculation Clarification Sand filtration pH correction Chlorination	Powdered activated carbon[2] Aluminium sulphate Soda ash Sodium hypochlorite	
Gunbower	Gunbower WTP	Ion Exchange Coagulation/flocculation Clarification Microfiltration GAC filtration UV disinfection Chlorination	Powdered activated carbon[2] MIEX resin Aluminium Chlorohydrate Caustic soda Chlorine gas/Calcium Hypochlorite	Chlorination process converted from Chlorine Gas to Calcium Hypochlorite during 2022/23.
Heathcote Tooborac	Heathcote WTP	Coagulation/flocculation Clarification Oxidation Dual-media filtration UV radiation pH correction Chlorination/ Chloramination[3]	Powdered activated carbon (PAC) Caustic soda Aluminium sulphate Sodium hypochlorite Polyelectrolyte Chlorine gas Ammonia	

Water Sampling Locality	Treatment Plant	Treatment Processes	Added Substances	Comments
Korong Vale Wedderburn	Korong Vale WTP	Coagulation/flocculation Clarification Dual-media filtration pH correction Chloramination	Powdered activated carbon[2] Caustic soda Aluminium sulphate Polyelectrolyte Chlorine gas Ammonia	
Kyneton Malmsbury Tylden	Kyneton WTP	Coagulation/flocculation Microfiltration Ozonation BAC filtration Fluoridation pH correction Chlorination	Carbon dioxide Aluminium Chlorohydrate Ozone Hydrofluorosilicic acid Lime Chlorine gas	
Bealiba Dunolly Laanecoorie Tarnagulla	Laanecoorie WTP	Coagulation/flocculation Clarification Oxidation Dual Media filtration UV radiation pH correction Chlorination/ Chloramination[3]	Powdered activated carbon Aluminium sulphate Polyelectrolyte Caustic soda Chlorine gas Ammonia Sodium hypochlorite	
Leitchville	Leitchville WTP	Coagulation/flocculation Clarification Microfiltration pH correction UV radiation Chlorination	Powdered activated carbon Aluminium sulphate Polyelectrolyte Caustic soda Chlorine gas	
Lockington	Lockington WTP	Coagulation/flocculation DAFF pH correction Chlorination	Powdered activated carbon[2] Aluminium Chlorohydrate (ACH) Polyelectrolyte Caustic soda Calcium Hypochlorite	
Pyramid Hill	Pyramid Hill WTP	Coagulation/flocculation Clarification Dual-media filtration pH correction Chlorination	Aluminium sulphate Aluminium Chlorohydrate (ACH) Polyelectrolyte Caustic soda Chlorine gas	

Water Sampling Locality	Treatment Plant	Treatment Processes	Added Substances	Comments
Rochester	Rochester WTP	Coagulation/flocculation Clarification Microfiltration GAC filtration pH correction Chlorination	Aluminium sulphate Chlorine gas Caustic Soda	
Serpentine	Serpentine WTP	Coagulation/flocculation Clarification Dual-media filtration pH correction Chlorination	Aluminium sulphate Polyelectrolyte Caustic soda Chlorine gas	
Trentham	Trentham WTP	Ultrafiltration GAC filtration Chlorination	Chlorine gas/ Calcium Hypochlorite	Chlorination process converted from Chlorine Gas to Calcium Hypochlorite during 2022/23

Note:

1 A water sampling locality is a discrete area of similar water quality.
2 There is no permanent PAC dosing system at these treatment plants; however, there is provision for a mobile PAC dosing system to be added into the process when required.
3 Primary disinfection occurs through chlorination, and then the treated water is chloraminated, to maintain disinfection residual for a longer period of time.

2.2 Improvements to water supply and treatment

The major Water Treatment Plant (WTP) improvement works undertaken in 2022/2023 are captured in Table 5: Water Treatment Plant Key Improvements 2022/2023 below.

Table 5: Water Treatment Plant Key Improvements 2022/2023

Water Treatment Plant	Key Improvement Works
Castlemaine WTP	Membranes replaced as part of standard maintenance
Elmore WTP	Booster pump station and ground level treated water storage tanks installed
Goornong WTP	Clarifier and sludge lagoon were de-sludged
Gunbower WTP	Treated Water Storage improvement project (improve water turnover and reduce potential for short circuiting) Membranes were replaced Chlorine gas was replaced with a ConstantChlor system, which uses Calcium Hypochlorite
Laanecoorie WTP	Powdered Activated Carbon (PAC) system was upgraded, including new batching tank, storage tank and bag rollers
Leitchville WTP	Balance tank replaced with a larger 12.5 kL tank to improve continuity of plant operations
Trentham	Chlorine gas system was replaced with a ConstantChlor system, which uses Calcium Hypochlorite

Across our region, we replaced approximately 5.5 kilometres of water mains as part of our ongoing water mains renewal program, at a cost of just over $1.5 million dollars. The mains were renewed using directional boring, a trenchless technology that reduces the need for excavations and results in overall cost savings of 25 to 50 per cent.

We identify sites for replacement by analysing a range of criteria including the criticality of the main, risks to customers, the number of recorded failures, the number of supply interruptions, the number of customers impacted and the assessed remaining useful life of the asset.

At a cost of approximately $145,000, in excess of 155 kilometres of water mains cleaning was completed in the water sampling localities of Boort, Rochester, Pyramid Hill, Trentham, Bridgewater, Bealiba, Tarnagulla, Tooborac and Malmsbury.

This program removes sediment from the water mains and improves chlorine residuals across our networks using multiple techniques, including air scouring. Air scouring involves forcing a mixture of compressed air and water through the system to remove naturally occurring sediment and other particles. This method of mains cleaning is safe, uses minimal water compared to other methods, and is environmentally friendly.

Our ongoing water mains cleaning program helps protect the integrity of the water system, enhances the drinking water quality we supply to customers and ensures our water continues to meet Australian Drinking Water Guidelines.

The detail in this report is focused on the management of drinking water quality. Coliban Water compiles an Annual Report that encompasses all the business activities, including the business' financial statements, which contains details on Coliban Water's capital expenditure. This report is available on the Coliban Water website.

2.3 Issues

During 2022/23 the drinking water supplied to our customers was of a high standard, except as described below.

Schedule 2 of Victoria's Safe Drinking Water Regulations 2015 (SDWR) lists three specific drinking water quality standards that apply to all drinking water supplies in Victoria: *Escherichia coli* (*E. coli*), Total Trihalomethanes (THM) and Turbidity, all of which have mandated limits, and frequencies for sampling and testing.

During 2022/23 there were five *E. coli* sample results that were non-compliant with the Schedule 2 standard, and two THM results that were non-compliant.

Poor raw water quality (due to flood water) impacted the treatment capability of the Gunbower Water Treatment Plant (WTP), and it was off-line for a period of time in November 2022. During this time, supply for the Gunbower system was maintained by carting treated water to the treated water storage tanks. Regular sampling continued and a non-complaint result for *E. coli* was recorded in samples collected from the elevated storage and also a customer tap site. A boil water advisory (BWA) was put in place until the drinking water was confirmed to be safe. Works undertaken in response to the BWA included the emptying of the elevated storage and completing an inspection of the storage. The raw water was tested and was found to be back within the operational process range for the WTP, and, as such, it was brought back on-line. The network was flushed, and sampling undertaken. The sampling results confirmed the quality of the drinking water and the BWA was removed. An investigation identified the most probable source of contamination was from the water carting supply hose.

The other three non-compliant *E. coli* results were from single samples collected at storage tanks located at Tooborac and Goornong, and a sample collected from a customer tap in Kyneton. In each case, adequate chlorine residuals were confirmed at the sites where the detections were recorded, and in the related networks, and the relevant WTPs were operating as expected.

The tanks were inspected, and no ingress points were identified. The Goornong tank was drained and refilled. Networks were flushed as necessary. Follow-up sampling was completed in all networks, and results confirmed that safe drinking water was being supplied. Investigations were conducted into potential sources of contamination, and each case, no obvious contamination sources were identified.

Section 18 notifications were completed for each *E. coli* non-compliance.

Organics in raw water are a precursor for THM formation. As a result of the flood water entering the Loddon River, the organic levels were higher than normal and resulted in THM formation. The two THM non complaint results were from the Laanecoorie system, which draws its raw water from the Loddon River. One elevated result was recorded at the Laanecoorie contact point within the Laanecoorie WTP, and the other a customer tap site in Tarnagulla, a town supplied from the Laanecoorie WTP. In both instances the treatment processes at the Laanecoorie WTP were checked to ensure that the processes were optimised for precursor removal.

Section 18 notifications were completed for each THM non-compliance.

The SDWR also require that any drinking water that is supplied to customers must not contain any toxin, pathogen, substance or chemical, whether alone or in combination with another toxin, pathogen, substance or chemical, in such amounts that may pose a risk to human health.

There were a few instances where elevated results for some chemicals were recorded during the monitoring of the drinking water that we supply; and the circumstances associated with their detection are described below.

2.3.1 Health Based and Aesthetic Guideline value exceedances

A range of organisms that grow naturally in water bodies can produce substances that can create unpleasant tastes and odours (T&O) in drinking water supplies. The most common of these substances are Geosmin and 2-Methylisoborneol (MIB). While these substances create unpleasant T&Os in drinking water, they do not pose a risk to public health.

Elevated concentrations of these T&O compounds, but primarily Geosmin, were experienced in three of our systems, the Murray, Goulburn and Campaspe River systems, which affected the quality of the drinking water produced.

It is not uncommon for the raw water in these systems to contain Geosmin, but the impact of the floods during 2022 were also a factor. Given that the concentration of Geosmin in the raw water was extremely high, the concentration of Geosmin in the treated drinking water leaving these the WTPs exceeded the T&O threshold of 10 ng/L, which is mentioned in the ADWG, on a couple of occasions during 2022/23. Given the potential for widespread customer complaint to occur as a result of the presence of these compounds in drinking water, DH was proactively notified under the Act. We optimised, and continue to optimise, our water treatment processes to manage these raw water events. The water treatment plants impacted by T&O issues were Boort, Echuca and Goornong WTPs. Section 22 reports were completed and forwarded to DH for all these events. Further detail is included in Section 3.1 - Section 22 Reports.

There were also some other isolated water quality incidents that occurred during the reporting period. The circumstances leading to the events, and actions taken in response, are described below.

2.3.2 Event Incidents reported to Department of Health

A significant water main burst in Heathcote in September 2022, all but draining the treated water storage (TWS) at the Heathcote WTP. The low level of the TWS dropped the pressure across the Heathcote network. The impact that a depressurised main can have is allowing ingress of material into the drinking water being supplied to customers making it potentially unsafe to drink. Coliban Water, in consultation with DH, put in place a Boil Water Advisory (BWA), until the burst main was repaired, flushing of the system was undertaken, and follow-up sampling completed, with test results confirming the water was safe to drink.

During a storm event in Echuca in October 2022, the storm water pumps within the Echuca WTP were unable to keep up with the volume of water onsite, and the excess water flooded the area where the two below ground TWSs are located. The turbidity analyser on one of the TWS indicated storm water had entered it. Coliban Water notified DH of the issue, and a BWA was put in place in consultation with DH. The impacted TWS was immediately isolated from the network, and the other TWS was checked and verified to have not been impacted. The network was flushed, and sampling was undertaken, and once the drinking water was confirmed as being safe to drink, the BWA was lifted. The impacted TWS remained isolated until all corrective actions were completed as per the reinstatement plan and verification monitoring results indicated the drinking water to be safe. The TWS was brought back online in early December 2022.

In late October 2022 maintenance work was undertaken at the Echuca WTP, which required the TWS to be operated at a lower level than normal. As Echuca was operating with only one TWS at the time, it filled faster than normal. This high velocity fill disturbed sediment on the bottom of the tank, causing a high turbidity reading on the Supervisory Control and Data Acquisition (SCADA) system. The tank was inspected externally, and no signs of infiltration were seen, and the operator also looked and listened inside the tank and there were no indications of infiltration. The isolated TWS was checked to ensure it was off-line to verify no cross contamination. Chlorine and turbidity results were verified, and they were found to be within drinking water guideline values. Customers were advised that the colour of their water may not be as clear as normal.

Echuca WTP also had to deal with high manganese in the raw water in late October 2022 (as a result of flood water in the Murray River). The high manganese impacted the colour of the drinking water, triggering some customer complaints. The water treatment process was enhanced to manage manganese, and customers were advised of the situation via the website and social media.

Flood water also impacted the raw water quality for the Cohuna WTP. This poor raw water quality significantly reduced the production of drinking water. To manage the volume of drinking water available, supply to the outlining rural areas was restricted, which lead to depressurisation of their systems. Considering the risk of contamination of the drinking water as a result of the depressurisation, a BWA was put in place for the areas impacted. Following process optimisation at the WTP, and an increase in water production, the depressurised systems were flushed, and sampling completed. When confirmation from the samples that the drinking water was safe to drink the BWA was removed.

In February 2023, the initial response to a burst main in Bealiba indicated the water main would need to be shutdown to repair. Shutting down the water main would lead to depressurised system and the potential for contamination to

occur. The repair crew were able to complete the repair and maintain positive pressure, therefore, avoiding the depressurisation of the system. As part of standard repair practice, the main was flushed and chlorine sampling completed to verify water quality.

A significant water main in Kyneton burst, which caused the level of the TWS at the Kyneton WTP to be extremely low, which dropped the pressure across the network to effectively zero. As a result of this depressurisation, the possibility of contamination was identified, leading to a BWA being implemented for Kyneton and Malmsbury, as both were being supplied drinking water from the Kyneton WTP during this time. Following the main being repaired, and the TWS filling, network flushing was completed, followed by sampling. The water quality sample results confirmed the water quality, and the BWA was lifted.

DH were advised of these events and a Section 22 report was submitted for each event, refer Section 3.1 for more details.

2.3.3 Fluoride Notifications

DH was notified of the following fluoride shutdowns during 2022/23, as the fluoride concentration in the drinking water was less than 0.6mg/L for a continuous period of >72 hours. Details of each shutdown are detailed below:

1. The Echuca WTP fluoride system shut down on Saturday 26 November 2022 with the system showing a mass balance fault. The system was restarted with the drinking water fluoride concentration reaching 0.6mg/L by 4.00pm Tuesday 29 November 2022. It was considered to be a programming issue, with a programmer tasked to investigate. The programmer did not identify any issues and this fault has not been seen again. This shutdown was notified to the Department of Health within 24 hours of the issue occurring.

2. A blockage in the fluoride line caused the Echuca fluoride system to shut down on 18 February 2023. The system was reset and then restarted on both 20 February and 21 February 2023 but faulted both times after a few hours. The pump was identified as the issue, with a temporary pump installed and system back online on 24 February. A new pump was ordered and has been installed, together with a dampener and a replacement of dosing line. This shutdown was notified to the Department of Health within 24 hours of the issue occurring.

3. Late Friday evening of 9 June 2023, the fluoride concentration in the drinking water within the Echuca WSL dropped below 0.6mg/L. The on-call operator attempted to restart the fluoride system, but this was unsuccessful. On Tuesday 13 June 2023 a blocked filter on the fluoride analyser was identified as the primary cause, together with a slight leak on the dosing pump. Both these issues were fixed, and the fluoride system restarted. Due to internal communication issues, notification to the Department of Health was not within the required 24 hours of the issue occurring.

The shutdowns, as outlined above, affected the rolling annual average fluoride concentration in the drinking water supplied to the Echuca network, which is highlighted in the Table 12 Fluoride-WTP exit/storage points for 2022-23, and Table 32 Fluoride-Customer Tap Sites 2022-23.

3 Emergency Incident and Event Management

Many towns throughout Coliban Water's region of operation were significantly impacted by extreme weather events and flooding that occurred in October and November 2022. Throughout the associated emergency we remained committed to the delivery of drinking water to our customers.

For more than 65 days, a 24/7 incident team worked hard to ensure the safety of both our customers and employees, priortising the protection of assets and the environment to achieve the best community outcomes. During this time, there were several water quality events that required notification to DH.

Sections 3.1 and 4.1 include all Section 22 reports and Section 18 notifications that were made to DH during 2022-23.

3.1 Section 22 Reports

The following reports were made to the Water Unit of DH under Section 22 of the Act. Fifteen Section 22 reports were submitted to DH, and all were submitted within the required timeframe.

Table 6: Section 22 Reports 2022/23

Water sampling locality/date	Nature of Incident	Actions taken in response to the incident
Potential widespread customer complaints relating to taste and odour issues		
Boort 19/07/2022	• A range of organisms that grow naturally in water bodies can produce substances that can create unpleasant tastes and odours (T&O) in drinking water supplies. • The most common of these substances are geosmin and 2- Methylisoborneol (MIB). • While these substances create unpleasant tastes and odours in drinking water, they do not pose a risk to public health. • Elevated concentrations of these T&O compounds, but mainly Geosmin, were impacting the Boort Basin (Boort Water Treatment Plant (WTP) source water). • The concentration of T&O compounds in the raw water exceeded the capacity of the treatment process to fully remove them. • The treated water leaving the WTP containing geosmin at a concentration above the T&O threshold (10 ng/L), that is mentioned in the ADWG. • This occurred on a few occasions during July and August 2022.	Corrective actions: • The plant consists of a Powdered Activated Carbon (PAC) dosing system to reduce T&O compounds, which, at the time, was off-line and being repaired. • Management of the T&O issue was achieved by completing repairs to the PAC dosing system and ensuring it was optimised.

Water sampling locality/date	Nature of Incident	Actions taken in response to the incident
Potential widespread customer complaints relating to taste and odour issues		
Boort 03/11/2022	• Elevated concentrations of Taste & Odour (T&O) compounds, but mainly geosmin, impacted the Boort Basin, which was the source water for Boort Water Treatment Plant (WTP) at this time. • The concentration of T&O compounds in the raw water exceeded the capacity of the treatment process to fully remove them. • The treated water leaving the WTP exceeding the T&O threshold (10 ng/L), mentioned in the ADWG.	<u>Corrective actions:</u> • The WTP treatment process (PAC) was optimised. • The community was informed via Coliban Water's website, a media release and social media. • As the aesthetically pleasing taste of the drinking water was impacted, a drinking water supply trailer was located in the town for the general public to use, with 24 hours access. <u>Preventative measures</u> • Investigations were undertaken to identify the source, and it is believed to be from a cyanobacterial (BGA) bloom. • The raw water basin was treated to reduce BGA cells numbers and the geosmin concentration.
Goornong 12/12/2022	• Elevated concentrations of Taste & Odour (T&O) compounds, but mainly geosmin, were impacting the Goornong Basin, which was the source water for Goornong Water Treatment Plant (WTP). • The concentration of T&O compounds in the raw water exceeded the capacity of the treatment process to fully remove them. • The treated water leaving the WTP exceeding the T&O threshold (10 ng/L), mentioned in the ADWG.	<u>Corrective actions:</u> • The available PAC dosing system was optimised. • The clarifier at the WTP was drained and cleaned. • As the aesthetically pleasing taste of the drinking water was impacted, a drinking water supply trailer was located in the town for the general public to use, with 24 hours access
Echuca 12/01/2023	• Elevated concentrations of Taste & Odour (T&O) compounds, but mainly geosmin, were impacting the Murray River which is the source water for Echuca Water Treatment Plant (WTP). • The concentration of T&O compounds in the raw water exceeded the capacity of the treatment process to fully remove them • The treated water leaving the WTP exceeding the T&O threshold (10 ng/L), mentioned in the ADWG.	<u>Corrective actions:</u> • The PAC system was run to capacity. • Communication to public was via Coliban Water's website, social media, and ABC radio (who had made direct enquiry).

Water sampling locality/date	Nature of Incident	Actions taken in response to the incident
Low pressure related events		
Heathcote 29/09/22	• A significant water main break, all but drained the treated water storage (TWS). • The low level of water in the TWS dropped the pressure across the Heathcote distribution network. • A Boil Water Advisory (BWA) was put in place due to the network being depressurised • A depressurised system possibly leading to ingress in the network potentially making drinking water unsafe.	<u>Corrective actions:</u> • Supply from TWS was shut off while the broken main was repaired. • Network was flushed following completion of the repair. • Network sampling was undertaken to confirm the drinking water was safe. • Verified that the pressure in the network was back to normal operation. • Consulted with DH following review of sampling results and network pressure information, enabling the lifting of the BWA.
Bealiba 09/02/2023	• Initial response to a Burst Main was that the water main would be required to be shut down, leading to a potential depressurised system.	<u>Corrective actions:</u> • Repair was completed and positive pressure was maintained. • As per standard practice for a burst main, flushing was undertaken, and chlorine sampling was also undertaken.
Kyneton & Malmsbury 11/04/2023	• A significant water main break in Kyneton drained the treated water storage (TWS) at the Kyneton WTP. • The low level of water in the TWS dropped the pressure across the network to effectively zero. • A BWA was put in place due to depressurised network, impacting both Kyneton and Malmsbury (Kyneton WTP supplies both these towns) • A depressurised system can possibly lead to ingress in the network potentially making drinking water unsafe.	<u>Corrective actions:</u> • The water main break was rectified. • The TWS level returned to normal supply level. • Flushing of the Kyneton and Malmsbury networks was completed • Network sampling was completed to confirm drinking water was safe. • Verified that the pressure in the network was back to normal operation. • Consulted with DH following review of sampling results and network pressure information, enabling lifting of the BWA • Public communicated was via Coliban Water's website, social media, SMS messaging, media releases and messaging via the Vic Emergency App.

Water sampling locality/date	Nature of Incident	Actions taken in response to the incident
Flood event impact		
Echuca 13/10/2022	• The stormwater pumps within the Echuca WTP were unable to keep up with the amount of water flowing across the site (specifically at one location) • This area was adjacent to where the below ground treated water storages are located, • Turbidity data indicated stormwater had entered one of the treated water storages. • A BWA was put in place as there was potentially unsafe drinking water being supplied to customers.	<u>Corrective actions:</u> • The impacted tank was immediately isolated. • Flushing of the network was undertaken. • Chlorine and turbidity sampling was undertaken at the contact point at the WTP and customer tap sample points across the Echuca WSL. • Water sampling results confirmed the water was safe to drink. • Consulted with DH following review of sampling results information, enabling lifting of the BWA • A tank reinstatement plan was developed and implemented. • Tank brought back on-line in early December 2022. <u>Preventative measures</u> • Stormwater drainage pit size to be verified • Additonal pumps installed.
Echuca 27/10/2022	• Flood water in the Murray River was high in manganese, • Colour of the drinking water triggered some customer complaints.	<u>Corrective actions:</u> • The water treatment process was enhanced to manage manganese and optimise its removal. • Customers were communicated to via Coliban Water's website and social media channels (Facebook & Twitter)
Cohuna 8/11/2022	• Significant rainfall events and resulting floods occurred in October/November 2022, which impacted the raw water supplied to the Cohuna WTP. • Treated water production was significantly reduced, impacting the volume of drinking water that could be produced. • A BWA was put in place for outlining rural areas, where supply was restricted, which led to the depressurisation of their systems • A depressurised system can possibly lead to ingress in the network potentially making drinking water unsafe.	<u>Corrective actions:</u> • Processes at the WTP were optimised. • Following WTP production stabilising, the depressurised networks were flushed, and water samples obtained. • Water sampling results confirmed the water was safe to drink. • Consulted with DH following review of sampling results information, enabling lifting of the BWA • Impacted customers were advised via letter drop. • Community information was via Coliban Water's website, social media, SMS messaging, and media statements.

Water sampling locality/date	Nature of Incident	Actions taken in response to the incident
***E. coli* related events**		
Gunbower 15/11/2022	• A routine sample collected from the Gunbower elevated tank and customer tap in the Gunbower WSL were positive for the presence of *E. coli* (tank 13 cfu/100mL, customer tap 19 cfu/100mL). • The *E. coli* detection was most likely the result of contamination from a water carting supply hose. • In response, a BWA was put in place for the town.	<u>Corrective actions:</u> • The WTP tanks were booster chlorinated with hypochlorite solution. • The elevated tank was emptied, and an inspection completed. • A booster chlorinator trailer dosed hypochlorite solution just downstream of the elevated storage into the network. • The raw water was assessed and was found to be back within the operational envelope for the water treatment plant, and this enabled recommencement of the operation of the WTP, eliminating the requirement to cart water. • Water mains were flushed • Sampling completed to confirming the drinking water was safe. • Consulted with DH following review of sampling results information, enabling lifting of the BWA • Communication was via media statements, SMS, social media, Vic Emergency App, Website, and some door knocking.
Tooborac 12/01/2023	• A routine sample collected from the Tooborac contact point was positive for the presence of *E. coli* (1 cfu/100mL). • There was no source of contamination identified.	<u>Corrective actions:</u> • The chlorine residual was verified. • Operational data for the Heathcote WTP (which supplies the Tooborac WSL) was reviewed to ensure there had been no issues at the WTP. • The break tank (located between Heathcote and Tooborac) and the Tooborac tanks were inspected for any signs of contamination, with none being found. • Tooborac's water mains were flushed, and sampling undertaken. • All samples collected verified safe drinking water was being supplied.
Kyneton 22/03/2023	• A routine sample collected from a Kyneton customer tap site was positive for the presence of *E. coli* (1 cfu/100mL). • There was no source of contamination identified.	<u>Corrective actions:</u> • The chlorine residual was verified. • Operational data for the Kyneton WTP was reviewed to ensure there had been no issues at the plant. • The customer tap site, together with one upstream and one downstream were sampled, with zero *E. coli* results at all sites. • Following sampling, flushing was undertaken in the area. • Post flushing, sampling was again completed, with zero *E. coli* results recorded at all sites.

Goornong 19/0/2023	• A routine sample collected from the Goornong elevated tank was positive for the presence of *E. coli* (4cfu/100mL). • There was no source of contamination identified.	Corrective actions: • The elevated tank was resampled, together with three customer tap sample points and the *E. coli* result was zero for all sites. • The elevated tank was inspected, and no ingress points were identified. • The tank was also drained and when refilled to 70%, it was sampled, together with a customer tap site. The *E. coli* result was zero for both sites. • WTP performance was reviewed and it was found to be operating as expected. • The sampler did advise it was raining very heavily when collecting the sample, and there is no shelter over the sample point. Preventative measures • Sample point was reviewed and a cover has been added.

Water sampling locality/date	**Nature of Incident**	**Actions taken in response to the incident**
Other incidents		
Echuca 24/10/2022	• A high turbidity reading on SCADA from the Treated Water Storage (TWS) (only one storage on-line, because of the ingress issue on 13/10/22 described above) raised a potential quality issue. • Maintenance works at the WTP required the online TWS to be run lower than usual, and when it was being refilled it filled faster than normal, as only one tank was on-line. • This high velocity fill disturbed sediment on the bottom of the tank.	Corrective actions: • A tank inspection was undertaken externally, and no signs of infiltration were found. • An operator looked and listened inside the tank and could not hear or see any infiltration. • The off-line storage was also checked to ensure that it remained the same, verifying that there was no cross contamination. • Chlorine and turbidity results were verified and were found to be within drinking water guidelines. • Customers were advised that the colour of their water may be not as clear as normal.

4 Drinking Water Quality Standards

The Safe Drinking Water Regulations 2015, specify specific water quality standards under Schedule 2. Any exceedance of water quality standards is notifiable to the DH under Section 18 of the Act.

4.1 Section 18 Notifications

The following notifications were made to the Water Program of DH under Section 18 of the Act. The Section 18 notification were submitted to DH within the required timeframe.

Table 7: Section 18 Notifications 2021/22

Water sampling locality/date	Nature of Incident	Actions taken in response to the incident
Gunbower 15/11/2022	A routine sample collected from Gunbower elevated tank was positive for the presence of *E. coli* (tank 13 cfu/100mL). The *E. coli* detection was most likely the result of contamination from water carting supply hose. A BWA was put in place for the town.	The tanks within the WTP were booster chlorinated with hypochlorite solution. The elevated tank was emptied, and an inspection completed. A booster chlorinator trailer dosed hypochlorite solution just downstream of the elevated storage into the network. The raw water was assessed and was found to be back within the treatment plant operational envelope, and this led to the recommencement of the operation of thew WTP, eliminating the requirement to cart water. Following the flushing of the mains, and sampling confirming the quality of the drinking water, in consultation with DH, the BWA was lifted. Communication to the community was via media statements, SMS, social media, Vic Emergency App, Website, and some doorknocking.
Gunbower 15/11/2022	A routine sample collected from Gunbower customer tap was positive for the presence of *E. coli* (19 cfu/100mL). The *E. coli* detection was most likely the result of contamination from water carting supply hose. A BWA was put in place for the town.	
Tooborac 12/01/2023	A routine sample collected from the Tooborac contact point was positive for the presence of *E. coli* (1 cfu/100mL). There was no source of contamination identified.	The chlorine residual was verified. Operational data for the Heathcote WTP (which supplies the Tooborac WSL) was reviewed to ensure there had been no issues. The break tank (located between Heathcote and Tooborac) and the Tooborac tanks were inspected for any signs of contamination, with none being found. Tooborac water mains were flushed, and sampling undertaken. All samples collected verified that safe drinking water was being supplied.
Tarnagulla 01/03/2023	A routine sample collected from a Tarnagulla customer tap site, had a THM's result of 0.27 mg/L, which exceeded the ADWG health-based guideline value (0.25 mg/L).	The Laanecoorie WTP, which supplies the Tarnagulla tank was reviewed to ensure it was optimised to manage the raw water quality it was receiving.

Water sampling locality/date	Nature of Incident	Actions taken in response to the incident
Kyneton 22/03/2023	A routine sample collected from the Kyneton customer tap site was positive for the presence of *E. coli* (1 cfu/100mL). There was no source of contamination identified.	The chlorine residual was verified. Operational data for the Kyneton WTP was reviewed to ensure there had been no issues at the plant. The customer tap site, together with one upstream and one downstream were sampled, with zero *E. coli* results at all sites. Following sampling, flushing was undertaken in the area. Post flushing, sampling was again completed, with zero *E. coli* results recorded at all sites.
Laanecoorie, Bealiba, Dunolly & Tarnagulla. 15/06/2023	A routine sample collected from the Laanecoorie contact point had a THM's result of 0.26 mg/L, which exceeded the ADWG health-based guideline value (0.25 mg/L).	The Laanecoorie WTP was optimised to manage the raw water quality it was receiving. Additional sampling was arranged for the Tarnagulla, Bealiba and Dunolly, as the Laanecoorie WTP supplies all these towns. There were no non complaint results in these localities.
Goornong 19/06/2023	A routine sample collected from Goornong elevated tank was positive for the presence of *E. coli* (4 cfu/100mL). There was no source of contamination identified.	The elevated tank was resampled, together with three customer tap sample points and the *E. coli* result was zero for all sites. The elevated tank was inspected, and no ingress points were identified. The tank was also drained and when refilled to 70%, it was sampled, together with a customer tap sites. The *E. coli* result was zero for both sites. The performance of the WTP was reviewed and it was found to be operating as expected. The sampler did advise it was raining very heavily when collecting the sample, and there is no shelter over the sample point. The sample point was reviewed and a cover built.

4.2 Water Quality Sampling Program

The Safe Drinking Water Regulations 2015 require water suppliers to incorporate a water sampling program into their risk management plan. Coliban Water's water sampling program is reviewed annually. Coliban Water's water sampling program is separated into three categories - raw water, storage tanks and contact points (i.e. storage tanks that are used to provide contact time for chlorine or chloramine disinfection) and distribution networks (i.e. customer taps).

Raw water sites include catchments, raw water storage reservoirs/basins and irrigation storages. Storage tanks and contact points include storage tanks in both our potable and non-potable (regulated) water supplies. The final verification monitoring is undertaken at customer tap sites. The parameters included in the sampling program include the Safe Drinking Water Regulations 2015 Schedule 2 requirements, together with the parameters that would identify any algal toxins, pathogens, chemical, radiological or other substances that may pose a risk to human health, and the parameters which are included in the program are based on system-specific and catchment-based risk assessments.

During the review process consideration is given to:

- ADWG recommendations;
- The likelihood of a particular hazard being present in the water, and historical data trends; and
- Operational changes.

With regard to raw water quality monitoring, additional consideration was given to seasonal impacts on water quality and data required to assess microbial hazards.

The following changes were made to the water quality sampling programs for 2022/23:

1. Raw Water:
    - Added additional parameters to the Murray River raw water sampling location to accommodate the requirements of the Echuca WTP supernatant return water discharge environmental improvement program (EIP) monitoring project.
2. Tanks/Contact Points:
    - Increased THM monitoring post the Tarnagulla tank (weekly during summer) to monitor for the risk of THM formation exceeding the ADWG health-based guideline value (0.25 mg/L)
    - Geosmin and MIB were added to the monitoring program for relevant sampling localities rather than being adhoc sampling undertaken in response to an issue.

4.2.1 Samples within the Water Quality Sampling Program were not collected

During 2022/23 the following samples were not collected and analysed as outlined in our water quality sampling program.

Parameter	Water Sampling Locality	Sample Location	Reason
Escherichia coli	Tooborac	Exit/Storage Point	No access due to flooding
	Raywood	Exit/Storage Point	
	Raywood	Customer Tap	
	Sebastian	Exit/Storage Point	
	Rochester	Exit/Storage Point	
	Serpentine	Exit/Storage Point	
	Serpentine	Customer Tap	
	Pyramid Hill	Exit/Storage Point	
	Echuca	Exit/Storage Point	OH&S issue access unavailable for one week
	Castlemaine	Customer Tap	Updated programming created scheduling error, resulting in missed samples.
	Kyneton	Customer Tap	
Chlorine (Total & Free)	Tooborac	Exit/Storage Point	No access due to flooding
	Raywood	Exit/Storage Point	
	Raywood	Customer Tap	
	Sebastian	Exit/Storage Point	
	Rochester	Exit/Storage Point	
	Serpentine	Exit/Storage Point	
	Serpentine	Customer Tap	
	Pyramid Hill	Exit/Storage Point	
	Echuca	Exit/Storage Point	OH&S issue access unavailable for one week

Parameter	Water Sampling Locality	Sample Location	Reason
	Castlemaine	Customer Tap	Updated programming created scheduling error, resulting in missed samples.
	Kyneton	Customer Tap	
Turbidity	Bendigo Northern	Customer Tap	Updated programming created scheduling error, resulting in missed samples.
	Big Hill	Exit/Storage Point	
	Raywood	Customer Tap	No access due to flooding
	Serpentine	Customer Tap	
	Echuca	Exit/Storage Point	OH&S issue access unavailable for one week
Ammonia	Korong Vale	Customer Tap	Updated programming created scheduling error, resulting in missed samples
	Korong Vale	Exit/Storage Point	
	Wedderburn	Customer Tap	
	Wedderburn	Exit/Storage Point	
	Strathfieldsaye	Customer Tap	
Nitrite	Korong Vale	Customer Tap	Updated programming created scheduling error, resulting in missed samples
	Korong Vale	Exit/Storage Point	
	Wedderburn	Customer Tap	
	Wedderburn	Exit/Storage Point	
	Strathfieldsaye	Customer Tap	
Nitrate	Korong Vale	Customer Tap	Updated programming created scheduling error, resulting in missed samples
	Korong Vale	Exit/Storage Point	
	Wedderburn	Customer Tap	
	Wedderburn	Exit/Storage Point	
THMs	Elmore	Customer Tap	Updated programming created scheduling error, resulting in missed samples
Formaldehyde	Kyneton	Exit/Storage Point	Sample collected, but programming error resulted in missed parameter
Iron	Rochester	Exit/Storage Point	No access due to flooding
Manganese	Rochester	Exit/Storage Point	No access due to flooding
Aluminum	Cohuna	Exit/Storage Point	Updated programming created scheduling error, resulting in missed samples
	Leitchville	Exit/Storage Point	

Coliban Water met with the sampling contractor and discussed the concerns it has with the respect to the missed sampling that occurred due to scheduling errors. The contractor has added additional steps to reduce the chance that scheduling errors will occur.

4.3 Water Quality Monitoring results

The following table is a comparison of the analysis for each parameter in the monitoring programs for the period from 2020/21 to 2022/23.

Sections 4.4.1 and 4.4.2 contain the individual data tables for each parameter sampled, as per the monitoring program undertaken during 2022/23.

4.3.1 Analysis of Water Sampling Results

Coliban Water has undertaken substantial water quality monitoring for a number of years. The following table refers to compliance with the parameters in our drinking water sampling programs for 2020/21 – 2022/23.

Table 8: Water Quality Parameter Comparison Results 2020/21 to 2022/23

Parameter	Compliant Localities 2020/21	Compliant Localities 2021/22	Compliant Localities 2022/23
Escherichia coli[1]	100%	100%	90%
Trihalomethanes[1]	100%	100%	95%
Turbidity[1]	100%	100%	100%
Chloroacetic acid[2]	100%	100%	100%
Dichloroacetic acid[2]	100%	100%	100%
Trichloroacetic acid[2]	100%	100%	100%
Bromate[2]	100%	100%	100%
Formaldehyde[2]	100%	100%	100%
Aluminium[3]	98%	100%	100%
Fluoride[2]	100%	100%	100%
Arsenic[2]	100%	100%	100%
Cadmium[2]	100%	100%	100%
Chlorine[2]	100%	98%	100%
Chromium[2]	100%	100%	100%
Cyanide[2]	100%	100%	100%
Mercury[2]	100%	100%	100%
Nitrate[2]	100%	100%	100%
Selenium[2]	100%	100%	100%
Sulphate[2]	100%	100%	100%
Manganese[2]	100%	100%	100%
Copper[2]	100%	100%	100%
Lead[2]	100%	100%	100%
Nickel[2]	100%	100%	100%
Gross alpha[2]	100%	100%	100%
Gross beta[2]	100%	100%	100%
Nitrite[2]	100%	100%	100%
pH[3]	74%	79%	74%
Hardness[3]	100%	100%	98%
Iron[3]	100%	98%	95%
True Colour[3]	100%	100%	100%
Electrical Conductivity[3]	100%	100%	100%
Sodium[3]	100%	100%	100%
Chloride[3]	100%	100%	98%
Zinc[3]	100%	100%	100%
Ammonia[3]	98%	98%	100%
NDMA[2]	98%	100%	100%
Total no. water sampling localities	42	42	42

Note:

1 This parameter is a water quality standard as listed in Schedule 2 of the SDW Regulations 2015.

2 This parameter is a water quality standard with reference to the relevant ADWG health-based guideline value.

3 This parameter has an ADWG aesthetic guideline value.

Coliban Water's compliance against most sampled parameter in 2022/23 was consistent across most parameters, compared to the two previous years. Sections 4.3.1.1 and 4.3.1.2 contain the details for the non-compliant parameters for 2022/23.

4.3.1.1 Actions Undertaken for Schedule 2 Non-compliant Health Parameters

Escherichia coli (E. coli)

E .coli bacteria were recorded in samples collected from the Goornong, Gunbower, Kyneton and Tooborac water sampling localities. Details of the actions undertaken in response to these results are included in both Section 3.1 – Section 22 Reports and Section 4.1- Section 18 Notifications.

Trihalomethanes (THM)

The THM results that exceeded the health-based guideline value in the ADWG were recorded in the Laanecoorie and Tarnagulla water sampling localities, which are supplied by the Laanecoorie WTP. Details of the actions undertaken in response to these exceedances are included in Section 4.1- Section 18 Notifications.

4.3.1.2 Actions undertaken for Aesthetic Parameters that were not met

pH

Eleven water sampling localities did not meet the ADWG aesthetic guideline value range for pH (pH 6.5 to 8.5). Eight of these localities are supplied with treated water from chloramination treatment systems. An elevated pH (>8.0) is maintained to improve the effectiveness of chloramination.

Additionally, we have systems that have long cement-lined mains in the network, which have alkalinity drawn out from the cement, and this causes a rise in alkalinity levels and an increase in pH. Coliban Water has a routine water mains renewal program to replace the water mains based on a number of criteria, such as age, size, population served, and frequency of failures etc. These cement-lined pipes will be renewed with pipes made of an appropriate material when they meet the criteria for renewal.

Chloride & Hardness

Elmore WTP has two bores that it sources water for treatment to a drinking water standard. The water quality in Bore 4 is the better quality and is the preferred bore to use. During January 2023, source water was switched to Bore 3 for a short time, and this was reflected in the results from the collected water quality samples. The average value for both parameters was below the guideline value, but above the historic norm.

Iron

The July 2023 iron customer tap result for both the Sebastian and Wedderburn WSL, was above the aesthetic guideline value. All other samples were below the guideline value and with no obvious issue, these were considered to be one-off results.

4.4 Water Quality Data for Sampling Localities: 1 July 2022 – 30 June 2023

As described in Section 4.2, Coliban Water undertakes a comprehensive water quality monitoring program that includes collecting samples from various points in the water supply system:

- Exit points from water treatment plants and water storage tanks into the distribution system.
- Customer tap sites, which are dedicated sampling points that are prior to the customer's water meter.

4.4.1 Treated Water results from WTP exit/storage points

Following are tables that detail the sampling results for each parameter at WTP exit/storage points in each of the water sampling localities.

Escherichia coli (E. coli) – WTP exit/storage points for 2022-23

E. coli is monitored in all water sampling localities as it is an indicator of the potential presence of faecal contamination in water.

Table 9: E. coli results for WTP exit/storage points (Water quality standard: No Escherichia coli per 100mL of drinking water, with the exception of any false positive samples^)

Water Sampling Locality	Sampling Frequency	Number of Samples[1]	Maximum detected (cfu/100mL)	Number of detections and investigations conducted (s.22)	Number of samples where standard was not met
Axedale	Weekly	52	0	0	0
Bealiba	Weekly	52	0	0	0
Bendigo (Northern)	Twice Weekly	104	0	0	0
Bendigo (Southern)	Twice Weekly	208	0	0	0
Bendigo (Spring Gully)	Twice Weekly	104	0	0	0
Big Hill	Weekly	104	0	0	0
Boort	Weekly	104	0	0	0
Bridgewater - Inglewood	Weekly	104	0	0	0
Castlemaine	Twice Weekly/ Weekly	156	0	0	0
Cohuna	Weekly	104	0	0	0
Dunolly	Weekly	52	0	0	0
Echuca[2]	Weekly	103	0	0	0
Elmore	Weekly	52	0	0	0
Epsom - Huntly	Twice Weekly	104	0	0	0
Fryerstown	Weekly	52	0	0	0
Goornong[3]	Weekly	104	4	1	1
Guildford	Twice Weekly	104	0	0	0
Gunbower[3]	Weekly	104	13	1	1
Harcourt	Twice Weekly/ Weekly	156	0	0	0
Heathcote	Weekly	52	0	0	0
Junortoun	Twice Weekly	104	0	0	0
Korong Vale	Weekly	104	0	0	0
Kyneton	Twice Weekly/ Weekly	156	0	0	0
Laanecoorie	Weekly	52	0	0	0
Leitchville	Weekly	52	0	0	0
Lockington	Weekly	52	0	0	0
Maiden Gully - Marong	Twice Weekly	156	0	0	0
Maldon	Weekly	52	0	0	0
Malmsbury	Twice Weekly/ Weekly	156	0	0	0
Newstead	Weekly	52	0	0	0
Pyramid Hill[4]	Weekly	51	0	0	0
Raywood[4]	Weekly	51	0	0	0
Rochester[4]	Weekly	51	0	0	0
Sebastian[4]	Weekly	51	0	0	0
Serpentine[4]	Weekly	51	0	0	0
Strathfieldsaye	Twice Weekly	104	0	0	0
Taradale - Elphinstone	Twice Weekly	104	0	0	0
Tarnagulla	Weekly	52	0	0	0
Tooborac[3&4]	Weekly	51	1	1	1
Trentham	Weekly	52	0	0	0
Tylden	Weekly	52	0	0	0
Wedderburn	Weekly	104	0	0	0

Note:

1 The number of samples will vary due to the different number of exit/storage samples points within each water sampling locality.

2 Due to OH & S reason, site inaccessible for a sample to be collected.

3 Details of water quality exceedance are located in Section 4.1.

4 Samples were not collected as no access during floods

Trihalomethanes (THM) – WTP exit/storage points for 2022-23

Trihalomethanes are formed as a by-product, predominantly when chlorine is used to disinfect water to make it safe for drinking. They represent one group of chemicals generally referred to as disinfection by-products.

Table 10: Trihalomethanes results for WTP exit/storage points (Water quality standard for THM is 0.25 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples[1]	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale[2]	Monthly	30	0.1700	0.1145	0
Bealiba	Monthly	12	0.2200	0.0978	0
Bendigo (Northern)	Monthly	12	0.1330	0.0529	0
Bendigo (Southern)	Monthly	12	0.1330	0.0529	0
Bendigo (Spring Gully)	Monthly	12	0.1330	0.0529	0
Big Hill[2]	Monthly	70	0.1700	0.0866	0
Boort	Monthly	12	0.1800	0.1245	0
Bridgewater – Inglewood	Monthly	24	0.0290	0.0127	0
Castlemaine	Monthly	24	0.1990	0.1182	0
Cohuna	Monthly	12	0.2100	0.0651	0
Dunolly	Monthly	12	0.2200	0.1132	0
Echuca	Monthly	12	0.1500	0.0572	0
Elmore	Monthly	12	<0.001	<0.001	0
Epsom - Huntly	Monthly	12	0.1330	0.0529	0
Fryerstown	Monthly	12	0.1900	0.1268	0
Goornong	Monthly	24	0.1700	0.1100	0
Guildford	Monthly	12	0.1990	0.1319	0
Gunbower	Monthly	12	0.1500	0.0688	0
Harcourt	Monthly	24	0.1990	0.1243	0
Heathcote	Monthly	12	0.1600	0.1007	0
Junortoun	Monthly	12	0.1330	0.0529	0
Korong Vale	n/a	n/a	n/a	n/a	n/a
Kyneton	Monthly	24	0.1760	0.1046	0
Laanecoorie[3]	Monthly	12	0.2600	0.1188	1
Leitchville	Monthly	12	0.1000	0.0420	0
Lockington	Monthly	12	0.0640	0.0241	0
Maiden Gully - Marong	Monthly	12	0.1330	0.0529	0
Maldon	Monthly	12	0.1700	0.1222	0
Malmsbury	Monthly	24	0.1760	0.1059	0
Newstead	Monthly	12	0.1700	0.1121	0
Pyramid Hill	Monthly	12	0.0460	0.0313	0
Raywood[2]	Monthly	30	0.2300	0.1309	0
Rochester	Monthly	12	0.1200	0.0484	0
Sebastian[2]	Monthly	30	0.1700	0.0904	0
Serpentine	Monthly	12	0.0520	0.0367	0
Strathfieldsaye	Monthly	12	0.1330	0.0529	0
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla	Monthly	12	0.2200	0.1053	0
Tooborac	Monthly	12	0.1400	0.0911	0
Trentham	Monthly	12	0.0330	0.0251	0
Tylden	Monthly	12	0.1300	0.0933	0
Wedderburn	n/a	n/a	n/a	n/a	n/a

Note:

n/a – sampling is not required, either because there is no definitive exit point into the water sampling locality from which a sample could be collected, or Coliban Water's risk assessments has indicated that THM sampling is not necessary to manage water quality risks.

1 The number of samples will vary due to the different number of exit/storage samples points within each locality.

2 Sampling increased as part of free chlorination project.

3 Details of water quality exceedance are located in Section 4.1.

Turbidity – WTP exit/storage points for 2022-23

Turbidity is a measure of the particulate matter in water and is monitored in all water sampling localities. High turbidity in the reticulation may indicate poor operation of the water treatment process and/or increased risk of microbiological contamination.

Table 11: Turbidity results for WTP exit/storage points (Water quality standard: 95th percentile of results over 12 month period must be ≤ 5.0 NTU)

Water Sampling Locality	Sampling Frequency	Number of Samples[1]	Maximum value (NTU)	95th percentile of results (NTU)	Number of 95th percentile of results above standard
Axedale	Monthly	12	0.1	0.1	0
Bealiba	Monthly	12	0.9	0.6	0
Bendigo (Northern)	Twice Weekly	104	0.3	0.1	0
Bendigo (Southern)	Twice Weekly	208	0.3	0.1	0
Bendigo (Spring Gully)	Twice Weekly	104	0.2	0.1	0
Big Hill[2]	Monthly	23	0.2	0.2	0
Boort	Monthly	24	0.3	0.2	0
Bridgewater – Inglewood	Monthly	24	0.1	0.1	0
Castlemaine	Twice Weekly/Mthly	117	0.2	0.1	0
Cohuna	Monthly	12	0.3	0.2	0
Dunolly	Monthly	12	0.2	0.1	0
Echuca[3]	Monthly	23	0.5	0.4	0
Elmore	Monthly	12	0.1	0.1	0
Epsom - Huntly	Twice Weekly	104	0.3	0.1	0
Fryerstown	Monthly	14	0.4	0.2	0
Goornong	Monthly	24	0.2	0.2	0
Guildford	Twice Weekly	104	0.2	0.1	0
Gunbower	Monthly	24	0.2	0.1	0
Harcourt	Twice Weekly/Mthly	116	0.2	0.1	0
Heathcote	Monthly	12	0.1	0.1	0
Junortoun	Twice Weekly	104	0.3	0.1	0
Korong Vale	Monthly	24	1.5	0.2	0
Kyneton	Twice Weekly/Mthly	116	0.3	0.1	0
Laanecoorie	Monthly	12	0.1	0.1	0
Leitchville	Monthly	12	0.1	0.1	0
Lockington	Monthly	12	0.1	0.1	0
Maiden Gully - Marong	Twice Weekly/Mthly	116	0.3	0.1	0
Maldon	Monthly	12	0.2	0.2	0
Malmsbury	Twice Weekly/Mthly	116	1.3	0.1	0
Newstead	Monthly	12	0.1	0.1	0
Pyramid Hill	Monthly	12	0.2	0.1	0
Raywood	Monthly	12	0.2	0.1	0
Rochester	Monthly	12	0.2	0.1	0
Sebastian	Monthly	12	0.5	0.3	0
Serpentine	Monthly	12	0.1	0.1	0
Strathfieldsaye	Twice Weekly	104	0.2	0.1	0
Taradale - Elphinstone	Twice Weekly	104	0.1	0.1	0
Tarnagulla	Monthly	12	0.1	0.1	0
Tooborac	Monthly	12	0.4	0.3	0
Trentham	Monthly	12	0.1	0.1	0
Tylden	Monthly	12	0.4	0.3	0
Wedderburn	Monthly	24	1.5	1.0	0

Note:

1 The number of samples will vary due to the different number of exit/storage samples points within each locality.

2 Updated programming created scheduling error, which resulted in missed sample

3 Due to OH & S reason, Echuca tank site inaccessible for a sample to be collected.

Fluoride – WTP exit/storage points for 2022-23

Table 12: Fluoride results for WTP exit/storage points (Water quality standard - ADWG health-based guideline value: 1.5 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Target optimum operating fluoride concentration (mg/L)	Max (mg/L)	Min (mg/L)	Ave (mg/L)	Number of samples where standard was not met
Axedale	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bealiba	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bendigo (Northern)	Twice Weekly	104	0.9	0.990	0.810	0.915	0
Bendigo (Southern)	Twice Weekly	104	0.9	0.990	0.810	0.915	0
Bendigo (Spring Gully)	Twice Weekly	104	0.9	0.990	0.810	0.915	0
Big Hill	Twice Weekly	104	0.9	0.990	0.810	0.915	0
Boort	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bridgewater - Inglewood	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Castlemaine	Twice Weekly	104	0.9	0.980	0.790	0.885	0
Cohuna	Monthly	12	0.8	0.850	0.710	0.770	0
Dunolly	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Echuca	Monthly	12	0.8	0.800	0.180	0.694	0
Elmore	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Twice Weekly	104	0.9	0.990	0.810	0.915	0
Fryerstown	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Goornong	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Guildford	Twice Weekly	104	0.9	0.980	0.790	0.885	0
Gunbower	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Harcourt	Twice Weekly	104	0.9	0.980	0.790	0.885	0
Heathcote	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Junortoun	Twice Weekly	104	0.9	0.990	0.810	0.915	0
Korong Vale	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Kyneton	Twice Weekly	104	0.9	0.970	0.650	0.887	0
Laanecoorie	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Leitchville	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lockington	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Maiden Gully - Marong	Twice Weekly	104	0.9	0.990	0.810	0.915	0
Maldon	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Malmsbury	Twice Weekly	104	0.9	0.970	0.650	0.887	0
Newstead	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Raywood	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rochester	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Sebastian	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Serpentine	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye	Twice Weekly	104	0.9	0.990	0.810	0.915	0
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Tarnagulla	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Tooborac	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Trentham	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Tylden	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Wedderburn	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Note:

Fluoride is only currently added to drinking water at the Bendigo, Castlemaine, Cohuna, Echuca and Kyneton Water Treatment Plants.

n/a – not applicable, as the drinking water is not fluoridated.

Bromate – WTP exit/storage points for 2022-23

Table 13: Bromate results for WTP exit/storage points (Water quality standard - ADWG health-based guideline value: 0.02 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	n/a	n/a	n/a	n/a	n/a
Bealiba	n/a	n/a	n/a	n/a	n/a
Bendigo (Northern)	Monthly	12	0.01	0.00	0
Bendigo (Southern)	Monthly	12	0.01	0.00	0
Bendigo (Spring Gully)	Monthly	12	0.01	0.00	0
Big Hill	Monthly	12	0.01	0.00	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater - Inglewood	n/a	n/a	n/a	n/a	n/a
Castlemaine	Monthly	12	0.00	0.00	0
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly	n/a	n/a	n/a	n/a	n/a
Echuca	n/a	n/a	n/a	n/a	n/a
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Monthly	12	0.01	0.00	0
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	Monthly	12	0.00	0.00	0
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt	Monthly	12	0.00	0.00	0
Heathcote	n/a	n/a	n/a	n/a	n/a
Junortoun	Monthly	12	0.01	0.00	0
Korong Vale	n/a	n/a	n/a	n/a	n/a
Kyneton	Monthly	12	0.01	0.00	0
Laanecoorie	n/a	n/a	n/a	n/a	n/a
Leitchville	n/a	n/a	n/a	n/a	n/a
Lockington	n/a	n/a	n/a	n/a	n/a
Maiden Gully - Marong	Monthly	12	0.01	0.00	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	Monthly	12	0.01	0.00	0
Newstead	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester	n/a	n/a	n/a	n/a	n/a
Sebastian	n/a	n/a	n/a	n/a	n/a
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye	Monthly	12	0.01	0.00	0
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla	n/a	n/a	n/a	n/a	n/a
Tooborac	n/a	n/a	n/a	n/a	n/a
Trentham	n/a	n/a	n/a	n/a	n/a
Tylden	n/a	n/a	n/a	n/a	n/a
Wedderburn	n/a	n/a	n/a	n/a	n/a

Note:

Bromate is monitored in localities where ozone is used in treatment, as ozone can result in the production of this by-products in drinking water.

Ozone is used at the Bendigo, Castlemaine and Kyneton Water Treatment Plants.

Ozone-based disinfection by-products are not deemed to be a significant risk in drinking water supplied by Coliban Water that has not been ozonated, therefore it is not monitored.

Formaldehyde – WTP exit/storage points for 2022-23

Table 14: Formaldehyde results for WTP exit/storage points (Water quality standard - ADWG health-based guideline value: 0.5 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	n/a	n/a	n/a	n/a	n/a
Bealiba	n/a	n/a	n/a	n/a	n/a
Bendigo (Northern)	Monthly	12	0.0	0.0	0
Bendigo (Southern)	Monthly	12	0.0	0.0	0
Bendigo (Spring Gully)	Monthly	12	0.0	0.0	0
Big Hill	Monthly	12	0.0	0.0	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater - Inglewood	n/a	n/a	n/a	n/a	n/a
Castlemaine	Monthly	12	0.0	0.0	0
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly	n/a	n/a	n/a	n/a	n/a
Echuca	n/a	n/a	n/a	n/a	n/a
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Monthly	12	0.0	0.0	0
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	Monthly	12	0.0	0.0	0
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt	Monthly	12	0.0	0.0	0
Heathcote	n/a	n/a	n/a	n/a	n/a
Junortoun	Monthly	12	0.0	0.0	0
Korong Vale	n/a	n/a	n/a	n/a	n/a
Kyneton[1]	Monthly	11	0.0	0.0	0
Laanecoorie	n/a	n/a	n/a	n/a	n/a
Leitchville	n/a	n/a	n/a	n/a	n/a
Lockington	n/a	n/a	n/a	n/a	n/a
Maiden Gully - Marong	Monthly	12	0.0	0.0	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	Monthly	12	0.0	0.0	0
Newstead	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester	n/a	n/a	n/a	n/a	n/a
Sebastian	n/a	n/a	n/a	n/a	n/a
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye	Monthly	12	0.0	0.0	0
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla	n/a	n/a	n/a	n/a	n/a
Tooborac	n/a	n/a	n/a	n/a	n/a
Trentham	n/a	n/a	n/a	n/a	n/a
Tylden	n/a	n/a	n/a	n/a	n/a
Wedderburn	n/a	n/a	n/a	n/a	n/a

Note:

Formaldehyde is monitored in localities where ozone is used in treatment, as ozone can result in the production of this by-products in drinking water.

Ozone is used at the Bendigo, Castlemaine and Kyneton Water Treatment Plants.

Ozone-based disinfection by-products are not deemed to be a significant risk in drinking water supplied by Coliban Water that has not been ozonated so is not monitored.

1 Sample collected, but programming error, resulted in missed parameter.

Arsenic – WTP exit/storage points for 2022-23

Table 15: Arsenic results for WTP exit/storage points (Water quality standard - ADWG health-based guideline value: 0.01 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	n/a	n/a	n/a	n/a	n/a
Bealiba	n/a	n/a	n/a	n/a	n/a
Bendigo (Northern)	Monthly	12	0.0005	0.0005	0
Bendigo (Southern)	Monthly	12	0.0005	0.0005	0
Bendigo (Spring Gully)	Monthly	12	0.0005	0.0005	0
Big Hill	Monthly	12	0.0005	0.0005	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater - Inglewood	n/a	n/a	n/a	n/a	n/a
Castlemaine	Monthly	12	0.0005	0.0005	0
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly	n/a	n/a	n/a	n/a	n/a
Echuca	n/a	n/a	n/a	n/a	n/a
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Monthly	12	0.0005	0.0005	0
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	Monthly	12	0.0005	0.0005	0
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt	Monthly	12	0.0005	0.0005	0
Heathcote	n/a	n/a	n/a	n/a	n/a
Junortoun	Monthly	12	0.0005	0.0005	0
Korong Vale	n/a	n/a	n/a	n/a	n/a
Kyneton	Monthly	12	0.0005	0.0005	0
Laanecoorie	n/a	n/a	n/a	n/a	n/a
Leitchville	n/a	n/a	n/a	n/a	n/a
Lockington	n/a	n/a	n/a	n/a	n/a
Maiden Gully - Marong	Monthly	12	0.0005	0.0005	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	Monthly	12	0.0005	0.0005	0
Newstead	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester	n/a	n/a	n/a	n/a	n/a
Sebastian	n/a	n/a	n/a	n/a	n/a
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye	Monthly	12	0.0005	0.0005	0
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla	n/a	n/a	n/a	n/a	n/a
Tooborac	n/a	n/a	n/a	n/a	n/a
Trentham	n/a	n/a	n/a	n/a	n/a
Tylden	n/a	n/a	n/a	n/a	n/a
Wedderburn	n/a	n/a	n/a	n/a	n/a

n/a – sampling is not required, either because there is no definitive exit point into the water sampling locality from which a sample could be collected, or Coliban Water's risk assessments has indicated that arsenic sampling is not necessary to manage water quality risks.

Nitrate – WTP exit/storage points for 2022-23

Table 16: Nitrate results for WTP exit/storage points (Water quality standard - ADWG health-based guideline value: 50 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples[1]	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	n/a	n/a	n/a	n/a	n/a
Bealiba	n/a	n/a	n/a	n/a	n/a
Bendigo (Northern)	n/a	n/a	n/a	n/a	n/a
Bendigo (Southern)	n/a	n/a	n/a	n/a	n/a
Bendigo (Spring Gully)	n/a	n/a	n/a	n/a	n/a
Big Hill[2]	Monthly	15	1.2	0.5	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater - Inglewood	Monthly	12	0.2	0.1	0
Castlemaine	n/a	n/a	n/a	n/a	n/a
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly	Weekly	52	1.0	0.4	0
Echuca	n/a	n/a	n/a	n/a	n/a
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	n/a	n/a	n/a	n/a	n/a
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	n/a	n/a	n/a	n/a	n/a
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt	n/a	n/a	n/a	n/a	n/a
Heathcote	n/a	n/a	n/a	n/a	n/a
Junortoun	n/a	n/a	n/a	n/a	n/a
Korong Vale[3]	Fortnightly	25	0.3	0.1	0
Kyneton	n/a	n/a	n/a	n/a	n/a
Laanecoorie	n/a	n/a	n/a	n/a	n/a
Leitchville	n/a	n/a	n/a	n/a	n/a
Lockington	n/a	n/a	n/a	n/a	n/a
Maiden Gully - Marong	n/a	n/a	n/a	n/a	n/a
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	n/a	n/a	n/a	n/a	n/a
Newstead	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester	n/a	n/a	n/a	n/a	n/a
Sebastian	n/a	n/a	n/a	n/a	n/a
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye	n/a	n/a	n/a	n/a	n/a
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla	Weekly	52	1.0	0.4	0
Tooborac	n/a	n/a	n/a	n/a	n/a
Trentham	n/a	n/a	n/a	n/a	n/a
Tylden	n/a	n/a	n/a	n/a	n/a
Wedderburn[3]	Fortnightly	50	0.3	0.1	0

Note:

1 The number of samples will vary due to the different number of exit/storage samples within each locality.

2 Sampling on-hold during free chlorination project.

3 Updated programming created scheduling error, which resulted in missed sample

n/a – sampling is not required, either because there is no definitive exit point into the water sampling locality from which a sample could be collected, or Coliban Water's risk assessments has indicated that nitrate sampling is not necessary to manage water quality risks.

Manganese – WTP exit/storage points for 2022-23

Table 17: Manganese results for WTP exit/storage points (Water quality standard - ADWG health-based guideline value: 0.5 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	n/a	n/a	n/a	n/a	n/a
Bealiba	n/a	n/a	n/a	n/a	n/a
Bendigo (Northern)	Monthly	12	0.006	0.001	0
Bendigo (Southern)	Monthly	12	0.006	0.001	0
Bendigo (Spring Gully)	Monthly	12	0.006	0.001	0
Big Hill	Monthly	12	0.006	0.001	0
Boort	Weekly	52	0.004	0.001	0
Bridgewater - Inglewood	Monthly	12	0.002	0.001	0
Castlemaine	Monthly	12	0.003	0.001	0
Cohuna	Weekly	52	0.120	0.008	0
Dunolly	n/a	n/a	n/a	n/a	n/a
Echuca	Weekly	52	0.160	0.008	0
Elmore	Monthly	12	0.001	0.001	0
Epsom - Huntly	Monthly	12	0.006	0.001	0
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	Monthly	12	0.003	0.001	0
Guildford	Monthly	12	0.003	0.001	0
Gunbower	Weekly	52	0.049	0.002	0
Harcourt	Monthly	12	0.003	0.001	0
Heathcote	Weekly	52	0.018	0.004	0
Junortoun	Monthly	12	0.006	0.001	0
Korong Vale	Monthly	12	0.002	0.001	0
Kyneton	Monthly	12	0.001	0.001	0
Laanecoorie	Weekly	52	0.057	0.009	0
Leitchville	Weekly	52	0.110	0.007	0
Lockington	Monthly	12	<0.001	<0.001	0
Maiden Gully - Marong	Monthly	12	0.006	0.001	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	Monthly	12	0.001	0.001	0
Newstead	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	Monthly	12	0.007	0.002	0
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester[1]	Weekly	51	0.005	0.001	0
Sebastian	n/a	n/a	n/a	n/a	n/a
Serpentine	Monthly	12	0.003	0.001	0
Strathfieldsaye	Monthly	12	0.006	0.001	0
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla	n/a	n/a	n/a	n/a	n/a
Tooborac	n/a	n/a	n/a	n/a	n/a
Trentham	Monthly	12	0.014	0.002	0
Tylden	n/a	n/a	n/a	n/a	n/a
Wedderburn	n/a	n/a	n/a	n/a	n/a

Note:

1 Sample was not collected as no access during floods.

n/a – sampling is not required, either because there is no definitive exit point into the water sampling locality from which a sample could be collected, or Coliban Water's risk assessments has indicated that manganese sampling is not necessary to manage water quality risks.

Nitrite – WTP exit/storage points for 2022-23

Table 18: Nitrite Results for WTP exit/storage points (Water quality standard - ADWG health-based guideline value: 3.0 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples[1]	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	n/a	n/a	n/a	n/a	n/a
Bealiba	n/a	n/a	n/a	n/a	n/a
Bendigo (Northern)	n/a	n/a	n/a	n/a	n/a
Bendigo (Southern)	n/a	n/a	n/a	n/a	n/a
Bendigo (Spring Gully)	n/a	n/a	n/a	n/a	n/a
Big Hill[2]	Monthly	15	0.24	0.05	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater - Inglewood	Monthly	12	0.02	0.02	0
Castlemaine	n/a	n/a	n/a	n/a	n/a
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly	Weekly	52	0.07	0.02	0
Echuca	n/a	n/a	n/a	n/a	n/a
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	n/a	n/a	n/a	n/a	n/a
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	n/a	n/a	n/a	n/a	n/a
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt	n/a	n/a	n/a	n/a	n/a
Heathcote	n/a	n/a	n/a	n/a	n/a
Junortoun	n/a	n/a	n/a	n/a	n/a
Korong Vale[3]	Fortnightly	25	0.02	0.01	0
Kyneton	n/a	n/a	n/a	n/a	n/a
Laanecoorie	n/a	n/a	n/a	n/a	n/a
Leitchville	n/a	n/a	n/a	n/a	n/a
Lockington	n/a	n/a	n/a	n/a	n/a
Maiden Gully – Marong[2]	Monthly	7	0.43	0.14	n/a
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	n/a	n/a	n/a	n/a	n/a
Newstead	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester	n/a	n/a	n/a	n/a	n/a
Sebastian	n/a	n/a	n/a	n/a	n/a
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye	n/a	n/a	n/a	n/a	n/a
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla	Weekly	52	0.35	0.06	0
Tooborac	n/a	n/a	n/a	n/a	n/a
Trentham	n/a	n/a	n/a	n/a	n/a
Tylden	n/a	n/a	n/a	n/a	n/a
Wedderburn[3]	Fortnightly	50	0.09	0.02	0

Note:

1 The number of samples will vary due to the different number of exit/storage samples within each locality.

2 Sampling on-hold during free chlorination project.

3 Updated programming created scheduling error, which resulted in missed sample

n/a – sampling is not required, either because there is no definitive exit point into the water sampling locality from which a sample could be collected, or Coliban Water's risk assessments has indicated that nitrite sampling is not necessary to manage water quality risks.

Aluminium – WTP exit/storage points for 2022-23

Table 19: Aluminium results for WTP exit/storage points (ADWG aesthetic guideline value: 0.2 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)	Number of samples where guideline was not met
Axedale	n/a	n/a	n/a	n/a	n/a
Bealiba	n/a	n/a	n/a	n/a	n/a
Bendigo (Northern)	Weekly	52	0.060	0.033	0
Bendigo (Southern)	Weekly	52	0.060	0.033	0
Bendigo (Spring Gully)	Weekly	52	0.060	0.033	0
Big Hill	Weekly	52	0.060	0.033	0
Boort	Quarterly	4	0.030	0.023	0
Bridgewater – Inglewood	Quarterly	4	0.090	0.034	0
Castlemaine	Weekly	52	0.060	0.028	0
Cohuna[1]	Quarterly	3	0.150	0.067	0
Dunolly	n/a	n/a	n/a	n/a	n/a
Echuca	Monthly	12	0.200	0.058	0
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Weekly	52	0.060	0.033	0
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	Monthly	12	0.110	0.063	0
Guildford	Weekly	52	0.060	0.028	0
Gunbower	Quarterly	4	0.160	0.063	0
Harcourt	Weekly	52	0.060	0.028	0
Heathcote	Quarterly	4	0.030	0.016	0
Junortoun	Weekly	52	0.060	0.033	0
Korong Vale	Quarterly	4	0.030	0.018	0
Kyneton	Weekly	52	0.040	0.029	0
Laanecoorie	Quarterly	4	0.050	0.025	0
Leitchville[1]	Quarterly	3	0.010	0.007	0
Lockington	Quarterly	4	0.140	0.085	0
Maiden Gully - Marong	Weekly	52	0.060	0.033	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	Weekly	52	0.040	0.029	0
Newstead	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	Quarterly	4	0.020	0.015	0
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester	Quarterly	4	0.010	0.006	0
Sebastian	n/a	n/a	n/a	n/a	n/a
Serpentine	Quarterly	4	0.030	0.016	0
Strathfieldsaye	Weekly	52	0.060	0.033	0
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla	n/a	n/a	n/a	n/a	n/a
Tooborac	n/a	n/a	n/a	n/a	n/a
Trentham	n/a	n/a	n/a	n/a	n/a
Tylden	n/a	n/a	n/a	n/a	n/a
Wedderburn	n/a	n/a	n/a	n/a	n/a

Note:

1 Scheduling issue resulted in missed sample.

n/a – sampling is not required, either because there is no definitive exit point into the water sampling locality from which a sample could be collected, or Coliban Water's risk assessments has indicated that aluminium sampling is not necessary to manage water quality risks.

Iron – WTP exit/storage points for 2022-23

Table 20: Iron results for WTP exit/storage points (ADWG aesthetic guideline value: 0.3mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where guideline was not met
Axedale	n/a	n/a	n/a	n/a	n/a
Bealiba	n/a	n/a	n/a	n/a	n/a
Bendigo (Northern)	Monthly	12	0.02	0.01	0
Bendigo (Southern)	Monthly	12	0.02	0.01	0
Bendigo (Spring Gully)	Monthly	12	0.02	0.01	0
Big Hill	Monthly	12	0.02	0.01	0
Boort	Weekly	52	0.06	0.03	0
Bridgewater - Inglewood	Monthly	12	<0.01	<0.01	0
Castlemaine	Monthly	12	0.01	0.01	0
Cohuna	Weekly	52	0.03	0.01	0
Dunolly	n/a	n/a	n/a	n/a	n/a
Echuca	Weekly	52	0.13	0.01	0
Elmore	Monthly	12	0.07	0.01	0
Epsom - Huntly	Monthly	12	0.02	0.01	0
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	Monthly	12	0.01	0.01	0
Guildford	Monthly	12	0.01	0.01	0
Gunbower	Weekly	52	0.04	0.01	0
Harcourt	Monthly	12	0.01	0.01	0
Heathcote	Weekly	52	0.02	0.01	0
Junortoun	Monthly	12	0.02	0.01	0
Korong Vale	Monthly	12	<0.01	<0.01	0
Kyneton	Monthly	12	0.02	0.01	0
Laanecoorie	Weekly	52	0.03	0.01	0
Leitchville	Weekly	52	<0.01	<0.01	0
Lockington	Monthly	12	<0.01	<0.01	0
Maiden Gully - Marong	Monthly	12	0.02	0.01	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	Monthly	12	0.02	0.01	0
Newstead	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	Monthly	12	0.01	0.01	0
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester[1]	Weekly	51	<0.01	<0.01	0
Sebastian	n/a	n/a	n/a	n/a	n/a
Serpentine	Monthly	12	0.01	0.01	0
Strathfieldsaye	Monthly	12	0.02	0.01	0
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla	n/a	n/a	n/a	n/a	n/a
Tooborac	n/a	n/a	n/a	n/a	n/a
Trentham	Monthly	12	0.13	0.02	0
Tylden	n/a	n/a	n/a	n/a	n/a
Wedderburn	n/a	n/a	n/a	n/a	n/a

Note:

1 Sample was not collected as no access during floods.

n/a – sampling is not required, either because there is no definitive exit point into the water sampling locality from which a sample could be collected, or Coliban Water's risk assessments has indicated that iron sampling is not necessary to manage water quality risks.

Chlorine – WTP exit/storage points for 2022-23

Table 21: Chlorine results for WTP exit/storage points (ADWG health-based guideline value: 5.0mg/L)

Water Sampling Locality	Sampling frequency	Number of samples[1]	Maximum (mg/L)	Average (mg/L)	Number of samples where guideline was not met
Axedale	Weekly	53	2.2	1.6	0
Bealiba	Weekly	52	1.6	0.5	0
Bendigo (Northern)	n/a	n/a	n/a	n/a	n/a
Bendigo (Southern)	n/a	n/a	n/a	n/a	n/a
Bendigo (Spring Gully)	n/a	n/a	n/a	n/a	n/a
Big Hill	Weekly	106	2.4	0.9	0
Boort	Weekly	104	3.6	1.9	0
Bridgewater - Inglewood	Weekly	104	2.9	1.8	0
Castlemaine	Weekly	52	2.2	0.8	0
Cohuna	Weekly	104	2.7	1.6	0
Dunolly	Weekly	52	2.2	1.3	0
Echuca[2]	Weekly	102	4.5	1.9	0
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	n/a	n/a	n/a	n/a	n/a
Fryerstown	Weekly	52	2.5	1.1	0
Goornong	Weekly	104	2.7	0.9	0
Guildford	n/a	n/a	n/a	n/a	n/a
Gunbower	Weekly	104	2.7	1.5	0
Harcourt	Weekly	52	1.9	1.3	0
Heathcote	Weekly	53	2.3	1.9	0
Junortoun	n/a	n/a	n/a	n/a	n/a
Korong Vale	Weekly	104	3.6	2.1	0
Kyneton	Weekly	52	2.1	1.3	0
Laanecoorie	Weekly	52	2.8	2.0	0
Leitchville	Weekly	52	2.7	1.8	0
Lockington	Weekly	52	4.7	2.2	0
Maiden Gully - Marong	Weekly	52	1.7	0.7	n/a
Maldon	Weekly	52	2.1	1.2	0
Malmsbury	Weekly	52	1.6	0.9	0
Newstead	Weekly	52	1.6	0.8	0
Pyramid Hill[3]	Weekly	51	2.2	1.6	0
Raywood[3]	Weekly	51	2.2	1.4	0
Rochester[3]	Weekly	51	3.2	2.0	0
Sebastian[3]	Weekly	51	2.9	2.1	0
Serpentine[3]	Weekly	51	2.9	1.9	0
Strathfieldsaye	n/a	n/a	n/a	n/a	n/a
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla	Weekly	52	1.6	1.0	0
Tooborac[3]	Weekly	51	1.8	1.3	0
Trentham	Weekly	52	3.5	2.0	0
Tylden	Weekly	52	2.0	1.0	0
Wedderburn	Weekly	104	3.1	1.8	0

Note:

1 The number of samples will vary due to the different number of exit/storage samples within each locality

2 Due to OH & S reason, Echuca tank site inaccessible for a sample to be collected.

3 Samples were not collected as no access during floods

n/a – sampling is not required as there is no definitive exit point into the water sampling locality from which a sample is collected.

Ammonia – WTP exit/storage points for 2022-23

Table 22: Ammonia results for WTP exit/storage points (ADWG aesthetic guideline value is 0.5 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples[1]	Maximum (mg/L)	Average (mg/L)	Number of samples where guideline was not met
Axedale	n/a	n/a	n/a	n/a	n/a
Bealiba	Fortnightly	26	0.260	0.080	0
Bendigo (Northern)	Weekly	52	0.370	0.142	0
Bendigo (Southern)	Weekly	52	0.370	0.142	0
Bendigo (Spring Gully)	Weekly	52	0.370	0.142	0
Big Hill	Weekly	52	0.370	0.142	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater - Inglewood	Fortnightly/Monthly	39	0.400	0.086	0
Castlemaine	Weekly	52	0.020	0.010	0
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly	Weekly	52	0.540	0.189	0
Echuca	n/a	n/a	n/a	n/a	n/a
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Weekly	52	0.370	0.142	0
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	Weekly	52	0.020	0.010	0
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt	Weekly	52	0.020	0.010	0
Heathcote	Fortnightly	26	0.300	0.158	0
Junortoun	Weekly	52	0.370	0.142	0
Korong Vale[2]	Fortnightly	50	0.370	0.125	0
Kyneton	n/a	n/a	n/a	n/a	n/a
Laanecoorie	Fortnightly	26	0.300	0.138	0
Leitchville	n/a	n/a	n/a	n/a	n/a
Lockington	n/a	n/a	n/a	n/a	n/a
Maiden Gully – Marong[3]	Weekly/Mthly	59	0.370	0.145	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	n/a	n/a	n/a	n/a	n/a
Newstead	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester	n/a	n/a	n/a	n/a	n/a
Sebastian	n/a	n/a	n/a	n/a	n/a
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye	Weekly	52	0.370	0.142	0
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla	Weekly	52	0.410	0.165	0
Tooborac	n/a	n/a	n/a	n/a	n/a
Trentham	n/a	n/a	n/a	n/a	n/a
Tylden	n/a	n/a	n/a	n/a	n/a
Wedderburn[2]	Fortnightly	50	0.370	0.130	0

Note:

1 The number of samples will vary due to the different number of exit/storage samples within each locality.

2 Updated programming created scheduling error, which resulted in missed sample.

3 Monthly sampling on-hold during free chlorination project

n/a – sampling is not required, either because there is no definitive exit point into the water sampling locality from which a sample could be collected, or Coliban Water's risk assessments has indicated that ammonia sampling is not necessary to manage water quality risks.

Alkalinity – WTP exit/storage points for 2022-23

Table 23: Alkalinity results for WTP exit/storage points – whilst there is no ADWG guideline limit for alkalinity, it is monitored for operational purposes.

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)
Axedale	n/a	n/a	n/a	n/a
Bealiba	n/a	n/a	n/a	n/a
Bendigo (Northern)	Weekly	52	55	49
Bendigo (Southern)	Weekly	52	55	49
Bendigo (Spring Gully)	Weekly	52	55	49
Big Hill	Weekly	52	55	49
Boort	n/a	n/a	n/a	n/a
Bridgewater - Inglewood	n/a	n/a	n/a	n/a
Castlemaine	Weekly	52	55	50
Cohuna	n/a	n/a	n/a	n/a
Dunolly	n/a	n/a	n/a	n/a
Echuca	n/a	n/a	n/a	n/a
Elmore	n/a	n/a	n/a	n/a
Epsom - Huntly	Weekly	52	55	49
Fryerstown	n/a	n/a	n/a	n/a
Goornong	n/a	n/a	n/a	n/a
Guildford	Weekly	52	55	50
Gunbower	n/a	n/a	n/a	n/a
Harcourt	Weekly	52	55	50
Heathcote	n/a	n/a	n/a	n/a
Junortoun	Weekly	52	55	49
Korong Vale	n/a	n/a	n/a	n/a
Kyneton	Weekly	52	58	51
Laanecoorie	n/a	n/a	n/a	n/a
Leitchville	n/a	n/a	n/a	n/a
Lockington	n/a	n/a	n/a	n/a
Maiden Gully - Marong	Weekly	52	55	49
Maldon	n/a	n/a	n/a	n/a
Malmsbury	Weekly	52	58	51
Newstead	n/a	n/a	n/a	n/a
Pyramid Hill	n/a	n/a	n/a	n/a
Raywood	n/a	n/a	n/a	n/a
Rochester	n/a	n/a	n/a	n/a
Sebastian	n/a	n/a	n/a	n/a
Serpentine	n/a	n/a	n/a	n/a
Strathfieldsaye	Weekly	52	55	49
Taradale - Elphinstone	n/a	n/a	n/a	n/a
Tarnagulla	n/a	n/a	n/a	n/a
Tooborac	n/a	n/a	n/a	n/a
Trentham	n/a	n/a	n/a	n/a
Tylden	n/a	n/a	n/a	n/a
Wedderburn	n/a	n/a	n/a	n/a

n/a – sampling is not required, either because there is no definitive exit point into the water sampling locality from which a sample could be collected, or Coliban Water's risk assessments has indicated that alkalinity sampling is not necessary to manage water quality risks.

4.4.2 Treated Water results from customer tap sample points

Following are tables of sampling results for each parameter at customer tap sample points in each of the sampling localities.

Escherichia coli (E. coli) – Customer Tap Sites 2022-23

E. coli is monitored in all water sampling localities as it is an indicator of the potential presence of faecal contamination in water.

Table 24: E. coli results for customer tap sites (Schedule 2 Drinking water quality standards: No Escherichia coli per 100mL of drinking water, with the exception of any false positive sample^).

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum detected (orgs/100mL)	Number of detections and investigations conducted (s.22)	Number of samples where standard was not met
Axedale	Weekly	52	0	0	0
Bealiba	Weekly	52	0	0	0
Bendigo (Northern)	Weekly	136	0	0	0
Bendigo (Southern)	Weekly	137	0	0	0
Bendigo (Spring Gully)	Weekly	77	0	0	0
Big Hill	Weekly	53	0	0	0
Boort	Weekly	52	0	0	0
Bridgewater-Inglewood	Weekly	52	0	0	0
Castlemaine[1]	Weekly	75	0	0	0
Cohuna	Weekly	52	0	0	0
Dunolly	Weekly	52	0	0	0
Echuca	Weekly	76	0	0	0
Elmore	Weekly	52	0	0	0
Epsom - Huntly	Weekly	64	0	0	0
Fryerstown	Weekly	52	0	0	0
Goornong	Weekly	52	0	0	0
Guildford	Weekly	52	0	0	0
Gunbower[2]	Weekly	52	19	1	1
Harcourt	Weekly	52	0	0	0
Heathcote	Weekly	52	0	0	0
Junortoun	Weekly	52	0	0	0
Korong Vale	Weekly	52	0	0	0
Kyneton[1&2]	Weekly	63	1	1	1
Laanecoorie	Weekly	52	0	0	0
Leitchville	Weekly	52	0	0	0
Lockington	Weekly	52	0	0	0
Maiden Gully - Marong	Weekly	64	0	0	0
Maldon	Weekly	52	0	0	0
Malmsbury	Weekly	52	0	0	0
Newstead	Weekly	52	0	0	0
Pyramid Hill	Weekly	52	0	0	0
Raywood[3]	Weekly	51	0	0	0
Rochester	Weekly	52	0	0	0
Sebastian	Weekly	52	0	0	0
Serpentine[3]	Weekly	51	0	0	0
Strathfieldsaye	Weekly	64	0	0	0
Taradale - Elphinstone	Weekly	52	0	0	0
Tarnagulla	Weekly	52	0	0	0
Tooborac	Weekly	52	0	0	0
Trentham	Weekly	52	0	0	0
Tylden	Weekly	52	0	0	0
Wedderburn	Weekly	52	0	0	0

Note:

Localities with populations greater than 5,000 have additional sampling to the one sample per week (one additional sample per month for each 5,000 above 5,000 population in accordance with the Australian Drinking Water Guidelines (2011).

1 Updated programming created scheduling error, which resulted in missed sample

2 Details of water quality exceedance are located in Section 4.1

3 No access due to flooding

^ no false positive *E. coli* results were recorded during 2022-23.

Trihalomethanes (THM) – Customer Tap Sites 2022-23

Trihalomethanes are formed as a by-product, predominantly when chlorine is used to disinfect water for drinking. They represent one group of chemicals generally referred to as disinfection by-products.

Table 25: Trihalomethanes results for customer tap sites (Schedule 2 –Drinking water quality standards - Less than or equal to 0.25 mg/L of drinking water.)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale[2]	Monthly/Wkly	30	0.18	0.12	0
Bealiba	Monthly	12	0.22	0.09	0
Bendigo (Northern)[2]	Monthly/Wkly	30	0.16	0.09	0
Bendigo (Southern)[2]	Monthly/Wkly	31	0.14	0.07	0
Bendigo (Spring Gully[2]	Monthly/Wkly	30	0.15	0.08	0
Big Hill[2]	Monthly/Wkly	30	0.15	0.08	0
Boort	Monthly	12	0.20	0.15	0
Bridgewater - Inglewood	Monthly	12	0.03	0.01	0
Castlemaine	Monthly	12	0.16	0.10	0
Cohuna	Monthly	12	0.22	0.07	0
Dunolly	Monthly	12	0.20	0.12	0
Echuca	Monthly	12	0.19	0.08	0
Elmore[1]	Monthly	11	0.00	0.00	0
Epsom – Huntly[2]	Monthly/Wkly	30	0.16	0.10	0
Fryerstown	Monthly	12	0.24	0.14	0
Goornong	Monthly	12	0.18	0.13	0
Guildford	Monthly	12	0.18	0.12	0
Gunbower	Monthly	12	0.15	0.08	0
Harcourt	Monthly	12	0.17	0.12	0
Heathcote	Monthly	12	0.18	0.11	0
Junortoun[2]	Monthly/Wkly	30	0.17	0.10	0
Korong Vale	Monthly	12	0.02	0.01	0
Kyneton	Monthly	12	0.16	0.09	0
Laanecoorie	Monthly	12	0.21	0.11	0
Leitchville	Monthly	12	0.13	0.06	0
Lockington	Monthly	12	0.07	0.05	0
Maiden Gully – Marong[2]	Monthly/Wkly	29	0.18	0.09	0
Maldon	Monthly	12	0.21	0.14	0
Malmsbury	Monthly	12	0.14	0.10	0
Newstead	Monthly	12	0.19	0.12	0
Pyramid Hill	Monthly	12	0.07	0.05	0
Raywood[2]	Monthly/Wkly	30	0.24	0.14	0
Rochester	Monthly	12	0.15	0.05	0
Sebastian[2]	Monthly	31	0.22	0.13	0
Serpentine	Monthly	12	0.09	0.08	0
Strathfieldsaye[2]	Monthly/Wkly	29	0.13	0.07	0
Taradale - Elphinstone	Monthly	12	0.17	0.11	0
Tarnagulla[3]	Monthly	12	0.27	0.12	1
Tooborac	Monthly	12	0.14	0.10	0
Trentham	Monthly	12	0.06	0.04	0
Tylden	Monthly	12	0.13	0.09	0
Wedderburn	Monthly	12	0.02	0.01	0

Note:

1 Updated programming created scheduling error, which resulted in missed sample.
2 Monthly sampling increased to weekly during free chlorination project
3 Details of water quality exceedance are located in Section 4.1

Turbidity – Customer Tap Sites 2022-23

Turbidity is a measure of the particulate matter in water and is monitored in all water sampling localities. High turbidity in the reticulation may indicate poor operation of the water treatment process and/or increased risk of microbiological contamination.

Table 26: Turbidity results for customer tap sites (Schedule 2 – Drinking water quality standards: 95th percentile of results over 12 month period must be ≤ 5.0 NTU)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum value (NTU)	95th percentile of results (NTU)	Number of 95th percentile of results above standard
Axedale	Weekly	52	0.4	0.2	0
Bealiba	Weekly	52	0.2	0.2	0
Bendigo (Northern)[2]	Weekly	51	0.4	0.2	0
Bendigo (Southern)	Weekly	52	0.5	0.2	0
Bendigo (Spring Gully)	Weekly	52	0.2	0.1	0
Big Hill	Weekly	53	0.2	0.2	0
Boort	Weekly	52	0.2	0.2	0
Bridgewater - Inglewood	Weekly	52	0.4	0.1	0
Castlemaine	Weekly	52	1.5	0.1	0
Cohuna	Weekly	52	0.4	0.3	0
Dunolly	Weekly	52	1.7	0.2	0
Echuca	Weekly	52	0.5	0.3	0
Elmore	Weekly	52	0.2	0.1	0
Epsom - Huntly	Weekly	52	0.1	0.1	0
Fryerstown[1]	Weekly	52	6.4	0.1	0
Goornong	Weekly	52	0.3	0.2	0
Guildford	Weekly	52	0.2	0.1	0
Gunbower	Weekly	52	0.5	0.1	0
Harcourt	Weekly	52	0.2	0.1	0
Heathcote	Weekly	52	0.3	0.1	0
Junortoun	Weekly	52	0.2	0.1	0
Korong Vale	Weekly	52	0.5	0.3	0
Kyneton	Weekly	52	0.2	0.1	0
Laanecoorie	Weekly	52	3.9	0.8	0
Leitchville	Weekly	52	1.0	0.6	0
Lockington	Weekly	52	0.2	0.1	0
Maiden Gully - Marong	Weekly	52	0.2	0.1	0
Maldon	Weekly	52	0.2	0.2	0
Malmsbury	Weekly	52	0.7	0.2	0
Newstead	Weekly	52	0.2	0.1	0
Pyramid Hill	Weekly	52	0.4	0.1	0
Raywood[3]	Weekly	51	0.4	0.1	0
Rochester	Weekly	52	0.9	0.2	0
Sebastian[1]	Weekly	52	5.5	0.1	0
Serpentine[3]	Weekly	51	0.3	0.2	0
Strathfieldsaye	Weekly	52	0.2	0.2	0
Taradale - Elphinstone	Weekly	52	0.3	0.2	0
Tarnagulla	Weekly	52	0.2	0.1	0
Tooborac	Weekly	52	0.7	0.4	0
Trentham	Weekly	52	0.2	0.1	0
Tylden	Weekly	52	1.5	0.2	0
Wedderburn	Weekly	52	1.6	0.8	0

Note:

1 Whilst this one high turbidity result did not exceed the 95th percentile standard it was investigated. There was no identified issue, but the water main was flushed and resample results were consistent with normal samples.

2 Updated programming created scheduling error, which resulted in missed sample

3 No access due to flooding.

Chloroacetic Acid – Customer Tap Sites 2022-23

Table 27: Chloroacetic Acid results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.15 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Quarterly	4	<0.005	<0.005	0
Bealiba	Quarterly	4	<0.005	<0.005	0
Bendigo (Northern)	Quarterly	4	<0.005	<0.005	0
Bendigo (Southern)	Quarterly	4	<0.005	<0.005	0
Bendigo (Spring Gully)	Quarterly	4	<0.005	<0.005	0
Big Hill	Quarterly	4	<0.005	<0.005	0
Boort	Quarterly	4	<0.005	<0.005	0
Bridgewater - Inglewood	Quarterly	4	<0.005	<0.005	0
Castlemaine	Quarterly	4	<0.005	<0.005	0
Cohuna	Quarterly	4	<0.005	<0.005	0
Dunolly	Quarterly	4	<0.005	<0.005	0
Echuca	Quarterly	4	<0.005	<0.005	0
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Quarterly	4	0.005	0.003	0
Fryerstown	Quarterly	4	<0.005	<0.005	0
Goornong	Quarterly	4	<0.005	<0.005	0
Guildford	Quarterly	4	<0.005	<0.005	0
Gunbower	Quarterly	4	<0.005	<0.005	0
Harcourt	Quarterly	4	<0.005	<0.005	0
Heathcote	Quarterly	4	<0.005	<0.005	0
Junortoun	Quarterly	4	<0.005	<0.005	0
Korong Vale	Quarterly	4	<0.005	<0.005	0
Kyneton	Quarterly	4	<0.005	<0.005	0
Laanecoorie	Quarterly	4	<0.005	<0.005	0
Leitchville	Quarterly	4	<0.005	<0.005	0
Lockington	Quarterly	4	<0.005	<0.005	0
Maiden Gully - Marong	Quarterly	4	<0.005	<0.005	0
Maldon	Quarterly	4	<0.005	<0.005	0
Malmsbury	Quarterly	4	<0.005	<0.005	0
Newstead	Quarterly	4	<0.005	<0.005	0
Pyramid Hill	Quarterly	4	<0.005	<0.005	0
Raywood	Quarterly	4	<0.005	<0.005	0
Rochester	Quarterly	4	<0.005	<0.005	0
Sebastian	Quarterly	4	<0.005	<0.005	0
Serpentine	Quarterly	4	<0.005	<0.005	0
Strathfieldsaye	Quarterly	4	<0.005	<0.005	0
Taradale - Elphinstone	Quarterly	4	<0.005	<0.005	0
Tarnagulla	Quarterly	4	<0.005	<0.005	0
Tooborac	Quarterly	4	<0.005	<0.005	0
Trentham	Quarterly	4	<0.005	<0.005	0
Tylden	Quarterly	4	<0.005	<0.005	0
Wedderburn	Quarterly	4	<0.005	<0.005	0

Note:

1 Chlorine is not used for disinfection at Elmore. Chlorine-based disinfection by-products are not deemed to be a significant risk in drinking water supplied by Coliban Water that has not been chlorinated.

Dichloroacetic Acid – Customer Tap Sites 2022-23

Table 28: Dichloroacetic Acid results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.1 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Quarterly	4	0.011	0.007	0
Bealiba	Quarterly	4	<0.005	<0.005	0
Bendigo (Northern)	Quarterly	4	0.039	0.018	0
Bendigo (Southern)	Quarterly	4	0.025	0.012	0
Bendigo (Spring Gully)	Quarterly	4	0.011	0.005	0
Big Hill	Quarterly	4	0.036	0.013	0
Boort	Quarterly	4	0.017	0.012	0
Bridgewater - Inglewood	Quarterly	4	0.007	0.004	0
Castlemaine	Quarterly	4	0.050	0.038	0
Cohuna	Quarterly	4	0.024	0.014	0
Dunolly	Quarterly	4	0.032	0.019	0
Echuca	Quarterly	4	0.053	0.032	0
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Quarterly	4	0.047	0.017	0
Fryerstown	Quarterly	4	0.016	0.010	0
Goornong	Quarterly	4	0.033	0.012	0
Guildford	Quarterly	4	0.007	0.004	0
Gunbower	Quarterly	4	0.038	0.028	0
Harcourt	Quarterly	4	0.010	0.007	0
Heathcote	Quarterly	4	0.027	0.017	0
Junortoun	Quarterly	4	0.006	0.003	0
Korong Vale	Quarterly	4	0.009	0.006	0
Kyneton	Quarterly	4	0.039	0.017	0
Laanecoorie	Quarterly	4	0.023	0.015	0
Leitchville	Quarterly	4	0.035	0.025	0
Lockington	Quarterly	4	0.015	0.010	0
Maiden Gully - Marong	Quarterly	4	0.043	0.013	0
Maldon	Quarterly	4	0.005	0.003	0
Malmsbury	Quarterly	4	0.021	0.011	0
Newstead	Quarterly	4	0.015	0.009	0
Pyramid Hill	Quarterly	4	0.011	0.009	0
Raywood	Quarterly	4	0.021	0.015	0
Rochester	Quarterly	4	0.011	0.007	0
Sebastian	Quarterly	4	0.011	0.005	0
Serpentine	Quarterly	4	0.023	0.017	0
Strathfieldsaye	Quarterly	4	0.030	0.017	0
Taradale - Elphinstone	Quarterly	4	0.011	0.006	0
Tarnagulla	Quarterly	4	0.008	0.006	0
Tooborac	Quarterly	4	0.041	0.018	0
Trentham	Quarterly	4	0.012	0.010	0
Tylden	Quarterly	4	0.036	0.025	0
Wedderburn	Quarterly	4	0.014	0.010	0

Note:

1 Chlorine is not used for disinfection at Elmore. Chlorine-based disinfection by-products are not deemed to be a significant risk in drinking water supplied by Coliban Water that has not been chlorinated.

Trichloroacetic Acid – Customer Tap Sites 2022-23

Table 29: Trichloroacetic Acid results for customer tap sites (Water quality standard - ADWG health-based guideline value 0.1 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Quarterly	4	0.015	0.010	0
Bealiba	Quarterly	4	0.007	0.004	0
Bendigo (Northern)	Quarterly	4	0.043	0.013	0
Bendigo (Southern)	Quarterly	4	0.024	0.008	0
Bendigo (Spring Gully)	Quarterly	4	0.030	0.009	0
Big Hill	Quarterly	4	0.024	0.008	0
Boort	Quarterly	4	0.020	0.015	0
Bridgewater - Inglewood	Quarterly	4	<0.005	<0.005	0
Castlemaine	Quarterly	4	0.071	0.045	0
Cohuna	Quarterly	4	0.046	0.024	0
Dunolly	Quarterly	4	0.012	0.009	0
Echuca	Quarterly	4	0.052	0.031	0
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Quarterly	4	0.046	0.013	0
Fryerstown	Quarterly	4	0.077	0.051	0
Goornong	Quarterly	4	0.037	0.020	0
Guildford	Quarterly	4	0.053	0.021	0
Gunbower	Quarterly	4	0.054	0.037	0
Harcourt	Quarterly	4	0.050	0.032	0
Heathcote	Quarterly	4	0.019	0.011	0
Junortoun	Quarterly	4	0.029	0.009	0
Korong Vale	Quarterly	4	<0.005	<0.005	0
Kyneton	Quarterly	4	0.061	0.035	0
Laanecoorie	Quarterly	4	0.011	0.006	0
Leitchville	Quarterly	4	0.040	0.025	0
Lockington	Quarterly	4	0.008	0.004	0
Maiden Gully - Marong	Quarterly	4	0.041	0.012	0
Maldon	Quarterly	4	0.024	0.013	0
Malmsbury	Quarterly	4	0.061	0.026	0
Newstead	Quarterly	4	0.070	0.040	0
Pyramid Hill	Quarterly	4	0.007	0.004	0
Raywood	Quarterly	4	0.027	0.017	0
Rochester	Quarterly	4	0.008	0.004	0
Sebastian	Quarterly	4	0.007	0.004	0
Serpentine	Quarterly	4	0.012	0.008	0
Strathfieldsaye	Quarterly	4	0.033	0.015	0
Taradale - Elphinstone	Quarterly	4	0.038	0.021	0
Tarnagulla	Quarterly	4	0.010	0.007	0
Tooborac	Quarterly	4	0.038	0.017	0
Trentham	Quarterly	4	0.017	0.013	0
Tylden	Quarterly	4	0.053	0.039	0
Wedderburn	Quarterly	4	<0.005	<0.005	0

Note:

1 Chlorine is not used for disinfection at Elmore. Chlorine-based disinfection by-products are not deemed to be a significant risk in drinking water supplied by Coliban Water that has not been chlorinated.

Bromate – Customer Tap Sites 2022-23

Table 30: Bromate results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.02 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Monthly	12	<0.005	<0.005	0
Bealiba	n/a	n/a	n/a	n/a	n/a
Bendigo (Northern)	Monthly	12	<0.005	<0.005	0
Bendigo (Southern)	Monthly	12	<0.005	<0.005	0
Bendigo (Spring Gully)	Monthly	12	<0.005	<0.005	0
Big Hill	Monthly	12	<0.005	<0.005	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater - Inglewood	n/a	n/a	n/a	n/a	n/a
Castlemaine	Quarterly	4	<0.01	<0.01	0
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly	n/a	n/a	n/a	n/a	n/a
Echuca	n/a	n/a	n/a	n/a	n/a
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Monthly	12	<0.005	<0.005	0
Fryerstown	Quarterly	4	<0.01	<0.01	0
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	Quarterly	4	<0.01	<0.01	0
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt	Quarterly	4	<0.005	<0.005	0
Heathcote	n/a	n/a	n/a	n/a	n/a
Junortoun	Monthly	12	<0.005	<0.005	0
Korong Vale	n/a	n/a	n/a	n/a	n/a
Kyneton	Quarterly	4	<0.01	<0.01	0
Laanecoorie	n/a	n/a	n/a	n/a	n/a
Leitchville	n/a	n/a	n/a	n/a	n/a
Lockington	n/a	n/a	n/a	n/a	n/a
Maiden Gully - Marong	Monthly	12	<0.005	<0.005	0
Maldon	Quarterly	4	<0.005	<0.005	0
Malmsbury	Quarterly	4	<0.01	<0.01	0
Newstead	Quarterly	4	<0.01	<0.01	0
Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Raywood	Monthly	12	<0.005	<0.005	0
Rochester	n/a	n/a	n/a	n/a	n/a
Sebastian	Monthly	12	<0.005	<0.005	0
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye	Monthly	12	<0.005	<0.005	0
Taradale - Elphinstone	Quarterly	4	<0.01	<0.01	0
Tarnagulla	n/a	n/a	n/a	n/a	n/a
Tooborac	n/a	n/a	n/a	n/a	n/a
Trentham	n/a	n/a	n/a	n/a	n/a
Tylden	Quarterly	4	<0.01	<0.01	0
Wedderburn	n/a	n/a	n/a	n/a	n/a

Note:

Bromate is monitored in localities where ozone is used in treatment, as ozone can result in the production of this by-products in drinking water.

Ozone is used at the Bendigo, Castlemaine and Kyneton Water Treatment Plants. Review of historical data has identified sampling localities supplied from Castlemaine and Kyneton WTP's as low risk, therefore monitoring is quarterly in those localities.

Ozone-based disinfection by-products are not deemed to be a significant risk in drinking water supplied by Coliban Water that has not been ozonated.

Formaldehyde – Customer Tap Sites 2022-23

Table 31: Formaldehyde results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.5 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Monthly	12	<0.05	<0.05	0
Bealiba	n/a	n/a	n/a	n/a	n/a
Bendigo (Northern)	Monthly	12	<0.05	<0.05	0
Bendigo (Southern)	Monthly	12	<0.05	<0.05	0
Bendigo (Spring Gully)	Monthly	12	<0.05	<0.05	0
Big Hill	Monthly	12	<0.05	<0.05	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater - Inglewood	n/a	n/a	n/a	n/a	n/a
Castlemaine	Quarterly	4	<0.05	<0.05	0
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly	n/a	n/a	n/a	n/a	n/a
Echuca	n/a	n/a	n/a	n/a	n/a
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Monthly	12	<0.05	<0.05	0
Fryerstown	Quarterly	4	<0.05	<0.05	0
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	Quarterly	4	<0.05	<0.05	0
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt	Quarterly	4	<0.05	<0.05	0
Heathcote	n/a	n/a	n/a	n/a	n/a
Junortoun	Monthly	12	<0.05	<0.05	0
Korong Vale	n/a	n/a	n/a	n/a	n/a
Kyneton	Quarterly	4	<0.05	<0.05	0
Laanecoorie	n/a	n/a	n/a	n/a	n/a
Leitchville	n/a	n/a	n/a	n/a	n/a
Lockington	n/a	n/a	n/a	n/a	n/a
Maiden Gully - Marong	Monthly	12	<0.05	<0.05	0
Maldon	Quarterly	4	<0.05	<0.05	0
Malmsbury	Quarterly	4	<0.05	<0.05	0
Newstead	Quarterly	4	<0.05	<0.05	0
Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Raywood	Monthly	12	<0.05	<0.05	0
Rochester	n/a	n/a	n/a	n/a	n/a
Sebastian	Monthly	12	<0.05	<0.05	0
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye	Monthly	12	<0.05	<0.05	0
Taradale - Elphinstone	Quarterly	4	<0.05	<0.05	0
Tarnagulla	n/a	n/a	n/a	n/a	n/a
Tooborac	n/a	n/a	n/a	n/a	n/a
Trentham	n/a	n/a	n/a	n/a	n/a
Tylden	Quarterly	4	<0.05	<0.05	0
Wedderburn	n/a	n/a	n/a	n/a	n/a

Note:

Formaldehyde is monitored in localities where ozone is used in treatment, as ozone can result in the production of this by-products in drinking water.

Ozone is used at the Bendigo, Castlemaine and Kyneton Water Treatment Plants. Review of historical data has identified sampling localities supplied from Castlemaine and Kyneton WTPs as low risk, therefore monitoring is quarterly in those localities.

Ozone-based disinfection by-products are not deemed to be a significant risk in drinking water supplied by Coliban Water that has not been ozonated.

Fluoride – Customer Tap Sites 2022-23

Table 32: Fluoride results for customer tap sites (Water quality standard - ADWG health-based guideline value: 1.5 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Target optimum operating fluoride concentration (mg/L)	Max (mg/L)	Min (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Monthly	12	0.9	0.990	0.810	0.914	0
Bealiba	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bendigo (Northern)	Monthly	12	0.9	0.960	0.880	0.913	0
Bendigo (Southern)	Monthly	12	0.9	0.970	0.870	0.912	0
Bendigo (Spring Gully)	Monthly	12	0.9	0.980	0.880	0.920	0
Big Hill	Monthly	12	0.9	0.960	0.840	0.908	0
Boort	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bridgewater - Inglewood	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Castlemaine	Monthly	12	0.9	0.960	0.850	0.889	0
Cohuna	Weekly	52	0.8	0.840	0.430	0.746	0
Dunolly	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Echuca	Weekly	52	0.8	0.820	0.180	0.684	0
Elmore	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Monthly	12	0.9	0.970	0.860	0.922	0
Fryerstown	Monthly	12	0.9	0.930	0.840	0.874	0
Goornong	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Guildford	Monthly	12	0.9	0.920	0.820	0.882	0
Gunbower	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Harcourt	Monthly	12	0.9	0.960	0.840	0.876	0
Heathcote	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Junortoun	Monthly	12	0.9	0.980	0.860	0.917	0
Korong Vale	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Kyneton	Weekly	52	0.9	0.980	0.540	0.883	0
Laanecoorie	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Leitchville	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lockington	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Maiden Gully - Marong	Monthly	12	0.9	0.960	0.880	0.922	0
Maldon	Monthly	12	0.9	0.910	0.820	0.867	0
Malmsbury	Weekly	52	0.9	0.950	0.810	0.887	0
Newstead	Monthly	12	0.9	0.940	0.830	0.876	0
Pyramid Hill	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Raywood	Monthly	12	0.9	0.970	0.850	0.905	0
Rochester	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Sebastian	Monthly	12	0.9	0.960	0.860	0.916	0
Serpentine	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye	Monthly	12	0.9	1.000	0.850	0.918	0
Taradale - Elphinstone	Monthly	12	0.9	0.930	0.840	0.885	0
Tarnagulla	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Tooborac	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Trentham	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Tylden	Weekly	52	0.9	0.970	0.780	0.886	0
Wedderburn	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Arsenic – Customer Tap Sites 2022-23

Table 33: Arsenic results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.01 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Quarterly	4	<0.001	<0.001	0
Bealiba	Quarterly	4	<0.001	<0.001	0
Bendigo (Northern)	Quarterly	4	<0.001	<0.001	0
Bendigo (Southern)	Quarterly	4	<0.001	<0.001	0
Bendigo (Spring Gully)	Quarterly	4	<0.001	<0.001	0
Big Hill	Quarterly	4	<0.001	<0.001	0
Boort	Quarterly	4	<0.001	<0.001	0
Bridgewater - Inglewood	Quarterly	4	<0.001	<0.001	0
Castlemaine	Quarterly	4	<0.001	<0.001	0
Cohuna	Quarterly	4	<0.001	<0.001	0
Dunolly	Quarterly	4	<0.001	<0.001	0
Echuca	Quarterly	4	<0.001	<0.001	0
Elmore	Quarterly	4	<0.001	<0.001	0
Epsom - Huntly	Quarterly	4	<0.001	<0.001	0
Fryerstown	Quarterly	4	<0.001	<0.001	0
Goornong	Quarterly	4	<0.001	<0.001	0
Guildford	Quarterly	4	<0.001	<0.001	0
Gunbower	Quarterly	4	<0.001	<0.001	0
Harcourt	Quarterly	4	<0.001	<0.001	0
Heathcote	Quarterly	4	<0.001	<0.001	0
Junortoun	Quarterly	4	<0.001	<0.001	0
Korong Vale	Quarterly	4	<0.001	<0.001	0
Kyneton	Quarterly	4	<0.001	<0.001	0
Laanecoorie	Quarterly	4	<0.001	<0.001	0
Leitchville	Quarterly	4	<0.001	<0.001	0
Lockington	Quarterly	4	<0.001	<0.001	0
Maiden Gully - Marong	Quarterly	4	<0.001	<0.001	0
Maldon	Quarterly	4	<0.001	<0.001	0
Malmsbury	Quarterly	4	<0.001	<0.001	0
Newstead	Quarterly	4	<0.001	<0.001	0
Pyramid Hill	Quarterly	4	<0.001	<0.001	0
Raywood	Quarterly	4	<0.001	<0.001	0
Rochester	Quarterly	4	<0.001	<0.001	0
Sebastian	Quarterly	4	<0.001	<0.001	0
Serpentine	Quarterly	4	<0.001	<0.001	0
Strathfieldsaye	Quarterly	4	<0.001	<0.001	0
Taradale - Elphinstone	Quarterly	4	<0.001	<0.001	0
Tarnagulla	Quarterly	4	<0.001	<0.001	0
Tooborac	Quarterly	4	<0.001	<0.001	0
Trentham	Quarterly	4	<0.001	<0.001	0
Tylden	Quarterly	4	<0.001	<0.001	0
Wedderburn	Quarterly	4	<0.001	<0.001	0

Cadmium – Customer Tap Sites 2022-23

Table 34: Cadmium results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.002 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Quarterly	4	<0.0002	<0.0002	0
Bealiba	Quarterly	4	<0.0002	<0.0002	0
Bendigo (Northern)	Quarterly	4	<0.0002	<0.0002	0
Bendigo (Southern)	Quarterly	4	<0.0002	<0.0002	0
Bendigo (Spring Gully)	Quarterly	4	<0.0002	<0.0002	0
Big Hill	Quarterly	4	<0.0002	<0.0002	0
Boort	Quarterly	4	<0.0002	<0.0002	0
Bridgewater - Inglewood	Quarterly	4	<0.0002	<0.0002	0
Castlemaine	Quarterly	4	<0.0002	<0.0002	0
Cohuna	Quarterly	4	<0.0002	<0.0002	0
Dunolly	Quarterly	4	<0.0002	<0.0002	0
Echuca	Quarterly	4	<0.0002	<0.0002	0
Elmore	Quarterly	4	<0.0002	<0.0002	0
Epsom - Huntly	Quarterly	4	<0.0002	<0.0002	0
Fryerstown	Quarterly	4	<0.0002	<0.0002	0
Goornong	Quarterly	4	<0.0002	<0.0002	0
Guildford	Quarterly	4	<0.0002	<0.0002	0
Gunbower	Quarterly	4	<0.0002	<0.0002	0
Harcourt	Quarterly	4	<0.0002	<0.0002	0
Heathcote	Quarterly	4	<0.0002	<0.0002	0
Junortoun	Quarterly	4	<0.0002	<0.0002	0
Korong Vale	Quarterly	4	<0.0002	<0.0002	0
Kyneton	Quarterly	4	<0.0002	<0.0002	0
Laanecoorie	Quarterly	4	<0.0002	<0.0002	0
Leitchville	Quarterly	4	<0.0002	<0.0002	0
Lockington	Quarterly	4	<0.0002	<0.0002	0
Maiden Gully - Marong	Quarterly	4	<0.0002	<0.0002	0
Maldon	Quarterly	4	<0.0002	<0.0002	0
Malmsbury	Quarterly	4	<0.0002	<0.0002	0
Newstead	Quarterly	4	<0.0002	<0.0002	0
Pyramid Hill	Quarterly	4	<0.0002	<0.0002	0
Raywood	Quarterly	4	<0.0002	<0.0002	0
Rochester	Quarterly	4	<0.0002	<0.0002	0
Sebastian	Quarterly	4	<0.0002	<0.0002	0
Serpentine	Quarterly	4	<0.0002	<0.0002	0
Strathfieldsaye	Quarterly	4	<0.0002	<0.0002	0
Taradale - Elphinstone	Quarterly	4	<0.0002	<0.0002	0
Tarnagulla	Quarterly	4	<0.0002	<0.0002	0
Tooborac	Quarterly	4	<0.0002	<0.0002	0
Trentham	Quarterly	4	<0.0002	<0.0002	0
Tylden	Quarterly	4	<0.0002	<0.0002	0
Wedderburn	Quarterly	4	<0.0002	<0.0002	0

Chlorine – Customer Tap Sites 2022-23

Table 35: Chlorine results for customer tap sites (Water quality standard - ADWG health-based guideline value: 5 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Weekly	52	2.20	1.30	0
Bealiba	Weekly	52	1.00	0.22	0
Bendigo (Northern)	Weekly	136	2.20	1.03	0
Bendigo (Southern)	Weekly	137	2.50	1.33	0
Bendigo (Spring Gully)	Weekly	77	2.30	0.85	0
Big Hill	Weekly	53	2.20	0.75	0
Boort	Weekly	52	2.20	0.93	0
Bridgewater - Inglewood	Weekly	52	2.50	1.79	0
Castlemaine[2]	Weekly	75	2.20	1.24	0
Cohuna	Weekly	52	2.10	1.20	0
Dunolly	Weekly	52	2.10	1.11	0
Echuca	Weekly	76	2.40	1.35	0
Elmore[1]	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Weekly	64	2.20	1.18	0
Fryerstown	Weekly	52	2.10	0.59	0
Goornong	Weekly	52	2.40	0.88	0
Guildford	Weekly	52	0.90	0.20	0
Gunbower	Weekly	52	2.60	1.28	0
Harcourt	Weekly	52	1.40	0.46	0
Heathcote	Weekly	52	2.20	1.47	0
Junortoun	Weekly	52	1.90	0.40	0
Korong Vale	Weekly	52	2.70	1.72	0
Kyneton[2]	Weekly	63	2.40	1.56	0
Laanecoorie	Weekly	52	2.00	1.06	0
Leitchville	Weekly	52	2.20	1.46	0
Lockington	Weekly	52	3.60	1.52	0
Maiden Gully - Marong	Weekly	64	2.40	1.33	0
Maldon	Weekly	52	1.40	0.67	0
Malmsbury	Weekly	52	1.70	0.51	0
Newstead	Weekly	52	1.50	0.52	0
Pyramid Hill	Weekly	52	1.50	0.91	0
Raywood[3]	Weekly	51	2.10	0.98	0
Rochester	Weekly	52	2.70	1.62	0
Sebastian	Weekly	52	2.00	0.69	0
Serpentine[3]	Weekly	51	2.10	0.84	0
Strathfieldsaye	Weekly	64	2.30	1.43	0
Taradale - Elphinstone	Weekly	52	1.70	0.54	0
Tarnagulla	Weekly	52	1.50	0.67	0
Tooborac	Weekly	52	2.10	0.73	0
Trentham	Weekly	52	2.30	1.66	0
Tylden	Weekly	52	2.20	1.39	0
Wedderburn	Weekly	52	2.40	1.41	0

Localities with populations greater than 5,000 have additional sampling to the one sample per week (one additional sample per month for each 5,000 above 5,000 population in accordance with the Australian Drinking Water Guidelines (2011).

Note:

1 Chlorine is not used for disinfection at Elmore.

2 Updated programming created scheduling error, which resulted in missed sample.

3 No access due to flooding.

Chromium – Customer Tap Sites 2022-23

Table 36: Chromium results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.05 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Quarterly	4	<0.001	<0.001	0
Bealiba	Quarterly	4	<0.001	<0.001	0
Bendigo (Northern)	Quarterly	4	<0.001	<0.001	0
Bendigo (Southern)	Quarterly	4	<0.001	<0.001	0
Bendigo (Spring Gully)	Quarterly	4	<0.001	<0.001	0
Big Hill	Quarterly	4	<0.001	<0.001	0
Boort	Quarterly	4	<0.001	<0.001	0
Bridgewater - Inglewood	Quarterly	4	<0.001	<0.001	0
Castlemaine	Quarterly	4	<0.001	<0.001	0
Cohuna	Quarterly	4	<0.001	<0.001	0
Dunolly	Quarterly	4	<0.001	<0.001	0
Echuca	Quarterly	4	<0.001	<0.001	0
Elmore	Quarterly	4	<0.001	<0.001	0
Epsom - Huntly	Quarterly	4	<0.001	<0.001	0
Fryerstown	Quarterly	4	<0.001	<0.001	0
Goornong	Quarterly	4	<0.001	<0.001	0
Guildford	Quarterly	4	<0.001	<0.001	0
Gunbower	Quarterly	4	<0.001	<0.001	0
Harcourt	Quarterly	4	<0.001	<0.001	0
Heathcote	Quarterly	4	<0.001	<0.001	0
Junortoun	Quarterly	4	<0.001	<0.001	0
Korong Vale	Quarterly	4	<0.001	<0.001	0
Kyneton	Quarterly	4	<0.001	<0.001	0
Laanecoorie	Quarterly	4	<0.001	<0.001	0
Leitchville	Quarterly	4	<0.001	<0.001	0
Lockington	Quarterly	4	<0.001	<0.001	0
Maiden Gully - Marong	Quarterly	4	<0.001	<0.001	0
Maldon	Quarterly	4	<0.001	<0.001	0
Malmsbury	Quarterly	4	<0.001	<0.001	0
Newstead	Quarterly	4	<0.001	<0.001	0
Pyramid Hill	Quarterly	4	<0.001	<0.001	0
Raywood	Quarterly	4	<0.001	<0.001	0
Rochester	Quarterly	4	<0.001	<0.001	0
Sebastian	Quarterly	4	<0.001	<0.001	0
Serpentine	Quarterly	4	<0.001	<0.001	0
Strathfieldsaye	Quarterly	4	<0.001	<0.001	0
Taradale - Elphinstone	Quarterly	4	<0.001	<0.001	0
Tarnagulla	Quarterly	4	<0.001	<0.001	0
Tooborac	Quarterly	4	<0.001	<0.001	0
Trentham	Quarterly	4	<0.001	<0.001	0
Tylden	Quarterly	4	<0.001	<0.001	0
Wedderburn	Quarterly	4	<0.001	<0.001	0

Cyanide – Customer Tap Sites 2022-23

Table 37: Cyanide results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.08 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Quarterly	4	<0.005	<0.005	0
Bealiba	Quarterly	4	<0.005	<0.005	0
Bendigo (Northern)	Quarterly	4	<0.005	<0.005	0
Bendigo (Southern)	Quarterly	4	<0.005	<0.005	0
Bendigo (Spring Gully)	Quarterly	4	<0.005	<0.005	0
Big Hill	Quarterly	4	<0.005	<0.005	0
Boort	Quarterly	4	<0.005	<0.005	0
Bridgewater - Inglewood	Quarterly	4	<0.005	<0.005	0
Castlemaine	Quarterly	4	<0.005	<0.005	0
Cohuna	Quarterly	4	<0.005	<0.005	0
Dunolly	Quarterly	4	<0.005	<0.005	0
Echuca	Quarterly	4	<0.005	<0.005	0
Elmore	Quarterly	4	<0.005	<0.005	0
Epsom - Huntly	Quarterly	4	<0.005	<0.005	0
Fryerstown	Quarterly	4	<0.005	<0.005	0
Goornong	Quarterly	4	<0.005	<0.005	0
Guildford	Quarterly	4	<0.005	<0.005	0
Gunbower	Quarterly	4	<0.005	<0.005	0
Harcourt	Quarterly	4	<0.005	<0.005	0
Heathcote	Quarterly	4	<0.005	<0.005	0
Junortoun	Quarterly	4	<0.005	<0.005	0
Korong Vale	Quarterly	4	<0.005	<0.005	0
Kyneton	Quarterly	4	<0.005	<0.005	0
Laanecoorie	Quarterly	4	<0.005	<0.005	0
Leitchville	Quarterly	4	<0.005	<0.005	0
Lockington	Quarterly	4	<0.005	<0.005	0
Maiden Gully - Marong	Quarterly	4	<0.005	<0.005	0
Maldon	Quarterly	4	<0.005	<0.005	0
Malmsbury	Quarterly	4	<0.005	<0.005	0
Newstead	Quarterly	4	<0.005	<0.005	0
Pyramid Hill	Quarterly	4	<0.005	<0.005	0
Raywood	Quarterly	4	<0.005	<0.005	0
Rochester	Quarterly	4	<0.005	<0.005	0
Sebastian	Quarterly	4	<0.005	<0.005	0
Serpentine	Quarterly	4	<0.005	<0.005	0
Strathfieldsaye	Quarterly	4	<0.005	<0.005	0
Taradale - Elphinstone	Quarterly	4	<0.005	<0.005	0
Tarnagulla	Quarterly	4	0.006	0.003	0
Tooborac	Quarterly	4	<0.005	<0.005	0
Trentham	Quarterly	4	<0.005	<0.005	0
Tylden	Quarterly	4	<0.005	<0.005	0
Wedderburn	Quarterly	4	<0.005	<0.005	0

Mercury – Customer Tap Sites 2022-23

Table 38: Mercury results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.001 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Quarterly	4	<0.0001	<0.0001	0
Bealiba	Quarterly	4	<0.0001	<0.0001	0
Bendigo (Northern)	Quarterly	4	<0.0001	<0.0001	0
Bendigo (Southern)	Quarterly	4	<0.0001	<0.0001	0
Bendigo (Spring Gully)	Quarterly	4	<0.0001	<0.0001	0
Big Hill	Quarterly	4	<0.0001	<0.0001	0
Boort	Quarterly	4	<0.0001	<0.0001	0
Bridgewater - Inglewood	Quarterly	4	<0.0001	<0.0001	0
Castlemaine	Quarterly	4	<0.0001	<0.0001	0
Cohuna	Quarterly	4	<0.0001	<0.0001	0
Dunolly	Quarterly	4	<0.0001	<0.0001	0
Echuca	Quarterly	4	<0.0001	<0.0001	0
Elmore	Quarterly	4	<0.0001	<0.0001	0
Epsom - Huntly	Quarterly	4	<0.0001	<0.0001	0
Fryerstown	Quarterly	4	<0.0001	<0.0001	0
Goornong	Quarterly	4	<0.0001	<0.0001	0
Guildford	Quarterly	4	<0.0001	<0.0001	0
Gunbower	Quarterly	4	<0.0001	<0.0001	0
Harcourt	Quarterly	4	<0.0001	<0.0001	0
Heathcote	Quarterly	4	<0.0001	<0.0001	0
Junortoun	Quarterly	4	<0.0001	<0.0001	0
Korong Vale	Quarterly	4	<0.0001	<0.0001	0
Kyneton	Quarterly	4	<0.0001	<0.0001	0
Laanecoorie	Quarterly	4	<0.0001	<0.0001	0
Leitchville	Quarterly	4	<0.0001	<0.0001	0
Lockington	Quarterly	4	<0.0001	<0.0001	0
Maiden Gully - Marong	Quarterly	4	<0.0001	<0.0001	0
Maldon	Quarterly	4	<0.0001	<0.0001	0
Malmsbury	Quarterly	4	<0.0001	<0.0001	0
Newstead	Quarterly	4	<0.0001	<0.0001	0
Pyramid Hill	Quarterly	4	<0.0001	<0.0001	0
Raywood	Quarterly	4	<0.0001	<0.0001	0
Rochester	Quarterly	4	<0.0001	<0.0001	0
Sebastian	Quarterly	4	<0.0001	<0.0001	0
Serpentine	Quarterly	4	<0.0001	<0.0001	0
Strathfieldsaye	Quarterly	4	<0.0001	<0.0001	0
Taradale - Elphinstone	Quarterly	4	<0.0001	<0.0001	0
Tarnagulla	Quarterly	4	<0.0001	<0.0001	0
Tooborac	Quarterly	4	<0.0001	<0.0001	0
Trentham	Quarterly	4	<0.0001	<0.0001	0
Tylden	Quarterly	4	<0.0001	<0.0001	0
Wedderburn	Quarterly	4	<0.0001	<0.0001	0

Nitrate – Customer Tap Sites 2022-23

Table 39: Nitrate results for customer tap sites (Water quality standard - ADWG health-based guideline value: 50 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale[2]	Quarterly	4	1.0	0.9	0
Bealiba[1]	Fortnightly	26	1.4	0.9	0
Bendigo (Northern)[1&3]	Fortnightly	16	0.6	0.4	0
Bendigo (Southern)[1&3]	Fortnightly	16	0.4	0.3	0
Bendigo (Spring Gully)[1&3]	Fortnightly	16	0.8	0.4	0
Big Hill[1&3]	Fortnightly	17	0.8	0.5	0
Boort[2]	Quarterly	4	0.3	0.1	0
Bridgewater-Inglewood[1]	Fortnightly	26	0.1	0.1	0
Castlemaine[2]	Quarterly	4	0.6	0.3	0
Cohuna[2]	Quarterly	4	0.0	0.0	0
Dunolly[1]	Fortnightly	26	0.6	0.4	0
Echuca[2]	Quarterly	4	0.1	0.0	0
Elmore[2]	Quarterly	4	2.4	1.6	0
Epsom - Huntly[1&3]	Fortnightly	17	0.4	0.4	0
Fryerstown[2]	Quarterly	4	0.2	0.2	0
Goornong[2]	Quarterly	4	0.1	0.0	0
Guildford[2]	Quarterly	4	0.2	0.2	0
Gunbower[2]	Quarterly	4	0.2	0.1	0
Harcourt[2]	Quarterly	4	0.2	0.2	0
Heathcote[1]	Fortnightly	26	0.3	0.1	0
Junortoun[1&3]	Fortnightly	17	0.9	0.6	0
Korong Vale[1&4]	Fortnightly	25	0.6	0.2	0
Kyneton[2]	Quarterly	4	0.6	0.5	0
Laanecoorie[1]	Fortnightly	26	1.2	0.4	0
Leitchville[2]	Quarterly	4	0.1	0.0	0
Lockington[2]	Quarterly	4	0.1	0.0	0
Maiden Gully - Marong[1&3]	Fortnightly	17	0.8	0.4	0
Maldon[2]	Quarterly	4	0.3	0.3	0
Malmsbury[2]	Quarterly	4	0.5	0.4	0
Newstead[2]	Quarterly	4	0.2	0.2	0
Pyramid Hill[2]	Quarterly	4	0.0	0.0	0
Raywood[2]	Quarterly	4	1.0	0.8	0
Rochester[2]	Quarterly	4	0.1	0.0	0
Sebastian[2]	Quarterly	4	0.9	0.7	0
Serpentine[2]	Quarterly	4	0.1	0.1	0
Strathfieldsaye[1&3]	Fortnightly	17	0.4	0.3	0
Taradale – Elphinstone[2]	Quarterly	4	0.2	0.2	0
Tarnagulla[1]	Fortnightly	26	1.0	0.4	0
Tooborac[2]	Quarterly	4	0.5	0.4	0
Trentham[2]	Quarterly	4	1.7	1.5	0
Tylden[2]	Quarterly	4	0.6	0.5	0
Wedderburn[1&4]	Fortnightly	25	0.2	0.1	0

Note:

1 Chloraminated systems are sampled fortnightly, to assist in monitoring for nitrification.

2 Chlorinated systems are sampled quarterly.

3 Sampling on-hold during free chlorination project

4 Updated programming created scheduling error, resulted in missed sample.

Selenium – Customer Tap Sites 2022-23

Table 40: Selenium results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.01 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Quarterly	4	<0.001	<0.001	0
Bealiba	Quarterly	4	<0.001	<0.001	0
Bendigo (Northern)	Quarterly	4	<0.001	<0.001	0
Bendigo (Southern)	Quarterly	4	<0.001	<0.001	0
Bendigo (Spring Gully)	Quarterly	4	<0.001	<0.001	0
Big Hill	Quarterly	4	<0.001	<0.001	0
Boort	Quarterly	4	<0.001	<0.001	0
Bridgewater - Inglewood	Quarterly	4	<0.001	<0.001	0
Castlemaine	Quarterly	4	<0.001	<0.001	0
Cohuna	Quarterly	4	<0.001	<0.001	0
Dunolly	Quarterly	4	<0.001	<0.001	0
Echuca	Quarterly	4	<0.001	<0.001	0
Elmore	Quarterly	4	<0.001	<0.001	0
Epsom - Huntly	Quarterly	4	<0.001	<0.001	0
Fryerstown	Quarterly	4	<0.001	<0.001	0
Goornong	Quarterly	4	<0.001	<0.001	0
Guildford	Quarterly	4	<0.001	<0.001	0
Gunbower	Quarterly	4	<0.001	<0.001	0
Harcourt	Quarterly	4	<0.001	<0.001	0
Heathcote	Quarterly	4	<0.001	<0.001	0
Junortoun	Quarterly	4	<0.001	<0.001	0
Korong Vale	Quarterly	4	<0.001	<0.001	0
Kyneton	Quarterly	4	<0.001	<0.001	0
Laanecoorie	Quarterly	4	<0.001	<0.001	0
Leitchville	Quarterly	4	<0.001	<0.001	0
Lockington	Quarterly	4	<0.001	<0.001	0
Maiden Gully - Marong	Quarterly	4	<0.001	<0.001	0
Maldon	Quarterly	4	<0.001	<0.001	0
Malmsbury	Quarterly	4	<0.001	<0.001	0
Newstead	Quarterly	4	<0.001	<0.001	0
Pyramid Hill	Quarterly	4	<0.001	<0.001	0
Raywood	Quarterly	4	<0.001	<0.001	0
Rochester	Quarterly	4	<0.001	<0.001	0
Sebastian	Quarterly	4	<0.001	<0.001	0
Serpentine	Quarterly	4	<0.001	<0.001	0
Strathfieldsaye	Quarterly	4	<0.001	<0.001	0
Taradale - Elphinstone	Quarterly	4	<0.001	<0.001	0
Tarnagulla	Quarterly	4	<0.001	<0.001	0
Tooborac	Quarterly	4	<0.001	<0.001	0
Trentham	Quarterly	4	<0.001	<0.001	0
Tylden	Quarterly	4	<0.001	<0.001	0
Wedderburn	Quarterly	4	<0.001	<0.001	0

Sulphate – Customer Tap Sites 2022-23

Table 41: Sulphate results for customer tap sites (Water quality standard - ADWG health-based guideline value 500 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Quarterly	4	3	1	0
Bealiba	Quarterly	4	85	73	0
Bendigo (Northern)	Quarterly	4	4	1	0
Bendigo (Southern)	Quarterly	4	4	1	0
Bendigo (Spring Gully)	Quarterly	4	4	1	0
Big Hill	Quarterly	4	3	1	0
Boort	Quarterly	4	84	58	0
Bridgewater - Inglewood	Quarterly	4	4	3	0
Castlemaine	Quarterly	4	4	4	0
Cohuna	Quarterly	4	67	39	0
Dunolly	Quarterly	4	77	70	0
Echuca	Quarterly	4	42	33	0
Elmore	Quarterly	4	23	12	0
Epsom - Huntly	Quarterly	4	3	2	0
Fryerstown	Quarterly	4	5	4	0
Goornong	Quarterly	4	70	58	0
Guildford	Quarterly	4	5	4	0
Gunbower	Quarterly	4	2	2	0
Harcourt	Quarterly	4	6	4	0
Heathcote	Quarterly	4	53	53	0
Junortoun	Quarterly	4	3	2	0
Korong Vale	Quarterly	4	14	12	0
Kyneton	Quarterly	4	3	1	0
Laanecoorie	Quarterly	4	76	70	0
Leitchville	Quarterly	4	68	41	0
Lockington	Quarterly	4	3	3	0
Maiden Gully - Marong	Quarterly	4	4	1	0
Maldon	Quarterly	4	6	4	0
Malmsbury	Quarterly	4	3	1	0
Newstead	Quarterly	4	4	4	0
Pyramid Hill	Quarterly	4	43	37	0
Raywood	Quarterly	4	4	1	0
Rochester	Quarterly	4	46	32	0
Sebastian	Quarterly	4	3	2	0
Serpentine	Quarterly	4	23	21	0
Strathfieldsaye	Quarterly	4	4	1	0
Taradale - Elphinstone	Quarterly	4	4	4	0
Tarnagulla	Quarterly	4	80	71	0
Tooborac	Quarterly	4	55	53	0
Trentham	Quarterly	4	1	1	0
Tylden	Quarterly	4	3	1	0
Wedderburn	Quarterly	4	14	12	0

Manganese – Customer Tap Sites 2022-23

Table 42: Manganese results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.5 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Monthly	12	0.004	0.001	0
Bealiba	Monthly	12	0.005	0.002	0
Bendigo (Northern)	Monthly	12	0.004	0.001	0
Bendigo (Southern)	Monthly	12	0.006	0.002	0
Bendigo (Spring Gully)	Monthly	12	0.005	0.001	0
Big Hill	Monthly	12	0.003	0.002	0
Boort	Monthly	12	0.004	0.001	0
Bridgewater - Inglewood	Monthly	12	<0.001	<0.001	0
Castlemaine	Monthly	12	0.002	0.001	0
Cohuna	Monthly	12	0.040	0.008	0
Dunolly	Monthly	12	0.019	0.006	0
Echuca	Monthly	12	0.023	0.005	0
Elmore	Monthly	12	0.001	0.001	0
Epsom - Huntly	Monthly	12	0.004	0.001	0
Fryerstown	Monthly	12	0.002	0.001	0
Goornong	Monthly	12	0.003	0.001	0
Guildford	Monthly	12	0.002	0.001	0
Gunbower	Monthly	12	0.017	0.002	0
Harcourt	Monthly	12	0.002	0.001	0
Heathcote	Monthly	12	0.007	0.004	0
Junortoun	Monthly	12	0.003	0.001	0
Korong Vale	Monthly	12	0.002	0.001	0
Kyneton	Monthly	12	0.002	0.001	0
Laanecoorie	Monthly	12	0.017	0.009	0
Leitchville	Monthly	12	0.015	0.003	0
Lockington	Monthly	12	0.001	0.001	0
Maiden Gully - Marong	Monthly	12	0.005	0.001	0
Maldon	Monthly	12	0.007	0.001	0
Malmsbury	Monthly	12	0.008	0.001	0
Newstead	Monthly	12	0.004	0.001	0
Pyramid Hill	Monthly	12	0.008	0.003	0
Raywood	Monthly	12	0.001	0.001	0
Rochester	Monthly	12	0.003	0.001	0
Sebastian	Monthly	12	0.084	0.007	0
Serpentine	Monthly	12	0.003	0.002	0
Strathfieldsaye	Monthly	12	0.004	0.001	0
Taradale - Elphinstone	Monthly	12	0.003	0.001	0
Tarnagulla	Monthly	12	0.018	0.005	0
Tooborac	Monthly	12	0.012	0.004	0
Trentham	Monthly	12	0.001	0.001	0
Tylden	Monthly	12	0.006	0.001	0
Wedderburn	Monthly	12	<0.001	<0.001	0

Copper – Customer Tap Sites 2022-23

Table 43: Copper results for customer tap sites (Water quality standard - ADWG health-based guideline value: 2.0 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Monthly	12	0.01	0.01	0
Bealiba	Monthly	12	0.02	0.01	0
Bendigo (Northern)	Monthly	12	0.03	0.01	0
Bendigo (Southern)	Monthly	12	0.02	0.01	0
Bendigo (Spring Gully)	Monthly	12	0.04	0.01	0
Big Hill	Monthly	12	0.05	0.01	0
Boort	Monthly	12	0.01	0.00	0
Bridgewater - Inglewood	Monthly	12	0.00	0.00	0
Castlemaine	Monthly	12	0.07	0.02	0
Cohuna	Monthly	12	0.01	0.00	0
Dunolly	Monthly	12	0.01	0.00	0
Echuca	Monthly	12	0.01	0.00	0
Elmore	Monthly	12	0.02	0.00	0
Epsom - Huntly	Monthly	12	0.07	0.01	0
Fryerstown	Monthly	12	0.05	0.02	0
Goornong	Monthly	12	0.00	0.00	0
Guildford	Monthly	12	0.03	0.01	0
Gunbower	Monthly	12	0.01	0.00	0
Harcourt	Monthly	12	0.04	0.02	0
Heathcote	Monthly	12	0.02	0.01	0
Junortoun	Monthly	12	0.03	0.01	0
Korong Vale	Monthly	12	0.00	0.00	0
Kyneton	Monthly	12	0.03	0.01	0
Laanecoorie	Monthly	12	0.00	0.00	0
Leitchville	Monthly	12	0.01	0.00	0
Lockington	Monthly	12	0.00	0.00	0
Maiden Gully - Marong	Monthly	12	0.01	0.01	0
Maldon	Monthly	12	0.08	0.03	0
Malmsbury	Monthly	12	0.02	0.01	0
Newstead	Monthly	12	0.02	0.01	0
Pyramid Hill	Monthly	12	0.01	0.00	0
Raywood	Monthly	12	0.02	0.01	0
Rochester	Monthly	12	0.02	0.01	0
Sebastian	Monthly	12	0.04	0.02	0
Serpentine	Monthly	12	0.01	0.00	0
Strathfieldsaye	Monthly	12	0.04	0.01	0
Taradale - Elphinstone	Monthly	12	0.03	0.01	0
Tarnagulla	Monthly	12	0.02	0.01	0
Tooborac	Monthly	12	0.01	0.01	0
Trentham	Monthly	12	0.02	0.01	0
Tylden	Monthly	12	0.02	0.01	0
Wedderburn	Monthly	12	<0.001	<0.001	0

Lead – Customer Tap Sites 2022-23

Table 44: Lead results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.01 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Monthly	12	0.0010	0.0005	0
Bealiba	Monthly	12	0.0010	0.0005	0
Bendigo (Northern)	Monthly	12	<0.001	<0.001	0
Bendigo (Southern)	Monthly	12	<0.001	<0.001	0
Bendigo (Spring Gully)	Monthly	12	<0.001	<0.001	0
Big Hill	Monthly	12	<0.001	<0.001	0
Boort	Monthly	12	<0.001	<0.001	0
Bridgewater - Inglewood	Monthly	12	<0.001	<0.001	0
Castlemaine	Monthly	12	<0.001	<0.001	0
Cohuna	Monthly	12	<0.001	<0.001	0
Dunolly	Monthly	12	<0.001	<0.001	0
Echuca	Monthly	12	<0.001	<0.001	0
Elmore	Monthly	12	0.0010	0.0005	0
Epsom - Huntly	Monthly	12	<0.001	<0.001	0
Fryerstown	Monthly	12	0.0080	0.0011	0
Goornong	Monthly	12	<0.001	<0.001	0
Guildford	Monthly	12	<0.001	<0.001	0
Gunbower	Monthly	12	<0.001	<0.001	0
Harcourt	Monthly	12	<0.001	<0.001	0
Heathcote	Monthly	12	<0.001	<0.001	0
Junortoun	Monthly	12	0.0040	0.0008	0
Korong Vale	Monthly	12	<0.001	<0.001	0
Kyneton	Monthly	12	<0.001	<0.001	0
Laanecoorie	Monthly	12	<0.001	<0.001	0
Leitchville	Monthly	12	<0.001	<0.001	0
Lockington	Monthly	12	<0.001	<0.001	0
Maiden Gully - Marong	Monthly	12	<0.001	<0.001	0
Maldon	Monthly	12	<0.001	<0.001	0
Malmsbury	Monthly	12	0.0010	0.0005	0
Newstead	Monthly	12	<0.001	<0.001	0
Pyramid Hill	Monthly	12	<0.001	<0.001	0
Raywood	Monthly	12	<0.001	<0.001	0
Rochester	Monthly	12	<0.001	<0.001	0
Sebastian	Monthly	12	0.0060	0.0009	0
Serpentine	Monthly	12	<0.001	<0.001	0
Strathfieldsaye	Monthly	12	<0.001	<0.001	0
Taradale - Elphinstone	Monthly	12	<0.001	<0.001	0
Tarnagulla	Monthly	12	<0.001	<0.001	0
Tooborac	Monthly	12	<0.001	<0.001	0
Trentham	Monthly	12	<0.001	<0.001	0
Tylden	Monthly	12	<0.001	<0.001	0
Wedderburn	Monthly	12	<0.001	<0.001	0

Nickel – Customer Tap Sites 2022-23

Table 45: Nickel results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.02 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Monthly	12	0.00	0.00	0
Bealiba	Monthly	12	0.00	0.00	0
Bendigo (Northern)	Monthly	12	0.00	0.00	0
Bendigo (Southern)	Monthly	12	0.00	0.00	0
Bendigo (Spring Gully)	Monthly	12	0.00	0.00	0
Big Hill	Monthly	12	0.00	0.00	0
Boort	Monthly	12	0.00	0.00	0
Bridgewater - Inglewood	Monthly	12	<0.001	<0.001	0
Castlemaine	Monthly	12	0.00	0.00	0
Cohuna	Monthly	12	0.00	0.00	0
Dunolly	Monthly	12	0.00	0.00	0
Echuca	Monthly	12	<0.001	<0.001	0
Elmore	Monthly	12	0.00	0.00	0
Epsom - Huntly	Monthly	12	0.00	0.00	0
Fryerstown	Monthly	12	0.00	0.00	0
Goornong	Monthly	12	0.00	0.00	0
Guildford	Monthly	12	0.00	0.00	0
Gunbower	Monthly	12	<0.001	<0.001	0
Harcourt	Monthly	12	<0.001	<0.001	0
Heathcote	Monthly	12	0.00	0.00	0
Junortoun	Monthly	12	0.00	0.00	0
Korong Vale	Monthly	12	<0.001	<0.001	0
Kyneton	Monthly	12	<0.001	<0.001	0
Laanecoorie	Monthly	12	0.00	0.00	0
Leitchville	Monthly	12	<0.001	<0.001	0
Lockington	Monthly	12	<0.001	<0.001	0
Maiden Gully - Marong	Monthly	12	0.00	0.00	0
Maldon	Monthly	12	<0.001	<0.001	0
Malmsbury	Monthly	12	<0.001	<0.001	0
Newstead	Monthly	12	0.00	0.00	0
Pyramid Hill	Monthly	12	<0.001	<0.001	0
Raywood	Monthly	12	0.00	0.00	0
Rochester	Monthly	12	0.00	0.00	0
Sebastian	Monthly	12	0.00	0.00	0
Serpentine	Monthly	12	<0.001	<0.001	0
Strathfieldsaye	Monthly	12	0.00	0.00	0
Taradale - Elphinstone	Monthly	12	0.00	0.00	0
Tarnagulla	Monthly	12	0.00	0.00	0
Tooborac	Monthly	12	0.00	0.00	0
Trentham	Monthly	12	<0.001	<0.001	0
Tylden	Monthly	12	<0.001	<0.001	0
Wedderburn	Monthly	12	<0.001	<0.001	0

Alpha Count – Customer Tap Sites 2022-23

Table 46: Alpha count results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.5 bq/L)

Water Sampling Locality	Sampling frequency	Number of samples	Value (bq/L)	Number of samples where standard was not met
Axedale	Annual	1	<0.05	0
Bealiba	Annual	1	<0.05	0
Bendigo (Northern)	Annual	1	<0.05	0
Bendigo (Southern)	Annual	1	<0.05	0
Bendigo (Spring Gully)	Annual	1	<0.05	0
Big Hill	Annual	1	<0.05	0
Boort	Annual	1	<0.05	0
Bridgewater - Inglewood	Annual	1	<0.05	0
Castlemaine	Annual	1	<0.05	0
Cohuna	Annual	1	<0.05	0
Dunolly	Annual	1	<0.05	0
Echuca	Annual	1	<0.05	0
Elmore	Annual	1	0.06	0
Epsom - Huntly	Annual	1	<0.05	0
Fryerstown	Annual	1	<0.05	0
Goornong	Annual	1	<0.05	0
Guildford	Annual	1	<0.05	0
Gunbower	Annual	1	<0.05	0
Harcourt	Annual	1	<0.05	0
Heathcote	Annual	1	<0.05	0
Junortoun	Annual	1	<0.05	0
Korong Vale	Annual	1	<0.05	0
Kyneton	Annual	1	<0.05	0
Laanecoorie	Annual	1	<0.05	0
Leitchville	Annual	1	<0.05	0
Lockington	Annual	1	<0.05	0
Maiden Gully - Marong	Annual	1	<0.05	0
Maldon	Annual	1	<0.05	0
Malmsbury	Annual	1	<0.05	0
Newstead	Annual	1	<0.05	0
Pyramid Hill	Annual	1	<0.05	0
Raywood	Annual	1	<0.05	0
Rochester	Annual	1	<0.05	0
Sebastian	Annual	1	<0.05	0
Serpentine	Annual	1	<0.05	0
Strathfieldsaye	Annual	1	<0.05	0
Taradale - Elphinstone	Annual	1	<0.05	0
Tarnagulla	Annual	1	<0.05	0
Tooborac	Annual	1	<0.05	0
Trentham	Annual	1	<0.05	0
Tylden	Annual	1	<0.05	0
Wedderburn	Annual	1	<0.05	0

Beta Count – Customer Tap Sites 2022-23

Table 47: Beta count results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.5 bq/L)

Water Sampling Locality	Sampling frequency	Number of samples	Value (bq/L)	Number of samples where standard was not met
Axedale	Annual	1	<0.1	0
Bealiba	Annual	1	<0.10	0
Bendigo (Northern)	Annual	1	<0.10	0
Bendigo (Southern)	Annual	1	<0.10	0
Bendigo (Spring Gully)	Annual	1	<0.10	0
Big Hill	Annual	1	<0.10	0
Boort	Annual	1	<0.10	0
Bridgewater - Inglewood	Annual	1	<0.10	0
Castlemaine	Annual	1	<0.10	0
Cohuna	Annual	1	<0.10	0
Dunolly	Annual	1	<0.10	0
Echuca	Annual	1	<0.10	0
Elmore	Annual	1	<0.1	0
Epsom - Huntly	Annual	1	<0.10	0
Fryerstown	Annual	1	<0.1	0
Goornong	Annual	1	<0.10	0
Guildford	Annual	1	<0.1	0
Gunbower	Annual	1	<0.1	0
Harcourt	Annual	1	<0.1	0
Heathcote	Annual	1	<0.10	0
Junortoun	Annual	1	<0.1	0
Korong Vale	Annual	1	<0.10	0
Kyneton	Annual	1	<0.1	0
Laanecoorie	Annual	1	<0.1	0
Leitchville	Annual	1	<0.10	0
Lockington	Annual	1	<0.1	0
Maiden Gully - Marong	Annual	1	<0.10	0
Maldon	Annual	1	<0.1	0
Malmsbury	Annual	1	<0.1	0
Newstead	Annual	1	<0.1	0
Pyramid Hill	Annual	1	<0.10	0
Raywood	Annual	1	<0.10	0
Rochester	Annual	1	<0.10	0
Sebastian	Annual	1	<0.1	0
Serpentine	Annual	1	<0.10	0
Strathfieldsaye	Annual	1	<0.10	0
Taradale - Elphinstone	Annual	1	<0.10	0
Tarnagulla	Annual	1	<0.1	0
Tooborac	Annual	1	<0.10	0
Trentham	Annual	1	<0.10	0
Tylden	Annual	1	<0.10	0
Wedderburn	Annual	1	<0.10	0

Nitrite – Customer Tap Sites 2022-23

Table 48: Nitrite results for customer tap sites (Water quality standard - ADWG health-based guideline value: 3.0 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	n/a	n/a	n/a	n/a	n/a
Bealiba	Fortnightly	26	0.28	0.08	0
Bendigo (Northern)[1]	Fortnightly	14	0.42	0.14	0
Bendigo (Southern)[1]	Fortnightly	14	0.15	0.04	0
Bendigo (Spring Gully)[1]	Fortnightly	14	0.40	0.12	0
Big Hill[1]	Fortnightly	15	0.41	0.08	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater - Inglewood	Fortnightly	26	0.02	0.01	0
Castlemaine	n/a	n/a	n/a	n/a	n/a
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly	Fortnightly	26	0.24	0.06	0
Echuca	n/a	n/a	n/a	n/a	n/a
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly[1]	Fortnightly	15	0.47	0.10	0
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	n/a	n/a	n/a	n/a	n/a
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt	n/a	n/a	n/a	n/a	n/a
Heathcote	Fortnightly	26	0.05	0.01	0
Junortoun[1]	Fortnightly	14	0.50	0.17	0
Korong Vale[2]	Fortnightly	25	0.14	0.02	0
Kyneton	n/a	n/a	n/a	n/a	n/a
Laanecoorie	Fortnightly	26	0.28	0.03	0
Leitchville	n/a	n/a	n/a	n/a	n/a
Lockington	n/a	n/a	n/a	n/a	n/a
Maiden Gully - Marong[1]	Fortnightly	14	0.41	0.10	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	n/a	n/a	n/a	n/a	n/a
Newstead	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester	n/a	n/a	n/a	n/a	n/a
Sebastian	n/a	n/a	n/a	n/a	n/a
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye[1&2]	Fortnightly	14	0.13	0.04	0
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla	Fortnightly	26	0.36	0.11	0
Tooborac	n/a	n/a	n/a	n/a	n/a
Trentham	n/a	n/a	n/a	n/a	n/a
Tylden	n/a	n/a	n/a	n/a	n/a
Wedderburn[2]	Fortnightly	25	0.33	0.08	0

Note:

1 Sampling on-hold during free chlorination project

2 Updated programming created scheduling error, resulted in missed sample.

NDMA – Customer Tap Sites 2022-23

Table 49: NDMA results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.1 ug/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (ug/L)	Average (ug/L)	Number of samples where standard was not met
Axedale	Quarterly	4	<0.003	<0.003	0
Bealiba	Quarterly	4	0.0230	0.0148	0
Bendigo (Northern)	Quarterly	4	<0.003	<0.003	0
Bendigo (Southern)	Quarterly	4	<0.003	<0.003	0
Bendigo (Spring Gully)	Quarterly	4	<0.003	<0.003	0
Big Hill	Quarterly	4	<0.003	<0.003	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater - Inglewood	Quarterly	4	0.0170	0.0135	0
Castlemaine	n/a	n/a	n/a	n/a	n/a
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly	Quarterly	4	0.0110	0.0073	0
Echuca	n/a	n/a	n/a	n/a	n/a
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom – Huntly[1]	Quarterly	3	<0.003	<0.003	0
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	n/a	n/a	n/a	n/a	n/a
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt	n/a	n/a	n/a	n/a	n/a
Heathcote	Quarterly	4	0.0070	0.0033	0
Junortoun[1]	Quarterly	3	<0.003	<0.003	0
Korong Vale	Quarterly	4	<0.003	<0.003	0
Kyneton	n/a	n/a	n/a	n/a	n/a
Laanecoorie	Quarterly	4	0.0100	0.0065	0
Leitchville	n/a	n/a	n/a	n/a	n/a
Lockington	n/a	n/a	n/a	n/a	n/a
Maiden Gully – Marong[1]	Quarterly	3	<0.003	<0.003	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	n/a	n/a	n/a	n/a	n/a
Newstead	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Raywood	Quarterly	4	<0.003	<0.003	0
Rochester	n/a	n/a	n/a	n/a	n/a
Sebastian[1]	Quarterly	3	<0.003	<0.003	0
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye[1]	Quarterly	3	<0.003	<0.003	0
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla	Quarterly	4	0.0100	0.0075	0
Tooborac	Quarterly	4	0.0050	0.0030	0
Trentham	n/a	n/a	n/a	n/a	n/a
Tylden	n/a	n/a	n/a	n/a	n/a
Wedderburn	Quarterly	4	0.0060	0.0034	0

Note:

Localities where chloramination is not part of the treatment process have not had NDMA included in their monitoring program.

1 Sampling on-hold during free chlorination project.

pH – Customer Tap Sites 2022-23

Table 50: pH results for customer tap sites (operating range: 6.5 - 8.5 pH Units)

Water Sampling Locality	Sampling frequency	Number of samples	Minimum	Maximum
Axedale	Monthly	12	7.6	8.0
Bealiba[1]	Monthly	12	8.0	8.8
Bendigo (Northern)	Monthly	12	7.3	8.0
Bendigo (Southern)	Monthly	12	7.4	8.1
Bendigo (Spring Gully)	Monthly	12	7.3	8.0
Big Hill	Monthly	12	7.3	8.0
Boort	Monthly	12	7.3	7.9
Bridgewater - Inglewood[1]	Monthly	12	7.7	9.0
Castlemaine	Monthly	12	7.2	7.9
Cohuna	Monthly	12	7.3	7.9
Dunolly[1]	Monthly	12	8.2	8.8
Echuca	Monthly	12	7.4	7.8
Elmore[1]	Monthly	12	6.5	8.6
Epsom - Huntly	Monthly	12	7.3	8.0
Fryerstown	Monthly	12	7.4	8.1
Goornong	Monthly	12	7.2	8.5
Guildford	Monthly	12	7.4	7.8
Gunbower	Monthly	12	7.4	8.1
Harcourt	Monthly	12	7.4	8.1
Heathcote	Monthly	12	7.5	8.3
Junortoun	Monthly	12	7.4	8.0
Korong Vale[1]	Monthly	12	7.6	10.6
Kyneton	Monthly	12	7.4	8.0
Laanecoorie	Monthly	12	8.0	8.3
Leitchville	Monthly	12	7.2	8.0
Lockington[1]	Monthly	12	7.7	8.8
Maiden Gully - Marong	Monthly	12	7.5	8.0
Maldon	Monthly	12	7.6	8.2
Malmsbury	Monthly	12	7.6	8.2
Newstead	Monthly	12	7.5	8.1
Pyramid Hill	Monthly	12	7.2	7.9
Raywood	Monthly	12	7.4	7.8
Rochester	Monthly	12	7.2	7.7
Sebastian[1]	Monthly	12	7.5	9.0
Serpentine[1]	Monthly	12	7.8	9.6
Strathfieldsaye	Monthly	12	7.3	8.0
Taradale - Elphinstone	Monthly	12	7.4	8.0
Tarnagulla[1]	Monthly	12	8.2	9.1
Tooborac[1]	Monthly	12	7.5	9.1
Trentham	Monthly	12	7.1	8.0
Tylden	Monthly	12	7.3	8.0
Wedderburn[1]	Monthly	12	7.7	9.3

Note:

1 Refer to section 4.3.1.2 for details on exceedances.

Aluminium – Customer Tap Sites 2022-23

Table 51: Aluminium results for customer tap sites (ADWG aesthetic guideline value: 0.2 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Quarterly	4	0.04	0.03	0
Bealiba	Quarterly	4	0.02	0.02	0
Bendigo (Northern)	Quarterly	4	0.04	0.04	0
Bendigo (Southern)	Quarterly	4	0.05	0.04	0
Bendigo (Spring Gully)	Quarterly	4	0.04	0.04	0
Big Hill	Quarterly	4	0.04	0.04	0
Boort	Quarterly	4	0.02	0.02	0
Bridgewater - Inglewood	Quarterly	4	0.08	0.06	0
Castlemaine	Quarterly	4	0.03	0.03	0
Cohuna	Quarterly	4	0.04	0.02	0
Dunolly	Quarterly	4	0.03	0.02	0
Echuca	Quarterly	4	0.06	0.05	0
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Quarterly	4	0.04	0.04	0
Fryerstown	Quarterly	4	0.03	0.03	0
Goornong	Quarterly	4	0.05	0.05	0
Guildford	Quarterly	4	0.03	0.02	0
Gunbower	Quarterly	4	0.14	0.06	0
Harcourt	Quarterly	4	0.03	0.02	0
Heathcote	Quarterly	4	0.03	0.02	0
Junortoun	Quarterly	4	0.04	0.04	0
Korong Vale	Quarterly	4	0.02	0.01	0
Kyneton	Quarterly	4	0.04	0.04	0
Laanecoorie	Quarterly	4	0.04	0.03	0
Leitchville	Quarterly	4	0.02	0.01	0
Lockington	Quarterly	4	0.14	0.09	0
Maiden Gully - Marong	Quarterly	4	0.06	0.04	0
Maldon	Quarterly	4	0.02	0.02	0
Malmsbury	Quarterly	4	0.03	0.03	0
Newstead	Quarterly	4	0.03	0.03	0
Pyramid Hill	Quarterly	4	0.03	0.02	0
Raywood	Quarterly	4	0.04	0.03	0
Rochester	Quarterly	4	<0.01	<0.01	0
Sebastian	Quarterly	4	0.18	0.07	0
Serpentine	Quarterly	4	0.04	0.03	0
Strathfieldsaye	Quarterly	4	0.04	0.04	0
Taradale - Elphinstone	Quarterly	4	0.03	0.03	0
Tarnagulla	Quarterly	4	0.02	0.02	0
Tooborac	Quarterly	4	0.02	0.02	0
Trentham	n/a	n/a	n/a	n/a	n/a
Tylden	Quarterly	4	0.03	0.03	0
Wedderburn	Quarterly	4	0.02	0.02	0

Note:

1 An aluminium based product is not used for coagulation at Elmore or Trentham, and therefore aluminium is not deemed to be a significant risk in this water supply.

Hardness – Customer Tap Sites 2022-23

To minimise undesirable build-up of scale in hot water systems, total hardness (as calcium carbonate) in drinking water should not exceed 200 mg/L.

Table 52: Hardness results for customer tap sites (ADWG aesthetic guideline limit: 200mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where guideline was not met
Axedale	Quarterly	4	80	71	0
Bealiba	Quarterly	4	160	138	0
Bendigo (Northern)	Quarterly	4	68	63	0
Bendigo (Southern)	Quarterly	4	65	62	0
Bendigo (Spring Gully)	Quarterly	4	71	65	0
Big Hill	Quarterly	4	69	63	0
Boort	Quarterly	4	110	108	0
Bridgewater - Inglewood	Quarterly	4	25	20	0
Castlemaine	Quarterly	4	80	60	0
Cohuna	Quarterly	4	29	26	0
Dunolly	Quarterly	4	140	112	0
Echuca	Quarterly	4	25	17	0
Elmore	Quarterly	4	210	143	1
Epsom - Huntly	Quarterly	4	75	65	0
Fryerstown	Quarterly	4	78	63	0
Goornong	Quarterly	4	110	88	0
Guildford	Quarterly	4	79	67	0
Gunbower	Quarterly	4	26	21	0
Harcourt	Quarterly	4	79	70	0
Heathcote	Quarterly	4	120	110	0
Junortoun	Quarterly	4	74	67	0
Korong Vale	Quarterly	4	19	17	0
Kyneton	Quarterly	4	86	72	0
Laanecoorie	Quarterly	4	150	117	0
Leitchville	Quarterly	4	29	24	0
Lockington	Quarterly	4	32	25	0
Maiden Gully - Marong	Quarterly	4	76	66	0
Maldon	Quarterly	4	89	75	0
Malmsbury	Quarterly	4	84	70	0
Newstead	Quarterly	4	80	64	0
Pyramid Hill	Quarterly	4	61	47	0
Raywood	Quarterly	4	71	63	0
Rochester	Quarterly	4	23	20	0
Sebastian	Quarterly	4	72	68	0
Serpentine	Quarterly	4	45	38	0
Strathfieldsaye	Quarterly	4	71	66	0
Taradale - Elphinstone	Quarterly	4	96	78	0
Tarnagulla	Quarterly	4	160	135	0
Tooborac	Quarterly	4	130	116	0
Trentham	Quarterly	4	55	40	0
Tylden	Quarterly	4	88	71	0
Wedderburn	Quarterly	4	21	18	0

Note:

1 Refer to section 4.3.1.2 for details on exceedances.

Iron – Customer Tap Sites 2022-23

The samples taken for analysis were obtained from the reticulation system. Iron levels may be higher at customers' internal taps, where galvanised iron pipes have been used in customers' plumbing.

Table 53: Iron results for customer tap sites (ADWG aesthetic guideline limit: 0.3 mg/L)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (mg/L)	Average (mg/L)	Number of samples where guideline was not met
Axedale	Monthly	12	0.05	0.02	0
Bealiba	Monthly	12	0.09	0.02	0
Bendigo (Northern)	Monthly	12	0.11	0.02	0
Bendigo (Southern)	Monthly	12	0.02	0.01	0
Bendigo (Spring Gully)	Monthly	12	0.03	0.02	0
Big Hill	Monthly	12	0.12	0.04	0
Boort	Monthly	12	0.06	0.03	0
Bridgewater - Inglewood	Monthly	12	0.04	0.01	0
Castlemaine	Monthly	12	0.02	0.01	0
Cohuna	Monthly	12	0.04	0.02	0
Dunolly	Monthly	12	0.01	0.01	0
Echuca	Monthly	12	0.02	0.01	0
Elmore	Monthly	12	<0.01	<0.01	0
Epsom - Huntly	Monthly	12	0.02	0.02	0
Fryerstown	Monthly	12	0.04	0.03	0
Goornong	Monthly	12	0.06	0.02	0
Guildford	Monthly	12	0.03	0.02	0
Gunbower	Monthly	12	0.02	0.01	0
Harcourt	Monthly	12	0.04	0.02	0
Heathcote	Monthly	12	0.05	0.03	0
Junortoun	Monthly	12	0.02	0.01	0
Korong Vale	Monthly	12	0.14	0.05	0
Kyneton[1]	Monthly	12	0.03	0.01	0
Laanecoorie	Monthly	12	0.05	0.02	0
Leitchville	Monthly	12	0.02	0.01	0
Lockington	Monthly	12	0.01	0.01	0
Maiden Gully - Marong	Monthly	12	0.02	0.01	0
Maldon	Monthly	12	0.03	0.02	0
Malmsbury	Monthly	12	0.09	0.02	0
Newstead	Monthly	12	0.03	0.02	0
Pyramid Hill	Monthly	12	0.02	0.01	0
Raywood	Monthly	12	0.03	0.02	0
Rochester	Monthly	12	0.07	0.02	0
Sebastian[1]	Monthly	12	0.60	0.06	1
Serpentine	Monthly	12	0.05	0.03	0
Strathfieldsaye	Monthly	12	0.25	0.04	0
Taradale - Elphinstone	Monthly	12	0.03	0.02	0
Tarnagulla	Monthly	12	0.02	0.01	0
Tooborac	Monthly	12	0.27	0.08	0
Trentham	Monthly	12	0.03	0.01	0
Tylden	Monthly	12	0.14	0.03	0
Wedderburn[1]	Monthly	12	0.34	0.06	1

Note:

1 Refer to section 4.3.1.2 for details on exceedances.

True Colour – Customer Tap Sites 2022-23

Based on aesthetic considerations, true colour in drinking water should not exceed 15 HU.

Table 54: True Colour results for customer tap sites (ADWG aesthetic guideline limit: 15 HU)

Water Sampling Locality	Sampling frequency	Number of samples[1]	Maximum (HU)	Average (HU)	Number of samples where guideline was not met
Axedale	Monthly	12	2	1	0
Bealiba	Monthly	12	2	1	0
Bendigo (Northern)	Monthly	12	6	2	0
Bendigo (Southern)	Monthly	12	4	1	0
Bendigo (Spring Gully)	Monthly	12	4	2	0
Big Hill	Monthly	12	4	2	0
Boort	Monthly	12	<2	<2	0
Bridgewater - Inglewood	Monthly	12	2	1	0
Castlemaine	Monthly	12	2	1	0
Cohuna	Monthly	12	2	1	0
Dunolly	Monthly	12	4	2	0
Echuca	Monthly	12	2	1	0
Elmore	Monthly	12	<2	<2	0
Epsom - Huntly	Monthly	12	2	1	0
Fryerstown	Monthly	12	2	1	0
Goornong	Monthly	12	2	1	0
Guildford	Monthly	12	6	1	0
Gunbower	Monthly	12	4	1	0
Harcourt	Monthly	12	4	1	0
Heathcote	Monthly	12	4	2	0
Junortoun	Monthly	12	2	1	0
Korong Vale	Monthly	12	4	2	0
Kyneton	Monthly	12	<2	<2	0
Laanecoorie	Monthly	12	4	2	0
Leitchville	Monthly	12	<2	<2	0
Lockington	Monthly	12	<2	<2	0
Maiden Gully - Marong	Monthly	12	4	1	0
Maldon	Monthly	12	2	1	0
Malmsbury	Monthly	12	2	1	0
Newstead	Monthly	12	2	1	0
Pyramid Hill	Monthly	12	<2	<2	0
Raywood	Monthly	12	2	1	0
Rochester	Monthly	12	<2	<2	0
Sebastian	Monthly	12	2	1	0
Serpentine	Monthly	12	<2	<2	0
Strathfieldsaye	Monthly	12	4	1	0
Taradale - Elphinstone	Monthly	12	4	1	0
Tarnagulla	Monthly	12	4	2	0
Tooborac	Monthly	12	2	1	0
Trentham	Monthly	12	2	1	0
Tylden	Monthly	12	2	1	0
Wedderburn	Monthly	12	6	2	0

Electrical Conductivity – Customer Tap Sites 2022-23

Based on taste, total dissolved solids in drinking water should not exceed 600 mg/L, equivalent to approximately 1,200 µS/cm in electrical conductivity.

Table 55: Electrical Conductivity results for customer tap sites (ADWG aesthetic guideline limit: 1,200 µS/cm)

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (µS/cm)	Average (µS/cm)	Number of samples where guideline was not met
Axedale	Monthly	12	240	228	0
Bealiba	Monthly	12	920	728	0
Bendigo (Northern)	Monthly	12	240	216	0
Bendigo (Southern)	Monthly	12	230	212	0
Bendigo (Spring Gully)	Monthly	12	230	213	0
Big Hill	Monthly	12	220	213	0
Boort	Monthly	12	670	601	0
Bridgewater - Inglewood	Monthly	12	130	121	0
Castlemaine	Monthly	12	260	238	0
Cohuna	Monthly	12	350	193	0
Dunolly	Monthly	12	920	691	0
Echuca	Monthly	12	260	167	0
Elmore	Monthly	12	1,000	720	0
Epsom - Huntly	Monthly	12	230	213	0
Fryerstown	Monthly	12	270	250	0
Goornong	Monthly	12	640	515	0
Guildford	Monthly	12	260	248	0
Gunbower	Monthly	12	220	129	0
Harcourt	Monthly	12	260	245	0
Heathcote	Monthly	12	650	581	0
Junortoun	Monthly	12	230	217	0
Korong Vale	Monthly	12	190	139	0
Kyneton	Monthly	12	210	205	0
Laanecoorie	Monthly	12	940	703	0
Leitchville	Monthly	12	280	169	0
Lockington	Monthly	12	160	142	0
Maiden Gully - Marong	Monthly	12	230	213	0
Maldon	Monthly	12	270	254	0
Malmsbury	Monthly	12	210	205	0
Newstead	Monthly	12	260	240	0
Pyramid Hill	Monthly	12	250	217	0
Raywood	Monthly	12	250	232	0
Rochester	Monthly	12	600	234	0
Sebastian	Monthly	12	250	231	0
Serpentine	Monthly	12	190	179	0
Strathfieldsaye	Monthly	12	240	214	0
Taradale - Elphinstone	Monthly	12	260	241	0
Tarnagulla	Monthly	12	1,000	726	0
Tooborac	Monthly	12	700	603	0
Trentham	Monthly	12	170	125	0
Tylden	Monthly	12	220	204	0
Wedderburn	Monthly	12	140	131	0

Sodium – Customer Tap Sites 2022-23

Based on aesthetic considerations (taste), the concentration of sodium in drinking water should not exceed 180 mg/L.

Table 56: Sodium results for customer tap sites (ADWG aesthetic guideline limit: 180mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)	Number of samples where guideline was not met
Axedale	Quarterly	4	18	17	0
Bealiba	Quarterly	4	93	83	0
Bendigo (Northern)	Quarterly	4	15	13	0
Bendigo (Southern)	Quarterly	4	14	13	0
Bendigo (Spring Gully)	Quarterly	4	14	12	0
Big Hill	Quarterly	4	16	13	0
Boort	Quarterly	4	72	64	0
Bridgewater - Inglewood	Quarterly	4	16	13	0
Castlemaine	Quarterly	4	17	14	0
Cohuna	Quarterly	4	31	23	0
Dunolly	Quarterly	4	90	72	0
Echuca	Quarterly	4	28	21	0
Elmore	Quarterly	4	110	94	0
Epsom - Huntly	Quarterly	4	16	14	0
Fryerstown	Quarterly	4	17	14	0
Goornong	Quarterly	4	61	48	0
Guildford	Quarterly	4	16	15	0
Gunbower	Quarterly	4	16	14	0
Harcourt	Quarterly	4	17	17	0
Heathcote	Quarterly	4	92	71	0
Junortoun	Quarterly	4	16	14	0
Korong Vale	Quarterly	4	20	16	0
Kyneton	Quarterly	4	13	12	0
Laanecoorie	Quarterly	4	94	74	0
Leitchville	Quarterly	4	38	25	0
Lockington	Quarterly	4	15	12	0
Maiden Gully - Marong	Quarterly	4	15	14	0
Maldon	Quarterly	4	19	17	0
Malmsbury	Quarterly	4	13	11	0
Newstead	Quarterly	4	17	15	0
Pyramid Hill	Quarterly	4	36	28	0
Raywood	Quarterly	4	18	16	0
Rochester	Quarterly	4	25	19	0
Sebastian	Quarterly	4	18	16	0
Serpentine	Quarterly	4	23	20	0
Strathfieldsaye	Quarterly	4	16	14	0
Taradale - Elphinstone	Quarterly	4	19	17	0
Tarnagulla	Quarterly	4	91	80	0
Tooborac	Quarterly	4	74	73	0
Trentham	Quarterly	4	10	8	0
Tylden	Quarterly	4	13	11	0
Wedderburn	Quarterly	4	16	15	0

Chloride – Customer Tap Sites 2022-23

Based on aesthetic consideration, the chloride concentration in drinking water should not exceed 250 mg/L.

Table 57: Chloride results for customer tap sites (ADWG aesthetic guideline limit: 250mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)	Number of samples where guideline was not met
Axedale	Quarterly	4	37	34	0
Bealiba	Quarterly	4	150	138	0
Bendigo (Northern)	Quarterly	4	34	31	0
Bendigo (Southern)	Quarterly	4	33	30	0
Bendigo (Spring Gully)	Quarterly	4	33	30	0
Big Hill	Quarterly	4	32	30	0
Boort	Quarterly	4	130	118	0
Bridgewater - Inglewood	Quarterly	4	27	24	0
Castlemaine	Quarterly	4	42	40	0
Cohuna	Quarterly	4	18	15	0
Dunolly	Quarterly	4	160	120	0
Echuca	Quarterly	4	14	11	0
Elmore[1]	Quarterly	4	280	170	1
Epsom - Huntly	Quarterly	4	34	31	0
Fryerstown	Quarterly	4	43	41	0
Goornong	Quarterly	4	120	107	0
Guildford	Quarterly	4	45	39	0
Gunbower	Quarterly	4	21	16	0
Harcourt	Quarterly	4	48	39	0
Heathcote	Quarterly	4	160	138	0
Junortoun	Quarterly	4	33	30	0
Korong Vale	Quarterly	4	23	22	0
Kyneton	Quarterly	4	27	25	0
Laanecoorie	Quarterly	4	160	125	0
Leitchville	Quarterly	4	12	11	0
Lockington	Quarterly	4	30	27	0
Maiden Gully - Marong	Quarterly	4	37	30	0
Maldon	Quarterly	4	49	40	0
Malmsbury	Quarterly	4	27	25	0
Newstead	Quarterly	4	45	39	0
Pyramid Hill	Quarterly	4	39	34	0
Raywood	Quarterly	4	38	36	0
Rochester	Quarterly	4	22	20	0
Sebastian	Quarterly	4	36	33	0
Serpentine	Quarterly	4	24	23	0
Strathfieldsaye	Quarterly	4	33	30	0
Taradale - Elphinstone	Quarterly	4	44	39	0
Tarnagulla	Quarterly	4	170	140	0
Tooborac	Quarterly	4	170	153	0
Trentham	Quarterly	4	14	14	0
Tylden	Quarterly	4	27	26	0
Wedderburn	Quarterly	4	23	21	0

Note:

1 Refer to section 4.3.1.2 for details on exceedances.

Zinc – Customer Tap Sites 2022-23

Based on aesthetic consideration (taste), the concentration of zinc in drinking water should not exceed 3 mg/L.

Table 58: Zinc results for customer tap sites (ADWG aesthetic guideline limit: 3 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)	Number of samples where guideline was not met
Axedale	Monthly	12	0.007	0.003	0
Bealiba	Monthly	12	0.005	0.004	0
Bendigo (Northern)	Monthly	12	0.019	0.003	0
Bendigo (Southern)	Monthly	12	0.002	0.001	0
Bendigo (Spring Gully)	Monthly	12	0.003	0.001	0
Big Hill	Monthly	12	0.011	0.005	0
Boort	Monthly	12	0.007	0.004	0
Bridgewater - Inglewood	Monthly	12	0.003	0.001	0
Castlemaine	Monthly	12	0.003	0.002	0
Cohuna	Monthly	12	0.017	0.005	0
Dunolly	Monthly	12	0.003	0.002	0
Echuca	Monthly	12	0.008	0.002	0
Elmore	Monthly	12	0.016	0.004	0
Epsom - Huntly	Monthly	12	0.006	0.002	0
Fryerstown	Monthly	12	0.014	0.008	0
Goornong	Monthly	12	0.004	0.002	0
Guildford	Monthly	12	0.025	0.006	0
Gunbower	Monthly	12	0.002	0.001	0
Harcourt	Monthly	12	0.006	0.003	0
Heathcote	Monthly	12	0.002	0.001	0
Junortoun	Monthly	12	0.009	0.002	0
Korong Vale	Monthly	12	0.003	0.002	0
Kyneton	Monthly	12	0.003	0.002	0
Laanecoorie	Monthly	12	0.007	0.005	0
Leitchville	Monthly	12	0.006	0.003	0
Lockington	Monthly	12	0.007	0.001	0
Maiden Gully - Marong	Monthly	12	0.002	0.001	0
Maldon	Monthly	12	0.004	0.002	0
Malmsbury	Monthly	12	0.015	0.008	0
Newstead	Monthly	12	0.007	0.003	0
Pyramid Hill	Monthly	12	0.005	0.003	0
Raywood	Monthly	12	0.004	0.002	0
Rochester	Monthly	12	0.004	0.003	0
Sebastian	Monthly	12	0.015	0.005	0
Serpentine	Monthly	12	0.006	0.003	0
Strathfieldsaye	Monthly	12	0.006	0.002	0
Taradale - Elphinstone	Monthly	12	0.010	0.004	0
Tarnagulla	Monthly	12	0.005	0.002	0
Tooborac	Monthly	12	0.013	0.005	0
Trentham	Monthly	12	0.004	0.003	0
Tylden	Monthly	12	0.005	0.003	0
Wedderburn	Monthly	12	0.062	0.008	0

Ammonia – Customer Tap Sites 2022-23

Table 59: Ammonia results for customer tap sites (ADWG aesthetic guideline limit: 0.5 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg/L)	Average (mg/L)	Number of samples where guideline was not met
Axedale	n/a	n/a	n/a	n/a	n/a
Bealiba	Fortnightly	26	0.2	0.1	0
Bendigo (Northern)[1]	Fortnightly	14	0.4	0.2	0
Bendigo (Southern)[1]	Fortnightly	14	0.4	0.3	0
Bendigo (Spring Gully)[1]	Fortnightly	14	0.4	0.2	0
Big Hill[1]	Fortnightly	15	0.3	0.1	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater - Inglewood	Fortnightly	26	0.2	0.1	0
Castlemaine	n/a	n/a	n/a	n/a	n/a
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly	Fortnightly	26	0.3	0.2	0
Echuca	n/a	n/a	n/a	n/a	n/a
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom – Huntly[1]	Fortnightly	15	0.4	0.2	0
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	n/a	n/a	n/a	n/a	n/a
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt	n/a	n/a	n/a	n/a	n/a
Heathcote	Fortnightly	26	0.3	0.2	0
Junortoun[1]	Fortnightly	14	0.4	0.1	0
Korong Vale[2]	Fortnightly	25	0.2	0.1	0
Kyneton	n/a	n/a	n/a	n/a	n/a
Laanecoorie	Fortnightly	26	0.3	0.2	0
Leitchville	n/a	n/a	n/a	n/a	n/a
Lockington	n/a	n/a	n/a	n/a	n/a
Maiden Gully – Marong[1]	Fortnightly	14	0.5	0.2	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	n/a	n/a	n/a	n/a	n/a
Newstead	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester	n/a	n/a	n/a	n/a	n/a
Sebastian	n/a	n/a	n/a	n/a	n/a
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye[1&2]	Fortnightly	14	0.4	0.2	0
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla	Fortnightly	26	0.3	0.1	0
Tooborac	n/a	n/a	n/a	n/a	n/a
Trentham	n/a	n/a	n/a	n/a	n/a
Tylden	n/a	n/a	n/a	n/a	n/a
Wedderburn[2]	Fortnightly	25	0.2	0.1	0

Note:

1 Sampling on-hold during free chlorination project
2 Updated programming created scheduling error, resulted in missed sample.

Alkalinity – Customer Tap Sites 2022-23

Table 60: Alkalinity results for customer tap sites - whilst there is no ADWG guideline value for alkalinity it is monitored for operational purposes

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum (mg CaCO3 / L)	Average (mg CaCO3 / L)
Axedale	Quarterly	4	55	52
Bealiba	Quarterly	4	86	69
Bendigo (Northern)	Quarterly	4	52	50
Bendigo (Southern)	Quarterly	4	54	53
Bendigo (Spring Gully)	Quarterly	4	53	52
Big Hill	Quarterly	4	55	51
Boort	Quarterly	4	52	43
Bridgewater - Inglewood	Quarterly	4	21	17
Castlemaine	Quarterly	4	52	49
Cohuna	Quarterly	4	27	23
Dunolly	Quarterly	4	84	65
Echuca	Quarterly	4	32	24
Elmore	Quarterly	4	160	130
Epsom - Huntly	Quarterly	4	55	52
Fryerstown	Quarterly	4	55	52
Goornong	Quarterly	4	52	38
Guildford	Quarterly	4	56	53
Gunbower	Quarterly	4	39	30
Harcourt	Quarterly	4	55	53
Heathcote	Quarterly	4	58	42
Junortoun	Quarterly	4	55	53
Korong Vale	Quarterly	4	16	14
Kyneton	Quarterly	4	57	54
Laanecoorie	Quarterly	4	82	65
Leitchville	Quarterly	4	27	23
Lockington	Quarterly	4	27	25
Maiden Gully - Marong	Quarterly	4	54	52
Maldon	Quarterly	4	61	57
Malmsbury	Quarterly	4	59	54
Newstead	Quarterly	4	58	51
Pyramid Hill	Quarterly	4	26	23
Raywood	Quarterly	4	55	52
Rochester	Quarterly	4	21	17
Sebastian	Quarterly	4	62	54
Serpentine	Quarterly	4	32	30
Strathfieldsaye	Quarterly	4	54	52
Taradale - Elphinstone	Quarterly	4	56	51
Tarnagulla	Quarterly	4	91	69
Tooborac	Quarterly	4	68	39
Trentham	Quarterly	4	58	36
Tylden	Quarterly	4	55	53
Wedderburn	Quarterly	4	16	16

Apparent Colour – Customer Tap Sites 2022-23

Table 61: Apparent Colour results for customer tap sites -whilst there is no ADWG guideline value for apparent colour it is monitored for operational purposes

Water Sampling Locality	Sampling frequency	Number of samples	Maximum (HU)	Average (HU)
Axedale	Monthly	12	4	2
Bealiba	Monthly	12	4	2
Bendigo (Northern)	Monthly	12	8	2
Bendigo (Southern)	Monthly	12	6	2
Bendigo (Spring Gully)	Monthly	12	6	2
Big Hill	Monthly	12	6	2
Boort	Monthly	12	4	1
Bridgewater - Inglewood	Monthly	12	4	2
Castlemaine	Monthly	12	4	2
Cohuna	Monthly	12	4	2
Dunolly	Monthly	12	6	3
Echuca	Monthly	12	8	2
Elmore	Monthly	12	2	1
Epsom - Huntly	Monthly	12	4	2
Fryerstown	Monthly	12	4	2
Goornong	Monthly	12	4	2
Guildford	Monthly	12	8	2
Gunbower	Monthly	12	6	2
Harcourt	Monthly	12	6	2
Heathcote	Monthly	12	6	3
Junortoun	Monthly	12	4	2
Korong Vale	Monthly	12	6	3
Kyneton	Monthly	12	2	1
Laanecoorie	Monthly	12	6	3
Leitchville	Monthly	12	2	1
Lockington	Monthly	12	2	1
Maiden Gully - Marong	Monthly	12	6	2
Maldon	Monthly	12	4	1
Malmsbury	Monthly	12	4	1
Newstead	Monthly	12	4	2
Pyramid Hill	Monthly	12	2	1
Raywood	Monthly	12	4	2
Rochester	Monthly	12	2	1
Sebastian	Monthly	12	16	3
Serpentine	Monthly	12	2	1
Strathfieldsaye	Monthly	12	6	2
Taradale - Elphinstone	Monthly	12	6	2
Tarnagulla	Monthly	12	6	3
Tooborac	Monthly	12	6	3
Trentham	Monthly	12	4	1
Tylden	Monthly	12	4	2
Wedderburn	Monthly	12	8	3

5 Complaints relating to water quality

5.1 Complaints and responses

Customer queries/complaints relating to drinking water quality are recorded and followed up using a customer response management (CRM) system. Generally, water quality queries are managed at the time of the enquiry, while complaints are forwarded to Coliban Water's Land, Water & Environment team, or Service Stream (the corporation's operational partner managing the water distribution network), depending on the type of complaint. The complaint is reviewed and actioned as appropriate.

Some of the actions that can be initiated are:

- Flushing of the main supplying the customer and or flushing of the customer's meter.
- Advisory phone call from Water Quality specialist to the customer.
- A visit to the property or written response by a Land, Water & Environment team member.

Table 62 summarises the water quality complaints received by Coliban Water in each category as recorded in CRM system between 1 July 2022 and 30 June 2023 and compared to the previous two years.

Complaints recorded fall into five categories, "Alleged illness", "Discoloured Water", "Taste/Odour", "Air in Water", and "Other".

Table 62: Complaints related to Water Quality by Classification

Types of Complaints	Number of Complaints			Comparison with previous reporting periods	Comments
	2022/23	2021/22	2020/21		
Alleged illness	10	7	10	Slight increase; however comparable with 2020/21 period.	The calls were all unrelated. Complaints were generally related to health conditions, such as a rash/skin irritation, or upset stomach. Water quality was verified after each contact to confirm that the drinking water supplied did not pose an unacceptable health risk.
Discoloured Water	84	115	105	Reduction in complaints compared to 2020/21, and 2021/22.	A significant source of customer complaints regarding discolouration of the drinking water supply were related to elevated manganese in the raw water following the floods. Coliban Water responded both proactively, and in response to customer complaints, by optimising WTP performance and flushing affected networks.
Taste or Odour	142	43	102	Increase from previous year 2021/22.	Taste and Odour was reported to DH via Section 22 reports on 4 occasions. During January 2023 Echuca experienced a taste and odour event, resulting in 94 complaints being received.
Air in Water	8	16	15	Reduction from previous year.	Coliban Water responded to each complaint by attending and flushing affected main.
Other	0	0	0	Consistently minimal	All water quality complaints were able to be allocated to the other four categories.

Types of Complaints	Number of Complaints			Comparison with previous reporting periods	Comments
	2022/23	2021/22	2020/21		
Total	244	181	232	Increase to the previous year but aligned with 2020/21. The 2022 floods and associated water quality issues were the major source of the complaints	

Table 63: Complaints related to water quality by water sampling locality 2022/23

Water sampling locality	Types of complaints					Total complaints
	Alleged illness	Discoloured water	Taste or Odour	Air in Water	Other	
Axedale	0	0	0	0	0	0
Bealiba	0	0	0	0	0	0
Bendigo Northern	1	6	7	1	0	15
Bendigo Southern	0	13	12	0	0	25
Bendigo Spring Gully	0	4	3	2	0	9
Big Hill	0	2	0	0	0	2
Boort	0	0	1	0	0	1
Bridgewater-Inglewood	0	0	0	0	0	0
Castlemaine	0	7	5	0	0	12
Cohuna	0	3	3	0	0	6
Dunolly	0	2	0	0	0	2
Echuca	7	20	96	1	0	124
Elmore	0	2	0	0	0	2
Epsom / Huntly	0	3	1	1	0	5
Fryerstown	0	0	0	0	0	0
Goornong	0	0	2	0	0	2
Guildford	0	0	0	0	0	0
Gunbower	0	0	0	0	0	0
Harcourt	0	0	2	0	0	2
Heathcote	1	2	4	0	0	7
Junortoun	0	2	2	1	0	5
Korong Vale	0	1	0	0	0	1
Kyneton	0	2	2	0	0	4
Laanecoorie	0	0	0	0	0	0
Leitchville	0	4	0	0	0	4
Lockington	0	0	0	0	0	0
Maiden Gully / Marong	1	1	0	0	0	2
Maldon	0	1	1	1	0	3
Malmsbury	0	0	0	0	0	0
Newstead	0	0	0	0	0	0
Pyramid Hill	0	0	0	0	0	0
Raywood	0	0	0	0	0	0
Rochester	0	0	1	0	0	1
Sebastian	0	0	0	0	0	0
Serpentine	0	1	0	0	0	1
Strathfieldsaye	0	2	0	0	0	2
Taradale-Elphinstone	0	0	0	0	0	0
Tarnagulla	0	0	0	0	0	0
Tooborac	0	3	0	0	0	3
Trentham	0	0	0	1	0	1
Tylden	0	0	0	0	0	0
Wedderburn	0	3	0	0	0	3
Total Complaints	10	84	142	8	0	244

6 Risk Management Plan Audit Results

6.1 Outcome of the most recent audit

The most recent regulatory audit as required by the Secretary to the Department of Health (DH), was undertaken between 7 March 2023 to 9 March 2023, for the audit period 1 January 2021 to 31 December 2022. Coliban Water's Drinking Water Quality Risk Management Plan (DWQRMP) was found to have not complied with the obligations imposed by Section 7(1) of the *Safe Drinking Water Act 2003*. Table 64 below lists the two minor non-complaint findings and opportunities for improvement with the action plan for addressing these findings.

6.2 Findings and Action Plan for audit completed in March 2023

There were two minor non-compliant findings and two opportunities for improvement (OFI) identified during the audit. Below is the action plan to address the findings together with the timeframes.

Table 64: Coliban Water's Drinking Water Quality Risk Management Plan 2-23 regulatory audit outcomes Action Plan.

Compliance Code	Finding	Responsible Team	Actions	Timeframe
Minor Non-Compliance	**OFI-2023-001** - Ensure the risk of people mistaking regulated water for drinking water has been assessed and effective preventive measures have been identified in the DWQRMP and implemented, including regular communication with property owners informing them of the requirement to provide signage on all internal and external taps, particularly properties used by the public, such as community halls.	Land, Water & Environment	Arrange for the Regulated Water section of the Risk Register to be reviewed. Prepare an internal memo for forwarding to Customer Care & Support that details the suggested communications to customers in towns supplied with Regulated Water.	Completed Completed
		Customer Care & Support	Following review of the memo, arrange for the implementation of communications to customers in towns supplied with Regulated Water	End of October 2023
Minor Non-Compliance	**OFI-2023-002** - Review the process for checking for compliance with the sampling program, to ensure that missed samples are identified in a timely manner and rescheduled. **OFI-2023-003** - Progress working with ALS to reduce the instance of missed samples and address issues with receiving data.	Land, Water & Environment	Review ALS program vs Test Counts report to ensure only relevant info included Meet with ALS to discuss missed samples issue and current status of new LIMS system Ensure ALS program vs Test Counts is reviewed weekly. Review the ALS program vs Test Counts report for any more improvements e.g. how results are displayed.	Completed Completed Completed End of September 2023

Compliance Code	Finding	Responsible Team	Actions	Timeframe
Compliant - Opportunity for Improvement	**OFI-2023-004** - Consider reviewing Table 1 in the Emergency Management Plan to reflect the current process for managing incidents that involve notification to the Department of Health	Land, Water & Environment ^	Review relevant table in Emergency Management Plan to ensure it reflects Coliban Water's current response to incidents	Extended to November 2023.
Compliant - Opportunity for Improvement	**OFI-2023-005** – Consider working with Veolia to reduce the flow rate of supernatant to the head of plants to align with *Good Practice Guide to the Operational of Drinking Water Supply Systems for the Management of Microbial Risk* (Water RA 2020)	Land, Water & Environment	Complete a Risk Assessment for this process. Review process to *'Good Practice Guide to the Operation of Drinking Water Supply Systems for the Management of Microbial Risk – Second Edition.*	Extended to November 2023. End of November 2023

Note – The two OFI's have had the time extended until the end of November, due to resourcing.

6.3 Audit certificate for audit period 1 January 2021 – 31 December 2022

Risk Management Plan Audit Certificate
Safe Drinking Water Regulations 2015

Certificate Number: 185
Audit period: 1 January 2021 – 31 December 2022

To:

Carmel Cumming
Water Quality Risk Coordinator
Coliban Water
37 - 45 Bridge Street Bendigo VIC 3550
Australian Business Number (ABN): 96 549 082 360

I, Karen Pither, after conducting a risk management plan audit of the water supplied by Coliban Water, am of the opinion that Coliban Water *has not* complied with the obligations imposed by section 7(1) of the *Safe Drinking Water Act 2003* during the audit period.

Two minor noncompliance's were noted:

- Not adequately managing risks associated with regulated water (Section 9(1b) *Safe Drinking water Act 2003*) and (*Safe Drinking Water Regulations 2015 8(3)*)
- Failure to collect and analyse all samples listed in water sampling program, and delays in identifying missed samples. (*Safe Drinking Water Regulations 2015* 8(1)(d)(iv))

Karen Pither

27/3/2023

6.4 Previous regulatory audit OFI's

The previous regulatory audit was completed in July 2020. There were thirteen opportunities for improvement (OFI) identified during the audit. The following table is a list of all the OFI's and the actions, and all have been completed.

Table 65: Opportunities for improvement (OFI) from the 2020 regulatory audit of Coliban Water's Drinking Water Quality Risk Management Plan.

OFI No.	Description of OFI	Action	Timeframe
1	It is recommended to expand the risk source assessment hazardous events in the DWQRMP Table 6.1.4-1 to cover clear water storage tanks, and booster chlorination systems within networks. This would then also require updating the DWQRMP and HACCP for these hazardous events.	Review and update as necessary DWQRMP Table 6.1.4-1, and other tables as appropriate. Any changes in DWQRMP Tables to be reflected in the Risk Register.	Completed Completed
2	The network booster chlorination system and associated network storage tanks descriptions and schematics with their operational philosophy should be added to the DWQRMP. This would raise awareness and highlight the importance of networks and the delivery of safe water.	Review booster chlorinator and tank descriptions and schematics and update as necessary in the DWQRMP, including review the Inglewood Basin chlorine dosing system and consider if it should be a CCP or QCP.	Completed
3	Add booster chlorination systems and basins/ tanks as a risk area to the Drinking Water Quality System Risk Register. Please add an event category that addresses the risk for booster chlorination and network storages. Review the CCPs for all chlorination systems.		
5	It is recommended to revise the Inglewood basin booster chlorination schematic and provide further detail with an operational explanation. See also OFI 2.	Expand the Risk Register to enable each basin/tank to be individually risk assessed, which will include booster chlorinators where appropriate, instead of as a group.	Completed
6	Review the Risk Assessment/ HACCP assessment for Inglewood chlorine dosing system and consider the Inglewood Basin chlorination system as a CCP point. This would provide further focus on managing this critical asset that is used for maintaining chlorine residual.		
11	Coliban Water to review the approach and documentation for the Inglewood chlorination point, and consider having it a CCP, as the nomination of a CCP point doesn't mean that it requires to be monitored online. It does mean that this is the last barrier and control point to maintain an identified hazard i.e. water quality aspect. CCP HACCP decision tree Question 3: Is the process step specifically designed to eliminate or reduce the hazard to an acceptable level? Yes – CCP (see OFI 3 & 6).	Booster Chlorinators: • Review risk assessment • Review CCP's Risk Register changes to be risk rated as required.	Completed Completed
12	It is recommended to review the CCP target, alert and critical limits for all booster chlorination stations. Targets should be meaningful for the management of overdosing and the underdosing risks. Both have potential water quality risk associated with them. Review the risk assessment for the Booster chlorination CCPs.	Consider how operational philosophy/management plan could be referenced in the DWQRMP.	Completed
13	It is recommended that an operational philosophy and more detail documentation is added to the DWQRMP that shows the operational philosophy, the reticulation system and the chlorination system, as per the SCADA screen for all Booster chlorination systems. This will provide clarity about the assets and their operation.		
4	When work orders are initiated in Hanson, previous works and inspection reports are not provided. It would	Review current asset management system	Completed

OFI No.	Description of OFI	Action	Timeframe
	be an advantage to the inspection personnel to view what works have been identified as part of previous visits and to see a condition report for the inspected side. This would help elimination of leaks, contamination or other water quality risk exposure and help justify the replacement of assets.	process and consider if possible/practical access to historic information in the field.	
7	Coliban Water to develop a "transition" plan to work under the Covid-19 requirement as part of "business-as-usual". This will require the business to carry out all maintenance, service delivery and training activities in the world of Covid-19 without compromising safety and operations. The aim is to continue critical operation in a safe environment.	Ensure Coliban Water and Strategic Partners all have a COVID 19 'Business as Usual' plans in place.	Completed
8	The WQ Surveillance rationale is a spreadsheet that identifies monitoring requirements. Recent changes, however, haven't been noted in the "change log" tab. Coliban Water to review the document control process for spreadsheets like the WQ Surveillance rationale and note what changes are made, when they are made and by whom.	Include the 'Rationale' information into the WQ Surveillance Monitoring Program spreadsheet. Changes to the 'Rationale' and Monitoring Program are all captured in one 'change log' tab.	Completed
9	Provide training on obligations under the SDW Act and CW commitment to all managers, executive staff, as a refresher and whenever someone moves internal roles, as well as for new starters. A general training schedule should be included for all CW personnel and further training for all involved in the delivery of the DWQRMP.	Develop presentation and schedule. Verify all new starters are viewing the presentation that is included in their induction. Consider annual general refresher on Water Quality overview for all staff.	Completed
10	Ensure all business units focus on providing training and that training is not put on hold during the Covid-19 pandemic. It is of upmost importance that operational staff have the skills to operate all sites and can cover work tasks for each other.	Training has resumed.	Completed

7 Regulated Water

Regulated water is water that is not intended for use as drinking water, but which could be reasonably mistaken for drinking water. Regulated water is non-potable, not suitable for human consumption and generally does not receive any form of treatment. The Minister for Health may declare a water supply as a regulated water supply under Section 6 of the Act. On 2 January 2006, the Minister for Health declared the following water supply systems as regulated water supplies: Borung, Dingee, Jarklin, Macorna, Mitiamo, Mysia and Wychitella

Coliban Water currently:

- Verifies signage is located at publicly-accessible water supply points (e.g. toilet blocks) advising that the water supply is not suitable for drinking purposes, and this is done on an annual basis.
- Notifies customers on a regular basis that the water is not for drinking and household with 'Do not drink' symbol on their quarterly accounts.
- Coliban Water website has information for each town, and advises water is non-potable.

Table 66: Regulated Water Systems in 2022/23

Area where regulated water is supplied	Source water	Date of publication of gazette notice	Estimated population supplied with regulated water
Borung	Grampians Wimmera Mallee Water (GWMW) Pipeline	19/01/2006	50
Dingee	Goulburn-Murray Water (GMW) Channel	19/01/2006	60
Jarklin	GMW Pipeline	19/01/2006	20
Macorna	GMW Channel	19/01/2006	20
Mitiamo	GMW Pipeline	19/01/2006	90
Mysia	GMW Pipeline	19/01/2006	20
Wychitella	GWMW Pipeline	19/01/2006	30

8 Further Information

Section 23 of the Act requires Coliban Water to make available for inspection by the public the results of any water quality monitoring program conducted by Coliban Water on any of the drinking water supplied by Coliban Water. Customers and members of the public may access drinking water quality data by contacting Coliban Water on the details provided below:

Telephone: 1300 363 200

Website: www.coliban.com.au

A list of glossary and terms is attached in Appendix A.

Appendix A – Glossary of Terms

Australian Drinking Water Guidelines (2011) (ADWG)

A publication by National Health and Medical Research Council that details a framework for the management of drinking water supply systems and provides information on a range of potential contaminants of water systems.

BAC Filtration

Biological activated carbon filtration is a unit process, similar to GAC filtration, which has the additional capability of removing dissolved organics by microorganisms that develop on the surface of the carbon granules.

Critical Control Point (CCP)

A point, step or procedure at which control can be applied and which is essential to prevent or eliminate a hazard or reduce it to an acceptable level.

Chloramination

The addition of chlorine compounds (e.g. chlorine gas and sodium hypochlorite) to aid the breakdown of organic matters and the inactivation harmful microorganisms -: the process is modified with the addition of ammonia gas to improve total chlorine residual in the distribution network.

Chlorination

The addition of chlorine compounds (e.g. chlorine gas and sodium hypochlorite) to aid the breakdown of organic matter and the inactivation harmful microorganisms.

Clarification

A unit operation where seeds of floc are allowed to grow and settle. Clarification is usually enhanced with the addition of polymer (e.g. polyelectrolyte) to increase the size of floc and increase their settling velocities.

Coagulation/flocculation

A unit process involves addition of positively charged coagulant (e.g. aluminium chlorohydrate or aluminium sulphate) and rapid mixing, causing coalescing of suspended particles, or seeds of flocs to form and settle out of suspension.

DEECA

Department of Energy, Environment, and Climate Action.

Dissolved Air Flotation & Filtration (DAFF)

A combination of dissolved air flotation and sand filtration. Dissolved air flotation is a unit operation where fine suspended particles and floc are removed by rising bubbles in the treatment vessel.

Desalination

A unit operation where virtually all dissolved substances and suspended materials are removed by reverse osmosis and only water molecules are allowed to pass through the membranes.

Dual-media filtration

A unit operation using both anthracite coal and sand to retain floc by both adhesion and physical sieving.

Drinking Water Quality Management System (DWQMS)

A term used interchangeably with Drinking Water Quality Risk Management Plan.

Drinking Water Quality Risk Management Plan (DWQRMP)

A risk management plan relating to water supply is a document that:

- contains a detailed description of the water system
- identifies the risks to the quality of the water and the risks posed by the quality of water
- assess those risks
- set out the steps required to manage those risks, including the development and implementation of preventative strategies
- contains other matters as required by the Safe Drinking Water Regulations 2015

Fluoridation

The addition of fluorine compounds (e.g. Hydrofluorosilicic Acid) into drinking water to improve the dental health of consumers.

GAC Filtration

A unit operation where floc is removed by granular activated carbon (GAC) by adhesion. GAC is fabricated to have a high surface area and hence improved efficiency for adhesion.

GMW

Goulburn-Murray Water Corporation.

GWMW

Grampians Wimmera Mallee Water Corporation.

Microfiltration/Ultrafiltration

A unit operation where fine suspended solid particles are retained by the pores of a filter membrane.

MIEX

Magnetic Ions Exchange is a unit operation where organic matter is attracted to, and removed by a MIEX resin. MIEX reduces the requirements for chemical dosage during the coagulation process, improves the efficiency of disinfection and improves the aesthetic properties of drinking water.

Minor Non-Conformance

A minor non-conformance is defined as a non-compliance with one or more auditable elements, legislative requirements or risk management activities where the potential impact of the non-conformance is not likely to be a serious or imminent risk to public health.

MoU

Memorandum of Understanding.

Opportunity for Improvement (OFI)

A conforming or non-conforming clause of the RMP or DWQMS system that does not contravene a legislative requirement. It is not itself a non-conformance. It may include opportunities for improvement, comments that may be relevant to the next audit or against best practice considerations, or incidental or isolated discrepancies.

Ozonation

A unit process that uses ozone to aid the breakdown of organic matter and the inactivation harmful microorganisms.

pH Correction

The adjustment of the pH of drinking water to get it into the recommended range, by the addition of carbon dioxide, sulphuric acid, lime, soda ash or caustic soda.

Sand Filtration

A unit operation where suspended solid particles are retained by the pores of a filter media (in this case, sand).

Supervisory Control and Data Acquisition (SCADA)

A SCADA system consists of human-machine interface, computerised logics, telemetry communication system, electronically actuated instruments and sensors. SCADA allows remote control and monitor of all key process parameters.

UV Disinfection

A unit operation where ultra violet light is impinged onto drinking water to inactive harmful microorganisms.

Water Treatment Plant (WTP)

A facility where raw water is directed through various treatment processes and produces treated water fit for human consumption.

Appendix B – List of Raw Water Organic (Fungicides/Herbicides/Insecticides) parameters

The following table is a comprehensive list of the organic parameters that are tested for in the raw water.

Fungicides	**Herbicides**	**Insecticides**
Azoxystrobin	2,4 D Acid	1, 3-dichloropropene
Boscalid	2,4 D B	Alpha cypermethrin
Captan	Atrazine	Azinphos-methyl
Carbendazim	Diquat	Bendiocarb
Chlorothalonil	Diuron	Bifenthrin
Cyprodinil	Glyphosate	Carbaryl
Difenoconazole	Hexazinone	Chlorantraniliprole
Iprodione	MCPA	Chloropicrin
Mancozeb	Metribuzin	Chlorpyrifos
Metalaxyl-M	Metsulfuron methyl	Cypermethrin
Myclobutanil	Molinate	Cyromazine
Penconazole	Paraquat dichloride	Deltamethrin
Prochloraz	Pendimethalin	Dichlorvos
Pyraclostrobin	Prometryn	Dimethoate
Pyrimethanil	Simazine	Esfenvalerate
Tebuconazole	Triclopyr	Imidacloprid
Thiram	Tebuthiuron	Lambda-cyhalothrin
Trifloxystrobin	Thiobencarb	Malathion
Ziram	Trifluralin	Methomyl
	S-metolachlor	Omethoate
		Permethrin
		Phorate
		Pirimicarb
		Thiodicarb

Appendix C - List of Treatment Processes and Added Substances

Water Treatment Plant	Water Sampling Locality	Treatment Process														Added Substances						
			Clarification		Filtration		Disinfection and or Oxidation						Other									
		Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Floatation	Granular Media Filtration	Membrane Filtration	Chlorine Gas	Chlorine Dioxide	Sodium Hypochlorite	Calcium Hypochlorite	Ultraviolet (UV)	Ozone	Activated Carbon (PAC/GAC/BAC)	Ion Exchange	Reverse Osmosis	Sludge Thickening / Dewatering	Lime / Soda Ash / Caustic Soda / Carbon Dioxide / Sulphuric Acid /	Aluminium-based Coagulants	Iron-based Coagulants	Polymers	Chlorine	Ammonia	Fluoride Compound
Bendigo	Axedale	x				x	x					x	x			x	x	x			x	x	x
	Bendigo Northern																						
	Bendigo Southern																						
	Bendigo Spring Gully																						
	Big Hill																						
	Epsom - Huntly																						
	Junortoun																						
	Maiden Gully - Marong																						
	Raywood																						
	Sebastian																						
	Strathfieldsaye																						
Boort	Boort	x	x		x		x						x				x	x		x	x		
Bridgewater	Bridgewater - Inglewood	x	x		x		x				x		x					x		x	x	x	
	Castlemaine																						

Water Treatment Plant	Water Sampling Locality	Treatment Process															Added Substances						
			Clarification		Filtration		Disinfection and or Oxidation						Other										
		Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Floatation	Granular Media Filtration	Membrane Filtration	Chlorine Gas	Chlorine Dioxide	Sodium Hypochlorite	Calcium Hypochlorite	Ultraviolet (UV)	Ozone	Activated Carbon (PAC/GAC/BAC)	Ion Exchange	Reverse Osmosis	Sludge Thickening / Dewatering	Lime / Soda Ash / Caustic Soda / Carbon Dioxide / Sulphuric Acid /	Aluminium-based Coagulants	Iron-based Coagulants	Polymers	Chlorine	Ammonia	Fluoride Compound
Castlemaine	Fryerstown Guildford Harcourt Maldon Newstead Taradale - Elphinstone	x				x	x					x	x			x	x	x		x	x		x
Cohuna	Cohuna	x	x		x		x		x				x				x	x		x	x		x
Echuca	Echuca	x	x		x		x		x				x				x	x		x	x		x
Elmore	Elmore										x						x						
Goornong	Goornong	x	x		x				x				x				x	x					
Gunbower	Gunbower	x	x			x				x	x		x	x			x	x			x		
Heathcote	Heathcote Tooborac	x	x		x		x		x		x		x			x	x	x		x	x	x	
Korong Vale	Korong Vale Wedderburn	x	x		x		x						x			x	x	x		x	x	x	
Kyneton	Kyneton Malmsbury	x				x	x					x	x			x	x	x		x	x		x

Water Treatment Plant	Water Sampling Locality	Treatment Process															Added Substances						
			Clarification		Filtration		Disinfection and or Oxidation						Other										
		Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Floatation	Granular Media Filtration	Membrane Filtration	Chlorine Gas	Chlorine Dioxide	Sodium Hypochlorite	Calcium Hypochlorite	Ultraviolet (UV)	Ozone	Activated Carbon (PAC/GAC/BAC)	Ion Exchange	Reverse Osmosis	Sludge Thickening / Dewatering	Lime / Soda Ash / Caustic Soda / Carbon Dioxide / Sulphuric Acid /	Aluminium-based Coagulants	Iron-based Coagulants	Polymers	Chlorine	Ammonia	Fluoride Compound
	Tylden																						
Laanecoorie	Bealiba	x	x		x		x		x		x		x				x	x		x	x	x	
	Dunolly																						
	Laanecoorie																						
	Tarnagulla																						
Leitchville	Leitchville	x	x			x	x				x		x				x	x		x	x		
Lockington	Lockington	x		x	x					x			x				x	x		x	x		
Pyramid Hill	Pyramid Hill	x	x		x		x						x			x	x	x		x	x		
Rochester	Rochester	x	x			x	x						x			x	x	x		x	x		
Serpentine	Serpentine	x	x		x		x						x			x	x	x		x	x		
Trentham	Trentham					x				x			x			x				x	x		

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