

Safe Drinking Water Act 2003 2019/2020 Annual Report



Contents

1	Overv	erview						
	1.1	Charact	erisation of the System	4				
	1.2	Source	Water Protection	5				
		1.2.1	Raw Water Monitoring Parameters	7				
	1.3	Water S	Supply Systems	9				
2	Drinki	ng Water	Treatment Processes	11				
	2.1	Water T	reatment	11				
	2.2	lssues.		18				
		2.2.1	E. coli	18				
		2.2.2	THM's	18				
		2.2.3	Other	19				
3	Emer	gency Inc	ident and Event Management	21				
	3.1	Section	22 Reports	21				
4	Drinki	ng Water	Quality Standards	26				
	4.1	Section	18 Notifications	26				
	4.2	Water C	Quality Sampling Program	30				
		4.2.1	Samples not managed in line with Water Quality monitoring program	31				
	4.3	Water C	Quality Monitoring results	32				
		4.3.1	Analysis of water sampling results	32				
		4.3.1.1	Actions undertaken for non-compliant health parameters	33				
		4.3.1.2	Actions undertaken for aesthetic parameters that were not met	34				
	4.4	Water C	Quality Data for Sampling Localities: 1 July 2019 – 30 June 2020	36				
		4.4.1	Treated water results from WTP exit/storage points	36				
		4.4.2	Treated water results from customer tap sample points	54				
		4.4.3	Improvements to water supply and treatment	93				
5	Comp	laints Re	lating to Water Quality	95				
	5.1	Compla	ints and Responses	95				
6	Risk N	<i>l</i> anagem	ent Plan Audit Results	97				
	6.1	Outcom	e of the most recent audit	97				
	6.2	Update	on the findings of the audit completed in May 2018	97				
7	Regulated Water							
8	Furthe	er Informa	ation	100				
Apper	ndix A -	- Glossar	y of Terms	101				
Apper	ndix B -	- List of T	reatment Processes and Added Substances	104				

1 Overview

This report, to the Secretary to the Department of Health and Human Services (DHHS), 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. 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 (Figure 1).

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 (WTP's), providing drinking water to 42 separate water sampling localities. We also have seven regulated water supply systems.

Figure 1: Coliban Water Service Region



SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20

Page 3 of 105

Coliban Water is committed to the provision of safe drinking water.

Our Drinking Water Quality Policy Statement is as follows:



1.1 Characterisation of the System

Coliban Water operates various types of water supply systems, which are summarised as follows.

The major centres of 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, respectively, 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 Lendlease. Lendlease operate the WTPs under an operations and maintenance service contract, which commenced 1 July 2013 for four years, with options to extend the term of the contract to a maximum of 14 years. The first contract extension has been enacted for a further five years, concluding on 30 June 2022.

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. 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.

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, an example of which are the recently completed upgrade works at the Heathcote Water Treatment Plant. 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. Further to this, we give consideration to the principles set out in the *Regional Catchment Strategy*, *Victorian Waterway Management Strategy* and the *State Environmental Protection Policy (SEPP)*.

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.

After completing the Pines Removal Project, rehabilitation of the harvested stands in recreational and visitor areas has continued. During 2019/20, work continued to occur to complete rehabilitation program for the Upper Coliban and Lauriston Reservoirs. Rehabilitation efforts have focused on pest plant and Pine wildling control to protect revegetation efforts, and access track enhancement. It has also involved working

SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20

Page 5 of 105

collaboratively with Dja Dja Wurrung Aboriginal Corporation for installation of a shelter design overseeing the Upper Coliban dam wall and spillway that reflects the cultural values of the area and welcomes visitors to Dja Dja Wurrung country.

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.

Achievements under these agreements include around 27 kilometres of fencing and approximately \$146,000 in off storage watering incentives at Malmsbury, Lauriston and Upper Coliban Reservoirs. We are continuing to negotiate with landowners adjoining Lauriston Reservoir to complete fencing to minimise risks to water quality and assist with managing on-water recreation at the storage.

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, so as 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, Department of Environment, Land, Water and Planning (DELWP) 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 signed in June 2018 with the North Central Catchment Management Authority (North Central CMA) and other partner organisations. Our ongoing role as a partner organisation has seen our continued participation on the Catchment Partnership Forum and provided representation on the North Central Regional Catchment Strategy renewal steering committee.

The Memorandum of Understanding (MoU) between Coliban Water and North Central CMA was reviewed in 2020 and an updated 2019-20 Action Plan that supports the Coliban Water – North Central CMA MoU formulated. The MoU enables the protection and/or 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.

The Upper Coliban Catchment Integrated Catchment Management Plan (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 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 and North Central CMA partnership program, now entering its third year of operation, called 'A Healthy Coliban Catchment' (AHCC). 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.

Over 2019/20 the program delivered an increase on the previous reporting period of on-ground works outlined through the AHCC Annual Works Plan, including 15 kilometres of riparian fencing, 23 off-stream watering

points, 60 hectares of weed management and 22 hectares of revegetation across the UCC. Similar targets are being planned for in the works plan for 2020/21. So far, the program has seen a total investment in the on-ground works of 40km of stream-front fencing, 76 off stream watering systems installed, 320ha of weed control and 72 ha of revegetation.

The 2019 Social Benchmarking survey evidence presented throughout the survey report supported the conclusion that the UCC is a multifunctional landscape; that is, there is a mix of values that shape the land use and management practices of rural landowners in the UCC. It seems likely that agriculture is an important element of the appearance and condition of the UCC, however, other values, such as amenity (e.g. recreation and aesthetic) and conservation, are likely to be more important for most UCC landowners. We continued to support projects such as the DELWP Planning for Melbourne's Green Wedges and Agricultural Land which encompasses all of the Upper Coliban Catchments.

The AHCC has initiated a partnership with the two relevant local governments, Macedon Ranges Shire Council and Hepburn Shire Council to better manage on-site domestic wastewater systems. The partnership with Macedon Ranges Shire Council also extends to supporting their delivery of a Regenerative Grazing Workshop and short course, and landholder information sessions.

Catchment Water Quality monitoring continues in conjunction with the AHCC program and this is being complemented with a Healthy Coliban Citizen Science water quality monitoring program, being delivered by North Central CMA. All this information will provide long term trends to assist Coliban Water better understand the catchment.

The delivery of catchment works, through partnerships between water corporations and catchment management authorities, is a key element of the Our Catchments, Our Communities policy framework, which is a state-wide strategy for integrated catchment management in Victoria.

Dja Dja Wurrung Enterprises (DDW Enterprises Pty Ltd) are supported by the AHCC through funded inclusion on the Technical Working Group and input into the development of the Annual Works Plan. The Healthy Coliban Catchment program continues to provide support to Dja Dja Wurrung participation in the planning and management of waterways, and develop culturally-informed management objectives.

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 e.g. *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.

SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20

Page 7 of 105

Table 1: Table for Raw Water Monitoring Parameters and Frequency

Group	Parameter	Sampling Frequency ¹	
Pastaria	E. coli	Weekly September to April and, monthly	
Daciena	Coliforms	remainder of year or Monthly or Quarterly	
	рН		
	Turbidity	romainder of year or Monthly or Quarterly	
Physical and chomical	Colour		
Filysical and chemical	Electrical conductivity		
	Alkalinity	Quarterly	
	Hardness		
	Arsenic		
	Cadmium		
	Chromium		
	Cyanide		
	Mercury		
	Nitrate	Quarterly	
Inorganic	Selenium		
morganio	Sodium		
	Sulphate		
	Chloride		
	Antimony		
	Barium		
	Boron	Quarterly or Annually	
	Beryllium		
Organic	MIB	Fortnightly September to April and, monthly remainder of year or Monthly September to April	
	Geosmin	or Monthly	
	TOC (Total Organic Carbon)	Monthly or Quarterly	
	Iron	Fortnightly or Monthly or Quarterly	
	Manganese		
Corrosion Products	Copper		
Contrainin roducts	Lead	Quarterly	
	Zinc		
	Nickel		
Cvanobacteria	BGA count	Weekly –September to April, monthly remainder of	
(Blue Green Algae)	BGA ID	the year or Fortnightly –September to April,	
(,	Biovolume	monthly remainder of the year	
Bromide	Bromide	Monthly	
Nutrients	Total phosphorus	Weekly September to April and, monthly	
	Total nitrogen	remainder of year	
	MCPA	4	
	2,4-D	-	
	Chlordane	-	
	DDT (total isomers)		
	Dieldrin	Six monthly or Annual	
Organic	Aldrin	4	
(Pesticide/Herbicides)	Epoxide	4	
,	Heptachlor	-	
	Lindane		
	Iriazine	4	
	Glyphosate	Six monthly	
	Phoxyacetic acids	,	
	OPPs (Organophosporous)		

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

Water Sampling Locality	Population supplied ¹	Source Water	Raw Water Storage	Water Treatment Plant (WTP)
Axedale	380	Upper Coliban	Sandhurst	Bendigo WTP
Bendigo Northern	34320	Reservoir	Reservoir	
Bendigo Southern	39480	Lauriston Reservoir		
Bendigo Spring Gully	12380	Reservoir		
Bendigo Raywood	190	Lake Eppalock		
Bendigo Sebastian	170	Waranga Western		
Big Hill	810	Channel		
Epsom - Huntly	7390			
Junortoun	3010	-		
Maiden Gully - Marong	5110			
Strathfieldsaye	4990			
Boort	840	Waranga Western Channel	Boort Basin	Boort WTP
Bridgewater-Inglewood	1480	Loddon River South West Loddon Pipeline	Bridgewater Basins	Bridgewater WTP
Castlemaine	11530	Upper Coliban	McCay	Castlemaine WTP
Fryerstown	220	Reservoir	Reservoir	
Guildford	270			
Harcourt	1010	Reservoir		
Maldon	1710	-		
Newstead	750	-		
Taradale - Elphinstone	490			
Cohuna	2500	Gunbower Creek	Nil	Cohuna WTP
Echuca	15150	Murray River	Nil	Echuca WTP
Elmore	770	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	2270	Caledonia	Caledonia	Heathcote WTP

Water Sampling Locality	Population supplied ¹	Source Water	Raw Water Storage	Water Treatment Plant (WTP)
Tooborac	120	Reservoir	Reservoir	
		Lake Eppalock		
		Waranga Western Channel		
		Upper Coliban Reservoir		
		Lauriston Reservoir		
		Malmsbury Reservoir		
Korong Vale	220	Grampian Wimmera Mallee Pipeline	Korong Vale Basins	Korong Vale WTP
Wedderburn	840	South West Loddon Pipeline		
Kyneton	6300	Lauriston Reservoir	Lauriston Reservoir	Kyneton WTP
Malmsbury	720	Upper Coliban		
Tylden	320	Reservoir		
Bealiba	160	Loddon River	Nil	Laanecoorie WTP
Dunolly	720			
Laanecoorie	70	-		
Tarnagulla	180			
Leitchville	380	Gunbower Creek	Nil	Leitchville WTP
		Cohuna Channel		
Lockington	440	Waranga Western Channel	Lockington Basins	Lockington WTP
Pyramid Hill	560	Pyramid Hill Channel	Pyramid Hill Basin	Pyramid Hill WTP
Rochester	3130	Waranga Western Channel	Nil	Rochester WTP
Serpentine	130	East Loddon stock and domestic pipeline	Serpentine Raw Water Tank	Serpentine WTP
Trentham	1330	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 2017 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 locality¹ and the chemicals that are added during the various water treatment processes. There were no changes to the water sampling localities during 2019/20.

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

Table 2: 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 Microfiltration Ozonation BAC filtration Fluoridation pH correction Chloramination	Potassium permanganate Carbon dioxide Aluminium Chlorohydrate Ozone Hydrofluorosilicic acid Lime Chlorine gas Ammonia	

Water Sampling Locality	Treatment Plant	Treatment Processes	Added Substances	Comments
Boort	Boort WTP	Coagulation Clarification Dual-media filtration pH correction Chlorination	Powdered activated carbon ² Aluminium sulphate Polyelectrolyte Caustic soda Chlorine gas	
Bridgewater-Inglewood	Bridgewater WTP	Coagulation Clarification Dual-media filtration GAC filtration Desalination (off-line) UV Disinfection pH correction Chlorination/ Chloramination ³	Sulphuric acid Powdered activated carbon Ultrion Caustic soda Chlorine gas Ammonia	Primary source water is now sourced from the South West Loddon Pipeline. Future use of the desalination process is under review due to the quality of the new source water, which is less salty than the Loddon River.
Castlemaine Fryerstown Guildford Harcourt Maldon Newstead Taradale - Elphinstone	Castlemaine WTP	Coagulation Microfiltration Ozonation BAC filtration Fluoridation pH correction Chlorination	Carbon dioxide Aluminium chlorohydrate Ozone Hydrofluorosilicic acid Lime Chlorine gas Ammonia (not in use)	Free chlorination trial has continued. The aim of the trial is to improve disinfection and maintain an effective chlorine residual across the entire water supply network.

Water Sampling Locality	Treatment Plant	Treatment Processes	Added Substances	Comments
Cohuna	Cohuna WTP	Coagulation Clarification Oxidation Dual-media filtration pH correction Chlorination	Powdered activated carbon Caustic soda Aluminium sulphate Polyelectrolyte Chlorine gas Sodium hypochlorite	DHHS has requested fluoride to be added to the Cohuna drinking water supply. Majority of works completed. COVID-19 travel restrictions have delayed the completion of the project.
Echuca	Echuca WTP	Coagulation 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 disinfection	Caustic soda	
Goornong	Goornong WTP	Coagulation Clarification Sand filtration pH correction Chlorination	Powdered activated carbon ² Aluminium sulphate Soda ash Sodium hypochlorite	

Water Sampling Locality	Treatment Plant	Treatment Processes	Added Substances	Comments
Gunbower	Gunbower WTP	Ion Exchange Coagulation Clarification Microfiltration GAC filtration UV disinfection Chlorination	Aluminium Chlorohydrate Caustic soda Chlorine gas	
Heathcote Tooborac	Heathcote WTP	Coagulation Clarification Oxidation Dual-media filtration UV disinfection pH correction Chlorination/ Chloramination ³	Powdered activated carbon (PAC) Caustic soda Aluminium sulphate Sodium hypochlorite Polyelectrolyte Chlorine gas Ammonia	 Stage 2 of the Heathcote WTP upgrade included the installation of the following processes: washwater system UV disinfection permanent PAC dosing system
Korong Vale Wedderburn	Korong Vale WTP	Coagulation Clarification Dual-media filtration pH correction Chloramination	Powdered activated carbon ² Caustic soda Aluminium sulphate Polyelectrolyte Chlorine gas Ammonia	

Water Sampling Locality	Treatment Plant	Treatment Processes	Added Substances	Comments
Kyneton Malmsbury Tylden	Kyneton WTP	Coagulation Microfiltration Ozonation BAC filtration Fluoridation pH correction Chlorination	Carbon dioxide Aluminium Chlorohydrate Ozone Hydrofluorosilicic acid Lime Chlorine gas Ammonia (not in use)	
Bealiba Dunolly Laanecoorie Tarnagulla	Laanecoorie WTP	Coagulation Clarification Oxidation Dual Media filtration pH correction Chlorination/ Chloramination ³	Powdered activated carbon Aluminium sulphate Ferric Chloride Polyelectrolyte Caustic soda Chlorine gas Ammonia Sodium hypochlorite	Ferric chloride was used from 1 September 2019 to 30 June 2020 due to a black water event upstream of the Laanecoorie Reservoir.
Leitchville	Leitchville WTP	Coagulation Clarification Microfiltration pH correction UV disinfection Chlorination	Powdered activated carbon Aluminium sulphate Polyelectrolyte Caustic soda Chlorine gas	

Water Sampling Locality	Treatment Plant	Treatment Processes	Added Substances	Comments
Lockington	Lockington WTP	Coagulation DAFF pH correction Chlorination	Powdered activated carbon ² Aluminium sulphate Aluminium Chlorohydrate (ACH) Polyelectrolyte Caustic soda Chlorine gas	Elevated concentrations of cynabacteria (aka BGA) lead to the addition of ACH to the raw water basins at the WTP, and a trial of ACH as a coagulant.
Pyramid Hill	Pyramid Hill WTP	Coagulation Clarification Dual-media filtration pH correction Chlorination	Powdered activated carbon Aluminium sulphate Aluminium Chlorohydrate (ACH) Polyelectrolyte Caustic soda Chlorine gas	Elevated concentrations of cynabacteria lead to the addition of ACH to the raw water basin at the WTP, and a trial of ACH as a coagulant.
Rochester	Rochester WTP	Coagulation Clarification Microfiltration GAC filtration pH correction Chlorination	Aluminium sulphate Polyelectrolyte Chlorine gas Caustic Soda	

Water Sampling Locality	Treatment Plant	Treatment Processes	Added Substances	Comments
Serpentine	Serpentine WTP	Coagulation Clarification Dual-media filtration pH correction Chlorination	Aluminium sulphate Polyelectrolyte Caustic soda Chlorine gas	
Trentham	Trentham WTP	Ultrafiltration GAC filtration Chlorination	Chlorine gas	

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, in order to maintain disinfection residual longer.

2.2 Issues

During 2019/20 the drinking water supplied to our customers was generally of a high standard.

Schedule 2 of Victoria's Safe Drinking Water Regulations (SDWR) 2015 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. The SDWR 2015 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.

All of our drinking water supplies were compliant with the Turbidity drinking water standard during 2019/20.

2.2.1 E. coli

During 2019/20 there were three separate detections of *E. coli* in treated drinking water. In all cases, the detections were addressed immediately, and the results for the follow-up tests were found to be free of *E. coli*, avoiding the need to issue any 'Boil Water Notices'. The circumstances associated with each *E. coli* detection are described below.

A routine sample collected on 6 January 2020 at the outlet of the Kalimna Basin in the Castlemaine water supply system was positive for the presence of *E. coli*. An investigation revealed that the performance of both the Castlemaine Water Treatment Plant (WTP) and the upstream distribution network were good, however, possible points for ingress of rainwater through the roof of the Kalimna basin were identified. The *E. coli* detection was most likely the result of the combination of the following issues:

- potential pathways for rainwater ingress into the basin;
- a rainfall event on the day the sample was collected; and
- low chlorine disinfectant residual in the basin.

The ingress points were repaired and tested to avoid a similar event occurring in the future.

A routine sample collected on 20 February 2020 at a sampling point on a trunk main that supplies treated drinking water to the Spring Gully area in the Bendigo water supply system tested positive for the presence of *E. coli*. There were no issues with performance of the Bendigo WTP, or in the upstream distribution network, except for low chlorine disinfectant residual in some parts of the affected locality. No probable root cause that could have led to secondary microbial contamination in the Bendigo distribution network was identified. Several actions are being undertaken to improve the chlorine residual in the Bendigo distribution network in order to prevent similar issues occurring in the future.

A routine sample collected on 26 February 2020 at the outlet of the Inglewood Basin in the Bridgewater-Inglewood water supply system was positive for the presence of *E. coli*. There was no obvious root cause that could have led to secondary microbial contamination in the Bridgewater-Inglewood distribution network was identified, except possibly for low chlorine disinfectant residual in the Inglewood Basin. A number of actions are being undertaken to improve the chlorine residual at the Inglewood Basin.

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

2.2.2 THM's

The concentration of THMs exceeded the health-based guideline value (i.e. 0.25 mg/L) specified in the 2011 Australian Drinking Water Guidelines (ADWG) in samples collected in the Laanecoorie water supply system between March and April 2020. The raw water for the Laanecoorie WTP is sourced from the Loddon River. Historically, raw water from the Loddon River is high in Natural Organic Matter (NOM) and bromide. The water age in the Laanecoorie system is also high due to the size of storage tanks and lengthy water mains. The high-water age, along with the high levels of NOM and bromide, leads to the formation of excessive disinfection by products (DPBs).

To manage this issue, primary disinfection at the Laanecoorie WTP is achieved through chlorination, and then the treated water is chloraminated by the addition of ammonia. Nitrification is a common problem for chloraminated water supply systems, which causes difficulties in maintaining adequate disinfectant

residual. Therefore, the disinfection process at the Laanecoorie WTP was changed from chloramination to chlorination to manage nitrification issue in the distribution network for a short period of time (i.e. between 17 February 2020 to 14 April 2020). The elevated THM results were due to a combination of the following:

- the temporary switch to chlorination;
- high concentrations of NOM and bromide in the raw water;
- and the high water age in the system.

Given that the health risk associated with THMs, and other DPBs, is based on life time exposure, occasional exceedances in THMs are considered low risk from a public health perspective, and measures to improve disinfectant residual in distribution networks, such as temporary chlorination in a chloraminated system, is considered important. However, we ceased the temporary chlorination to avoid further THMs exceedances. Subsequent test results confirmed that concentration of THMs in the samples collected from the Laanecoorie water supply system were below the health-based guideline value specified in the ADWG.

2.2.3 Other

Since June 2020, the concentration of N-Nitrosodimethylamine (NDMA) exceeded the health-based guideline value (i.e. 0.0001 mg/L) specified in the ADWG in samples collected from the Laanecoorie water supply system. NDMA is a disinfection by-product (DBP) of chloramination. Given the health risks associated with DPBs including NDMA are based on life time exposure, occasional exceedances are considered low risk from a public health perspective. However, a number of corrective actions have been completed to minimise future excessive NDMA formation. The samples tested for NDMA after the implementation of the corrective actions indicate that the actions were effective in reducing the concentration of NDMA in the treated drinking water. Further, investigations are currently underway to better understand the root cause of the issue.

A routine sample collected from the outlet of the Treated Water Storage (TWS) tanks at the Boort WTP on 10 June 2020 returned an elevated total chlorine result. An investigation was undertaken in response to the elevated result, which revealed that the customers of Boort were not supplied with drinking water containing a total chlorine concentration greater than the health-based guideline value (5.0 mg/L) specified in the ADWG. The investigation also indicated that the total chlorine result reported was most probably an erroneous result.

A range of organisms that grow naturally in water bodies can produce substances that can create unpleasant taste and odour (T&O) in drinking water supplies. The most common of these substances are Geosmin and 2- Methylisoborneol (MIB). Note that these substances do not pose any health risk. Significantly, high concentration of T&O compounds, mainly Geosmin, was experienced in the Murray River System between December 2019 and March 2020, which affected the Echuca, Cohuna, Gunbower and Leitchville WTPs that draw raw water from the Murray River and its tributaries. Given that the concentration of Geosmin in the raw water was very high, the concentration of Geosmin in the treated water exceeded the T&O threshold (10 ng/L) mentioned in the ADWG during this period. A number of works are being undertaken to address similar events if they occur in the future.

Starting on 8 April 2020, widespread customer complaints were received from the Trentham water sampling locality, with customers describing the drinking water as being earthy or metallic in taste. In total, we received twenty complaints during the period between 8 April 2020 and 14 April 2020. Natural spring water provides the majority of the raw water supply for the Trentham WTP, with the spring flowing into the two raw water storage reservoirs. An investigation of the issue revealed that an unprecedentedly high concentration of MIB was present in the storage known as Reservoir No.1, which was supplying raw water to the Trentham WTP at the time of the event. Therefore, the raw water supply to the WTP was changed to Reservoir No. 2, which resolved the issue.

There were also some isolated incidents that occurred during the reporting period that raised suspicion that the safety of the drinking water that was being supplied. The circumstances associated with their detection are described below.

In June 2019, some anomalies in Integrity Test data for one of the two membrane trains of the microfiltration (MF) process at the Rochester WTP were identified. Further investigation of the issue revealed that one membrane train was in operation without performing Integrity Tests for a period of time (identified as 2 December 2018 to 31 July 2020). Integrity Test is used to assess whether or not the MF membranes are

intact, so that adequate pathogen removal is likely to have occurred. Therefore, the issue raised a concern of potential for inadequate pathogen removal in the drinking water produced through the affected membrane train. However, the health risk to customers is considered low as good chlorine residual was maintained in the treated drinking water and no non-conformances in water quality parameters were reported during the period. The issue was reported to Department of Health and Human Services (DHHS), and necessary actions have been taken to eliminate this kind of issue from occurring in the future.

On 21 August 2019, treatment operators at the Cohuna WTP undertook some maintenance work on the valves associated with the raw water pump for the WTP, which required them to isolate the raw water main to the WTP. A potential leak within the isolation valve in the back up raw water pumping arrangement was identified, which raised a concern that a small amount of raw water could be drawn through the leaking valve when the treated drinking water pumps were in operation. Since good chlorine residual was maintained in the treated drinking water and no non-conformances water quality parameters were reported for the routine treated water samples tested in the last 12 months, the drinking water supplied was assessed as not posing any unacceptable risks to customers. However, the issue was reported to DHHS and the back-up raw water arrangement was removed to eliminate the risk.

In the early morning of 4 April 2020 some parts of the Bridgewater - Inglewood water sampling locality lost water supply due to a burst water main. Consequently, the Inglewood network experienced very low pressure for a period of approximately 1.5 hours. Coliban Water also received nine (9) customer complaints related to the loss of water. This raised a potential concern with respect to contaminated water entering the Inglewood water distribution network. The burst main was repaired at around 7:00 am on 4 April 2020, and the adjacent distribution network was flushed. Subsequently, drinking water samples were collected and tested for major water quality parameters. The results showed that the event did not cause unacceptable risk to customers. This issue was reported to DHHS.

As required, DHHS was informed of each of the above issues under the relevant section of the Safe Drinking Water Act. Therefore, further details of the above issues can be found in either Section 3.1 - Section 22 Reports, or Section 4.1 Section 18 – Notifications.

The Echuca Water Treatment Plant (WTP) fluoride system had two shutdowns in 2019/20 as outlined below:

- 1. The fluoride system shutdown on 13 December 2019 due to a leak in the dosing line. The leak was repaired and the plant was brought back online on 17 December 2019. This incident was reported to DHHS, as per the fluoride notification requirement.
- 2. The fluoride system shutdown on 26 December 2019 due a to a faulty component. This incident was reported to DHHS via email on 27 December 2019 by Coliban Water's Incident Manager. It took longer to repair the fault than usual as the incident occurred during the holiday season (i.e. Christmas break). Another reason for the delay is the faulty part was not readily available. Therefore, in the interim operational staff undertook to repair the fault with available materials and brought the fluoride system back online on 13 January 2020. The temporary repairs enabled the system to operation until 30 January 2020. The repair works were completed and the fluoride system was restarted on 4 February 2020.

3 Emergency Incident and Event Management

3.1 Section 22 Reports

The following notifications were made to the Water Program of DHHS under Section 22 of the Act. All Section 22 notifications were submitted to DHHS within the required timeframe.

Table 3: Section 22 Notifications 2019/20

Date incident occurred	Drinking water locality affected	Nature of Incident	Actions taken in response to the incident
21/08/2019	Cohuna	On 21 August 2019, operators at the Cohuna WTP undertook some maintenance work on the valves associated with the raw water pump for the WTP, which required them to isolate the raw water main to the WTP. A potential leak within the isolation valve in the back up raw water pumping arrangement was identified, which raised a concern that a small amount of raw water could be drawn through the leaking valve when the treated drinking water pumps were in operation.	A review of the last 12 months of routine water sampling was completed. Good chlorine residual was maintained in the treated drinking water and no non- conformances water quality parameters were reported, the drinking water supplied was assessed as not posing any unacceptable risks to customers. The back-up raw water arrangement was removed to eliminate the risk.
03/09/2019	Rochester	In June 2019, some anomalies in Integrity Test data for one of the two membrane trains of the microfiltration (MF) process at the Rochester Water Treatment Plant (WTP) were identified. Further investigation of the issue revealed that one membrane train was in operation without performing Integrity Tests for a period of time (identified as 2 December 2018 to 31 July 2019) and one of the membrane modules in the affected train may have had an integrity breach. Integrity Test is used to assess whether or not the MF membranes are intact, so that adequate pathogen removal is ensured. Therefore, the issue raised a concern of potential for inadequate pathogen removal in the drinking water produced through the affected membrane train. The health risk to customers is considered low as good chlorine residual was maintained in the treated drinking water and no non- conformances in water quality parameters were reported during the period.	 Complete review undertaken and the following corrective actions were identified and completed: 1. Reprogram the Integrity Tests frequency to once every 24-hour period in the plant's Programmable Logic Controller (PLC) to align with the requirements of the Water Services Association of Australia's (WSAA's) microbial Health-based Targets (HBT) manual. 2. Reprogram the PLC to disable the functionality that allows the resetting of critical alarms remotely and only allow resetting the Human Machine Interface (HMI) by attending site. 3. Replaced the actuator valve that controls the pressurisation and depressurisation of the affected membrane train as it was identified as faulty. 4. Repaired the failed membrane module.

Date incident occurred	Drinking water locality affected	Nature of Incident	Actions taken in response to the incident
06/01/2020	Castlemaine Guildford Harcourt	 A routine sample collected on 6 January 2020 at the outlet of the Kalimna Basin in the Castlemaine water supply system was positive for the presence of <i>E. coli</i> (25 Orgs/100mL). The <i>E. coli</i> detection was most likely the result of the combination of the following issues: potential pathways for rainwater ingress into the basin, a rainfall event on the day the sample was collected, and low chlorine disinfectant residual in the basin. 	Performance of the Castlemaine WTP and upstream distribution network were verified, with no issues identified. Kalimna Basin was inspected, with possible points of ingress of rainwater through the roof identified. The ingress points were repaired and tested to avoid a similar event occurring in the future. The basin was dosed with sodium hypochlorite from 7 – 9 January 2020 targeting a free chlorine residual of 0.8 mg/L.
22/01/2020	Leitchville	A range of organisms that grow naturally in water bodies can produce substances that can create unpleasant taste and odour (T&O) in drinking water supplies. The most common of these substances are geosmin and 2- Methylisoborneol (MIB). Note that these substances	A temporary Powdered Activated Carbon (PAC) dosing system was installed to increase the PAC dose, thereby improving removal of T&O compounds.
29/01/20	do not pos 20 Cohuna Significan T&O com was experi- System be and Marcl Echuca, C Leitchville from the M	Significantly, high concentration of T&O compounds, mainly geosmin, was experienced in the Murray River System between December 2019 and March 2020, which affected the Echuca, Cohuna, Gunbower and Leitchville WTPs that draw raw water from the Murray River and its	Installation of a PAC contact tank and a pump system with a Variable Speed Drive (VSD) to re-pump the water from the proposed contact tank. Note that work is delayed due to COVID -19.
	Gunbower	tributaries. Given that the concentration of geosmin in the raw water was very high, the affected WTPs were unable to fully remove all the geosmin that was present, and, as such, the concentration of geosmin in the treated water exceeded the T&O threshold (10	A mobile PAC dosing system was installed to improve the removal of T&O compounds by having two removal processes (i.e. Granular Activated Carbon (GAC) and PAC) in series.

Date incident occurred	Drinking water locality affected	Nature of Incident	Actions taken in response to the incident
	Echuca ng/L) mentioned in the ADWG during this period.		Optimisation of the existing PAC dosing system.
		Routine samples from customer tap sampling points returned results as high as:	
		Leitchville 56ng/L	
		Cohuna 55 ng/L	
		Gunbower 12mg/L	
		Echuca 15ng/L	
20/02/2020	Bendigo – Spring Gully	A routine sample collected on 20 February 2020 at a sampling point on a trunk main that supplies treated	Performance of the Bendigo WTP was reviewed with no issues identified
		drinking water to Spring Gully water sampling locality in the Bendigo water supply system tested positive for the presence of <i>E. coli</i> (1 Orgs/100mL).	A review of the upstream network distribution identified low chloramine disinfection residual in some parts of the affected locality.
		No probable root cause that could have led to secondary microbial contamination in the Bendigo distribution network was identified.	A number of actions are being undertaken to improve the chlorine residual in the Bendigo distribution network in order to prevent similar issues occurring in the future, which includes the following:
			 Improved water quality monitoring;
			2. A system wide, short-term period of free chlorination is being considered for the 2020/21 summer to manage nitrification in the distribution system.

Date incident occurred	Drinking water locality affected	Nature of Incident	Actions taken in response to the incident
26/02/2020	Bridgewater / Inglewood	A routine sample collected on 26 February 2020 at the outlet of the Inglewood Basin returned a positive <i>E. coli</i> result of 2 Orgs/100 mL. There was no obvious root cause that could have led to secondary microbial contamination in the Bridgewater-Inglewood distribution network was identified, except possibly for low chlorine disinfectant residual in the Inglewood Basin.	A suspected performance issue at the Bridgewater WTP was investigated, but as there were no issues found with the disinfection process during this time, and it was verified that no out-of- specification water was supplied into the network, it was concluded that the detection was not related to the performance of the WTP.
			Several actions are being undertaken to improve the chlorine residual in this system, including the following:
			 Completed an inspection of the integrity of the Inglewood Basin, with the assistance of a specialised contractor;
			2. Optimisation of the operation of the booster chlorinator at the Basin to achieve break point chlorination without creating a chlorine overdose risk on an ongoing basis;
			3. Optimisation of the chloramine residual maintained at the Bridgewater WTP.
04/04/2020	Bridgewater / Inglewood	In the early hours of 4 April 2020 some areas of the Bridgewater - Inglewood water sampling locality lost water supply due to a burst water main. Consequently, the Inglewood network experienced very low pressure for a period of approximately 1.5 hours. Coliban Water also received nine (9) customer complaints related to the loss of water. This raised a potential concern with respect to contaminated water entering the Inglewood water distribution network.	The burst main was repaired at around 7:00 am on 4 April 2020, and the affected distribution network was flushed. Subsequently, drinking water samples were collected and tested for major water quality parameters. The results showed that the event did not cause unacceptable risk to customers.

Date incident occurred	Drinking water locality affected	Nature of Incident	Actions taken in response to the incident
08/04/2020	Trentham	Starting on 8 April 2020, widespread customer complaints were received from the Trentham water sampling locality, with customers describing the drinking water as being earthy or metallic in taste. In total, Coliban Water received twenty complaints during the period 8 to 14 April 2020. Natural spring water provides the majority of the raw water supply for the Trentham WTP, with the spring flowing into the two raw water storage reservoirs. An investigation of the issue revealed that an unprecedentedly high concentration of MIB was present in the storage known as Reservoir No.1, which was supplying raw water to the Trentham WTP at the time of the event.	The customer complaints were received after the source water was switched over to Reservoir No. 1. High concentrations of MIB were recorded in Reservoir No. 1, so the source water was swapped back to Reservoir No. 2 immediately. The concentration of T&O compounds in both the raw water and the treated water reduced significantly after the raw water source changed back to Reservoir No.2. The distribution network was flushed to remove any remaining water that had a high concentration of T&O compounds, and to also draw fresh treated water from the WTP. Subsequent water quality test results confirmed that concentration of T&O compounds in the treated water reduced to below the acceptable level. A procedure has been implemented to ensure raw water quality parameters are checked and are appropriate prior to switching reservoirs.

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 Department of Health and Human Services (DHHS) under Section 18 of the Act.

4.1 Section 18 Notifications

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

Date incident occurred	Drinking water locality affected	Nature of Incident	Actions taken in response to the incident
06/01/2020	Castlemaine (<i>E. coli</i>) Guildford Harcourt	 A routine sample collected on 6 January 2020 at the outlet of the Kalimna Basin in the Castelamine water supply system was positive for the presence of <i>E. coli</i> (25 Orgs/100mL). The <i>E. coli</i> detection was most likely the result of the combination of the following issues: potential pathways for rainwater ingress into the basin, a rainfall event on the day the sample was collected, and low chlorine disinfectant residual in the basin. 	 Performance of the Castlemaine WTP and upstream distribution network were verified, with no issues identified. Kalimna Basin was inspected, with possible points of ingress of rainwater through the roof identified. The ingress points were repaired and tested to avoid a similar event occurring in the future. The basin was dosed with sodium hypochlorite from 7 – 9 January 2020 targeting a free chlorine residual of 0.8 mg/L.
20/02/2020	Bendigo- Spring Gully (<i>E. coli</i>)	A routine sample collected on 20 February 2020 at a sampling point on a trunk main that supplies treated drinking water to Spring Gully water sampling locality in the Bendigo water supply system tested positive for the presence of <i>E. coli</i> (1 Orgs/100mL). No probable root cause that could have led to secondary microbial contamination in the Bendigo distribution network was identified.	 Performance of the Bendigo WTP was reviewed with no issues identified A review of the upstream network distribution identified low chloramine disinfection residual in some parts of the affected locality. A number of actions are being undertaken to improve the chlorine residual in the Bendigo distribution network in order to prevent similar issues occurring in the future, which includes the following: Improved water quality monitoring; A system wide, short-term period of free chlorination is being considered for the 2020/21 summer to manage nitrification in the distribution system.
26/02/2020	Bridgewater / Inglewood (E. coli)	A routine sample collected on 26 February 2020 at the outlet of the Inglewood Basin returned a positive <i>E. coli</i> result of 2	A suspected performance issue at the Bridgewater WTP was investigated, but as there were no issues found with the disinfection

Table 4: Section 18 Notifications 2019/20

Date incident occurred	Drinking water locality affected	Nature of Incident	Actions taken in response to the incident
		Orgs/100 mL. There was no obvious root cause that could have led to secondary microbial contamination in the Bridgewater-Inglewood distribution network was identified, except possibly for low chlorine disinfectant residual in the Inglewood Basin.	 process during this time, and it was verified that no out-of-specification water was supplied into the network, it was concluded that the detection was not related to the performance of the WTP. Several actions are being undertaken to improve the chlorine residual in this system, including the following: 1. Completed an inspection of the integrity of the Inglewood Basin, with the assistance of a specialised contractor; 2. Optimisation of the operation of the booster chlorinator at the Basin to achieve break point chlorination without creating a chlorine overdose risk on an ongoing basis; 3. Optimisation of the Bridgewater WTP.
04/03/2020	Laanecoorie (THM)	The concentration of Total Trihalomethanes (THMs) exceeded the health-based guideline value (i.e. 0.25 mg/L) specified in the ADWG in samples collected in the Laanecoorie water supply system between March and April 2020. The raw water for the Laanecoorie WTP is sourced from the Loddon River. Historically, raw water from the Loddon River is high in Natural Organic Matter (NOM) and bromide. The water age in the Laanecoorie system is also high due to the size of storage tanks and lengthy water mains. The high-water age, along with the high levels of NOM and bromide, leads to the formation of excessive	The health risk associated with THMs, and other Disinfection by- products (DPBs), is based on life time exposure, therefore, occasional exceedances of the guideline value are considered low risk from a public health perspective, and measures to improve disinfectant residual in distribution networks, such as temporary chlorination in a chloraminated system, is considered important. However, the temporary chlorination was ceased to avoid further THMs exceedances. Subsequent test results confirmed that concentration of THMs in the samples collected from the Laanecoorie water supply system

Page 27 of 105

Date incident occurred	Drinking water locality affected	Nature of Incident	Actions taken in response to the incident
12/03/2020	Bealiba, Tarnagulla (THM)	disinfection by products (DPBs). To manage this issue, primary disinfection at the Laanecoorie WTP is achieved through chlorination, and then the treated water is chloraminated. Nitrification is a common problem for chloraminated water supply systems, which causes difficulties in maintaining adequate disinfectant residual. Therefore, the disinfection process at the Laanecoorie WTP was changed from chloramination to chlorination to manage nitrification issue in the distribution network for a short period of time (i.e. between 17	were below the health-based guideline value specified in the ADWG.
29/04/2020	Bealiba (THM)	 February 2020 to 14 April 2020). The elevated THM results were due to a combination of the following: the temporary switch to chlorination; high concentrations of NOM and bromide in the raw water; and the high-water age in the system. The non-compliant results that were recorded are as follows: 04/03/2020 Customer tap Laanecoorie 0.27 mg/L 12/03/2020 Bealiba Tank Outlet 0.26 mg/L; Tarnagulla Tank Outlet 0.31 mg/L; and Customer tap Tarnagulla. 0.30 mg/L 29/04/2020 Bealiba Tank outlet 0.28 mg/L; and Customer tap Bealiba 0.31 mg/L 	

Date incident occurred	Drinking water locality affected	Nature of Incident	Actions taken in response to the incident
01/06/2020	Laanecoorie, Tarnagulla (NDMA)	Since June 2020, the concentration of N- Nitrosodimethylamine (NDMA) has exceeded the health-based guideline value (i.e. 0.0001 mg/L) specified in the ADWG in samples collected from the Laanecoorie water supply system. NDMA is a disinfection by-product (DBP) of chloramination. The non-compliant results that were recorded are as follows:	 Given the health risks associated with DPBs, including NDMA, are based on life time exposure, occasional exceedances are considered low risk from a public health perspective. However, the following corrective actions have been completed: 1. Checked and confirmed the chlorine: ammonia ratio that was being used to achieve chloramination was appropriate.
24/06/2020	Dunolly (NDMA)	 01/06/2020 Laanecoorie Water Treatment Plant Storage tank 0.00016 mg/L; Customer tap, Laanecoorie 0.00029 mg/L; and Customer tap Tarnagulla 0.00017 mg/L 24/06/2020 Customer tap Dunolly 0.00011mg/L 	2. Increased the final water pH to ≥ 8.5 . The samples tested for the presence of NDMA after the implementation of the corrective actions indicate that the actions were effective in reducing the concentration of NDMA in the treated drinking water. Further investigations are currently underway to better understand the root cause of the issue.
10/06/2020	Boort (Chlorine)	A routine sample collected from the Boort Clear Water Storage (CWS) tanks outlet on 10 June 2020 returned with total chlorine result of 5.7 mg/L, exceeding the health-based guideline value (5.0 mg/L) specified in the ADWG.	 The investigation undertaken included the following actions: Data review of other chlorine sampling on the same day (customer tap and elevated storage); no high results were recorded. Instrument verification completed 9 June 2020, and found the instrument to be compliant. On-line instrumentation from the CWS outlet did not indicate any readings of this level. Tank cleaning maintenance was being undertaken at the time of this sample but chlorine results were within limits. The investigation concluded that the reported total chlorine result was most probably an erroneous result.

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 quality monitoring program is separated into three categories - raw water, 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. 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.

The following changes were made to the water quality monitoring programs for 2019/20.

- 1. Raw Water
 - Sampling for organics (i.e. pesticides/herbicides) at twice yearly frequency at the Campaspe River at Goornong has been included, as it was noted that organics testing had previously not been done upstream of Goornong. This addition was made to forewarn of potential water quality risks.
 - Removed sampling for organics at the Goornong WTP raw water basin, as was now being tested at the upper catchment (Campaspe River at Goornong) twice yearly.
 - Increased the frequency of sampling for taste and odour (T&O) compounds at the Trentham WTP
 raw water inlet due to frequent algal blooms and associated T&O issues that were encountered
 previously, particularly during warmer months. Note that non-routine sampling for T&O compounds
 was undertaken on several occasions in previous years.
 - Extended the list of organics tested at the Lake Eppalock in order to align the organics monitoring at Lake Eppalock with other major water supply reservoirs.
 - Removed Chlorophyll A (Chl A) from all main supplies and raw water basins, as cyanobacterial testing is deemed sufficient and Chl A does not provide additional operational benefits.
 - Removed UVA 254 (organic testing parameter) at the following locations, as a sufficient understanding of UVA and influencing organics had been obtained from historical data. Additionally, operators are undertaking onsite UVA tests at the respective WTPs.
 - Heathcote WTP raw water inlet;
 - Loddon River at Laanecoorie; and
 - Bridgewater WTP raw water inlet.
- 2. Tanks/Contact Points
 - Included the Cohuna elevated storage in the sampling program to ensure more comprehensive monitoring of the Cohuna water supply system.
 - Increased the frequency of acid soluble aluminium sampling at the Echuca WTP contact point from quarterly to monthly due to a relatively high risk of soluble aluminium carry through at this WTP.

- 3. Distribution Network (Customer taps)
 - Added apparent colour to all customer tap sites, as it was noted that only true colour is currently being monitored. Based on recent discolouration events in the network, apparent colour is deemed important to understand such issues.
 - Reduced the frequency of sampling for indicators of ozone by-products (bromate and formaldehyde) in the Castlemaine water supply system from monthly to quarterly due to a low risk of occurrence, based on the analysis of historical data. This change was applied to the following water sampling localities:
 - Castlemaine
 - Fryerstown
 - Guildford
 - Maldon
 - Newstead
 - Harcourt
 - Taradale/Elphinstone

4.2.1 Samples not managed in line with Water Quality monitoring program

During 2019/20 the following samples were not collected and analysed as outlined in our water quality monitoring program. Each reason has been investigated and where applicable/practical changes to sample points/procedures were undertaken to rectify the issue.

Parameter	Water Sampling Locality	Sample Location	Reason
E. coli	Laanecoorie	Exit/Storage Point	No water coming from the sample point
	Big Hill	Exit/Storage Point	No water coming from the sample point
	Castlemaine	Exit/Storage Point	No water coming from the sample point
Turbidity	Big Hill	Exit/Storage Point	No water coming from the sample point
	Cohuna	Exit/Storage Point	Sample point not accessible due to safety issues.
THMs	Boort	Exit/Storage Point	Scheduling error resulted in missed sample
	Cohuna	Exit/Storage Point	Sample point not accessible due to safety issues.
Fluoride	Tylden	Customer Tap	Scheduling error resulted in missed sample
Nitrate	Big Hill	Exit/Storage Point	No water coming from the sample point
Manganese	Laanecoorie	Exit/Storage Point	No water coming from the sample point
Nitrite	Big Hill	Exit/Storage Point	No water coming from the sample point
Iron	Laanecoorie	Exit/Storage Point	No water coming from the sample point
Ammonia	Big Hill	Exit/Storage Point	No water coming from the sample point
Chlorine	Big Hill	Exit/Storage Point	No water coming from the sample point
	Castlemaine	Exit/Storage Point	No water coming from the sample point
	Laanecoorie	Exit/Storage Point	No water coming from the sample point
Alpha Count	Elmore	Customer Tap	Scheduling error resulted in missed sample

Parameter	Water Sampling Locality	Sample Location	Reason
Beta Count	Elmore	Customer Tap	Scheduling error resulted in missed sample
рН	Big Hill	Exit/Storage Point	No water coming from the sample point
	Cohuna	Exit/Storage Point	Sample point not accessible due to safety issues.
Colour	Big Hill	Exit/Storage Point	No water coming from the sample point
	Cohuna	Exit/Storage Point	Sample point not accessible due to safety issues.
Electrical Conductivity (EC)	Cohuna	Exit/Storage Point	Sample point not accessible due to safety issues.

4.3 Water Quality Monitoring results

The following table is a comparison of the analysis for each parameter in the monitoring programs from 2017/18 to 2019/20

Sections 4.4.1 and 4.4.2 contain the individual data tables for each parameter sampled, as per the monitoring program, during 2019/20.

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 2017/18 – 2019/20.

Parameter	Compliant Localities 2017/18	Compliant Localities 2018/19	Compliant Localities 2019/20
Escherichia coli ¹	98%	100%	88%
Trihalomethanes ¹	100%	100%	93%
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	98%	100%	100%
Formaldehyde ²	100%	100%	100%
Aluminium ³	100%	98%	98%
Fluoride ²	100%	100%	100%
Arsenic ²	100%	100%	100%
Cadmium ²	100%	100%	100%
Chlorine ²	100%	100%	98%
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%

Table 5: Table for Water Quality Parameter Comparison Results 2017/18 to 2019/20.

Page 32 of 105

Parameter	Compliant Localities 2017/18	Compliant Localities 2018/19	Compliant Localities 2019/20
Manganese ²	100%	100%	100%
Copper ²	100%	100%	100%
Lead ²	98%	98%	100%
Nickel ²	89%	98%	100%
Gross alpha ²	100%	100%	100%
Gross beta ²	100%	100%	100%
Nitrite ²	100%	100%	100%
pH ³	82%	81%	81%
Hardness ³	100%	100%	100%
Iron ³	98%	100%	95%
True Colour ³	100%	100%	98%
Electrical Conductivity ³	100%	100%	100%
Sodium ³	100%	100%	100%
Chloride ³	100%	100%	93%
Zinc ³	100%	100%	100%
Ammonia ³	100%	100%	93%
NDMA ^{2&4}	n/a	100%	90%
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 ADWG health guideline values.
- 3 This parameter uses ADWG aesthetic guideline values.
- 4 New parameter that has been added to the sampling program for 2018/19.

Coliban Water's compliance against each sampled parameter in 2019/20 has experienced a minor decline across some 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 2019/20.

4.3.1.1 Actions undertaken for non-compliant health parameters

Escherichia coli (E. coli)

Five water sampling localities (Bendigo-Spring Gully, Bridgewater/Inglewood & Castlemaine, Guildford, Harcourt) had a routine sample that exceeded the *E. coli* standard. Details of the actions undertaken in response to these detections are included in Section 3.1 – Section 22 Notifications & Section 4.1 - Section 18 Notifications.

Trihalomethanes (THMs)

THM exceedances were recorded in three water sampling localities, Bealiba, Laanecoorie & Tarnagulla, all within the Laanecoorie system. Details of the actions undertaken in response to these exceedances are included in Section 3.1 – Section 22 Notifications & Section 4.1- Section 18 Notifications.

Chlorine

A routine sample collected from the Boort Clear Water Storage (CWS) tanks outlet exceeded the health-based guideline value specified in the ADWG. Details of the actions undertaken in response to this exceedance are included in Section 4.1- Section 18 Notifications.

NDMA

NDMA results that exceeded the guideline value were recorded in water sampling localities within the Laanecoorie system. 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.

Aluminium

A sample taken from the Pyramid Hill water sampling locality returned a result for aluminum just above the aesthetic guideline value of the ADWG. There were no issues with the performance of the Pyramid Hill WTP during the period, therefore cause of the high aluminum result is unknown. The subsequent, aluminium results were below the aesthetic guideline value of the ADWG.

рΗ

Eight water sampling localities did not meet the ADWG aesthetic guideline value range for pH (pH 6.5 to 8.5). These localities, except for Serpentine, are supplied treated water from chloramination treatment systems. An elevated pH (>8.0) is maintained to improve the effectiveness of chloramination. Also, some of these systems have long cement-lined mains in the network, with 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.

Iron

Samples collected from the Laanecoorie water sampling locality returned with results for iron exceeding the aesthetic guideline value of the ADWG. Iron results for the samples collected from other water sampling localities supplied from the Laanecoorie WTP on the same dates were well below the aesthetic guideline value of the ADWG. Moreover, the samples that had elevated Iron results were collected from the same sample tap. This indicates that issue was isolated to a sample tap and likely cause was corrosion of sample tap. Action has been taken to resolve the issue.

A sample taken from the TWS tank at the Serpentine WTP returned a result for Iron exceeding the aesthetic guideline value of the ADWG. The elevated iron result was likely to be due to the change in the raw water quality. The issue has been resolved by optimizing the treatment plant performance. The subsequent, Iron results were below the aesthetic guideline value of the ADWG.

True Colour

A sample taken from the Tarnagulla water sampling locality returned a result for colour exceeding the aesthetic guideline value of the ADWG. The event was isolated to a section of water main, which had sediments accumulation. The issue has been resolved by flushing the affected water main.

Chloride

Samples collected from the Bealiba, Dunolly and Laanecoorie water sampling localities returned with results for chloride exceeding the aesthetic guideline value of the ADWG. These water sampling localities are supplied from the Laanecoorie WTP, which source raw water from the Loddon River. The raw water sourced from the Loddon River has high levels of salinity. Therefore, chloride level in the drinking water produced at the Laanecoorie WTP is relatively high (i.e. average is around 200mg/L). The occasional chloride exceedances were due to variation in the raw water quality. Note that the Laanecoorie WTP does not have specific treatment processes to remove salinity. However, treatment processes at the plant has been optimized to minimise the impact to the customers.

Ammonia

A sample taken from the TWS tank at the Heathcote WTP returned a result for ammonia exceeding the aesthetic guideline value of the ADWG. Water is disinfected with chloramination process at the Heathcote WTP, therefore ammonia is added to form chloramine as a part of the process. The change in raw water quality impacted the chlorine to ammonia ratio, which may have resulted in a short-term spike in concentration

of ammonia in the treated water. This has been resolved immediately by adjusting the chlorine and ammonia dose rates to compensate the change in the raw water quality.

Samples collected from the Bendigo (Northern) and Dunolly water sampling localities returned with results for ammonia just above the aesthetic guideline value of the ADWG. The drinking water supplied to these localities are chloraminated. The short-term spikes concentration of ammonia in the drinking water could be attributed to nitrification in the distribution networks. The nitrification control measures are being undertaken in the affected distribution networks.

4.4 Water Quality Data for Sampling Localities: 1 July 2019 - 30 June 2020

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 2019-20

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

Table 6: 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 (orgs/100 mL)	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	105	0	0	0
Bendigo (Southern)	Twice Weekly	210	0	0	0
Bendigo (Spring Gully) ²	Twice Weekly	105	1	1	1
Big Hill⁵	Weekly	103	0	0	0
Boort	Weekly	106	0	0	0
Bridgewater-Inglewood ³	Weekly	104	2	1	1
Castlemaine ^{4&5}	Twice Weekly/ Weekly	157	25	1	1
Cohuna	Weekly	53	0	0	0
Dunolly	Weekly	52	0	0	0
Echuca	Weekly	107	0	0	0
Elmore	Weekly	53	0	0	0
Epsom - Huntly	Twice Weekly	105	0	0	0
Fryerstown	Weekly	53	0	0	0
Goornong	Weekly	106	0	0	0
Guildford ⁴	Twice Weekly	105	25	1	1
Gunbower	Weekly	106	0	0	0
Harcourt ⁴	Twice Weekly/ Weekly	158	25	1	1
Heathcote	Weekly	52	0	0	0
Junortoun	Twice Weekly	105	0	0	0
Korong Vale	Weekly	106	0	0	0
Kyneton	Twice Weekly/ Weekly	157	0	0	0
Laanecoorie ⁵	Weekly	51	0	0	0
Leitchville	Weekly	53	0	0	0
Lockington	Weekly	53	0	0	0
Maiden Gully - Marong	Twice Weekly	105	0	0	0
Maldon	Weekly	53	0	0	0
Malmsbury	Twice Weekly/ Weekly	157	0	0	0
Newstead	Weekly	53	0	0	0
Pyramid Hill	Weekly	53	0	0	0
Raywood	Weekly	52	0	0	0
Water Sampling Locality	Sampling Frequency	Number of Samples 1	Maximum detected (orgs/100 mL)	Number of detections and investigations conducted (s.22)	Number of samples where standard was not met
----------------------------	-----------------------	------------------------------	---	--	---
Rochester	Weekly	53	0	0	0
Sebastian	Weekly	52	0	0	0
Serpentine	Weekly	53	0	0	0
Strathfieldsaye	Twice Weekly	105	0	0	0
Taradale - Elphinstone	Twice Weekly	105	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	106	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 E. coli result of 1 Orgs/100 mL detected in sample from the trunk main supplying the Bendigo-Spring Gully water sampling locality area. Full details available in Sec 3.1 & 4.1.

3 E. coli result of 2 Orgs/100 mL detected in sample from the Inglewood Basin that is part of the Bridgewater-Inglewood water sampling locality area. Full details available in Sec 3.1 & 4.1

4 E. coli result of 25 Orgs/100 mL detected in sample from the Kalimna Basin that can supply the Castlemaine, Guildford & Harcourt water sampling localities. Full details available in Sec 3.1 & 4.1.

5 Sampler attended sites, but was unable to collect sample as no water coming from the sample point, refer Sec 4.2.1 for more detail.

SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20

Trihalomethanes (THM) – WTP exit/storage points for 2019-20

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.

Water Sampling Locality	Sampling Frequency	Number of Samples ¹	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Monthly	12	0.0760	0.0548	0
Bealiba ²	Monthly	12	0.2800	0.1372	2
Bendigo (Northern)	Monthly	12	0.0280	0.0148	0
Bendigo (Southern)	Monthly	12	0.0280	0.0148	0
Bendigo (Spring Gully)	Monthly	12	0.0280	0.0148	0
Big Hill	Monthly	24	0.0330	0.0154	0
Boort ⁴	Monthly	23	0.1100	0.0786	0
Bridgewater-Inglewood	Monthly	24	0.0690	0.0231	0
Castlemaine ⁵	Monthly	17	0.0870	0.0636	0
Cohuna ⁷	Monthly	19	0.0330	0.0263	0
Dunolly	Monthly	12	0.2500	0.1295	0
Echuca	Monthly	12	0.0550	0.0235	0
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Monthly	12	0.0280	0.0148	0
Fryerstown ⁶	Monthly	16	0.1100	0.0742	0
Goornong	Monthly	12	0.1300	0.1114	0
Guildford	Monthly	12	0.0870	0.0646	0
Gunbower	Monthly	12	0.0530	0.0283	0
Harcourt	Monthly	24	0.0870	0.0685	0
Heathcote	n/a	n/a	n/a	n/a	n/a
Junortoun	Monthly	12	0.0280	0.0148	0
Korong Vale	n/a	n/a	n/a	n/a	n/a
Kyneton	Monthly	36	0.0920	0.0654	0
Laanecoorie	Monthly	12	0.2200	0.1125	0
Leitchville	Monthly	12	0.0350	0.0206	0
Lockington	Monthly	12	0.0220	0.0144	0
Maiden Gully - Marong	Monthly	12	0.0280	0.0148	0
Maldon	Monthly	24	0.0960	0.0742	0
Malmsbury	Monthly	36	0.0960	0.0687	0
Newstead ⁶	Monthly	16	0.0890	0.0649	0
Pyramid Hill	Monthly	12	0.0460	0.0295	0
Raywood	Monthly	12	0.1100	0.0759	0
Rochester	n/a	n/a	n/a	n/a	n/a
Sebastian	Monthly	12	0.0230	0.0131	0
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye	Monthly	12	0.0280	0.0148	0
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla ³	Monthly	12	0.3100	0.1306	1
Tooborac	Monthly	12	0.0970	0.0669	0
Trentham	n/a	n/a	n/a	n/a	n/a
Tylden	Monthly	24	0.0900	0.0653	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 Two samples taken from the Bealiba tank (0.26mg/L & 0.28mg/L) exceeded the water quality standard of 0.25mg/L. Full details available in Sec 4.1

- 3 One sample taken from the Tarnagulla tank (0.31mg/L) exceeded the water quality standard of 0.25mg/L. Full details available in Sec 4.1
- 4 Scheduling error resulted in one monthly sample being missed.
- 5 Trial of free chlorination continuing, monthly THM sampling at Kalimna Basin (Castlemaine) commenced in March 2020
- 6 The inclusion in two sampling programs resulted in Fryerstown and Newstead THM being sampled twice monthly from March 2020.
- 7 Cohuna elevated storage was added to 2019/20 monitoring program, with sampling commencing in November 2019, following the installation of a new sampling point. Due to OH&S restrictions sample not collected in April 2020.

SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20

Turbidity – WTP exit/storage points for 2019-20

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

Water Sampling Locality	Sampling Frequency	Number of Samples ¹	Maximum value (NTU)	95 th percentile of results (NTU)	Number of 95th percentile of results above standard
Axedale	Monthly	12	0.1	0.1	0
Bealiba	Monthly	12	0.8	0.6	0
Bendigo (Northern)	Twice Weekly	105	0.2	0.1	0
Bendigo (Southern)	Twice Weekly	210	0.2	0.1	0
Bendigo (Spring Gully)	Twice Weekly	105	0.2	0.1	0
Big Hill ²	Monthly	23	0.1	0.1	0
Boort	Monthly	24	0.5	0.5	0
Bridgewater/Inglewood	Monthly	24	0.2	0.2	0
Castlemaine	Twice Weekly/Mthly	117	0.1	0.1	0
Cohuna ³	Monthly	19	0.2	0.1	0
Dunolly	Monthly	12	0.1	0.1	0
Echuca	Monthly	25	0.4	0.1	0
Elmore	Monthly	12	0.1	0.1	0
Epsom - Huntly	Twice Weekly	105	0.2	0.1	0
Fryerstown	Monthly	12	0.1	0.1	0
Goornong	Monthly	24	0.5	0.3	0
Guildford	Twice Weekly	105	0.1	0.1	0
Gunbower	Monthly	24	0.2	0.1	0
Harcourt	Twice Weekly/Mthly	117	0.2	0.1	0
Heathcote	Monthly	12	0.1	0.1	0
Junortoun	Twice Weekly	105	0.2	0.1	0
Korong Vale	Monthly	24	0.5	0.4	0
Kyneton	I wice Weekly/Mthly	117	0.2	0.1	0
	Monthly	12	0.1	0.1	0
Leitchville	Monthly	12	0.1	0.1	0
		12	0.1	0.1	0
Malden Gully - Marong		105	0.2	0.1	0
		12	0.2	0.1	0
Newstaad		117	0.2	0.1	0
Dyramid Hill	Monthly	12	0.1	0.1	0
	Monthly	12	0.2	0.1	0
Raywood	Monthly	12	0.5	0.3	0
Sobastian	Monthly	12	0.2	0.1	0
Sepastian	Monthly	12	0.2	0.2	0
Strathfieldeeve	Twice Weekly	105	1.0	0.0	0
Taradale - Elphinstopo		105	0.1	0.1	0
	Monthly	12	0.2	0.1	0
Tooborac	Monthly	12	0.1	0.1	0
Trentham	Monthly	12	0.2	0.1	0
Tylden	Monthly	12	0.1	0.1	0
Wedderburn	Monthly	24	0.3	0.2	0
Note:	wonuny	24	0.9	0.0	0

Note:

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

2 Sampler was unable to collect sample as no water coming from sample point.

3 Cohuna elevated storage added to 19/20 monitoring program, with sampling commencing in November 2019, following the installation of a new sampling point. Due to OH&S restrictions sample not collected in April 2020.

Fluoride – WTP exit/storage points for 2019-20

Table 9: 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	Max (mg/L)	Min (mg/L)	Ave (mg/L)	Number of samples where standard
			concentrati				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	n/a
Bendigo (Northern)	Twice Weekly	105	0.9	0.960	0.800	0.889	0
Bendigo (Southern)	Twice Weekly	105	0.9	0.960	0.800	0.889	0
Bendigo (Spring Gully)	Twice Weekly	105	0.9	0.960	0.800	0.889	0
Big Hill	Twice Weekly	105	0.9	0.960	0.800	0.889	0
Boort	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bridgewater -	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Castlemaine	Twice Weekly	105	0.9	0.920	0 780	0.836	0
Cohuna	n/a	n/a	0.9 n/a	n/a	n/a	0.000 n/a	n/a
Dunolly	n/a n/a	n/a	n/a	n/a	n/a	n/a	n/a
Echuca ¹	Monthly	12	0.8	0.850	0.025	0.665	0
Flmore	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Twice Weekly	105	0.9	0.960	0.800	0.889	0
Frverstown	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	105	0.9	0.920	0.780	0.836	0
Gunbower	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Harcourt	Twice Weekly	105	0.9	0.920	0.780	0.836	0
Heathcote	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Junortoun	Twice Weekly	105	0.9	0.960	0.800	0.889	0
Korong Vale	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Kyneton	Twice Weekly	105	0.9	0.970	0.760	0.859	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	105	0.9	0.960	0.800	0.889	0
Maldon	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Malmsbury	Twice Weekly	105	0.9	0.970	0.760	0.859	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	105	0.9	0.960	0.800	0.889	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:

1300 363 200 : www.coliban.com.au

Fluoride is only currently added to drinking water at the Bendigo, Castlemaine, Kyneton and Echuca water treatment plants. n/a – not applicable, as the drinking water is not fluoridated.

1 Fluoride outages impacted average (refer section 2.2 Issues for detail)

Page 41 of 105

Bromate – WTP exit/storage points for 2019-20

Table 10: 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	0.00	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
Malden Gully - Marong	Monthly	12	0.01	0.00	0
	n/a	n/a	n/a	n/a	n/a
Neuropad	wontniy	12	0.00	0.00	0
Dyromid Hill	11/a	n/a	11/a	11/a	n/a
	n/a	n/a	n/a	n/a	n/a
Raywood	n/a	n/a	n/a	n/a	n/a
Sobastian	n/a	n/a	n/a	n/a	n/a
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsave	Monthly	12	0.01	0.00	11/a
Taradale - Elphinstone	n/a	n/2	n/2	0.00 n/a	n/2
	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
**Cuucibuiti	11/a	n/a	11/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 byproducts 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.

Page 42 of 105

Formaldehyde – WTP exit/storage points for 2019-20

Table 11: 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
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	0.1	0.0	0
Bendigo (Southern)	Monthly	12	0.1	0.0	0
Bendigo (Spring Gully)	Monthly	12	0.1	0.0	0
Big Hill	Monthly	12	0.1	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	0.1	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	0.1	0.0	0
Korong Vale	n/a	n/a	n/a	n/a	n/a
Kyneton	Monthly	12	0.0	0.0	0
	n/a	n/a	n/a	n/a	n/a
Leikington	n/a	n/a	n/a	n/a	n/a
Maidan Gully Marang	n/a Monthly	1/a 12	0 1	11/a	n/a
Malden	monting	12 n/2	0.1	0.0	0 n/a
Malmshury	Monthly	12	11/a	11/a	11/a
Newstead	n/a	n/a	0.0 n/a	0.0 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
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
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsave	Monthly	12	0.1	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:

1300 363 200 : www.coliban.com.au

Formaldehyde is monitored in localities where ozone is used in treatment, as ozone can result in the production of this byproducts 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.

Page 43 of 105

Arsenic – WTP exit/storage points for 2019-20

Table 12: 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
	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
	Wonthly	12	0.0005	0.0005	U n / -
	n/a	n/a	n/a	n/a	n/a
Tacharaa	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a
vvedderburn	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 2019-20

Table 13: Nitrate results for WTP exit/storage points (Water quality standard - ADWG health-based guideline value: 50 mg/L)

Axedalen/an/an/am/am/aBealiba²Fortnightly166.23.50Bendigo (Northern)n/an/an/an/an/aBendigo (Southern)n/an/an/an/an/aBendigo (Southern)n/an/an/an/an/aBendigo (Southern)n/an/an/an/an/aBendigo (Spring Gully)n/an/an/an/an/aBordi Guevater-InglewoodMonthly121.61.10Castlemaine³Monthly121.61.10Cohunan/an/an/an/an/aDunolly4Monthly446.22.20Cehucan/an/an/an/an/aDunolly4Monthly80.60.50Goorongn/an/an/an/an/aEpson - Huntlyn/an/an/an/an/aGuildfordn/an/an/an/an/aGuildfordn/an/an/an/an/aHacotoren/an/an/an/an/aGuildfordn/an/an/an/an/aHacotoren/an/an/an/an/aGuildfordn/an/an/an/an/aHarcotren/an/an/an/an/aJunortounn/an/an/a <t< th=""><th>Water Sampling Locality</th><th>Sampling frequency</th><th>Number of samples¹</th><th>Maximum (mg/L)</th><th>Average (mg/L)</th><th>Number of samples where</th></t<>	Water Sampling Locality	Sampling frequency	Number of samples ¹	Maximum (mg/L)	Average (mg/L)	Number of samples where
Axedale n/a n/a n/a n/a n/a n/a Beadigo (Northern) n/a n/a n/a n/a n/a n/a n/a Bendigo (Southern) n/a n/a n/a n/a n/a n/a n/a Bendigo (Southern) n/a n/a n/a n/a n/a n/a Big Hill ⁶ Monthly 23 3.6 1.7 0 Boort n/a n/a n/a n/a n/a n/a Bridgewater-Inglewood Monthly 12 1.6 1.1 0 Castemaine ³ Monthly 7 0.6 0.5 0 Cohuna n/a n/a n/a n/a n/a Dunolly ⁴ Monthly 44 6.2 2.2 0 Elmore n/a n/a n/a n/a n/a Fyerstown ³ Monthly 8 0.6 0.5 0 Guonong <td< th=""><th></th><th></th><th></th><th></th><th></th><th>standard</th></td<>						standard
Axecuae Ina Ina Ina Ina Ina Ina Bealiba ² Fortnightly 116 6.2 3.5 0 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 ⁵ Monthly 23 3.6 1.7 0 Bordt nía nía n/a n/a n/a Bridgewater-Inglewood Monthly 12 1.6 1.1 0 Castiemaine ³ Monthly 12 1.6 1.1 0 Castiemaine ³ Monthly 44 6.2 2.2 0 Echuca n/a n/a n/a n/a n/a Dunolly ⁴ Monthly 44 6.2 2.2 0 Echuca n/a n/a n/a n/a n/a Epson - Huntly n/a n/a n/a n/a n/a	Avadala	<i>n</i> /2	n/o	n/a	n/o	was not met
Beandige (Northern) n/a		n/a	n/a	n/a	n/a	n/a
Bendigo (Northern) n/a		Fortnightly	16	6.2	3.5	0
Bendigo (Southern) Ina <thina< th=""> Ina <thina< th=""></thina<></thina<>	Bendigo (Northern)	n/a	n/a	n/a	n/a	n/a
Bendgo (Spring Gully) n/a	Bendigo (Southern)	n/a	n/a	n/a	n/a	n/a
Big Hill ⁰ Monthly 23 3.6 1.7 0 Boort n/a n/a n/a n/a n/a n/a Bridgewater-Inglewood Monthly 12 1.6 1.1 0 Castlemaine ³ Monthly 7 0.6 0.5 0 Cohuna n/a n/a n/a n/a n/a Dunolly ⁴ Monthly 44 6.2 2.2 0 Echuca n/a n/a n/a n/a n/a Epsom - Huntly n/a n/a n/a n/a n/a Fryerstown ³ Monthly 8 0.6 0.5 0 Goornong n/a n/a n/a n/a n/a Guildford n/a n/a n/a n/a n/a Guildford n/a n/a n/a n/a n/a Junortoun n/a n/a n/a n/a n/a Junortoun	Bendigo (Spring Gully)	n/a	n/a	n/a	n/a	n/a
Boot n/a n/a n/a n/a n/a n/a Bridgewater-Inglewood Monthly 12 1.6 1.1 0 Castlemaine ³ Monthly 7 0.6 0.5 0 Cohuna n/a n/a n/a n/a n/a n/a Dunolly ⁴ Monthly 44 6.2 2.2 0 Echuca n/a n/a n/a n/a n/a Elmore n/a n/a n/a n/a n/a Gornong n/a n/a n/a n/a n/a Guildford n/a n/a n/a n/a n/a Guildford n/a n/a n/a n/a n/a Harcourt ³ Monthly 7 0.7 0.5 0 Heathoote n/a n/a n/a n/a n/a Junortoun n/a n/a n/a n/a n/a Locotring Va	Big Hill ³	Monthly	23	3.6	1.7	0
Bridgewater-Inglewood Monthly 12 1.6 1.1 0 Castlemaine ³ Monthly 7 0.6 0.5 0 Cohuna n/a n/a n/a n/a n/a n/a Dunolly ⁴ Monthly 44 6.2 2.2 0 Echuca n/a n/a n/a n/a n/a n/a Elmore n/a n/a n/a n/a n/a n/a Epson - Huntly n/a n/a n/a n/a n/a n/a Gornong n/a n/a n/a n/a n/a n/a Guildford n/a n/a n/a n/a n/a n/a Gunower n/a n/a n/a n/a n/a n/a Guildford n/a n/a n/a n/a n/a n/a Junortoun n/a n/a n/a n/a n/a n/a Junortoun<	Boort	n/a	n/a	n/a	n/a	n/a
Castlemaine ³ Monthly 7 0.6 0.5 0 Cohuna n/a n/a n/a n/a n/a n/a Dunolly ⁴ Monthly 44 6.2 2.2 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 n/a n/a n/a n/a n/a Fryerstown ³ Monthly 8 0.6 0.5 0 Goornong n/a n/a n/a n/a n/a Guidford n/a n/a n/a n/a n/a Guidford n/a n/a n/a n/a n/a Harcourt ³ Monthly 7 0.7 0.5 0 Heathcote n/a n/a n/a n/a n/a Junotton n/a n/a n/a n/a n/a Leitchville n/a </td <td>Bridgewater-Inglewood</td> <td>Monthly</td> <td>12</td> <td>1.6</td> <td>1.1</td> <td>0</td>	Bridgewater-Inglewood	Monthly	12	1.6	1.1	0
Cohunan/an/an/an/an/aDunolly4Monthly44 6.2 2.2 0 Echucan/an/an/an/an/aElmoren/an/an/an/an/aElmoren/an/an/an/an/aEpsom - Huntlyn/an/an/an/an/aFryerstown3Monthly 8 0.6 0.5 0 Goornongn/an/an/an/an/aGuildfordn/an/an/an/an/aGuibowern/an/an/an/an/aHacourt3Monthly 7 0.7 0.5 0 Heathcoten/an/an/an/aJunortounn/an/an/an/aKorong ValeForthightly 27 0.7 0.4 Leitchvillen/an/an/an/aLeitchvillen/an/an/an/aLeitchvillen/an/an/an/aLeitchvillen/an/an/an/aLeitchvillen/an/an/an/aLeitchvillen/an/an/an/aMaiden Guily - Marongn/an/an/an/aMaiden Guily - Marongn/an/an/aNan/an/an/an/aMaiden Guily - Marongn/an/an/aMaiden Guily - Marongn/an/a<	Castlemaine ³	Monthly	7	0.6	0.5	0
Dunolly4Monthly446.22.20Echucan/an/an/an/an/an/aElmoren/an/an/an/an/aEpson - Huntlyn/an/an/an/an/aFryerstown3Monthly80.60.50Goornongn/an/an/an/an/aGuildfordn/an/an/an/an/aGuildfordn/an/an/an/an/aGunbowern/an/an/an/an/aHarcourt3Monthly70.70.50Heathcoten/an/an/an/aJunortounn/an/an/an/aKorong ValeFortnightly270.70.40Kynetonn/an/an/an/an/aLeitchvillen/an/an/an/an/aLockingtonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMonthly80.70.50 <td>Cohuna</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> <td>n/a</td>	Cohuna	n/a	n/a	n/a	n/a	n/a
Echucan/an/an/an/an/aElmoren/an/an/an/an/aEpsom - Huntlyn/an/an/an/aFryerstown³Monthly80.60.50Goornongn/an/an/an/an/aGuildfordn/an/an/an/an/aGuildfordn/an/an/an/an/aGunbowern/an/an/an/an/aHarcourt³Monthly70.70.50Heathcoten/an/an/an/an/aJunortounn/an/an/an/an/aKynetonn/an/an/an/an/aLaanecoorien/an/an/an/an/aLockingtonn/an/an/an/an/aMaldonn/an/an/an/an/aKaged 3Monthly80.70.50Pyramid Hilln/an/an/an/aNewstead³Monthly80.70.5Pyramid Hilln/an/an/an/aNewstead³Monthly80.70.5Pyramid Hilln/an/an/an/aNewstead³Monthly80.70.5Pyramid Hilln/an/an/an/aRochestern/an/an/an/aNan/an/an	Dunolly ⁴	Monthly	44	6.2	2.2	0
Elmoren/an/an/an/an/aEpsom - Huntlyn/an/an/an/an/aFryerstown³Monthly80.60.50Goornongn/an/an/an/an/aGuildfordn/an/an/an/an/aGuildfordn/an/an/an/an/aGunbowern/an/an/an/an/aHarcourt³Monthly70.70.50Heathcoten/an/an/an/aJunortounn/an/an/an/aKorong ValeFortnightly270.70.40Kynetonn/an/an/an/an/aLaanecoorien/an/an/an/an/aLockingtonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMalmsburyn/an/an/an/an/aNewstead³Monthly80.70.50Pyramid Hilln/an/an/an/aRaywoodn/an/an/an/aSebastiann/an/an/an/aStrathfieldsayen/an/an/an/aTaradale	Echuca	n/a	n/a	n/a	n/a	n/a
Epsom - Huntlyn/an/an/an/an/aFryerstown³Monthly80.60.50Goornongn/an/an/an/an/aGuildfordn/an/an/an/an/aGunbowern/an/an/an/an/aGunbowern/an/an/an/an/aHarcourt³Monthly70.70.50Heathcoten/an/an/an/aJunortounn/an/an/an/aKorong ValeFortnightly270.70.40Kynetonn/an/an/an/aLaanecoorien/an/an/an/aLokingtonn/an/an/an/aMalden Gully - Marongn/an/an/aMaldonn/an/an/an/aMaldonn/an/an/an/aMalmsburyn/an/an/an/aNewstead³Monthly80.70.5Pyramid Hilln/an/an/aNan/an/an/aRaywoodn/an/an/aSebastiann/an/an/aNan/an/an/aStrathfieldsayen/an/aNan/an/aSepentinen/an/an/an/an/aTaradale - Elphinstonen/an/an/an	Elmore	n/a	n/a	n/a	n/a	n/a
Fryerstown³Monthly80.60.50Goornongn/an/an/an/an/an/aGuildfordn/an/an/an/an/an/aGunbowern/an/an/an/an/an/aGunbowern/an/an/an/an/an/aHarcourt³Monthly70.70.50Heathcoten/an/an/an/an/aJunortounn/an/an/an/an/aKorong ValeFortnightly270.70.40Kynetonn/an/an/an/an/aLaanecoorien/an/an/an/an/aLockingtonn/an/an/an/an/aMaiden Gully - Marongn/an/an/an/an/aMaldonn/an/an/an/an/aNewstead³Monthly80.70.50Pyramid Hilln/an/an/an/aRaywoodn/an/an/an/aRochestern/an/an/an/aSetpentinen/an/an/an/aStrathfieldsayen/an/an/an/aTaradale - Elphinstonen/an/an/an/aTrenthamn/an/an/an/aTyldenn/an/an/an/aToroboracn/an/an	Epsom - Huntly	n/a	n/a	n/a	n/a	n/a
Goornongn/an/an/an/an/aGuildfordn/an/an/an/an/aGunbowern/an/an/an/an/aHarcourt ³ Monthly70.70.50Heathcoten/an/an/an/an/aJunortounn/an/an/an/an/aJunortounn/an/an/an/an/aKorong ValeFortnightly270.70.40Kynetonn/an/an/an/an/aLaanecoorien/an/an/an/an/aLockingtonn/an/an/an/an/aMaiden Gully - Marongn/an/an/an/an/aMaldonn/an/an/an/an/an/aMaldonn/an/an/an/an/an/aMaldonn/an/an/an/an/an/aNewstead ³ Monthly80.70.50Pyramid Hilln/an/an/an/an/aRochestern/an/an/an/an/aSepentinen/an/an/an/an/aStrathfieldsayen/an/an/an/an/aTaragulla ⁴ Weekly445.82.20Tooboracn/an/an/an/an/aTernthamn/an/an/an	Fryerstown ³	Monthly	8	0.6	0.5	0
Guildfordn/an/an/an/an/aGunbowern/an/an/an/an/aHarcourt ³ Monthly70.70.50Heathcoten/an/an/an/an/aJunortounn/an/an/an/an/aKorong ValeFortnightly270.70.40Kynetonn/an/an/an/an/aLaanecoorien/an/an/an/an/aLatchvillen/an/an/an/an/aLockingtonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aNewstead ³ Monthly80.70.50Pyramid Hilln/an/an/an/aRaywoodn/an/an/an/aNan/an/an/an/aSepentinen/an/an/an/aStrattfieldsayen/an/an/an/aTaradale - Elphinstonen/an/an/an/aTaradale - Elphinstonen/an/an/an/aTrenthamn/an/an/an/an/aTaradale - Elphinstonen/an/an/an/a <td< td=""><td>Goornong</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td></td<>	Goornong	n/a	n/a	n/a	n/a	n/a
Gunbowern/an/an/an/an/aHarcourt³Monthly70.70.50Heathcoten/an/an/an/an/aJunortounn/an/an/an/an/aKorong ValeFortnightly270.70.40Kynetonn/an/an/an/an/aLaanecoorien/an/an/an/an/aLeitchvillen/an/an/an/an/aLockingtonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aNewstead³Monthly80.70.50Pyramid Hilln/an/an/an/an/aRaywoodn/an/an/an/an/aRochestern/an/an/an/an/aSetastiann/an/an/an/an/aTaradale - Elphinstonen/an/an/an/aTernthamn/an/an/an/an/aTernthamn/an/a <t< td=""><td>Guildford</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td></t<>	Guildford	n/a	n/a	n/a	n/a	n/a
Harcourt3Monthly70.70.50Heathcoten/an/an/an/an/an/aJunortounn/an/an/an/an/aKorong ValeFortnightly270.70.40Kynetonn/an/an/an/an/aLaanecoorien/an/an/an/an/aLeitchvillen/an/an/an/an/aLockingtonn/an/an/an/an/aMaiden Gully - Marongn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aNewstead3Monthly80.70.50Pyramid Hilln/an/an/an/aRaywoodn/an/an/an/aRochestern/an/an/an/aSebastiann/an/an/an/aTaradale - Elphinstonen/an/an/an/aTrenthamn/an/an/an/an/aTrenthamn/an/an/an/a<	Gunbower	n/a	n/a	n/a	n/a	n/a
Heathcoten/an/an/an/an/aJunortounn/an/an/an/an/aKorong ValeFortnightly270.70.40Kynetonn/an/an/an/an/aLaanecoorien/an/an/an/an/aLatchvillen/an/an/an/an/aLockingtonn/an/an/an/an/aMaiden Gully - Marongn/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMawsburyn/an/an/an/an/aNewstead³Monthly80.70.50Pyramid Hilln/an/an/an/aRaywoodn/an/an/an/aSebastiann/an/an/an/aStrathfieldsayen/an/an/an/aTaradale - Elphinstonen/an/an/an/aTrenthamn/an/an/an/an/aTrenthamn/an/an/an/aTrenthamn/an/an/an/aTrenthamn/an/an/an/aTrenthamn/an/an/an/aNan/an/an/an/aNan/an/an/an/a	Harcourt ³	Monthly	7	0.7	0.5	0
Junortounn/an/an/an/an/aKorong ValeFortnightly270.70.40Kynetonn/an/an/an/an/aLaanecoorien/an/an/an/an/aLainecoorien/an/an/an/an/aLeitchvillen/an/an/an/an/aLockingtonn/an/an/an/an/aMaiden Gully - Marongn/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMawsburyn/an/an/an/an/aNewstead ³ Monthly80.70.50Pyramid Hilln/an/an/an/aRaywoodn/an/an/an/aSebastiann/an/an/an/aStrathfieldsayen/an/an/an/aTaradale - Elphinstonen/an/an/aTernthamn/an/an/an/aTrenthamn/an/an/an/aTrenthamn/an/an/aNan/an/an/aNan/an/an/aNan/an/an/aRaywoodn/an/aNan/an/aNan/an/aNan/an/aNan/an/a	Heathcote	n/a	n/a	n/a	n/a	n/a
Korong ValeFortnightly27 0.7 0.4 0 Kynetonn/an/an/an/an/an/aLaanecoorien/an/an/an/an/an/aLeitchvillen/an/an/an/an/an/aLeitchvillen/an/an/an/an/an/aLockingtonn/an/an/an/an/an/aMaiden Gully - Marongn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMalmsburyn/an/an/an/an/aNewstead ³ Monthly8 0.7 0.5 0 Pyramid Hilln/an/an/an/an/aRaywoodn/an/an/an/an/aSebastiann/an/an/an/an/aStrathfieldsayen/an/an/an/aTaragulla ⁴ Weekly44 5.8 2.2 0 Tooboracn/an/an/an/an/aTrenthamn/an/an/an/an/aTyldenn/an/an/an/a	Junortoun	n/a	n/a	n/a	n/a	n/a
Kynetonn/an/an/an/an/aLaanecoorien/an/an/an/an/aLeitchvillen/an/an/an/an/aLeitchvillen/an/an/an/an/aLockingtonn/an/an/an/an/aMaiden Gully - Marongn/an/an/an/an/aMaldonn/an/an/an/an/aMaldonn/an/an/an/an/aMalmsburyn/an/an/an/an/aNewstead ³ Monthly80.70.50Pyramid Hilln/an/an/an/an/aRaywoodn/an/an/an/an/aSepentinen/an/an/an/an/aStrathfieldsayen/an/an/an/aTaradale - Elphinstonen/an/an/an/aTrenthamn/an/an/an/an/aTrenthamn/an/an/an/an/aTyldenn/an/an/an/an/a	Korong Vale	Fortnightly	27	0.7	0.4	0
Laanecoorien/an/an/an/an/aLeitchvillen/an/an/an/an/an/aLockingtonn/an/an/an/an/an/aMaiden Gully - Marongn/an/an/an/an/an/aMaldonn/an/an/an/an/an/aMaldonn/an/an/an/an/an/aMalmsburyn/an/an/an/an/aNewstead³Monthly80.70.50Pyramid Hilln/an/an/an/an/aRaywoodn/an/an/an/an/aRochestern/an/an/an/an/aSebastiann/an/an/an/an/aStrathfieldsayen/an/an/an/aTaragulla ⁴ Weekly445.82.20Tooboracn/an/an/an/an/aTrenthamn/an/an/an/an/aTyldenn/an/an/an/an/a	Kyneton	n/a	n/a	n/a	n/a	n/a
Leitchvillen/an/an/an/an/aLockingtonn/an/an/an/an/an/aMaiden Gully - Marongn/an/an/an/an/an/aMaldonn/an/an/an/an/an/aMalmsburyn/an/an/an/an/an/aNewstead³Monthly80.70.50Pyramid Hilln/an/an/an/an/aRaywoodn/an/an/an/an/aRochestern/an/an/an/an/aSebastiann/an/an/an/an/aStrathfieldsayen/an/an/an/an/aTaragulla4Weekly445.82.20Tooboracn/an/an/an/an/aTrenthamn/an/an/an/an/aMaldenn/an/an/an/an/aMaldenn/an/an/an/an/aMedderburnFortniphtly540.70.40	Laanecoorie	n/a	n/a	n/a	n/a	n/a
Lockingtonn/an/an/an/an/aMaiden Gully - Marongn/an/an/an/an/an/aMaldonn/an/an/an/an/an/aMaldonn/an/an/an/an/an/aMalmsburyn/an/an/an/an/aNewstead³Monthly80.70.50Pyramid Hilln/an/an/an/aRaywoodn/an/an/an/aRochestern/an/an/an/aSebastiann/an/an/an/aSerpentinen/an/an/an/aTaradale - Elphinstonen/an/an/an/an/an/an/an/aTrenthamn/an/an/an/aTyldenn/an/an/an/aNan/an/an/an/aNn/an/an/an/aNan/an/an/an/aNan/an/an/an/aNan/an/an/an/aNan/an/an/an/aNan/an/an/an/aNan/an/an/an/aNan/an/an/an/aNan/an/an/an/aNan/an/an/an/aNan/an/an/an/a	Leitchville	n/a	n/a	n/a	n/a	n/a
Maiden Gully - Marongn/an/an/an/aMaldonn/an/an/an/an/aMalmsburyn/an/an/an/an/aMewstead³Monthly80.70.50Pyramid Hilln/an/an/an/an/aRaywoodn/an/an/an/an/aRochestern/an/an/an/an/aSebastiann/an/an/an/an/aSerpentinen/an/an/an/an/aTaradale - Elphinstonen/an/an/an/an/aTrenthamn/an/an/an/an/aTrenthamn/an/an/an/an/aTyldenn/an/an/an/an/a	Lockington	n/a	n/a	n/a	n/a	n/a
Maldonn/an/an/an/an/aMalmsburyn/an/an/an/an/aNewstead³Monthly80.70.50Pyramid Hilln/an/an/an/an/aRaywoodn/an/an/an/an/aRochestern/an/an/an/an/aSebastiann/an/an/an/an/aSerpentinen/an/an/an/aStrathfieldsayen/an/an/an/aTaradale - Elphinstonen/an/an/an/aTooboracn/an/an/an/aTrenthamn/an/an/an/aTyldenn/an/an/an/aWedderburnFortnightly540.70.4	Maiden Gully - Marong	n/a	n/a	n/a	n/a	n/a
Malmsburyn/an/an/an/an/aNewstead3Monthly80.70.50Pyramid Hilln/an/an/an/an/aRaywoodn/an/an/an/an/aRochestern/an/an/an/an/aRochestern/an/an/an/an/aSebastiann/an/an/an/an/aSerpentinen/an/an/an/aStrathfieldsayen/an/an/an/aTaradale - Elphinstonen/an/an/an/aTooboracn/an/an/an/aTrenthamn/an/an/an/aTyldenn/an/an/an/aWedderburnFortnightly540.70.4	Maldon	n/a	n/a	n/a	n/a	n/a
Newstead3Monthly8 0.7 0.5 0 Pyramid Hilln/an/an/an/an/aRaywoodn/an/an/an/an/aRochestern/an/an/an/an/aSebastiann/an/an/an/an/aSerpentinen/an/an/an/aStrathfieldsayen/an/an/an/aTaradale - Elphinstonen/an/an/an/aTooboracn/an/an/an/aTrenthamn/an/an/an/aTyldenn/an/an/an/aWedderburnEortnightly540.70.4	Malmsbury	n/a	n/a	n/a	n/a	n/a
Pyramid Hilln/an/an/an/an/aRaywoodn/an/an/an/an/aRochestern/an/an/an/an/aSebastiann/an/an/an/an/aSerpentinen/an/an/an/an/aStrathfieldsayen/an/an/an/aTaradale - Elphinstonen/an/an/an/aTarnagulla ⁴ Weekly445.82.20Tooboracn/an/an/an/an/aTrenthamn/an/an/an/an/aTyldenn/an/an/an/an/aWedderburnFortnightly540.70.40	Newstead ³	Monthly	8	0.7	0.5	0
Raywoodn/an/an/an/aRochestern/an/an/an/an/aSebastiann/an/an/an/an/aSerpentinen/an/an/an/an/aStrathfieldsayen/an/an/an/aTaradale - Elphinstonen/an/an/an/aTarnagulla ⁴ Weekly445.82.20Tooboracn/an/an/an/an/aTrenthamn/an/an/an/an/aTyldenn/an/an/an/an/aWedderburnEortnightly540.70.40	Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Rochestern/an/an/an/aSebastiann/an/an/an/an/aSerpentinen/an/an/an/an/aStrathfieldsayen/an/an/an/an/aTaradale - Elphinstonen/an/an/an/an/aTarnagulla4Weekly445.82.20Tooboracn/an/an/an/an/aTrenthamn/an/an/an/an/aTyldenn/an/an/an/an/aWedderburnEortnightly540.70.40	Raywood	n/a	n/a	n/a	n/a	n/a
Sebastiann/an/an/an/aSerpentinen/an/an/an/an/aStrathfieldsayen/an/an/an/an/aTaradale - Elphinstonen/an/an/an/aTarnagulla ⁴ Weekly445.82.20Tooboracn/an/an/an/an/aTrenthamn/an/an/an/an/aTyldenn/an/an/an/an/aWedderburnEortnightly540.70.40	Rochester	n/a	n/a	n/a	n/a	n/a
Serpentinen/an/an/an/aStrathfieldsayen/an/an/an/aTaradale - Elphinstonen/an/an/an/aTarnagulla ⁴ Weekly445.82.20Tooboracn/an/an/an/an/aTrenthamn/an/an/an/an/aTyldenn/an/an/an/an/aWedderburnEortnightly540.70.40	Sebastian	n/a	n/a	n/a	n/a	n/a
Strathfieldsayen/an/an/an/aTaradale - Elphinstonen/an/an/an/aTarnagulla4Weekly445.82.20Tooboracn/an/an/an/an/aTrenthamn/an/an/an/an/aTyldenn/an/an/an/an/aWedderburnFortnightly540.70.40	Serpentine	n/a	n/a	n/a	n/a	n/a
Taradale - Elphinstonen/an/an/an/aTarnagulla4Weekly44 5.8 2.2 0 Tooboracn/an/an/an/an/aTrenthamn/an/an/an/an/aTyldenn/an/an/an/an/aWedderburnFortnightly 54 0.7 0.4 0	Strathfieldsave	n/a	n/a	n/a	n/a	n/a
Tarnagulla4Weekly445.82.20Tooboracn/an/an/an/an/aTrenthamn/an/an/an/an/aTyldenn/an/an/an/an/aWedderburnFortnightly540.70.40	Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tooboracn/an/an/an/aTrenthamn/an/an/an/aTyldenn/an/an/an/aWedderburnFortnightly540.70.4	Tarnagulla ⁴	Weekly	44	5.8	2.2	0
Trenthamn/an/an/an/aTyldenn/an/an/an/aWedderburnFortnightly540.70.4	Tooborac	n/a	n/a	n/a	n/a	n/a
Tyldenn/an/an/an/aWedderburnFortnightly540.70.40	Trentham	n/a	n/a	n/a	n/a	n/a
Wedderburn Fortnightly 54 0.7 0.4 0	Tvlden	n/a	n/a	n/a	n/a	n/a
	Wedderburn	Fortniahtly	54	0.7	0.4	0

Note:

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

2 Sampling ceased as identified as not required from Bealiba tank.

3 Free chlorination trial continuing, in February 2020 it was decided to cease sampling.

4 During free chlorination project, sampling temporarily on-hold (8 weeks)

5 One sample not collected as sampler was unable to collect sample as no water coming from sample point.

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.

Page 45 of 105

Manganese - WTP exit/storage points for 2019-20

Table 14: 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	0.003	0.001	0
Bendigo (Southern)	Monthly	12	0.003	0.001	0
Bendigo (Spring Gully)	Monthly	12	0.003	0.001	0
Big Hill	Monthly	12	0.003	0.001	0
Boort	Monthly	12	0.032	0.009	0
Bridgewater-Inglewood	Monthly	12	0.030	0.010	0
Castlemaine	Monthly	12	0.004	0.001	0
Cohuna	Weekly	53	0.004	0.002	0
Dunolly	n/a	n/a	n/a	n/a	n/a
Echuca	Weekly	53	0.006	0.001	0
Elmore	Monthly	12	<0.001	<0.001	0
Epsom - Huntly	Monthly	12	0.003	0.001	0
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	Monthly	12	0.019	0.004	0
Guildford	Monthly	12	0.004	0.001	0
Gunbower	Weekly	53	<0.001	<0.001	0
Harcourt	Monthly	12	0.004	0.001	0
Heathcote	Weekly	52	0.011	0.003	0
Junortoun	Monthly	12	0.003	0.001	0
Korong Vale	Monthly	12	0.004	0.001	0
Kyneton	Monthly	12	0.002	0.001	0
Laanecoorie ¹	Weekly	51	0.042	0.010	0
Leitchville	Weekly	53	0.004	0.001	0
Lockington	Monthly	12	<0.001	<0.001	0
Maiden Gully - Marong	Monthly	12	0.003	0.001	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	Monthly	12	0.002	0.001	0
Newstead	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	Monthly	12	0.003	0.001	0
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester	Monthly	12	0.077	0.008	0
Sebastian	n/a	n/a	n/a	n/a	n/a
Serpentine	Monthly	12	0.074	0.014	0
Strathfieldsaye	Monthly	12	0.003	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	0.001	0.001	0
Tylden	n/a	n/a	n/a	n/a	n/a
Wedderburn	n/a	n/a	n/a	n/a	n/a

Note:

1300 363 200 : www.coliban.com.au

1 One sample not collected as sampler was unable to collect sample as no water coming from sample point.

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 2019-20

Table 15: 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 ²	Fortnightly	16	0.26	0.16	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 Hill⁵	Monthly	23	1.25	0.38	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater-Inglewood	Monthly	12	0.30	0.08	0
Castlemaine ³	Monthly	7	0.02	0.02	0
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly ⁴	Weekly	44	0.79	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	n/a	n/a	n/a	n/a	n/a
Fryerstown ³	Monthly	8	0.02	0.02	0
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 ³	Monthly	7	0.02	0.02	0
Heathcote	n/a	n/a	n/a	n/a	n/a
Junortoun	n/a	n/a	n/a	n/a	n/a
Korong Vale	Fortnightly	27	0.13	0.04	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 ³	Monthly	8	0.02	0.02	0
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 ⁴	Weekly	44	0.76	0.26	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	Fortnightly	54	0.13	0.04	0

Note:

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

2 Sampling ceased as identified as not required from Bealiba tank.

3 Free chlorination trial continuing, in February 2020 it was decided to cease sampling.

4 During free chlorination project, sampling temporarily on-hold (8 weeks)

5 One sample not collected as sampler was unable to collect sample as no water coming from sample point. 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 2019-20

	Table 16: Aluminium results	for WTP exit/storage	points (ADWG aesthetic	auideline value: 0.2 ma/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	53	0.050	0.032	0
Bendigo (Southern)	Weekly	53	0.050	0.032	0
Bendigo (Spring Gully)	Weekly	53	0.050	0.032	0
Big Hill	Weekly	53	0.050	0.032	0
Boort	Quarterly	5	0.080	0.028	0
Bridgewater-Inglewood	Quarterly	4	0.030	0.016	0
Castlemaine	Weekly	53	0.030	0.015	0
Cohuna	Quarterly	4	0.020	0.013	0
Dunolly	n/a	n/a	n/a	n/a	n/a
Echuca	Monthly	12	0.090	0.025	0
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Weekly	53	0.050	0.032	0
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	Monthly	12	0.170	0.078	0
Guildford	Weekly	53	0.030	0.015	0
Gunbower	Quarterly	4	0.030	0.021	0
Harcourt	Weekly	53	0.030	0.015	0
Heathcote	Quarterly	4	0.020	0.015	0
Junortoun	Weekly	53	0.050	0.032	0
Korong Vale	Quarterly	4	0.050	0.028	0
Kyneton	Weekly	53	0.030	0.022	0
Laanecoorie	Quarterly	4	0.040	0.021	0
Leitchville	Quarterly	4	0.020	0.009	0
Lockington	Quarterly	4	0.160	0.108	0
Maiden Gully - Marong	Weekly	53	0.050	0.032	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	Weekly	53	0.030	0.022	0
Newstead	n/a	n/a	n/a	n/a	n/a
Pyramid Hill	Quarterly	4	0.200	0.100	0
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester	Quarterly	4	0.010	0.008	0
Sebastian	n/a	n/a	n/a	n/a	n/a
Serpentine	Quarterly	4	0.120	0.045	0
Strathfieldsaye	Weekly	53	0.050	0.032	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:

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 2019-20

Table 17: Iron results for WT	P exit/storage points (ADW	G aesthetic guideline v	alue: 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	n/a
Bendigo (Northern)	Monthly	12	0.01	0.01	0
Bendigo (Southern)	Monthly	12	0.01	0.01	0
Bendigo (Spring Gully)	Monthly	12	0.01	0.01	0
Big Hill	Monthly	12	0.01	0.01	0
Boort	Monthly	12	0.10	0.04	0
Bridgewater-Inglewood	Monthly	12	0.02	0.01	0
Castlemaine	Monthly	12	0.01	0.01	0
Cohuna	Weekly	53	<0.01	<0.01	0
Dunolly	n/a	n/a	n/a	n/a	n/a
Echuca	Weekly	53	0.24	0.01	0
Elmore	Monthly	12	<0.01	<0.01	0
Epsom - Huntly	Monthly	12	0.01	0.01	0
Fryerstown	n/a	n/a	n/a	n/a	n/a
Goornong	Monthly	12	0.02	0.01	0
Guildford	Monthly	12	0.01	0.01	0
Gunbower	Weekly	53	<0.01	<0.01	0
Harcourt	Monthly	12	0.01	0.01	0
Heathcote	Weekly	52	<0.01	<0.01	0
Junortoun	Monthly	12	0.01	0.01	0
Korong Vale	Monthly	12	0.02	0.01	0
Kyneton	Monthly	12	0.01	0.01	0
Laanecoorie ¹	Weekly	51	0.04	0.01	0
Leitchville	Weekly	53	0.04	0.01	0
Lockington	Monthly	12	0.02	0.01	0
Maiden Gully - Marong	Monthly	12	0.01	0.01	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	Monthly	12	0.01	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	Monthly	12	0.03	0.01	0
Sebastian	n/a	n/a	n/a	n/a	n/a
Serpentine ²	Monthly	12	0.48	0.05	1
Strathfieldsaye	Monthly	12	0.01	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	<0.01	<0.01	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 One sample not collected as sampler was unable to collect sample as no water coming from sample point.

2 Details of exceedance are located in Section 4.3.1.2

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 2019-20

Table 18:	Chlorine rest	ults for WTF	exit/storage	points (ADWG	health-based	quideline	value:	5.0mg/L)
						3		

Water Sampling Locality	Sampling frequency	Number of samples ¹	Maximum (mg/L)	Average (mg/L)	Number of samples where guideline was
		50		0.4	not met
Axedale	Weekly	52	0.8	0.4	0
Bealiba	Weekly	52	1.6	0.9	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 ²	Weekly	103	2.7	0.8	0
Boort ³	Weekly	106	5.7	1.4	1
Bridgewater-Inglewood	Weekly	104	4.3	1.3	0
Castlemaine ²	Weekly	52	1.6	0.6	0
Cohuna	Weekly	53	2.0	1.6	0
Dunolly	Weekly	52	1.9	1.0	0
Echuca	Weekly	107	2.1	1.3	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	54	2.7	1.1	0
Goornong	Weekly	106	3.9	1.1	0
Guildford	n/a	n/a	n/a	n/a	n/a
Gunbower	Weekly	107	1.9	1.3	0
Harcourt	Weekly	53	1.4	0.9	0
Heathcote	Weekly	52	2.6	1.8	0
Junortoun	n/a	n/a	n/a	n/a	n/a
Korong Vale	Weekly	106	3.2	1.7	0
Kyneton	Weekly	52	1.7	1.4	0
Laanecoorie ²	Weekly	51	2.7	1.7	0
Leitchville	Weekly	53	2.2	1.7	0
Lockington	Weekly	53	4.5	2.3	0
Maiden Gully - Marong	n/a	n/a	n/a	n/a	n/a
Maldon	Weekly	53	1.3	0.9	0
Malmsbury	Weekly	52	1.6	1.2	0
Newstead	Weekly	53	1.7	1.0	0
Pyramid Hill	Weekly	53	2.9	1.8	0
Raywood	Weekly	52	2.2	0.9	0
Rochester	Weekly	53	2.9	1.7	0
Sebastian	Weekly	52	2.6	1.4	0
Serpentine	Weekly	53	2.9	1.8	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	1.3	0.6	0
Tooborac	Weekly	52	1.3	0.7	0
Trentham	Weekly	52	2.0	1.5	0
Tylden	Weekly	52	1.9	1.3	0
Wedderburn	Weekly	106	2.5	1.5	0

Note:

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

2 One sample not collected as sampler was unable to collect sample as no water coming from sample point.

3 Details of exceedance are located in Section 4.3.1.1

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 2019-20

Water Sampling	Sampling	Number of	Maximum	Average	Number of
Locality	irequency	samples	(iiig/L)	(mg/∟)	where
					guideline was
					not met
Axedale	n/a	n/a	n/a	n/a	n/a
Bealiba ²	Fortnightly	22	0.353	0.127	0
Bendigo (Northern)	Weekly	53	0.389	0.254	0
Bendigo (Southern)	Weekly	53	0.389	0.254	0
Bendigo (Spring Gully)	Weekly	53	0.389	0.254	0
Big Hill⁵	Weekly/Monthly	76	0.401	0.236	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater-Inglewood	Fortnightly/Mthly	38	0.486	0.124	0
Castlemaine ³	Weekly/Mthly	60	0.085	0.022	0
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly ²	Weekly	44	0.328	0.174	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	53	0.389	0.254	0
Fryerstown ³	Monthly	8	0.049	0.020	0
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	Weekly	53	0.085	0.022	0
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt ³	Weekly/Fortnightly	69	0.085	0.021	0
Heathcote ⁴	Fortnightly	26	0.657	0.162	1
Junortoun	Monthly	53	0.389	0.254	0
Korong Vale	Fortnightly	54	0.280	0.091	0
Kyneton	n/a	n/a	n/a	n/a	n/a
Laanecoorie ²	Fortnightly	22	0.401	0.137	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	Weekly	53	0.389	0.254	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	n/a	n/a	n/a	n/a	n/a
Newstead ³	Monthly	8	0.049	0.018	0
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	53	0.389	0.254	0
Taradale - Elphinstone	n/a	n/a	n/a	n/a	n/a
Tarnagulla ²	Weekly	44	0.389	0.176	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	Fortnightly	54	0.255	0.099	0

Table 19: Ammonia results for WTP exit/storage points (ADWG aesthetic guideline value is 0.5 mg/L)

Note:

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

2 During free chlorination project, sampling temporarily on-hold (8 weeks)

3 Free chlorination trial continuing, in February 2020 it was decided to cease sampling at tanks in the Castlemaine system.

4 Details of exceedance are located in Section 4.3.1.2

1300 363 200 : www.coliban.com.au

5 One sample not collected as sampler was unable to collect sample as no water coming from sample point.

Page 51 of 105

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.

SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20

Page 52 of 105

Alkalinity – WTP exit/storage points for 2019-20

Table 20: 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	53	96	70
Bendigo (Southern)	Weekly	53	96	70
Bendigo (Spring Gully)	Weekly	53	96	70
Big Hill	Weekly	53	96	70
Boort	n/a	n/a	n/a	n/a
Bridgewater-Inglewood	n/a	n/a	n/a	n/a
Castlemaine	Weekly	53	68	57
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	53	96	70
Fryerstown	n/a	n/a	n/a	n/a
Goornong	n/a	n/a	n/a	n/a
Guildford	Weekly	53	68	57
Gunbower	n/a	n/a	n/a	n/a
Harcourt	Weekly	53	68	57
Heathcote	n/a	n/a	n/a	n/a
Junortoun	Weekly	53	96	70
Korong Vale	n/a	n/a	n/a	n/a
Kyneton	Weekly	53	76	54
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	53	96	70
Maldon	n/a	n/a	n/a	n/a
Malmsbury	Weekly	53	76	54
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	53	96	70
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 2019-20

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

Table 21: 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	130	0	0	0
Bendigo (Southern)	Weekly	130	0	0	0
Bendigo (Spring Gully)	Weekly	78	0	0	0
Big Hill	Weekly	52	0	0	0
Boort	Weekly	53	0	0	0
Bridgewater-Inglewood	Weekly	52	0	0	0
Castlemaine	Weekly	65	0	0	0
Cohuna	Weekly	53	0	0	0
Dunolly	Weekly	52	0	0	0
Echuca	Weekly	79	0	0	0
Elmore	Weekly	53	0	0	0
Epsom - Huntly	Weekly	53	0	0	0
Fryerstown	Weekly	53	0	0	0
Goornong	Weekly	53	0	0	0
Guildford	Weekly	53	0	0	0
Gunbower	Weekly	53	0	0	0
Harcourt	Weekly	53	0	0	0
Heathcote	Weekly	52	0	0	0
Junortoun	Weekly	52	0	0	0
Korong Vale	Weekly	53	0	0	0
Kyneton	Weekly	52	0	0	0
Laanecoorie	Weekly	52	0	0	0
Leitchville	Weekly	53	0	0	0
Lockington	Weekly	53	0	0	0
Maiden Gully - Marong	Weekly	52	0	0	0
Maldon	Weekly	53	0	0	0
Malmsbury	Weekly	52	0	0	0
Newstead	Weekly	53	0	0	0
Pyramid Hill	Weekly	53	0	0	0
Raywood	Weekly	52	0	0	0
Rochester	Weekly	53	0	0	0
Sebastian	Weekly	52	0	0	0
Serpentine	Weekly	53	0	0	0
Strathfieldsaye	Weekly	52	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	53	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).

^ no false positive E. coli results were recorded during 2019-20.

SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20

Page 55 of 105

Trihalomethanes (THM) – Customer Tap Sites 2019-20

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 22: 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	Monthly	12	0.0710	0.0541	0
Bealiba ²	Monthly	12	0.3100	0.1375	1
Bendigo (Northern)	Monthly	12	0.0280	0.0137	0
Bendigo (Southern)	Monthly	12	0.0220	0.0118	0
Bendigo (Spring Gully)	Monthly	12	0.0220	0.0114	0
Big Hill	Monthly	12	0.0640	0.0217	0
Boort	Monthly	12	0.1200	0.0993	0
Bridgewater-Inglewood	Monthly	12	0.1100	0.0321	0
Castlemaine	Monthly	12	0.1000	0.0618	0
Cohuna	Monthly	12	0.0430	0.0322	0
Dunolly	Monthly	12	0.2400	0.1294	0
Echuca	Monthly	12	0.0630	0.0312	0
Elmore ¹	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Monthly	12	0.0290	0.0138	0
Fryerstown	Monthly	12	0.1200	0.0878	0
Goornong	Monthly	12	0.1300	0.0982	0
Guildford	Monthly	12	0.0990	0.0705	0
Gunbower	Monthly	12	0.0560	0.0326	0
Harcourt	Monthly	12	0.1200	0.0808	0
Heathcote	Monthly	12	0.0950	0.0803	0
Junortoun	Monthly	12	0.0230	0.0131	0
Korong Vale	Monthly	12	0.1400	0.0202	0
Kyneton	Monthly	12	0.0950	0.0612	0
Laanecoorie ²	Monthly	12	0.2700	0.1194	1
Leitchville	Monthly	12	0.0470	0.0289	0
Lockington	Monthly	12	0.0480	0.0298	0
Maiden Gully - Marong	Monthly	12	0.0260	0.0133	0
Maldon	Monthly	12	0.1100	0.0866	0
Malmsbury	Monthly	12	0.1100	0.0792	0
Newstead	Monthly	12	0.0930	0.0693	0
Pyramid Hill	Monthly	12	0.0770	0.0487	0
Raywood	Monthly	12	0.1100	0.0833	0
Rochester	Monthly	12	0.0620	0.0267	0
Sebastian	Monthly	12	0.0860	0.0459	0
Serpentine	Monthly	12	0.0970	0.0498	0
Strathfieldsaye	Monthly	12	0.0240	0.0115	0
Taradale - Elphinstone	Monthly	12	0.0940	0.0564	0
Tarnagulla ²	Monthly	12	0.3000	0.1213	1
Tooborac	Monthly	12	0.1100	0.0770	0
Trentham	Monthly	12	0.0860	0.0440	0
Tylden	Monthly	12	0.0860	0.0612	0
Wedderburn	Monthly	12	0.0770	0.0147	0

Note:

1300 363 200 : www.coliban.com.au

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 so not monitored.

2 Actions in relation to the exceedance are discussed in section 4.3.1.1.

Page 56 of 105

Turbidity – Customer Tap Sites 2019-20

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

Water Sampling Locality	Sampling Frequency	Number of Samples	Maximum value (NTU)	95 th percentile of results (NTU)	Number of 95th percentile of results above standard
Axedale	Weekly	52	0.1	0.1	0
Bealiba	Weekly	52	0.4	0.2	0
Bendigo (Northern)	Weekly	52	0.4	0.1	0
Bendigo (Southern)	Weekly	52	0.2	0.1	0
Bendigo (Spring Gully)	Weekly	52	0.1	0.1	0
Big Hill	Weekly	52	0.2	0.1	0
Boort	Weekly	53	1.6	0.2	0
Bridgewater-Inglewood	Weekly	52	0.2	0.1	0
Castlemaine	Weekly	53	0.3	0.1	0
Cohuna	Weekly	53	0.5	0.3	0
Dunolly	Weekly	52	0.2	0.1	0
Echuca	Weekly	53	0.2	0.1	0
Elmore	Weekly	53	0.1	0.1	0
Epsom - Huntly	Weekly	53	0.1	0.1	0
Fryerstown	Weekly	53	0.2	0.1	0
Goornong	Weekly	53	0.5	0.2	0
Guildford	Weekly	53	0.1	0.1	0
Gunbower	Weekly	53	0.2	0.1	0
Harcourt	Weekly	53	0.3	0.1	0
Heathcote	Weekly	52	0.1	0.1	0
Junortoun	Weekly	52	0.1	0.1	0
Korong Vale	Weekly	53	0.4	0.3	0
Kyneton	Weekly	52	1.5	0.2	0
Laanecoorie	Weekly	52	0.6	0.2	0
Leitchville	Weekly	53	0.5	0.2	0
Lockington	Weekly	53	0.3	0.1	0
Maiden Gully - Marong	Weekly	52	0.1	0.1	0
Maldon	Weekly	53	0.2	0.1	0
Malmsbury	Weekly	52	0.2	0.1	0
Newstead	Weekly	53	0.3	0.1	0
Pyramid Hill	Weekly	53	0.5	0.3	0
Raywood	Weekly	52	0.2	0.1	0
Rochester	Weekly	53	1.3	0.1	0
Sebastian	Weekly	52	0.3	0.1	0
Serpentine	Weekly	53	0.3	0.2	0
Strathfieldsaye	Weekly	52	0.1	0.1	0
Taradale - Elphinstone	Weekly	52	0.4	0.1	0
Tarnagulla	Weekly	52	0.2	0.1	0
Tooborac	Weekly	52	0.3	0.1	0
Trentham	Weekly	52	0.3	0.2	0
Tylden	Weekly	52	0.2	0.1	0
Wedderburn	Weekly	53	3.3	0.5	0

Chloroacetic Acid – Customer Tap Sites 2019-20

Table 24: 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
		1	10.005	-0.005	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 Reart	Quarterly	4	<0.005	<0.005	0
Build Bridgewater Inglewood	Quarterly	4	<0.005	<0.005	0
Costlemaine	Quarterly	4	<0.005	<0.005	0
Castiemane	Quarterly	4	<0.005	<0.005	0
	Quarterly	4	<0.005	<0.005	0
Echuca	Quarterly	4	<0.005	<0.005	0
Elmore ¹	n/a		-0.005 n/a	-0.000 n/a	0
Ensom - Huntly	Quarterly	11/a	<0.005	<0.005	0
Frverstown	Quarterly	4	<0.000	<0.000	0
Goornong	Quarterly	4	<0.000	<0.000	0
Guildford	Quarterly	4	<0.005	<0.000	0
Gunbower	Quarterly	4	<0.000	<0.000	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 2019-20

Table 25: 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	<0.005	<0.005	0
Bealiba	Quarterly	4	0.016	0.009	0
Bendigo (Northern)	Quarterly	4	0.007	0.004	0
Bendigo (Southern)	Quarterly	4	0.007	0.004	0
Bendigo (Spring Gully)	Quarterly	4	0.008	0.004	0
Big Hill	Quarterly	4	0.008	0.005	0
Boort	Quarterly	4	0.019	0.014	0
Bridgewater-Inglewood	Quarterly	4	0.010	0.004	0
Castlemaine	Quarterly	4	0.020	0.016	0
Cohuna	Quarterly	4	0.009	0.009	0
Dunolly	Quarterly	4	0.028	0.016	0
Echuca	Quarterly	4	0.025	0.014	0
Elmore ¹	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Quarterly	4	0.011	0.005	0
Fryerstown	Quarterly	4	0.018	0.009	0
Goornong	Quarterly	4	0.010	0.006	0
Guildford	Quarterly	4	<0.005	< 0.005	0
Gunbower	Quarterly	4	0.010	0.008	0
Harcourt	Quarterly	4	0.007	0.004	0
Heathcote	Quarterly	4	0.014	0.011	0
Junortoun	Quarterly	4	0.006	0.003	0
Korong Vale	Quarterly	4	0.007	0.005	0
Kyneton	Quarterly	4	0.026	0.019	0
Laanecoorie	Quarterly	4	0.022	0.012	0
Leitchville	Quarterly	4	0.015	0.013	0
Lockington	Quarterly	4	0.016	0.008	0
Maiden Gully - Marong	Quarterly	4	0.007	0.004	0
Maldon	Quarterly	4	<0.005	<0.005	0
Malmsbury	Quarterly	4	0.032	0.019	0
Newstead	Quarterly	4	0.012	0.007	0
Pyramid Hill	Quarterly	4	0.012	0.011	0
Raywood	Quarterly	4	0.013	0.009	0
Rochester	Quarterly	4	0.010	0.005	0
Sebastian	Quarterly	4	<0.005	< 0.005	0
Serpentine	Quarterly	4	0.017	0.016	0
Strathfieldsaye	Quarterly	4	0.010	0.004	0
Taradale - Elphinstone	Quarterly	4	0.014	0.009	0
Tarnagulla	Quarterly	4	0.011	0.005	0
Tooborac	Quarterly	4	0.007	0.005	0
Trentham	Quarterly	4	0.030	0.015	0
Tylden	Quarterly	4	0.031	0.019	0
Wedderburn	Quarterly	4	0.006	0.004	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 2019-20

Table 26: 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	<0.005	<0.005	0
Bealiba	Quarterly	4	0.006	0.003	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	0.015	0.011	0
Bridgewater-Inglewood	Quarterly	4	0.005	0.003	0
Castlemaine	Quarterly	4	0.012	0.010	0
Cohuna	Quarterly	4	0.010	0.009	0
Dunolly	Quarterly	4	0.011	0.006	0
Echuca	Quarterly	4	0.026	0.012	0
Elmore ¹	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Quarterly	4	<0.005	<0.005	0
Fryerstown	Quarterly	4	0.013	0.007	0
Goornong	Quarterly	4	<0.005	<0.005	0
Guildford	Quarterly	4	0.012	0.009	0
Gunbower	Quarterly	4	0.008	0.006	0
Harcourt	Quarterly	4	0.012	0.008	0
Heathcote	Quarterly	4	0.006	0.003	0
Junortoun	Quarterly	4	<0.005	<0.005	0
Korong Vale	Quarterly	4	<0.005	<0.005	0
Kyneton	Quarterly	4	0.019	0.013	0
Laanecoorie	Quarterly	4	0.010	0.006	0
Leitchville	Quarterly	4	0.014	0.009	0
Lockington	Quarterly	4	0.009	0.006	0
Maiden Gully - Marong	Quarterly	4	<0.005	<0.005	0
Maldon	Quarterly	4	<0.005	<0.005	0
Malmsbury	Quarterly	4	0.018	0.017	0
Newstead	Quarterly	4	0.013	0.009	0
Pyramid Hill	Quarterly	4	0.014	0.010	0
Raywood	Quarterly	4	0.006	0.004	0
Rochester	Quarterly	4	0.006	0.003	0
Sebastian	Quarterly	4	<0.005	<0.005	0
Serpentine	Quarterly	4	0.010	0.007	0
Strathfieldsaye	Quarterly	4	<0.005	<0.005	0
Taradale - Elphinstone	Quarterly	4	0.013	0.008	0
Tarnagulla	Quarterly	4	0.008	0.004	0
Tooborac	Quarterly	4	<0.005	<0.005	0
Trentham	Quarterly	4	0.018	0.013	0
Tylden	Quarterly	4	0.018	0.013	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 2019-20

Table 27: 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	0.01	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	<0.005	<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	<0.005	<0.005	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	<0.005	<0.005	0
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	Quarterly	4	<0.005	<0.005	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
	Monthly	12	0.01	0.00	0
	n/a	n/a	n/a	n/a	n/a
Kyneton	Monthly	12	<0.005	<0.005	0
	11/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a
Maiden Gully - Marong	Monthly	11/a 12	<0.005	<0.005	11/a
Maldon	Quarterly	12	<0.005	<0.005	0
Malmsbury	Monthly	12	0.000	0.00	0
Newstead	Quarterly	5	<0.01	<0.00	0
Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Raywood	Monthly	12	0.01	0.00	0
Rochester	n/a	n/a	n/a	n/a	n/a
Sebastian	Monthly	12	0.01	0.00	0
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsave	Monthly	12	0.01	0.00	0
Taradale - Elphinstone	Quarterly	4	< 0.005	< 0.005	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	Monthly	12	<0.005	<0.005	0
Wedderburn	n/a	n/a	n/a	n/a	n/a

Note:

1300 363 200 : www.coliban.com.au

Bromate is monitored in localities where ozone is used in treatment, as ozone can result in the production of this byproducts 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 WTP 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.

Page 61 of 105

Formaldehyde – Customer Tap Sites 2019-20

Table 28: 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	Quarteriy	4	<0.05	<0.05	0
Heathcole	n/a Monthly	n/a	n/a	n/a	n/a
Korong Valo	MONUTILY	12	<0.05	<0.05	0
Kupoton	17/a Monthly	11/a	11/a	11/a	11/a
	n/a	n/a	-0.05 n/a	-0.03 n/a	0 n/a
	n/a	n/a	n/a	n/a	n/a
	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	Monthly	12	0.1	0.0	0
Newstead	Quarterly	5	<0.05	<0.05	0
Pvramid 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	0.1	0.0	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	Monthly	12	<0.05	<0.05	0
Wedderburn	n/a	n/a	n/a	n/a	n/a

Note:

1300 363 200 : www.coliban.com.au

Formaldehyde is monitored in localities where ozone is used in treatment, as ozone can result in the production of this byproducts 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 WTP 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.

Page 62 of 105

Fluoride – Customer Tap Sites 2019-20

Table 29: 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	Max (mg/L)	Min (mg/L)	Average (mg/L)	Number of samples where standard was not met
Axedale	Monthly	12	0.9	0.920	0.820	0.882	0
Bealiba	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bendigo (Northern)	Monthly	12	0.9	0.940	0.850	0.896	0
Bendigo (Southern)	Monthly	12	0.9	1.000	0.860	0.898	0
Bendigo (Spring Gully)	Monthly	12	0.9	0.920	0.850	0.890	0
Big Hill	Monthly	12	0.9	0.960	0.820	0.883	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	0.880	0.750	0.828	0
Cohuna	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Dunolly	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Echuca ¹	Weekly	53	0.8	0.840	0.025	0.653	0
Elmore	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Monthly	12	0.9	0.950	0.830	0.888	0
Fryerstown	Monthly	12	0.9	0.850	0.760	0.811	0
Goornong	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Guildford	Monthly	12	0.9	0.860	0.780	0.829	0
Gunbower	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Harcourt	Monthly	12	0.9	0.910	0.750	0.824	0
Heathcote	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Junortoun	Monthly	12	0.9	0.940	0.830	0.883	0
Korong Vale	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Kyneton	Weekly	52	0.9	0.990	0.740	0.862	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	0.940	0.790	0.886	0
Maldon	Monthly	12	0.9	0.860	0.800	0.833	0
Malmsbury	Weekly	52	0.9	0.980	0.750	0.861	0
Newstead	Monthly	13	0.9	0.920	0.800	0.842	0
Pyramid Hill	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Raywood	Monthly	12	0.9	0.930	0.850	0.889	0
Rochester	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Sebastian	Monthly	12	0.9	0.940	0.840	0.884	0
Serpentine	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye	Monthly	12	0.9	0.920	0.830	0.880	0
I aradale - Elphinstone	Monthly	12	0.9	0.910	0.690	0.813	0
I arnagulla	n/a	n/a	n/a	n/a	n/a	n/a	n/a
l ooborac	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a
I ylden ²	Weekly	51	0.9	0.990	0.740	0.860	0
Wedderburn	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Note:

1 Fluoride outages impacted average (refer section 2.2 Issues for detail)

2 Sampling error resulted in one missed sample.

1300 363 200 : www.coliban.com.au

Page 63 of 105

Arsenic – Customer Tap Sites 2019-20

Table 30: 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	0.0010	0.0006	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 2019-20

Table 31: 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 2019-20

Table 32: 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
		Samples			standard
Avedale	Weekly	52	0.56	0.26	
Bealiba	Weekly	52	1 47	0.20	0
Bendigo (Northern)	Weekly	130	2.08	1.07	0
Bendigo (Southern)	Weekly	130	2.00	1.07	0
Bendigo (Spring Gully)	Weekly	78	2.00	1.20	0
Big Hill	Weekly	52	2.07	0.78	0
Boort	Weekly	53	1.54	0.70	0
Bridgewater Indewood	Weekly	52	2 70	1 31	0
Castlemaine	Weekly	65	2.70	0.88	0
Castienname	Weekly	52 52	1.55	1.00	0
Dupolly	Weekly	53	1.00	0.02	0
Echuco	Weekly	- 52 - 70	1.04	0.92	0
Echuca	vveekiy	19	1.00	1.10	0
	n/a	11/a	102	1.00	11/a
Epsolii - Hunuy	Weekly	53	1.03	1.00	0
Coorport	Weekly	53	1.73	0.00	0
Goomong	Weekly	53	3.50	1.00	0
Guilaíora	Weekly	53	0.73	0.25	0
Gunbower	VVeekly	53	1.83	1.25	0
	VVeekiy	53	1.17	0.55	0
Heathcote	vveekiy	52	2.03	1.49	0
Junortoun	Weekly	52	1.74	0.52	0
Korong Vale	Weekly	53	2.16	1.44	0
Kyneton	Weekly	52	2.13	1.64	0
	Weekly	52	1.71	0.75	0
Leitchville	Weekly	53	1.99	1.51	0
Lockington	Weekly	53	2.40	1.47	0
Maiden Gully - Marong	Weekly	52	2.16	1.34	0
Maldon	Weekly	53	0.89	0.68	0
Malmsbury	Weekly	52	1.54	0.90	0
Newstead	Weekly	53	1.72	0.57	0
Pyramid Hill	Weekly	53	1.65	1.05	0
Raywood	Weekly	52	1.57	0.62	0
Rochester	Weekly	53	2.70	1.48	0
Sebastian	Weekly	52	1.27	0.26	0
Serpentine	Weekly	53	1.92	1.08	0
Strathfieldsaye	Weekly	52	2.05	1.38	0
Taradale - Elphinstone	Weekly	52	1.30	0.90	0
Tarnagulla	Weekly	52	1.17	0.38	0
Tooborac	Weekly	52	1.18	0.42	0
Trentham	Weekly	52	1.73	1.18	0
Tylden	Weekly	52	2.09	1.35	0
Wedderburn	Weekly	53	1.91	1.33	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.

Chromium – Customer Tap Sites 2019-20

Table 33: 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 2019-20

Table 34: 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	<0.005	<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

Mercury – Customer Tap Sites 2019-20

Table 35: 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 2019-20

Table 36: 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	4.4	3.9	0
Bealiba ¹	Fortnightly	26	8.9	2.8	0
Bendigo (Northern) ¹	Fortnightly	26	3.1	1.5	0
Bendigo (Southern) ¹	Fortnightly	26	3.4	1.5	0
Bendigo (Spring Gully) ¹	Fortnightly	26	3.2	1.3	0
Big Hill ¹	Fortnightly	26	3.4	1.6	0
Boort ²	Quarterly	4	1.5	0.6	0
Bridgewater-Inglewood ¹	Fortnightly	26	1.5	0.6	0
Castlemaine ¹	Fortnightly	26	0.7	0.5	0
Cohuna ²	Quarterly	4	0.1	0.0	0
Dunolly ¹	Fortnightly	26	6.2	1.9	0
Echuca ²	Quarterly	4	0.7	0.2	0
Elmore ²	Quarterly	4	6.6	5.6	0
Epsom - Huntly ¹	Fortnightly	26	2.3	1.4	0
Fryerstown ¹	Fortnightly	26	1.0	0.5	0
Goornong ²	Quarterly	4	0.9	0.3	0
Guildford ¹	Fortnightly	26	1.4	0.5	0
Gunbower ²	Quarterly	4	0.3	0.1	0
Harcourt ¹	Fortnightly	26	0.8	0.5	0
Heathcote ¹	Fortnightly	26	3.1	0.7	0
Junortoun ¹	Fortnightly	26	4.4	1.9	0
Korong Vale ¹	Fortnightly	26	0.6	0.4	0
Kyneton ²	Quarterly	4	1.9	1.6	0
Laanecoorie ¹	Fortnightly	26	6.2	1.9	0
Leitchville ²	Quarterly	4	0.3	0.1	0
Lockington ²	Quarterly	4	0.7	0.4	0
Maiden Gully - Marong ¹	Fortnightly	26	5.3	1.5	0
Maldon ²	Quarterly	4	0.5	0.4	0
Malmsbury ²	Quarterly	4	2.0	1.4	0
Newstead ¹	Fortnightly	27	0.9	0.5	0
Pyramid Hill ²	Quarterly	4	1.0	0.5	0
Raywood ²	Quarterly	4	4.3	3.8	0
Rochester ²	Quarterly	4	2.1	1.1	0
Sebastian ²	Quarterly	4	4.3	3.8	0
Serpentine ²	Quarterly	4	3.4	1.6	0
Strathfieldsaye ¹	Fortnightly	26	1.9	1.2	0
Taradale - Elphinstone ¹	Fortnightly	26	2.3	0.6	0
Tarnagulla ¹	Fortnightly	26	6.6	2.1	0
Tooborac ²	Quarterly	4	2.3	1.7	0
Trentham ²	Quarterly	4	9.7	4.8	0
Tylden ²	Quarterly	4	1.8	1.5	0
Wedderburn ¹	Fortnightly	26	7.1	0.7	0

Note:

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

2 Chlorinated systems are sampled quarterly.

Selenium – Customer Tap Sites 2019-20

Table 37: 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

SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20

Sulphate – Customer Tap Sites 2019-20

Table 38: 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	20.000	9.875	0
Bealiba	Quarterly	4	58.000	34.250	0
Bendigo (Northern)	Quarterly	4	11.000	7.250	0
Bendigo (Southern)	Quarterly	4	11.000	6.875	0
Bendigo (Spring Gully)	Quarterly	4	11.000	6.125	0
Big Hill	Quarterly	4	10.000	6.125	0
Boort	Quarterly	4	53.000	48.750	0
Bridgewater-Inglewood	Quarterly	4	50.000	15.500	0
Castlemaine	Quarterly	4	5.000	4.250	0
Cohuna	Quarterly	4	30.000	25.750	0
Dunolly	Quarterly	4	29.000	26.500	0
Echuca	Quarterly	4	36.000	22.500	0
Elmore	Quarterly	4	9.000	8.000	0
Epsom - Huntly	Quarterly	4	12.000	7.000	0
Fryerstown	Quarterly	4	5.000	4.750	0
Goornong	Quarterly	4	85.000	79.250	0
Guildford	Quarterly	4	6.000	3.875	0
Gunbower	Quarterly	4	2.000	1.625	0
Harcourt	Quarterly	4	4.000	3.125	0
Heathcote	Quarterly	4	64.000	58.500	0
Junortoun	Quarterly	4	12.000	7.250	0
Korong Vale	Quarterly	4	18.000	14.250	0
Kyneton	Quarterly	4	5.000	4.250	0
Laanecoorie	Quarterly	4	30.000	27.750	0
Leitchville	Quarterly	4	20.000	15.500	0
Lockington	Quarterly	4	13.000	5.875	0
Maiden Gully - Marong	Quarterly	4	12.000	7.125	0
Maldon	Quarterly	4	5.000	3.375	0
Malmsbury	Quarterly	4	4.000	2.625	0
Newstead	Quarterly	4	4.000	3.125	0
Pyramid Hill	Quarterly	4	13.000	7.500	0
Raywood	Quarterly	4	11.000	7.000	0
Rochester	Quarterly	4	34.000	30.000	0
Sebastian	Quarterly	4	12.000	7.500	0
Serpentine	Quarterly	4	29.000	24.750	0
Strathfieldsaye	Quarterly	4	12.000	6.375	0
Taradale - Elphinstone	Quarterly	4	5.000	4.250	0
Tarnagulla	Quarterly	4	91.000	40.250	0
Tooborac	Quarterly	4	68.000	59.750	0
Trentham	Quarterly	4	1.000	0.750	0
Tylden	Quarterly	4	4.000	3.500	0
Wedderburn	Quarterly	4	17.000	14,750	0
Manganese – Customer Tap Sites 2019-20

Table 39: Manganese results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.5 mg/L)

Water Sampling Locality	Sampling Locality Sampling Number of Maximum frequency samples (mg/L)		Average (mg/L)	Number of samples where standard was not met	
Axedale	Monthly	12	<0.001	<0.001	0
Bealiba	Monthly	12	0.009	0.003	0
Bendigo (Northern)	Monthly	12	0.002	0.001	0
Bendigo (Southern)	Monthly	12	0.002	0.001	0
Bendigo (Spring Gully)	Monthly	12	0.002	0.001	0
Big Hill	Monthly	12	0.003	0.001	0
Boort	Monthly	12	0.020	0.007	0
Bridgewater-Inglewood	Monthly	12	0.014	0.005	0
Castlemaine	Monthly	12	0.002	0.001	0
Cohuna	Monthly	12	0.004	0.002	0
Dunolly	Monthly	12	0.015	0.007	0
Echuca	Monthly	12	0.009	0.002	0
Elmore	Monthly	12	<0.001	<0.001	0
Epsom - Huntly	Monthly	12	0.003	0.001	0
Fryerstown	Monthly	12	0.003	0.001	0
Goornong	Monthly	12	0.004	0.002	0
Guildford	Monthly	12	0.003	0.001	0
Gunbower	Monthly	12	<0.001	<0.001	0
Harcourt	Monthly	12	0.002	0.001	0
Heathcote	Monthly	12	0.006	0.003	0
Junortoun	Monthly	12	0.003	0.001	0
Korong Vale	Monthly	12	0.002	0.001	0
Kyneton	Monthly	12	0.005	0.001	0
Laanecoorie	Monthly	12	0.340	0.067	0
Leitchville	Monthly	12	0.004	0.001	0
Lockington	Monthly	12	0.001	0.001	0
Maiden Gully - Marong	Monthly	12	0.002	0.001	0
Maldon	Monthly	12	0.004	0.001	0
Malmsbury	Monthly	12	0.002	0.001	0
Newstead	Monthly	12	0.005	0.001	0
Pyramid Hill	Monthly	12	0.003	0.001	0
Raywood	Monthly	12	0.001	0.001	0
Rochester	Monthly	12	0.003	0.002	0
Sebastian	Monthly	12	0.002	0.001	0
Serpentine	Monthly	12	0.035	0.009	0
Strathfieldsaye	Monthly	12	0.002	0.001	0
Taradale - Elphinstone	Monthly	12	0.002	0.001	0
Tarnagulla	Monthly	12	0.014	0.005	0
Tooborac	Monthly	12	0.007	0.003	0
Trentham	Monthly	12	0.001	0.001	0
Tylden	Monthly	12	0.002	0.001	0
Wedderburn	Monthly	12	0.002	0.001	0

Copper – Customer Tap Sites 2019-20

Table 40: 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
Avadala	Monthly	10	0.01	0.00	not met
Axedale	Monthly	12	0.01	0.00	0
Bealina (Nartharma)	Monthly	12	0.01	0.00	0
Bendigo (Northern)	Monthly	12	0.02	0.01	0
Bendigo (Southern)	Monthly	12	0.03	0.01	0
Bendigo (Spring Gully)	Monthly	12	0.01	0.01	0
	Monthly	12	0.01	0.01	0
Boort	Monthly	12	0.01	0.00	0
Bridgewater-Inglewood	Monthly	12	0.02	0.00	0
Castlemaine	Monthly	12	0.12	0.04	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	0.01	0.00	0
Epsom - Huntly	Monthly	12	0.09	0.02	0
Fryerstown	Monthly	12	0.05	0.02	0
Goornong	Monthly	12	0.00	0.00	0
Guildford	Monthly	12	0.04	0.03	0
Gunbower	Monthly	12	0.01	0.00	0
Harcourt	Monthly	12	0.08	0.03	0
Heathcote	Monthly	12	0.02	0.01	0
Junortoun	Monthly	12	0.02	0.01	0
Korong Vale	Monthly	12	0.01	0.00	0
Kyneton	Monthly	12	0.04	0.02	0
Laanecoorie	Monthly	12	0.04	0.01	0
Leitchville	Monthly	12	0.00	0.00	0
Lockington	Monthly	12	0.00	0.00	0
Maiden Gully - Marong	Monthly	12	0.02	0.01	0
Maldon	Monthly	12	0.12	0.03	0
Malmsbury	Monthly	12	0.02	0.01	0
Newstead	Monthly	12	0.05	0.02	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	0.02	0.01	0
Serpentine	Monthly	12	0.01	0.00	0
Strathfieldsave	Monthly	12	0.02	0.01	0
Taradale - Elphinstone	Monthly	12	0.08	0.03	0
Tarnagulla	Monthly	12	0.02	0.01	0
Tooborac	Monthly	12	0.02	0.01	0
Trentham	Monthly	12	0.02	0.01	0
Tvlden	Monthly	12	0.14	0.04	0
Wedderburn	Monthly	12	0.01	0.00	0

Lead – Customer Tap Sites 2019-20

Table 41: Lead results for customer tap sites (N	Vater quality standard -	ADWG health-based guideline value):
0.01 mg/L)			

Water Sampling Locality	Sampling frequency	oling Number of Maximum ency samples (mg/L)		Average (mg/L)	Number of samples where standard was not met
Axedale	Monthly	12	0.0020	0.0006	0
Bealiba	Monthly	12	<0.001	< 0.001	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	0.0020	0.0006	0
Castlemaine	Monthly	12	0.0040	0.0009	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	<0.001	<0.001	0
Epsom - Huntly	Monthly	12	<0.001	<0.001	0
Fryerstown	Monthly	12	0.0010	0.0005	0
Goornong	Monthly	12	<0.001	<0.001	0
Guildford	Monthly	12	0.0040	0.0015	0
Gunbower	Monthly	12	0.0010	0.0005	0
Harcourt	Monthly	12	0.0090	0.0013	0
Heathcote	Monthly	12	0.0010	0.0005	0
Junortoun	Monthly	12	0.0010	0.0005	0
Korong Vale	Monthly	12	0.0020	0.0007	0
Kyneton	Monthly	12	0.0010	0.0005	0
Laanecoorie	Monthly	12	0.0080	0.0018	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	0.0010	0.0005	0
Malmsbury	Monthly	12	0.0030	0.0007	0
Newstead	Monthly	12	0.0010	0.0006	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	<0.001	<0.001	0
Serpentine	Monthly	12	<0.001	<0.001	0
Strathfieldsaye	Monthly	12	<0.001	<0.001	0
Taradale - Elphinstone	Monthly	12	0.0050	0.0015	0
Tarnagulla	Monthly	12	<0.001	<0.001	0
Tooborac	Monthly	12	0.0020	0.0007	0
Trentham	Monthly	12	0.0010	0.0005	0
Tylden	Monthly	12	0.0010	0.0005	0
Wedderburn	Monthly	12	0.0020	0.0006	0

Nickel – Customer Tap Sites 2019-20

Table 42: 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	<0.001	<0.001	0
Bridgewater-Inglewood	Monthly	12	<0.001	<0.001	0
Castlemaine	Monthly	12	0.00	0.00	0
Cohuna	Monthly	12	<0.001	<0.001	0
Dunolly	Monthly	12	0.00	0.00	0
Echuca	Monthly	12	<0.001	<0.001	0
Elmore	Monthly	12	<0.001	<0.001	0
Epsom - Huntly	Monthly	12	0.00	0.00	0
Fryerstown	Monthly	12	<0.001	<0.001	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	0.00	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	0.01	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	<0.001	<0.001	0
Pyramid Hill	Monthly	12	<0.001	<0.001	0
Raywood	Monthly	12	0.00	0.00	0
Rochester	Monthly	12	<0.001	<0.001	0
Sebastian	Monthly	12	0.00	0.00	0
Serpentine	Monthly	12	0.00	0.00	0
Strathfieldsaye	Monthly	12	0.00	0.00	0
Taradale - Elphinstone	Monthly	12	<0.001	<0.001	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 2019-20

Table 43: Alpha count results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.5 bq/L)

Water Sampling Locality	Sampling	Number of	Value	Number of
	frequency	samples	(bq/L)	samples where
				Stanuaru 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 ¹	Annual			
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

Note:

1 Scheduling error resulted in missed sample.

Beta Count – Customer Tap Sites 2019-20

Table 44: Beta count results for customer tap sites (Water quality standard - ADWG health-based guideline value: 0.5 bq/L)

Water Sampling Locality	er Sampling Locality Sampling Number of Val		Value	Number of samples
	nequency	Samples	(54/2)	not met
Axedale	Annual	1	<0.10	0
Bealiba	Annual	1	<0.10	0
Bendigo (Northern)	Annual	1	<0.10	0
Bendigo (Southern)	Annual	1	<0.1	0
Bendigo (Spring Gully)	Annual	1	<0.1	0
Big Hill	Annual	1	<0.1	0
Boort	Annual	1	<0.1	0
Bridgewater-Inglewood	Annual	1	<0.10	0
Castlemaine	Annual	1	<0.1	0
Cohuna	Annual	1	<0.1	0
Dunolly	Annual	1	<0.1	0
Echuca	Annual	1	<0.1	0
Elmore ¹	Annual			
Epsom - Huntly	Annual	1	<0.10	0
Fryerstown	Annual	1	<0.10	0
Goornong	Annual	1	<0.10	0
Guildford	Annual	1	<0.10	0
Gunbower	Annual	1	<0.1	0
Harcourt	Annual	1	<0.10	0
Heathcote	Annual	1	<0.10	0
Junortoun	Annual	1	<0.10	0
Korong Vale	Annual	1	<0.10	0
Kyneton	Annual	1	0.16	0
Laanecoorie	Annual	1	<0.10	0
Leitchville	Annual	1	<0.10	0
Lockington	Annual	1	<0.1	0
Maiden Gully - Marong	Annual	1	<0.10	0
Maldon	Annual	1	<0.10	0
Malmsbury	Annual	1	<0.10	0
Newstead	Annual	1	<0.10	0
Pyramid Hill	Annual	1	<0.1	0
Raywood	Annual	1	<0.1	0
Rochester	Annual	1	<0.1	0
Sebastian	Annual	1	<0.1	0
Serpentine	Annual	1	<0.1	0
Strathfieldsaye	Annual	1	<0.1	0
Taradale - Elphinstone	Annual	1	<0.1	0
Tarnagulla	Annual	1	<0.1	0
Tooborac	Annual	1	<0.1	0
Trentham	Annual	1	<0.1	0
Tylden	Annual	1	<0.1	0
Wedderburn	Annual	1	<0.1	0

Note:

1 Scheduling error resulted in missed sample.

Nitrite – Customer Tap Sites 2019-20

Table 45: Nitrite Results for customer tap sites (Water quality standard - ADWG health-based guideline value: 3.0 mg/L)

Water Sampling Locality	ocality Sampling Number of Maximum frequency samples (mg/L)		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	0.72	0.14	0
Bendigo (Northern)	Fortnightly	26	1.31	0.53	0
Bendigo (Southern)	Fortnightly	26	1.25	0.46	0
Bendigo (Spring Gully)	Fortnightly	26	1.51	0.59	0
Big Hill	Fortnightly	26	1.31	0.47	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater-Inglewood	Fortnightly	26	0.49	0.06	0
Castlemaine	Fortnightly	26	0.03	0.02	0
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly	Fortnightly	26	0.10	0.05	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	Fortnightly	26	1.68	0.81	0
Fryerstown	Fortnightly	26	0.02	0.02	0
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	Fortnightly	26	1.90	0.09	0
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt	Fortnightly	26	0.03	0.02	0
Heathcote	Fortnightly	26	1.28	0.07	0
Junortoun	Fortnightly	26	1.71	0.77	0
Korong Vale	Fortnightly	26	0.20	0.05	0
Kyneton	n/a	n/a	n/a	n/a	n/a
Laanecoorie	Fortnightly	26	0.16	0.04	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	Fortnightly	26	1.81	0.46	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	n/a	n/a	n/a	n/a	n/a
Newstead	Fortnightly	27	1.35	0.07	0
Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester ¹	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	Fortnightly	26	1.25	0.28	0
Taradale - Elphinstone	Fortnightly	26	0.07	0.02	0
Tarnagulla	Fortnightly	26	0.76	0.34	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	Fortnightly	26	0.23	0.05	0

NDMA – Customer Tap Sites 2019-20

Table 46: 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	0.0040	0.0021	0
Bealiba	Quarterly	4	0.0780	0.0335	0
Bendigo (Northern)	Quarterly	4	0.0030	0.0019	0
Bendigo (Southern)	Quarterly	4	0.0040	0.0029	0
Bendigo (Spring Gully)	Quarterly	4	0.0050	0.0028	0
Big Hill	Quarterly	4	0.0040	0.0025	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater-Inglewood	Quarterly	4	0.0100	0.0078	0
Castlemaine	Quarterly	4	<0.003	<0.003	0
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly ¹	Quarterly	4	0.1100	0.0355	1
Echuca	n/a	n/a	n/a	n/a	n/a
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Quarterly	4	0.0040	0.0025	0
Fryerstown	Quarterly	4	0.0080	0.0031	0
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	Quarterly	4	<0.003	<0.003	0
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt	Quarterly	4	0.0040	0.0021	0
Heathcote	Quarterly	4	0.0200	0.0084	0
Junortoun	Quarterly	4	0.0060	0.0030	0
Korong Vale	Quarterly	4	0.0160	0.0066	0
Kyneton	n/a	n/a	n/a	n/a	n/a
Laanecoorie	Quarterly	4	0.0410	0.0218	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	Quarterly	4	0.0040	0.0034	0
Maldon	Quarterly	4	<0.003	<0.003	0
Malmsbury	n/a	n/a	n/a	n/a	n/a
Newstead	Quarterly	4	<0.003	<0.003	0
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	Quarterly	4	0.0030	0.0019	0
Serpentine	n/a	n/a	n/a	n/a	n/a
Strathfieldsaye	Quarterly	4	0.0080	0.0031	0
Taradale - Elphinstone	Quarterly	4	<0.003	<0.003	0
Tarnagulla ¹	Quarterly	4	0.1100	0.0500	1
Tooborac	Quarterly	4	0.0400	0.0150	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	0.0090	0.0051	0

Note:

1 Refer to section 4.3.1.1 for details on exceedances.

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

pH – Customer Tap Sites 2019-20

Table 47: 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	8.3	8.8
Bendigo (Northern)	Monthly	12	7.7	8.0
Bendigo (Southern)	Monthly	12	7.7	8.0
Bendigo (Spring Gully)	Monthly	12	7.7	8.0
Big Hill	Monthly	12	7.6	8.0
Boort	Monthly	12	7.3	7.9
Bridgewater-Inglewood ¹	Monthly	12	7.6	8.9
Castlemaine	Monthly	12	7.2	7.8
Cohuna	Monthly	12	7.2	7.7
Dunolly ¹	Monthly	12	8.2	8.9
Echuca	Monthly	12	7.0	7.7
Elmore	Monthly	12	7.0	7.9
Epsom - Huntly	Monthly	12	7.6	8.1
Fryerstown	Monthly	12	7.4	8.1
Goornong	Monthly	12	6.9	8.4
Guildford	Monthly	12	7.4	7.9
Gunbower	Monthly	12	7.3	7.7
Harcourt	Monthly	12	7.4	8.0
Heathcote	Monthly	12	7.8	8.4
Junortoun	Monthly	12	7.7	8.0
Korong Vale ¹	Monthly	12	7.1	10.2
Kyneton	Monthly	12	7.4	7.7
Laanecoorie	Monthly	12	7.9	8.2
Leitchville	Monthly	12	7.2	7.7
Lockington	Monthly	12	7.1	8.1
Maiden Gully - Marong	Monthly	12	7.7	8.1
Maldon	Monthly	12	7.6	8.1
Malmsbury	Monthly	12	7.5	8.0
Newstead	Monthly	12	7.5	7.8
Pyramid Hill	Monthly	12	7.0	7.7
Raywood	Monthly	12	7.5	7.9
Rochester	Monthly	12	7.3	7.9
Sebastian	Monthly	12	7.5	8.1
Serpentine ¹	Monthly	12	7.5	9.0
Strathfieldsaye	Monthly	12	7.7	8.0
Taradale - Elphinstone	Monthly	12	7.2	7.9
Tarnagulla ¹	Monthly	12	8.2	8.9
Tooborac ¹	Monthly	12	8.0	9.2
Trentham	Monthly	12	7.2	8.3
Tylden	Monthly	12	7.4	7.8
Wedderburn ¹	Monthly	12	8.8	9.5

Note:

1 Refer to section 4.3.1.2 for details on exceedances.

Aluminium – Customer Tap Sites 2019-20

Table 48: Aluminium results for customer tap sites (ADWG aesthetic guideline value: 0.2 mg/L)

Water Sampling Locality	Sampling Frequency	Number of Samples	Number of Maximum Samples (mg/L)		Number of samples where standard was not met
Axedale	Quarterly	4	0.03	0.03	0
Bealiba	Quarterly	4	0.03	0.02	0
Bendigo (Northern)	Quarterly	4	0.04	0.04	0
Bendigo (Southern)	Quarterly	4	0.04	0.03	0
Bendigo (Spring Gully)	Quarterly	4	0.03	0.03	0
Big Hill	Quarterly	4	0.04	0.03	0
Boort	Quarterly	4	0.11	0.05	0
Bridgewater-Inglewood	Quarterly	4	0.06	0.02	0
Castlemaine	Quarterly	4	0.02	0.01	0
Cohuna	Quarterly	4	0.02	0.02	0
Dunolly	Quarterly	4	0.03	0.02	0
Echuca	Quarterly	4	0.09	0.04	0
Elmore ¹	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Quarterly	4	0.03	0.03	0
Fryerstown	Quarterly	4	0.02	0.01	0
Goornong	Quarterly	4	0.12	0.07	0
Guildford	Quarterly	4	0.01	0.01	0
Gunbower	Quarterly	4	0.04	0.03	0
Harcourt	Quarterly	4	0.02	0.02	0
Heathcote	Quarterly	4	0.03	0.02	0
Junortoun	Quarterly	4	0.03	0.03	0
Korong Vale	Quarterly	4	0.07	0.05	0
Kyneton	Quarterly	4	0.03	0.03	0
Laanecoorie	Quarterly	4	0.15	0.05	0
Leitchville	Quarterly	4	0.01	0.01	0
Lockington	Quarterly	4	0.14	0.10	0
Maiden Gully - Marong	Quarterly	4	0.04	0.04	0
Maldon	Quarterly	4	0.02	0.02	0
Malmsbury	Quarterly	4	0.02	0.02	0
Newstead	Quarterly	4	0.01	0.01	0
Pyramid Hill ²	Quarterly	4	0.23	0.10	1
Raywood	Quarterly	4	0.03	0.03	0
Rochester	Quarterly	4	0.02	0.01	0
Sebastian	Quarterly	4	0.03	0.03	0
Serpentine	Quarterly	4	0.08	0.04	0
Strathfieldsaye	Quarterly	4	0.04	0.03	0
Taradale - Elphinstone	Quarterly	4	0.03	0.02	0
Tarnagulla	Quarterly	4	0.03	0.02	0
Tooborac	Quarterly	4	0.04	0.02	0
Trentham	Quarterly	4	<0.01	<0.01	0
Tylden	Quarterly	4	0.02	0.02	0
Wedderburn	Quarterly	4	0.04	0.04	0

Note:

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

2 Refer to section 4.3.1.2 for details on exceedance.

Hardness – Customer Tap Sites 2019-20

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 49:	Hardness	results for	customer tap	sites (AL	DWG a	aesthetic	guideline	limit:	200mg/	Ľ)
-----------	----------	-------------	--------------	-----------	-------	-----------	-----------	--------	--------	----

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	130	103	0
Bealiba	Quarterly	4	160	145	0
Bendigo (Northern)	Quarterly	4	130	90	0
Bendigo (Southern)	Quarterly	4	130	95	0
Bendigo (Spring Gully)	Quarterly	4	120	85	0
Big Hill	Quarterly	4	120	89	0
Boort	Quarterly	4	96	78	0
Bridgewater-Inglewood	Quarterly	4	170	63	0
Castlemaine	Quarterly	4	78	75	0
Cohuna	Quarterly	4	17	16	0
Dunolly	Quarterly	4	160	148	0
Echuca	Quarterly	4	18	14	0
Elmore	Quarterly	4	120	115	0
Epsom - Huntly	Quarterly	4	140	91	0
Fryerstown	Quarterly	4	81	73	0
Goornong	Quarterly	4	130	123	0
Guildford	Quarterly	4	73	65	0
Gunbower	Quarterly	4	19	15	0
Harcourt	Quarterly	4	77	65	0
Heathcote	Quarterly	4	130	128	0
Junortoun	Quarterly	4	140	92	0
Korong Vale	Quarterly	4	31	24	0
Kyneton	Quarterly	4	72	65	0
Laanecoorie	Quarterly	4	160	148	0
Leitchville	Quarterly	4	19	17	0
Lockington	Quarterly	4	27	23	0
Maiden Gully - Marong	Quarterly	4	110	94	0
Maldon	Quarterly	4	77	73	0
Malmsbury	Quarterly	4	71	63	0
Newstead	Quarterly	4	71	66	0
Pyramid Hill	Quarterly	4	44	36	0
Raywood	Quarterly	4	120	90	0
Rochester	Quarterly	4	20	20	0
Sebastian	Quarterly	4	120	91	0
Serpentine	Quarterly	4	36	31	0
Strathfieldsaye	Quarterly	4	120	86	0
Taradale - Elphinstone	Quarterly	4	79	75	0
Tarnagulla	Quarterly	4	150	148	0
Tooborac	Quarterly	4	140	123	0
Trentham	Quarterly	4	44	33	0
Tylden	Quarterly	4	69	64	0
Wedderburn	Quarterly	4	22	21	0

Iron – Customer Tap Sites 2019-20

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 50:	Iron results f	or customer ta	o sites	(ADWG aesthetic	auideline lir	nit: 0.3 ma/L)
					J · · · ·	· · · J /

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	0.02	0.01	
Bealiba	Monthly	12	0.02	0.02	0
Bendigo (Northern)	Monthly	12	0.02	0.01	0
Bendigo (Southern)	Monthly	12	0.03	0.01	0
Bendigo (Spring Gully)	Monthly	12	0.02	0.01	0
Big Hill	Monthly	12	0.02	0.02	0
Boort	Monthly	12	0.06	0.03	0
Bridgewater-Inglewood	Monthly	12	0.10	0.02	0
Castlemaine	Monthly	12	0.09	0.01	0
Cohuna	Monthly	12	0.05	0.02	0
Dunolly	Monthly	12	0.03	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	0.01	0
Fryerstown	Monthly	12	0.03	0.02	0
Goornong	Monthly	12	0.05	0.02	0
Guildford	Monthly	12	0.03	0.01	0
Gunbower	Monthly	12	0.01	0.01	0
Harcourt	Monthly	12	0.03	0.01	0
Heathcote	Monthly	12	0.04	0.02	0
Junortoun	Monthly	12	0.02	0.01	0
Korong Vale	Monthly	12	0.18	0.06	0
Kyneton	Monthly	12	0.07	0.02	0
Laanecoorie ¹	Monthly	12	0.63	0.14	3
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	0.01	0.01	0
Malmsbury	Monthly	12	0.02	0.01	0
Newstead	Monthly	12	0.02	0.01	0
Pyramid Hill	Monthly	12	0.03	0.01	0
Raywood	Monthly	12	0.03	0.01	0
Rochester	Monthly	12	0.05	0.01	0
Sebastian	Monthly	12	0.04	0.02	0
Serpentine	Monthly	12	0.07	0.03	0
Strathfieldsaye	Monthly	12	0.02	0.02	0
Taradale - Elphinstone	Monthly	12	0.03	0.01	0
Tarnagulla	Monthly	12	0.02	0.02	0
Tooborac	Monthly	12	0.04	0.01	0
Trentham	Monthly	12	<0.01	<0.01	0
Tylden	Monthly	12	0.03	0.02	0
Wedderburn	Monthly	12	0.15	0.04	0

Note:

1 Refer to section 4.3.1.2 for details on exceedance.

True Colour – Customer Tap Sites 2019-20

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

Table 51: 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	11	2	1	0
Bealiba	Monthly	11	2	1	0
Bendigo (Northern)	Monthly	11	2	1	0
Bendigo (Southern)	Monthly	11	4	1	0
Bendigo (Spring Gully)	Monthly	11	2	1	0
Big Hill	Monthly	11	4	1	0
Boort	Monthly	11	4	1	0
Bridgewater-Inglewood	Monthly	11	2	1	0
Castlemaine	Monthly	11	4	1	0
Cohuna	Monthly	11	4	1	0
Dunolly	Monthly	11	4	2	0
Echuca	Monthly	11	2	1	0
Elmore	Monthly	11	2	1	0
Epsom - Huntly	Monthly	11	4	1	0
Fryerstown	Monthly	11	4	1	0
Goornong	Monthly	11	2	1	0
Guildford	Monthly	11	2	1	0
Gunbower	Monthly	11	2	1	0
Harcourt	Monthly	11	4	1	0
Heathcote	Monthly	11	4	2	0
Junortoun	Monthly	11	2	1	0
Korong Vale	Monthly	11	4	2	0
Kyneton	Monthly	10	2	1	0
Laanecoorie	Monthly	11	4	2	0
Leitchville	Monthly	11	2	1	0
Lockington	Monthly	11	2	1	0
Maiden Gully - Marong	Monthly	11	2	1	0
Maldon	Monthly	11	2	1	0
Malmsbury	Monthly	11	2	1	0
Newstead	Monthly	11	<2	<2	0
Pyramid Hill	Monthly	11	4	1	0
Raywood	Monthly	11	2	1	0
Rochester	Monthly	11	2	1	0
Sebastian	Monthly	11	2	1	0
Serpentine	Monthly	11	4	1	0
Strathfieldsaye	Monthly	11	4	1	0
Taradale - Elphinstone	Monthly	11	2	1	0
Tarnagulla ²	Monthly	11	16	3	1
Tooborac	Monthly	11	4	2	0
Trentham	Monthly	11	<2	<2	0
Tylden	Monthly	11	<2	<2	0
Wedderburn	Monthly	11	4	2	0

Note:

1 Apparent colour was added to the monitoring program 2019/20. Colour was initially removed, but reinstated in mid August, hence 11 samples collected, other than Kyneton which did not commence until September.

2 Refer to section 4.3.1.2 for details on exceedance.

1300 363 200 : www.coliban.com.au

Page 85 of 105

Electrical Conductivity – Customer Tap Sites 2019-20

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

Table 52: 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	560	397	0
Bealiba	Monthly	12	1,000	867	0
Bendigo (Northern)	Monthly	12	560	388	0
Bendigo (Southern)	Monthly	12	550	380	0
Bendigo (Spring Gully)	Monthly	12	550	381	0
Big Hill	Monthly	12	550	378	0
Boort	Monthly	12	520	413	0
Bridgewater-Inglewood	Monthly	12	920	331	0
Castlemaine	Monthly	12	260	239	0
Cohuna	Monthly	12	150	120	0
Dunolly	Monthly	12	1,100	877	0
Echuca	Monthly	12	170	110	0
Elmore	Monthly	12	1,000	658	0
Epsom - Huntly	Monthly	12	550	384	0
Fryerstown	Monthly	12	280	248	0
Goornong	Monthly	12	710	653	0
Guildford	Monthly	12	260	247	0
Gunbower	Monthly	12	110	86	0
Harcourt	Monthly	12	260	248	0
Heathcote	Monthly	12	690	646	0
Junortoun	Monthly	12	540	381	0
Korong Vale	Monthly	12	160	133	0
Kyneton	Monthly	12	220	213	0
Laanecoorie	Monthly	12	1,200	870	0
Leitchville	Monthly	12	150	106	0
Lockington	Monthly	12	140	130	0
Maiden Gully - Marong	Monthly	12	550	383	0
Maldon	Monthly	12	270	257	0
Malmsbury	Monthly	12	230	215	0
Newstead	Monthly	12	260	246	0
Pyramid Hill	Monthly	12	200	171	0
Raywood	Monthly	12	560	404	0
Rochester	Monthly	12	170	148	0
Sebastian	Monthly	12	560	404	0
Serpentine	Monthly	12	170	157	0
Strathfieldsaye	Monthly	12	560	373	0
Taradale - Elphinstone	Monthly	12	270	244	0
Tarnagulla	Monthly	12	1,000	853	0
Tooborac	Monthly	12	720	673	0
Trentham	Monthly	12	140	114	0
Tylden	Monthly	12	220	213	0
Wedderburn	Monthly	12	150	133	0

Sodium – Customer Tap Sites 2019-20

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

Table 53:	Sodium results	s 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	48	38	0
Bealiba	Quarterly	4	120	97	0
Bendiao (Northern)	Quarterly	4	47	31	0
Bendigo (Southern)	Quarterly	4	51	35	0
Bendigo (Spring Gully)	Quarterly	4	51	31	0
Big Hill	Quarterly	4	46	31	0
Boort	Quarterly	4	55	42	0
Bridgewater-Inglewood	Quarterly	4	99	37	0
Castlemaine	Quarterly	4	20	19	0
Cohuna	Quarterly	4	15	14	0
Dunolly	Quarterly	4	120	99	0
Echuca	Quarterly	4	24	15	0
Elmore	Quarterly	4	82	81	0
Epsom - Huntly	Quarterly	4	54	32	0
Fryerstown	Quarterly	4	18	17	0
Goornong	Quarterly	4	75	70	0
Guildford	Quarterly	4	18	17	0
Gunbower	Quarterly	4	10	9	0
Harcourt	Quarterly	4	18	16	0
Heathcote	Quarterly	4	73	71	0
Junortoun	Quarterly	4	52	32	0
Korong Vale	Quarterly	4	16	14	0
Kyneton	Quarterly	4	16	15	0
Laanecoorie	Quarterly	4	130	103	0
Leitchville	Quarterly	4	12	11	0
Lockington	Quarterly	4	15	14	0
Maiden Gully - Marong	Quarterly	4	45	34	0
Maldon	Quarterly	4	19	18	0
Malmsbury	Quarterly	4	15	14	0
Newstead	Quarterly	4	18	17	0
Pyramid Hill	Quarterly	4	19	16	0
Raywood	Quarterly	4	49	34	0
Rochester	Quarterly	4	19	18	0
Sebastian	Quarterly	4	48	33	0
Serpentine	Quarterly	4	19	16	0
Strathfieldsaye	Quarterly	4	51	31	0
Taradale - Elphinstone	Quarterly	4	19	18	0
Tarnagulla	Quarterly	4	120	96	0
Tooborac	Quarterly	4	79	74	0
Trentham	Quarterly	4	9	8	0
Tylden	Quarterly	4	15	15	0
Wedderburn	Quarterly	4	15	14	0

SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20

Chloride – Customer Tap Sites 2019-20

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

Table 54:	Chloride	results for	customer ta	p sites	(ADWG	aesthetic	quideline	limit:	250mg	(/L)
							3			~ - /

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	130	94	0
Bealiba ¹	Quarterly	4	270	210	1
Bendigo (Northern)	Quarterly	4	110	72	0
Bendigo (Southern)	Quarterly	4	110	81	0
Bendigo (Spring Gully)	Quarterly	4	110	70	0
Big Hill	Quarterly	4	120	78	0
Boort	Quarterly	4	100	79	0
Bridgewater-Inglewood	Quarterly	4	220	77	0
Castlemaine	Quarterly	4	42	39	0
Cohuna	Quarterly	4	12	9	0
Dunolly ¹	Quarterly	4	270	220	1
Echuca	Quarterly	4	15	9	0
Elmore	Quarterly	4	130	120	0
Epsom - Huntly	Quarterly	4	120	73	0
Fryerstown	Quarterly	4	41	38	0
Goornong	Quarterly	4	160	140	0
Guildford	Quarterly	4	43	39	0
Gunbower	Quarterly	4	48	20	0
Harcourt	Quarterly	4	40	38	0
Heathcote	Quarterly	4	150	140	0
Junortoun	Quarterly	4	110	73	0
Korong Vale	Quarterly	4	23	22	0
Kyneton	Quarterly	4	35	32	0
Laanecoorie ¹	Quarterly	4	270	223	1
Leitchville	Quarterly	4	12	9	0
Lockington	Quarterly	4	28	23	0
Maiden Gully - Marong	Quarterly	4	120	85	0
Maldon	Quarterly	4	40	39	0
Malmsbury	Quarterly	4	35	31	0
Newstead	Quarterly	4	40	37	0
Pyramid Hill	Quarterly	4	34	30	0
Raywood	Quarterly	4	120	75	0
Rochester	Quarterly	4	15	13	0
Sebastian	Quarterly	4	120	77	0
Serpentine	Quarterly	4	40	21	0
Strathfieldsaye	Quarterly	4	140	81	0
Taradale - Elphinstone	Quarterly	4	41	38	0
Tarnagulla	Quarterly	4	230	213	0
Tooborac	Quarterly	4	160	150	0
Trentham	Quarterly	4	14	13	0
Tylden	Quarterly	4	33	31	0
Wedderburn	Quarterly	4	22	21	0

Note:

1 Refer to section 4.3.1.2 for details on exceedance

Zinc – Customer Tap Sites 2019-20

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

Table 55: 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	0.010	0.005	0
Bealiba	Monthly	12	0.006	0.004	0
Bendigo (Northern)	Monthly	12	0.005	0.002	0
Bendigo (Southern)	Monthly	12	0.006	0.002	0
Bendigo (Spring Gully)	Monthly	12	0.002	0.001	0
Big Hill	Monthly	12	0.006	0.003	0
Boort	Monthly	12	0.021	0.009	0
Bridgewater-Inglewood	Monthly	12	0.011	0.002	0
Castlemaine	Monthly	12	0.012	0.006	0
Cohuna	Monthly	12	0.010	0.004	0
Dunolly	Monthly	12	0.004	0.003	0
Echuca	Monthly	12	0.003	0.002	0
Elmore	Monthly	12	0.015	0.006	0
Epsom - Huntly	Monthly	12	0.003	0.002	0
Fryerstown	Monthly	12	0.017	0.010	0
Goornong	Monthly	12	0.009	0.003	0
Guildford	Monthly	12	0.031	0.010	0
Gunbower	Monthly	12	0.007	0.003	0
Harcourt	Monthly	12	0.029	0.008	0
Heathcote	Monthly	12	0.021	0.005	0
Junortoun	Monthly	12	0.006	0.003	0
Korong Vale	Monthly	12	0.033	0.007	0
Kyneton	Monthly	12	0.027	0.007	0
Laanecoorie	Monthly	12	0.047	0.017	0
Leitchville	Monthly	12	0.007	0.003	0
Lockington	Monthly	12	0.002	0.001	0
Maiden Gully - Marong	Monthly	12	0.008	0.002	0
Maldon	Monthly	12	0.011	0.005	0
Malmsbury	Monthly	12	0.020	0.009	0
Newstead	Monthly	12	0.017	0.007	0
Pyramid Hill	Monthly	12	0.006	0.003	0
Raywood	Monthly	12	0.007	0.003	0
Rochester	Monthly	12	0.004	0.002	0
Sebastian	Monthly	12	0.008	0.004	0
Serpentine	Monthly	12	0.007	0.004	0
Strathfieldsaye	Monthly	12	0.004	0.003	0
Taradale - Elphinstone	Monthly	12	0.042	0.015	0
Tarnagulla	Monthly	12	0.006	0.003	0
Tooborac	Monthly	12	0.020	0.007	0
Trentham	Monthly	12	0.014	0.006	0
Tylden	Monthly	12	0.008	0.005	0
Wedderburn	Monthly	12	0.023	0.005	0

Ammonia – Customer Tap Sites 2019-20

Table 56: 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	0.340	0.121	0
Bendigo (Northern) ¹	Fortnightly	26	0.571	0.277	1
Bendigo (Southern)	Fortnightly	26	0.377	0.175	0
Bendigo (Spring Gully)	Fortnightly	26	0.377	0.193	0
Big Hill	Fortnightly	26	0.401	0.147	0
Boort	n/a	n/a	n/a	n/a	n/a
Bridgewater-Inglewood	Fortnightly	26	0.486	0.186	0
Castlemaine	Fortnightly	26	0.231	0.025	0
Cohuna	n/a	n/a	n/a	n/a	n/a
Dunolly ¹	Fortnightly	26	0.511	0.178	1
Echuca	n/a	n/a	n/a	n/a	n/a
Elmore	n/a	n/a	n/a	n/a	n/a
Epsom - Huntly	Fortnightly	26	0.474	0.206	0
Fryerstown	Fortnightly	26	0.073	0.018	0
Goornong	n/a	n/a	n/a	n/a	n/a
Guildford	Fortnightly	26	0.085	0.021	0
Gunbower	n/a	n/a	n/a	n/a	n/a
Harcourt	Fortnightly	26	0.036	0.018	0
Heathcote	Fortnightly	26	0.401	0.202	0
Junortoun	Fortnightly	26	0.413	0.146	0
Korong Vale	Fortnightly	26	0.328	0.131	0
Kyneton	n/a	n/a	n/a	n/a	n/a
Laanecoorie	Fortnightly	26	0.426	0.178	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	Fortnightly	26	0.499	0.268	0
Maldon	n/a	n/a	n/a	n/a	n/a
Malmsbury	n/a	n/a	n/a	n/a	n/a
Newstead	Fortnightly	27	0.049	0.018	0
Pyramid Hill	n/a	n/a	n/a	n/a	n/a
Raywood	n/a	n/a	n/a	n/a	n/a
Rochester ¹	Fortnightly	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	Fortnightly	26	0.401	0.250	0
Taradale - Elphinstone	Fortnightly	26	0.036	0.016	0
Tarnagulla	Fortnightly	26	0.365	0.126	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	Fortnightly	26	0.340	0.130	0

Note:

1 Refer to section 4.3.1.2 for details on exceedance

Alkalinity – Customer Tap Sites 2019-20

Table 57: 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/L)	Average (mg/L)
Axedale	Quarterly	4	92	75
Bealiba	Quarterly	4	89	79
Bendigo (Northern)	Quarterly	4	90	67
Bendigo (Southern)	Quarterly	4	88	69
Bendigo (Spring Gully)	Quarterly	4	88	64
Big Hill	Quarterly	4	85	66
Boort	Quarterly	4	39	35
Bridgewater-Inglewood	Quarterly	4	100	43
Castlemaine	Quarterly	4	65	59
Cohuna	Quarterly	4	17	16
Dunolly	Quarterly	4	82	73
Echuca	Quarterly	4	20	18
Elmore	Quarterly	4	150	140
Epsom - Huntly	Quarterly	4	92	66
Fryerstown	Quarterly	4	68	62
Goornong	Quarterly	4	60	56
Guildford	Quarterly	4	60	58
Gunbower	Quarterly	4	26	23
Harcourt	Quarterly	4	62	59
Heathcote	Quarterly	4	70	64
Junortoun	Quarterly	4	90	66
Korong Vale	Quarterly	4	23	20
Kyneton	Quarterly	4	57	53
Laanecoorie	Quarterly	4	84	70
Leitchville	Quarterly	4	19	17
Lockington	Quarterly	4	27	23
Maiden Gully - Marong	Quarterly	4	91	72
Maldon	Quarterly	4	65	63
Malmsbury	Quarterly	4	60	56
Newstead	Quarterly	4	62	58
Pyramid Hill	Quarterly	4	36	30
Raywood	Quarterly	4	92	66
Rochester	Quarterly	4	21	20
Sebastian	Quarterly	4	88	65
Serpentine	Quarterly	4	32	28
Strathfieldsaye	Quarterly	4	92	68
Taradale - Elphinstone	Quarterly	4	67	60
Tarnagulla	Quarterly	4	79	75
Tooborac	Quarterly	4	70	65
Trentham	Quarterly	4	47	33
Tylden	Quarterly	4	58	54
Wedderburn	Quarterly	4	17	16

Apparent Colour – Customer Tap Sites 2019-20

Table 58: 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	6	2
Bendigo (Northern)	Monthly	12	6	2
Bendigo (Southern)	Monthly	12	4	1
Bendigo (Spring Gully)	Monthly	12	2	1
Big Hill	Monthly	12	6	2
Boort	Monthly	12	4	2
Bridgewater-Inglewood	Monthly	12	4	1
Castlemaine	Monthly	12	8	2
Cohuna	Monthly	12	4	2
Dunolly	Monthly	12	8	2
Echuca	Monthly	12	4	2
Elmore	Monthly	12	6	2
Epsom - Huntly	Monthly	12	4	2
Fryerstown	Monthly	12	4	1
Goornong	Monthly	12	4	2
Guildford	Monthly	12	4	1
Gunbower	Monthly	12	2	1
Harcourt	Monthly	12	6	2
Heathcote	Monthly	12	4	1
Junortoun	Monthly	12	4	2
Korong Vale	Monthly	12	8	3
Kyneton	Monthly	12	8	2
Laanecoorie	Monthly	12	10	4
Leitchville	Monthly	12	6	2
Lockington	Monthly	12	6	2
Maiden Gully - Marong	Monthly	12	4	1
Maldon	Monthly	12	4	1
Malmsbury	Monthly	12	6	2
Newstead	Monthly	12	4	2
Pyramid Hill	Monthly	12	2	1
Raywood	Monthly	12	8	2
Rochester	Monthly	12	4	1
Sebastian	Monthly	12	4	1
Serpentine	Monthly	12	6	2
Strathfieldsave	Monthly	12	4	2
Taradale - Elphinstone	Monthly	12	2	1
Tarnagulla ¹	Monthly	12	32	6
Tooborac	Monthly	12	6	3
Trentham	Monthly	12	4	1
Tylden	Monthly	12	4	1
Wedderburn	Monthly	12	18	4

SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20

4.4.3 Improvements to water supply and treatment

Coliban Water continued to monitor the network systems for possible nitrification issues.

Throughout 2019/20, the trial in the Castlemaine system to shift from chloramination to free chlorination to improve disinfection and maintain chlorine levels across the entire Castlemaine network has continued. Utilising operational data and customer feedback, operational changes were continually managed to ensure safe drinking water standards were maintained, while managing any concerns raised by customers.

A trial for the Kyneton system which involved a change from chloramination to free chlorination was completed. The most appropriate disinfection process was identified as free chlorination, which is now permanently in place.

This year, some of the major Water Treatment Plant (WTP) improvement works that were undertaken included:

- Completion of significant upgrades at Heathcote WTP to improve water quality
- Installation of powdered activated carbon (PAC) units and raw water dosing facilities at multiple sites to assist with the treatment/management of taste and odour issues.
- Installation of a new raw water pump at the Eppalock-Heathcote pump station to improve reliability of supply.
- Installation of an improved sludge handling system at Rochester WTP to assist with the management of the waste stream.
- Refurbishment of the raw water pumps at Echuca WTP to improve reliability.
- Renewal of raw water pumps and pipes at Cohuna WTP to improve reliability.
- Detailed design work ahead of significant upgrade works at the Echuca WTP to improve water quality and security of supply.
- Renewal of control and communications systems at:
 - Cohuna WTP
 - Boort WTP

Across our region, we replaced approximately 4.4 kilometres of water mains as part of our ongoing water mains renewal program, at a cost of around \$900,000. This included renewing 1.35 kilometres of water mains in three regional towns of Castlemaine, Fryerstown and Tylden at a cost of \$243,000. The mains were renewed using directional boring, a trenchless technology that reduces the need for excavations and overall cost savings of 25 to 50 per cent.

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

At a cost of approximately \$125,000, in excess of 201 km of water mains cleaning was completed in Echuca, Mitiamo, Dingee, Cohuna, Guildford, Yapeen, Boort, Big Hill, Belvoir Park, Junortoun, Sebastian and Raywood.

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.

In our water supply network, there are in excess of 10,000 water isolation valves that play an important role in ensuring supply is maintained to customers. A valve maintenance program has been implemented that involves proactively exercising (opening and closing) valves to confirm their location (mapped into our Geographic Information System [GIS]), condition and operability. This ensures that the valves can be located quickly, and are functioning correctly, allowing the quick isolation of water mains in the event of any bursts or works that are required. This year, 475 valves were exercised in Echuca and areas around Bendigo: Huntly to White Hills and in the Eaglehawk area.

SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20

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 system called Aquatact. Generally, water quality queries are managed at the time of the enquiry, while complaints are forwarded to Coliban Water's Water Quality Performance team, or Lendlease (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 customer's meter.
- Flushing of the main supplying the customer.
- Advisory phone call from Water Quality Performance team to the customer.
- A visit to the property by a Water Quality Performance team member.
- A written response to the customer from the Water Quality Performance Team.

Table 59 summarises the water quality complaints received by Coliban Water in each category as recorded in Aquatact between 1 July 2019 and 30 June 2020, and compared to the previous two years.

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

	Num	ber of Com	Comparison with	Comments							
Complaints	2019/20	2018/19	2017/18	periods							
Alleged illness	12	19	14	Consistent with previous year	The calls were all unrelated. Complaints were generally related to health conditions, such as a rash/skin condition. Water quality was verified after each contact to confirm that the drinking water supplied would not pose an unacceptable health risk.						
Discoloured Water	122	151	98	Reduction compared to 2018/19.	There is little consistent connection to any events. Four calls from Echuca during April 2020 followed the planned air scouring that customers were informed was scheduled.						
Taste or Odour	76	60	64	Slight increase to past years	25% of complaints were connected to Trentham source water issue in April 2020, refer Sec 3.1 for details.						
Air in water	8	23	7	Reduction to 18/19, and in line with 17/18.	No consistent connection.						
Other	0	0	0	Consistently minimal	All water quality complaints were able to be allocated to the other four categories.						
Total	218	253	183								

Table 59: Complaints related to Water Quality by Classification.

Water sampling locality		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	17	2	2	0	22				
Bendigo Southern	4	31	6	1	0	42				
Bendigo Spring Gully	0	5	0	0	0	5				
Big Hill	0	2	1	0	0	3				
Boort	0	1	1	0	0	2				
Bridgewater-Inglewood	0	1	1	0	0	2				
Castlemaine	2	7	9	0	0	18				
Cohuna	0	9	3	0	0	12				
Dunolly	0	2	2	0	0	4				
Echuca	1	11	7	1	0	20				
Elmore	0	2	2	0	0	4				
Epsom / Huntly	0	1	0	0	0	1				
Fryerstown	0	0	0	0	0	0				
Goornong	0	0	0	0	0	0				
Guildford	0	1	0	0	0	1				
Gunbower	0	0	0	0	0	0				
Harcourt	0	5	2	0	0	7				
Heathcote	0	2	2	0	0	4				
Inglewood	0	0	0	0	0	0				
Junortoun	0	0	0	0	0	0				
Korong Vale	0	1	1	0	0	2				
Kyneton	2	4	6	0	0	12				
Laanecoorie	0	0	1	0	0	1				
Leitchville	0	1	4	0	0	5				
Lockington	0	1	1	0	0	2				
Maiden Gully / Marong	0	1	0	0	0	1				
Maldon	1	0	2	0	0	3				
Malmsbury	0	3	2	1	0	6				
Newstead	0	1	0	0	0	1				
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	0	0	0	0	0				
Strathfieldsaye	0	2	0	1	0	3				
Taradale-Elphinstone	0	0	0	0	0	0				
Tarnagulla	0	0	0	0	0	0				
Tooborac	0	0	0	0	0	0				
Trentham	0	2	20	0	0	22				
Tylden	0	0	0	0	0	0				
Wedderburn	1	9	0	2	0	12				
Total complaints	12	122	76	8	0	218				

Table 60: Complaints related to water quality by water sampling locality 2019/20

1300 363 200 🗄 www.coliban.com.au

6 Risk Management Plan Audit Results

6.1 Outcome of the most recent audit

The Secretary to the Department of Health and Human Services (DHHS) had given notice for the risk management plan to be audited between 1 November 2019 to 31 May 2020. The audit was scheduled for April 2020. Due to the impact of the COVID-19 pandemic, DHHS extended the audit timeframe until 28 August 2020, and the audit was rescheduled for July 2020.

The prior audit was completed in May 2018, and Coliban Water's Drinking Water Quality Risk Management Plan (DWQRMP) was found to be compliant with the requirements outlined in Section 7 of the Act, but with identified opportunities for improvement

6.2 Update on the findings of the audit completed in May 2018

There were eight opportunities for improvement (OFI) identified during the audit, and below is an update on the actions, with one remaining open.

Table 61: Opportunities for improvement (OFI) from the 2018 regulatory audit of Coliban Water's Drinking Water Quality Risk Management Plan.

OFI No.	Description of OFI	Actions	Timeframe
1	At the next review, confirm the accuracy of document titles referred to in the RMP.	Review and update document as required.	Completed
2	Include the risks associated with the changeover of raw water sources in the risk register and document the current preventive measures.	DWQ risk register to be reviewed and procedure documented.	Completed
3a	Progress implementation of catchment management programs.	Commence implementation of the 'Upper Coliban Integrated Catchment Plan'	Completed
3b	Consider implementing a documented program for regular (for example monthly or quarterly) visual inspections of tank condition and integrity. Include targets for following up on findings in a timely manner.	Consider this OFI in relation to current practices.	Completed
4a	Follow up on inspection findings and prioritise recommended works to treatment water tanks in a timely manner to adequately manage risks to the treated water.	Review process to ensure inspection findings are reviewed and actioned appropriately.	Completed
4b	Prioritise repairs to the Pyramid Hill tank roof to prevent stormwater ingress.	Ensure repairs are implemented as a priority.	Completed
5	Progress development of processes for capturing and documenting progress actions identified in master planning process.	Summarise master plan actions into one document for easier monitoring.	Completed
6a	Progress implementation of a general awareness in the Drinking Water Policy and Risk Management Plan for the organisation.	Arrangement for WQ Introduction Video to be added to Induction program.	Completed
6b	Progress establishment of a database or program for recording and progressing training and awareness.	Continue plan to implement module for recording training requirements/details	July 2020

OFI No.	Description of OFI	Actions	Timeframe
7a	Progress with Veolia, the ability to view SCADA results for the Veolia operated sites.	Enable Veolia results to be view on SCADA.	Completed
7b	Progress the audit of CCP time delays set in the PLC.	Engage SCADA programmer to complete audit and export time delays to the PLC.	Completed
8	Continue to refine and review the monitoring that is used for the real time HBT monitoring, for example, the HBT landing page indicated the one filter at Echuca was not meeting performance targets, however, there were no known issues at the treatment plant.	Check virtual tags and review to ensure configuration to report.	Completed

SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20

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 the 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 use (e.g. symbols on quarterly accounts), and also, bi-annually, a non-potable water brochure is included with account notifications.
- Coliban Water website has information for each town, and advises water is non-potable.

Table 62: Regulated Water Systems in 2019/20

Area where regulated water is supplied	Source water	Date of publication of gazette notice	Estimated population supplied with regulated water
Borung	GWMW Pipeline	19/01/2006	40
Dingee	GMW Channel	19/01/2006	70
Jarklin	GMW Pipeline	19/01/2006	10
Macorna	GMW Channel	19/01/2006	20
Mitiamo	GMW Channel	19/01/2006	90
Mysia	GMW Pipeline	19/01/2006	30
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.

SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20

Page 100 of 105

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

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.

DELWP

Department of Environment, Land, Water and Planning

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 lons 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 Treatment Processes and Added Substances

Water Treatment Plant	Water Sampling Locality		Treatment Process												Added Substances							
		ion	Clarifi	cation	Filtra	tion	D	isinfe O	ction cidati	and on	or	Ot	ther		atering	c Soda uric	lants					Fluoride compound
		Coagulation & Flocculati	Sedimentation / Clarification	Dissolved Air Floatation	Granular Media Filtration	Membrane Filtration	Chlorine Gas	Chlorine Dioxide	Sodium Hypochlorite	Ultraviolet (UV)	Ozone	Activated Carbon (PAC/GAC/BAC)	lon Exchange	Reverse Osmosis	Sludge Thickening / Dew	Lime / Soda Ash / Caustic / Carbon Dioxide / Sulphi	Aluminium-based Coagu	Iron-based Coagulants	Polymers	Chlorine	Ammonia	
Bendigo	Axedale Bendigo Northern Bendigo Southern Bendigo Spring Gully Big Hill Epsom - Huntly Junortoun Maiden Gully - Marong Raywood Sebastian Strathfieldsaye	X				x	×				x	x			x	x	X		×	×	X	x
Boort	Boort	х	х		х		х					х				х	х		Х	Х		
Bridgewater	Bridgewater - Inglewood	х	х		х		Х			х		х		Х			Х		Х	Х	Х	
Castlemaine	Castlemaine Fryerstown Guildford Harcourt Maldon Newstead Taradale - Elphinstone	X				x	x				x	x			x	x	x		x	x	x ¹	x
Cohuna	Cohuna	Х	х		Х		х		х			Х				х	х		х	х		x ²
Echuca	Echuca	Х	х		Х		х		х			Х				х	х		х	х		Х
Elmore	Elmore									х						х						
Goornong	Goornong	х	х		Х				Х			Х				Х	Х					

SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20

Page 104 of 105

Water Treatment Plant	Water Sampling Locality	Treatment Process													Added Substances								
			Clarific	cation	Filtra	tion	Di	sinfe Ov	ction (idati	and on	or	0	ther		tering	Soda Iric	ants						
		Coagulation & Flocculatio	Sedimentation / Clarification	Dissolved Air Floatation	Granular Media Filtration	Membrane Filtration	Chlorine Gas	Chlorine Dioxide	Sodium Hypochlorite	Ultraviolet (UV)	Ozone	Activated Carbon (PAC/GAC/BAC)	lon Exchange	Reverse Osmosis	Sludge Thickening / Dewa	Lime / Soda Ash / Caustic / Carbon Dioxide / Sulphu Acid /	Aluminium-based Coagul	Iron-based Coagulants	Polymers	Chlorine	Ammonia	Fluoride compound	
Gunbower	Gunbower	Х	х			Х	Х			Х		Х	Х			х	Х			Х			
Heathcote	Heathcote	Х	х		х		Х		Х	Х		Х			Х	х	х		Х	Х	Х		
	Tooborac																						
Korong Vale	Korong Vale	х	х		х		х					Х			х	х	х		х	х	х		
	Wedderburn																						
Kyneton	Kyneton	х				х	х				х	х			х	х	х		х	х	X ¹	х	
	Malmsbury																						
	Tylden																						
Laanecoorie	Bealiba	х	х		х		х		х	х		х				х	х		х	х	х		
	Dunolly																						
	Laanecoorie																						
	Tarnagulla																						
Leitchville	Leitchville	х	х			х	х			х		х				х	х		х	х			
Lockington	Lockington	х		х	х		х					х				х	х		х	х			
Pyramid Hill	Pyramid Hill	х	х		х		х					х			Х	х	х		х	х			
Rochester	Rochester	х	х			х	х					Х				х	х		х	х			
Serpentine	Serpentine	х	х		х		х					Х			х	х	х		х	х			
Trentham	Trentham					х	х					х			х				х	х			

Note:

1 Currently turned off as disinfection process is free chlorination.

2 Fluoride system being installed, not yet operational.

SAFE DRINKING WATER ACT ANNUAL REPORT 2019/20