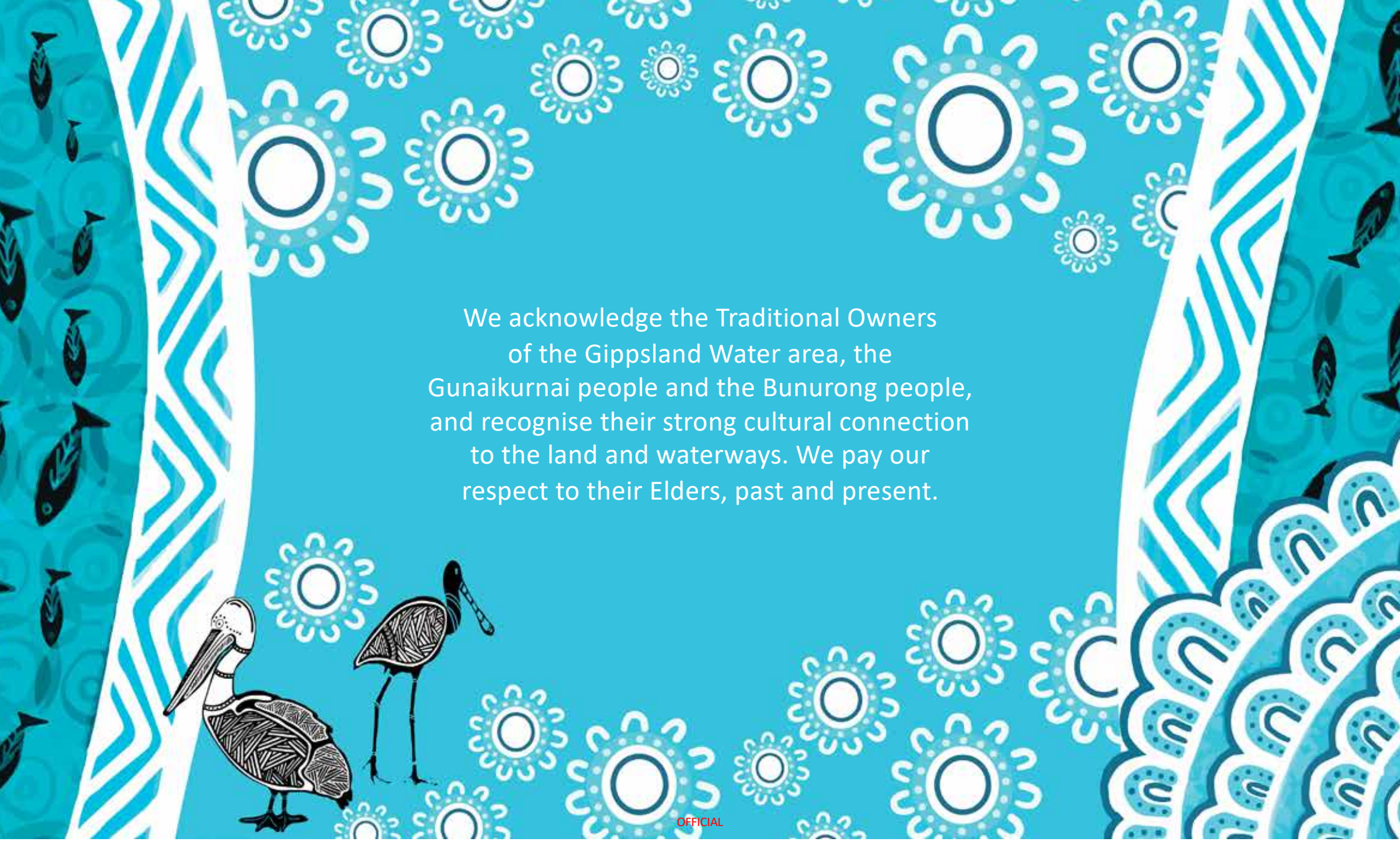
Gippsland Water

Annual Report

on drinking water quality

2023 - 2024



Our 2023-2024 Annual Report on drinking water quality is available for viewing or download from our website.

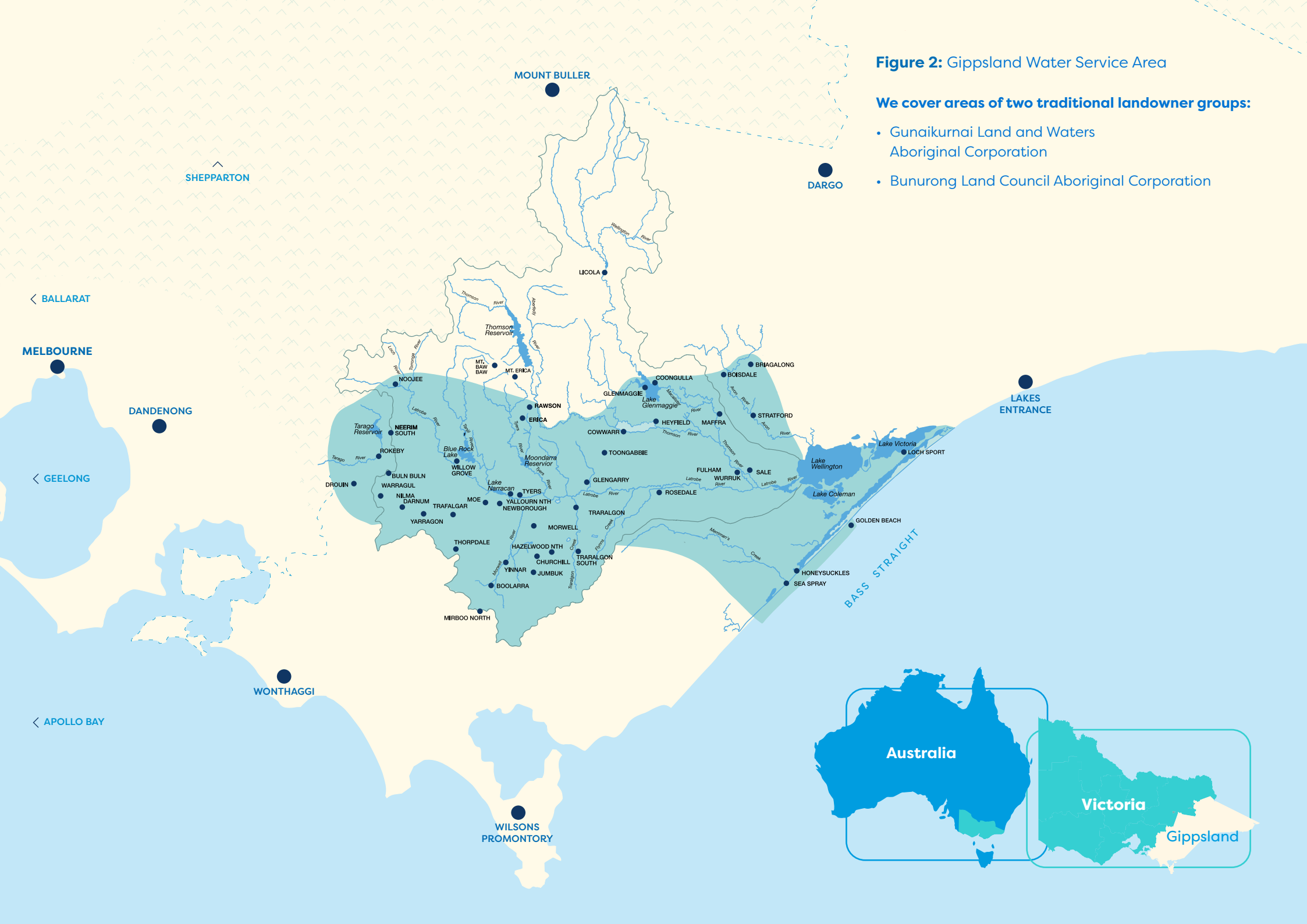


Figure 2: Gippsland Water Service Area

We cover areas of two traditional landowner groups:

- Gunaikurnai Land and Waters Aboriginal Corporation
- Bunurong Land Council Aboriginal Corporation

Contents

Contents cont.

Contents cont.

Contents cont.

tables/figures

FIGURES

1. Glossary of terms

ADWG	Australian Drinking Water Guidelines 2011 prepared by National Health and Medical Research Council that details a framework for the management of drinking water.
BGA	Blue Green Algae are Cyanobacteria that can range in colour from yellow to purple. Some types can be highly toxic to humans, livestock, and birds
Department of Health	Department of Health.
CCP	A physical (critical control) point in treatment processes that can be controlled either by SCADA, or manually, and has a significant impact on water quality.
Detection limit	The lowest concentration of analytical parameter in the sample that can be detected by the process laboratory.
Drinking Water Supply systems	Towns supplied with water from a common water source (WTP, supply mains and reticulation pipework).
E. coli	Escherichia coli.
Water Sampling Locality	Under the SDWR, a specified area that is supplied with drinking water by a water supplier.
mg/L	Milligram per litre.
HVP	Melbourne-based HVP is one of Australia's largest private timber plantation companies
NHMRC	National Health and Medical Research Council.
NTU	Nephelometric Turbidity Units.
Properties	A registered customer connection to the drinking water supply.
RMP	Risk Management Plan.
SCADA system	A Supervisory Control and Data Acquisition (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 processes
SDWA	Safe Drinking Water Act 2003 Act.
SDWR	Safe Drinking Water Regulations 2015.
Sludge	Water Treatment sludge is the solid, semisolid, or slurry residual material that is produced as a by-product of the water treatment process.
Source Water	Raw water supply for town, prior to treatment.
THM	Trihalomethane.
Water Sampling Locality	An area that has common water quality characteristics because the supply is provided through specific pipes, tanks, or pumps. It is more likely to follow geographic features than suburb boundaries
Water Hardness	Refers to the concentration of calcium and magnesium salts in water, which can attach to surfaces and cause a hard, flaky scale. These salts can also make it difficult to achieve lather when using soap.
WSAA	Water Services Association Australia.
WTP	Water Treatment Plant - A facility where raw water is directed through various treatment processes and produces treated water fit for human consumption.

2. Introduction

The Annual Drinking Water Quality report is provided to the Secretary of the Department of Health (DH) in accordance with section 26 of the Safe Drinking Water Act 2003 (SDWA), and Regulations 16 and 17 of the Safe Drinking Water Regulations 2015 (SDWR). This report includes a summary of the chemical, physical and bacteriological test results of drinking water supplied to our customers, as part of our water quality monitoring program for each water sampling locality.

The information presented in this report explains the sources of our drinking water and how it is treated to ensure it consistently meets regulatory requirement. It further demonstrates our commitment to delivering water of high-quality standards, and highlights water quality challenges experienced as well as our improvements in 2023-2024.

In addition to the above, the report includes the following information:

- An overview of our water supply systems and sources of our water supply.
- A summary of water treatment and disinfection processes.
- An outline of how we arrange collection and testing of water samples.
- Details of customer feedback regarding water quality and safety.
- A summary of the independent auditing processes used to verify our management of drinking water quality.

We're committed to continuing our record of reliably providing high quality standard safe drinking water to our customers. We have achieved full compliance with the water quality standards and requirements of the SDWA and SDWR.

3. About Us

We are the Central Gippsland Region Water Corporation, and trade as Gippsland Water. We are a regional water corporation in Victoria established under the Water Act 1989 and constituted on 21 December 1994, ABN 75 830 750 413.

We work closely with the Environment Protection Authority Victoria (EPA), the Department of Health (DH), and the Essential Services Commission (ESC), as they regulate and monitor the service performance of our environmental, public health, and water pricing obligations.

3.1 Summary

- With over 300 operational, engineering, financial, environmental, and administrative employees, we are a major local employer for the region serving a population base of approximately164,034.
- We deliver water to 76,490 customers and wastewater services to 69,093 customers in 43 towns. Our customers include major industries, some of which are of state and national significance.
- These towns are grouped into 35 localities for the purposes of monitoring and reporting in accordance with the SDWR.
- The way we treat water depends on where it is sourced. We take water from 13 different sources including aquifers, rivers, creeks, and reservoirs. Our largest storage is Moondarra Reservoir, south of Erica, with a capacity of 30,458ML. We also take water from storages managed by Southern Rural Water (Blue Rock Dam and Lake Glenmaggie) and Melbourne Water (Tarago Reservoir).

3. *About us Continued*

- We are the second largest regional water corporation in Victoria in terms of revenue earned and the total volume of water supplied, and wastewater collected. We own and maintain a $1 billion infrastructure network which includes:
- More than 2,000 kilometers of water mains.
- 65 treated water storages.
- 48 treated water pump stations.
- 15 water treatment plants.
- We are committed to providing responsible asset management, quality management, incident management and operational audit of the reticulated urban water supply system to ensure that customer service levels are achieved according to our Customer Charter targets and SDWA.
- A major objective for the corporation is to achieve and maintain community confidence in the safety, reliability, and quality of their water supply.
- To ensure customers are provided with safe drinking water, we maintain a 'risk based' drinking water quality management system, which covers the entire water supply system from catchment to customers' taps. The system entails:
- Detailed water quality risk identification processes.
- Audited control measures to manage risks.
- Continuous improvement project to increase system capability, manage risk and improve customer experiences.
- Verification systems, including an independent water quality monitoring program.

3.2 Service Area

Our service area spans from Drouin in the west, to Loch Sport in the east, from Briagolong in the north, to Mirboo North in the south. This covers approximately 5,000 square kilometers in the municipalities of Latrobe City, Baw Baw, South Gippsland Shire, and Wellington Shires.

Our Vision and Values

We take pride in partnering with the community in providing quality water and waste services so we can enjoy a healthy and sustainable Gippsland for generations to come.

SAFETY AND WELLBEING

'Go home safe'

The safety and wellbeing of our employees and community is our priority. Always.

ACCOUNTABILITY

'Make it happen'

We each take ownership and deliver on what we say.

CUSTOMER FOCUSED

'Customer first'

Customers are at the heart of everything we do.

COLLABORATION

'Working together'

We work in partnership with our colleagues, customers, and stakeholders.

INNOVATION

'Clever solutions'

We challenge our thinking, learn and embrace change.

INTEGRITY AND RESPECT

'Treat others as we wish to be treated'

We are transparent, honest, inclusive, and treat people fairly.

Figure 2: Gippsland Water's Vision and Values

Figure 3: Gippsland Water's Vision and Values

2023-24 Strategic Priorities Framework.

Gippsland Water

Our values

Safety and wellbeing
'Go home safe'
The safety and wellbeing of our employees and community is our priority.

Customer focused
'Customer first'
Customers are at the heart of everything we do.

Accountability
'Make it happen'
We each take ownership and deliver on what we say.

Collaboration
'Working together'
We work in partnership with our colleagues, customers, and stakeholders.

Innovation
'Clever solutions'
We challenge our thinking, learn and embrace change.

Integrity and respect
'Treat others as we wish to be treated'
We are transparent, honest and inclusive, and treat people fairly.

Our focus areas

- Safety – people and customers
- Crisis and emergency management
- Organisational culture environment
- Talent attraction and development
- Empowering and enabling our people
- Diversity and inclusion
- Traditional owners - spiritual and economic outcomes
- Recreational values
- Environmental outcomes
- Circular economy
- Sustainable livable communities
- Climate – be prepared/proactive
- Future communities
- Sustainable business and environment
- Asset management and resources
- Land and water – farming/ land management
- Water security
- Industry transition in our region
- Cost to serve customers
- Business development
- Efficient operations
- Asset optimization
- Risk mitigation
- Technology
- Leadership
- Advocacy
- Research and development
- Customer engagement
- 2050 Vision
- Government stakeholder relations

Figure 4: 2023-24 Strategic Priorities Framework

4. Drinking water quality management framework

The regulatory environment in which we operate is to provide safe drinking water at all times. Safe drinking water is water that does not cause illness in those who consume it. To achieve this, the water must be free of pathogens and harmful chemicals.

Guidance regarding the structure of this report has been provided by the Department of Health (DH) in accordance with the Safe Drinking Water Act 2003 (section 26) and the current Water Quality Annual Report Guidance, June 2017.

Drinking water supplied by us must meets the obligations under SDWA and SDWR. The Australian Drinking Water Guidelines 2011 (ADWG) are used as a benchmark for safe drinking water. The guidelines provide a framework for good management of drinking water supplies that if implemented, will ensure safety at the point of use.

The ADWG include two types of guideline values:

- A health-related guideline value, which is the concentration or measure of a water quality characteristic that, based on present knowledge, does not result in any significant risk to health of the consumer over a lifetime of consumption.
- An aesthetic guideline value, which is the concentration or measure of a water quality characteristic that is associated with acceptability of water to the consumer, such as appearance, taste, and odour.

The regulatory environment that provides guidance in the production of safe drinking water consists of:

Safe Drinking Water Act 2003 (SDWA)

The Victorian State Government passed the Safe Drinking Water Act 2003 in June 2003. This Act provides details of further requirements for Victorian water corporations.

The purpose of the Safe Drinking Water Act (2003) is to make provision for the supply of safe drinking water. In outline this Act:

- Requires water suppliers and water storage managers to prepare and implement plans to manage risks in relation to drinking water and some types of non-potable water.
- Provides for the auditing of those plans by approved auditors.
- Requires water suppliers to ensure that the drinking water they supply meets quality standards specified by the regulations.
- Requires water suppliers to disclose to the public information concerning the quality of drinking water.
- Provides for the variation, after community consultation, of water quality standards that relate only to aesthetic factors.
- Requires the reporting of known or suspected contamination of drinking water to the Secretary to the Department of Health.
- Empowers the Secretary to enforce this Act.

4. Drinking water quality management framework continued

Safe Drinking Water Regulations 2015 (SDWR)

- The Victorian State Government passed the Safe Drinking Water Regulations 2005 in July 2005. These Regulations provides details of further requirements for Victorian water corporations. The Safe Drinking Water Regulations 2015 came into operation on 18 July 2015 with the Safe Drinking Water Regulations 2005 being revoked.
- The purpose of the Safe Drinking Water Regulations 2015 is to make further provision for the supply of safe drinking water. In outline, the regulations include:
- Setting out further matters to be addressed in risk management plans and the risks to be addressed in those plans.
- Specifying the documents to be made available for inspection in a risk management plan audit.
- Specifying the issues relating to the quality of drinking water and regulated water that are to be dealt with by a water supplier and water storage manager in an annual report.
- Providing for other matters required to be prescribed under the Safe Drinking Water Act 2003.

Australian Drinking Water Guidelines 2011 (ADWG)

The purpose of the Australian Drinking Water Guidelines 2011 is to provide the authoritative reference for use within Australia's administrative and legislative framework to ensure the accountability of drinking water suppliers. The ADWG are not mandatory legally enforceable standards.

The guidelines set the framework for the management of drinking water quality known as the 12 elements. We have adopted the 12 elements of the ADWG 2011 that guides the design of a structured and systematic approach for the management of drinking water quality from catchment to consumer, to assure its safety and reliability.

Health (Fluoridation) Act 1973

The Health (Fluoridation) Act 1973 ('the Fluoridation Act') regulates the safe and effective addition of fluoride into drinking water supplies in Victoria.

Under the Fluoridation Act, the Secretary to the Department of Health has the power to direct water supply authorities to commence water fluoridation.

Code of Practice for Fluoridation of Drinking Water Supplies; Second Edition (2018) – Health (Fluoridation) Act 1973.

This code provides details of further requirements for Victorian water corporations.

The objective of the code is to provide for the safe and effective addition of fluoride into the drinking water supply. This will be achieved by specifying:

(a) The optimum fluoride levels for drinking water supplies and the design control limits for fluoridation plants.

(b) The minimum requirements for the safe and effective addition of fluoride chemicals to drinking water supplies, covering the design and operation of a fluoridation plant.

(c) Monitoring and reporting requirements for the proposed fluoridation scheme.

The code also includes works undertaken on fluoridation plants and integrates the practices with the SDWA through:

(a) The inclusion of water fluoridation into the corporations' risk management plan under the SDWA.

(b) Integration and compliance with the auditing, notification and reporting requirements of the SDWA.

The code also describes the gap analysis and subsequent works program associated with water fluoridation plant through:

a) The regulatory framework including the procedure to fluoridate.

b) Safety in design.

c) Requirements for the design and control of fluoridation facilities.

d) Requirements for plant operation including monitoring, training or personnel, occupational health and safety, security, and environmental protection.

4. Drinking water quality management framework continued

Health Based Targets (HBT)

Health-based targets provide a quantitative measure of the microbial safety of drinking water. The Australian Drinking Water Guidelines (the Guidelines) promote preventive risk-based management of drinking water quality from source to consumer tap. Health-based targets provide an assessment of enteric pathogen risks in the source water and inform appropriate risk management measures (barriers). These assessment and preventive measures support the Risk Management Framework.

Health-based targets are not a pass/fail metric, instead they provide the basis for assessing the level of treatment required to manage source water microbial risks. Shortfalls in achieving the required treatment targets (expressed as log10 reduction values or LRVs) to manage source water pathogen risks should be used to prioritise improvements for treatment processes.

the ADWG Framework for Management of Drinking Water Quality requites water utilities to undertake a source risk assessment, plus a water treatment assessment, and determine whether there is a shortfall or residual risk.

The WSAA Drinking Water Source Assessment and Treatment Requirements Manual for the Application of Health-Based Treatment Targets Release No. 2 September 2015 was adopted by Gippsland Water for assessing the microbiological risk associated with its catchments and treatment processes in place (log removal requirements) to manage these risks.

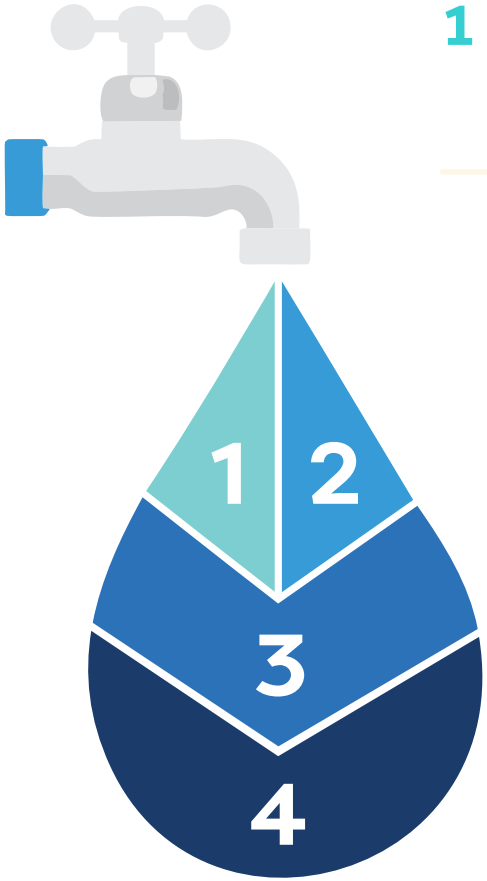
The HBT comprises four parts:

(a) **Source water assessment** (microbial risk). Pathogen risk assessment is conducted in accordance with the above WSAA manual and is consistent with the ADWG 2011 Framework. Figure 1 below sets out WSAA's approach to quantitative risk assessment that has been adopted by the Corporation.

(b) **Water treatment plant process assessment.** The water treatment assessment involves assigning estimates of pathogen reduction to the treatment processes deployed at a source. Pathogen reduction is expressed as a logarithmic scale (log10) or log reduction value (LRV). To claim the LRV credit a water treatment process, the performance of the existing process must be monitored and adhere to acceptable performance limits.

(c) **Water safety assessment**. Comparing the log reduction required from the source assessment with the log reduction values claimable from the water treatment assessment.

(d) **Water Safety Improvement Plan.** The water safety improvement plan involves planning improvements to improve water safety. Where the HBT is not achieved, the water supplier should undertake improvements.



1 Source Water Assessment

Tier 1 Assessment	**Mandatory**
Tier 2 Assessment	**Optional**
Determine Pathogen Reduction	**Required**

2 Water Treatment Assessment

Review Operational Data

Confirm Actual Performance

Determine Pathogen Reduction **Achieved**

3 Water Safety Assessment

Compare Pathogen Reduction Required with that Achieved.

Plot on Water Safety Continuum

Determine Need for **Improvement**

4 Water Safety Improvement Plan

Consider Additional Monitoring to Reduce Uncertainty

Consider Reducing Source Challenge through Catchment and Source Management

Consider Improving Water Treatment Performance/Barriers

Determine **Actions and Urgency**

Figure 5: Water safety assessment process.

5. Drinking Water Quality Policy

5.1 Policy statement and purpose

Gippsland Water is committed to managing its water supply systems to provide safe drinking water for customers at all times. This is achieved by managing catchments, treatment and water supply assets and systems in an efficient and sustainable manner reflecting the current and future commitments.

Drinking water is managed in accordance with our Drinking Water Quality Manual that outlines the strategic and operational processes which reflect our attitude to our customers, our product, our service delivery and each other, in a matter which demonstrates that we:

- Understand our obligations to public health.
- Are committed to high quality products and services.
- Behave openly, ethically, and fairly.
- Focus on customer satisfaction.
- Promote innovative solutions.
- Strive to get the best out of our systems all of the time.

5.2 Our commitments

To continually improve our drinking water quality performance by:

- Meeting all of our legislated drinking water quality requirements and moving our practices beyond compliance with relevant legislation only, where sustainable and economic opportunities are identified.
- Managing the water quality aspects of all our activities by training our people, incorporating water quality objectives and targets into our business planning activities, and implementing appropriate risk-based approaches to ensure we provide safe drinking water at all times.
- Working with our customers and suppliers to jointly understand and be more effective in the management of water quality products and services supplied to us.
- Undertaking whole-of-water supply catchment to tap assessments as part of an integrated approach to the sustainable management of our water resources and treatment activities.

To communicate with our community by:

- Openly sharing and publishing information on our drinking water quality activities and performance.
- Utilising our water industry partners, advisory committees and other consultative mechanisms, to seek community involvement in policy development and planning processes and by contributing to initiatives and activities that educate and enhance community awareness of water resources, catchments, water treatment and water quality issues.
- Co-operating with all stakeholders within the community to identify, influence and participate in sustainable solutions to global and regional drinking water quality priorities.

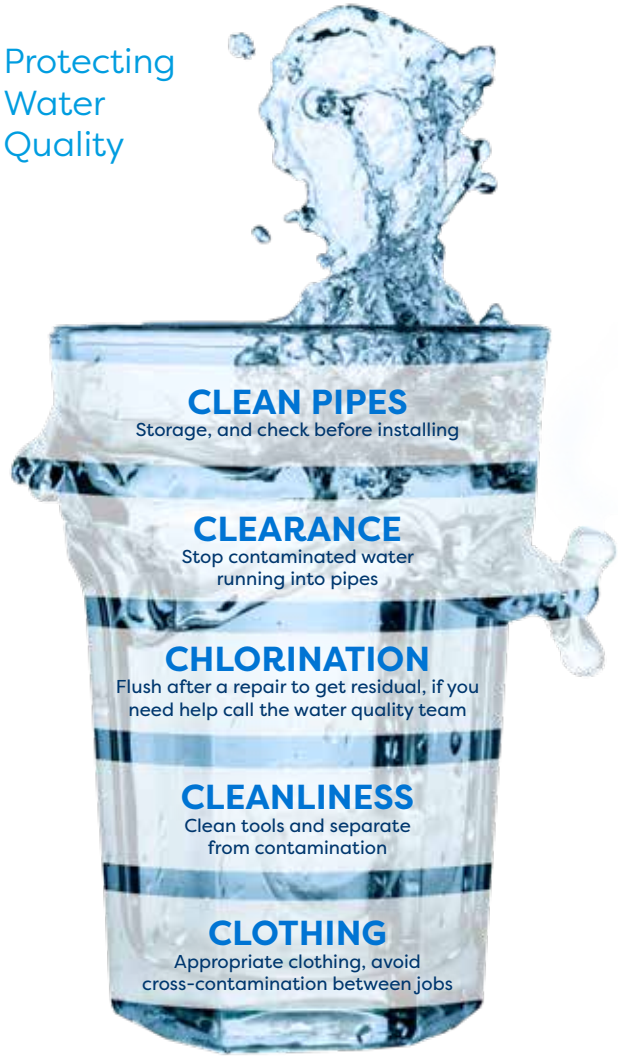


Figure 6: Gippsland Water's 5Cs program

6. Drinking water supply systems

We operate 14 water treatment systems supplying 35 water sampling localities, and 43 towns, which provide drinking water to a population of approximately 76,490 customers in the region. Details of our drinking water supply systems, including water sampling localities, population supplied, source water including raw water storages, and water treatment processes are provided in Table 1. We manage Moondarra reservoir for the supply of water to the Traralgon, Tyers and Morwell water treatment plants. For all other systems, we draw directly from the rivers or storages managed by Southern Rural Water (SRW) and Melbourne Water.

6.1 Source Water

The water for these systems is sourced from a variety of water supplies including stream off-takes, reservoirs, and groundwater (bore water). To quantify the microbial risks in the catchment, we conducted a detailed microbial hazard quantification assessment on our drinking water supply systems. The assessment used the methodology outlined in the Water Services Association Australia (WSAA) Manual for the Application of Health Based Targets for Drinking Water (2015)

We interact with many stakeholders regarding catchment management. For details regarding catchment management activities refer to section 9.6.

Table 1: Gippsland Water - water sampling locality source water and water treatment processes

Water Treatment Plant	Water sampling Locality	Estimated Population Serviced[1]	Source water	Raw Water Storage	Treatment process										Sludge Thickening Dewatering	Added substances					
						Clarification		Filtration		Disinfection				Other							
					Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[2]		Lime / Soda Ash	Coagulants	Potassium Permanganate	Polymers	Fluoridation	Calgon-T (Sodium hexametaphosphate)
Maffra	**Maffra**	5,630	Macalister River	NA	X	X		X		X		Stratford and Boisdale		X		Soda Ash	Alum		LT22	Sodium Fluoride	X
	Stratford	2,860																			
	Boisdale	80																			
Briagolong	**Briagolong**	780	Bore - Wa De Lock Aquifer	NA	X			X				X				Soda Ash	PFS Polymerised Ferric Sulphate		1115 & 1160		

1 . The listed populations are for the water sampling localities calculated using Gippsland Water's number of residential water connections, the 2021 ABS census data of number of persons per dwelling and adjusted for estimates of permanent occupation rates. Figures have been rounded to the nearest 10 people.
2. PAC/GAC used as required to treat for taste and odour compounds.

Table 1 (Cont.): Gippsland Water - water sampling locality source water and water treatment processes

Water Treatment Plant	Water sampling Locality	Estimated Population Serviced[1]	Source water	Raw Water Storage	Treatment process										Sludge Thickening Dewatering	Added substances				
						Clarification		Filtration		Disinfection				Other						
					Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[2]		Lime / Soda Ash	Coagulants	Potassium Permanganate	Polymers	Fluoridation
Morwell	**Morwell**	15,920	Tyers River	Moondarra	✕	✕		✕		✕		Morwell, Churchill, Jumbuk, Hazelwood Nth, Boolarra	Traralgon South			Soda Ash	Alum / PAC 10*		LT20	Sodium Fluoride
	Boolarra	680																		
	Churchill	5,360																		
	Yinnar	1,220																		
	Jumbuk	390																		
	Traralgon Sth/ Hazelwood Nth	1,930																		
Tyers (Plant 1)	**Tyers/Glengarry**	2,380	Tyers River	Moondarra	✕			✕				Tyers, Rosedale & Toongabbie			✕	Soda Ash	Alum		1115 & 1160	
	Rosedale	1,790																		
Tyers (Plant 2)	**Toongabbie**	990			✕		✕	✕												
	Cowarr	310																		
Traralgon	**Traralgon**	28,870	Tyers River	Moondarra	✕		✕	✕		✕						Soda Ash	Alum / PAC23/ PAC10**		LT20	Sodium Fluoride

1. The listed populations are for the water sampling localities calculated using Gippsland Water's number of residential water connections, the 2021 ABS census data of number of persons per dwelling and adjusted for estimates of permanent occupation rates. Figures have been rounded to the nearest 10 people. 2. PAC/GAC used as required to treat for taste and odour compounds.
* Changed to PAC10. ** Changed to PACI-23 then to PAC10.

Table 1 (Cont.): Gippsland Water - water sampling locality source water and water treatment processes

Water Treatment Plant	Water sampling Locality	Estimated Population Serviced[1]	Source water	Raw Water Storage	Treatment process										Sludge Thickening Dewatering	Added substances					
						Clarification		Filtration		Disinfection				Other							
					Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[2]		Lime / Soda Ash	Coagulants	Potassium Permanganate	Polymers	Fluoridation	Calgon-T (Sodium hexametaphosphate)
Warragul	**Warragul (Incl Nilma, Drouin East, Darnum)**	21,780	Pederson Weir (Tarago River) Tarago Reservoir - (supplementary supply)	Tarago Reservoir (supplementary supply)	X		X	X		X		Warragul South & Drouin		X[1]	X	Lime	Alum		LT20	Sodium Fluoride	
	Warragul South	670																			
	Drouin	17,520																			
	Rokeby/Buln Buln	560																			
Heyfield	**Heyfield**	2,080	Thomson River	Heyfield raw water storage	X			X		X				X	X	Soda ASH	PFS (Polymerised Ferric Sulphate)		1115, 1160		X
	Coongulla/ Glenmaggie[3]	830																			
Rawson	**Rawson**	360	Trigger Creek	Amours Basins	X		X	X				Rawson WTP, Parkers Corner			X	Soda ASH	PFS (Polymerised Ferric Sulphate)		1160		
	Erica	250																			

1. The listed populations are for the water sampling localities calculated using Gippsland Water's number of residential water connections, the 2021 ABS census data of number of persons per dwelling and adjusted for estimates of permanent occupation rates. Figures have been rounded to the nearest 10 people. 2. PAC/GAC used as required to treat for taste and odour compounds. 3. Coongulla Water Treatment Plant was decommissioned in 2022, with supply to Coongulla and Glenmaggie being source via pipeline from Heyfield from 2022.

X[1] Plant capability for activated carbon dosing (not currently in use).

Table 1 (Cont.): Gippsland Water - water sampling locality source water and water treatment processes

Water Treatment Plant	Water sampling Locality	Estimated Population Serviced[1]	Source water	Raw Water Storage	Treatment process											Added substances					
						Clarification		Filtration		Disinfection				Other							
					Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[2]	Sludge Thickening Dewatering	Lime / Soda Ash / CO2	Coagulants	Potassium Permanganate	Polymers	Fluoridation	Calgon-T (Sodium hexametaphosphate)
Mirboo North	**Mirboo North**	1,740	Little Morwell River	N/A	X	X	X	X				X			X	Soda Ash	PASS		LT20		
Moe	**Moe (inc Darnum[3])**	9,980	Tanjil River and Narracan Creek	N/A	X	X		X		X		Newborough, Yallourn North, Trafalgar, Yarragon & Darnum			X	Soda Ash	Alum		LT20	LSodium Fluoride	X
	Newborough	7,230																			
	Yallourn North	1,470																			
	Trafalgar	4,320																			
	Yarragon	1,950																			
Neerim South	**Neerim South**	1,560	Tarago River	Tarago Reservoir	X		X	X			X (Noojee System)	X (Neerim South)			X	Soda Ash	PFS / PAC10*		1115, 1160		X
	Noojee	240																			
Sale	**Sale/Wurruk**	17,350	Bore (Boisdale Aquifer)	N/A				X		X						Lime / CO2		X		Sodium Fluoride	

1. The listed populations are for the water sampling localities calculated using Gippsland Water's number of residential water connections, the 2021 ABS census data of number of persons per dwelling and adjusted for estimates of permanent occupation rates. Figures have been rounded to the nearest 10 people. 2. PAC/GAC used as required to treat for taste and odour compounds.
* Changed to PAC10.

Table 1 (Cont.): Gippsland Water - water sampling locality source water and water treatment processes

Water Treatment Plant	Water sampling Locality	Estimated Population Serviced[1]	Source water	Raw Water Storage	Treatment process										Sludge Thickening Dewatering	Added substances					
						Clarification		Filtration		Disinfection				Other							
					Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[2]		Lime / Soda Ash	Coagulants	Potassium Permanganate	Polymers	Fluoridation	Calgon-T (Sodium hexametaphosphate)
Seaspray	**Seaspray**	780	Merrimans Creek	Seaspray raw water storage	✕			✕				✕		✕		Soda Ash	Alum 90		1115, 1160		
Moe	**Thorpdale (Water carting from Moe water sampling locality)**	180	Tanjil River & Narracan Creek (September 2015 - ongoing)	N/A	✕	✕		✕		✕		Newborough, Yallourn North, Trafalgar, Yarragon & Darnum			✕	Soda Ash	Alum		LT20	Sodium Fluoride	✕
Willow Grove	**Willow Grove**	470	Tanjil River	Blue Rock Lake	✕			✕			✕					Soda Ash	Alum		1115, 1160		

1. The listed populations are for the water sampling localities calculated using Gippsland Water's number of residential water connections, the 2021 ABS census data of number of persons per dwelling and adjusted for estimates of permanent occupation rates. Figures have been rounded to the nearest 10 people. 2. PAC/GAC used as required to treat for taste and odour compounds.

6.2 Catchment Management

We work in partnership with the following organisations to improve and preserve our waterway ecosystems:

- West Gippsland Catchment Management Authority (WGCMA).
- Landcare groups and local councils.
- Lake Wellington Sustainable Irrigation Group.
- ARC Nutrient Reference Project for Lake Wellington in Macalister Irrigation District.
- Regional Integrated Water Management Program.
- Latrobe Catchment Landcare Network.

Initiatives that have been undertaken to contribute to source water protection in our catchments have included:

- Commenced fencing and revegetation of a section of riverbank on the Tanjil River just upstream of the Moe water supply offtake. This project will assist with the improvement of water quality by restricting livestock access to the river and preventing erosion through bank stabilization by planting 8000 native plants indigenous to the area.
- Assessment of planning permit application referrals from Councils for locations that fall within open, special water supply catchment areas. In total, 37 planning permit applications were received by Gippsland Water from Councils for further assessment as a referral authority for open special water supply catchments.
- Completion and updating of sanitary surveys for all special water supply catchments.
- Ongoing works within the Moondarra Catchment area, including weed and pest animal control, track maintenance, native vegetation management (including planned burns) and surveillance for illegal access and activity.

Table 2: Gippsland Water - water supply locality water source and activities undertaken

Water Treatment Plant	Source water	Raw Water Storage	Water Sampling Locality	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Maffra WTP	Macalister River	Lake Glenmaggie	Maffra Stratford Boisdale	Southern Rural Water	West Gippsland Catchment Management Authority	• Water Licence applications referrals – water quality assessments • Planning application assessments: including coordination with Southern Rural Water, as co-referral authority. • Sharing of water quality data with WGCMA and SRW for environmental & recreational water monitoring • Sharing of water quality data with horticultural producers • Participation in pre-bushfire season briefing with Forest Fire Management Victoria Heyfield
Briagolong WTP	Bore-Wa De Lock Aquifer	N/A	Briagolong	Southern Rural Water	West Gippsland Catchment Management Authority	• PFAS/PFOA monitoring • Water Licence applications referrals – water quality assessments • Test bore and monitoring to investigate future water security options.

Table 2 (cont.): Gippsland Water - water supply locality water source and activities undertaken

Water Treatment Plant	Source water	Raw Water Storage	Water Sampling Locality	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Morwell WTP	Tyers River (Including Trigger Creek)	Moondarra Reservoir	Morwell Boolarra Churchill Yinnar Jumbuk Traralgon Sth / Hazelwood Nth	Gippsland Water	West Gippsland Catchment Management Authority	• Implementation of the Moondarra Land Use Options Plan • Road and track maintenance • Pre-bushfire season orientation with fire agencies. • Planning application assessments for water quality risks • Ongoing participation in the Regional Water Monitoring Partnership. • Timber production from GW-owned pine plantation: including harvest & site preparation for re-establishment. • Ongoing liaison with Friends of Tyers State Park • Liaison with Baw Baw Shire as major road maintenance manager. • Gathering of intelligence data for trespass into closed catchment area • Review of forest plantation pesticide application operational plans • Weir maintenance and inspection at Trigger Creek • Reporting of rubbish dumping on Crown land to stakeholders • Bulk Water shoreline assessments of Moondarra Reservoir
Tyers WTP			Tyers/ Glengarry Rosedale Toongabbie Cowwarr			
Traralgon WTP		Amours Basins	Traralgon			
Rawson WTP			Rawson Erica			
Warragul WTP	Pederson Weir (Tarago River) Tarago Reservoir (supplementary supply)	Tarago Reservoir (supplementary supply)	Warragul (including Nilma, Drouin East) Warragul South Drouin Rokeby/Buln Buln	Melbourne Water	West Gippsland Catchment Management Authority	• Planning application assessments, including liaison with Melbourne Water • Ongoing liaison with Melbourne Water, specific to Tarago Reservoir water quality.
Neerim South WTP			Neerim South Noojee			
Sale WTP	Bore (Boisdale Aquifer)	N/A	Sale / Wurruk	Southern Rural Water	West Gippsland Catchment Management Authority	• PFAS/PFOA monitoring • Water Licence applications referrals – water quality assessments

Table 2 (cont.): Gippsland Water - water supply locality water source and activities undertaken

Water Treatment Plant	Source water	Raw Water Storage	Water Sampling Locality	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Seaspray WTP	Merriman Creek	Seaspray raw water storage	Seaspray	Gippsland Water	West Gippsland Catchment Management Authority	• PFAS/PFOA monitoring • Ongoing monitoring of algae control measures in raw water basins • Forestry Spray application program review • Forestry pesticide application, on ground observance and infield monitoring data gathering with HVP Plantations • Ongoing working relationship with Merriman Creek Landcare group • Water Licence applications referrals – water quality assessments
Seaspray WTP	Merriman Creek	Seaspray raw water storage	Seaspray	Gippsland Water	West Gippsland Catchment Management Authority	• PFAS/PFOA monitoring • Ongoing monitoring of the trial of algae control measures in raw water basin • Forestry Spray application program review • Forestry pesticide application, on ground observance and infield monitoring • Ongoing working relationship with Merriman Creek Landcare group • Water Licence applications referrals – water quality assessments
Willow Grove WTP	Tanjil River	Blue Rock Lake	Willow Grove	Southern Rural Water	West Gippsland Catchment Management Authority	• Engagement with SRW and WGCMA regarding water quality protection
Heyfield WTP	Thomson River	Heyfield raw water storage	Heyfield	Gippsland Water	West Gippsland Catchment Management Authority	• Planning application assessments, including coordination with Melbourne Water • Liaise with Melbourne Water, including Thomson dam visit by Bulk Water staff • Water Licence applications referrals – water quality assessments
Mirboo North WTP	Little Morwell River	N/A	Mirboo North	N/A	West Gippsland Catchment Management Authority	• Engagement with upstream landholders and assessment of sediment runoff mitigation potentials • Reporting of rubbish dumping in State Forest to stakeholders • Water Licence applications referrals – water quality assessments
Moe WTP	Tanjil River and Narracan Creek	N/A	Moe Newborough Yallourn North Trafalgar Yarragon Darnum Thorpdale (water carting from Moe water sampling locality)	N/A	West Gippsland Catchment Management Authority	• Planning application assessments, including liaison with SRW • Ongoing participation in the Regional Water Monitoring Partnership. • Water Licence applications referrals – water quality assessments • Water Act, irrigation dam work permit referrals.


GIPPSLAND
WATER
WATER TREATMENT PLANT
HAZCHEM
STOP
10
IN

6.3 Water treatment processes

The source waters for our 15 water supply systems are treated prior to distribution to our customers via the reticulation systems, with the objective of providing safe drinking water at all times. The treatment varies for each water supply system with the specific treatment process dependent on the quality and risks of the source water.

Table 1 identifies the regular treatment process for each of the water localities and lists added substances and any periodic treatment activities. We use the following treatment processes to produce safe drinking water.

6.3.1 Coagulation/flocculation

Coagulation is a process to remove very fine suspended particles often associated with turbidity, colour or colloidal matter in water. These particles have a negative charge that causes them to repel each other and stay suspended in water. The addition of a suitable iron- or aluminium-based salt 'coagulant' with a positive charge neutralises or destabilises the negative charge enabling the fine particles to join together to form larger particles.

The flocculation (floc) process involves the formation of small flocs which later aggregate to form a larger floc thus speeding up their removal during the sedimentation process.

6.3.2 Sedimentation

The clarification or sedimentation of the floc particles formed during the coagulation/flocculation process is usually carried out under still conditions (e.g. in the sedimentation tank or clarifier). A sedimentation tank relies on gravity to separate the floc from the water, which is heavy and falls to the bottom of the tank – leaving the 'cleaner' water on top.

6.3.3 Solid Contact Clarification

The purpose of the solid contact clarification is the same as the sedimentation process, i.e., to enhance the filtration process by removing particles. It involves mixing the influent flow with previously settled solids within a cylinder located in the Centre of the clarifier. Gentle mixing within the reaction well promotes agglomeration of floc particles and/or chemical precipitates. The aggregated solids settle out more rapidly in the clarification area. Even better clarity is achieved when particles become enmeshed in a sludge blanket layer. Rotating sludge scrapers transport settled solids to the Centre of the basin for removal. Clarified overflow is removed through a circular launder system that draws water from the entire surface area to prevent solids carryover caused by uneven velocity currents.

6.3.4 Filtration

The clarified water is passed through a filter consisting of several types of graded filter media (sand, gravel, and coal) to remove any remaining particles, floc or dissolved chemicals that may have passed through the clarification/sedimentation process.

6.3.5 Dissolved Air Floatation (DAFF)

This process involves the injection of microscopic air bubbles, formed as a result of pressurizing the air under several atmospheres, into the water stream, where it is mixed with pre-coagulated water just before it enters the flotation tank. The air bubbles attach to the solid particles (flocs formatted during the coagulation and flocculation stages), causing the flocculated particles to float to the surface. These particles are then drawn off the surface and off the filtration tank and removed to

6.3 Water treatment processes continued

waste. The clear water then is filtered, as above, through graded filter media.

Over time, the filters gradually become clogged with trapped particles. A filter backwash is carried out to clean the filters, returning them to optimum condition. The backwash process involves a reverse flow of air and water through the filter media and consists of two steps:

Air Scour: Air is forced up through the filter nozzles to agitate, expand the filter bed, and loosen up any trapped dirt particles from the filter media.

Water Backwash: Clean backwash water is forced upwards through the filter bed continuing the filter bed expansion and carrying the particles in suspension into backwash troughs suspended above the filter surface.

The backwash water produced during the filter cleaning process is discharged to the sludge thickening system to separate solids from process water. To maximise water use, the separated process water is then returned to the treatment plant and mixed with new raw water to recommence the treatment process.

6.3.6 Sequestration

Sequestration involves the addition of sequestering agents to the filtered water to prevent an oxidization reaction between dissolved iron/manganese and chlorine during the disinfection stage, which results in forming particulate iron/manganese that discolors the water and causes water quality complaints.

6.3.7 Disinfection

Drinking water is disinfected to prevent the spread of waterborne pathogens that cause diseases like dysentery, cholera, typhoid, and gastroenteritis.

Water disinfection can be achieved using one or more of the following methods:

Chlorination

Chlorine is widely used throughout the world to disinfect drinking water and control disease causing organisms. The type of chlorine used at our plants is either chlorine gas or sodium hypochlorite.

Chloramination

Chloramination is also used throughout the world as a means of disinfecting drinking water to control disease causing organisms. Small amounts of chlorine and ammonia are added to the water to form chloramines, providing a relatively long-lasting process to safely disinfect water.

Secondary disinfection

Disinfectant residuals decrease with time as water passes throughout the distribution system and within storage tanks. Secondary water disinfection plants are used to maintain adequate disinfection levels within the distribution system.

Ultraviolet (UV) disinfection

Gippsland Water has recently introduced an ultraviolet (UV) disinfection system to its water treatment processes. UV light, a type of electromagnetic radiation, possesses incredible potential in disinfecting water by neutralising harmful, including chlorine tolerant, microorganisms. This process involves the UV light damaging the DNA of these microorganisms, rendering them unable to reproduce and cause infections. When used in combination with the other treatment processes, it ensures the provision of a multi-barrier approach to managing water quality.

6.3.8 Added Substances

Lime/Soda ash

To assist with the treatment process and to ensure the pH level in the raw water (before treatment chemicals are added) and filtered water (after treatment) is within the required ranges, lime or soda ash is added. Lime or soda ash is added to the raw water to adjust the pH to ensure the optimum level for chemical reactions to occur in the coagulation/flocculation process.

Lime or soda ash is also added to the water before it leaves the water treatment plant to maintain the pH in the desired range to optimise the effectiveness of disinfection chlorinated systems and to minimise the risk of corrosion, as well as improve water taste.

Potassium permanganate

Potassium permanganate can be added to the water supply as required to reduce iron and manganese levels. When present in higher concentrations, these metals can cause staining of laundry and plumbing fixtures and contribute to ‘discoloured water’ events.

Powdered activated carbon

Powdered activated carbon can be added to the water supply as required to remove compounds that contribute to taste and odour issues, usually associated with higher levels of certain algae in raw water.

6.3 Water treatment processes continued

Coagulants (Alum, PAC10, PFS, PASS)

Coagulants are compounds that promote the clumping of fine floc particles into larger floc particles so that they can be more easily separated from the water. The coagulants are either aluminium or iron based, with the type used dependent on the characteristics of the raw water being treated.

Fluoridation

Water fluoridation is the adjustment of fluoride in drinking water to a level that helps protect teeth against dental decay. We fluoridate the drinking water supplies at 6 of our 14 water treatment plants (Moe, Morwell, Maffra, Traralgon, Sale, and Warragul). Fluoridation of the drinking water supplies is undertaken as per the requirements of the Health (Fluoridation) Act 1973.For information about the health issues associated with the water fluoridation program, contact the Department of Health (Department of Health) on 1800 651 723.

Sodium hexametaphosphate

Sodium hexametaphosphate can be added to the water supply as required as a sequestration agent to prevent the oxidation of soluble iron/manganese in the water supply that can contribute to discoloured water issues.

6.3.9 Distribution

After water is filtered and disinfected, it is relayed to customers through a vast network of tanks, basins, pumps, and pipes. We use positive pressure, gravity, and backflow prevention to ensure safe drinking water. Positive pressure in the water mains prevent contaminants entering the water supply system when leaks occur. We require properties assessed as high-risk to water supply such as industrial and commercial properties to install and maintain a testable backflow prevention device before connecting to the water supply network.

Where works are required on water mains, the safety of drinking water is maintained through pro-actively managing any risks. Programs such as our 5Cs (clean pipes, clearance, chlorination, cleanliness, clothing) is specifically designed to address any contamination risk. **See Figure 6.**

The water distribution system is also strategically flushed to remove build-up of naturally occurring sediments from pipes that can cause customers to experience dirty water.

6.4 Water Quality Management System

The Safe Drinking Water Act 2003 (SDWA) provides regulatory and risk management framework for drinking water quality management. The SDWA requires all Victorian Water Corporations to prepare, implement and review a risk management plan. To assist with this requirement, we have made a commitment to establish and maintain a Drinking Water Quality Management System (DWQMS) that considers the principles of the Framework for the Management of Drinking Water Quality within the Australian Drinking Water Guidelines 2011 (ADWG). This quality management framework is specific for the water industry and incorporates a preventive risk management approach from catchment to consumer.

We utilise the ADWG Framework principles in its Water Quality Management System for the supply of safe drinking water. The ADWG Framework is based on 12 elements outlined in Chapter 2.

The 12 elements of the Water Quality Management System must be met, and the key processes undertaken to meet these requirements include:

6.4.1 Hazard and risk identification

To determine the key risk to a water supply to enable control measures to be implemented, we undertake an extensive hazard identification and assessment process from the catchment to the end user involving management, operational staff, system operators and key stakeholders.

The risks identified during this process are reviewed regularly to identify changes to risks, new risks, or when processes and system changes occur.

6.4.2 Control measures

Control measures are established to reduce the key risk or likelihood of the risk occurring. The intent is to manage or reduce the risk to an acceptable level. Within our Drinking Water Quality Management System, this consists of:

- Critical Control Points (CCPs) that are alarmed and have the ability to stop processes before a water quality failure occurs. The CCPs are documented and apply to critical process steps in the treatment process.
- Maintenance programs that include preventive maintenance of critical assets used in the treatment process and control systems such as dosing systems, monitoring instrumentation for key assets and system-based maintenance such as mains flushing, air scouring, tank, and basin cleaning as well as asset maintenance and replacement programs.
- Trained and competent water treatment technicians manage the operation and maintenance of water treatment plants and water supply systems. All technicians undertake industry-based training to ensure a high level of knowledge of treatment processes and associated risks. Our technicians are trained in accordance with the Water Industry Operator Certification Framework 2018: Drinking Water, Wastewater, Recycled Water effective 1 July 2019 requirements to Certificate 3 and Certificate 4 level in water industry operations.

6.4.3 Verification and monitoring

Verification and monitoring are used to confirm and authenticate the performance of water treatment processes and water supply systems to ensure compliance with SDWR 2015 standards and ADWG health related and aesthetic guideline values. Our verification and monitoring include:

- Supervisory control and data acquisition systems (SCADA) at:
  - System-wide telemetry and alarms 24 hours a day, 7 days a week.
  - Critical Control Point (CCP) alert and critical process alarms.
  - Water treatment and water quality Technicians on-call 24 hours a day, 7 days a week for system monitoring and alarm verification and response.
- A drinking water quality monitoring program covering the catchment, water treatment plant process and water supply system testing and undertaken by an independent National Association of Testing Authorities (NATA) accredited laboratory that include:
  - Pathogenic microorganisms.
  - Inorganic chemicals, including inorganic disinfection by-products.
  - Organic chemicals, including pesticides, pesticide residues and organic disinfection by-products.
  - Radiological parameters.
  - Algal toxins (as required when algal events occur).
- A water treatment chemical quality assurance program undertaken by an independent laboratory that includes certificates of analysis prior to receipt of chemicals for use.

6.4 Water quality management system continued

- Calibration programs of on-line and benchtop critical instruments used for process control and alert and critical alarm processes by independent service providers.
- Customer feedback captured through our water quality complaint resolution procedure.

6.4.4 System auditing

Internal and external auditing programs have been established to assess compliance of the Water Quality Management System. This includes auditing:

- Water treatment plant records, systems, and processes.
- Water supply system infrastructure (water mains repairs, treated water storage tanks and basins).
- Challenging testing CCP alert and critical alarms.
- Behavioural audits to verify compliance with control, verification, and monitoring requirements.

6.5 Water Treatment and Quality Projects Undertaken

During the 2023-24 reporting period, we undertook several works, programs, and projects to ensure that continual improvements were made for the provision of safe drinking water to our customers. These included:

Treatment Processes

- Commenced project to upgrade of Morwell WTP chemical storage tanks.
- Replaced the chemical dosing systems and pumps at Morwell WTP
- Implemented a change in coagulant at Neerim South and Tyers Water Treatment Plants from Polymerised Ferric Sulphate (PFS) to Poly Aluminium Chloride (PAC10) to improve treatment plant performance and reduce treatment costs.
- Continued the project to investigate alternative treatment chemicals as part of our business continuity and risk management process.
- Installed a cover over the Moe clear water distributor.
- Replaced the filter backwash storage water tanks at Sale WTP.
- Replaced the filter backwash water tank at Seaspray WTP.
- Implemented improvements to the chemical delivery area at Tyers WTP

Treated water Storages and tanks

- Conducted annual inspections on treated water storage basins and tanks, assessed their condition, identified, and completed maintenance and cleaning works.
- Completed a clean of the Noojee tank.
- Completed maintenance works and roof sealing on the following treated water storages:
  - Thorpdale high level tank
  - Willow Grove high level tanks
  - Melaleuca Drive (Trafalgar East) tank
  - Yarragon South Tanks
  - Coach Rd Tanks (Newborough)
- Replaced the roof, cleaned, and disinfected the Traralgon South treated water storage tanks.
- Replacement of the Buln Buln Tank with two new plastic treated water storage tanks.
- Replacement of the inlet pipework for the Seaspray WTP elevated treated water storage tank.
- Commissioned a new 25ML water storage basin at Moe WTP.
- Replaced the foot valves inside the Warragul WTP chlorine contact tank.
- Completed treated water storage cleaning of the floating covers of Newborough and Warragul South treated water storages.

Reticulation system and disinfection

- Commissioned a new disinfection facility at Warragul South Basin.
- Completed Ice pigging and air scouring of the Neerim South reticulation system.
- Completed swabbing and air scouring of the Seaspray reticulation system.
- Completed swabbing of the Erica/Rawson water transfer main.
- Upgrade of Drouin Basin disinfection site to increase chemical storage capacity and improve safety.

Other Projects

- Continued to train staff to undertake Dam inspection and monitoring to ensure they are well equipped to identify features that may lead to concerns if not addressed.
- Completed scheduled Moondarra track, drainage, and vegetation maintenance works.
- Ongoing replacement and upgrade of water treatment plant and field water quality site on-line and field instrumentation.

7. System issues for 2023-24

During the 2023-24 reporting period, there were five events reportable under section 22 of the SDWA, with details discussed in section 8.5 of this report. The five events were:

Neerim South

Widespread Customer Complaint – discoloured water (July 2023)

Mirboo North

Widespread Customer Complaint – low water pressure (February 2024)

Morwell

Widespread Customer Compliant – low water pressure (February 2024)

Blue Rock Lake

Suspected Contamination – vehicle into raw water storage (February 2024)

Blue Rock Lake

Suspected Contamination – vehicle into raw water storage (April 2024)

There was one event reportable under section 18 of the SDWA which was associated with the widespread customer compliant for Neerim South system in July 2023 due to the following:

Neerim South

Manganese level detected above the Australian Drinking Water Guideline Value (July 2023)

Any other non-reportable systems issues were detailed in Section 8.6 or addressed through the customer water quality complaints process outlined in section 6.

8. Quality of drinking water 2023-24

The Safe Drinking Water Regulations require water authorities to develop and implement a risk-based water quality monitoring program to verify compliance of specified water quality parameters with the regulatory requirements. As part of our water quality monitoring program, samples are collected weekly, monthly, quarterly, yearly, and every five years from the 35 localities, and tested to determine the water meets the specified quality standard. Over the reporting period, more than 5,000 samples were collected for quality testing and over 70,000 tests performed. The following section provides a summary of the results against the water quality parameters monitored through the year at the required sampling frequency.

A brief explanation of the required water quality parameters is provided below. A more detailed explanation can be obtained from the ADWG prepared by the National Health and Medical Research Council (NHMRC).

8.1 Water quality standards (SDWR 2015)

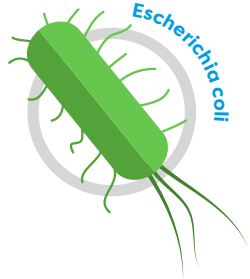
Escherichia coli (E. coli) – E. coli is a common thermo-tolerant coliform present in faeces and is regarded as the most specific indicator of recent faecal contamination from warm blooded animals. The presence of E. coli in the water supply can therefore indicate the potential for other pathogenic bacteria to be present. Results from samples taken within the water sampling locality that exceed the maximum level of this parameter are reported to Department of Health, as required under section 22 of the SDWA.

Trihalomethanes (THM) – Trihalomethanes are a category of by-products produced in drinking water, principally as a result of disinfection chemicals (chlorine) reacting with naturally occurring organic matter derived from the decay of aquatic and terrestrial vegetative matter present in water supplies. Results from samples taken within the water sampling locality that exceed the maximum level of this parameter are reported to Department of Health, as required under section 18 of the SDWA.

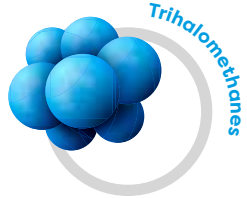
Turbidity – Turbidity is caused by the presence of fine suspended matter such as clay, silt, colloidal particles, algae and other microscopic organisms in the water. In high levels, this matter gives the water the appearance of being dirty, muddy, or milky. Turbidity is best removed by coagulation and filtration treatment processes. Results from samples taken within the water sampling locality that exceed the maximum level of this parameter are reported to Department of Health, as required under section 18 of the SDWA.

The Safe Drinking Water Regulations (2015) monitoring requirements are summarised in Table 3:

Table 3: Summary of the Safe Drinking Water Regulations 2015 (Schedule 2):



All samples of drinking water collected are found to contain **no Escherichia coli per 100 millilitres**, with the exception of any false positive sample.



Less than or equal to 0.25 mg/L.

The **95th percentile** of results for samples in any 12 month period **must be less than or equal to 5.0** Nephelometric Turbidity Units.

8. Quality of drinking water 2023-24 continued

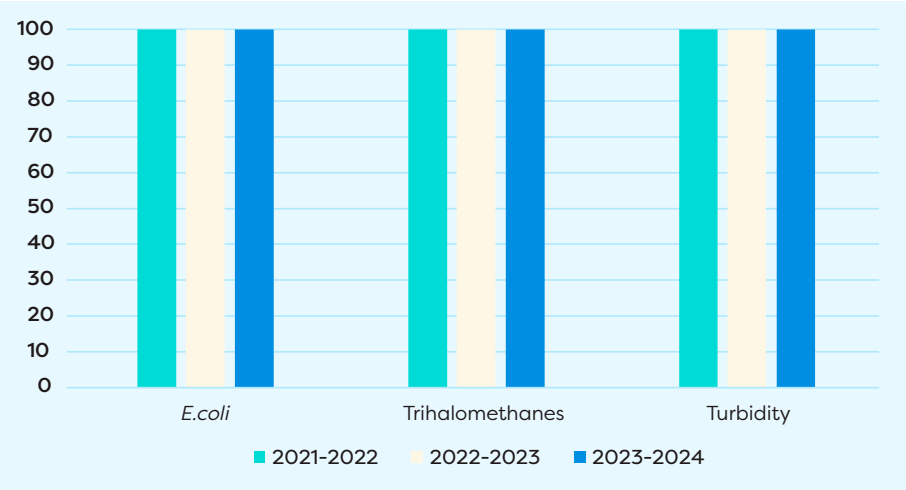


Figure 7: Percentage Compliance by Water Sampling Locality with Water Quality Standards – Schedule 2 (SDWR) 2015

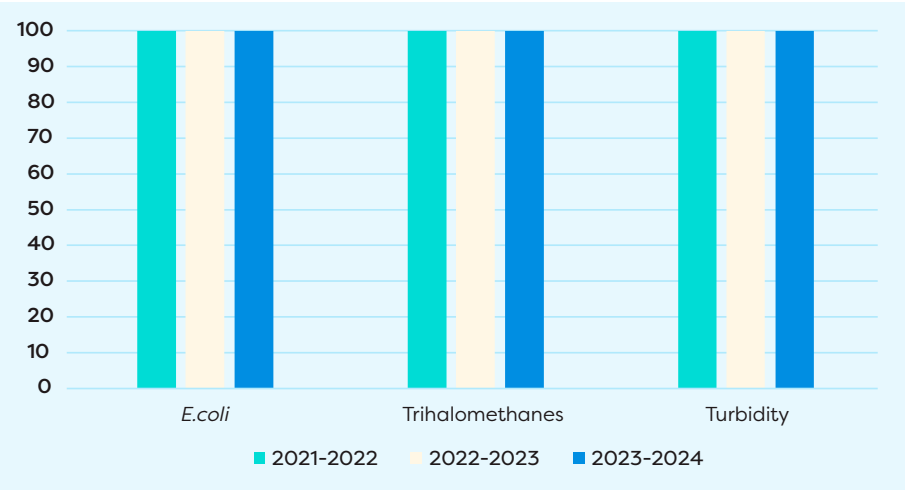


Figure 8: Percentage Compliance by Population with Water Quality Standards – Schedule 2 (SDWR) 2015

For the 2023-2024 reporting period, 100% compliance was achieved with the Schedule 2 parameters. This result was equivalent to the 2021-2022 and 2022-2023 results, we are committed to delivering safe and high-quality standard drinking water to our customers.

For the 2023-2024 reporting period, 100% compliance was achieved with the Schedule 2 parameters, which was equivalent to the 2021-2022 and 2022-2023 result. This demonstrates consistent compliance with the water quality standards.

8.2 Water quality standards

We must ensure all drinking water supplied to the localities we service complies with the quality standards specified under Part 3 of the SDWA (2003). As well as the above parameters that are required under Schedule 2 of the SDWR (2015), many other tests are conducted to ensure that the water supplied is safe to drink. These parameters are determined by assessing the risks to each water supply system and monitoring to verify that these risks are being controlled effectively.

The quality standards applied for the additional parameters in most instances are derived from the ADWG.

8.3 Emergency / incident management

We align our incident/emergency management approach to the Australasian Inter-service Incident Management Systems (AIIMS) as part of its SDWA and SDWR emergency and incident management processes.

We continually review our All-Hazards Incident Management Plan to ensure ongoing compliance with the requirements of Part 7a of the Emergency Management Act (2013).

8.4 Reportable Incidents and potential water quality events

Section 18 of the SDWA states:

'A water supplier must notify the Secretary in writing if it becomes aware that the drinking water it is supplying to another person does not comply, or is not likely to comply, with any relevant water quality standard and must do so within 10 days after it becomes aware of the fact.'

In 2023-24, the water quality events reported to the Department of Health pursuant to section 18 of the SDWA are summarised below.

Table 4: Summary of notifications under section 18

Water Sampling Locality Affected	Date and duration of incident	Location of incident	Nature of the incident	Drinking water supplies affected	Actions taken in response to the incident	Drinking Water – Standard Not Met
Neerim South	15 July 2023 to 17 July 2023	Neerim South Reticulation	Widespread customer complaint – discoloured water partially attributable to residual oxidized manganese accumulating in the reticulation system.	Neerim South	• Immediate actions included mains flushing, planning for extensive water main cleaning, and additional network monitoring • Medium term actions (within 3 months) included undertake mains cleaning utilising ice-pigging, air scouring and flushing. • Long term actions (within one year). • Two repeat sampling events of the reticulation 24 hrs apart.	Manganese ADWG Guideline Value = 0.5 mg/L Levels detected: 0.51 mg/L – 4.4 mg/L

Refer to section 8.5 for information on events and actions taken to manage and return the drinking water supply to specification, and preventative actions.

8.5 Emergencies and water quality events

Section 22 of the SDWA states:

'(1) This section applies if an officer of a water supplier believes or suspects on reasonable grounds that the water supplied, or to be supplied for drinking purposes

(a) may be the cause of illness; or

(b) may be the means by which an illness is being, has been or will be transmitted; or

(c) may contain any pathogens, substance, chemical or blue-green algae toxin, whether alone or in combination, at levels that may pose a risk to human health; or

(d) may cause widespread public complaint.

'(2) On forming that belief or suspicion, the officer must immediately report his or her belief or suspicion to the Secretary and must make the report in the form required by the Secretary.'

During the 2023-24 reporting year, there were five reportable events that required notification to the Department of Health under section 22 of the SDWA. These notifications are summarised over page:

8.5 Emergencies and water quality events continued

Table 5: Summary of incidents and actions taken under section 18

Water Sampling Locality Affected	Date and duration of incident	Location of incident	Nature of the incident	Drinking water supplies affected	Actions taken in response to the incident	Was the community notified
Neerim South	17 July 2023	Neerim South Reticulation	Widespread customer complaint – discoloured water	Neerim South	• Immediate actions included mains flushing, planning for extensive water main cleaning, and additional network monitoring • Medium term actions (within 3 months) included undertake mains cleaning utilising ice-pigging, air scouring and flushing. • Long term actions (within one year). • T wo repeat sampling events of the reticulation 24 hrs apart.	Yes. • We sent letters to all customers outlining the issue and what we were doing to fix it. • We gave updates on social media and our website. • Roadside signage implemented during cleaning activities.
Mirboo North	13 February 2024	Mirboo North Reticulation	Widespread customer complaint – No water / low water pressure during severe storm event	Mirboo North	• Access to large water main break (cause by severe weather) difficult due to storm debris (fallen trees and power lines down) resulting in draining down of the storage basin and an inability to run the Mirboo North water treatment plant due to power outages. • Crews isolated main as soon as safe to do so. • Generator installed at Mirboo North water treatment plant to re-commence drinking water production. • Gippsland Water personnel providing bottled water in town to impacted customers. • Extensive testing to confirm system integrity (all results compliant with SDWA/ADWG)	Yes. • We liaised with the emergency services and placed staff on the ground to provide bottled water to our customers. • We were active on social media, provided regular updates on our website, live outage map and communicated updates to local and state media. We also sent text messages to customers who had their mobile numbers recorded.

8.5 Emergencies and water quality events continued

Water Sampling Locality Affected	Date and duration of incident	Location of incident	Nature of the incident	Drinking water supplies affected	Actions taken in response to the incident	Was the community notified
Morwell	14 February 2024	Morwell – High Level system	Widespread customer complaint – No water / low water pressure during severe storm event	Morwell (High Level system)	• Widespread power outages caused by a severe storm resulted in draining down of the high level water tower. • Low level in the tower resulted in low pressure. • Generator installed in Morwell WTP to provide power to the high lift water pumps to reinstate supply. • Extensive testing to confirm system integrity (all results compliant with SDWA/ADWG).	Yes. • We were active on social media, provided regular updates on our website, live outage map and communicated updates to local and state media.
Blue Rock Reservoir (supply for Willow Grove and Moe)	20 February 2024	Blue Rock Reservoir	Submerged Vehicle in Reservoir – risk of contamination	Willow Grove & Moe	• Liaison with Storage Manager – SRW. • Testing for contaminants (none detected). • Vehicle recovered from reservoir (without release of contaminants).	No • No contamination detected and no impact on drinking water services.
Blue Rock Reservoir (supply for Willow Grove and Moe)	20 April 2024	Blue Rock Reservoir	Submerged Vehicle in Reservoir – risk of contamination	Willow Grove & Moe	• Liaison with Storage Manager – Southern Rural Water. • Testing for contaminants (none detected). • Vehicle recovered from reservoir (without release of contaminants).	No • No contamination detected and no impact on drinking water services.

Table 5 cont.: Summary of incidents and actions taken under section 22

8.5 Emergencies and water quality events continued

8.5.1 Neerim South - Widespread customer complaint – discoloured water (July 2023)

During July 2023, a series of high flow events within the Neerim South reticulation network were detected.

The high flows, peaking up to 19L/s, were substantially higher than the typical average flow observed of 6 to 8 L/s. These events were of short duration, typically between 5 and 10 minutes, and were not associated with any water main breaks or any other operational activities. Figure 9 show the high flow spikes that were recorded on the flow meter located at the Neerim South water treatment plant.

The consequences of the high flow events include disturbing and resuspending sediment built-up within the water mains, and relocating it throughout the reticulation, causing discolouration of water.

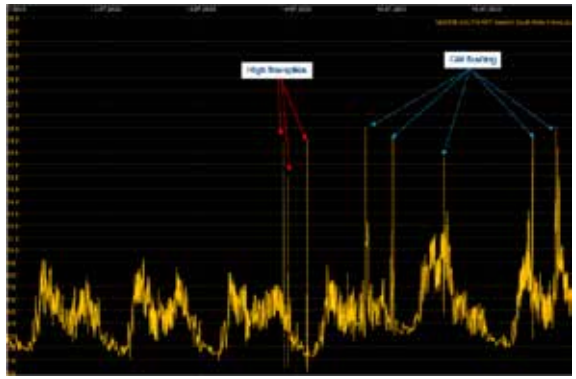


Figure 9: Neerim South treated water Storage basin outlet flow meter

Due to the number of customer complaints received from Neerim South, 26 dirty water complaints, between 14 July 2023 and 17 July 2023, the Department of Health (DH) was advised, and a notification was submitted under Section 22 (1)(d), as required. Figure 10 below shows that number of complaints received from customers in the Neerim South reticulation for the period 1 July 2023 to 17 July 2023. As shown below, the customer complaints peaked during and immediately after the high flow spikes.

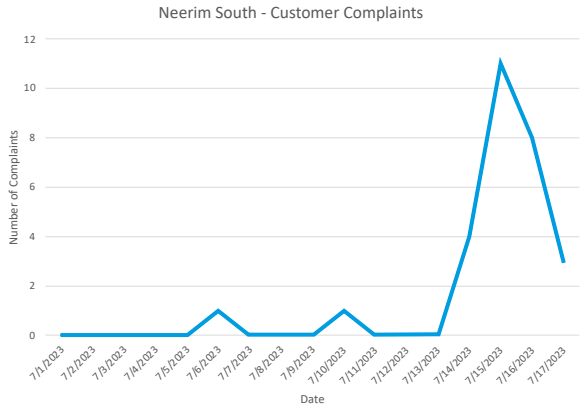


Figure 10: Neerim South customer complaints received between 1 July 2023 – 17 July 2023.

The sediment in the water main comes from trace levels of iron and manganese that pass through the treatment process in the dissolved form. When chlorine is added to disinfect the water at the end of the treatment process, it oxidises the dissolved iron and manganese and changes them to particulate matter that deposits in the reticulation network. Under normal operating conditions, this does not cause any issues and is periodically cleaned out of the system.

After the complaints were recorded, the following corrective actions were implemented:

- Immediate flushing of the impacted areas to remove the discoloured water from the reticulation network.
- Undertaking an air scouring project to clean out the sediment.
- Larger size mains required an alternative cleaning method, ice pigging, which required the installation of additional infrastructure to facilitate the cleaning program.
- Swabbing some parts of the reticulation system (also known as pigging).

In total, 64 water quality complaints were received during this event. After cleaning activities were completed in October 2023, no further water quality complaints were received between October 2023 and June 2024.

8.5.2 Neerim South – Manganese Exceedance (July 2023)

As detailed in section 8.5.1, the discoloured water experienced by customers at Neerim South was a result of the re-suspension of settled sediment in the water mains. This sediment, predominantly of iron and manganese precipitate, were the cause of the elevated analytical results observed for Manganese in July 2023.

The remedial actions implemented (as described in section 8.5.1) removed this material from the system and reduced the manganese levels to below guideline values.

Water quality samples were collected between 15 – 24 July 2023 with the results detailed in Table 6. Initial results indicated higher levels of manganese. System flushing was immediately commenced to remove the discoloured water. By 18 July 2023, all sites tested returned results well below the ADWG values.

Table 6: Neerim South Water quality test results during investigation

Location Sample	Time Sampled	Total Manganese (mg/L)	Soluble Manganese (mg/L)
15 July 2023			
Jackson's Track Neerim South	10:00	0.51	0.003
Burtonwood Court Neerim South	10:30	4.4	0.005
Burtonwood Court Neerim South	12:30	1.4	0.064
Shirley Road Neerim South	14:00	3.2	0.004
18 July 2023			
Neerim South Water Entry	09:40	0.049	----
McDougal Road Neerim South	10:05	0.028	----
Cnr Railway Road & Queen Street Neerim South	10:20	0.032	----
Kookaburra Grove Neerim South	10:30	0.030	----
Barr Road Neerim South	10:45	0.034	----
Shirley Road Neerim South	11:00	0.031	----
Main Road Neerim South	11:10	0.038	----
Wagner Road Neerim South	11:15	0.038	----
Jackson's Track Neerim South	12:15	0.037	----
Burtonwood Court Neerim South	12:15	0.033	----
19 July 2023			
Neerim South Water Entry	06:40	0.051	----
24 July 2023			
Neerim South Water Entry	07:40	0.055	----

8.5.3 Mirboo North - Widespread Customer Compliant -no water/low water pressure (February 2024)

On 13 February 2024, a severe storm impacted the Gippsland Water service area, uprooting trees and causing widespread power outages. During the storm, a large tree fell, and the tree roots pulled up a 150mm water main and caused multiple breaks. Due to the size of the main, significant flows from the break site were observed and the water level in the storage basin rapidly decreased.

Access to the area was significantly hampered by the amount of storm debris and fallen powerline in the area. Maintenance crews attended site and isolated the affected area. Multiple sections of pipe were repaired before the main could be brought back into service. The level in the water storage basin dropped to a low level but did not totally empty.

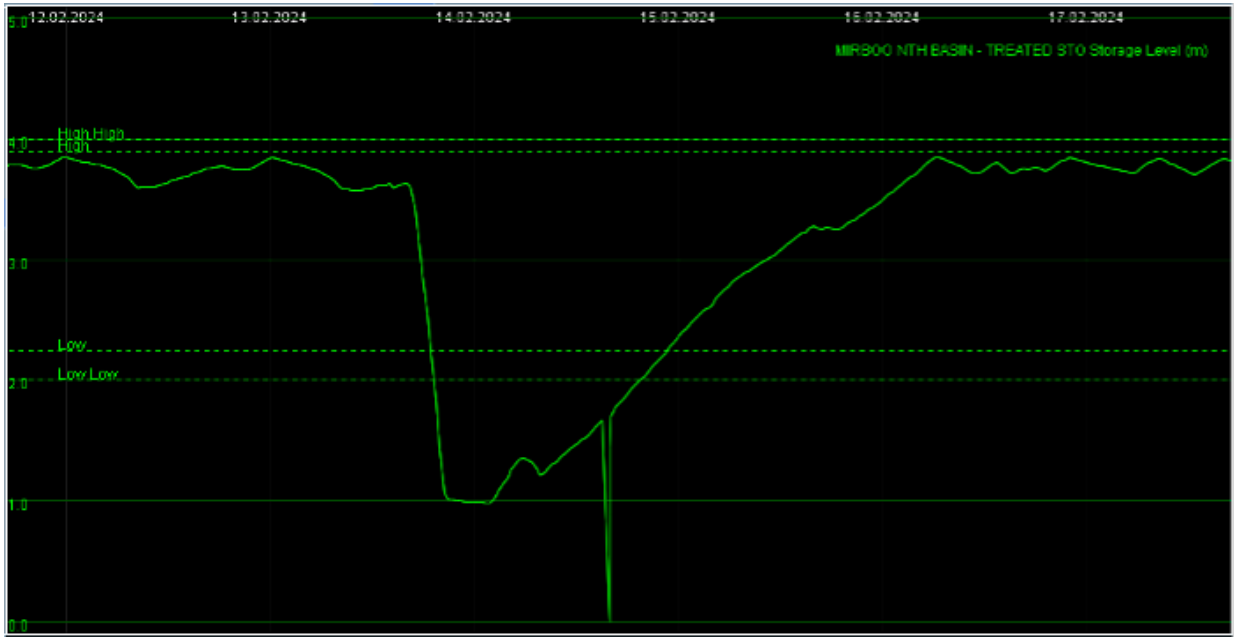


Figure 11: Mirboo North water storage basin level showing a sudden drop caused by the mains break.

Due to the widespread power outages across the Gippsland Region, no power was available to record the flow readings to town. Power to the Mirboo North water treatment plant was also impacted, requiring the installation of a generator to recommence water production.

Due to the low volume in storage, pressure across the Mirboo North system decreased until water production recommenced.

As a result of the system pressure reduction, the Department of Health was advised, and a Section 22 notification submitted.

An assessment of the risks to supply was undertaken, and it was determined that the potential for contamination of the drinking water supply was low. As a precaution, water quality samples were collected from across the distribution network to confirm that the storm and reduction in pressure did not have any impact on water quality.

Water Quality sampling was conducted over two days (14 and 15 February 2024), with all samples collected (refer Table 6) and tested showing no indication of any water quality issues.

Table 7: Mirboo North Water quality test results during investigation

Location Sample	Free Chlorine (mg/L)	Total Chlorine (mg/L)	Turbidity (NTU)	E. coli (orgs/100mL)	Total Coliforms (orgs/100mL)
14 February 2024					
Murray St, Mirboo North	0.75	1.02	1.2	0	0
Ridgeway, Mirboo North	0.88	0.97	1.4	0	0
Couper St, Mirboo North	0.89	0.96	0.8	0	0
Farmer St, Mirboo North	0.90	0.98	2.2	0	0
Grand Ridge Rd, Mirboo North	0.84	0.90	3.5	0	0
Giles St, Mirboo North	0.83	1.00	2.1	0	0
Wells St, Mirboo North	0.72	0.98	0.8	0	0
15 February 2024					
Murray St, Mirboo North	1.19	1.35	1.4	----	----
Ridgeway, Mirboo North	1.05	1.16	0.4	----	----
Couper St, Mirboo North	0.80	0.90	0.3	----	----
Farmer St, Mirboo North	0.76	0.91	0.6	----	----
Grand Ridge Rd, Mirboo North	0.72	0.89	0.7	----	----
Giles St, Mirboo North	0.91	1.04	0.3	----	----
Wells St, Mirboo North	0.85	0.92	0.6	----	----
Hipwell St, Mirboo North	1.05	1.25	0.4	----	----
Jepson St, Mirboo North	0.72	0.79	0.8	----	----

Once generator power was installed at the water treatment plant, water production resumed, the level in the basin steadily increased as shown in Figure 11, and the pressure across the system was restored.

8.5 Emergencies and water quality events continued

8.5.3 Morwell - widespread customer complaint – Low water pressure (February 2024)

The storm that impacted Mirboo North supply on 13 February 2024, caused significant widespread damage to the power transmission infrastructure and resulted in a major power outage for an extended period.

During this time, the Morwell water treatment plant was also impacted by the power outage. For the Morwell supply system, there was sufficient volume of treated drinking water in storage to provide for customers. Most of the Morwell system is provided drinking water via gravity from elevated storage basins at Ridge (Hazelwood) and Buckley's Hill (Morwell). Water from these storages does not require pumping to deliver to customers.

One section of the supply system in Morwell, however, does rely on water pumps to transfer water to the elevated water tower located in Vincent Rd. This is known as the Morwell High level system and covers an area surrounding the Buckley's Hill storage supplying approximately 2,500 customers. The elevated tower provides the additional pressure required to achieve the service standards stipulated in our customer charter that would not be achieved by supplying out of Buckley's Hill due to insufficient elevation.

Due to the loss of power, the pumps that transfer water from Morwell water treatment plant to the tower were unable to operate. Under normal operation, the elevated tower has sufficient volume to provide for customer in the Morwell high level system, being replenished regularly from the pumps at the Morwell WTP based on the demand for water.

With the pumps unable to operate, the elevated tower drained down through customer usage, resulting in a low level in the tower. This low water level reduced the pressure in the system, resulting in customer experiencing issues with their water supply.

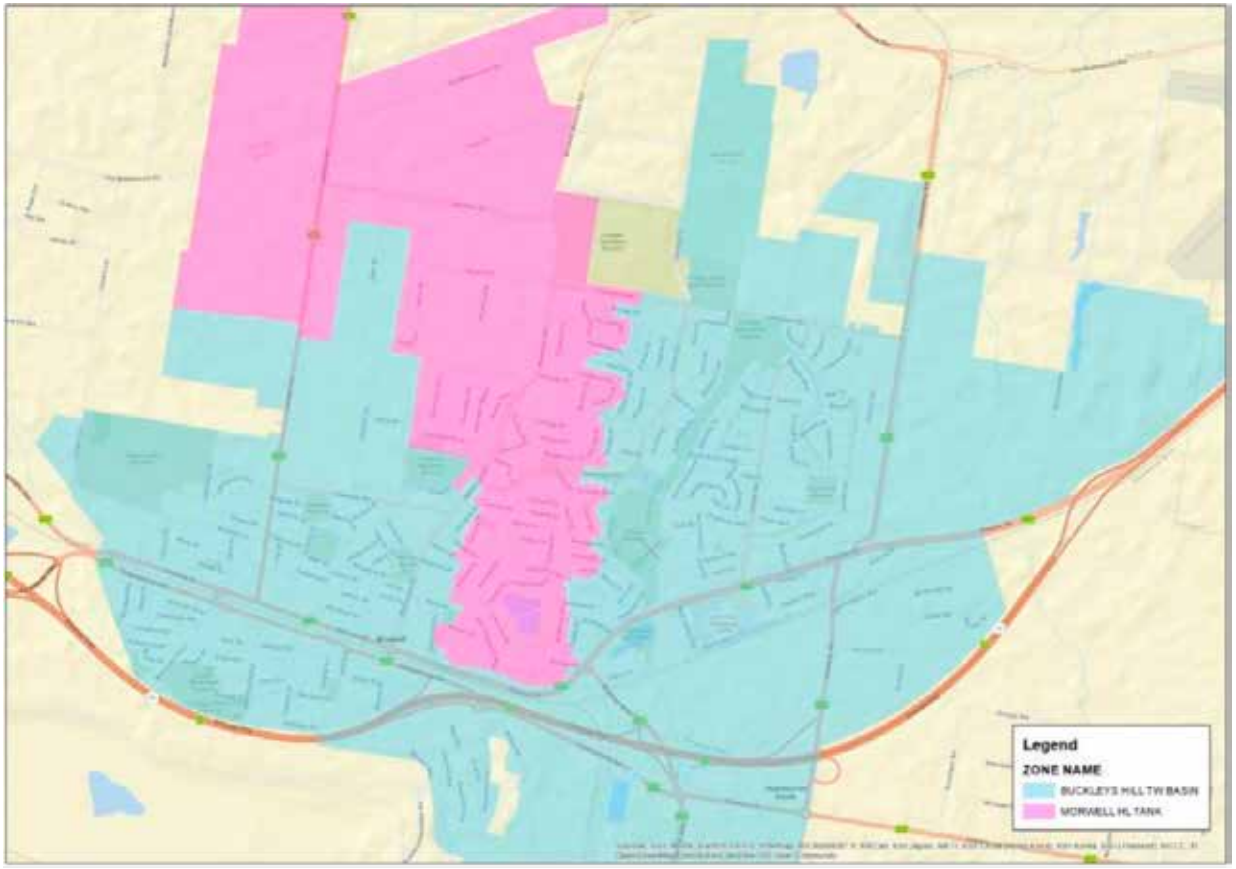


Figure 12: Morwell High Level Water Supply System

On 14 February 2024, our service centre received 39 calls regarding water supply issues, which is considered a widespread public complaint. Consequently, we notified the Department of Health and submitted a Section 22 notification.

A temporary generator was installed at the Morwell WTP to allow operation of the high lift pumps and provide water to the elevated tower. Once pumping commenced, the level in the elevated tower began to increase quickly, indicating that the reticulation had not been totally drained.

An assessment of the risks associated with the reduced pressure in the reticulation was undertaken, and it was determined that the potential for contamination of the drinking water supply was low. As a precaution, water quality samples were collected over two days from across the distribution network to confirm that there was no impact on water quality and safety. Flushing of the system was also undertaken. The results of the testing are shown in Table 8.

8.5 Emergencies and water quality events continued

Table 8: Morwell (High Level) Water quality test results during investigation

Location Sample	Free Chlorine (mg/L)	Total Chlorine (mg/L)	Turbidity (NTU)	E. coli (orgs/100mL)	Total Coliforms (orgs/100mL)
14 February 2024					
Morwell WTP Clear Water Storage	0.84	0.96	0.2	0	0
119 Comans Street Morwell (before flush)	0.06	0.10	0.2	0	0
119 Comans Street Morwell (after flush)	0.55	0.60	0.3	----	----
10 Barry Street Morwell	0.55	0.69	0.3	0	0
1 Savige Street Morwell (before flush)	0.04	0.10	0.2	0	0
1 Savige Street Morwell (after flush)	0.59	0.66	0.8	----	----
2 Crinigan Road Morwell	0.24	0.31	0.3	0	0
140 Andrew Street Morwell (before flush)	0.07	0.14	0.3	0	0
140 Andrew Street Morwell (after flush)	0.17	0.26	0.4	----	----
10 Satelburg St Morwell (before flush)	0.26	0.32	0.3	0	0
10 Satelburg St Morwell (after flush)	0.54	0.66	0.4	----	----
8 Booth street, Morwell	0.22	0.34	0.4	0	0
6 Rene Street, Morwell (before flush)	0.05	0.10	0.3	0	0
6 Rene Street, Morwell (after flush)	0.43	0.57	0.6	----	----
46 Robertson Street, Morwell (before flush)	0.12	0.22	0.4	0	0
46 Robertson Street, Morwell (after flush)	0.56	0.69	0.4	----	----

Table 8 continued: Morwell (High Level) Water quality test results during investigation

Location Sample	Free Chlorine (mg/L)	Total Chlorine (mg/L)	Turbidity (NTU)	E. coli (orgs/100mL)	Total Coliforms (orgs/100mL)
15 February 2024					
Morwell WTP Clear Water Storage	1.10	1.27	<0.1	----	----
119 Comans Street Morwell	0.60	0.69	0.3	----	----
10 Barry Street Morwell	0.77	0.90	0.2	----	----
1 Savige Street Morwell	0.41	0.50	0.3	----	----
52 Haywood street, Morwell	0.33	0.55	0.3	----	----
2 Crinigan Road Morwell	0.35	0.46	0.3	----	----
140 Andrew Street Morwell	0.25	0.37	0.4	----	----
10 Satelburg St Morwell	0.44	0.52	0.2	----	----
8 Booth street, Morwell	0.29	0.35	0.2	----	----
6 Rene Street, Morwell	0.20	0.28	0.2	----	----
46 Robertson Street, Morwell	0.34	0.39	0.3	----	----

The risk of contamination was considered low due to the following:

- A high-risk customer within the high area where the risk was controlled via a tested and compliant backflow prevention device.
- Residential customers have double check valve water meters.
- Hydrants within the system are spring loaded to prevent drop.
- The effected area is elevated, with no water mains running through low lying areas, therefore low risk of ingress from groundwater.

The water quality monitoring results throughout the system indicated that chlorine residuals within the system appeared slightly lower than typical averages, however, the turbidity levels remained low.

The chlorine residual at the water treatment plant was increased allowing for adequate free chlorine residual in the water leaving the Morwell clear water storage and being transferred to the tower. The bacterial results confirmed that no contamination of the system occurred.

Annual report on drinking water quality 2023-2024

8.5.5 Blue Rock Lake – Risk of contamination – Vehicle into raw water storage (February 2024)

On 20 February 2024, the Water Storage Manager, Southern Rural Water (SRW) notified Gippsland Water that they had received notification from Victoria Police (Moe) of a vehicle incident at Blue Rock Reservoir located in the township of Willow Grove. The incident involved a small petrol sedan, believed to be a Holden Cruze Wagon, that had rolled down the boat ramp and into the reservoir. The boat ramp is located near the reservoir wall, Spillway Road, Willow Grove. Our operators attended site, but the vehicle had been completely submerged and was not visible from the boat ramp. However, they conducted a thorough inspection of the area where the vehicle entered the reservoir and found no visible signs of oil or fuel on the water surface.

Blue Rock Reservoir provides raw water to the following water treatment plants to be treated for drinking water purposes:

- Willow Grove water treatment plant – Water is drawn directly from the Blue Rock Reservoir via the discharge pipework and is pumped to the nearby Willow Grove Water Treatment plant.
- Moe water treatment plant – Water is drawn from the Tanjil River, near the bridge on the Moe-Rawson Road and pumped to Moe Water Treatment Plant. The pump station is located approximately 13km downstream of the Blue Rock reservoir wall. Other tributaries also feed into the Tanjil River downstream of the dam wall before the pump station. We hold a bulk entitlement, issued by SRW, to extract water from the Tanjil River.

Analyte	Unit of Measure	Blue Rock Reservoir - Surface sample above vehicle	Blue Rock Reservoir - Shoreline windward	Willow Grove WTP Raw Water Pump Station	Tanjil River Pump Station (13km Downstream)
Total Organic Carbon	mg/L	4.1	4.4	4.4	4.7
Dissolved Organic Carbon	mg/L	4.1	4.3	4.4	4.7
Oil & Grease	mg/L	<5	<5	<5	<5
TPH C6 – C9	mg/L	<0.1	<0.1	<0.1	<0.1
TRH C6 – C10	mg/L	<0.1	<0.1	<0.1	<0.1
TRH C6 – C10 minus BTEX	mg/L	<0.1	<0.1	<0.1	<0.1
TRH >C10 – C16 minus Naphthalene	mg/L	<0.1	<0.1	<0.1	<0.1
TPH C10 – C14	mg/L	<0.1	<0.1	<0.1	<0.1
TPH C15 – C28	mg/L	<0.1	<0.1	<0.1	<0.1
TPH C29 – C36	mg/L	<0.1	<0.1	<0.1	<0.1
Sum of TPH C10 – C36	mg/L	<0.1	<0.1	<0.1	<0.1
TRH >C10 – C16	mg/L	<0.1	<0.1	<0.1	<0.1
TPH >C16 – C34	mg/L	<0.1	<0.1	<0.1	<0.1
TPH >C34 – C40	mg/L	<0.1	<0.1	<0.1	<0.1
Sum of TRH >C10 – C40	mg/L	<0.1	<0.1	<0.1	<0.1

Table 9: Water quality results during investigation

TPH = Total Petroleum Hydrocarbon TRH = Total Residual Hydrocarbon

- We also draw approximately 5,000 ML/year on average via a bulk entitlement, which allows to take up to 15,000 ML piped to Moondarra Reservoir to supply Morwell, Traralgon, and Tyers WTPs. No transfer of water had occurred during the incident.

As a precaution, the Willow Grove water treatment plant was shut down until further information could be obtained. The Moe water treatment plant continued to operate and extract water from the Tanjil River as the offtake is located 13 km downstream and the water is released from an offtake at depth, where the risks from any contamination would be extremely low.

Water samples were collected from the reservoir for testing for hydrocarbons and oils. Analysis did not detect the presence of hydrocarbon compounds. In addition to the external testing, daily inspections and in-house testing of the water were undertaken to monitor for any signs of contamination – no indications of contamination were detected throughout the incident. Table 9 (previous page) shows the results of the water samples collected for hydrocarbon and oil & grease testing. All results were below the detection levels for the test, and well below any water quality guideline value.

On 28 February 2024, the vehicle was located and recovered from the reservoir without incident.

8.5.6 Blue Rock Lake - Suspected contamination – Vehicle into raw water storage

On 20 April 2024, we were again notified by the Water Storage Manager, Southern Rural Water (SRW), that a vehicle had entered Blue Rock Reservoir and sunk. The incident involved a Ford Territory towing a boat trailer that had lost control on the boat ramp and entered the water. The driver was able to exit the vehicle before the vehicle was fully submerged and sank to the bottom of the reservoir. The boat ramp is located near the reservoir wall, Spillway Road, Willow Grove.

Our operators attended site, but the vehicle had been completely submerged and was not visible from the boat ramp. However, they conducted a thorough inspection of the area where the vehicle entered the reservoir and found no visible signs of oil or fuel on the water surface.

The information obtained by SRW and provided to Gippsland Water included:

- A Ford Territory SUV has accidently driven down the boat ramp and into the reservoir.
- The driver was uninjured.
- The vehicle floated for a short period of time, eventually sinking to the bottom of the reservoir.
- It is estimated that the vehicle had 75 litres of fuel on board, along with 7L of engine oil.

Water samples were collected from the reservoir for testing for hydrocarbons and oils. Analysis did not detect the presence of hydrocarbon compounds. In addition to the external testing, daily inspections and in-house testing of the water were undertaken to monitor water quality for any signs of contamination – no indications of contamination were detected throughout the incident.

Table 10 overleaf shows the results of the water samples collected for hydrocarbon and oil and grease testing. All results were below the detection levels for the test, and well below any water quality guideline value.

An assessment of the contamination risk was undertaken by SRW and Gippsland Water on Saturday 20 April 2024, and continued until the vehicle was recovered. This include visual inspections being undertaken at the following locations along the Blue Rock system:

- Blue Rock Reservoir – incident site - no visible surface plume or indication of oil/fuel.
- Blue Rock Reservoir – shoreline - no visible surface plume or indication of oil/fuel.
- Tanjil River pump station - no visible surface plume or indication of oil/fuel.
- Inlet to Willow Grove WTP - no visible oil/fuel, no smell or taste
- Based on the risk assessment performed jointly with SRW, the following observations/conclusions were made:
- There were no visible indications of oil or fuel at the boat ramp.
- The vehicle was fully submerged, with fuel and oil contained within the vehicle (no indications on the water surface).
- There was no risk to the Moe Water Supply (Tanjil River Pump Station) downstream as the effects of distance and dilution would render any concentration of contaminants well below Australian Drinking Water Guidelines.

8.5 Emergencies and water quality events continued

- Willow Grove WTP was shut down as a precaution until visible inspections were undertaken.
- No evidence of fuel or oil being present within the Willow Grove Water Treatment Plant, based on visible inspection, taste of the water produced, or odour above the DAF process.

Based on the above, no contamination has occurred to the Willow Grove supply.

Precautionary water samples were collected and processed – all show no signs of contamination.

The Willow Grove WTP recommence production once the full inspection has been completed.

Analyte	Unit of Measure	Willow Grove WTP Raw Water Pump Station	Blue Rock Reservoir – Boat Ramp	Willow Grove WTP – Final Water	Willow Grove WTP – filtered water
Total Organic Carbon	mg/L	4.0	4.4	1.5	1.5
Oil & Grease	mg/L	<5	<5	<5	<5
Benzene	mg/L	<0.001	<0.001	<0.001	<0.001
Toluene	mg/L	<0.001	<0.001	<0.001	<0.001
Ethyl Benzene	mg/L	<0.001	<0.001	<0.001	<0.001
Xylene (m & p)	mg/L	<0.002	<0.002	<0.002	<0.002
Xylene (o)	mg/L	<0.001	<0.001	<0.001	<0.001
Naphthalene	mg/L	<0.001	<0.001	<0.001	<0.001
Total Xylenes	mg/L	<0.002	<0.002	<0.002	<0.002
BTEX (sum)	mg/L	<0.002	<0.002	<0.002	<0.002
TPH C6 – C9	mg/L	<0.1	<0.1	<0.1	<0.1
TRH C6 – C10	mg/L	<0.1	<0.1	<0.1	<0.1
TRH C6 – C10 minus BTEX	mg/L	<0.1	<0.1	<0.1	<0.1
TRH >C10 – C16 minus Naphthalene	mg/L	<0.1	<0.1	<0.1	<0.1
TPH C10 – C14	mg/L	<0.1	<0.1	<0.1	<0.1
TPH C15 – C28	mg/L	<0.1	<0.1	<0.1	<0.1
TPH C29 – C36	mg/L	<0.1	<0.1	<0.1	<0.1
Sum of TPH C10 – C36	mg/L	<0.1	<0.1	<0.1	<0.1
TRH >C10 – C16	mg/L	<0.1	<0.1	<0.1	<0.1
TPH >C16 – C34	mg/L	<0.1	<0.1	<0.1	<0.1
TPH >C34 – C40	mg/L	<0.1	<0.1	<0.1	<0.1
Sum of TRH >C10 – C40	mg/L	<0.1	<0.1	<0.1	<0.1
PAH - Naphthalene	mg/L	<0.001	<0.001	<0.001	<0.001

Table 10: Water quality results during investigation

TPH = Total Petroleum Hydrocarbon TRH = Total Residual Hydrocarbon PAH = Poly Aromatic Hydrocarbon

8.5 Emergencies and water quality events continued

Analyte	Unit of Measure	Willow Grove WTP Raw Water Pump Station	Blue Rock Reservoir – Boat Ramp	Willow Grove WTP – Final Water	Willow Grove WTP – filtered water
PAH – Acenaphthylene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Acenaphthene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Fluorene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Phenanthrene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Anthracene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Fluoranthene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Pyrene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Benzo(a)anthracene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Chrysene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Benzo(b)fluoranthene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Benzo(k)fluoranthene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Benzo(a)pyrene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Dibenz(a,h)anthracene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Benzo(g,h,i)perylene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Indeno(1,2,3-cd)pyrene	mg/L	<0.001	<0.001	<0.001	<0.001
PAH – Total PAH	mg/L	<0.001	<0.001	<0.001	<0.001
TPH C29 – C36	mg/L	<0.1	<0.1	<0.1	<0.1
Sum of TPH C10 – C36	mg/L	<0.1	<0.1	<0.1	<0.1
TRH >C10 – C16	mg/L	<0.1	<0.1	<0.1	<0.1
TPH >C16 – C34	mg/L	<0.1	<0.1	<0.1	<0.1
TPH >C34 – C40	mg/L	<0.1	<0.1	<0.1	<0.1
Sum of TRH >C10 – C40	mg/L	<0.1	<0.1	<0.1	<0.1
PAH - Naphthalene	mg/L	<0.001	<0.001	<0.001	<0.001

Table 10 Cont.: Water quality results during investigation

TPH = Total Petroleum Hydrocarbon TRH = Total Residual Hydrocarbon PAH = Poly Aromatic Hydrocarbon

On Sunday 20 April 2024, the vehicle was located and recovered from the reservoir without incident.

8.6 Non-reportable water quality events

In 2023-24, there was one water quality event that was not reportable to the Department of Health. A summary of this event is provided in Table 10 (below), with details provided in Section 8.6.1.

Water Sampling Localities Affected	**Maffra, Stratford, Boisdale**
Date and duration of incident	**December 2023**
Location of incident	**Maffra – Macalister River**
Nature of the incident	**Elevated electrical conductivity levels in Macalister River**
Drinking water supplies affected	**Maffra, Stratford, Boisdale**
Event Summary	**Electrical conductivity (salt) levels in the Macalister River increased suddenly impacting the rate at which the Maffra water treatment plant could produce drinking water.**

Table 11: Water quality results during investigation

8.6.1 Maffra (Macalister River) water quality event

Maffra Water Treatment Plant receives raw water from the Macalister River, where water quality can be significantly impacted by agricultural, horticultural, and forestry activity in the catchment.

Changes in water quality can occur quickly following rainfall events, where the levels of suspended solids, salts and other contaminants from runoff increases the risk of microbial, pesticide and herbicide contamination.

During November and December 2023, a number of rainfall events resulted in raw water quality issues that resulted in challenges for drinking water production at the Maffra WTP.

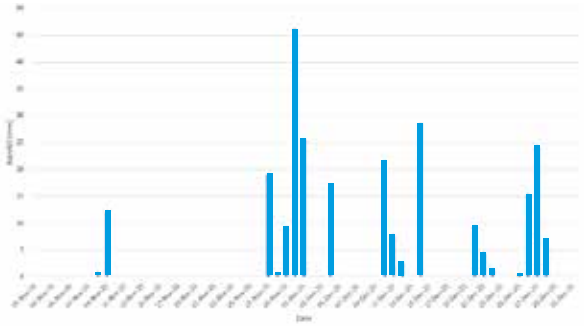


Figure 13: Maffra Daily Rainfall Totals (November – December 2023).

Heavy rainfall at the end of November / start of December resulted in elevated turbidity, electrical conductivity (EC), and colour levels, which entailed reducing the plant flow rate / productivity to allow more time for the treatment process to remove contaminants and produce compliant drinking water.

In mid-December 2023, and along with the increased turbidity levels directly associated with a rainfall event, the electrical conductivity (dissolved salt content), of the raw water significantly increased. The change in EC did not correspond directly with a rainfall event (refer Figure 14). The change in EC content had a dramatic impact on the water treatment process and productivity, as the plant was unable to maintain production of drinking water during the first two days as a result of the change in raw water quality. Ongoing process testing was undertaken to identify the optimal process parameters and bring the treatment process back online.

Due to the water treatment plants inability to produce water for two days, water levels in the McAdam Street storage tanks dropped to a low level (see Figure 15).

As the change in the EC didn't correspond with the rainfall event, an investigation into the cause of the elevated EC is undertaken. The investigation involved inspection of the catchment upstream the Maffra Water Treatment Plant offtake. During this inspection it was discovered that a local farmer was pumping water from an inundated paddock and dam directly into the Macalister River. This discharge into the river resulted in increasing the salt and turbidity content, which accounted for the electrical conductivity increase observed on 14 December 2023. Once the discharge from the farm was ceased, the raw water EC gradually returned to normal levels.

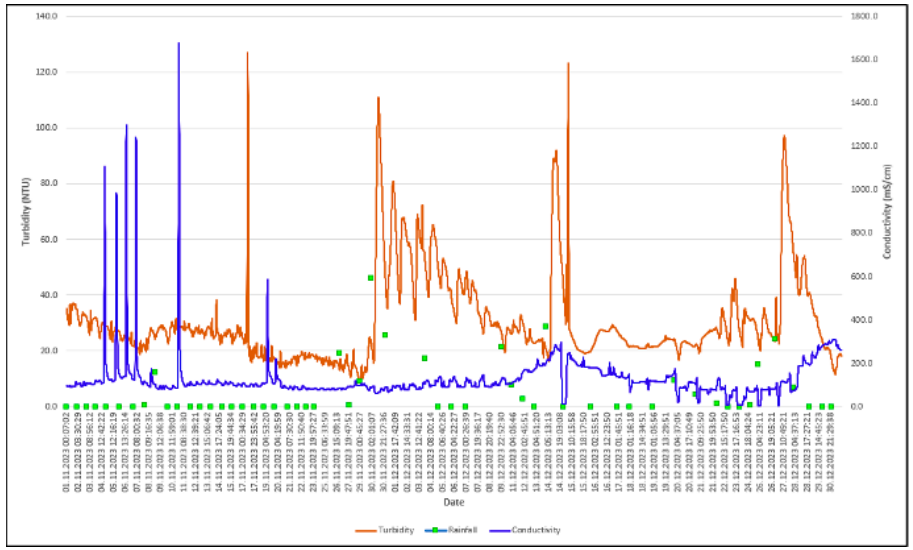


Figure 14: Maffra WTP raw water pump station turbidity and conductivity readings (November – December 2023)

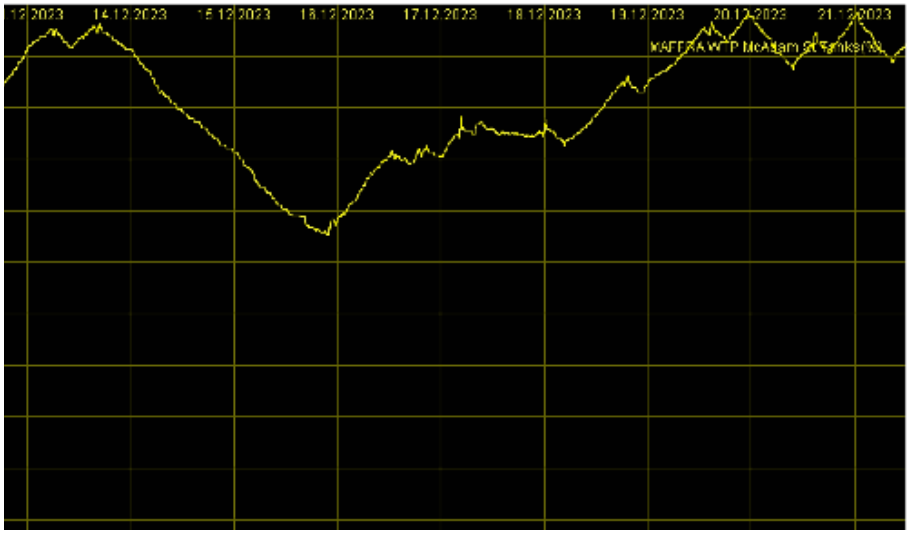


Figure 15: Maffra McAdam Street storage tank levels decreased due to the inability to treat the water.

On 28 December 2023, the electrical conductivity of the Macalister River was again seen to suddenly increase to an even higher level. This again impacted the operation of the Maffra WTP and resulted in reduced production levels and operational issues. Unfortunately, at the time, an investigation was unable to determine the source of the increased electrical conductivity.

The elevated conductivity levels persisted for over a week, then suddenly decreased to normal range on 8 January 2024. The sudden changes in conductivity would suggest an artificial source of conductivity being introduced into the river (i.e., pumped, or consistent discharge).

At all times the quality of the drinking water supplied to our customers remained compliant with the SDWA, SDWR, and Australian Drinking Water Guidelines.

9. Analysis of results

9.1 Comparison to previous years

For the 2023-24 reporting period, all samples analysed complied with the relevant health-based water quality standards. The water quality standards required under the SDWR have been represented as trend data over three financial years. This information allows for a comparison of data for the major towns.

An analysis by the percentage of water sampling localities where the drinking water complied with each of the health-based parameters, over three reporting periods, is shown below. The table also shows an analysis of the percentage of customers supplied with drinking water that complied with the standards.

Table 12: Compliance by water sampling locality and population

	Percentage by water sampling Locality			Percentage by Population		
Parameter	**2023-24**	**2022-23**	**2021-22**	**2023-24**	**2022-23**	**2021-22**
Aluminum	100%	100%	100%	100%	100%	100%
Chloroacetic Acid	100%	100%	100%	100%	100%	100%
Dichloroacetic Acid	100%	100%	100%	100%	100%	100%
E. coli	100%	100%	100%	100%	100%	100%
Trichloroacetic Acid	100%	100%	100%	100%	100%	100%
Trihalomethanes	100%	100%	100%	100%	100%	100%
Turbidity	100%	100%	100%	100%	100%	100%
Chlorine (Total)	100%	100%	97.1%	100%	100%	99.5%
Nitrite	100%	100%	100%	100%	100%	100%
Nitrate	100%	100%	100%	100%	100%	100%
Fluoride	100%	100%	100%	100%	100%	100%
Mercury	100%	100%	100%	100%	100%	100%
Chromium	100%	100%	100%	100%	100%	100%
Cadmium	100%	100%	100%	100%	100%	100%
Nickel	100%	100%	100%	100%	100%	100%
Arsenic	100%	100%	100%	100%	100%	100%
Selenium	100%	100%	100%	100%	100%	100%
Beryllium	100%	100%	100%	100%	100%	100%
Copper	100%	100%	100%	100%	100%	100%
Barium	100%	100%	100%	100%	100%	100%
Lead	100%	100%	100%	100%	100%	100%
Manganese	100%	100%	97.1%	100%	100%	98.9%
Cyanide	100%	100%	100%	100%	100%	100%
Selenium	100%	100%	100%	100%	100%	100%
Molybdenum	100%	100%	100%	100%	100%	100%
Acrylamide	100%	100%	100%	100%	100%	100%
Boron	100%	100%	100%	100%	100%	100%
Chloryl Hydrate	100%	100%	100%	100%	100%	100%
2, 4-Dichlorophenoxy acetic acid	100%	100%	100%	100%	100%	100%
Nitrosodimethylamine	100%	100%	100%	100%	100%	100%
2,4,6-Trichlorophenol	100%	100%	100%	100%	100%	100%
2,4-Dichlorophenol	100%	100%	100%	100%	100%	100%
2- Chlorophenol	100%	100%	100%	100%	100%	100%
Pentachlorophenol	100%	100%	100%	100%	100%	100%

10. Complaints

10.1 Water quality complaints

We are committed to providing safe drinking water to our customers at all times. We record all types of water quality complaints, which are classified as follows:

- Discoloured/dirty water.
- Taste/odour.
- Blue water.
- Air in water.
- Alleged illness.

The number of complaints per 100 customers is compared against previous years and the industry benchmark. A summary of customer complaints we received relating to the quality of drinking water supplied is reported below.

Each water quality complaint is logged by our Customer Service or after-hours staff, and a Gippsland Water representative responds to the complaint and initiates any corrective actions as required.

Type of Complaint	2023-24	2022-23	2021-22	Comparison with previous reporting period	Comments
	No. of Complaints	No. of Complaints	No. of Complaints		
Discoloured water	190	80	58	An increase of 110 complaints from previous reporting period.	Largely attributable to discoloured water issues experienced in Neerim South (refer s. 22 report in Section 8.5.1).
Taste / Odour	46	118	32	A decrease of 72 complaints compared to previous period. Fourteen complaints higher than the 2021-22 period.	The decreased number of complaints is due to an MIB and geosmin event that occurred in the Warragul system in 2022-23. The increase over the 2021-22 period was due to a minor algae bloom at Warragul which was diverted before significant customer impact occurred.
Blue water	0	4	0	No significant change	Nil
Air in water	34	11	13	An increase of 23 complaints compared to previous years.	The increased complaints is attributable to works associated with construction of a new basin at Moe WTP which allowed air to enter the water main.
Alleged illness	10	10	9	No significant change	Nil
Total	**280**	**223**	**112**		

Table 13: Water quality complaints per 100 customers supplied

10.1 Water quality complaints continued

The total number of complaints we received during the 2023-24 reporting period increased when compared to 2021-22 and 2022-23. The higher complaint numbers are attributed to the following specific events:

- Neerim South – dirty water due to an accumulation of sediment which contributed 64 complaints.
- Erica – dirty water caused by the inappropriate extraction of water from the system which contributed 22 complaints.
- Mirboo North - dirty water caused by the inappropriate extraction of water from the system which contributed 7 complaints.
- Moe/Newborough – air in water complaints caused by works associated with the new basin construction, which contributed 17 complaints.
- Warragul/Drouin – taste and odour complaints caused by an algae bloom in the sludge processing system at Warragul WTP which contributed 18 complaints.

Without the contribution of the complaint numbers caused by the above listed events, the number of complaints becomes comparable with the 2022-23 complaint numbers. A snapshot of water quality complaints over the last 20 years is shown in the following diagram.

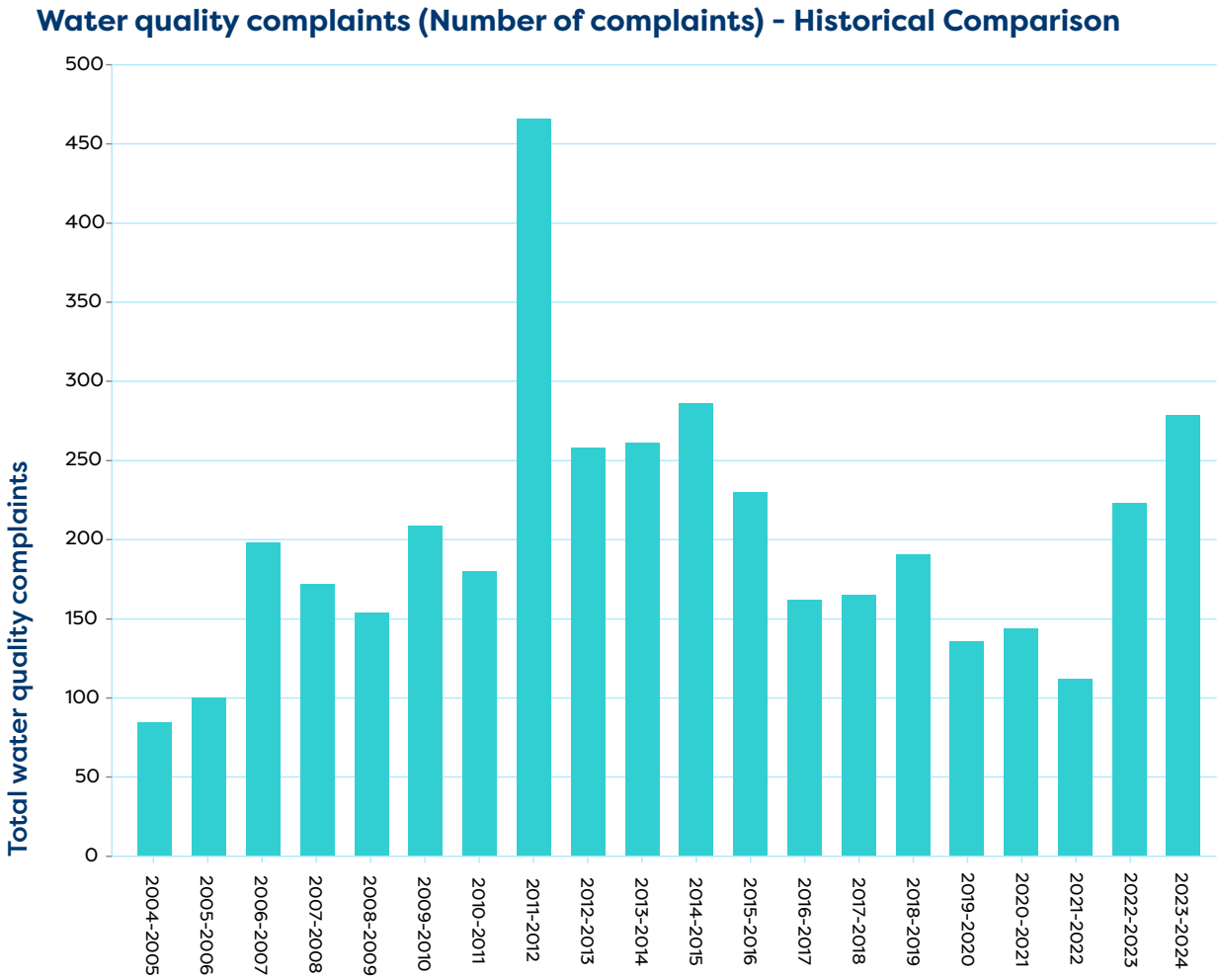
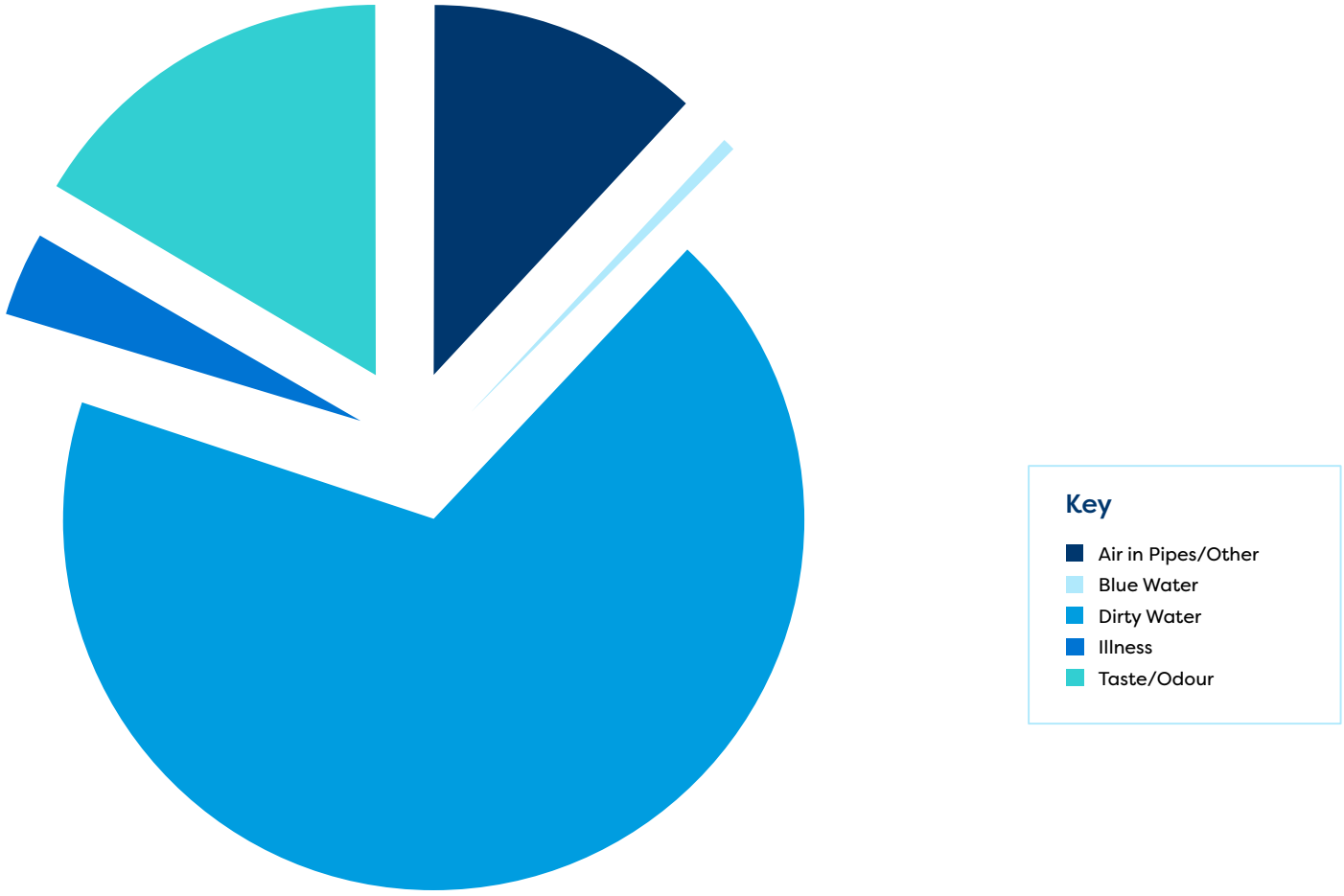


Figure 16: Customer Total customer complaints for 2004-2005 to 2023-2024.

Customer Complaints by Type - Cumulative
01 July 2023 - 30 June 2024



The majority of customer complaints for the 2023-24 period (as in Figure 17) related to dirty or discoloured water followed by taste and odour complaints.

10.1 Water quality complaints continued

As can be seen from the above complaint numbers per locality, the events which occurred in Neerim South, Erica, Mirboo North, Moe, Newborough, Warragul and Drouin account for the increase in complaint numbers.

Table 14: Types of complaints by water sampling locality 2023-24

Water Sampling Locality	Type of Complaint					Total Complaints
	Discoloured water	Taste / Odour	Blue water	Air in water	Alleged illness	
Boisdale	0	0	0	0	0	0
Boolarra	0	2	0	0	0	2
Briagolong	0	0	0	0	0	0
Churchill	2	0	0	3	0	5
Coongulla/Glenmaggie	0	1	0	0	0	1
Cowwarr	0	0	0	0	0	0
Drouin	7	11	0	2	2	22
Erica	23	0	0	0	2	25
Heyfield	10	0	0	0	0	10
Jumbuk	2	0	0	0	0	2
Maffra	1	0	0	0	1	2
Mirboo North	8	2	0	0	0	10
Moe	4	4	0	16	0	24
Morwell	5	4	0	0	2	11
Neerim South	65	0	0	0	0	65
Newborough	1	1	0	3	0	5
Noojee	2	0	0	0	0	2
Rawson	14	0	0	0	0	14
Rokeby / Buln Buln	1	0	0	0	0	1
Rosedale	1	0	0	1	0	2
Sale / Wurruk	7	2	0	1	0	10
Seaspray	0	0	0	1	0	1
Stratford	1	0	0	1	0	2
Thorpdale	0	0	0	0	0	0
Toongabbie	1	0	0	0	0	1
Trafalgar	4	0	0	0	0	4
Traralgon	16	3	0	2	0	21
Traralgon Sth / Hazelwood Nth	0	0	0	0	1	1
Tyers / Glengarry	0	0	0	0	0	0
Warragul	11	12	0	4	2	29
Warragul South	0	0	0	0	0	0
Willow Grove	0	0	0	0	0	0
Yallourn North	0	1	0	0	0	1
Yarragon	2	1	0	0	0	3
Yinnar	2	2	0	0	0	4

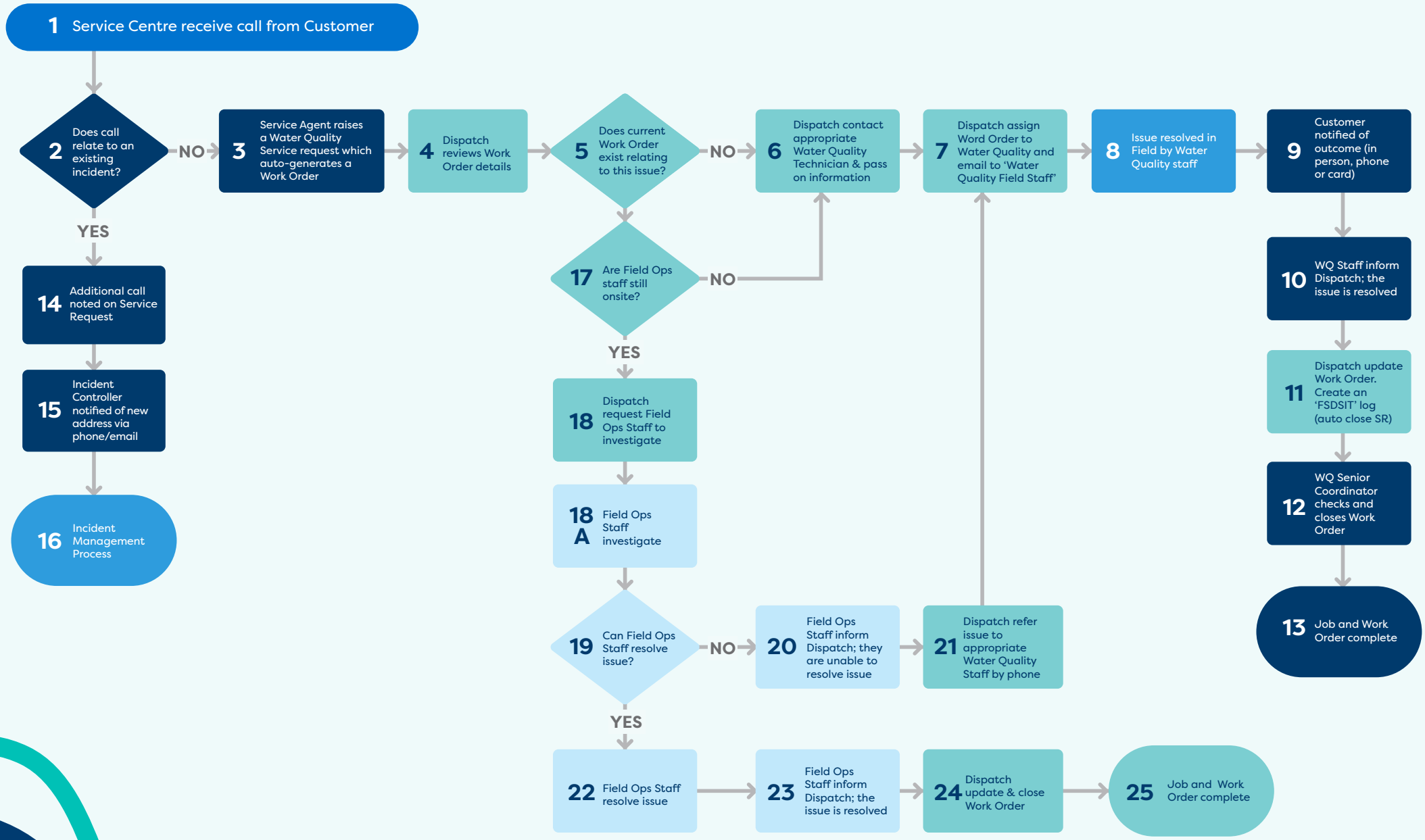
10.2 A summary of the customer complaint process

Customer complaints are managed according to the following summary procedure:

- Customer complaints received by our Customer Contact Centre are recorded in a corporate database. Details include information of who, where, time, and nature of complaints.
- The Customer Contact Centre via the dispatch team issues a work order to the water quality team.
- The Water Quality Team investigates by contacting the customer and visiting the site if necessary to determine details of the water quality problem.
- For complaints associated with taste and odour, dirty water, and air in pipes, field measurements are performed, the reticulation system is typically flushed then field measurements are taken again to verify the problem has been corrected.
- Follow up contact may be made with the customer to determine if they are satisfied with the quality of service, alternatively, our standard contact card is left with the customer. This also encourages customers to keep us informed of any reoccurrence of water quality problems.
- Details of actions undertaken are entered into a database to provide a record/history of the site, to document issues for maintenance programs, and to inform capital upgrade requirements where a history of system failures occur.

This procedure is presented in more detail in the figure on the following page.

Figure 18: Water quality complaints resolution procedure



11. Risk management plan audit

Our Water Quality Risk Management Plan has been operational since 2005 and adopts the 12 elements outlined in the ADWG and preventative risk management strategies outlined in the SDWA.

During the reporting period, there were no external audits performed on the Gippsland Water Risk Management Plan.

The previous Safe Drinking Water Act 2003 regulatory audit was undertaken in March 2023 by Department of Health approved (Exemplar Global) auditor for compliance with section 7(1) of the SDWA 2003. The audit period being from 1 January 2021 to 31 December 2022. The audit was undertaken by Viridis Consultants.

Gippsland Water's regulatory compliance was assessed against the Safe Drinking Water Act (SDWA) 2003 and Safe Drinking Water Regulations (SDWR) 2015. The audit found that Gippsland Water has not fully compliant with the obligations imposed by section 7(1) of the Safe Drinking Water Act 2003 during the audit period. Two minor non-compliances were noted in relation to:

- Failure to collect and analyse small number of samples listed in water sampling program, and the absence of an effective process to identify missed samples.
- Chemical parameters that were sampled from the same location within a sampling location on two or more consecutive occasions.

The non-compliances were considered minor as there is a low potential for a risk situation, and the potential impact of the non-compliance is not likely to be a serious or imminent risk to public health, or compromise public health.

11.1 Audit outcomes

The SDWA audit identified the following key findings:

- Gippsland Water's Drinking Water Quality Management Plans (DWQMP) satisfy the requirements of the SDWA and Regulations, including identification of risks, risk assessments, and development of preventative measures and controls.
- During the audit, Gippsland Water demonstrated that implementation of the DWQMP is standard business practice, which is an indicator of a mature risk-based management system.
- Operational teams had a high level of awareness and demonstrated a strong sense of personal responsibility for providing safe drinking water and that processes and procedures are consistently implemented across regions.
- Gippsland Water has a culture of continuous improvement and has reviewed, revised and updated the plan as required.
- The sampling program is detailed and meets the requirements of the legislation however, there were two minor non-compliances
- Gippsland Water has robust document control and records keeping processes that were observed in the audit.
- Operational monitoring results and trending confirm the treatment processes are well operated.
- Water quality compliance monitoring results demonstrate consistent compliance with the water quality standards.

11.1 Audit outcomes

The two minor non-compliances identified during the audit have both been resolved and closed out. The OFI's have also been accepted and addressed.

2023 Audit Outcomes	GW Action Identified and Status
Minor Non-compliance (MNC) **OFI-2023-002: Ensure the sampling program is fully implemented and missed samples are rapidly identified to comply with regulation r.8(1)(d)(iv).**	A data reconciliation program has been developed in GW's Water Information Management System (WIMS) and has been commissioned and demonstrated to the auditor that will automatically identify these issues and raise alerts. The Manager Water Treatment and Quality met with the contract manager for GW's analytical service provider and explained the cause of the noncompliance. The contractor has engaged a consultant to review their current scheduling software and eliminate relevant risks. In addition, a secondary check has been implemented to review the programs before they are undertaken (month ahead view) to identify compliance with the monitoring program and ensure no consecutive samples are collected.
Minor Non-compliance (MNC) **OFI-2023-003: Develop and implement a process for reviewing monitoring schedules to ensure samples are not taken from the same collection point within a water sampling locality on two consecutive occasions to comply with regulation r.8(1)(d)(v).**	A data reconciliation program has been developed in WIMS and was commissioned and demonstrated to the auditor that will automatically identify these issues and raise alerts. The Manager Water Treatment and Quality met with the contract manager for GW's analytical service provider and explained the cause of the noncompliance. The contractor have engaged a consultant to review their current scheduling software and eliminate relevant risks. In addition, a secondary check will be taken internally to review the programs before they are undertaken (month ahead view) to identify compliance with the monitoring program and ensure no consecutive samples are collected
Opportunity for Improvement (OFI) **OFI-2023-001: Consider reviewing the condition of all vermin proofing to ensure it remains effective.**	Review our existing storage and tank inspection and maintenance program to ensure we clearly inspect and document vermin proofing assessment and document actions in our asset management system where identified. A separate vermin proofing audit has been completed on all storages and any identified issues address.
Opportunity for Improvement (OFI) **OFI-2023-004: Consider adding a water quality and environmental policy component to the general induction process.**	An environmental & public health induction has already been developed and is yet to be rolled out. The induction session provides information that staff members need to be aware of and apply to effectively manage key environmental protection considerations. Currently in the final phase of rollout with Organisational Development. A hard copy of the induction was provided to the auditor as evidence.
Opportunity for Improvement (OFI) **OFI-2023-005: To ensure consistent sanitary survey results, document the survey methodology and ensure it is consistent with the identified HBT framework (e.g. HBT Manual or ADWG).**	A program had already been developed to review our Health Based Target by a third-party independent contractor. The consultant was engaged in late 2022 and to complete the review across 2023 for our 14 water treatment plants. A plan was developed and has been completed for the review of our catchment and existing sanitary surveys by the Catchment Officer from the Environmental team.

Table 15: 2023 Risk Management Plan Audit Outcomes

12. Water Quality Results for 2023-24

12.1 Escherichia Coli (*E. coli*)

12.1.1 E. coli Results

Compliance under the SDWR (2015) requires all samples of drinking water collected within a water sampling locality to contain no *E. coli* organism/100mL of drinking water, except for any false positive sample. All our localities achieved compliance with this standard for the 2023-24 reporting period.

Tables 16 and 17 below details all *E. coli* notifications for the reporting period 1 July 2023 to 30 June 2024 under the SDWR.

Water Sampling Locality	No *E. coli* detections recorded
No. of investigations conducted (s.22)	
No. of confirmed false positives	
No. of investigations where standard not met (s.18)	

Table 16: *E. coli* detections for water sampling localities 2023-24

Water Sampling Locality	Frequency of Sampling	Number of samples*	Maximum Detected (orgs/100mL)	No. of detections and investigations conducted (s.22)	No. of samples where standard was not met (s.18)
Boisdale	2 sites weekly	104	0	0	0
Boolarra	2 sites weekly	104	0	0	0
Briagolong	2 sites weekly	104	0	0	0
Churchill	3 sites weekly[1]	168	0	0	0
Coongulla-Glenmaggie	2 sites weekly	104	0	0	0
Cowwarr	1 site weekly	52	0	0	0
Drouin	1 site weekly[2]	152	0	0	0
Erica	1 site weekly	52	0	0	0
Heyfield	2 sites weekly	104	0	0	0
Jumbuk	1 site weekly	52	0	0	0
Maffra	2 sites weekly[3]	168	0	0	0
Mirboo North	3 sites weekly	156	0	0	0
Moe	3 sites weekly[4]	168	0	0	0
Morwell	4 sites weekly[5]	168	0	0	0
Neerim South	2 sites weekly	104	0	0	0
Newborough	2 sites weekly[1]	116	0	0	0
Noojee	3 sites weekly	156	0	0	0
Rawson	2 sites weekly	104	0	0	0
Rokeby-Buln Buln	1 site weekly	52	0	0	0
Rosedale	2 sites weekly[4]	135	0	0	0
Sale-Wurruk	3 sites weekly[5]	192	0	0	0
Seaspray	2 sites weekly	104	0	0	0

Table 17: *E. coli* results for all water sampling localities for 2023-24

1 = plus one additional site per month 2 = plus two additional site per month, plus two major customer sites per month 3 = plus one additional site per month, plus one additional site added as of 27Nov23. 4 = plus one additional site added as of 27Nov23 5 = plus four additional samples per month
*= The number of samples collected is based on the population of the water sampling locality and is calculated based on the guidance provided in ADWG (2011) - Table 9.4 Recommended minimum frequency of *E. coli* monitoring.

Water Sampling Locality	Frequency of Sampling	Number of samples*	Maximum Detected (orgs/100mL)	No. of detections and investigations conducted (s.22)	No. of samples where standard was not met (s.18)
Stratford	1 site weekly	52	0	0	0
Thorpdale	2 sites weekly	104	0	0	0
Toongabbie	2 sites weekly	104	0	0	0
Trafalgar	2 sites weekly	104	0	0	0
Traralgon	4 sites weekly[1]	213	0	0	0
Traralgon Sth/ Hazelwood Nth	1 site weekly	52	0	0	0
Tyers-Glengarry	2 sites weekly	104	0	0	0
Warragul	3 sites weekly[5]	192	0	0	0
Warragul South	2 sites weekly	104	0	0	0
Willow Grove	2 sites weekly	104	0	0	0
Yallourn North	2 sites weekly	104	0	0	0
Yarragon	2 sites weekly[1]	116	0	0	0
Yinnar	1 site weekly	52	0	0	0

Table 17 Cont.: *E. coli* results for all water sampling localities for 2023-24

1 = plus one additional site per month
2 = plus two additional site per month, plus two major customer sites per month
3 = plus one additional site per month, plus one additional site added as of 27Nov23.
4 = plus one additional site added as of 27Nov23
5 = plus four additional samples per month
*= The number of samples collected is based on the population of the water sampling locality and is calculated based on the guidance provided in ADWG (2011) - Table 9.4 Recommended minimum frequency of *E. coli* monitoring.

12.1 Escherichia Coli (E. coli) continued

Table 18: Comparison of *E. coli* results for previous years (2021-2024)

Water Sampling Locality	2023 - 2024		2022 - 2023		2021 - 2022	
	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)
Boisdale	0	0	0	0	0	0
Boolarra	0	0	0	0	0	0
Briagolong	0	0	0	0	1	0
Churchill	0	0	0	0	0	0
Coongulla/Glenmaggie	0	0	0	0	0	0
Cowwarr	0	0	0	0	0	0
Drouin	0	0	0	0	0	0
Erica	0	0	0	0	0	0
Heyfield	0	0	0	0	0	0
Jumbuk	0	0	0	0	0	0
Maffra	0	0	0	0	0	0
Mirboo North	0	0	0	0	0	0
Moe	0	0	0	0	0	0
Morwell	0	0	0	0	0	0
Neerim South	0	0	0	0	0	0
Newborough	0	0	0	0	0	0
Noojee	0	0	0	0	0	0
Rawson	0	0	0	0	0	0
Rokeby/Buln Buln	0	0	0	0	0	0
Rosedale	0	0	0	0	0	0
Sale/Wurruk	0	0	0	0	0	0
Seaspray	0	0	0	0	0	0
Stratford	0	0	0	0	0	0

12.1 Escherichia Coli (E. coli) continued

Table 18 Cont.: Comparison of *E. coli* results for previous years (2021-2024)

Water Sampling Locality	2023 - 2024		2022 - 2023		2021 - 2022	
	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)
Thorpdale	0	0	0	0	0	0
Toongabbie	0	0	0	0	0	0
Trafalgar	0	0	0	0	0	0
Traralgon	0	0	3	0	0	0
Traralgon South/ Hazelwood North	0	0	0	0	0	0
Tyers/Glengarry	0	0	0	0	0	0
Warragul	0	0	0	0	0	0
Warragul South	0	0	0	0	0	0
Willow Grove	0	0	0	0	0	0
Yallourn North	0	0	0	0	0	0
Yarragon	0	0	0	0	0	0
Yinnar	0	0	1	0	0	0

Results obtained for the 2023-24 reporting period for each of the localities were similar to that of previous years.

12.1.2 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

12.2 Chlorine base disinfection by-product chemicals

12.2.1 Trihalomethanes (THM) results

For compliance with the SDWR (2015), a sample result must not exceed 0.25 mg/L trihalomethanes.

All our sites achieved 100% compliance with this standard for the 2023-24 reporting period.

Table 19: Trihalomethanes results for all localities for 2023-24

Water Sampling Locality	Frequency of sampling	No. of samples	No. of non-complying samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	1 site monthly	12	0	0.130	0.029	Yes
Boolarra	1 site monthly	12	0	0.130	0.053	Yes
Briagolong	1 site monthly	12	0	0.017	0.006	Yes
Churchill	1 site monthly	12	0	0.150	0.036	Yes
Coongulla-Glenmaggie	1 site monthly	12	0	0.034	0.016	Yes
Cowwarr	1 site monthly	12	0	0.110	0.046	Yes
Drouin	1 site monthly	12	0	0.073	0.039	Yes
Erica	1 site monthly	12	0	0.038	0.014	Yes
Heyfield	1 site monthly	12	0	0.038	0.014	Yes
Jumbuk	1 site monthly	12	0	0.120	0.057	Yes
Maffra	1 site monthly	12	0	0.120	0.017	Yes
Mirboo North	1 site monthly	12	0	0.055	0.022	Yes
Moe	1 site monthly	12	0	0.063	0.024	Yes
Morwell	1 site monthly	12	0	0.068	0.026	Yes
Neerim South	1 site monthly	12	0	0.072	0.034	Yes
Newborough	1 site monthly	12	0	0.058	0.029	Yes
Noojee	1 site monthly	12	0	0.053	0.026	Yes
Rawson	1 site monthly	12	0	0.026	0.012	Yes

12.2 Chlorine base disinfection by-product chemicals continued

Water Sampling Locality	Frequency of sampling	No. of samples	No. of non-complying samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Rokeby-Buln Buln	1 site monthly	12	0	0.072	0.038	Yes
Rosedale	1 site monthly	12	0	0.110	0.050	Yes
Sale-Wurruk	1 site monthly	12	0	0.025	0.011	Yes
Seaspray	1 site monthly	12	0	0.170	0.120	Yes
Stratford	1 site monthly	12	0	0.140	0.028	Yes
Thorpdale	1 site monthly	12	0	0.086	0.044	Yes
Toongabbie	1 site monthly	12	0	0.093	0.045	Yes
Trafalgar	1 site monthly	12	0	0.052	0.026	Yes
Traralgon	1 site monthly	12	0	0.047	0.017	Yes
Traralgon Sth /Hazelwood Nth	1 site monthly	12	0	0.082	0.043	Yes
Tyers-Glengarry	1 site monthly	12	0	0.076	0.039	Yes
Warragul	1 site monthly	12	0	0.078	0.039	Yes
Warragul South	1 site monthly	12	0	0.083	0.056	Yes
Willow Grove	1 site monthly	12	0	0.002	0.001	Yes
Yallourn North	1 site monthly	12	0	0.068	0.036	Yes
Yarragon	1 site monthly	12	0	0.062	0.030	Yes
Yinnar	1 site monthly	12	0	0.120	0.050	Yes

Table 19 cont.: Trihalomethanes results for all localities for 2023-24

12.2 Chlorine base disinfection by-product chemicals continued

Table 20: Comparison of Trihalomethane (THM) results for previous years (2021-2024)

Water Sampling Locality	2023 - 2024		2022 - 2023		2021 - 2022	
	Maximum THM in a sample (mg/L)	Complying (Yes/No)	Maximum THM in a sample (mg/L)	Complying (Yes/No)	Maximum THM in a sample (mg/L)	Complying (Yes/No)
Boisdale	0.130	Yes	0.059	Yes	0.092	Yes
Boolarra	0.130	Yes	0.130	Yes	0.130	Yes
Briagolong	0.017	Yes	0.023	Yes	0.024	Yes
Churchill	0.150	Yes	0.087	Yes	0.140	Yes
Coongulla/Glenmaggie	0.034	Yes	0.033	Yes	0.029	Yes
Cowwarr	0.110	Yes	0.100	Yes	0.100	Yes
Drouin	0.073	Yes	0.075	Yes	0.082	Yes
Erica	0.038	Yes	0.034	Yes	0.043	Yes
Heyfield	0.038	Yes	0.036	Yes	0.039	Yes
Jumbuk	0.120	Yes	0.089	Yes	0.160	Yes
Maffra	0.120	Yes	0.051	Yes	0.080	Yes
Mirboo North	0.055	Yes	0.040	Yes	0.039	Yes
Moe	0.063	Yes	0.050	Yes	0.053	Yes
Morwell	0.068	Yes	0.058	Yes	0.063	Yes
Neerim South	0.072	Yes	0.080	Yes	0.080	Yes
Newborough	0.058	Yes	0.063	Yes	0.034	Yes
Noojee	0.053	Yes	0.057	Yes	0.049	Yes
Rawson	0.026	Yes	0.021	Yes	0.029	Yes
Rokeby/Buln Buln	0.072	Yes	0.071	Yes	0.071	Yes
Rosedale	0.110	Yes	0.170	Yes	0.210	Yes
Sale/Wurruk	0.025	Yes	0.027	Yes	0.027	Yes
Seaspray	0.170	Yes	0.170	Yes	0.160	Yes

12.2 Chlorine base disinfection by-product chemicals continued

Table 20 cont.: Comparison of Trihalomethane (THM) results for previous years (2021-2024)

Water Sampling Locality	2023 - 2024		2022 - 2023		2021 - 2022	
	Maximum THM in a sample (mg/L)	Complying (Yes/No)	Maximum THM in a sample (mg/L)	Complying (Yes/No)	Maximum THM in a sample (mg/L)	Complying (Yes/No)
Stratford	0.140	Yes	0.057	Yes	0.077	Yes
Thorpdale	0.086	Yes	0.088	Yes	0.086	Yes
Toongabbie	0.093	Yes	0.076	Yes	0.090	Yes
Trafalgar	0.052	Yes	0.044	Yes	0.045	Yes
Traralgon	0.047	Yes	0.061	Yes	0.086	Yes
Traralgon Sth / Hazelwood Nth	0.082	Yes	0.068	Yes	0.083	Yes
Tyers/Glengarry	0.076	Yes	0.066	Yes	0.230	Yes
Warragul	0.078	Yes	0.091	Yes	0.076	Yes
Warragul South	0.083	Yes	0.086	Yes	0.066	Yes
Willow Grove	0.002	Yes	0.003	Yes	0.001	Yes
Yallourn North	0.068	Yes	0.067	Yes	0.067	Yes
Yarragon	0.062	Yes	0.049	Yes	0.049	Yes
Yinnar	0.120	Yes	0.073	Yes	0.110	Yes

Results obtained for each of the localities was similar to the previous two reporting periods.

12.2.2 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

12.3 Chlorine base disinfection by-product chemicals

12.3.1 Turbidity results

For compliance with the SDWR (2015), the 95th percentile of results for samples of drinking water collected in any 12-month period, must be less than or equal to 5.0 NTU (Nephelometric Turbidity Unit). All of our water sampling localities achieved 100% compliance with this standard for the 2023-24 reporting period for the scheduled sampling results.

Table 21: Turbidity results for all water sampling localities in 2023-24

Water Sampling Locality	Frequency of Sampling	Number of Samples	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	No. of 95th Percentile of results in any 12 months above standard (s.18)	Complying (Yes/No)
Boisdale	1 site weekly	52	0.2	0.2	0	Yes
Boolarra	1 site weekly	52	0.6	0.4	0	Yes
Briagolong	1 site weekly	52	0.4	0.4	0	Yes
Churchill	1 site weekly[1]	64	0.2	0.2	0	Yes
Coongulla/Glenmaggie	1 site weekly	52	0.4	0.3	0	Yes
Cowwarr	1 site weekly	52	1.6	0.5	0	Yes
Drouin	1 site weekly	52	0.3	0.2	0	Yes
Erica	1 site weekly	52	4.7	0.7	0	Yes
Heyfield	1 site weekly	52	0.4	0.3	0	Yes
Jumbuk	1 site weekly	52	0.2	0.1	0	Yes
Maffra	1 site weekly	52	0.8	0.4	0	Yes
Mirboo North	1 site weekly	52	0.2	0.2	0	Yes
Moe	1 site weekly	52	0.2	0.1	0	Yes
Morwell	1 site weekly	52	0.2	0.2	0	Yes
Neerim South	1 site weekly	52	0.5	0.3	0	Yes
Newborough	1 site weekly	52	0.2	0.2	0	Yes

12.3 Chlorine base disinfection by-product chemicals continued

Table 21 cont.: Turbidity results for all water sampling localities in 2023-24

Water Sampling Locality	Frequency of Sampling	Number of Samples	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	No. of 95th Percentile of results in any 12 months above standard (s.18)	Complying (Yes/No)
Noojee	1 site weekly	52	0.6	0.5	0	Yes
Rawson	1 site weekly	52	3.3	0.5	0	Yes
Rokeby/Buln Buln	1 site weekly	52	0.3	0.2	0	Yes
Rosedale	1 site weekly	52	0.3	0.2	0	Yes
Sale/Wurruk	1 site weekly	52	0.3	0.2	0	Yes
Seaspray	1 site weekly	52	1.2	0.8	0	Yes
Stratford	1 site weekly	52	0.4	0.2	0	Yes
Thorpdale	1 site weekly	52	0.3	0.2	0	Yes
Toongabbie	1 site weekly	52	1.6	0.3	0	Yes
Trafalgar	1 site weekly	52	0.2	0.1	0	Yes
Traralgon	1 site weekly	52	0.6	0.2	0	Yes
Traralgon Sth/ Hazelwood Nth	1 site weekly	52	0.2	0.2	0	Yes
Tyers/Glengarry	1 site weekly	52	0.7	0.2	0	Yes
Warragul	2 sites weekly	104	0.9	0.4	0	Yes
Warragul South	1 site weekly	52	0.4	0.2	0	Yes
Willow Grove	1 site weekly	52	0.8	0.1	0	Yes
Yallourn North	1 site weekly	52	0.2	0.2	0	Yes
Yarragon	1 site weekly	52	0.2	0.2	0	Yes
Yinnar	1 site weekly	52	0.5	0.4	0	Yes

1 = plus one additional site per month

* = For calculation purposes, all results reported as <0.1 NTU were rounded to 0.1 NTU for calculating the maximum 95th percentile.

12.3 Chlorine base disinfection by-product chemicals cont.

Table 22: Comparison of Turbidity results for previous years (2021-2024)

Water Sampling Locality	2023 - 2024		2022 - 2023		2021 - 2022	
	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*
Boisdale	0.2	0.2	1.2	0.2	0.1	0.1
Boolarra	0.6	0.6	0.6	0.3	0.3	0.2
Briagolong	0.4	0.4	0.2	0.2	0.1	0.1
Churchill	0.2	0.2	0.3	0.2	0.4	0.3
Coongulla/Glenmaggie	0.4	0.4	0.4	0.2	0.9	0.3
Cowwarr	1.6	1.6	0.3	0.2	0.3	0.2
Drouin	0.3	0.3	1.7	0.5	0.2	0.2
Erica	4.7	4.7	0.8	0.5	0.4	0.4
Heyfield	0.4	0.4	0.4	0.3	0.6	0.3
Jumbuk	0.2	0.2	0.2	0.2	0.7	0.2
Maffra	0.8	0.8	0.2	0.1	0.1	0.1
Mirboo North	0.2	0.2	1.6	0.2	0.2	0.1
Moe#	0.2	0.2	0.3	0.2	0.5	0.3
Morwell	0.2	0.2	0.6	0.3	0.5	0.2
Neerim South	0.5	0.5	0.8	0.8	0.7	0.6
Newborough#	0.2	0.2	0.2	0.1	0.9	0.2
Noojee	0.6	0.6	0.8	0.5	0.6	0.5
Rawson	3.3	3.3	0.3	0.2	0.6	0.3
Rokeby/Buln Buln	0.3	0.3	0.2	0.2	0.4	0.2
Rosedale	0.3	0.3	0.6	0.2	0.3	0.3
Sale/Wurruk	0.3	0.3	0.4	0.3	0.1	0.1

12.3 Chlorine base disinfection by-product chemicals cont.

Table 22 cont.: Comparison of Turbidity results for previous years (2021-2024)

Water Sampling Locality	2023 - 2024		2022 - 2023		2021 - 2022	
	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*
Seaspray	1.2	1.2	1.0	0.5	0.4	0.2
Stratford	0.4	0.4	0.6	0.3	0.1	0.1
Thorpdale	0.3	0.3	5.5	0.4	2.2	0.8
Toongabbie	1.6	1.6	0.7	0.5	0.2	0.2
Trafalgar	0.2	0.2	0.2	0.1	0.2	0.1
Traralgon	0.6	0.6	0.2	0.2	0.8	0.3
Traralgon Sth / Hazelwood Nth	0.2	0.2	0.4	0.2	0.2	0.2
Tyers/Glengarry	0.7	0.7	0.5	0.3	0.3	0.2
Warragul	0.9	0.9	0.5	0.2	0.4	0.2
Warragul South	0.4	0.4	0.2	0.1	0.2	0.1
Willow Grove	0.8	0.8	0.4	0.2	0.2	0.1
Yallourn North#	0.2	0.2	0.5	0.2	0.2	0.1
Yarragon	0.2	0.2	0.6	0.2	0.2	0.1
Yinnar	0.5	0.5	0.3	0.3	0.4	0.3

*For calculation purposes, all results reported as <0.1 NTU were rounded to 0.1 NTU for calculating the maximum 95th percentile.

Results obtained for each of the localities was similar to the previous two reporting periods.

12.3.2 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

12.4 Fluoride

Fluoride testing has been performed in the water supply systems where fluoride is added to the water. This includes the Maffra, Warragul, Sale, Traralgon, Morwell and Moe systems reaching over 90% of our population.

We have sampled localities on a weekly basis even though some of the localities listed in Table 17 require monthly samples according to section 5.1.3 of the Code of Practice for Fluoridation of Drinking Water Supplies (second edition) 2018 (i.e. if a fluoride plant supplies five or more water sampling localities then the corporation must take a sample each month from a water sampling point in each water sampling locality supplied from those plants such that a sample is collected from the distribution system at least once per week).

12.4.1 Fluoride results

For compliance with the SDWR (2015), the 95th percentile of results for samples of drinking water collected in any 12-month period, must be less than or equal to 5.0 NTU (Nephelometric Turbidity Unit). All of our water sampling localities achieved 100% compliance with this standard

Based on health considerations and the Health (Fluoridation) Act 1973, no single sample concentration of fluoride in drinking water should exceed 1.5 mg/L, and the average optimum concentration of fluoride should not exceed 1.0 mg/L. All our sites achieved 100% compliance with this standard for the 2023-24 reporting period.

The Code of Practice for Fluoridation of Drinking Water Supplies (second edition) 2018, section 4.2.2, defines the operating range of annual average concentration of fluoride being the operating target set by the Department of Health (0.9mg/L for our plants) plus/minus 0.1 mg/L of fluoride. The drinking water fluoridation system in Moe and Sale achieved operating averages which met the target for the reporting period. The fluoridation systems for Maffra, Morwell, Traralgon and Warragul achieved an operating average fluoride concentration within the range of 0.70 to 0.79 mg/L, below the operating target. For 2023-24, further adjustment will be made to the dosing setpoints to achieve the 0.9 mg/L target.

12.4 Fluoride cont.

Table 23: Fluoride results for all fluoridated localities in 2023-24

Treatment Plant	Water Sampling Locality	Frequency of Sampling	Number of Samples	Operating Target	Max (mg/L)	Min (mg/L)	Overall Average[1] (mg/L)	Operating Average[2] (mg/L)	Comply[3] (Yes /No)	Meeting Obligations[4] (Yes/No)
Maffra	Boisdale	1 site weekly	52	0.90	0.79	0.25	0.69	0.70	Yes	No
	Maffra	2 site weekly[7]	135	0.90	0.85	0.05	0.69	0.72	Yes	No
	Stratford	1 site weekly	52	0.90	0.79	0.58	0.70	0.70	Yes	No
Morwell	Churchill	1 site weekly	52	0.90	0.85	0.73	0.79	0.79	Yes	No
	Boolarra	1 site weekly	52	0.90	0.85	0.58	0.79	0.79	Yes	No
	Jumbuk	1 site weekly	52	0.90	0.84	0.67	0.79	0.79	Yes	No
	Morwell	2 site weekly	104	0.90	0.86	0.59	0.79	0.79	Yes	No
	Traralgon South/ Hazelwood North	1 site weekly	52	0.90	0.84	0.73	0.79	0.79	Yes	No
Moe	Yinnar	1 site weekly	52	0.90	0.89	0.73	0.79	0.79	Yes	No
	Moe	2 site weekly[7]	135	0.90	0.96	0.34	0.79	0.79	Yes	No
	Newborough	1 site weekly	52	0.90	0.92	0.59	0.80	0.80	Yes	Yes
	Trafalgar	1 site weekly	52	0.90	0.92	0.25	0.79	0.80	Yes	Yes
	Yallourn North	1 site weekly	52	0.90	0.87	0.68	0.80	0.80	Yes	Yes
	Thorpdale[5]	1 site weekly	52	0.90	0.87	<0.05	0.77	0.79	Yes	No
	Yarragon	1 site weekly	52	0.90	0.92	0.31	0.79	0.80	Yes	Yes
Sale	Sale/Wurruk	2 sites weekly	104	0.90	0.87	0.10	0.78	0.80	Yes	Yes
Traralgon	Traralgon	2 sites weekly[6]	149	0.90	0.87	0.05	0.71	0.73	Yes	No
Warragul	Drouin	Weekly	52	0.90	0.93	0.58	0.79	0.79	Yes	No
	Rokeby/Buln Buln	Weekly	52	0.90	0.95	0.55	0.80	0.80	Yes	Yes
	Warragul	Weekly	104	0.90	0.96	0.29	0.78	0.79	Yes	No
	Warragul South	Weekly	52	0.90	0.85	0.66	0.78	0.78	Yes	No

1 = The overall average value calculated based on all monitoring conducted over the 2023-24 reporting period, including when dosing did not occur.
2 = The operating average is calculated excluding the times where dosing did not occur (concentration decreased below 0.6mg/L).
3 = Complying is defined as any sample not exceeding 1.5 mg/L, or the 12-month rolling average not exceeding 1.0 mg/L.
4 = Meeting obligation is defined as the annual average concentration of fluoride was within the operating target plus/minus 0.1mg/L excluding when dosing did not occur.
5 = Water carting to Thorpdale from the Moe system (Trafalgar) commenced in September 2015.
6 = plus one additional site weekly from 23 August 2023
7 = plus one additional site weekly from 27 November 2023

12.4 Fluoride cont.

Table 24: Comparison of Fluoride results for previous years (2021-2024)

Treatment Plant	Water Sampling Locality	2023 - 2024			2022 - 2023			2021 - 2022		
		Max	Min (mg/L)	Overall Average[1] (mg/L)	Max (mg/L)	Min (mg/L)	Overall Average[1] (mg/L)	Max (mg/L)	Min (mg/L)	Overall Average[1] (mg/L)
Maffra	Boisdale	0.79	0.25	0.69	0.82	0.66	0.74	0.78	0.54	0.70
	Maffra	0.85	0.05	0.69	0.96	0.51	0.74	0.87	0.36	0.70
	Stratford	0.79	0.58	0.70	0.84	0.67	0.74	0.85	0.43	0.70
Morwell	Churchill	0.85	0.73	0.79	0.86	0.07	0.79	0.88	0.67	0.81
	Boolarra	0.85	0.58	0.79	0.85	0.72	0.79	0.86	0.72	0.80
	Jumbuk	0.84	0.67	0.79	0.88	0.72	0.80	0.86	0.75	0.81
	Morwell	0.86	0.59	0.79	0.88	0.58	0.80	0.94	0.06	0.80
	Traralgon South/ Hazelwood North	0.84	0.73	0.79	0.85	0.72	0.79	0.88	0.70	0.81
	Yinnar	0.89	0.73	0.79	0.86	0.72	0.79	0.88	0.71	0.81
Moe	Moe	0.96	0.34	0.79	0.94	0.66	0.78	0.97	0.13	0.75
	Newborough	0.92	0.59	0.80	0.90	0.06	0.76	0.93	0.45	0.76
	Trafalgar	0.92	0.25	0.79	0.91	0.59	0.77	0.94	0.23	0.76
	Yallourn North	0.87	0.68	0.80	0.83	0.66	0.77	0.85	0.64	0.77
	Thorpdale[5]	0.87	<0.05	0.77	0.82	0.08	0.76	0.88	0.70	0.79
	Yarragon	0.92	0.31	0.79	0.92	0.57	0.78	0.93	0.22	0.76
Sale	Sale/Wurruk	0.87	0.10	0.78	0.89	0.06	0.81	0.89	0.44	0.82
Traralgon*	Traralgon	0.87	0.05	0.71	0.94	0.14	0.78	0.93	0.07	0.72
Warragul	Drouin	0.93	0.58	0.79	0.88	0.09	0.66	0.85	0.47	0.79
	Rokeby/Buln Buln	0.95	0.55	0.80	0.90	0.11	0.68	0.88	0.42	0.79
	Warragul	0.96	0.29	0.78	0.89	0.08	0.68	0.89	0.52	0.79
	Warragul South	0.85	0.66	0.78	0.79	0.06	0.71	0.83	0.59	0.77

1 = The average value calculated based on all monitoring conducted over the 2022-23 reporting period, including when dosing did not occur
5 = Water carting to Thorpdale from the Moe system (Trafalgar) commenced in September 2015.

The fluoride dosing systems of Moe and Sale performed within requirements for the 2023-24 reporting period. The systems for Maffra, Morwell, Traralgon and Warragul were operating slightly below the operating target. Overall system performance is similar in terms of overall average achieved when compared to the 2021-22 and 2022-23 reporting periods.

12.4.2 Actions taken in relation to non-compliance

All systems achieved compliance against the standard (no single sample concentration of fluoride in drinking water should exceed 1.5 mg/L, and the average level of fluoride should not exceed 1.0 mg/L).

12.4.3 Fluoride dosing systems performance and maintenance 2023-24

Under the Code of Practice for Fluoridation of Drinking Water Supplies (second edition) 2018, we are required to notify the Department of Health if the fluoride concentration in drinking water, measured at the fluoridation plant, is less than 0.6 mg/L for a continuous period of greater than 72 hours. Notifications are included under each fluoride plant.

A number of maintenance activities were undertaken during the reporting period which necessitated that the fluoridation systems be shut down for a period of time to allow the works to proceed.

- **TRARALGON**
  The fluoride dosing system at the Traralgon Water Treatment Plant was operational for the duration of the reporting period.

- **MAFFRA**
  The fluoride dosing system at the Maffra Water Treatment Plant was operational for the duration of the reporting period.

  During October 2023, the system was turned off for a period of 9 days between 14 October and 24 October 2023 due to a fault with the flow sensing switch and final fluoride measuring probe. As a precaution the system was shut down until the parts could be sourced and replaced. The system was returned to service on 24 October 2023.

- **WARRAGUL**
  The fluoride dosing system at the Warragul Water Treatment Plant was operational for the duration of the reporting period.

- **SALE**
  The fluoride dosing system at the Sale Water Treatment Plant was operational for the duration of the reporting period.

  During October 2023, the system was turned off for a period of 7 days between 10 October and 18 October 2023 due to a fault with the pump discharge pressure valve. The pump was serviced and repaired, with the system coming back into service on 18 October 2023.

  During March/April 2024, the system was turned off for a period of 9 days due to chemical supply issues caused by a weather event interstate. The system was off between 30 March – 9 April 2024. Additional supplies of sodium fluoride were delivered to site on 8 April 2024, with dosing recommenced immediately. The concentration of fluoride in the water leaving the water treatment plant increase above 0.6 mg/L approximately 24 hours later, on 9 April 2024.

- **MORWELL**
  The fluoride dosing system at the Morwell Water Treatment Plant was operational during the reporting period.

- **MOE**
  The fluoride dosing system at the Moe Water Treatment Plant was operational for the duration of the reporting period. Between 01 June - 06 June 2024, the system was turned off due to a fault with a level senor on the fluoride tank. A new level sensor was purchased, installed, with the system being returned to service on 6 June 2024 . In total, the fluoride dosing system was turned off for a total of 5 days.

12.5 Other algae, pathogen, chemical or substances not specified that may pose a risk to human health

12.5.1 Overall results

During the reporting period, the corporation monitored for the following health-related aspects of the drinking water supplied to customer taps. The following table lists the parameters and the frequency of samples taken across all localities, comparing the results to the ADWG and the health-based guideline value.

Parameter	Frequency of sampling	2023-24 No. of Samples	2022-23 Maximum Value Recorded for All Localities (mg/L)	2022-23 Maximum Value Recorded for All Localities (mg/L)	2021-22 Maximum Value Recorded for All Localities (mg/L)	Health Based Guideline value (mg/L)	Result
Nitrite	Weekly*/6 Monthly	298	0.38	0.005	0.013	< 3	All results below ADWG health guideline values
Mercury	Quarterly	157	<0.0001	0.0001	0.0002	< 0.001	
Chromium	Quarterly	157	<0.001	<0.001	<0.001	< 0.05	
Cadmium	Quarterly	157	<0.0002	<0.0002	<0.0002	< 0.002	
Nitrate	Weekly*/Quarterly	298	1.4	1.2	1.3	< 50	
Nickel	Annually	49	0.005	0.005	0.003	< 0.02	
Arsenic	Annually/Quarterly	145	<0.001	<0.001	<0.001	< 0.01	
Cyanide	Annually	36	<0.005	<0.005	<0.005	< 0.08	
Selenium	Annually/Quarterly	145	<0.001	<0.001	<0.001	< 0.01	
Beryllium	Annually/6 Monthly	37	<0.001	<0.001	<0.01	< 0.06	
Nitrosodimethylamine	Monthly**	20	0.000007	0.000013	0.000008	< 0.0001	
2,4,6-Trichlorophenol	Monthly***	12	<0.001	<0.001	<0.001	< 0.02	
2,4-Dichlorophenol	Monthly***	12	<0.001	<0.001	<0.001	< 0.2	
2- Chlorophenol	Monthly***	12	<0.001	<0.001	<0.001	< 0.3	
Pentachlorophenol	Monthly	12	<0.001	<0.001	<0.001	< 0.01	
Chloride	Annually/Quarterly	352	120	120	120	<250	
Zinc	Annually	49	0.023	0.023	0.012	<3	
Hardness (CaCO3)	Annually/Quarterly	307	92	90	87	<200	
Total dissolved solids	Annually/Quarterly	144	270	310	340	<600	
Silica	Annually/Quarterly	196	16	16	15	<80	
Sulphate	Annually/Quarterly	36	34	70	61	<250	

* Weekly monitoring undertaken on chloraminated systems ** Monthly monitoring undertaken on chloraminated systems *** Frequency Increased from quarterly to monthly during reporting period

Table 25 : Other sampled parameter results for all localities in 2023-24 (Health Based Parameters)

Monitoring for other parameters such as radiological, pesticides, protozoan organisms is conducted routinely. A complete list of raw water parameters monitored is included in Appendix 1. Additional monitoring is performed on a risk basis and as the need arises.

Blue Green Algae (BGA) monitoring is undertaken across our storages based on visual and water quality triggers. Major raw water supply/storages are routinely monitored for BGA as part of the routine catchment monitoring program. The frequency of sampling is determined by the assessed risk and historical bloom occurrences.

For water storages not managed by us, the Water Storage Manager (Melbourne Water – Tarago, Southern Rural Water – Blue Rock and Lake Glenmaggie) undertakes monitoring and advise us of the results in accordance with their respective algae management plans.

Table 26: Routine BGA monitoring for raw water supplies in 2023-24 (samples per month collected)

Location	Jul '23	Aug '23	Sept '23	Oct '23	Nov '23	Dec '23	Jan '24	Feb '24	Mar '24	Apr '24	May '24	Jun '24
Maffra Weir	2	2	2	4	5	4	5	4	4	4	2	2
Heyfield Raw Water Storage	2	2	2	4	5	4	5	4	4	4	2	2
Neerim South Tarago Reservoir	1	1	1	1	1	1	1	1	1	1	1	1
Warragul WTP Inlet to Plant (Pedersen Weir or Tarago Reservoir)	1	1	1	1	1	1	1	1	1	1	1	1
Rawson Amours Basin				1	1	1	1	1	1	1	1	1
Seaspray Raw Water Storage	1	2	4	4	5	4	5	4	4	4	2	2
Seaspray – Merriman Creek	1	1	2	2	2	2	2	2	1	2	1	1
Blue Rock Lake (Southern Rural Water BGA Program)	Southern Rural Water (SRW) BGA Monitoring Program											
Willow Grove WTP Inlet (Blue Rock Lake)	1	1	1	1	1	1	1	1	1	1	1	1
Lake Glenmaggie (Southern Rural Water BGA Program)	Southern Rural Water (SRW) BGA Monitoring Program											
Coongulla WTP Inlet – Lake Glenmaggie	2	2	Coongulla Water Treatment Plant Decommissioned									
Tarago Reservoir (Melbourne Water BGA Program)	Melbourne Water BGA Monitoring Program											
Moondarra Surface	1	1	1	1	1	1	1	1	1	1	1	1
Moondarra pipeline	1	1	1	1	1	1	1	1	1	1	1	1

During the reporting period, although there were algae and blue green algae blooms, none of these impacted the water treatment process or the production of safe drinking water.

Construction of a new water storage basin at Moe Water Treatment Plant

12.5 Other algae, pathogen, chemical or substances not specified that may pose a risk to human health

12.5.2 Manganese

Manganese can be naturally present in raw water supplies as either a soluble or insoluble form. When concentrations exceed the aesthetic guideline of 0.1 mg/L, manganese can create unacceptable tastes in water, as well as stain fixtures and laundry. The ADWG guideline value is measured against the health guideline value of 0.5 mg/L in ADWG.

Table 27: Manganese results for all water sampling localities in 2023-24

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Boisdale	1 site monthly	12	0.001	0.004	<0.001	Yes
Boolarra	1 site monthly	12	<0.001	<0.001	<0.001	Yes
Briagolong	1 site weekly[1]	64	0.005	0.017	<0.001	Yes
Churchill	3 sites monthly	36	0.001	0.002	<0.001	Yes
Coongulla/Glenmaggie	1 site weekly[1]	64	0.004	0.012	0.002	Yes
Cowwarr	1 site monthly	12	0.001	0.001	<0.001	Yes
Drouin	1 site monthly	12	0.001	0.004	<0.001	Yes
Erica	1 site monthly	12	0.018	0.023	0.011	Yes
Heyfield	1 site weekly[1]	64	0.018	0.033	0.003	Yes
Jumbuk	1 site monthly	12	<0.001	<0.001	<0.001	Yes
Maffra	1 site weekly1,[2]	64	0.025	0.130	<0.001	Yes
Mirboo North	2 sites weekly[1]	116	0.003	0.012	0.001	Yes
Moe	2 sites weekly[1]	95	0.011	0.480	<0.001	Yes
Morwell	3 sites weekly[1]	168	0.004	0.058	<0.001	Yes
Neerim South	1 site weekly[1]	64	0.021	0.080	0.001	Yes
Newborough	1 site monthly	12	0.001	0.002	<0.001	Yes
Noojee	1 site monthly	12	0.024	0.049	0.007	Yes
Rawson	1 site weekly[1]	64	0.019	0.066	<0.001	Yes
Rokeby/Buln Buln	1 site monthly	12	0.001	0.003	<0.001	Yes
Rosedale	1 site monthly	12	<0.001	<0.001	<0.001	Yes

*= average unable to be calculated as all results for reporting period were below detection level
#= average values calculated using the detection limit value for sample results showing less than detection limit.
^= Based on the maximum value being below the ADWG guideline health limit of 0.5 mg/L.
1 = plus one additional site per month
2 = plus one additional site weekly from 27 November 2023
3 = plus one additional site weekly from 23 August 2023

12.5 Other algae, pathogen, chemical or substances not specified that may pose a risk to human health

Table 27 cont.: Manganese results for all water sampling localities in 2023-24

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Sale/Wurruk	1 site weekly[1]	64	0.001	0.005	<0.001	Yes
Seaspray	1 site weekly[1]	64	0.010	0.052	0.002	Yes
Stratford	1 site monthly	12	0.003	0.009	<0.001	Yes
Thorpdale	1 site weekly[1]	64	0.001	0.006	<0.001	Yes
Toongabbie	1 site monthly	12	0.001	0.002	<0.001	Yes
Trafalgar	1 site weekly[1]	64	0.002	0.011	<0.001	Yes
Traralgon	1 sites weekly[1,3]	109	0.001	0.004	<0.001	Yes
Traralgon South/Hazelwood North	1 site monthly	12	<0.001	<0.001	<0.001	Yes
Tyers/Glengarry	1 site monthly	64	0.003	0.008	<0.001	Yes
Warragul	2 sites weekly[1]	116	0.002	0.015	<0.001	Yes
Warragul South	1 site monthly	12	0.001	0.001	<0.001	Yes
Willow Grove	1 site weekly[1]	64	0.003	0.010	<0.001	Yes
Yallourn North	1 site monthly	12	0.001	0.001	<0.001	Yes
Yarragon	1 site weekly[1]	64	0.001	0.012	<0.001	Yes
Yinnar	1 site monthly	12	0.001	0.001	<0.001	Yes

*= average unable to be calculated as all results for reporting period were below detection level
#= average values calculated using the detection limit value for sample results showing less than detection limit.
^= Based on the maximum value being below the ADWG guideline health limit of 0.5 mg/L.
1 = plus one additional site per month
2 = plus one additional site weekly from 27 November 2023
3 = plus one additional site weekly from 23 August 2023

12.5.3 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

12.5 Other algae, pathogen, chemical or substances not specified that may pose a risk to human health

12.5.4 Lead

Lead can be present in drinking water due to dissolution from natural sources or from household plumbing.

Based on health considerations in the ADWG guidelines, concentrations of lead in drinking water should not exceed 0.01 mg/L. Our sites achieved 100% ADWG guideline value against lead guideline values for all customer tap sites.

Table 28: Lead results for all water sampling localities in 2023-24

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Boisdale	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Boolarra	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Briagolong	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Churchill	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Coongulla/Glenmaggie	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Cowwarr	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Drouin	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Erica	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Heyfield	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Jumbuk	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Maffra	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Mirboo North	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Moe	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Morwell	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Neerim South	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Newborough	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Noojee	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Rawson	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Rokeby/Buln Buln	1 site quarterly	4	<0.001	<0.001	<0.001	Yes

*= average unable to be calculated as all results for reporting period were below detection level
#= average values calculated using the detection limit value for sample results showing less than detection limit.
^= Based on the maximum value being below the ADWG guideline health limit of 0.01 mg/L.
1 = plus one additional site per quarter

12.5 Other algae, pathogen, chemical or substances not specified that may pose a risk to human health

Table 28 cont.: Lead results for all water sampling localities in 2023-24

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Rosedale	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Sale/Wurruk	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Seaspray	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Stratford	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Thorpdale	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Toongabbie	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Trafalgar	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Traralgon	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Traralgon South/Hazelwood North	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Tyers/Glengarry	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Warragul	1 site monthly[1]	16	<0.001	<0.001	<0.001	Yes
Warragul South	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Willow Grove	1 site quarterly	4	0.002	0.004	<0.001	Yes
Yallourn North	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Yarragon	1 site quarterly	4	<0.001	<0.001	<0.001	Yes
Yinnar	1 site quarterly	4	<0.001	<0.001	<0.001	Yes

*= average unable to be calculated as all results for reporting period were below detection level
#= average values calculated using the detection limit value for sample results showing less than detection limit.
^= Based on the maximum value being below the ADWG guideline health limit of 0.01 mg/L.
1 = plus one additional site per quarter

12.5.4 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

12.5 Other algae, pathogen, chemical or substances not specified that may pose a risk to human health

12.5.5 Copper

Copper is present in raw water supplies at very low concentrations. Copper can be found in higher concentrations in drinking water as a result of corrosion of copper pipes and fittings. Based on health considerations in the ADWG guideline, concentrations of copper in drinking water should not exceed 2 mg/L. The aesthetic guideline value is 1 mg/L. Our sites achieved 100% ADWG guideline value against both copper guideline values.

Table 29: Copper results for all water sampling localities in 2023-24

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Boisdale	1 site quarterly	4	0.006	0.009	0.003	Yes
Boolarra	1 site quarterly	4	0.003	0.004	0.002	Yes
Briagolong	1 site quarterly	4	0.021	0.040	0.002	Yes
Churchill	1 site quarterly	4	0.009	0.022	0.003	Yes
Coongulla/Glenmaggie	1 site quarterly	4	0.002	0.004	<0.001	Yes
Cowwarr	1 site quarterly	4	0.003	0.006	0.001	Yes
Drouin	1 site quarterly	4	0.004	0.009	<0.001	Yes
Erica	1 site quarterly	4	0.009	0.019	0.001	Yes
Heyfield	1 site quarterly	4	0.013	0.023	0.006	Yes
Jumbuk	1 site quarterly	4	0.007	0.012	0.002	Yes
Maffra	1 site quarterly	4	0.023	0.058	0.002	Yes
Mirboo North	1 site quarterly	4	0.007	0.013	0.003	Yes
Moe	1 site quarterly	4	0.008	0.017	0.002	Yes
Morwell	1 site quarterly	4	0.007	0.013	0.003	Yes
Neerim South	1 site quarterly	4	0.008	0.010	0.005	Yes
Newborough	1 site quarterly	4	0.005	0.007	0.002	Yes
Noojee	1 site quarterly	4	0.005	0.008	0.002	Yes
Rawson	1 site quarterly	4	0.012	0.017	0.003	Yes
Rokeby/Buln Buln	1 site quarterly	4	0.011	0.017	0.005	Yes

*= average unable to be calculated as all results for reporting period were below detection level
#= average values calculated using the detection limit value for sample results showing less than detection limit.
^= Based on the maximum value being below the ADWG guideline health limit of 2 mg/L.
1 = plus one additional site per quarter

12.5 Other algae, pathogen, chemical or substances not specified that may pose a risk to human health

Table 29 cont.: Copper results for all water sampling localities in 2023-24

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Rosedale	1 site quarterly	4	0.004	0.006	0.002	Yes
Sale/Wurruk	1 site quarterly	4	0.028	0.057	0.005	Yes
Seaspray	1 site quarterly	4	0.027	0.041	0.018	Yes
Stratford	1 site quarterly	4	0.006	0.009	0.001	Yes
Thorpdale	1 site quarterly	4	0.002	0.003	0.001	Yes
Toongabbie	1 site quarterly	4	0.007	0.012	0.004	Yes
Trafalgar	1 site quarterly	4	0.003	0.006	<0.001	Yes
Traralgon	1 site quarterly	4	0.014	0.033	0.001	Yes
Traralgon South/Hazelwood North	1 site quarterly	4	0.004	0.008	0.001	Yes
Tyers/Glengarry	1 site quarterly	4	0.011	0.032	0.003	Yes
Warragul	1 site monthly1	16	0.003	0.009	<0.001	Yes
Warragul South	1 site quarterly	4	0.004	0.006	<0.001	Yes
Willow Grove	1 site quarterly	4	0.005	0.007	<0.001	Yes
Yallourn North	1 site quarterly	4	0.004	0.005	0.002	Yes
Yarragon	1 site quarterly	4	0.003	0.006	0.001	Yes
Yinnar	1 site quarterly	4	0.003	0.005	0.001	Yes

*= average unable to be calculated as all results for reporting period were below detection level
#= average values calculated using the detection limit value for sample results showing less than detection limit.
^= Based on the maximum value being below the ADWG guideline health limit of 2 mg/L.
1 = plus one additional site per quarter

12.5.6 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

12.6 Aesthetics

12.6.1 pH results

In addition to the monitoring of parameters to determine compliance against the SDWA regulations, pH is routinely monitored in the reticulation system.

The ADWG guidelines suggest that the drinking water be between pH 6.5 and pH 8.5. The pH results for all towns are provided below.

Table 30: pH results for all water sampling localities in 2023-24

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Boisdale	1 site weekly	52	7.7	8.0	7.1	Yes
Boolarra	1 site weekly	52	7.5	7.8	7.3	Yes
Briagolong	1 site weekly	52	7.3	7.7	7.1	Yes
Churchill	1 site weekly[1]	64	7.4	7.9	7.1	Yes
Coongulla/Glenmaggie	1 site weekly	52	7.7	8.2	7.2	Yes
Cowwarr	1 site weekly	52	7.6	9.5	7.1	No
Drouin	1 site weekly	52	7.2	7.5	7.0	Yes
Erica	1 site weekly	52	7.7	9.0	7.2	No
Heyfield	1 site weekly	52	7.3	7.9	7.1	Yes
Jumbuk	1 site weekly	52	7.4	7.6	7.1	Yes
Maffra	1 site weekly	52	7.4	7.9	7.1	Yes
Mirboo North	1 site weekly	52	7.4	7.8	7.2	Yes
Moe	1 site weekly	52	7.3	7.6	7.0	Yes
Morwell	1 site weekly	52	7.3	7.6	7.1	Yes
Neerim South	1 site weekly	52	7.7	8.4	7.5	Yes
Newborough	1 site weekly	52	7.4	9.1	7.1	No
Noojee	1 site weekly	52	7.7	8.8	7.1	No
Rawson	1 site weekly	52	7.4	7.8	7.2	Yes
Rokeby/Buln Buln	1 site weekly	52	7.2	7.5	7.0	Yes

^= Based on the minimum and maximum values being within the ADWG guideline aesthetic operating range of 6.5 – 8.5.
1 = plus one additional site per month

12.6 Aesthetics

Table 30 cont: pH results for all water sampling localities in 2023-24

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Rosedale	1 site weekly	52	7.7	9.0	7.3	No
Sale/Wurruk	1 site weekly	52	7.3	7.8	7.1	Yes
Seaspray	1 site weekly	52	7.3	8.0	6.9	Yes
Stratford	1 site weekly	52	7.5	8.0	7.2	Yes
Thorpdale	1 site weekly	52	7.9	8.7	7.2	No
Toongabbie	1 site weekly	52	7.3	7.6	7.1	Yes
Trafalgar	1 site weekly	52	7.3	7.6	7.1	Yes
Traralgon	1 site weekly	52	7.2	7.5	7.0	Yes
Traralgon South/Hazelwood North	1 site weekly	52	7.4	7.7	7.1	Yes
Tyers/Glengarry	1 site weekly	52	7.3	7.7	7.1	Yes
Warragul	2 site weekly	104	7.4	7.8	6.9	Yes
Warragul South	1 site weekly	52	7.5	8.4	7.2	Yes
Willow Grove	1 site weekly	52	7.7	7.9	7.3	Yes
Yallourn North	1 site weekly	52	7.4	7.7	7.1	Yes
Yarragon	1 site weekly	52	7.5	8.0	7.2	Yes
Yinnar	1 site weekly	52	7.4	7.8	7.2	Yes

^= Based on the minimum and maximum values being within the ADWG guideline aesthetic operating range of 6.5 – 8.5.
1 = plus one additional site per month

12.6.2 Actions taken in relation to non-compliance

Some systems experienced elevated pH results (Cowwarr, Erica, Newborough, Noojee, Rosedale and Thorpdale) as a result of long residence times of water in the reticulation, cement-lined pipes in parts of the reticulation, and reduced flushing programs due to permanent water saving rules in place. All average pH results were within the range of 6.5 to 8.5.

We continue to monitor pH variations and modify system operation where possible to reduce variability.

Automatic flushing devices have been installed in some locations to manage pH changes from excessive “water age”. These also have the benefit of improving chlorine residual in the extremities of the systems.

Reactive flushing of mains based on routine water sampling results is assessed on a case-by-case basis to manage pH, chlorine residuals and customer water supply pressures.

ADWG states that cement mortar lined pipes can significantly increase the pH and a value up to 9.2 may be tolerated provided monitoring indicates no deterioration in the microbiological quality. No deterioration in the microbiological quality of the water was observed.

12.6 Aesthetics

12.6.3 Iron results

Iron can become apparent in taste in water at about 0.3 mg/L and above. High concentrations can give water a rust-brown appearance and cause staining of laundry and plumbing fittings.

Based on aesthetic considerations the concentration in the ADWG guidelines of iron in drinking water should not exceed 0.3 mg/L, however no health-based guideline value has been set for iron.

Table 31: Iron results for all water sampling localities in 2023-24

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Boisdale	1 site weekly	12	0.010	0.010	<0.010	Yes
Boolarra	1 site weekly	12	0.051	0.110	0.020	Yes
Briagolong	1 site weekly	64	0.012	0.070	<0.010	Yes
Churchill	1 site weekly1	36	0.016	0.040	<0.010	Yes
Coongulla/Glenmaggie	1 site weekly	64	0.011	0.050	<0.010	Yes
Cowwarr	1 site weekly	12	0.013	0.030	<0.010	Yes
Drouin	1 site weekly	12	0.011	0.020	<0.010	Yes
Erica	1 site weekly	12	0.038	0.080	0.020	Yes
Heyfield	1 site weekly	64	0.010	0.020	<0.010	Yes
Jumbuk	1 site weekly	12	0.022	0.050	<0.010	Yes
Maffra	1 site weekly	952	0.010	0.010	<0.010	Yes
Mirboo North	1 site weekly	116	0.010	0.020	<0.010	Yes
Moe	1 site weekly	95	0.017	0.470	<0.010	No
Morwell	1 site weekly	168	0.025	0.460	<0.010	No
Neerim South	1 site weekly	64	0.011	0.020	<0.010	Yes
Newborough	1 site weekly	12	0.011	0.020	<0.010	Yes
Noojee	1 site weekly	12	0.014	0.020	<0.010	Yes
Rawson	1 site weekly	64	0.015	0.040	<0.010	Yes
Rokeby/Buln Buln	1 site weekly	12	0.010	0.010	<0.010	Yes

*= average unable to be calculated as all results for reporting period were below detection level
#= average values calculated using the detection limit value for sample results showing less than detection limit.
^= Based on the maximum value being below the ADWG guideline aesthetic limit of 0.3 mg/L.
1 = plus one additional site per month
2 = plus one additional site weekly from 27 November 2023

12.6 Aesthetics

Table 31 cont.: Iron results for all water sampling localities in 2023-24

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Rosedale	1 site weekly	12	0.013	0.040	<0.010	Yes
Sale/Wurruk	1 site weekly	64	0.010	0.020	<0.010	Yes
Seaspray	1 site weekly	64	0.057	0.180	0.010	Yes
Stratford	1 site weekly	12	0.010	0.010	<0.010	Yes
Thorpdale	1 site weekly	64	0.030	0.080	0.010	Yes
Toongabbie	1 site weekly	12	0.010	0.010	<0.010	Yes
Trafalgar	1 site weekly	64	0.011	0.020	<0.010	Yes
Traralgon	1 site weekly	109	0.010	0.030	<0.010	Yes
Traralgon South/Hazelwood North	1 site weekly	12	0.017	0.060	<0.010	Yes
Tyers/Glengarry	1 site weekly	64	0.022	0.050	<0.010	Yes
Warragul	2 sites weekly	116	0.012	0.100	<0.010	Yes
Warragul South	1 site weekly	12	0.011	0.020	<0.010	Yes
Willow Grove	1 site weekly	64	0.010	0.010	<0.010	Yes
Yallourn North	1 site weekly	12	0.012	0.020	<0.010	Yes
Yarragon	1 site weekly	64	0.010	0.010	<0.010	Yes
Yinnar	1 site weekly	12	0.042	0.080	<0.010	Yes

*= average unable to be calculated as all results for reporting period were below detection level
#= average values calculated using the detection limit value for sample results showing less than detection limit.
^= Based on the maximum value being below the ADWG guideline aesthetic limit of 0.3 mg/L.
1 = plus one additional site per month
2 = plus one additional site weekly from 27 November 2023

12.6.4 Actions taken in relation to non-compliance

All localities with the exception of Moe and Morwell complied with this water quality parameter. Moe locality recorded a single result of 0.47 mg/L in November 2023 which was above the aesthetic guideline value of 0.3 mg/L. The reading is likely the result of the disturbance of sediment in the sample line.

Morwell locality recorded a single result of 0.46 mg/L in January 2024 which was above the aesthetic guideline value of 0.3 mg/L. The reading is likely caused the presence of cast iron pipework in the vicinity of the sample point.

13. Undertakings under section 30 of the SDWA

We have no undertakings relevant to the 2023-24 reporting year.

14. Exemptions under section 20 of the SDWA

We have no exemptions relevant to the 2023-24 reporting year.

15. Variation in aesthetic standards

We have no variations in aesthetic standards sought under section 19 of the SDWA.

16. Regulated water

Regulated water is water that is not intended for drinking but could reasonably be mistaken as drinking water and declared under section 6 of the Safe Drinking Water Act 2003

We do not manage any regulated water supplies.

17. Further information

The Safe Drinking Water Act **(2003) No.46/2003, Section 23, requires us to disclose water quality monitoring information publically. We publish this Annual Drinking Water Report on the following website :**

www.gippswater.com.au/residential/about-us/corporate-documents/drinking-water-reports

Customers and members of the public may request further drinking water quality information by phoning 1800 050 500, or visiting our websites:

www.gippswater.com.au or,

www.gippswater.com.au/residential/what-we-do/water-quality

18. References

National Health and Medical Research Council. ***Australian Drinking Water Guidelines 2011.***
Web address: www.nhmrc.gov.au

Department of Health and Human Services - Guidance: *Water Quality Annual Report* Section 26 of the Safe Drinking Water Act 2003 Regulations 16 and 17 of the Safe Drinking Water Regulations 2015 – June 2017

Safe Drinking Water Act (2003) No.46/2003

Safe Drinking Water Regulations (2015) S.R No.88/2015

Health (Fluoridation) Act (1973)

Code of Practice for Fluoridation of Drinking Water Supplies; Second Edition (2018)

Appendix

1: Raw water monitoring

Source water	Water Sampling Locality	Nature of other raw water monitoring programs			
		Weekly/Fortnightly	Monthly	Annual/Quarterly	
Moondarra Reservoir via Tyers River	Morwell Churchill Yinnar Jumbuk Boolarra Traralgon South/ Hazelwood North	**Physicals** • Absorbance (254nm) • Colour True (465nm) • Dissolved Oxygen • SUVA (245nm) • Turbidity • Electrical Conductivity @25°C • pH **Microbiologica l** • Escherichia coli • Total Coliforms • Heterotrophic Plate Count **Metals*** • Iron Total • Manganese Total • Mercury	**Physicals** • Alkalinity Bicarbonate as CaCO3 • Alkalinity Total as CaCO3 • Dissolved Organic Carbon (DOC) • Total Organic Carbon (TOC) • Total Dissolved Solids (TDS) • SUVA (245nm) • Chlorophyll a **Chemical inorganic** • Ammonia as N • Bromide • Chloride • Fluoride • Nitrate as N • Nitrite as N • Organic Nitrogen as N • Phosphorous, Reactive as P • Phosphorous Total as N • Sulphate • Total Kjeldahl Nitrogen as N • Total Nitrogen as N **Biological** • Algae • Blue Green Algae (sampling frequency may vary depending on the season and results received)	**Physicals*** • Total Dissolved Solids (TDS) • Suspended Solids • • Chemical inorganic • Cyanide • Dissolved Organic Carbon (DOC) • Total Organic Carbon (TOC) • Bromide • Fluoride **Metals*** • Aluminium Total • Arsenic Total • Selenium • Cadmium Total • Copper Total • Lead Total • Mercury • Zinc Total **Radiological** • Gross Alpha Activity • Gross Beta Activity **Microbiological** • *Cryptosporidium spp* • *Giardia spp*	**Pesticides, Herbicides and Chemical Organics**** • 2,4,5-T (Herbicide) • 2,4,5-Tp (Silvex) • 2,4,6-T • 2,4-D • 2,4-Db • 2,4-Dp • 2,6-D • 3-Hydroxy Carbofuran • 4-Cpa • 4 Chlorophenoxy Acetic Acid • 4,4-Ddd • 4,4-Dde • 4,4-Ddt • Abamectin • Acephate • Alachlor • Aldicarb • Aldrin • Ametryn • Aminopyralid • Amitraz • Ampa • Asulam • Atrazine • Atrazine-Desethyl • Atrazine-Desisopropyl
	Traralgon				
	Tyers/Glengarry Rosedale Cowwarr Toongabbie				
Macalister River	Maffra				
	Stratford				
	Boisdale				
Bore – Wa De Lock Aquifer	Briagolong				
Pederson Weir (Tarago River)	Warragul (including Nilma, Darnum, Drouin East)				
Tarago Reservoir (supplementary supply)	Warragul South				
	Drouin				
	Rokeby/Buln Buln				
Macalister River	Coongulla/Glenmaggie				
Trigger Creek	Rawson				
	Erica				
Thomson River	Heyfield				
Little Morwell River	Mirboo North				

*Reduced frequency of monitoring in some catchments based on risk profile. ** Note all pesticides, herbicides and chemical organics results were within ADWG guideline values.
Not all parameters were measured at all localities or source waters. Purpose of monitoring - risk management within catchments and raw water supply systems.
Comprehensiveness (frequency) – weekly, fortnightly, monthly, quarterly and annual monitoring or as risks identified.

1: Raw water monitoring cont.

Source water	Water Sampling Locality	Nature of other raw water monitoring programs			
		Weekly/Fortnightly	Monthly	Annual/Quarterly	
Tanjil River and Narracan Creek	Moe		**Metals** • Aluminium Total • Arsenic Total • Calcium Total • Cadmium Total • Copper Total • Iron Total • Iron Soluble • Lead Total • Mercury • Potassium • Magnesium • Manganese Total • Manganese Soluble • Selenium • Zinc Total **Chlorophenols (Sale Bores Only)** • 2,3,4,5 Tetrechlorophenol • 2,6-Dichlorphenol • 2-Chlorophenol • 4-Chloro-3-Methylphenol • Total Phenols (Halogenated) • Pentachlorophenol • 2,4,5-Trichlorophenol **PFOS/PFOA suite** (Seaspray, Sale Bores, Briagolong Bores and reticulation)	• Azinphos-Ethyl • Azinphos-Methyl • Azoxystrobin • Bendiocarb • Benomyl • Bensulfuron Methyl • Bensulide • Bentazon • BHC (Alpha) • BHC (Beta) • BHC (Delta) • Bifenthrin • Boscalid • Brodifacoum • Bromacil • Bromophos-Ethyl • Bromoxynil • Butachlor • Carbaryl • Carbendazim • Carbofenothion • Carbofuran • Carboxin • Carfentrazone-Ethyl • Chlorantraniliprole • Chlordane (Cis) • Chlordane (Trans) • Chlorfenvinphos	• Chlorothalonil • Chloroxuron • Chloropyrifos • Chloropyrifos - Methyl • Chlorsulfuron • Clopyralid • Coumaphos • Cyanazine • Cyfluthrin • Cypermethrin • Cyproconazole • Cyprodinil • Cypromazine • Cyromazine • Deltamethrin • Demeton-O • Demeton-S • Demeton-S-Methyl • Diazinon • Dicamba • Dichlobenil • Dichlorprop • Dichlorprop-P • Dichlorvos • Diclofop-Methyl • Dicofol • Dieldrin • Difenoconazole
	Newborough				
	Yallourn North				
	Trafalgar				
	Yarragon				
Tarago River	Neerim South				
	Noojee				
Bore (Boisdale Aquifer)	Sale/Wurruk				
Merrimans Creek	Seaspray				
Tanjil River and Narracan Creek	Thorpdale				
Tanjil River	Willow Grove				

*Reduced frequency of monitoring in some catchments based on risk profile. ** Note all pesticides, herbicides and chemical organics results were within ADWG guideline values.
Not all parameters were measured at all localities or source waters. Purpose of monitoring - risk management within catchments and raw water supply systems.
Comprehensiveness (frequency) – weekly, fortnightly, monthly, quarterly and annual monitoring or as risks identified.

Appendix

1: Raw water monitoring cont.

Source water	Water Sampling Locality	Nature of other raw water monitoring programs			
		Weekly/Fortnightly	Monthly	Annual/Quarterly	
				• Diflufenican • Dimethoate • Dinoseb • Diphenamid • Diquat • DiflubenzuronDiuron • ENDOSULFAN (Alpha) • ENDOSULFAN (Beta) • Endosulfan Sulphate • Endothal • Endrin • Endrin Aldehyde • Endrin Ketone • Epn • Eptc • Ethion • Ethoprophos • Etridiazole • Fenamiphos • Fenarimol • Fenchlorphos (Ronnel) • Fenitrothion • Fenoxycarb • Fensulfothion • Fenthion • Fenvalerate • Fipronil • Flamprop Methyl • Fluometuron	• Flupropanate • Fluroxypyr • Flusilazole • Formothion • Fosetyl Aluminium • Glyphosate • Haloxyfop • Heptachlor • Heptachlor Epoxide • Hexachlorobenzene • Hexaconazole • Hexaflurate • Hexazinone • Imazapyr • Indoxacarb • Iodosulfuron Methyl • Iprodione • Irgarol • Isoproturon • Lindane • Malathion • Mcpa • Mcpb • Mecoprop • Metalaxyl • Metalaxyl-M • Metaldehyde • Methidathion • Methiocarb

*Reduced frequency of monitoring in some catchments based on risk profile. ** Note all pesticides, herbicides and chemical organics results were within ADWG guideline values.
Not all parameters were measured at all localities or source waters. Purpose of monitoring - risk management within catchments and raw water supply systems.
Comprehensiveness (frequency) – weekly, fortnightly, monthly, quarterly and annual monitoring or as risks identified.

1: Raw water monitoring cont.

Source water	Water Sampling Locality	Nature of other raw water monitoring programs			
		Weekly/Fortnightly	Monthly	Annual/Quarterly	
				• Methomyl • Methoxychlor • Metolachlor • Metribuzin • Mevinphos • Molinate • Monocrotophos • Myclobutanil • Naftalofos • Napropamide • Nicarbazin • Nitralin • Norfluazon • Novaluron • Omethoate • Oryzalin • Oxamyl • Oxychlordane • Oxyfluorfen • Paclobutrazole • Paraquat • Parathion • Parathion-Methyl • Pebulate • Penconazole • Pendimethalin • Permethrin • PFAS	• Phorate • Picloram • Pirimicarb • Pirimiphos-Ethyl • Pirimiphos-Methyl • Prochloraz • Profenofos • Promecarb • Prometon • Prometryn • Propachlor • Propamocarb • Propanil • Propargite • Propazine • Propiconazole • Propyzamide • Prothiofos • Pyraclostrobin • Pyrasulfatole • Pyrazophos • Pyrimethanil • Pyriproxyfen • Pyroxsulam • Quinclorac • Rimsulfuron • Siduron • Silvex

*Reduced frequency of monitoring in some catchments based on risk profile. ** Note all pesticides, herbicides and chemical organics results were within ADWG guideline values.
Not all parameters were measured at all localities or source waters. Purpose of monitoring - risk management within catchments and raw water supply systems.
Comprehensiveness (frequency) – weekly, fortnightly, monthly, quarterly and annual monitoring or as risks identified.

Appendix

1: Raw water monitoring cont.

Source water	Water Sampling Locality	Nature of other raw water monitoring programs			
		Weekly/Fortnightly	Monthly	Annual/Quarterly	
				• Simazine • Simetryn • Spirotetramat • Sulfotep • Sulprofos • Tebuconazole • Tebuthiuron • Temephos • Terbacil • Terbufos • Terbuthylazine • Terbutryn • Tertbutryn • Tetrachlorvinphos • Tetraconazole • Thiamethoxam • Thiobencarb • Thiodicarb • Thiometon • Toltrazuril	• Trans Chlordane • Triadimefon • Triadimenol • Triazophos • Trichlorfon • Trichloronate • Triclopyr • Trifloxystrobin • Trifloxysulfuron-Sodium • Trifluralin • Trinexapac Ethyl • Vernolate

*Reduced frequency of monitoring in some catchments based on risk profile.
** Note all pesticides, herbicides and chemical organics results were within ADWG guideline values.
Not all parameters were measured at all localities or source waters.
Purpose of monitoring - risk management within catchments and raw water supply systems.
Comprehensiveness (frequency) – weekly, fortnightly, monthly, quarterly and annual monitoring or as risks identified.

2: Safe Drinking Water Act Audit Certificate

Risk Management Plan Audit Certificate
Safe Drinking Water Regulations 2015

Certificate Number: 188
Audit period: 1 January 2021 – 31 December 2022

To:
Mr Muneeb Sunna
Manager Water Treatment and Quality
Gippsland Water
55 Hazelwood Road
Traralgon VIC 3844

Australian Business Number (ABN): 75 830 750 413

I, Karen Pither, after conducting a risk management plan audit of the water supplied by Gippsland Water, am of the opinion that—

> Gippsland Water *has not* complied with the obligations imposed by section 7(1) of the *Safe Drinking Water Act 2003* during the audit period.

Two minor non-compliances were noted in relation to:

- Failure to collect and analyse small number of samples listed in water sampling program, and the absence of an effective process to identify missed samples.
- Chemical parameters that were sampled from the same location within a sampling location on two or more consecutive occasions.

The non-compliances were considered minor as there is a low potential for a risk situation, and the potential impact of the non-compliance is not likely to be a serious or imminent risk to public health, or compromise public health.

27 April 2023

Gippsland Water

PO Box 348
55 Hazelwood Road
Traralgon VIC 3844

General enquiries 1800 050 500
Faults and emergencies 1800 057 057

contactus@gippswater.com.au
www.gippswater.com.au

ABN 75 830 750 413