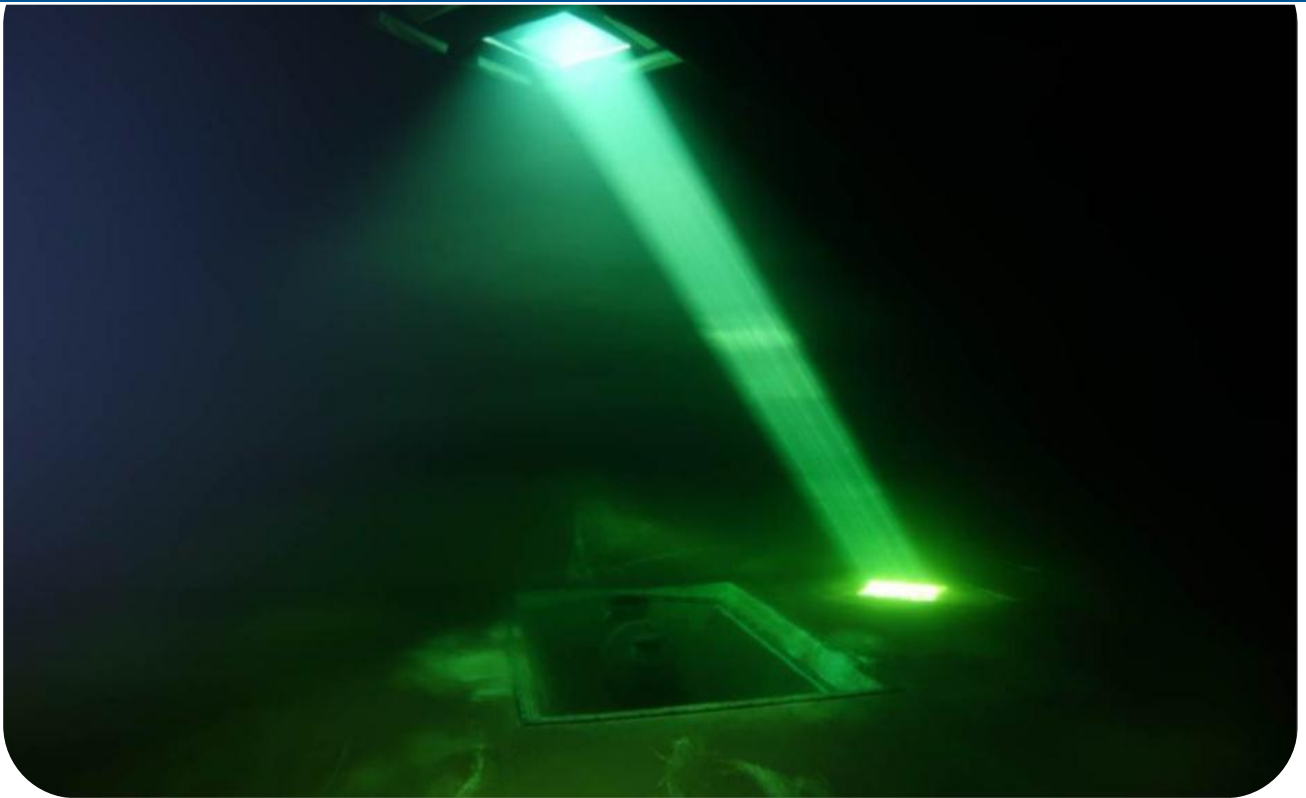


2012/13

Water Quality ANNUAL REPORT



Prepared for: Department of Health
(Water Program)

Dated: October 2013



Cover photo – An inside view of a clear water storage

TABLE OF CONTENTS

1.	INTRODUCTION	5
	Defining Drinking Water	5
	Sources of Water	5
2.	MANAGING WATER QUALITY	9
	Undertakings under Section 30 of The Act.....	9
	Variation to Aesthetic Standards	9
	Exemptions from water quality standards.....	9
	Regulated Water	9
	Non-potable supplies	9
3.	ENSURING SAFE DRINKING WATER	10
	Water Quality Management System	10
	Catchment Management.....	10
	Risk Management Plan Audit.....	10
4.	WATER TREATMENT.....	11
5.	MAINTAINING HIGH QUALITY WATER.....	13
	Staff Awareness and Training	13
	Distribution System	13
	Water Treatment Plant Changes and Improvements	13
	Water Plan 2 Summary of Improvements.....	14
6.	DRINKING WATER QUALITY RESULTS 2012/13	15
	Sampling Frequency	15
	Testing Programs	15
	Interpreting the results	15
	<i>Escherichia coli</i> (<i>E. coli</i>).....	16
	Chlorine-based Disinfection By-Product Chemicals.....	17
	Compliance – Trihalomethanes Results.....	17
	Non Compliance Regarding Trihalomethanes	17
	Compliance – Chloroacetic Acid Results.....	19
	Compliance – Dichloroacetic Acid Results	20
	Compliance – Trichloroacetic Acid Results	21
	Ozone-based Disinfection By-Product Chemicals.....	22
	Aluminium	23
	Non-Compliance Regarding Aluminium	24
	Turbidity	25
	Fluoride.....	26
	Other – May Pose A Risk To Human Health	27
	Manganese Results.....	27
	Lead Results.....	28
	Copper Results	29
	Arsenic Results	30
	Water treatment related chemicals	31
	Inorganics	31
	Polycyclic Aromatic Hydrocarbon Results	31
	Disinfection by-products	31
	Pesticide/Herbicide Results.....	32
	Industrial Chemical Results.....	32
	Radionuclides – Gross Beta, Gross Alpha Radioactivity Results	33
	Other Results	33
	Aesthetic Parameters.....	34

pH	34
Alkalinity	34
Hardness	34
Iron	34
Colour	34
Total Dissolved Solids.....	35
Alkalinity Results	37
Hardness Results.....	38
Iron Results	39
Colour Results	40
Total Dissolved Solids Results.....	41
Analysis of Results	42
Compliance as a Percentage of Localities	42
Compliance as a Percentage of Population	42
7. EMERGENCY AND INCIDENT MANAGEMENT.....	43
Section 22 Incidents.....	43
Other Incidents.....	43
Customer Complaints.....	43
Incidents Notified pursuant to Section 22 of SDWA	45
Other Incidents/Issues	46
8. GLOSSARY	47
9. WANNON WATER SERVICE AREA MAP	48

I. INTRODUCTION

Wannon Water is committed to providing safe, reliable drinking water to South-west Victoria. Wannon Water provides water and water reclamation services to a population of approximately 80,000 people (100,000 during peak season) in South-west Victoria. The area serviced extends from the South Australian border in the west, to Balmoral in the north, to Lismore in the east and the lower Gellibrand River catchment on the coast.

Wannon Water has aligned its drinking water quality management system with the Australian Drinking Water Guidelines 2011 (ADWG) and Hazard Analysis and Critical Control Point (HACCP) risk management principles. Wannon Water will continue to improve its drinking water quality management program to ensure that water is delivered to our customers within the limits of the *Safe Drinking Water Act 2003* and associated Regulations.

This 2012/13 Drinking Water Quality annual report has been developed in accordance with the requirements of the *Safe Drinking Water Act 2003*. The report highlights the programs and initiatives Wannon Water has in place to provide safe drinking water to the people living in Wannon Water's water sampling localities.

Wannon Water has a comprehensive water quality monitoring program extending across a region of 24,500 square kilometres. Samples are collected from: raw water sources; water entry points; water storages and at specific points in the reticulation representing the "customers tap". All samples collected are analysed by an independent laboratory certified by the National Association of Testing Authorities (NATA).

During 2012/13, Wannon Water continued to achieve a high level of compliance against the requirements of the *Safe Drinking Water Act 2003*.

The high standard of drinking water provided is reflected in customers' continued satisfaction with Wannon Water's performance. The 2012 customer satisfaction survey showed that 93% of business customers and 93% of

domestic customers were satisfied or very satisfied with the performance of Wannon Water.

Defining Drinking Water

The *Safe Drinking Water Act 2003* defines three types of water quality categories.

Drinking Water – Water that is intended for human consumption or for purposes connected with human consumption, such as the preparation of food or the making of ice for consumption or for the preservation of unpackaged food, whether or not the water is used for other purposes.

Regulated Water – This is water that is not intended for human consumption, but could be mistaken as drinking water. If there is a potential for the supply to be mistaken as drinking water exists, then the Minister for Health will declare the water as Regulated Water.

Non Potable Water – This is water that is not intended for human consumption and cannot be mistaken as drinking water. This water falls outside the *Safe Drinking Water Act 2003* and *Safe Drinking Water Regulations 2005*.

Sources of Water

During 2012/13, Wannon Water supplied drinking water to residential, rural, commercial and industrial customers. The water is harvested from a variety of sources and supplied through approximately 1,878 kilometres of water mains.

Wannon Water harvested approximately 11,620 megalitres (ML) of water to supply its customers. This water comes from an array of sources; namely, protected catchment areas, agricultural land, groundwater and, in two instances, supply from another regional water corporation. This water is supplied to customers with varying degrees of treatment, dependent on the characteristics of the quality.

Table I-1 details: Wannon Water's water sampling localities; the sources of supply; how the water is stored subsequent to treatment and the treatment facilities operated by Wannon Water. Figure 9 -1 illustrates the localities and where the water is sourced from.

Table I-1 - Source water and treatment systems summary

Water Sampling Locality	Source Water	Raw Water Storage	Treatment Plant	Number of customers ¹
Allansford - via Warrnambool Water Treatment Plant (WTP)	Arkins Creeks (3)	Gellibrand Tank	Warrnambool WTP	360
	Gellibrand River	South Otway Tank	Allansford Disinfection Plant (DP)	
	Carlisle Bores (2)	Ewen's Hill Reservoir		
	– via North Otway Pipeline	Plantation Rd Storage		
		Tank Hill Reservoir		
	Gellibrand River – South Otway Pipeline	Warrnambool Storage East		
		Warrnambool Storage West		
	Albert Park Bores (3)	Brierly Basin		
Roof water (North Warrnambool)	Albert Park Raw Water Storage			
Balmoral	Rocklands Reservoir (Grampians Wimmera Mallee Water)	Balmoral Service Basin	Balmoral WTP	160
Camperdown (Rural)	Arkins Creeks (3)	Gellibrand Tank	Camperdown WTP	390
	Gellibrand River	Donald's Hill Reservoir		
	Carlisle Bores (2)			
	– via North Otway Pipeline			
Camperdown (Urban)	Arkins Creeks (3)	Gellibrand Tank	Camperdown WTP	1860
	Gellibrand River	Donald's Hill Reservoir		
	Carlisle Bores (2)			
	– via North Otway Pipeline			
Caramut	Caramut Bores (2)	Caramut Service Basin	Caramut DP	80
		Caramut Tank (Raw Water)		
Casterton	Tullich Bores (4)	N/A	Casterton WTP	1020
Cavendish	Grampians National Park	Cavendish Service Basin	Cavendish Disinfection Plant	100
	7 streams on the western slopes of the Victoria Range and drought relief bores (2)			
Cobden	Arkins Creeks (3)	Gellibrand Tank	Cobden WTP	920
	Gellibrand River	Cobden Service Basin		
	Carlisle Bores (2)			
	– via North Otway Pipeline			
Coleraine - via Casterton WTP	Tullich Bores (4)	N/A	Casterton WTP	660
			Coleraine DP	
Darlington (Regulated Supply)	Darlington Bore (1)	Darlington Elevated Tank	Nil Treatment	20
Dartmoor	Dartmoor Bore (1)	N/A	Dartmoor DP	180
Derrinallum - via Camperdown WTP	Arkins Creeks (3)	Gellibrand Tank	Camperdown WTP	270 ²
	Gellibrand River	Donald's Hill Reservoir	Ettrick's Springs DP	
	Carlisle Bores (2)		Lismore/Derrinallum Tank DP	
	– via North Otway Pipeline			
Dunkeld - via Hamilton WTP	Grampians National Park	Hayes Reservoir	Hamilton WTP	410
	7 streams on the western slopes of the Victoria Range and drought relief bores (2)	Cruckoor Reservoir	Dunkeld DP	
		Hartwichs Reservoir		
		Hamilton Service Basins 1 & 2		
Glenthompson	Yuppeckiar Creek Catchment and	Glenthompson Reservoir	Glenthompson WTP	140
	Grampians Wimmera Mallee Water (32ML supplementary purchase from Willaura Catchment)	Railway Reservoir		

Water Sampling Locality	Source Water	Raw Water Storage	Treatment Plant	Number of customers ¹
Hamilton	Grampians National Park	Hayes Reservoir	Hamilton WTP	5500
	7 streams on the western slopes of the Victoria Range and drought relief bores (2)	Cruckoor Reservoir		
		Hartwichs Reservoir		
		Hamilton Service Basins 1 & 2		
Heywood	Heywood Bores (2)	N/A	Heywood WTP	780
Koroit - via Warrnambool WTP	Arkins Creeks (3)	Gellibrand Tank	Warrnambool WTP	770
	Gellibrand River	South Otway Tank	Illowa (Koroit) DP	
	Carlisle Bores (2)	Ewen's Hill Reservoir		
	– via North Otway Pipeline	Plantation Rd Storage		
		Tank Hill Reservoir		
	Gellibrand River – South Otway Pipeline	Warrnambool Storage East		
		Warrnambool Storage West		
	Albert Park Bores (3)	Brierly Basin		
Roof water (North Warrnambool)	Albert Park Raw Water Storage			
Lismore - via Camperdown WTP	Arkins Creeks (3)	Gellibrand Tank	Camperdown WTP	270 ²
	Gellibrand River	Donald's Hill Reservoir	Ettrick's Springs DP	
	Carlisle Bores (2)		Lismore/Derrinallum Tank DP	
	– via North Otway Pipeline			
Macarthur	Macarthur Bore	N/A	Macarthur WTP	180
Merino - via Casterton WTP	Tullich Bores - Bore Field (4)	N/A	Casterton WTP	190
			Merino DP	
Mortlake - via Terang WTP	Arkins Creeks (3)	Gellibrand Tank	Terang WTP	740
	Gellibrand River	Ewen's Hill Reservoir	Mortlake DP	
	Carlisle Bores (2)	Absolom's Bore Balance Tank		
	– via North Otway Pipeline			
	and Absolom's Bore (2)			
Noorat/Glenormiston - via Terang WTP	Arkins Creeks (3)	Gellibrand Tank	Terang WTP	250
	Gellibrand River	Ewen's Hill Reservoir		
	Carlisle Bores (2)			
	– via North Otway Pipeline			
Paaratte - via Port Campbell WTP	Port Campbell Bore (1)	N/A	Port Campbell WTP	30
Penshurst	Penshurst Bore (1)	N/A	Penshurst DP	330
Peterborough - via Port Campbell WTP	Port Campbell Bore (1)	N/A	Port Campbell WTP	400
Port Campbell	Port Campbell Bore (1)	N/A	Port Campbell WTP	310
Port Fairy	Port Fairy Bores (2)	N/A	Port Fairy WTP	2360
Portland	Wyatt Street Bore (1)	N/A	Portland Wyatt St WTP	6150
	Bald Hill Bores (2)		Portland Bald Hill WTP	
Purnim	Arkins Creeks (3)	Gellibrand Tank	Purnim DP	90
	Gellibrand River	Ewen's Hill Reservoir		
	Carlisle Bores (2)	Tank Hill Reservoir		
	– via North Otway Pipeline	Purnim Raw Water Tank		
Sandford - via Casterton WTP	Tullich Bores - (4)	N/A	Casterton WTP	90

Water Sampling Locality	Source Water	Raw Water Storage	Treatment Plant	Number of customers ¹
Simpson	Arkins Creeks (3)	Gellibrand Tank	Simpson WTP	110
	Gellibrand River	Simpson Service Basin		
	Carlisle Bores (2)			
	– via North Otway Pipeline			
Tarrington - via Hamilton WTP	Grampians National Park	Hayes Reservoir	Hamilton WTP	160
	7 streams on the western slopes of the Victoria Range and drought relief bores (2)	Cruckoor Reservoir		
		Hartwich's Reservoir		
		Hamilton Service Basins 1 & 2		
Terang	Arkins Creeks (3)	Gellibrand Tank	Terang WTP	1100
	Gellibrand River	Ewen's Hill Reservoir		
	Carlisle Bores (2)			
	– via North Otway Pipeline			
Timboon - via Port Campbell WTP	Port Campbell Bore (1)	N/A	Port Campbell WTP	610
Warrnambool	Arkins Creeks (3)	Gellibrand Tank	Warrnambool WTP	15580
	Gellibrand River	South Otway Tank		
	Carlisle Bores (2)	Ewen's Hill Reservoir		
	– via North Otway Pipeline	Plantation Rd Storage		
		Tank Hill Reservoir		
	Gellibrand River – South Otway Pipeline	Warrnambool Storage East		
		Warrnambool Storage West		
	Albert Park Bores (3)	Brierly Basin		
Roof water (North Warrnambool)	Albert Park Raw Water Storage			

N/A not applicable

¹ The figure used is the number of connections² Assumption (Lismore and Derrinalum customers 485)

2. MANAGING WATER QUALITY

Wannon Water bases its water quality compliance on the ADWG, as governed by the *Safe Drinking Water Act 2003* and associated Regulations. These guidelines are used for establishing microbiological, physical and chemical monitoring programs, which provide the basis for assessing drinking water quality.

Water Quality Standards

The Safe Drinking Water Regulations 2005 specify the water quality standards and the frequency at which they will be sampled. A brief explanation of the mandated water quality standards is given below.

Escherichia coli (E. coli) - is a bacterial species belonging to the Coliforms group. It is only found naturally in the digestive tract of warm blooded animals. The presence of *E. coli* is indicative that faecal contamination may have occurred. The water quality standard for *E. coli* is zero organisms per 100mL in 98% of samples collected within the locality in any 12 month period.

Chlorine Based Disinfection By-Product Chemicals - are compounds which form when chlorine reacts with naturally-occurring organic matter in the water supply. The most significant disinfection by-products are trihalomethanes (THMs), chloroacetic acid, dichloroacetic acid and trichloroacetic acid. The standard limits for THMs, chloroacetic acid, dichloroacetic acid and trichloroacetic acid are 0.25 mg/L, 0.15 mg/L, 0.10 mg/L and 0.10 mg/L, respectively.

Aluminium - may be present naturally in waters through leaching from soil and rocks. It may also be present through the addition of aluminium-based coagulants used for water treatment, such as aluminium sulphate. The standard limit for aluminium is 0.2 mg/L (acid soluble).

Turbidity - is a measure of particulate and suspended matter in water (cloudiness). Turbidity is caused by the presence of fine suspended matter such as clay, silt, colloidal particles and micro-organisms. Turbidity is measured in Nephelometric Turbidity Units (NTU). Based on aesthetic considerations, the standard is defined as the 95% upper confidence limit of the mean of samples of drinking water collected in a 12 month period must be less than or equal to 5.0 NTU.

Wannon Water also monitors for additional algal, microbiological, chemical, physical and radiological parameters. Results from the monitoring of the parameters that have a potential health or aesthetic impact on customers are presented in Section 6.

Undertakings under Section 30 of The Act

Should drinking water continually not meet the quality criterion then the Corporation is required to commit to an undertaking with the Department of Health to remediate the problem. Wannon Water did not apply for any undertakings in 2012/13.

Variation to Aesthetic Standards

No variations under section 19 or 21 of the Act were sought.

Exemptions from water quality standards

In accordance with the *Safe Drinking Water Act 2003* a water supplier may apply to the Minister for Health for an exemption to a water quality standard. The Minister will, if satisfied, exempt the water supplier from complying with the water quality standard, as it applies to drinking water supplied by the water supplier. As noted, approved exemptions release water suppliers from the requirement to meet a specified quality standard for a period of time, but do not release them from the obligation to minimise any risk to the public.

Consultation was undertaken with Cavendish customers, and an exemption from complying with the aluminium water quality standard was granted by the Minister on 30 June 2013; the exemption applies until 30 June 2018.

Regulated Water

The Minister for Health has declared the following systems as regulated water:

- Darlington was declared a regulated water supply on 7 September 2006 (Gazette number G36). Darlington's water is sourced from a bore at Darlington. The number of properties connected to this system is 22.
- North Otway Pipeline was declared a regulated water supply on 26 June 2008 (Gazette number S168). The North Otway Pipeline is sourced from Arkins Creek Catchment and Gellibrand River Catchment and is supplemented in the drier months from the Carlisle River Borefield. The number of properties connected to the system is 450.

In accordance with section 7 of the *Safe Drinking Water Act 2003* Wannon Water has a regulated water risk management plan that covers the two regulated water localities.

Non-potable supplies

Nine of the 34 systems contain customers that are supplied with non-potable water.

All these customers are known as non-drinking water 'supply-by-agreement' customers. They have each signed a contract with Wannon Water that indicates that the water is not fit for human consumption. These customers receive water from the system prior to disinfection.

3. ENSURING SAFE DRINKING WATER

Water Quality Management System

Wannon Water maintains a drinking water quality management system based on Hazard Analysis Critical Control Point (HACCP) and the ADWG risk management principles. Wannon Water utilises a multiple barrier approach to ensure that drinking water is safe and aesthetically pleasing. The strength of this approach is that if a barrier is compromised it is able to be compensated for by the effective operation of the remaining barriers. This approach minimises the likelihood of contaminants passing through the treatment system and potentially causing harm to consumers.

The barriers utilised are:

- Catchment management and source water protection;
- Detention in protected reservoirs or storages;
- Extraction management;
- Treatment;
- Disinfection; and
- Maintenance of the distribution system; including maintaining adequate chlorine or chloramine residuals.

Raw (source) water from surface and groundwater supplies may contain contaminants such as sediment, microorganisms and dissolved organic compounds. Such water may not be aesthetically pleasing or safe to drink. To create a safe drinking supply Wannon Water treats the water through differing processes. The treated water is then reticulated through a number of storage tanks and pipes before being delivered to customers.

Catchment Management

Wannon Water has a partnership agreement with the Corangamite Catchment Management Authority, and local councils and shires within the catchment, to work with landholders to implement projects which improve the water quality and health of waterways within the Gellibrand River Water Supply Catchment. Rehabilitation activities include fencing and supply of alternative stock water, willow removal and revegetation. The aim when fencing is for 100% exclusion.

During 2012/13, a number of projects funded in the previous two years were completed. This included: willow removal at one property; fencing at two properties; and revegetation on three properties. Flood recovery works were completed on three properties. Two landholders on the Gellibrand River just upstream of the South Otway pump station formed agreements. Both properties had willows removed and fencing and revegetation at these properties has commenced.

During Water Plan 2 there have been 22 landholders' projects within the water supply catchments. In all, work has been undertaken on 44 km of waterway (single side) covering a total area of 67 hectares. This has included 42 km of willow removal and the creation of 57 hectares of streamside buffer zones. These projects have occurred on the Gellibrand River; and one was also undertaken on Loves Creek.

Risk Management Plan Audit

A regulatory audit was not carried out during the reporting period. The next risk management plan audit is required between 1 September 2013 and 30 April 2014.

Wannon Water achieved HACCP re-certification in December 2012. A HACCP surveillance audit was also conducted in May 2013. Three minor non-conformances were identified over the two audits:

1. Use of out-dated log sheets at some sites.
Wannon Water has a system of notification of new forms, so team members were reminded to replace forms in a timely manner. Wannon Water is working towards paperless recording of log sheets.
2. Some on-site records were not well organised, making it difficult to verify instrument calibration. Wannon Water is working towards paperless recording of this information.
3. Chemical Delivery Checklist was not always signed by the delivery driver and out-dated forms were used on occasion. The form was updated to include a reminder. Wannon Water is working towards paperless recording of this information.

4. WATER TREATMENT

Water treatment at Wannon Water varies by system, ranging from no treatment in regulated water supplies, to full treatment via a water treatment plant.

Some of the processes incorporated in treating water include:

- Raw water detention – clarification, via settling, microbial die-off and reducing variability in water quality.
- Oxidation - used to convert soluble contaminants to insoluble contaminants for easier removal. Sodium hypochlorite is used for oxidation.
- Coagulation - to destabilise colloidal particles (turbidity and colour) by neutralising the surface charge of the particle to allow floc formation. Coagulants used are ferric chloride, aluminium chlorohydrate (ACH) and aluminium sulphate (alum)
- Flocculation - to increase the floc size to enhance clarification and aid filtration. Flocculants used include polyelectrolyte Nalco, Magnafloc, polymer Nalclear and polymer Klaraid.
- Cooling/ aeration towers – cool water via aeration.
- Clarification - two main primary solids removal processes are utilised;
- Sedimentation for coarse removal of particles through settling under gravity;
- Dissolved Air Flotation (DAF) for coarse removal of particles through air flotation;
- Filtration - remove suspended material;
- Adsorption - remove dissolved organic matter, particles, algal toxins and compounds causing taste and odour problems. Granulated activated carbon (GAC) is used for adsorption.
- Sequestration - involves the addition of sequestering agents to keep dissolved iron and manganese from oxidising and precipitating. Calgon is used as a sequestering agent.
- Disinfection - to kill bacteria and viruses. Note all drinking water supplied by Wannon Water is disinfected (chlorination or chloramination) to ensure that microorganisms are eliminated. Chlorine gas, sodium hypochlorite and aqueous ammonia are used for disinfection.
- pH correction/ stabilisation - to adjust pH, to aid coagulation, to prevent corrosion or scaling and to optimise disinfection. Caustic soda, soda ash and hydrated lime are used for pH correction.
- Fluoridation – for dental health benefits. Fluorosilicic acid is used for fluoridation.
- Storage - to provide adequate contact time for effective disinfection.

Table 4-1 details the treatment processes utilised within each of Wannon Water's drinking water treatment plants.

The water treatment processes employed during 2012/13 were similar to 2011/12. Changes and improvements to the system are outlined in Section 5.



Table 4-1 - Treatment Processes and Added Substances 2012/13

Plants	Raw Water Detention	Cooling / aeration towers	Upstream Water Treatment Plant	pH Adjust				Coagulation		Flocculation			Clarification		Filtration	Adsorption		Sequestration	Disinfection				pH Adjust				Fluoridisation	Clear Water Storage					
				Pre-Chlorination Sodium Hypo	Caustic soda	Soda Ash	Hydrated Lime	Carbon Dioxide	Ferric Chloride	Aluminium chlorohydrate (ACH)	Aluminium Sulphate	Polyelectrolyte Nalco 3482	Magnafloc LT20 flocculant	Polymer Nalclear 8170PULN		Polymer Klaraid	Clarifier		Dissolved air floatation	Activated Carbon	Calgon	Chlorine gas	Sodium hypochlorite	Aqueous ammonia	UV	Caustic soda			Soda Ash	Hydrated Lime	Carbon Dioxide		
Allansford			✓																													✓	
Balmoral	✓				✓				✓						✓	✓	✓	✓			✓	✓				✓						✓	
Camperdown	✓					✓				✓					✓	✓				✓		✓					✓	✓				✓	
Caramut																																✓	
Carlisle River																																✓	
Casterton			✓						✓			✓				✓																✓	
Cavendish	✓									✓																						✓	
Cobden	✓				✓					✓				✓	✓		✓		✓								✓					✓	
Coleraine			✓																													✓	
Dartmoor																																✓	
Dunkeld			✓																													✓	
Ewen's Hill	✓																															✓	
Glenthompson	✓									✓					✓	✓	✓	✓			✓	✓	✓	✓								✓	
Hamilton	✓					✓					✓				✓	✓				✓		✓	✓				✓				✓	✓	
Heywood		✓																		✓												✓	
Koroit		✓																														✓	
Ettrick Springs		✓																														✓	
Lismore/Derrinallum		✓																														✓	
Macarthur			✓						✓			✓				✓*																	✓
Merino		✓																														✓	
Mortlake		✓																														✓	
Penshurst																																✓	
Port Campbell		✓														✓																✓	
Port Fairy		✓																	✓													✓	
Portland Wyatt St		✓																														✓	
Portland Bald Hill		✓																														✓	
Purnim	✓																															✓	
Sandford		✓																														✓	
Simpson	✓				✓					✓						✓	✓											✓					✓
Tank Hill	✓																											✓				✓	
Terang	✓				✓					✓				✓	✓		✓										✓					✓	
Warrnambool	✓									✓	✓					✓	✓												✓			✓	

*Pressure filters plus iron sorption filters

Legend

	Raw Water
	Oxidation
	Coagulation, Flocculation and Clarification
	Filtration
	Sequestration
	Disinfection
	Fluoridation
	Treated Water Storage

5. MAINTAINING HIGH QUALITY WATER

Staff Awareness and Training

Wannon Water has adopted the Best Practice Guidelines for Victorian Framework for Water Treatment Operator Competencies. Wannon Water is dedicated to providing relevant employees with water industry training and awareness in via formal training and attendance at relevant conferences and information sessions. In 2012/13 this included:

- Internal auditor training
- Certification III and IV in Water Industry Operations
- Attendance at Water Industry Operators Association (WIOA) Conference
- Attendance at Water Contamination Conference
- Oz Water Conference
- Attendance at Victorian Drinking Water Network meetings

Distribution System

Flushing Program

Wannon Water has a regular flushing program for drinking water localities. Frequency of flushing is risk-based and Wannon Water utilises field data and customer feedback in scheduling the program, which is reviewed as required.

Wannon Water uses flushing to remove colour or turbidity in response to reaching critical limits or when a customer complaint is received. Flushing is also used to increase chlorine residual at locations where water usage is low.

Air Scouring Program

Wannon Water utilises contractors to conduct air scouring on a regular basis. Frequency of air scouring is risk based. Localities where air scouring occurred in 2012/13 included:

- Allansford
- Koroit
- Balmoral
- Macarthur
- Simpson

The air scouring undertaken totalled 86 kilometres of water mains.

Mains Renewal Program

Wannon Water has an asset replacement program created and prioritised via a risk-based process using event information, condition assessments and asset modelling. In 2012/13 Wannon Water spent over \$1.34 million replacing or extending 5 km of mains at Port Campbell/Timboon, Terang and Warrnambool.

Tank Cleaning Program

Wannon Water utilises contractors on a regular basis to clean tanks within the distribution system and storages at water treatment plants. In 2012/13 cleaning occurred at:

- Arundel Road basin at Casterton
- Dunkeld clear water storage
- Glenthompson clear water storage
- Bald Hill cooling tower sumps Portland.

Water Treatment Plant Changes and Improvements

Allansford DP

The chlorinator at the Allansford DP was upgraded.

Cavendish DP

A UV system and raw water storage cover were added at the Cavendish DP.

Cobden WTP

The backwash system at the Cobden WTP was upgraded.

Glenthompson WTP

The clarifier at Glenthompson WTP was upgraded, filter media was replaced and a UV disinfection system was installed.

Macarthur WTP

The clarifier at Macarthur WTP was repaired. Dosing equipment was also replaced and bunding was improved. During the replacement period, supply was ensured by tankering from Warrnambool.

Purnim DP

A UV system was added to the Purnim DP.

Conversion of chloraminated systems

Wannon Water commenced a program to reduce its ammonia exceedances. The process involved converting chloraminated systems back to chlorinated systems by cessation of ammonia dosing. Systems included Terang and Warrnambool, and the localities of Glenthompson and Balmoral. The program of works resulted in long term changes to the disinfection modes in some localities. The Terang System, which includes Terang, Glenormiston, Noorat and Mortlake, and the Warrnambool System, which includes Allansford, Koroit and Warrnambool, remained as chlorinated systems at the end of the reporting period. The conversion successfully removed biofilms from the system resulting in reduced ammonia levels and compliance being achieved.

NOTE: Ammonia is added to systems for two principle reasons: it reduces the amount of disinfection by-products (Schedule 2 parameters) in systems which have high organics in their source water; and it helps maintain chlorine residual in long systems/mains.

Isolation of storages

During 2012/13 trigger levels for Blue Green Algae were exceeded at Cobden raw water storage. The storage was isolated from the system and dosed with copper sulphate.

Water Plan 2 Summary of Improvements

2012/13 was the last year of Water Plan 2 and concluded a very productive five year water plan period. Projects completed during Water Plan 2 included corporate wide improvements including SCADA, online instrumentation and emergency back-up (generators). Other major projects (\$250,000+ projects) are listed in Table 5-1.

Roof water harvesting project mastermind Peter Wilson



Water main replacement at Terang



Merino clear water storage



Figure 5-1 - Water Plan 2 Summary of Improvements

Project	Capital Cost (000's)	Status/comments
Hamilton/Grampians pipeline	24,600	Completed
Casterton/Coleraine pipeline	3,830	Completed
Roof water harvesting project	2,800	Completed
Hamilton WTP upgrade	1,624 ^F	To be completed 2013-14 - includes filter upgrade, lime dosing system and DAF improvements
Mobile Information Management System	1,360	Completed - Used by Systems Operations for reactive maintenance
Casterton WTP upgrade	1,240	Completed - included ferric, poly dosing and pre-chlorination system
Fluoridation at Hamilton WTP	1,200	Completed
Line and cover basin at Arundel Road, Casterton	1,160	Completed
Water main replacement Port Campbell/Timboon	930	Completed
Macarthur Ion Sorption Plant	890	Completed
Water main replacement Terang	835	To be completed 2013-14
Construction of Dales Road storage 2	826 ^F	Completed
Hartwich's Reservoir inlet out separation	760	Completed
Coleraine clear water storage	690	Completed
Port Fairy cooling towers replacement	671	Completed
New development Warrnambool	630	Completed
Merino clear water storage	520	Completed
Fluoridation at Warrnambool WTP (finish)	480 ^F	Completed
Bald Hill Portland Bore 2 replacement	478	Completed
Bald Hill Portland Replace chlorinator building	416	Completed
Bald Hill Portland Bore 1 replacement	411	Completed
Portland chlorine dosing upgrade	406	Completed
Water main extension South Warrnambool	380	To be completed in 2013-14
Camperdown WP pH correction (carbon dioxide)	323 ^F	Completed
Arundel Road Casterton feeder main	303	Completed
Casterton feeder main connection Glenelg River	300	Completed
Water main replacement Warrnambool	297	Completed
Cavendish basin cover and UV disinfection	250	Completed

F – Finalisation of a project which commenced in Water Plan 1

6. DRINKING WATER QUALITY RESULTS 2012/13

Sampling Frequency

The frequency of sampling of the water quality standards (*Escherichia coli*, disinfection by-products, aluminium and turbidity) is specified in Schedule 2 of the Safe Drinking Water Regulations 2005. Wannon Water uses its risk assessment process to select an appropriate sampling frequency for additional microbiological, chemical, physical, radiological and algal monitoring.

Regulation 11 of the Safe Drinking Water Regulations 2005 (the Regulations) provides that the Secretary to the Department of Health may, by notice published in the Government Gazette, vary the frequencies specified in Schedule 2 of the Regulations at which samples of drinking water are to be collected at a water sampling point located within a water sampling locality. On 5 June 2009 the Secretary approved a variation to the frequency at which a sample of drinking water for *Escherichia coli* (*E.coli*) and turbidity were to be collected at:

- Port Fairy – from 1 sample per week to 2 samples per week
- Portland – from 1 sample per week to 2 samples per week
- Hamilton – from 1 sample per week to 2 samples per week
- Warrnambool – from 1 sample per week to 3 samples per week

Testing Programs

The number of samples collected and frequency of testing varies for each locality according to population and risk. The geographic location of customer sampling taps is designed to ensure that the samples are collected representative of the supply system. The sampling program is reviewed on a regular basis to align with changes in the risk profile of each locality.

During 2012/13 Wannon Water performed over 67,000 individual tests. Approximately 41% of the tests were sampled at customer's taps within 34 localities.

With the exception of Schedule 2 parameters, where weekly samples are collected, a total number of 51 samples are collected in the reporting period, as a reduced sampling program is utilised during Christmas week.

On occasion, scheduled testing will be missed for various reasons, such as human error, broken or missing sample bottles or the sample point being out of action (e.g. bore not operational at time of sampling). Any missed regulatory samples are communicated to the Department of Health at the time. In 2012/13 no regulatory samples were missed.

Interpreting the results

The units of results are dependent on the parameter being analysed. The most common unit used within this report is milligrams per litre (**mg/L**). This unit is interchangeable with parts per million (ppm). Other units within this report include:

- **orgs/100mL** used for measurement of *E.coli*
- Nephelometric Turbidity Units (**NTU**) a measurement for turbidity
- **pH units** for measurement of pH
- Platinum-Cobalt (**Pt.-Co.**) units for measurement of colour. This unit is interchangeable with Hazen Units (HU)
- **mg/L as calcium carbonate (CaCO₃)** used for measuring total hardness

More than one sample collected per week – Localities where more than one sample is collected per week are marked with an asterisk (*).

Missing tests – All missing tests are marked with the hash symbol (#) within the report and due to reasons stated under Testing Programs.

Less than limit of detection – The symbol for less than (<) is used when the concentration of a parameter is less than what can be detected accurately by the instrument. The level which an instrument can accurately detect is known as the "limit of detection".

Weekly testing – All tests marked with a "W" are tested weekly, except during Christmas week.

Aesthetic exceedance – All tests marked with "A*" are aesthetic exceedance, "x" indicating the number of exceedances.

Thermal bores only – All tests marked with an "H" are conducted at localities with thermal bore/s only, namely Heywood, Port Campbell, Port Fairy and Portland.

Escherichia coli (E. coli)

Standard At least 98% of all samples of drinking water collected within a locality in any 12 month period to contain no *E. coli* (SDWR).

Table 6-1 *E. coli* results by locality 2012/13**E.coli**

Locality	Sampling Frequency	No. of Samples	No. of Non-complying samples	% samples with no <i>E.coli</i>	Max result (orgs/100ml)	Compliant (Yes/no)
ALLANSFORD	Weekly	52	0	100.0	0	Yes
BALMORAL	Weekly	52	0	100.0	0	Yes
CAMPERDOWN (RURAL)	Weekly	52	0	100.0	0	Yes
CAMPERDOWN (URBAN)	Weekly	52	0	100.0	0	Yes
CARAMUT	Weekly	52	0	100.0	0	Yes
CASTERTON	Weekly	52	0	100.0	0	Yes
CAVENDISH	Weekly	52	0	100.0	0	Yes
COBDEN	Weekly	52	0	100.0	0	Yes
COLERAINE	Weekly	52	0	100.0	0	Yes
DARTMOOR	Weekly	52	0	100.0	0	Yes
DERRINALLUM	Weekly	52	0	100.0	0	Yes
DUNKELD	Weekly	52	0	100.0	0	Yes
GLENTHOMPSON	Weekly	52	0	100.0	0	Yes
HAMILTON	Weekly*	104	0	100.0	0	Yes
HEYWOOD	Weekly	52	0	100.0	0	Yes
KOROIT	Weekly	52	0	100.0	0	Yes
LISMORE	Weekly	52	0	100.0	0	Yes
MACARTHUR	Weekly	52	0	100.0	0	Yes
MERINO	Weekly	52	0	100.0	0	Yes
MORTLAKE	Weekly	52	0	100.0	0	Yes
NOORAT/GLENORMISTON	Weekly	52	0	100.0	0	Yes
PAARATTE	Weekly	52	0	100.0	0	Yes
PENSHURST	Weekly	52	0	100.0	0	Yes
PETERBOROUGH	Weekly	52	0	100.0	0	Yes
PORT CAMPBELL	Weekly	52	0	100.0	0	Yes
PORT FAIRY	Weekly*	104	0	100.0	0	Yes
PORTLAND	Weekly*	104	0	100.0	0	Yes
PURNIM	Weekly	52	0	100.0	0	Yes
SANDFORD	Weekly	52	0	100.0	0	Yes
SIMPSON	Weekly	52	0	100.0	0	Yes
TARRINGTON	Weekly	52	0	100.0	0	Yes
TERANG	Weekly	52	0	100.0	0	Yes
TIMBOON	Weekly	52	0	100.0	0	Yes
WARRNAMBOOL	Weekly*	156	0	100.0	0	Yes

* Weekly sampling with increases for population (ADWG, Section 9.5.2)

Chlorine-based Disinfection By-Product Chemicals

Compliance – Trihalomethanes Results

Standard All samples of drinking water collected within a locality in any 12 month period must not exceed 0.25 mg/L (SDWR)

Table 6-2 Trihalomethanes results by locality 2012/13

Trihalomethanes

Locality	Sampling Frequency	No. of Samples	No. of Non-complying samples	Maximum result (mg/L)	Compliant (Yes/no) ¹
ALLANSFORD	Monthly	12	0	0.084	Yes
BALMORAL	Monthly	12	1	0.270	No
CAMPERDOWN (RURAL)	Monthly	12	0	0.013	Yes
CAMPERDOWN (URBAN)	Monthly	12	0	0.014	Yes
CARAMUT	Monthly	12	0	0.026	Yes
CASTERTON	Monthly	12	0	0.150	Yes
CAVENDISH	Monthly	12	0	0.022	Yes
COBDEN	Monthly	12	0	0.098	Yes
COLERAINE	Monthly	12	0	0.200	Yes
DARTMOOR	Monthly	12	0	0.027	Yes
DERRINALLUM	Monthly	12	0	0.100	Yes
DUNKELD	Monthly	12	0	0.092	Yes
GLENTHOMPSON	Monthly	12	0	0.190	Yes
HAMILTON	Monthly	12	0	0.019	Yes
HEYWOOD	Monthly	12	0	0.019	Yes
KOROIT	Monthly	12	0	0.097	Yes
LISMORE	Monthly	12	0	0.059	Yes
MACARTHUR	Monthly	12	0	0.068	Yes
MERINO	Monthly	12	0	0.170	Yes
MORTLAKE	Monthly	12	0	0.140	Yes
NOORAT/GLENORMISTON	Monthly	12	0	0.140	Yes
PAARATTE	Monthly	12	0	0.011	Yes
PENSHURST	Monthly	12	0	0.041	Yes
PETERBOROUGH	Monthly	12	0	0.012	Yes
PORT CAMPBELL	Monthly	12	0	0.022	Yes
PORT FAIRY	Monthly	12	0	<0.001	Yes
PORTLAND	Monthly	12	0	0.001	Yes
PURNIM	Monthly	12	0	0.120	Yes
SANDFORD	Monthly	12	0	0.190	Yes
SIMPSON	Monthly	12	0	0.058	Yes
TARRINGTON	Monthly	12	0	0.017	Yes
TERANG	Monthly	12	0	0.110	Yes
TIMBOON	Monthly	12	0	0.051	Yes
WARRNAMBOOL	Monthly	12	0	0.069	Yes

1 - For total trihalomethanes, if the maximum result is 0.255mg/L or greater, then the locality is non-compliant

Non Compliance Regarding Trihalomethanes

The Balmoral water sampling locality experienced a single non-conformance (Figure 6-1). This was a result of the conversion from a chloraminated supply to chlorination as discussed in Section 5 and was quickly rectified by converting the Balmoral Water Treatment Plant back to a chloramination dosing system.

Maximum result for Trihalomethanes is 0.25 mg/L or greater (red line)

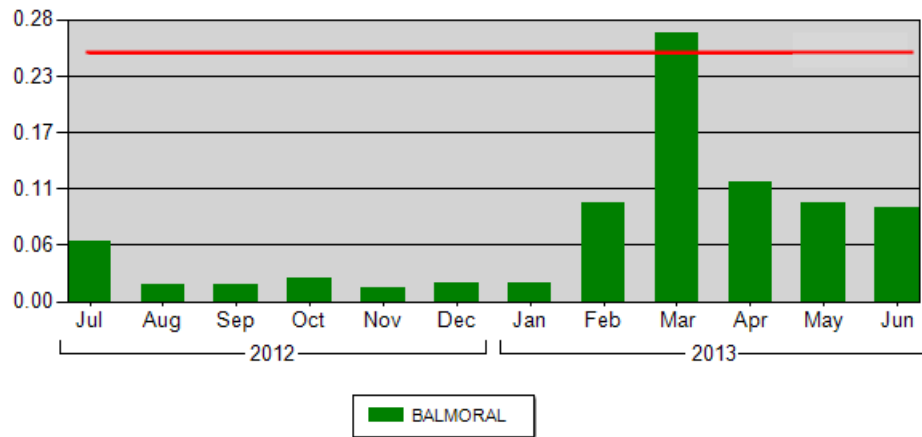


Figure 6-1- Balmoral Trihalomethanes 2012/13

Compliance – Chloroacetic Acid Results

Standard All samples of drinking water collected within a locality in any 12 month period must not exceed 0.15 mg/L (SDWR)

Table 6-3 Chloroacetic acid results by locality 2012/13

Chloroacetic Acid

Locality	Sampling Frequency	No. of Samples	No. of Non-complying samples	Maximum result (mg/L)	Compliant (Yes/no) ¹
ALLANSFORD	Monthly	12	0	<0.002	Yes
BALMORAL	Monthly	12	0	0.007	Yes
CAMPERDOWN (RURAL)	Monthly	12	0	<0.002	Yes
CAMPERDOWN (URBAN)	Monthly	12	0	<0.002	Yes
CARAMUT	Monthly	12	0	<0.002	Yes
CASTERTON	Monthly	12	0	<0.002	Yes
CAVENDISH	Monthly	12	0	0.020	Yes
COBDEN	Monthly	12	0	<0.002	Yes
COLERAINE	Monthly	12	0	0.004	Yes
DARTMOOR	Monthly	12	0	<0.002	Yes
DERRINALLUM	Monthly	12	0	<0.002	Yes
DUNKELD	Monthly	12	0	0.006	Yes
GLENTHOMPSON	Monthly	12	0	0.004	Yes
HAMILTON	Monthly	12	0	0.004	Yes
HEYWOOD	Monthly	12	0	<0.002	Yes
KOROIT	Monthly	12	0	0.003	Yes
LISMORE	Monthly	12	0	<0.002	Yes
MACARTHUR	Monthly	12	0	<0.002	Yes
MERINO	Monthly	12	0	0.003	Yes
MORTLAKE	Monthly	12	0	0.003	Yes
NOORAT/GLENORMISTON	Monthly	12	0	0.003	Yes
PAARATTE	Monthly	12	0	<0.002	Yes
PENSHURST	Monthly	12	0	<0.002	Yes
PETERBOROUGH	Monthly	12	0	<0.002	Yes
PORT CAMPBELL	Monthly	12	0	<0.002	Yes
PORT FAIRY	Monthly	12	0	<0.002	Yes
PORTLAND	Monthly	12	0	<0.002	Yes
PURNIM	Monthly	12	0	0.003	Yes
SANDFORD	Monthly	12	0	<0.002	Yes
SIMPSON	Monthly	12	0	<0.002	Yes
TARRINGTON	Monthly	12	0	<0.002	Yes
TERANG	Monthly	12	0	<0.002	Yes
TIMBOON	Monthly	12	0	<0.002	Yes
WARRNAMBOOL	Monthly	12	0	<0.002	Yes

1 - For chloroacetic acid, if the maximum result is 0.155mg/L or greater, then the locality is non-compliant

Compliance – Dichloroacetic Acid Results

Standard All samples of drinking water collected within a locality in any 12 month period must not exceed 0.10 mg/L (SDWR)

Table 6-4 Dichloroacetic acid results by locality 2012/13

Dichloroacetic Acid

Locality	Sampling Frequency	No. of Samples	No. of Non-complying samples	Maximum result (mg/L)	Compliant (Yes/no) I
ALLANSFORD	Monthly	12	0	0.015	Yes
BALMORAL	Monthly	12	0	0.057	Yes
CAMPERDOWN (RURAL)	Monthly	12	0	0.013	Yes
CAMPERDOWN (URBAN)	Monthly	12	0	0.009	Yes
CARAMUT	Monthly	12	0	0.003	Yes
CASTERTON	Monthly	12	0	0.014	Yes
CAVENDISH	Monthly	12	0	0.075	Yes
COBDEN	Monthly	12	0	0.023	Yes
COLERAINE	Monthly	12	0	0.021	Yes
DARTMOOR	Monthly	12	0	<0.002	Yes
DERRINALLUM	Monthly	12	0	0.017	Yes
DUNKELD	Monthly	12	0	0.040	Yes
GLENTHOMPSON	Monthly	12	0	0.034	Yes
HAMILTON	Monthly	12	0	0.024	Yes
HEYWOOD	Monthly	12	0	<0.002	Yes
KOROIT	Monthly	12	0	0.015	Yes
LISMORE	Monthly	12	0	0.006	Yes
MACARTHUR	Monthly	12	0	0.003	Yes
MERINO	Monthly	12	0	0.017	Yes
MORTLAKE	Monthly	12	0	0.034	Yes
NOORAT/GLENORMISTON	Monthly	12	0	0.031	Yes
PAARATTE	Monthly	12	0	<0.002	Yes
PENSHURST	Monthly	12	0	<0.002	Yes
PETERBOROUGH	Monthly	12	0	<0.002	Yes
PORT CAMPBELL	Monthly	12	0	<0.002	Yes
PORT FAIRY	Monthly	12	0	0.003	Yes
PORTLAND	Monthly	12	0	0.004	Yes
PURNIM	Monthly	12	0	0.030	Yes
SANDFORD	Monthly	12	0	0.016	Yes
SIMPSON	Monthly	12	0	0.014	Yes
TARRINGTON	Monthly	12	0	0.018	Yes
TERANG	Monthly	12	0	0.028	Yes
TIMBOON	Monthly	12	0	<0.002	Yes
WARRNAMBOOL	Monthly	12	0	0.011	Yes

I - For dichloroacetic acid, if the maximum result is 0.145mg/L or greater, then the locality is non-compliant

Compliance – Trichloroacetic Acid Results

Standard All samples of drinking water collected within a locality in any 12 month period must not exceed 0.10 mg/L (SDWR)

Table 6-5 Trichloroacetic acid results by locality 2012/13

Trichloroacetic Acid

Locality	Sampling Frequency	No. of Samples	No. of Non-complying samples	Maximum result (mg/L)	Compliant (Yes/no) ¹
ALLANSFORD	Monthly	12	0	0.009	Yes
BALMORAL	Monthly	12	0	0.050	Yes
CAMPERDOWN (RURAL)	Monthly	12	0	0.011	Yes
CAMPERDOWN (URBAN)	Monthly	12	0	0.012	Yes
CARAMUT	Monthly	12	0	<0.002	Yes
CASTERTON	Monthly	12	0	0.011	Yes
CAVENDISH	Monthly	12	0	0.005	Yes
COBDEN	Monthly	12	0	0.025	Yes
COLERAINE	Monthly	12	0	0.015	Yes
DARTMOOR	Monthly	12	0	<0.002	Yes
DERRINALLUM	Monthly	12	0	0.018	Yes
DUNKELD	Monthly	12	0	0.017	Yes
GLENTHOMPSON	Monthly	12	0	0.022	Yes
HAMILTON	Monthly	12	0	0.003	Yes
HEYWOOD	Monthly	12	0	<0.002	Yes
KOROIT	Monthly	12	0	0.007	Yes
LISMORE	Monthly	12	0	0.014	Yes
MACARTHUR	Monthly	12	0	<0.002	Yes
MERINO	Monthly	12	0	0.012	Yes
MORTLAKE	Monthly	12	0	0.035	Yes
NOORAT/GLENORMISTON	Monthly	12	0	0.038	Yes
PAARATTE	Monthly	12	0	<0.002	Yes
PENSHURST	Monthly	12	0	<0.002	Yes
PETERBOROUGH	Monthly	12	0	<0.002	Yes
PORT CAMPBELL	Monthly	12	0	<0.002	Yes
PORT FAIRY	Monthly	12	0	<0.002	Yes
PORTLAND	Monthly	12	0	<0.002	Yes
PURNIM	Monthly	12	0	0.062	Yes
SANDFORD	Monthly	12	0	0.012	Yes
SIMPSON	Monthly	12	0	0.011	Yes
TARRINGTON	Monthly	12	0	0.003	Yes
TERANG	Monthly	12	0	0.036	Yes
TIMBOON	Monthly	12	0	<0.002	Yes
WARRNAMBOOL	Monthly	12	0	0.005	Yes

1 - For trichloroacetic acid, if the maximum result is 0.145mg/L or greater, then the locality is non-compliant

Ozone-based Disinfection By-Product Chemicals

Wannon Water does not use ozone in any treatment or disinfection plants. All the raw waters are sourced from surface and groundwater that have not been pre-treated with ozone.

The ADWG states “Bromate is a possible by-product of disinfection using ozone, otherwise unlikely to be found in drinking water”. Based on this information Wannon Water considers the risk of bromate low and did not sample for it during 2012/13.

Another disinfection by-product of ozone is formaldehyde. Formaldehyde may also enter a drinking water supply via deposition from the atmosphere or via industry spills. Wannon Water’s risk assessments have not identified any industries that utilise formaldehyde within the catchments. Wannon Water undertook base line formaldehyde monitoring in 2006/07 with all results returning less than the analytical detection limit. Based on this information Wannon Water considers the risk of formaldehyde low and did not sample for it during 2012/13.

Aluminium

Standard All samples of drinking water collected within a locality in any 12 month period must not exceed 0.2 mg/L (Acid Soluble) (SDWR)

Table 6-6 Aluminium results by locality 2012/13

Aluminium (Acid Soluble)

Locality	Sampling Frequency	No. of Samples	No. of Non-complying samples	Maximum result (mg/L)	Compliant (Yes/no)
ALLANSFORD	Monthly	12	0	0.11	Yes
BALMORAL	Monthly	12	0	0.15	Yes
CAMPERDOWN (RURAL)	Monthly	12	0	0.05	Yes
CAMPERDOWN (URBAN)	Monthly	12	0	0.05	Yes
CARAMUT	-	-	-	-	-
CASTERTON	-	-	-	-	-
CAVENDISH	Monthly	12	1	0.25	No
COBDEN	Monthly	12	0	0.18	Yes
COLERAINE	-	-	-	-	-
DARTMOOR	-	-	-	-	-
DERRINALLUM	Monthly	12	0	0.04	Yes
DUNKELD	Monthly	12	0	0.03	Yes
GLENTHOMPSON	Monthly	12	0	0.06	Yes
HAMILTON	Monthly	12	1	0.28	No
HEYWOOD	-	-	-	-	-
KOROIT	Monthly	12	0	0.09	Yes
LISMORE	Monthly	12	0	0.03	Yes
MACARTHUR	-	-	-	-	-
MERINO	-	-	-	-	-
MORTLAKE	Monthly	12	0	0.05	Yes
NOORAT/GLENORMISTON	Monthly	12	0	0.07	Yes
PAARATTE	-	-	-	-	-
PENSHURST	-	-	-	-	-
PETERBOROUGH	-	-	-	-	-
PORT CAMPBELL	-	-	-	-	-
PORT FAIRY	-	-	-	-	-
PORTLAND	-	-	-	-	-
PUENIM	-	-	-	-	-
SANDFORD	-	-	-	-	-
SIMPSON	Monthly	12	0	0.23	Yes
TARRINGTON	Monthly	12	0	0.10	Yes
TERANG	Monthly	12	0	0.10	Yes
TIMBOON	-	-	-	-	-
WARRNAMBOOL	Monthly	12	0	0.09	Yes

If the maximum result for acid-soluble aluminium is 0.25 mg/L or greater, then the locality is non-compliant.

- Supplies not utilising aluminium compounds in the water treatment process are not required to be sampled as part of the regulatory requirement.

Wannon Water's risk assessment identified that acid soluble aluminium should be monitored in all localities where an aluminium-based coagulant is used within the treatment process.

Non-Compliance Regarding Aluminium

Cavendish

The Cavendish raw water service basin is fed from the Grampians Headworks streams, which are naturally high in aluminium and also fluctuate in turbidity. The only barrier is detention time (settling) in the Cavendish raw water service basin. Cavendish continued to experience exceedances for acid soluble aluminium in 2012/13 (Figure 6-2 and 6-3). In 2010/11 Wannon Water applied for exemption from the Safe Drinking Water Regulations 2005 in relation to aluminium. The application was assessed by Department of Health and failed to meet the criteria for exemptions in Section 20 of the *Safe Drinking Water Act 2003*. Consultation was undertaken with Cavendish customers, and an exemption from complying with the aluminium water quality standard was granted by the Minister on 30 June 2013; the exemption applies until 30 June 2018

Maximum result for acid-soluble aluminium is 0.25 mg/L or greater (red line)

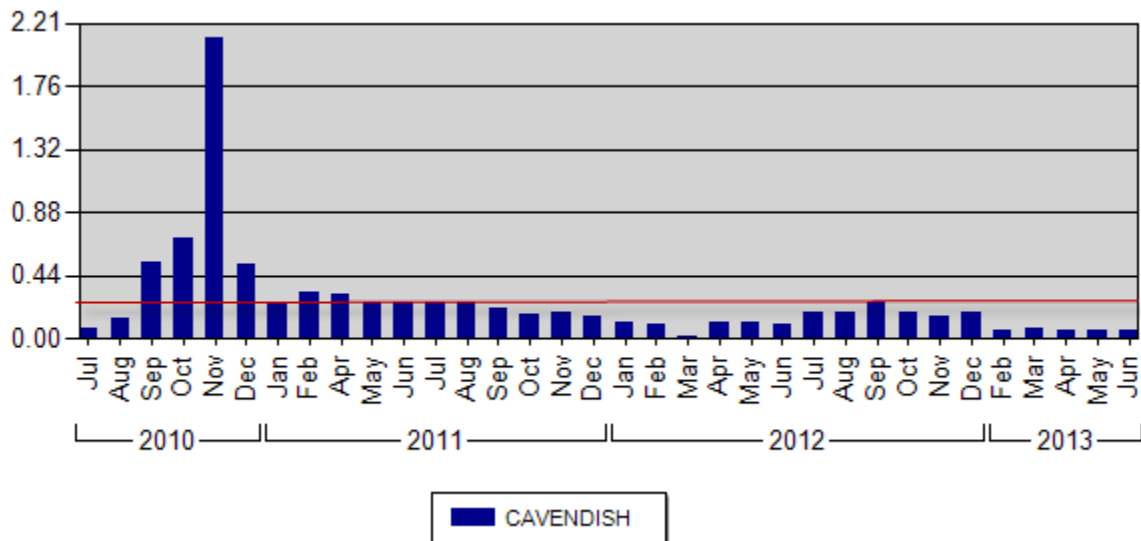


Figure 6-2 – Cavendish acid soluble aluminium 2010- 2012

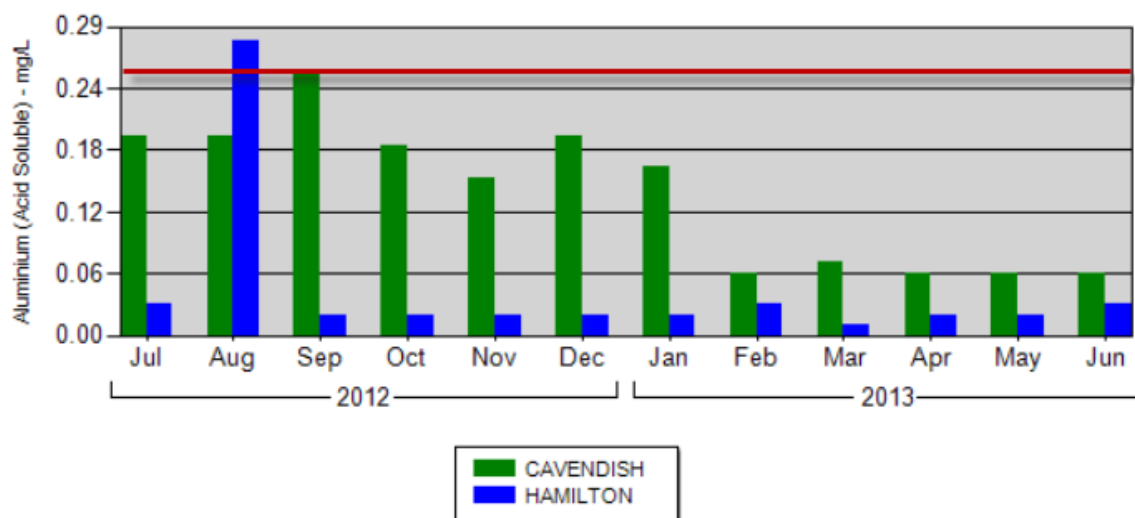


Figure 6-3 – Aluminium (acid soluble) in the Cavendish and Hamilton reticulations 2012-13

Hamilton

The Hamilton water sampling locality experienced a single non-conformance (Figure 6-3). This was a result of an operational issue with coagulant dosing at the Hamilton Water Treatment Plant, which was quickly rectified.

Turbidity

Standard 95% upper confidence limit (UCL) of the mean of samples of drinking water collected in a 12 month period must be less than or equal to 5.0 NTU (SDWR)

Table 6-7 Turbidity results by locality 2012/13

Turbidity

Locality	Sampling Frequency	No. of Samples	Maximum result	95% UCL of Mean	Compliant (Yes/no)
ALLANSFORD	Weekly	52	20.0	1.7	Yes
BALMORAL	Weekly	52	1.5	0.3	Yes
CAMPERDOWN (RURAL)	Weekly	52	0.9	0.2	Yes
CAMPERDOWN (URBAN)	Weekly	52	0.2	<0.1	Yes
CARAMUT	Weekly	52	0.5	0.2	Yes
CASTERTON	Weekly	52	0.1	0.1	Yes
CAVENDISH	Weekly	52	1.8	0.9	Yes
COBDEN	Weekly	52	1.1	0.2	Yes
COLERAINE	Weekly	52	0.9	0.2	Yes
DARTMOOR	Weekly	52	0.3	<0.1	Yes
DERRINALLUM	Weekly	52	0.6	0.2	Yes
DUNKELD	Weekly	52	0.8	0.2	Yes
GLENTHOMPSON	Weekly	52	2.3	0.3	Yes
HAMILTON	Weekly	104	1.0	0.2	Yes
HEYWOOD	Weekly	52	1.5	0.7	Yes
KOROIT	Weekly	52	3.0	0.3	Yes
LISMORE	Weekly	52	0.4	<0.1	Yes
MACARTHUR	Weekly	52	0.6	0.1	Yes
MERINO	Weekly	52	0.2	0.1	Yes
MORTLAKE	Weekly	52	1.2	0.2	Yes
NOORAT/GLENORMISTON	Weekly	52	2.0	0.2	Yes
PAARATTE	Weekly	52	0.6	0.2	Yes
PENSHURST	Weekly	52	5.0	0.6	Yes
PETERBOROUGH	Weekly	52	0.4	0.2	Yes
PORT CAMPBELL	Weekly	52	0.4	0.2	Yes
PORT FAIRY	Weekly	104	2.9	0.3	Yes
PORTLAND	Weekly	104	1.2	<0.1	Yes
PUENIM	Weekly	52	2.2	1.0	Yes
SANDFORD	Weekly	52	0.3	<0.1	Yes
SIMPSON	Weekly	52	1.0	0.2	Yes
TARRINGTON	Weekly	52	0.8	0.2	Yes
TERANG	Weekly	52	0.4	<0.1	Yes
TIMBOON	Weekly	52	1.0	0.2	Yes
WARRNAMBOOL	Weekly	156	1.6	0.2	Yes

* Weekly sampling with increases for population (ADWG, Section 9.5.2)

Fluoride

Standard All samples of drinking water collected within a locality not to exceed 1.5 mg/L (ADWG – Health).

Table 6-8 Fluoride results by locality 2012/13

Fluoride

Locality	Sampling Frequency	No. of Samples	Maximum result	Minimum Result	Average	Compliant (Yes/no)	Meeting obligation [^] (Yes/no)
ALLANSFORD	Weekly+	52	1.00	0.05	0.76	Yes	Yes
DUNKELD	Weekly+	52	0.95	0.14	0.63	Yes	Yes
HAMILTON*	Weekly+	104	0.96	0.05	0.71	Yes	Yes
KOROIT	Weekly+	52	1.00	0.05	0.79	Yes	Yes
PORTLAND*	Weekly	104	1.20	0.92	1.06	Yes	N/A
TARRINGTON	Weekly+	52	0.95	0.05	0.68	Yes	Yes
WARRNAMBOOL*	Weekly+	156	1.00	0.05	0.77	Yes	Yes

+ Fluoride added to drinking water supply. Results from other localities are background levels of naturally occurring fluoride.

* More than one sample site was analysed for fluoride

[^] For fluoridated supplies this is achieved if the annual average concentration of fluoride was greater than 0.6 mg/L.

Other – May Pose A Risk To Human Health

Manganese Results

Standard All samples of drinking water collected within a locality in any 12 month period having a concentration less than 0.5 mg/L (ADWG)

Table 6-9 Manganese results by locality 2012/13

Manganese

Locality	Sampling Frequency	No. of Samples	No. of Non-complying samples	Maximum result (mg/L)	Compliant (Yes / No)
ALLANSFORD	Quarterly	4	0	0.003	Yes
BALMORAL	Weekly W	51	0	0.037	Yes
CAMPERDOWN (RURAL)	Quarterly	4	0	0.007	Yes
CAMPERDOWN (URBAN)	Quarterly	4	0	0.007	Yes
CARAMUT	Quarterly	4	0	<0.002	Yes
CASTERTON	Weekly W	51	0	<0.002	Yes
CAVENDISH	Quarterly	4	0	<0.002	Yes
COBDEN	Weekly A ¹ W	51	0	0.170	Yes
COLERAINE	Weekly W	51	0	0.011	Yes
DARTMOOR	Quarterly	4	0	<0.002	Yes
DERRINALLUM	Quarterly	4	0	<0.002	Yes
DUNKELD	Quarterly	4	0	0.003	Yes
GLENTHOMPSON	Weekly W	51	0	0.008	Yes
HAMILTON	Quarterly	4	0	0.007	Yes
HEYWOOD	Weekly A ² W	51	0	0.120	Yes
KOROIT	Quarterly	4	0	0.004	Yes
LISMORE	Quarterly	4	0	<0.002	Yes
MACARTHUR	Quarterly	4	0	<0.002	Yes
MERINO	Weekly W	51	0	0.004	Yes
MORTLAKE	Quarterly	4	0	0.004	Yes
NOORAT/GLENORMISTON	Quarterly	4	0	<0.002	Yes
PAARATTE	Quarterly	4	0	<0.002	Yes
PENSHURST	Quarterly	4	0	0.003	Yes
PETERBOROUGH	Quarterly	4	0	<0.002	Yes
PORT CAMPBELL	Quarterly	4	0	<0.002	Yes
PORT FAIRY	Weekly A ⁵ W	100	0	0.540	Yes
PORTLAND	Monthly	12	0	<0.002	Yes
PURNIM	Weekly W	51	0	0.027	Yes
SANDFORD	Weekly W	51	0	0.005	Yes
SIMPSON	Quarterly	4	0	0.034	Yes
TARRINGTON	Quarterly	4	0	0.007	Yes
TERANG	Quarterly	4	0	<0.002	Yes
TIMBOON	Quarterly	4	0	<0.002	Yes
WARRNAMBOOL	Quarterly	4	0	0.004	Yes

If the maximum result manganese is 0.55 mg/L or greater, then the locality is non-compliant.

W- Tested weekly, except Christmas week.

A - Exceedance of aesthetic limit.

Lead Results

Standard All samples of drinking water collected within a locality in any 12 month period having a concentration less than 0.01 mg/L (ADWG)

Table 6-10 Lead results by locality 2012/13

Lead

Locality	Sampling Frequency	No. of Samples	No. of Non-complying samples	Maximum result (mg/L)	Compliant (Yes / No)
ALLANSFORD	Yearly	1	0	<0.001	Yes
BALMORAL	Yearly	1	0	<0.001	Yes
CAMPERDOWN (RURAL)	Yearly	1	0	<0.001	Yes
CAMPERDOWN (URBAN)	Yearly	1	0	<0.001	Yes
CARAMUT	Quarterly	4	0	<0.001	Yes
CASTERTON	Yearly	1	0	<0.001	Yes
CAVENDISH	Yearly	1	0	<0.001	Yes
COBDEN	Yearly	1	0	<0.001	Yes
COLERAINE	Yearly	1	0	<0.001	Yes
DARTMOOR	Yearly	1	0	0.001	Yes
DERRINALLUM	Yearly	1	0	<0.001	Yes
DUNKELD	Yearly	1	0	<0.001	Yes
GLENTHOMPSON	Yearly	1	0	<0.001	Yes
HAMILTON	Yearly	1	0	<0.001	Yes
HEYWOOD	Yearly	1	0	<0.001	Yes
KOROIT	Yearly	1	0	<0.001	Yes
LISMORE	Yearly	1	0	<0.001	Yes
MACARTHUR	Quarterly	4	0	<0.001	Yes
MERINO	Yearly	1	0	<0.001	Yes
MORTLAKE	Yearly	1	0	<0.001	Yes
NOORAT/GLENORMISTON	Yearly	1	0	<0.001	Yes
PAARATTE	Yearly	1	0	<0.001	Yes
PENSHURST	Yearly	1	0	<0.001	Yes
PETERBOROUGH	Yearly	1	0	<0.001	Yes
PORT CAMPBELL	Yearly	1	0	<0.001	Yes
PORT FAIRY	Quarterly	4	0	0.002	Yes
PORTLAND	Yearly	1	0	0.001	Yes
PURNIM	Yearly	1	0	<0.001	Yes
SANDFORD	Yearly	1	0	<0.001	Yes
SIMPSON	Yearly	1	0	<0.001	Yes
TARRINGTON	Yearly	1	0	<0.001	Yes
TERANG	Yearly	1	0	<0.001	Yes
TIMBOON	Yearly	1	0	<0.001	Yes
WARRNAMBOOL	Yearly	1	0	<0.001	Yes

All localities recorded levels of lead less than the ADWG health-related guideline value of 0.01 mg/L during 2012/13.

Copper Results

Standard All samples of drinking water collected within a locality in any 12 month period having a concentration less than 2 mg/L (ADWG)

Table 6-11 Copper results by locality 2012/13

Copper

Locality	Sampling Frequency	No. of Samples	No. of Non-complying samples	Maximum result (mg/L)	Compliant (Yes / No)
ALLANSFORD	Quarterly	4	0	0.023	Yes
BALMORAL	Quarterly	4	0	0.063	Yes
CAMPERDOWN (RURAL)	Quarterly	4	0	0.006	Yes
CAMPERDOWN (URBAN)	Quarterly	4	0	0.011	Yes
CARAMUT	Quarterly	4	0	0.018	Yes
CASTERTON	Quarterly	4	0	0.230	Yes
CAVENDISH	Quarterly	4	0	0.003	Yes
COBDEN	Quarterly	4	0	0.012	Yes
COLERAINE	Quarterly	4	0	0.120	Yes
DARTMOOR	Quarterly	4	0	0.009	Yes
DERRINALLUM	Quarterly	4	0	0.002	Yes
DUNKELD	Quarterly	4	0	0.008	Yes
GLENTHOMPSON	Quarterly	4	0	0.008	Yes
HAMILTON	Quarterly	4	0	0.006	Yes
HEYWOOD	Quarterly	4	0	0.004	Yes
KOROIT	Quarterly	4	0	0.025	Yes
LISMORE	Quarterly	4	0	0.003	Yes
MACARTHUR	Quarterly	4	0	0.011	Yes
MERINO	Quarterly	4	0	0.021	Yes
MORTLAKE	Quarterly	4	0	0.005	Yes
NOORAT/GLENORMISTON	Quarterly	4	0	0.012	Yes
PAARATTE	Quarterly	4	0	0.013	Yes
PENSHURST	Quarterly	4	0	0.006	Yes
PETERBOROUGH	Quarterly	4	0	0.009	Yes
PORT CAMPBELL	Quarterly	4	0	0.010	Yes
PORT FAIRY	Quarterly	4	0	0.020	Yes
PORTLAND	Quarterly	4	0	0.006	Yes
PURNIM	Quarterly	4	0	0.055	Yes
SANDFORD	Quarterly	4	0	0.086	Yes
SIMPSON	Quarterly	4	0	0.020	Yes
TARRINGTON	Quarterly	4	0	0.006	Yes
TERANG	Quarterly	4	0	0.011	Yes
TIMBOON	Quarterly	4	0	0.006	Yes
WARRNAMBOOL	Quarterly	4	0	0.010	Yes

Arsenic Results

Standard All samples of drinking water collected within a locality in any 12 month period having a concentration less than 0.01 mg/L (ADWG)

Table 6-12 Arsenic results by locality 2012/13

Arsenic

Locality	Sampling Frequency	No. of Samples	No. of Non-complying samples	Maximum result (mg/L)	Compliant (Yes / No)
ALLANSFORD	Yearly	1	0	<0.001	Yes
BALMORAL	Yearly	1	0	<0.001	Yes
CAMPERDOWN (RURAL)	Yearly	1	0	<0.001	Yes
CAMPERDOWN (URBAN)	Yearly	1	0	<0.001	Yes
CARAMUT	Yearly	1	0	<0.001	Yes
CASTERTON	Yearly	1	0	<0.001	Yes
CAVENDISH	Yearly	1	0	<0.001	Yes
COBDEN	Yearly	1	0	<0.001	Yes
COLERAINE	Yearly	1	0	<0.001	Yes
DARTMOOR	Yearly	1	0	<0.001	Yes
DERRINALLUM	Yearly	1	0	<0.001	Yes
DUNKELD	Yearly	1	0	<0.001	Yes
GLENTHOMPSON	Yearly	1	0	<0.001	Yes
HAMILTON	Yearly	1	0	<0.001	Yes
HEYWOOD	Yearly	1	0	<0.001	Yes
KOROIT	Yearly	1	0	<0.001	Yes
LISMORE	Yearly	1	0	<0.001	Yes
MACARTHUR	Weekly	52	0	0.008	Yes
MERINO	Yearly	1	0	<0.001	Yes
MORTLAKE	Yearly	1	0	0.001	Yes
NOORAT/GLENORMISTON	Yearly	1	0	<0.001	Yes
PAARATTE	Yearly	1	0	<0.001	Yes
PENSHURST	Yearly	1	0	0.002	Yes
PETERBOROUGH	Yearly	1	0	<0.001	Yes
PORT CAMPBELL	Yearly	1	0	<0.001	Yes
PORT FAIRY	Yearly	1	0	0.003	Yes
PORTLAND	Yearly	1	0	<0.001	Yes
PURNIM	Yearly	1	0	<0.001	Yes
SANDFORD	Yearly	1	0	<0.001	Yes
SIMPSON	Yearly	1	0	<0.001	Yes
TARRINGTON	Yearly	1	0	<0.001	Yes
TERANG	Yearly	1	0	<0.001	Yes
TIMBOON	Yearly	1	0	<0.001	Yes
WARRNAMBOOL	Yearly	1	0	<0.001	Yes

Water treatment related chemicals

Table 6-13 lists the water treatment related chemicals monitored at each locality during 2012/13. All test results were less than the ADWG health-related guideline values.

Table 6-13 water treatment related chemical sampling summary and health-related guideline values

Parameter	Sampling frequency	ADWG Value (mg/L)
1,1,1-Trichloropropan-2-one	Quarterly	-
1,1,3-Trichloropropan-2-one	Quarterly	-
1,1-Dichloropropan-2-one	Quarterly	-
1,3-Dichloropropan-2-one	Quarterly	-
2,4,6-Trichlorophenol	Quarterly	-
2,4-Dichlorophenol	Quarterly	0.2
2-Chlorophenol	Quarterly	0.3
Acrylamide	Quarterly	0.0002
Carbon tetrachloride	Quarterly	0.003
Cyanogen Chloride	Quarterly	0.08
Epichlorohydrin	Quarterly	0.0005
Trichloroacetaldehyde	Quarterly	0.021

Inorganics

Table 6-14 lists the metals monitored at each locality during 2012/13. All localities recorded levels less than the ADWG health-related guideline values.

Table 6-14 – metals sampling summary and health-related guideline values

Parameter	Sampling Frequency	ADWG Value (mg/L)
Cadmium	Quarterly	0.002
Chromium	Quarterly	0.05
Nickel	Quarterly	0.02
Zinc	Quarterly	3
Tin	Annually	-
Silver	Annually	0.1
Beryllium	Annually	0.06
Uranium	Annually	0.017
Iodide	Annually	0.5
Molybdenum	Annually	0.05
Boron	Annually	4
Barium	Annually	2
Selenium	Annually	0.01
Mercury	Annually	0.001

Polycyclic Aromatic Hydrocarbon Results

Table 6- lists the suite of polycyclic aromatic hydrocarbons monitored at each locality during 2012/13. All test results were below the limit of detection.

Table 6-15 - PAH sampling summary and health related guideline values

Parameter	Sampling Frequency	ADWG Value (mg/L)
Acenaphthene	Annually	-
Acenaphthylene	Annually	-
Anthracene	Annually	-
Benz(a)anthracene	Annually	-
Benzo(a)pyrene	Annually	0.00001
Benzo(b)fluoranthene	Annually	-
Benzo(g,h,i)perylene	Annually	-
Benzo(k)fluoranthene	Annually	-
Chrysene	Annually	-
Dibenz(a,h)anthracene	Annually	-
Fluoranthene	Annually	-
Indeno(1,2,3-cd)pyrene	Annually	-
Naphthalene	Annually	-
Phenanthrene	Annually	-
Pyrene	Annually	-
Total PAH	Annually	-

Disinfection by-products

Chlorite

Wannon Water does not disinfect with chlorine dioxide therefore this parameter is not included in the testing regime. Table 6-16 lists the chloramine disinfection by-products monitored at each locality during 2012/13. All test results were less than the ADWG health-related guideline values.

Table 6-16 – chloramine disinfection by-products sampling summary and health-related guideline values

Parameter	Sampling Frequency	ADWG Value (mg/L)
Nitrate (as nitrate)	Monthly	50
Nitrite (as nitrite)	Monthly	3

Pesticide/Herbicide Results

Table 6-17 lists the pesticides and herbicides monitored at representative raw water storage and rivers/creeks during 2012/13. All test results were less than the ADWG health-related guideline values.

Table 6-17 – pesticide and herbicide sampling summary and health-related guideline values

Parameter	Sampling Frequency	ADWG Value (mg/L)
1,2-Dibromo-3-Chloropropane	Annually	-
1,2-Dibromoethane	Annually	-
2,4,5-T	Annually	100
2,4,5-TP	Annually	0.1
2,4,6-T	Annually	20
2,4-D	Annually	0.03
2,4-DB	Annually	-
2,4-DP	Annually	0.03
2,6-D	Annually	-
4,4-DDD	Annually	-
4,4-DDE	Annually	-
4,4-DDT	Annually	0.009
4-Chlorophenoxy acetic acid	Annually	-
Aldrin	Annually	0.0003
Ametryn	Annually	0.07
Atrazine	Annually	0.02
BHC (Alpha Isomer)	Annually	-
BHC (Beta Isomer)	Annually	-
BHC (Delta Isomer)	Annually	-
Chlordane	Annually	0.0015
Chloropicrin	Annually	-
Chlorpyrifos	Annually	10
CIS-1,3-Dichloropropene	Annually	-
cis-Chlordane	Annually	0.002
Dicamba	Annually	0.1
Dieldrin	Annually	0.003
Endosulphan 1	Annually	0.02
Endosulphan 2	Annually	0.02
Endosulphan Sulphate	Annually	0.02
Endrin	Annually	-
Endrin Aldehyde	Annually	-
Endrin Ketone	Annually	-
Glyphosate	Annually	1
Heptachlor	Annually	0.0003
Heptachlor Epoxide	Annually	0.0003
Hexachlorbenzene	Annually	-
Hexazinone	Annually	400
Lindane	Annually	0.01
MCPA	Annually	0.04
MCPB	Annually	-
Mecoprop	Annually	-
Methoxychlor	Annually	0.3
Molinate	Annually	4
oxy-Chlordane	Annually	0.11
Prometon	Annually	-
Prometryn	Annually	-
Propazine	Annually	0.05
Propiconazole	Annually	100
Simazine	Annually	0.02
Simetryn	Annually	-
Temephos	Annually	400
Terbutryn	Annually	0.4
Tertbutylazine	Annually	0.01
Trans-1,3-Dichloropropene	Annually	-
Trans-Chlordane	Annually	0.011
Trichlopyr	Annually	0.02

Industrial Chemical Results

Table 6-18 lists industrial chemical health-related parameters tested at each locality during 2012/13. All test results were less than the ADWG health-related guideline values.

Table 6-18 – Industrial chemicals sampling summary and health-based guideline values

Parameter	Sampling Frequency	ADWG Value
1,1,1,2-Tetrachlorethane	Annually	
1,1,1-Trichloroethane	Annually	
1,1,2,2-Tetrachloroethane	Annually	
1,1,2-Trichloroethane	Annually	
1,1-Dichloroethane	Annually	
1,1-Dichloroethene	Annually	
1,1-Dichloropropene	Annually	
1,2,3-Trichlorobenzene	Annually	
1,2,3-Trichloropropane	Annually	
1,2,4-Trichlorobenzene	Annually	
1,2,4-Trimethylbenzene	Annually	
1,2-Dichlorobenzene	Annually	
1,2-Dichloroethane	Annually	
1,2-Dichloropropane	Annually	
1,3,5-Trimethylbenzene	Annually	
1,3-Dichlorobenzene	Annually	
1,3-Dichloropropane	Annually	
1,4-Dichlorobenzene	Annually	
2,2-Dichloropropane	Annually	
2-Chlorotoluene	Annually	
4-Chlorotoluene	Annually	
Benzene	Annually	
Bromobenzene	Annually	
Bromochloromethane	Annually	
Carbon Disulphide	Annually	
Chlorobenzene	Annually	
CIS-1,2-Dichloroethene	Annually	
Dibromomethane	Annually	
di-Octyl Phthalate	Annually	
Ethylbenzene	Annually	
Hexachloro-1,3-Butadiene	Annually	
Isopropylbenzene	Annually	
M-&-P-Xylene	Annually	
Methylenechloride	Annually	
N-Butylbenzene	Annually	
N-Propylbenzene	Annually	
o-Xylene	Annually	
P-Isopropyltoluene	Annually	
Sec-Butylbenzene	Annually	
Styrene	Annually	
Tert-Butylbenzene	Annually	
Tetrachloroethene	Annually	
Toluene	Annually	
Trans-1,2-Dichloroethene	Annually	
Tributyltin as Sn	Annually	
Trichloroethene	Annually	
Vinyl chloride	Annually	

Algae Results

During 2012/13 Wannon Water collected samples on a fortnightly basis from all raw water storages and permanent rivers that supply raw water to drinking water localities. These samples were sent to a NATA certified laboratory for algal identification and counts. The sampling frequency was increased if blue green algae were detected and the numbers were noted to be increasing. Raw water sources were isolated if possible.

The Blue-Green Algae Circular 2012 /13 (Department of Sustainability and Environment) lists the following triggers for action and notification to the Department of Health of a blue green algae (BGA) incident as:

- Total microcystins ≥ 1.3 ug/L
- ≥ 6500 cells/mL *Microcystis aeruginosa*
- Total combined biovolume of known toxic species ≥ 0.6 mm³/L
- Total combined biovolume of all cyanobacterial > 10 mm³/L OR
- Bloom may cause widespread public complaint for example through taste and odour

Radionuclides – Gross Beta, Gross Alpha Radioactivity Results

Table 6-19 lists the radionuclides monitored at each locality during 2012/13. All test results were less than the ADWG health-related guideline values.

Table 6-19 – radionuclides sampling summary and health-related guideline values

Parameter	Sampling Frequency	ADWG Value (Bq/L)
Gross Alpha	Annually	0.5
Gross Beta	Annually	0.5

Other Results

Table 6-20 lists other parameters tested at the customer tap during 2012/13. All test results were less than the ADWG health-related guideline values.

Table 6-20 - Other parameters sampling summary and health-based guideline values

Parameter	Sampling Frequency	ADWG Value (mg/L)
Sulphate	Quarterly	500
<i>Naegleria</i> ^H	Monthly	-
<i>M. kansasii</i> ^H	Monthly	-

H – Localities with thermal bore/s only, namely Heywood, Port Campbell, Port Fairy and Portland.

Aesthetic Parameters

Wannon Water has an internal Key Performance Indicator (KPI) of 90% for aesthetic water quality parameters controllable by treatment plants or field operation to be less than the aesthetic limits set within the ADWG. Wannon Water achieved 93.7% during 2012/13 and was compliant with its aesthetic KPI.

pH

Compliance Summary

- Refer to Table 6-21
- 92% of samples collected from sites during 2012/13 which were controllable by treatment plant operations, were less than 8.5 and greater than 6.5 pH units as recommended in the ADWG.
- 98% of all pH samples collected from sites during 2012/13 which were controllable by treatment plant operations, were less than 9.2 and greater than 6.5 pH units as recommended in the ADWG providing monitoring shows that there is no deterioration in microbiological quality.
- Balmoral, Cavendish and Glenthompson – pH increases are due to long detention times in the cement lined mains. There is a regular flushing program to reduce the detention times.
- Derrinallum and Lismore – Carbon dioxide dosing at the Camperdown Water Treatment Plant has been unable to suitably reduce the pH. There is capital expenditure in Water Plan 3 to address this ongoing issue.

Alkalinity

Compliance Summary

- Refer to Table 6-22
- Hardness is not controllable by treatment processes at any of Wannon Water's localities.
- Casterton, Dartmoor, Heywood, Macarthur, Mortlake, Port Fairy and Portland are all sourced from groundwater. The levels of hardness are typical of these systems. All systems are between 200-500 mg/L and hence can have scaling problems.
- The Macarthur community was consulted about treatment options to reduce hardness prior to moving from a regulated water supply to a drinking water supply. The community voted against these treatment processes.
- At this stage Heywood is the only locality identified in Water Plan 3 as having works done to improve both alkalinity and hardness.

Hardness

Compliance Summary

- Refer to Table 6-23
- Hardness is not controllable by treatment processes at any of Wannon Water's localities.
- The Casterton supply system, Dartmoor, Macarthur and Penshurst are all sourced from groundwater. The levels of hardness are typical of these systems. All systems are between 200-500 mg/L and hence can have scaling problems.
- The Macarthur community was consulted about treatment options to reduce hardness prior to moving from a regulated water supply to a drinking water supply. The community voted against these treatment processes.

Iron

Compliance Summary

- Refer to Table 6-24
- 98% of samples collected from sites during 2012/13 which were controllable by treatment plant operations were less than 0.3 mg/L as recommended in the ADWG.
- All exceedances were isolated incidents, the response action is initially indirect, being to flush if field tests indicate turbidity or colour issues or if a customer contact is received. When the result is received the relevant team is notified and flushing is conducted usually rectifying the issue.

Colour

Compliance Summary

- Refer to Table 6-25
- 100% of samples collected from sites during 2012/13 which were controllable by treatment plant operations were less than 15 HU as recommended in the ADWG.
- Cavendish – The colour of the Cavendish supply is derived from the raw source water of the Grampians Headworks. Surface water run-off, particularly the initial flows, tends to be high in colour. Cavendish is a disinfection-only plant and therefore there is no capacity for colour removal.
- The colour of the Purnim supply is derived from the raw source water of the Otways. Surface water run-off, particularly the initial flows, tends to be high in colour. Purnim is a disinfection-only plant and therefore there is no capacity for colour removal.
- All exceedances were isolated; the response action is to flush if field tests indicate colour issues or if a customer contact is received. When the result is received the relevant team is notified and flushing is conducted usually rectifying the issue.

Total Dissolved Solids

Compliance Summary

- Total dissolved solids are not controllable by treatment processes at any of Wannon Water's localities. Heywood, Macarthur, Penshurst, Port Fairy and Portland are all sourced from groundwater. The levels are typical of these systems.
- There are no plans to implement changes in water treatment that will improve the level of total dissolved solids at any of these locations.

pH Results

Guideline The guideline limit for pH is 6.5-8.5 pH units. There is no health-based guideline.

Description A pH of less than 6.5 may be corrosive; greater than pH 8 progressively decreases efficiency of chlorination, greater than 8.5 may cause scale and taste problems. New concrete tanks and cement-mortar lined pipes can significantly increase pH and a value of up to 9.2 may be tolerated provided monitoring indicates no deterioration in microbial quality.

Table 6-21 pH results by locality 2012/13

pH				
Locality	Sampling Frequency	No. of Samples	Max	Min
ALLANSFORD	Weekly	52	8.0	7.1
BALMORAL	Weekly	52	9.2	6.8
CAMPERDOWN (RURAL)	Weekly	52	8.7	7.0
CAMPERDOWN (URBAN)	Weekly	52	7.8	6.9
CARAMUT	Weekly	52	8.7	7.7
CASTERTON	Weekly	52	7.9	7.5
CAVENDISH	Weekly	52	9.9	7.4
COBDEN	Weekly	52	8.2	7.0
COLERAINE	Weekly	52	7.9	7.7
DARTMOOR	Weekly	52	7.9	7.6
DERRINALLUM	Weekly	52	9.9	7.9
DUNKELD	Weekly	52	7.9	6.5
GLENTHOMPSON	Weekly	52	9.1	7.6
HAMILTON	Weekly*	104	7.5	6.7
HEYWOOD	Weekly	52	8.7	8.3
KOROIT	Weekly	52	7.8	7.2
LISMORE	Weekly	52	9.1	7.3
MACARTHUR	Weekly	52	8.2	7.8
MERINO	Weekly	52	7.9	7.7
MORTLAKE	Weekly	52	8.3	7.6
NOORAT/GLENORMISTON	Weekly	52	8.5	7.1
PAARATTE	Weekly	52	8.3	7.8
PENSHURST	Weekly	52	8.6	8.2
PETERBOROUGH	Weekly	52	8.4	8.0
PORT CAMPBELL	Weekly	52	8.2	7.9
PORT FAIRY	Weekly*	102	8.6	8.3
PORTLAND	Weekly*	104	8.8	8.4
PURNIM	Weekly	52	7.6	6.9
SANDFORD	Weekly	52	7.9	7.6
SIMPSON	Weekly	52	7.6	7.2
TARRINGTON	Weekly	52	10.0	6.7
TERANG	Weekly	52	7.6	7.1
TIMBOON	Weekly	52	8.3	8.1
WARRNAMBOOL	Weekly*	156	8.1	6.9

* More than one sample

NOTE: pH is analysed in the same test set as turbidity and E.coli, hence result during Christmas week

Alkalinity Results

Guideline The guideline limit for hardness is 200 mg/L as calcium carbonate (CaCO_3). There is no health based guideline.

Description Caused by calcium and magnesium salts. Hard water is difficult to lather.

Less than 60 mg/L CaCO_3 – soft but possible corrosive

60-200 mg/L CaCO_3 – good quality

200-500 mg/L CaCO_3 – increasing scaling problems

Greater than 500 mg/L CaCO_3 – severe scaling

Table 6-22 Total Alkalinity as CaCO_3 by locality 2012/13

Total Alkalinity as CaCO_3

Locality	Sampling Frequency	No. of Samples	Maximum result (mg/L CaCO_3)
ALLANSFORD	Quarterly	4	47
BALMORAL	Quarterly	4	15
CAMPERDOWN (RURAL)	Quarterly	4	17
CAMPERDOWN (URBAN)	Quarterly	4	18
CARAMUT	Quarterly	4	91
CASTERTON	Quarterly	4	210
CAVENDISH	Quarterly	4	22
COBDEN	Quarterly	4	27
COLERAINE	Quarterly	4	200
DARTMOOR	Quarterly	4	230
DERRINALLUM/LISMORE	Quarterly	4	28
DUNKELD	Quarterly	4	17
GLENTHOMPSON	Quarterly	4	31
HAMILTON	Quarterly	4	14
HEYWOOD	Quarterly	4	240
KOROIT#	Quarterly	3	46
MACARTHUR	Quarterly	4	380
MERINO#	Quarterly	3	210
MORTLAKE	Quarterly	4	64
NOORAT/GLENORMISTON	Quarterly	4	27
PAARATTE	Quarterly	4	140
PENSHURST	Quarterly	4	200
PETERBOROUGH	Quarterly	4	140
PORT CAMPBELL	Quarterly	4	130
PORT FAIRY	Quarterly	4	310
PORTLAND	Quarterly	4	340
PURNIM	Quarterly	4	25
SIMPSON	Quarterly	4	24
TARRINGTON	Quarterly	4	10
TERANG	Quarterly	4	24
TIMBOON	Quarterly	4	140
WARRNAMBOOL	Quarterly	4	44

Single sample missed due to scheduling error

Hardness Results

Guideline The guideline limit for hardness is 200 mg/L as calcium carbonate (CaCO_3). There is no health based guideline.

Description Caused by calcium and magnesium salts. Hard water is difficult to lather.

Less than 60 mg/L CaCO_3 – soft but possible corrosive

60-200 mg/L CaCO_3 – good quality

200-500 mg/L CaCO_3 – increasing scaling problems

Greater than 500 mg/L CaCO_3 – severe scaling

Table 6-14 Hardness as CaCO_3 results by locality 2012/13

Total Hardness as CaCO_3

Locality	Sampling Frequency	No. of Samples	Maximum result (mg/L CaCO_3)
ALLANSFORD	Quarterly	4	72
BALMORAL	Quarterly	4	74
CAMPERDOWN (RURAL)	Quarterly	4	55
CAMPERDOWN (URBAN)	Quarterly	4	42
CARAMUT	Quarterly	4	110
CASTERTON	Quarterly	4	240
CAVENDISH	Quarterly	4	25
COBDEN	Quarterly	4	34
COLERAINE	Quarterly	4	240
DARTMOOR	Quarterly	4	250
DERRINALLUM	Quarterly	4	49
DUNKELD	Quarterly	4	73
GLENTHOMPSON	Quarterly	4	76
HAMILTON	Quarterly	4	53
HEYWOOD	Quarterly	4	160
KOROIT#	Quarterly	3	73
MACARTHUR	Quarterly	4	300
MERINO#	Quarterly	3	230
MORTLAKE	Quarterly	4	64
NOORAT/GLENORMISTON	Quarterly	4	33
PAARATTE	Quarterly	4	170
PENSHURST	Quarterly	4	430
PETERBOROUGH	Quarterly	4	160
PORT CAMPBELL	Quarterly	4	150
PORT FAIRY	Quarterly	4	170
PORTLAND	Quarterly	4	18
PURNIM	Quarterly	4	29
SIMPSON	Quarterly	4	33
TARRINGTON	Quarterly	4	51
TERANG	Quarterly	4	32
TIMBOON	Quarterly	4	160
WARRNAMBOOL	Quarterly	4	69

Single sample missed due to scheduling error

Iron Results

Guideline The guideline value for iron is 0.3 mg/L. There is no health-related guideline value.

Description Occurs naturally in water. Taste threshold is 0.3 mg/L. High concentrations stain laundry and fittings. Iron bacteria cause blockages, taste/odour and corrosion.

Table 6-24 Iron results by locality 2012 /13

Iron

Locality	Sampling Frequency	No. of Samples	Maximum result (mg/L)
ALLANSFORD	Quarterly	4	0.023
BALMORAL	Weekly W	51	0.410
CAMPERDOWN (RURAL)	Quarterly	4	0.041
CAMPERDOWN (URBAN)	Quarterly	4	0.028
CARAMUT	Quarterly	4	0.046
CASTERTON	Weekly W	51	0.081
CAVENDISH	Quarterly	4	0.170
COBDEN	Weekly W	51	0.190
COLERAINE	Weekly W	51	0.210
DARTMOOR	Quarterly	4	0.007
DERRINALLUM	Quarterly	4	0.067
DUNKELD	Quarterly	4	0.100
GLENTHOMPSON	Weekly W	51	0.260
HAMILTON	Quarterly	4	0.044
HEYWOOD	Weekly W	51	0.029
KOROIT	Quarterly	4	0.029
LISMORE	Quarterly	4	0.094
MACARTHUR	Quarterly	4	0.096
MERINO	Weekly W	51	0.057
MORTLAKE	Quarterly	4	0.270
NOORAT/GLENORMISTON	Quarterly	4	0.038
PAARATTE	Quarterly	4	0.084
PENSHURST	Quarterly	4	0.140
PETERBOROUGH	Quarterly	4	0.041
PORT CAMPBELL	Quarterly	4	0.054
PORT FAIRY *	Weekly W	102	5.800
PORTLAND	Monthly	14	0.034
PURNIM	Weekly W	51	0.410
SANDFORD	Weekly W	51	0.038
SIMPSON	Quarterly	4	0.060
TARRINGTON	Quarterly	4	0.190
TERANG	Quarterly	4	0.020
TIMBOON	Quarterly	4	0.051
WARRNAMBOOL	Quarterly	4	0.054

*More than one sample taken

W- Tested weekly, except Christmas week

Colour Results

Guideline < 15 HU. There is no health-based guideline.

Description An important aesthetic characteristic for customer acceptance. Treatment processes can be optimised to remove colour.

Table 6-25 True Colour results by locality 2012/13

Colour

Locality	Sampling Frequency	No. of Samples	Maximum result (Pt.-Co)
ALLANSFORD	Quarterly	4	2
BALMORAL	Weekly	51	6
CAMPERDOWN (RURAL)	Quarterly	4	1
CAMPERDOWN (URBAN)	Quarterly	4	1
CARAMUT	Quarterly	4	1
CASTERTON	Weekly	51	2
CAVENDISH	Quarterly	4	27
COBDEN	Weekly	51	3
COLERAINE	Weekly	51	3
DARTMOOR	Quarterly	4	1
DERRINALLUM	Quarterly	4	2
DUNKELD	Quarterly	4	1
GLENTHOMPSON	Weekly	51	5
HAMILTON	Quarterly	4	11
HEYWOOD	Weekly	51	2
KOROIT	Quarterly	4	2
LISMORE	Quarterly	4	2
MACARTHUR	Quarterly	4	1
MERINO	Weekly	51	2
MORTLAKE	Quarterly	4	1
NOORAT/GLENORMISTON	Quarterly	4	2
PAARATTE	Quarterly	4	1
PENSHURST	Quarterly	4	1
PETERBOROUGH	Quarterly	4	1
PORT CAMPBELL	Quarterly	4	1
PORT FAIRY *	Weekly	100	8
PORTLAND	Monthly	14	4
PURNIM	Weekly	51	60
SANDFORD	Weekly	51	3
SIMPSON	Quarterly	4	2
TARRINGTON	Quarterly	4	2
TERANG	Quarterly	4	3
TIMBOON	Quarterly	4	1
WARRNAMBOOL	Quarterly	4	2

*More than one sample taken

Total Dissolved Solids Results

Guideline 600 mg/L. There is no health-based guideline.

Description Based on taste: Less than 600 mg/L is regarded as good quality drinking water.
 600 – 900 mg/L is regarded as fair quality
 900 – 1200 mg/L is regarded as poor quality
 Greater than 1200 mg/L is regarded as unacceptable

Table 6-26 Total Dissolved Solids results by locality 2012/13

Total Dissolved Solids

Locality	Sampling Frequency	No. of Samples	Maximum result (mg/L)
ALLANSFORD	Quarterly	4	220
BALMORAL	Quarterly	4	400
CAMPERDOWN (RURAL)	Quarterly	4	120
CAMPERDOWN (URBAN)	Quarterly	4	140
CARAMUT	Quarterly	4	280
CASTERTON	Quarterly	4	500
CAVENDISH	Quarterly	4	120
COBDEN	Quarterly	4	170
COLERAINE	Quarterly	4	510
DARTMOOR	Quarterly	4	400
DERRINALLUM	Quarterly	4	220
DUNKELD	Quarterly	4	190
GLENTHOMPSON	Quarterly	4	430
HAMILTON	Quarterly	4	160
HEYWOOD	Quarterly	4	680
KOROIT#	Quarterly	3	220
MACARTHUR	Quarterly	4	1,000
MERINO#	Quarterly	3	530
MORTLAKE	Quarterly	4	260
NOORAT/GLENORMISTON	Quarterly	4	160
PAARATTE	Quarterly	4	300
PENSHURST	Quarterly	4	780
PETERBOROUGH	Quarterly	4	290
PORT CAMPBELL	Quarterly	4	310
PORT FAIRY	Quarterly	4	910
PORTLAND	Quarterly	4	750
PURNIM	Quarterly	4	110
SIMPSON	Quarterly	4	150
TARRINGTON	Quarterly	4	140
TERANG	Quarterly	4	130
TIMBOON	Quarterly	4	310
WARRNAMBOOL	Quarterly	4	210

Single sample missed due to scheduling error

Analysis of Results

Compliance as a Percentage of Localities

Table 6-15 shows the percentage of localities compliant with each of the Safe Drinking Water Regulation 2005 (SDWR) Schedule 2 parameters, which has been relatively consistent over the past four years. There has been significant improvement in the areas of THMs and aluminium.

Table 6-15 Compliance as a Percentage of Localities

Parameter	% of Localities Receiving Compliant Water			
	2012/13	2011/12	2010/11	2009/10
<i>Escherichia coli</i>	100	99.85	100	100
Trihalomethanes	99.7	100	99.5	94
Chloroacetic acid	100	100	100	100
Dichloroacetic acid	100	100	99.5	100
Trichloroacetic acid	100	100	99.5	100
Aluminium (acid soluble)	99.1	99.1	92.6	85
Turbidity	100	100	100	100

The number of localities changed from 33 in 2010/11 to 34 in 2011/12 when Macarthur was added as a drinking water locality effective 1st July 2011.

Compliance as a Percentage of Population

The percentage of Wannon Water customers that were supplied with drinking water that complied with the SDWR Schedule 2 standards are detailed in Table 6-27. The percentage of customers receiving compliant water has remained relatively steady over the past two years for all parameters except acid soluble aluminium, where there was a significant improvement between 2009 and 2012.

Table 6-16 Compliance as a Percentage of Population

Parameter	% of Customers Receiving Compliant Water			
	2012/13	2011/12	2010/11	2009/10
<i>Escherichia coli</i>	100	99.3	100	100
Trihalomethanes	99.9	100	99.8	98.4
Chloroacetic acid	100	100	100	100
Dichloroacetic acid	100	100	99.7	100
Trichloroacetic acid	100	100	99.8	100
Aluminium (acid soluble)	99.9	99.9	72.8	72.7
Turbidity	100	100	100	100

7. EMERGENCY AND INCIDENT MANAGEMENT

Whilst every effort is made to prevent water quality incidents from occurring, there will inevitably be times when things go wrong. Such instances may be due to equipment failure, human error or unforeseen events. Wannon Water has incident management plans to manage such events to ensure the minimum possible impact on water quality. The incident management plans are a component of Wannon Water's Emergency Management Plan which uses the principles of prevention, response and recovery as outlined in the Australian Inter-Service Incidents Management System (AIIMS) structure. The objectives of the Emergency Management Plan are to ensure:

- The safety of customers, employees and the community in general;
- Continuity of operations;
- Protection of the environment; and
- Compliance with legislated and regulatory requirements

Wannon Water undertakes regular training and joint exercises in emergency simulations and emergency management with key stakeholders. These sessions are designed to put systems, processes and facilities into an environment as close as possible to a real event. The exercises provide participants with an opportunity to test communications, planning and management procedures and to include emergency management training.

Section 22 Incidents

The objective of Section 22 of the *Safe Drinking Water Act 2003* is to protect public health. Wannon Water must inform the Department of Health of any potential or actual contaminated water supplied for drinking purposes. Information relating to all Section 22 incidents during 2012/13 is listed in Table 7-2.

Other Incidents

Wannon Water communicates other water quality related incidents to the Department of Health. Information relating to incidents which occurred during 2012/13 is listed in Table 7-3.

Customer Complaints

Wannon Water is actively committed to the successful and efficient management of complaints and disputes to ensure effective customer service.

Wannon Water's Corporate Complaints Management process is a "roadmap" to complaints management, allowing for a fair and detailed consideration of complaints and provides for genuine internal review if the complainant remains dissatisfied.

The collection, processing and reporting of Wannon Water's complaints is managed through a customer relationship database, allowing Wannon Water to meet its obligations under the Customer Service Code issued by the Essential Services Commission, under its reporting principles. This is also supported by Wannon Water's Customer Charter.

The number of water quality customer complaints was similar to last year for all complaint types, with the exception of taste/odour, which had almost twice as many complaints; however the total number of complaints for 2012/13 was very low. The increase in taste/odour complaints is attributed to the difference in taste and odour experienced in the Warrnambool system when it was changed from chloramination to chlorination, as detailed in Section 5. The combination of fine tuning of the target chlorine residual, and customers becoming accustomed to the altered taste of the water, alleviated the complaints within the first few months.

Wannon Water continued to maintain its proactive approach to customer complaints by continuing to:

- Allocate specific resources to trouble shoot hot spot townships identified in the 2012/13 period
- Maintained resourcing to meet the scheduled flushing program for each of Wannon Water's localities
- Improved chemical dosing in a number of towns, such as Terang, Glenhompson, Balmoral and Warrnambool, which improved quality within the reticulation.

- Proactive approach taken by Treatment Services Branch to quality trend variances

The Port Fairy Township was again flushed, and had a sequestering agent added to the water, just prior to Christmas 2012, to clean the reticulation before the tourist season. These activities kept the number of customer complaints this locality low.

A summary of the complaints received is presented in Table 7-1, with all localities recording less than 1 complaint per 100 customers.

All customer complaints are investigated to determine the cause and significance of the complaint. Operational changes or capital improvements which optimise treated water quality may be implemented in response to valid and significant customer complaints.

In response to a complaint, customers are contacted directly and a site/vicinity inspection conducted. Appropriate action is then taken. This action will vary depending on the nature of the complaint.

Multiple complaints from a single locality are monitored closely. If the number of complaints within the locality exceeds five in any 24 hour period, an incident response team is assembled and the cause investigated. Appropriate actions are then taken using AIMS structure and Wannon Water's Emergency Management Plan.

During 2012/13 there were no instances where more than five water quality complaints were received within any 24 hour period.

Table 7-1 – Customer complaints 2012/13 by type

Type of complaint	No. of complaints	No. of complaints per 100 customers supplied [^]
Discoloured water	11	0.025
Taste/ odour	19	0.044
Blue Water	0	0
Air in Water	0	0
Alleged illness [#]	1	0.002
Other	2	0.005

[^] for the purposes of the complaints section, the term "customer" has the same meaning as that used by the Essential Services Commission, that is a customer = a connection

[#] alleged illness complaints include skin irritation.

Incidents Notified pursuant to Section 22 of SDWA

Table 7-2 – Section 22 incidents 2012/13

Date (and Duration) of Incident	Location of Incident	Nature of Incident	Potentially Affected/ Affected Drinking Water Supplies	Actions Taken in Response to Incident
15 January 2013	Macarthur	Free chlorine -6.1 mg/L	Macarthur system	The high level tank was drained and flushed then refilled with fresh (compliant) water. The reticulation system was flushed. Informed DH of initial and resample results.

Incidents Notified pursuant to Section 18 of SDWA

Table 7-3 – Section 22 incidents 2012/13

Date (and Duration) of Incident	Location of Incident	Nature of Incident	Potentially Affected/ Affected Drinking Water Supplies	Actions Taken in Response to Incident
1 August 2012	Hamilton	Aluminium 0.28mg/L	Hamilton System	Unblocking a flow restriction in alum pipework causing overdosing the following day. Plant ran to waste during optimising; only a small slug went through to the reticulation.
4 September 2012	Cavendish	Aluminium (Acid Soluble) 0.28 mg/L	Cavendish system	Refer to section entitled "Exemption from Water Quality Standards"
5 March 2013	Balmoral	Trihalomethanes 0.27mg/L	Balmoral System	This was a result of the conversion from a chloraminated supply to chlorination and was quickly rectified by converting the plant back to a chloraminated supply.

Other Incidents/Issues

Table 7-3 – Other incidents 2012/13

Date (and Duration) of Incident	Location of Incident	Nature of Incident	Potentially Affected/ Affected Drinking Water Supplies	Actions Taken in Response to Incident
1 July – 6 September 2012	Hamilton	Fluoride not dosed at the required optimal concentration	Dunkeld, Hamilton and Tarrington	A new fluoride meter was installed. Other operational issues were rectified.
23 January – 13 February 2013	Cobden raw water storage	Microcystis sp. – 5900 cells/mL	N/A	The storage was isolated from system and dosed with copper sulphate.
5 August – 31 August 2012	Warrnambool	Fluoride not dosed at the required optimal concentration	Allansford, Koroit and Warrnambool	A new fluoride meter was installed.
March - May 2013	Warrnambool reticulation	Taste and odour complaints	Warrnambool System	Numerous contacts and 13 taste and odour complaints. Dose rates and target residuals for chlorine were fine tuned.
20 November 2012	Allansford reticulation	20 NTU Turbidity	Allansford	The reticulation was flushed.
20 May 2013	Allansford reticulation	6.3 NTU Turbidity	Allansford	The reticulation was flushed.

8. GLOSSARY

ADWG	Australian Drinking Water Guidelines (2011)
AIMS	Australian Inter-Service Incidents Management System
BGA	Blue Green Algae
DH	Department of Health Victoria
DP	Disinfection Plant
CCP	Critical control point
GAC	Granulated Activated Carbon
HACCP	Hazard Analysis and Critical Control Point. A system that identifies evaluates and controls hazards.
KPI	Key Performance Indicator
Mean	The average of a number of numerical values.
ML	Megalitre – one million litres
NATA	National Association of Testing Authorities, Australia.
UCL	Upper Confidence Limit
Raw Water	Water that has not been treated in any way.
Risk Assessment	The overall process of risk identification, risk analysis and risk evaluation. Risk analysis the systematic process to understand the nature of and to deduce the level of risk. Risk evaluation the process of comparing the level of risk against risk criteria.
SDWA	<i>Safe Drinking Water Act 2003</i>
SDWR	Safe Drinking Water Regulations 2005
WHO	World Health Organisation
WTP	Water Treatment Plant

9. WANNON WATER SERVICE AREA MAP

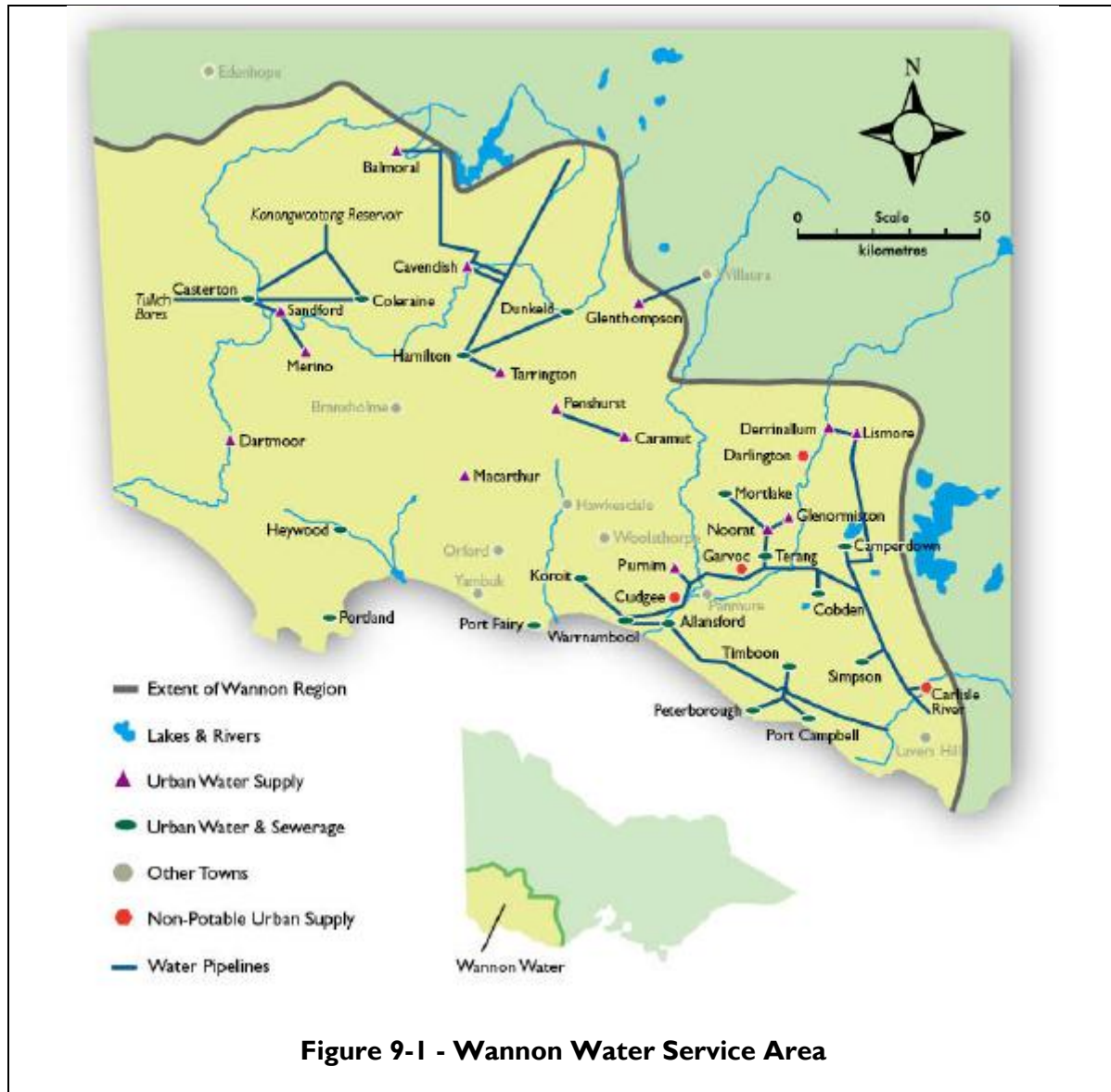


Figure 9-1 - Wannon Water Service Area

Information regarding water treatment and the latest water quality information can be obtained from Wannon Water's web site:

www.wannonwater.com.au

Wannon Water published the results of SDWR Schedule 2 parameters for each of the localities on the website on a monthly basis.

Results for additional water quality parameters can be provided upon request from Wannon Water via:

Tel 1300 926 666

Fax 03 5565 6050

Email info@wannonwater.com.au

Address PO Box 1158 Warrnambool Vic 3280