Westernport Water
Annual Drinking Water Quality Report 2013-14

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Water Quality Officer

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Authorisation

I authorise the use of this report in the Department of Health's Annual Report and made freely available on Westernport Water's website – www.westernportwater.com.au

Benita Russell

Acting General Manager Risk, Regulation and Resources

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1. Introduction

1.1 Westernport Water - Overview

Westernport Region Water Corporation (WPW) provides water, wastewater and gas services in an economically, environmentally and socially practicable manner to customers within its service area.

WPW services Phillip Island and an area of the mainland from The Gurdies to Archies Creek. Individual towns that are provided with drinking water include Bass, Grantville, Corinella, Kilcunda (including Dalyston), San Remo, Cape Woolamai, Rhyll, Cowes and Ventnor. A map of the service area is included in this report as figure 1-1

1.2 Aims and Objectives of this Report

Under section 26 of the *Safe Drinking Water Act 2003* (SDWA), WPW is required to provide the Department of Health (DH) with an annual report on the quality of drinking water supplied to its customers.

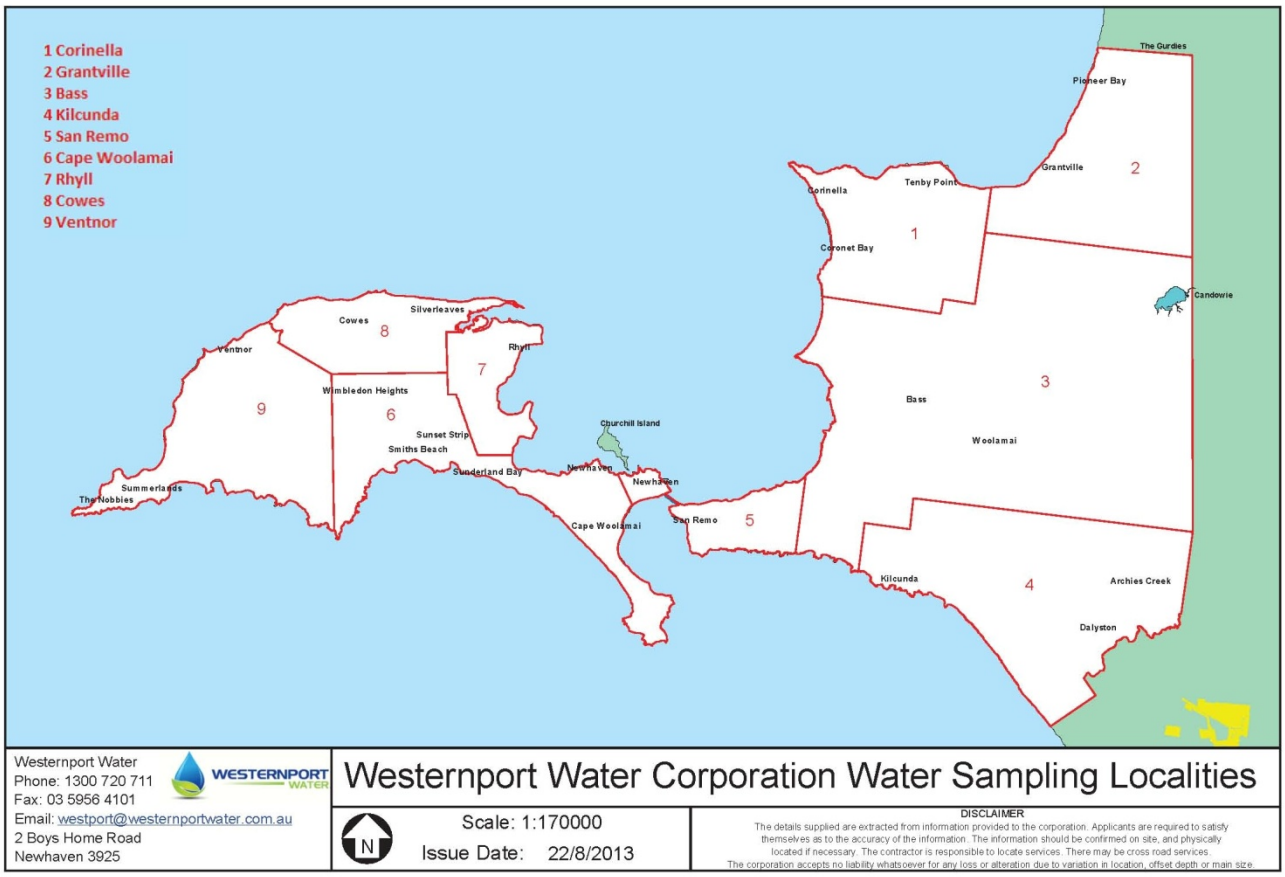
The aim of this report is to provide all stakeholders, including the community, with water quality information compliant with Section 26 of the SDWA. The report covers issues relating to the quality of drinking water and the management of regulated water.

1.3 Westernport Water's Commitment to Drinking Water Quality

WPW is committed to a comprehensive risk assessment/ risk management approach to the safe provision drinking water to its customers. This is achieved through the adoption of the framework for the management of drinking water quality outlined in the 2011 Australian Drinking Water Guidelines, (ADWG) and implemented through continual review/improvement of WPW Water Quality Risk Management Plan (WQRMP).

WPW's commitment to drinking water quality is highlighted in the foundation of its drinking water quality policy (endorsed by senior management and WPW's board). The policy demonstrates WPW support and long-term commitment to the development and implementation of an effective system for drinking water quality management.

Figure 1-1 WPW region including water sampling localities



2. Characterisation of Westernport Water's Supply System

2.1 System Overview

WPW has a single water supply storage (Candowie Reservoir), which is an on-stream storage on Tennent Creek, located in the Bass Hills near Glen Forbes.

Water is treated at the Ian Bartlett Water Purification Plant (IBWPP) and then reticulated to communities through a single main supply line, with a number of smaller off takes servicing each of the residential communities within WPW area of supply. A plan of the distribution system is included in this report as figure 2-1.

Raw water quality in Candowie Reservoir is generally considered poor for human consumption due to intensive farming activities and runoff from cleared land within the catchment area. Before treatment, the raw water is high in nutrients and organics and has periodically shown to be high in iron and manganese. Raw water quality is typical of water that is sourced from an unprotected catchment. Following treatment, the water complies with the ADWG and standards outlined in Schedule 2 of the Safe Drinking Water Regulations, 2005 (SDWR).

Localities and population supplied in WPW region, water sources and the treatment process are outlined in table 3-1 under section 3.

2.2 Water Sources

Other sources of water are available to supplement Candowie Reservoir during low rainfall periods. These alternative sources are: groundwater from bores constructed in the Corinella Groundwater Management Unit (GMU) and surface water from the Bass River. Water from these alternative sources is pumped via a pipeline to Candowie Reservoir for centralised storage and treatment at the IBWPP. Table 3-1 lists where raw water is sourced and the treatment processes used to produce potable water to customers

2.2.1 Groundwater

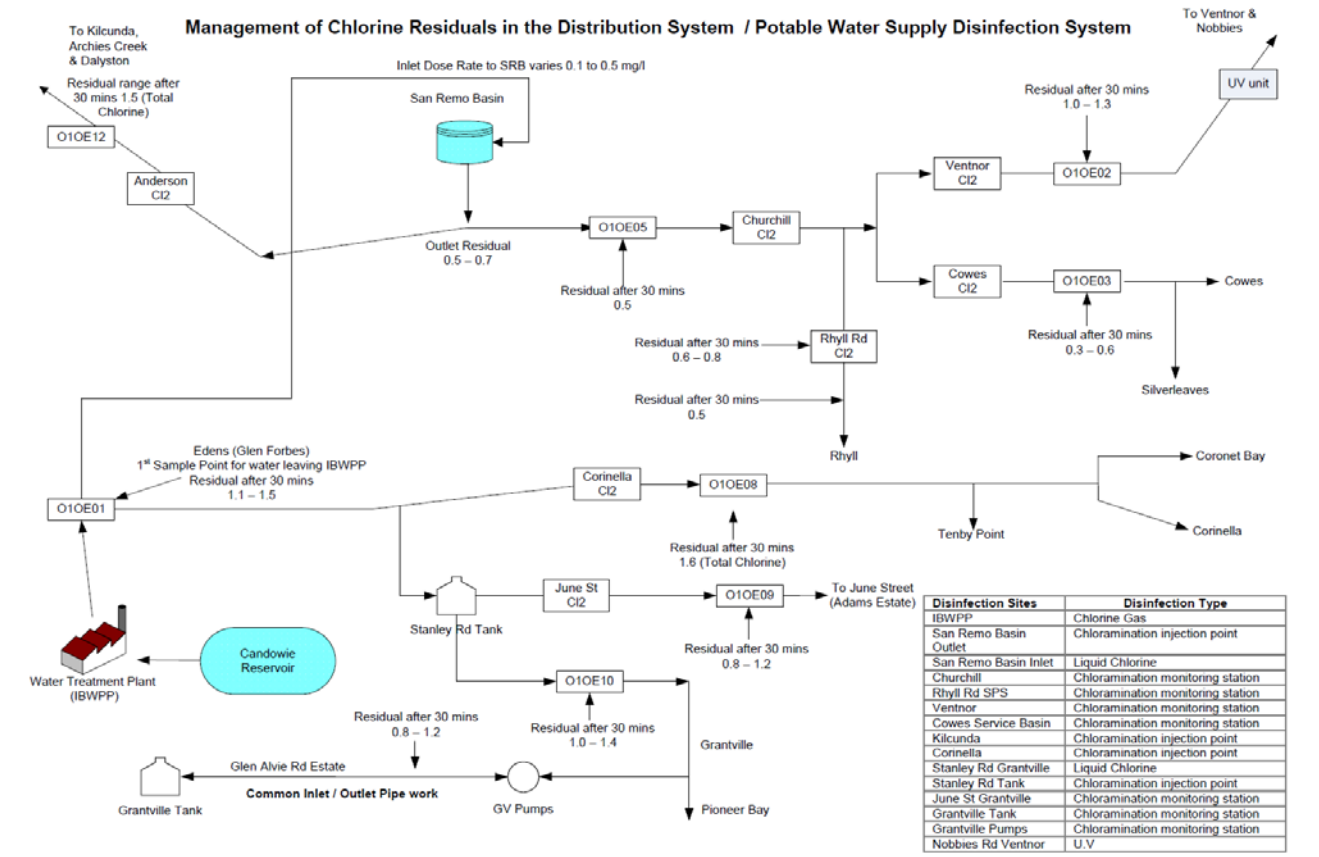
WPW have four bores licenced to take and use groundwater within the Corinella GMU. WPW has an entitlement of 490 ML/year and during the 2013-14 reporting period the total extraction was

21 ML.

2.2.2 Bass River

Westernport Water's pump station, located along the banks of the Bass River, is used to transfer water into Candowie Reservoir. This is licenced under the Bass River Bulk Entitlement. No water was extracted from the river during the 2013-14 reporting period.

Figure 2-1 WPW distribution system



Disinfection Sites	Disinfection Type
IBWPP	Chlorine Gas
San Remo Basin Outlet	Chloramination injection point
San Remo Basin Inlet	Liquid Chlorine
Churchill	Chloramination monitoring station
Rhyll Rd SPS	Chloramination monitoring station
Ventnor	Chloramination monitoring station
Cowes Service Basin	Chloramination monitoring station
Kilcunda	Chloramination injection point
Corinella	Chloramination injection point
Stanley Rd Grantville	Liquid Chlorine
Stanley Rd Tank	Chloramination injection point
June St Grantville	Chloramination monitoring station
Grantville Tank	Chloramination monitoring station
Grantville Pumps	Chloramination monitoring station
Nobbies Rd Ventnor	U.V

3. Water treatment and quality management systems

WPW operates a comprehensive water quality management system that complies with the SDWA and SDWR. The system is designed to ensure that customers receive drinking water of acceptable quality at all times, and that public health is protected.

3.1 Water treatment

Raw water from Candowie Reservoir is treated using a combination of oxidation, adsorption, flocculation, coagulation, dissolved air flotation, filtration, pH correction, fluoridation and disinfection at the IBWPP. The source water is predominantly high in nutrients and organics, and has periodically been high in iron and manganese. However, this is typical of water that is sourced from an open, unprotected catchment. The following sections and Table 3-1 highlight the treatment process used at IBWPP.

3.1.1 Oxidation

Oxidation is used to remove iron and manganese from the water. Potassium permanganate is added to aid the removal process.

3.1.2 Adsorption

Adsorption is a process where a solid is used to remove a soluble substance from the water. WPW uses powdered activated carbon (PAC) as the solid in water. Water is pumped through PAC and accumulates the soluble substances in the filter, subsequently removing the substance from the water. Adsorption is used to control potential taste and odour issues, and to remove algal toxins from the water.

3.1.3 Coagulation/flocculation

Coagulation is the process to remove fine suspended particles to aid the removal of colour and turbidity. The particles have a negative charge allowing them to remain suspended in water. Coagulation involves the addition of a coagulant (aluminium sulphate) to water with a positive charge that neutralises the negative charge enabling the fine particles to merge to create larger particles. Flocculation involves gentle mixing of the water which increases the particle size to visible suspended solids. The visible particles are called a ‘floc’.

3.1.4 Dissolved air floatation and filtration (DAFF)

DAFF is a process of injecting air particles into water causing the floc to float to the surface. The floc is then removed to waste and the clear water is filtered through graded filter media. The purpose of DAFF is to produce water low in turbidity.

Over time filters become blocked with particles from the floc. To overcome the blockage, the filters are backwashed periodically to allow optimum production in the filters to produce consistently low turbidity results.

3.1.5 Fluoridation

Fluoride is added to treated water to protect against teeth decay and to promote general oral health. Fluoridated water is delivered to all nine localities in WPW distribution system.

3.1.6 pH correction

To ensure treated water is within the ADWG desired range, caustic soda is added to raise pH.

3.1.7 Disinfection

(a) Chlorine

The final stage of treatment at IBWPP is chlorine disinfection. Disinfection is required to prevent the spread of waterborne pathogens and to retain an appropriate chlorine residual throughout the system.

(b) Chloramination

WPW adopt the method of chloramination to address taste & odour issues and total chlorine residuals to the extremities of the distribution system. Chloramination is the process of adding chlorine to a small amount of ammonia. All localities (except Bass) receive chloraminated water.

Table 3-1 Source water and treatment process

Water Sampling Locality	Population supplied[1]	Source water[2]	Storage	Treatment plant	Treatment Process														Added substance(s)							Comments
					Coagulation and flocculation	Clarification		Filtration		Disinfection					Other			Sludge-handling (mechanical with chemical addition	Lime/soda ash/Caustic soda/Carbon dioxide/sulphuric acid	Aluminium-based coagulants	Iron-based coagulants	Polymers	Chlorine	Ammonia[3]	Fluoride	
						Sedimentation/clarification	Dissolved air flotation	Granular Media Filter	Membrane	Chlorine gas	Sodium hypochlorite	Chlorine dioxide	Ultraviolet (UV)[4]	Ozone	Activated carbon (PAC/GAC)	Ion exchange	Reverse osmosis									
Bass (including Woolamai)	603	Bass River, Tennent Creek, and Corinella Bores	Candowie Reservoir	IBWPP	✓		✓	✓		✓	✓				✓			✓	✓	✓		✓	✓	✓	Potassium permanganate is an added substance used during oxidation at IBWPP to remove iron and manganese. Flouridated water was received by all localities in 2013-14.
Cape Woolamai (incorporating Smiths Beach, Sunderland Bay, Sunset Strip and Wimbledon Heights)	3196																									
Corinella (incorporating Coronet Bay)	1710																									
Cowes (incorporating Silverleaves)	4053																									
Grantville (incorporating Pioneer Bay)	1068																									
Kilcunda (incorporating Dalyston and Archies Creek)	927																									
Rhyll	674																									
San Remo (incorporating Newhaven)	1469																									
Ventnor	835																									

[1] Population sourced from current census data
[2] Water sources listed are used to augment supply to Candowie and subsequently supply all localities
[3] Ammonia as aqua ammonia used with sodium hypochlorite for chloramination disinfection.
[4] UV disinfection is only used for water supplied to The Penguin Parade and Nobbies area. A UV unit was constructed in the district in 2001. The unit was constructed due to low chlorine residuals at the extremity of WPW distribution pipe network.

3.2 Major changes to the arrangements for water supply

There was one change to the arrangements for water supply in 2013-14:

- Construction of the Candowie Upgrade Project (CUP) was completed and officially opened on August 30, 2013. The CUP raises full supply level by three metres, increasing storage volume from 2,263 ML to 4,463 ML.

3.3 Issues

3.3.1 Candowie Reservoir

Candowie Reservoir has a history of blue-green algal blooms due to the nature of the catchment (open and unprotected) which is intensively grazed. Nutrient enrichment of the storage due to catchment characteristics can result in algal blooms. 2013-14 was no exception, and an algal bloom was identified on Friday 27th December 2013, which was dominated by non-toxic species *Anabena Perturbata* and contained traces of potentially toxic *Anabaena circinalis.*

In previous years, the option to dose with Cupricide would be considered but due to the nutrient enrichment of the storage and ability of the algae to re-bloom later in summer the decision to not dose was made. This also allowed integrity testing of the treatment plant. The bloom continued to prosper with favourable conditions throughout all summer and lasted until May 2014. At its peak, cell counts of *Anabena Perturbata* were approximately 7.78 million cells/mL with a biovolume of 2,100 mm^3/L (the highest ever witnessed in Candowie Reservoir) and the potentially toxic *Anabaena circinalis* 170, 000 cells/mL (with a biovolume of 42.5 mm^3/L). Toxicity testing indicated the present *Anabaena circinalis* to be non-toxic. Throughout the entire bloom cycle, integrity testing of the clear water storage indicated no presence of cyanobacteria (blue green algae) in the treated water.

However, cyanobacteria have the ability to produce a compound called Geosmin which carries an earthy taste. The structure of these compounds are not susceptible to oxidation and other conventional treatment methods making them difficult to detect and remove. Geosmin was sampled at high levels throughout the bloom period. WPW's treatment removal for Geosmin is Adsorption (PAC dosing). Unfortunately PAC dose levels couldn't keep up with the Geosmin in the Reservoir and significant taste and odour complaints were received during the bloom period. Customer complaints were based around an earthy, grassy smell and taste (consistent with Geosmin). As taste and odour of the water is aesthetic and subjective from customer to customer, there is no standard to report on. However to ensure taste and odour of this nature was removed from the distribution system, the whole network was flushed. Treatment processes and procedures have been updated to ensure Geosmin levels in the Reservoir have the ability to be removed by the treatment plant to enable water to be produced free of earthy taste and odour

DH were notified as per section 22 notification (see section 5.1).

Water produced from the treatment plant was 100% compliant with the SDWA and SDWR and at no time was deemed a risk to public health or unsafe to consume. The taste and odour event (and subsequent reporting) is an aesthetic characteristic and is subjective to the individual. Nonetheless, WPW recognise poor water quality through widespread public complaint and corrective actions were implemented.

3.3.2 Distribution system

There were two exceedances of the safe drinking water regulations, health and aesthetic guideline values in the ADWG in the distribution system from one sample site.

- **03/09/2013 –** An *E. coli* exceedance of 10 orgs/mL and a pH exceedance of 5.8 was recorded in the Cape Woolamai locality. Investigations led to tank water being sampled. This was a scheduling error by the independent laboratory that undertakes sampling. Department of Health were notified under section 22 notification. The site was flushed and follow up samples of treated water indicated compliance. The tenants were notified of potentially poor water quality in the tank.

4. Quality of drinking water for 2013-14

The SDWR requires evidence of compliance or non-compliance with the drinking water quality standards listed in Schedule 2. The regulations also refer to ensuring that water is free of other toxins, pathogens, substances or chemicals that may pose a risk to human health. Compliance with Schedule 2 drinking water quality standards and other parameters sampled are presented in tables throughout this section.

All parameters sampled by WPW throughout 2013-14 were compliant with Schedule 2 of the SDWR and health-based values in the ADWG. There were two exceedances (from the same sample site) of ADWG guideline values discussed in section 3.3.2.However investigations led to tank water being sampled. Re-sampling of treated water indicated compliance.

There was one section 22 notification sent to DH regarding widespread public complaint. This was due to a taste and odour issue and was discussed in section 3.3.1

For further information on water quality in WPW region please contact the Water Quality Officer via:

Email: jweir@westernportwater.com.au,

Website www.westernportwater.com.au/Services/Waterquality/

Phone (03) 5956 4189.

4.1 Water quality improvements in 2013-14

Water quality improvements through scheduled works programs and projects in 2013/14 include:

- All three filters in IBWPP were scraped and cleaned, resulting in longer filter runtimes and improved water quality;
- An independent review of the plant and processes at IBWPP was undertaken and recommendations for improvements implemented;
- Supervisory control and data acquisition system (SCADA) was refined and improved;
- Annual air scouring and quarterly flushing program continued as routine in 2013-14.
- A secondary alum tank was installed at IBWPP to provide treatment security

4.2 *Escherichia coli*

The SDWR stipulate that at least 98 % of all samples of drinking water collected in any 12 months period contain no *Escherichia coli* (*E. coli*) per 100mL. The water quality with respect to *E. coli* was compliant with this standard as per table 4-3 below:

Table 4-2 *Escherichia coli*

Locality	Frequency	Samples	Max result	Samples with zero *E.coli* (%)	Complying
Bass	Weekly	53	0	100	Yes
Cape Woolamai	Weekly	55*	10	98.2	Yes
Corinella	Weekly	52	0	100	Yes
Cowes	Weekly	57**	0	100	Yes
Grantville	Weekly	52	0	100	Yes
Kilcunda	Weekly	64***	0	100	Yes
Rhyll	Weekly	52	0	100	Yes
San Remo	Weekly	52	0	100	Yes
Ventnor	Weekly	52	0	100	Yes

*3 samples taken as validation monitoring due to exceedance in September. See section 3.3.1 and section 5 for explanation.

** extra samples taken due to population increase over summer

*** extra samples taken in first quarter due to locality split

4.3 Chlorine based disinfection by-product chemicals

4.3.1 Chloroacetic acid

The SDWR stipulate a maximum value of 0.15 mg/L for Chloroacetic acid. All localities were compliant with the water quality standard as per table 4-4.1 below:

Table 4-3.1 Chloroacetic acid

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	<0.005[1]	0	Yes
Cape Woolamai	Monthly	12	<0.005	0	Yes
Corinella	Monthly	12	<0.005	0	Yes
Cowes	Monthly	14**	<0.005	0	Yes
Grantville	Monthly	12	<0.005	0	Yes
Kilcunda	Monthly	15***	<0.005	0	Yes
Rhyll	Monthly	12	<0.005	0	Yes
San Remo	Monthly	12	<0.005	0	Yes
Ventnor	Monthly	12	<0.005	0	Yes

[1] Results with a less than qualifier (<) are below the laboratory detection limit

** extra samples taken due to population increase over summer

*** extra samples taken in first quarter due to locality split

4.3.2 Dichloroacetic acid

The SDWR stipulate a maximum value of 0.10 mg/L for Dichloroacetic acid. All localities were compliant with the water quality standard as per table 4-4.2 below:

Table 4-3.2 Dichloroacetic acid

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	0.023	0	Yes
Cape Woolamai	Monthly	12	0.017	0	Yes
Corinella	Monthly	12	0.009	0	Yes
Cowes	Monthly	14**	0.018	0	Yes
Grantville	Monthly	12	0.026	0	Yes
Kilcunda	Monthly	15***	0.025	0	Yes
Rhyll	Monthly	12	0.016	0	Yes
San Remo	Monthly	12	0.017	0	Yes
Ventnor	Monthly	12	0.009	0	Yes

** extra samples taken due to population increase over summer

*** extra samples taken in first quarter due to locality split

4.3.3 Trichloroacetic acid

The SDWR stipulate a maximum value of 0.10 mg/L for Trichloroacetic acid. All localities were compliant with the water quality standard as per table 4-4.3 below:

Table 4-3.3 Trichloroacetic acid

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	0.019	0	Yes
Cape Woolamai	Monthly	12	0.017	0	Yes
Corinella	Monthly	12	0.01	0	Yes
Cowes	Monthly	14**	0.019	0	Yes
Grantville	Monthly	12	0.019	0	Yes
Kilcunda	Monthly	15***	0.025	0	Yes
Rhyll	Monthly	12	0.02	0	Yes
San Remo	Monthly	12	0.021	0	Yes
Ventnor	Monthly	12	0.016	0	Yes

** extra samples taken due to population increase over summer

*** extra samples taken in first quarter due to locality split

4.3.4 Trihalomethanes

The SDWR stipulate a maximum value of 0.25 mg/L for Trihalomethanes (THM). All localities were compliant with the water quality standard as per table 4-4.4 below:

Table 4-3.4 – THM

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	0.120	0	Yes
Cape Woolamai	Monthly	12	0.150	0	Yes
Corinella	Monthly	12	0.130	0	Yes
Cowes	Monthly	14**	0.160	0	Yes
Grantville	Monthly	12	0.130	0	Yes
Kilcunda	Monthly	15***	0.160	0	Yes
Rhyll	Monthly	12	0.160	0	Yes
San Remo	Monthly	12	0.150	0	Yes
Ventnor	Monthly	12	0.150	0	Yes

** extra samples taken due to population increase over summer
*** extra samples taken in first quarter due to locality split

4.4 Ozone-based disinfection by-product chemicals

WPW does not use ozone for disinfection treatment; therefore bromate and formaldehyde were not tested for in 2013/14.

4.5 Aluminium

The SDWR stipulate a maximum value of 0.2 mg/L for Aluminium. All localities were compliant with the water quality standard as per table 4-6 below:

Table 4-5 Aluminium

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	0.05	0	Yes
Cape Woolamai	Monthly	12	0.03	0	Yes
Corinella	Monthly	12	0.03	0	Yes
Cowes	Monthly	14**	0.09	0	Yes
Grantville	Monthly	12	0.03	0	Yes
Kilcunda	Monthly	15***	0.03	0	Yes
Rhyll	Monthly	12	0.03	0	Yes
San Remo	Monthly	12	0.03	0	Yes
Ventnor	Monthly	12	0.03	0	Yes

** extra samples taken due to population increase over summer
*** extra samples taken in first quarter due to locality split

4.6 Turbidity

The SDWR stipulate that the 95% upper confidence limit (UCL) of the mean of drinking water samples collected in the preceding 12 months must be ≤ 5.0 NTU. All localities were compliant with the water quality standard as per table 4-7 below:

Table 4-6 Turbidity

Locality	Frequency	Samples	Max result	95% UCL	Non-complying samples	Complying
Bass	Weekly	53	0.5	0.2	0	Yes
Cape Woolamai	Weekly	52	4.3	0.2	0	Yes
Corinella	Weekly	52	0.3	0.2	0	Yes
Cowes	Weekly	57**	2.3	0.3	0	Yes
Grantville	Weekly	52	0.5	0.2	0	Yes
Kilcunda	Weekly	64***	0.6	0.2	0	Yes
Rhyll	Weekly	52	1.1	0.2	0	Yes
San Remo	Weekly	52	0.6	0.2	0	Yes
Ventnor	Weekly	52	2.4	0.3	0	Yes

** extra samples taken due to population increase over summer
*** extra samples taken in first quarter due to locality split

4.7 Fluoride

The heath-based guideline value for fluoride in the ADWG is 1.5mg/L. In conjunction with this value the *Health (Fluoridation) Act 1973* states that the annual average for fluoride in drinking water must not exceed 1 mg/L. Fluoride concentrations at all locations were compliant during the reporting period as presented in table 4-8 below:

Table 4-7 Fluoride

Locality	Frequency	Samples	Max	Min	Average	Non-complying samples	Complying	Meeting obligation^
Bass	Monthly	13	0.79	0.39	0.66	0	Yes	Yes
Cape Woolamai	Monthly	14	0.81	0.05	0.62	0	Yes	Yes
Corinella	Monthly	14	0.79	0.47	0.65	0	Yes	Yes
Cowes	Monthly	15	0.78	0.48	0.65	0	Yes	Yes
Grantville	Monthly	16	0.78	0.39	0.65	0	Yes	Yes
Kilcunda	Monthly	14	0.79	0.38	0.61	0	Yes	Yes
Rhyll	Monthly	14	0.74	0.46	0.64	0	Yes	Yes
San Remo	Monthly	18	0.81	0.47	0.64	0	Yes	Yes
Ventnor	Monthly	14	0.84	0.52	0.65	0	Yes	Yes

^ Obligation is achieved if annual average concentration was >0.6mg/L

4.8 Other algae, pathogen, chemical or substance not specified above that may pose a risk to human health

WPW regularly tests for metals in the drinking water they supply to customers. The following sections detail the results for the 2013/14 reporting period

4.8.1 Antimony

Based on health considerations, the ADWG guideline value for Antimony is 0.003 mg/L. All localities were compliant with the ADWG as per table 4-9.1 below:

Table 4-8.1 Antimony

Locality	Frequency	Samples	Max result[1]	Non-complying samples	Complying
Bass	Quarterly	4	<0.001	0	Yes
Cape Woolamai	Quarterly	4	<0.001	0	Yes
Corinella	Quarterly	4	<0.001	0	Yes
Cowes	Quarterly	4	<0.001	0	Yes
Grantville	Quarterly	4	<0.001	0	Yes
Kilcunda	Quarterly	5	<0.001	0	Yes
Rhyll	Quarterly	4	<0.001	0	Yes
San Remo	Quarterly	4	<0.001	0	Yes
Ventnor	Quarterly	4	<0.001	0	Yes

[1] Results with a less than qualifier (<) are below the laboratory detection limit

4.8.2 Cadmium

Based on health considerations, the ADWG guideline value for Cadmium is 0.002 mg/L. All localities were compliant with the ADWG as per table 4-9.2 below:

Table 4-8.2 Cadmium

Locality	Frequency	Samples	Max result[1]	Non-complying samples	Complying
Bass	Quarterly	4	<0.0002	0	Yes
Cape Woolamai	Quarterly	4	<0.0002	0	Yes
Corinella	Quarterly	4	<0.0002	0	Yes
Cowes	Quarterly	4	<0.0002	0	Yes
Grantville	Quarterly	4	<0.0002	0	Yes
Kilcunda	Quarterly	5	<0.0002	0	Yes
Rhyll	Quarterly	4	<0.0002	0	Yes
San Remo	Quarterly	4	<0.0002	0	Yes
Ventnor	Quarterly	4	<0.0002	0	Yes

[1] Results with a less than qualifier (<) are below the laboratory detection limit

4.8.3 Copper

Based on health considerations, the ADWG health-based guideline value is set at 1 mg/L, and at 2 mg/L for the aesthetic-based guideline. The copper concentration complied with both guideline values at all localities during the reporting period as per table 4-9.3 below:

Table 4-8.3 Copper

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	0.16	0	Yes
Cape Woolamai	Monthly	12	0.055	0	Yes
Corinella	Monthly	12	0.065	0	Yes
Cowes	Monthly	14**	0.047	0	Yes
Grantville	Monthly	12	0.11	0	Yes
Kilcunda	Monthly	15***	0.088	0	Yes
Rhyll	Monthly	12	0.1	0	Yes
San Remo	Monthly	12	0.097	0	Yes
Ventnor	Monthly	12	0.41	0	Yes

** extra samples taken due to population increase over summer
*** extra samples taken in first quarter due to locality split

4.8.4 Lead

Based on health considerations, the ADWG guideline value is set at 0.01 mg/L. Lead concentrations complied with this guideline value at all localities during the reporting period as per table 4-9.4 below:

Table 4-8.4 Lead

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	0.001	0	Yes
Cape Woolamai	Monthly	12	0.002	0	Yes
Corinella	Monthly	12	0.007	0	Yes
Cowes	Monthly	14**	0.002	0	Yes
Grantville	Monthly	12	0.001	0	Yes
Kilcunda	Monthly	15***	0.001	0	Yes
Rhyll	Monthly	12	0.002	0	Yes
San Remo	Monthly	12	0.003	0	Yes
Ventnor	Monthly	12	0.002	0	Yes

** extra samples taken due to population increase over summer
*** extra samples taken in first quarter due to locality split

4.8.5 Nickel

Based on health considerations, the ADWG guideline value is set at 0.02 mg/L. The nickel concentration complied with this guideline value at all localities during the reporting period as per table 4-9.5 below:

Table 4-8.5 Nickel

Locality	Frequency	Samples	Max result[1]	Non-complying samples	Complying
Bass	Quarterly	4	<0.001	0	Yes
Cape Woolamai	Quarterly	4	<0.001	0	Yes
Corinella	Quarterly	4	0.001	0	Yes
Cowes	Quarterly	4	<0.001	0	Yes
Grantville	Quarterly	4	<0.001	0	Yes
Kilcunda	Quarterly	5	<0.001	0	Yes
Rhyll	Quarterly	4	<0.001	0	Yes
San Remo	Quarterly	4	<0.001	0	Yes
Ventnor	Quarterly	4	<0.001	0	Yes

[1] Results with a less than qualifier (<) are below the laboratory detection limit

4.8.6 Zinc

Based on aesthetic considerations, the ADWG guideline value is set at 3 mg/L. The zinc concentration complied with this guideline value at all localities during the reporting period as per table 4-9.6 below:

Table 4-8.6 Zinc

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	0.029	0	Yes
Cape Woolamai	Monthly	12	0.03	0	Yes
Corinella	Monthly	12	0.018	0	Yes
Cowes	Monthly	14**	0.015	0	Yes
Grantville	Monthly	12	0.034	0	Yes
Kilcunda	Monthly	15***	0.019	0	Yes
Rhyll	Monthly	12	0.014	0	Yes
San Remo	Monthly	12	0.053	0	Yes
Ventnor	Monthly	12	0.063	0	Yes

4.8.7 Manganese

The ADWG health-based value is set at 0.5 mg/L, and at 0.1 mg/L for aesthetic-based value. The manganese results met both ADWG values (for aesthetics and health) in all sampling localities during the reporting period as per table 4-9.7 below:

The manganese samples at the Bass locality are collected from water entering points as Bass does not have a 30 minute contact point within the distribution system.

Table 4-8.7 Manganese

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Fortnightly	26	0.038	0	Yes
Cape Woolamai	Fortnightly	26	0.021	0	Yes
Corinella	Fortnightly	26	0.059	0	Yes
Cowes	Fortnightly	26	0.018	0	Yes
Grantville	Fortnightly[2]	52	0.025	0	Yes
Kilcunda	Fortnightly	26	0.036	0	Yes
Rhyll	Fortnightly	26	0.02	0	Yes
San Remo	Fortnightly	26	0.042	0	Yes
Ventnor	Fortnightly	26	0.016	0	Yes

[2] 2 sites in Grantville locality sampled weekly

4.8.8 All other chemicals or monitored parameters

WPW also sample from water entering points and service basins that deliver water into each locality for health related aspects of drinking water. There are a number of sites that sample different parameters at varying frequencies. These are highlighted, along with compliance with ADWG, in table 4-9.8 below:

4-8.8 Other health related parameters sampled at water entering points and service basins

Parameter	Frequency	Samples	ADWG value (mg/L)	Complying samples
Chromium (as Cr(VI)	Quarterly	40	<0.05	All results from water entering points and service basins were compliant with ADWG health related values
Cyanide	Annually	10	<0.08	
Nitrate	Weekly	348	<50	
Nitrite	Fortnightly	260	<3	
Sulphate	Quarterly	16	<500	

4.8.9 Raw water monitoring

As described in section 2.1, the raw water quality in Candowie Reservoir is impacted by intensive farming throughout the open catchment. For this reason WPW monitors a number of parameters in the raw water storage to detect changes in water quality, allowing for proactive management of water treatment processes. Parameters, sampling frequency and location are tabulated below:

Table 4-8.9 Raw water monitoring

Location	Frequency	Parameter
Raw water offtake	Daily	Fluoride, turbidity, pH, iron and manganese
	Weekly	Colilert (200) *E. coli*, coliforms, standard plate count, dissolved organic carbon and electrical conductivity
	Fortnightly (or increased as required)	Methylisoborneol (MIB) and geosmin
	Monthly	Alkalinity
	Quarterly	Metals (arsenic, barium, boron, mercury, molybdenum, selenium), herbicides and pesticides, cryptosporidium and giardia
	Annually	Metals (silver iodide, tin and beryllium) and radiation
Profile sampling at surface, 1, 3, 7 and 9 meter depths	Fortnightly (or increased as required)	Blue green algae, nitrate, nitrite, ammonia, phosphorus, silica, iron and manganese
Surface and every meter interval (up to 10m)	Fortnightly	Temperature, dissolved oxygen, pH and electrical conductivity @25°C

4.9 Aesthetics

The SDWR refers to aesthetic water quality and states the annual report must include the steps taken by a water supplier to manage aesthetic characteristics of drinking water supplied. Along with verification monitoring of colour and pH, WPW undertake jar testing for taste and odour characteristics. The jar tests are then taste and smell tested by a group of WPW staff. This allows the PAC dose rate to be effective in removing MIB and Geosmin (taste and odour compounds found in the raw water). Other steps taken to manage aesthetics are reactive maintenance programs: annual air scouring of the distribution pipe network and a quarterly flushing program. The ADWG set the aesthetic based guideline values for true colour iron and pH. Those parameters sampled throughout the distribution system, indicating compliance, are presented in tables below.

4.9.1 True colour

Sampling for true colour was undertaken at water entering points into the distribution system - not at customer taps. The table below presents the data from a locality perspective rather than for individual water sampling points. The ADWG value is set at 15 HU. True colour results met ADWG in all sampling localities during the reporting period as per table 4-10.1 below:

Table 4-9.1 True colour

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Monthly	12	4	0	Yes
Cape Woolamai	Monthly	12	2	0	Yes
Corinella	Monthly	12	2	0	Yes
Cowes	Monthly	12	4	0	Yes
Grantville	Monthly	24[2]	4	0	Yes
Kilcunda	Monthly	12	2	0	Yes
Rhyll	Monthly	12	2	0	Yes
San Remo	Monthly	12	4	0	Yes
Ventnor	Monthly	12	4	0	Yes

[2] 2 sites in Grantville locality sampled monthly.

4.9.2 Iron

Based on aesthetic considerations, the ADWG guideline value is set at 0.3 mg/L. All localities were compliant with the ADWG in the 2013-14 reporting period as highlighted in table 4-9.2 below

Table 4-9.2 Iron

Locality	Frequency	Samples	Max result	Non-complying samples	Complying
Bass	Fortnightly	27	0.04	0	Yes
Cape Woolamai	Fortnightly	26	0.07	0	Yes
Corinella	Fortnightly	26	0.04	0	Yes
Cowes	Fortnightly	28**	0.18	0	Yes
Grantville	Fortnightly	26	0.07	0	Yes
Kilcunda	Fortnightly	32***	0.05	0	Yes
Rhyll	Fortnightly	26	0.07	0	No
San Remo	Fortnightly	26	0.06	0	Yes
Ventnor	Fortnightly	26	0.22	0	Yes

** extra samples taken due to population increase over summer
*** extra samples taken in first quarter due to locality split

4.9.3 pH

The ADWG aesthetic value for pH is between 6.5 and 8.5. There was one non-compliant result for pH throughout 2013-14. The exceedances are highlighted below

Table 4-9.3 pH

Locality	Frequency	Samples	Min	Max	Non-complying samples	Complying
Bass	Weekly	54	6.6	7.4	0	Yes
Cape Woolamai	Weekly	52	5.8	7.8	1	No
Corinella	Weekly	52	6.6	7.9	0	Yes
Cowes	Weekly	57**	6.9	8.5	0	Yes
Grantville	Weekly	52	6.8	7.8	0	Yes
Kilcunda	Weekly	64***	6.8	7.9	0	Yes
Rhyll	Weekly	52	6.9	7.8	0	Yes
San Remo	Weekly	52	6.8	7.7	0	Yes
Ventnor	Weekly	52	7.0	8.1	0	Yes

** extra samples taken due to population increase over summer
*** extra samples taken in first quarter due to locality split

One pH exceedances occurred In September 2013 in the Cape Woolamai locality. Exceedance detailed in section 3.3.2.

4.10 Analysis of results

The SDWR Schedule 2 results have been analysed and expressed in the table below as a comparison of percentage of localities and percentage of customers where drinking water supplied was complying with schedule 2. The table plots the current and last two reporting periods.

WPW have reached 100% compliance with every standard in Schedule 2 for the current reporting period. 2011/12 had one exceedance for aluminium in Kilcunda (0.9mg/L). This was a one off, outlying result. The site was flushed and re samples indicated compliance. Compliance has been maintained over the last two reporting periods as 100%, proving that 0.9mg/L aluminium result was a one off exceedance.

Table 4-10 Percentage compliance with Schedule 2 of the SDWR

Parameter	Percentage by locality			Percentage by customer		
	2011/12	2012/13	2013/14	2011/12	2012/13	2013/14
Escherichia coli	100	100	100	100	100	100
Chloroacetic acid	100	100	100	100	100	100
Dichloroacetic acid	100	100	100	100	100	100
Trichloroacetic acid	100	100	100	100	100	100
Trihalomethanes	100	100	100	100	100	100
Aluminium	89	100	100	96	100	100
Turbidity	100	100	100	100	100	100

5. Emergency and incident management

5.1 Reportable events under sections 22 and 18 of the SDWA

WPW had two reportable section 22 events due to:

- widespread public complaint, and
- An Ecoli exceedance in the distribution network

5.1.1 Widespread public complaint

This was due to an algal bloom in Candowie Reservoir which resulted in a taste and odour event in the distribution system. The taste and odour was reported as an earthy, grassy taste and smell which is consistent with algal blooms. There is no guideline for value to exceed regarding taste and odour as complaint is aesthetic and subjective to the individual. However, WPW acknowledged the poor taste and odour of the water throughout the whole distribution system and corrective action was warranted and performed. Table 5-1-1 highlights the event. Section 3.3.1 details the event further.

Table 5-1-1. Section 22 reportable event – widespread public complaint

Taste and odour event	Details
Duration	24/02/2014 to 07/03/2014
Location and affected localities	Derived from algal bloom in Candowie Reservoir. Affected all localities in the distribution network
Nature of event	Large algal bloom in Candowie Reservoir led to widespread taste and odour complaint
Actions taken in response to event	Distribution network was repeatedly flushed, PAC dose was increased, a root cause analysis was undertaken by an industry expert and operational changes implemented
Communication with public	Incoming phone calls were briefed by Customer Service and transferred to the Water Quality Officer for further explanation if required. WPW website was updated with information regarding the algal bloom. Media releases also were sent to the two local papers (The Advertiser and The South Gippsland Sentinel Times)

5.1.2 *E. coli* exceedance

An *E. coli* exceedance of 10 orgs/mL was identified in Cape Woolamai locality. Investigations led to tank water being sampled from the tap at the front of the property. This was a scheduling error by the independent laboratory that undertakes sampling. Department of Health were notified under section 22 notification. The site was flushed and follow up samples of treated water indicated compliance. The tenants were notified of potentially poor water quality in the tank. Table 5-1-2 highlights the event

Table 5-1-2. Section 22 reportable event – *E. coli* exceedance

Taste and odour event	Details
Duration	03/09/2013
Location and affected localities	Property in the Cape Woolamai locality

Nature of event	A positive *E. coli* result of 10 orgs/mL was recorded. Investigations led to tank water being sampled. The site was sampled due a scheduling error, admitted by the contracted laboratory.
Actions taken in response to event	The site was flushed with main supply. The site had a backflow prevention device installed at the meter so no other properties were affected by tank water
Communication with public	WPW believe we have a duty of care, so information was provided to the tenant on the risks of consuming tank water and the maintenance requirements of using tank water. The tenants informed WPW that they do not use tank water for drinking and flush there internal plumbing when switching over to mains supply

5.2 Other incidents issues or events not reportable under sections 22 of SDWA

As discussed under section 3.3.1 and 3.3.2 WPW had a blue green algal issue in Candowie Reservoir. For further information on these issues please refer to the relevant section.

6. Complaints relating to water quality

6.1 Summary of complaints

The number of customer complaints to WPW regarding drinking water totalled 101 for 2013/14. This was an increase of 83 from 2012/13. The increase was due to a taste and odour event discussed in sections 3.3.1 and 5. Table 6-1 highlights the type of customer complaints

Table 6-1 Complaints relating to water quality

Type of complaint	No. of complaints	No of complaints per 100 customers supplied^
Discoloured water	8	0.04
Taste/odour	88	0.49
Blue water	0	0.00
Air in water	0	0.00
Other**	5	0.03

^for the purposes of this section, the term 'customer' has the same meaning as that used by the Essential Services Commission, that is, a customer = a connection
**the category 'other' includes any calls related to alleged illness

87% of complaints for 2013/14 were for taste/odour, 8% for discoloured water issues and 5% for other. Note that all taste/odour complaints were for an algal bloom discussed in section 3.3.1 and 5.1. Media releases were sent to the two local media outlets – The Phillip Island and San Remo Advertiser and the South Gippsland Sentinel Times explaining the situation.

6.2 Response to complaints

WPW is committed to providing its customers with ongoing quality water and services. Our customer service division manages customer complaints and each complaint is lodged using an entry form in WPW customer request management (CRM) system. Depending on the nature of the complaint, the details are electronically forwarded to the Water Quality Officer for water quality complaints; the Maintenance group for bursts and leaks; and the Communications Manager or Customer Service Manager for all other complaints.

After a complaint is lodged, depending on the nature of the complaint, one or a combination of the following actions may be performed:

- Proceed with remedial action such as water sample testing, mains flushing and sometimes water sampling testing after flushing;
- Contact the customer who lodged the complaint to determine the seriousness of the issue;
- Discuss with the complainant the possible causes of the poor water quality i.e. temporary changes to normal operation or high manganese and/or iron in raw water;
- Explain to the complainant the multiple barriers and rigorous sampling and testing regime employed to provide a safe and aesthetically acceptable water; and
- Give feedback to customer in terms of water quality information and links to further information regarding regulatory obligations.

7. Findings of the most recent risk-management plan audit

DH required a regulatory audit of Westernport Water's Risk Management Plan during the 2013/14 reporting period.. WPW were found to be compliant with the obligations imposed by section 7(1) of the SDWA. A list of opportunities for improvement is defined below. The audit certificate can be found in Appendix 1

Table 7 OFI's from most recent audit and actions taken

OFI	Actions taken to address OFI
Include a process flow diagram in the plan to assist in understanding the control points	*WQRMP* has been updated to reflect OFI
Critical control points are labelled as Control Points in the WQRMP which nevertheless treats them as CCPs. To minimise the risk of confusion, it would be better to label such control points as CCPs.	*WQRMP* has not been updated to reflect OFI. Critical Control Points are of a HACCP approach. HACCP is not used at IBWPP.
CCPs should include a validation section that describes the source and justification for the Targets and Critical limits. WPW advice was that all such data sources came from advice from a water quality expert. This is considered acceptable but it would be better if the specific references on which the water quality expert based his advice were listed in a validation section for each CCP.	*WQRMP* has been updated to reflect OFI
For the CCP for Coagulation and Flocculation, the section on Monitoring Procedures needs to be corrected to list the actual monitoring procedures (currently lists "none"), or alternatively all SOPs could be listed in the section for "Operating Procedures".	*WQRMP* has been updated to reflect OFI
The catchment description could be more informative, perhaps including a GIS map of elevation and drainage and roads.	Catchment modelling (including GIS mapping) will be added in WPW Water Quality Strategy.
There is some inconsistency about the regularity of the tests and recording of the results. To reduce the risk of calibration checks being overlooked, tests should be scheduled at fixed intervals or following significant events affecting this process step.	Tests will be scheduled into new Water Quality software that has been purchased by WPW and will be implemented in 2014/15

8. Undertakings under section 30 of the Act

WPW currently has no section 30 undertakings.

9. Exemption under section 20 of the Act

WPW has no exemptions under section 20

10. Glossary of Terms

Term	Meaning
ADWG	*Australian Drinking Water Guidelines, 2011* prepared by the National Health and Medical Research Council
CRM	Customer Request Management system
CUP	Candowie Upgrade Project
DAFF	Dissolved Air Floatation and Filtration
DH	Department of Health
E.coli	*Escherichia coli*
GMU	Groundwater Management Unit
IBWPP	Ian Bartlett Water Purification Plant
mg/L	Milligram per litre
NTU	Nephelometric Turbidity Units
OFI	Opportunity for Improvement
PAC	Powdered Activated Carbon
SCADA	Supervisory Control and Data Acquisition
SDWA	*Safe Drinking Water Act, 2003 (Victoria)*
SDWR	*Safe Drinking Water Regulations, 2005*
THM	Trihalomethanes
UCL	Upper Confidence Limit
WPW	Westernport Water
WTPO	Water Treatment Plant Operator
WQO	Water Quality Officer
WQRMP	Water Quality Risk Management Plan

11. Appendix 1 – Audit certificate

The audit certificate is attached

State Government Victoria

Risk Management Plan Audit Certificate

SCHEDULE 1

Safe Drinking Water Regulations 2005, Regulation 8

Risk Management Plan Audit Certificate

Certificate Number: 93

Audit period: 10th February 2012 to March 30th 2014

To: Mr Murray Jackson
Managing Director
Westernport Water
2 Boys Home Road, Newhaven VIC 3925

Australian Business Number (ABN): 63 759 106 755

I, Nicholas Alan O'Connor, after conducting a risk management plan audit of the water supplied by Westernport Water, am of the opinion that Westernport Water *has complied* with the obligations imposed by section 7(1) of the **Safe Drinking Water Act 2003** during the audit period.

Signature of approved auditor:

3 April 2014