

Westernport Water

Annual Drinking Water Quality Report 2011/12

3 October 2012



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1. Introduction

1.1 Westernport Water - Overview

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

Westernport Water services approximately 15,000 properties on 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, Woolamai Waters, 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

The aim of this report is to provide all stakeholders, including the community, with water quality information compliant with Section 26 of the *Safe Drinking Water Act 2003* (Victoria) (the Act). The report covers issues relating to the quality of drinking water and the management of regulated water.

Under section 26 of the Act Westernport Water is required to provide the Department of Health (DH) with an annual report on the quality of drinking water supplied to its customers.

1.3 Westernport Water's Water Supply System

Westernport Water has a single-water supply storage – Candowie Reservoir – which is an on-stream storage on Tennent Creek, which is 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 Westernport Water's area of supply. A plan of the distribution system is included in this report as Figure 1–2.

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 manganese and iron. Raw water quality is typical of water that is sourced from an unprotected catchment. Following treatment, the water complies with the Australian Drinking Water Quality Guidelines (NHMRC, 2011).

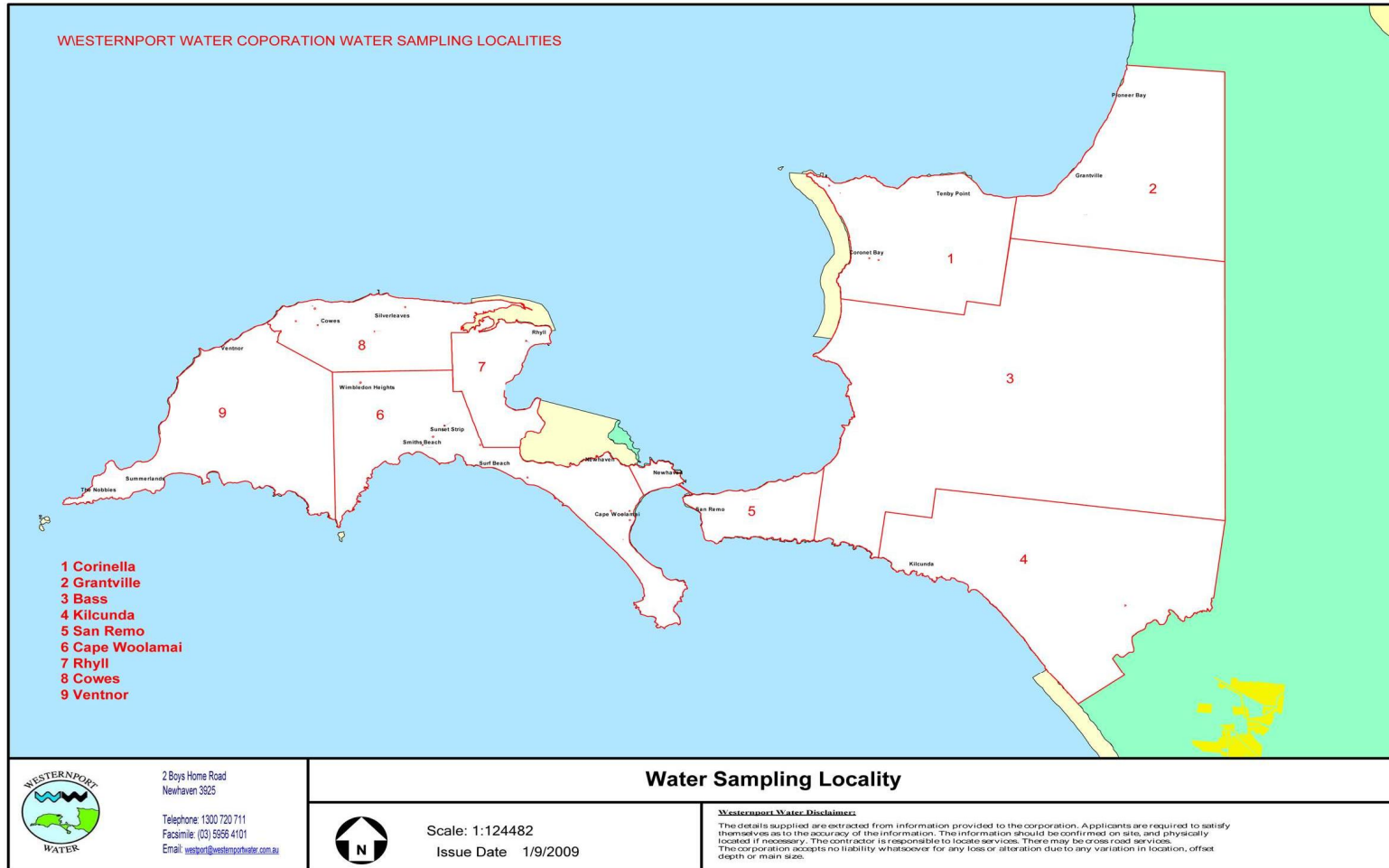


Figure 1-1: Westernport Water service area

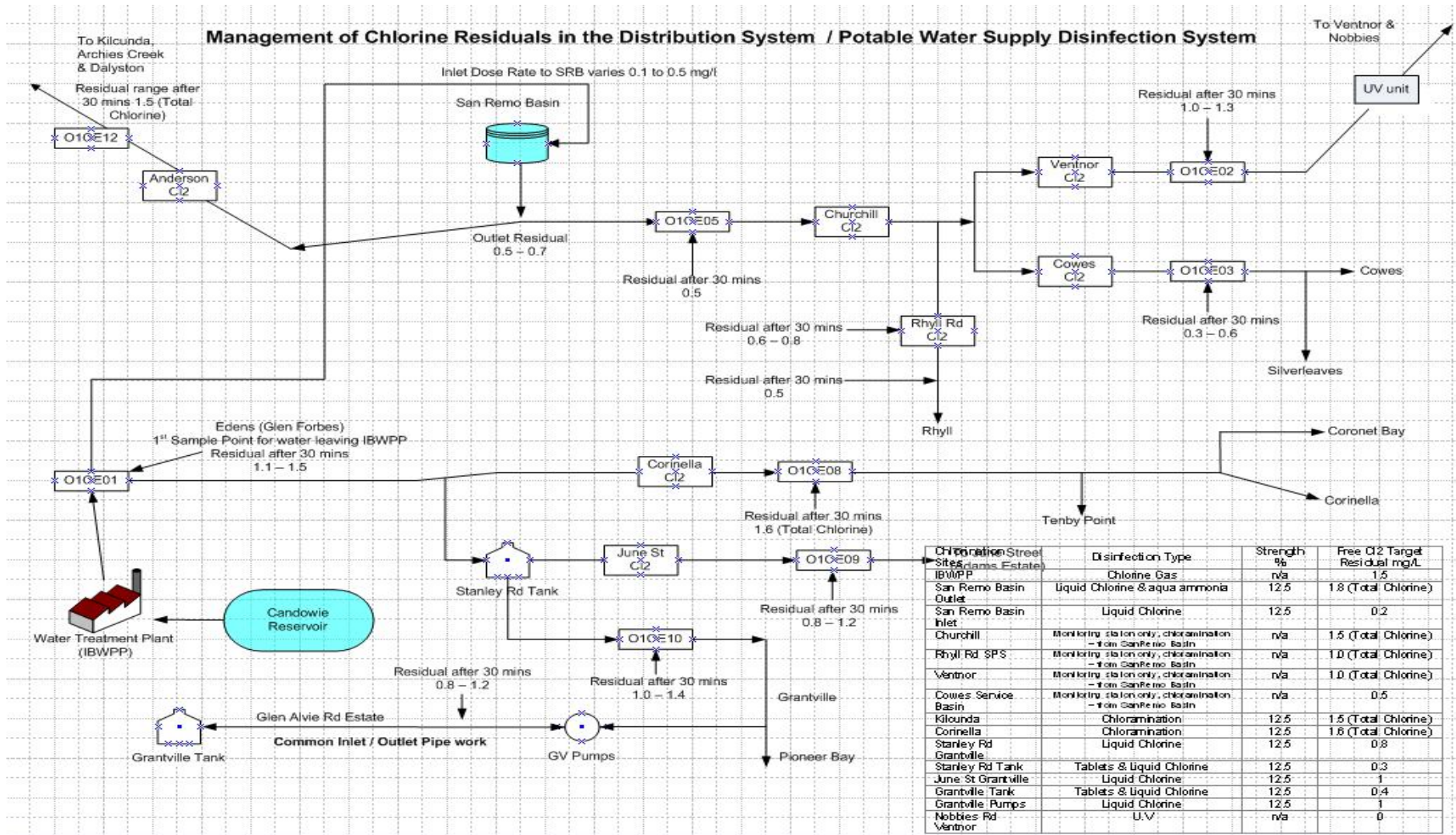


Figure 1-2: Potable water supply disinfection and distribution system schematic diagram



1.4 Other Water Sources

Other sources of water are available to supplement Candowie Reservoir during low rainfall periods. These alternative sources include bores, the Bass River and Lance Creek reservoir. Water from these alternative sources is pumped to Candowie Reservoir for centralised storage and treatment at the IBWPP.

1.4.1 Bores

A number of groundwater bores are available to Westernport Water located throughout the Corinella Aquifer. However, this resource was not utilised during the 2011/12 reporting period. The bore depth and application of the bores are listed in Table 1-1.

Table 1-1: Corinella bores

Asset	Location	Bore Depth	Application
KRDB1	King Road Wastewater Treatment Plant (WWTP)	117 m	Production bore
KRSB2	King Road 500 m from WWTP	26.6 m	Production bore
KRSB3	Cnr King Road and Bass Highway	52.1 m	Production bore
CMSB1	Cemetery Road	36 m	Production bore

1.4.2 Bass River

Westernport Water's pump station, located along the banks of the Bass River, can transfer water via the Bass River Pipeline to Candowie Reservoir. The Bass River resource was not required during the 2011/12 reporting period.

1.4.3 Lance Creek Reservoir

Westernport Water is able to share resources from South Gippsland Water's Lance Creek Reservoir, which is located within the neighbouring Powlett River catchment. However, this resource was not utilised during the 2011/12 reporting period.

2. Water Treatment and Quality Management System

Westernport Water operates a comprehensive water quality management system that complies with the *Safe Drinking Water Act 2003* and associated regulations. This system is designed to ensure that customers receive drinking water of acceptable quality at all times, and that public health is protected.

2.1 Water Treatment

Raw water from Candowie Reservoir is treated using a combination of flocculation, coagulation, dissolved air flotation, filtration and chemical dosing at the IBWPP. The source water is predominantly high in nutrients and organics, and has periodically been high in manganese and iron by Australian Drinking Water Guidelines (ADWG) standards. However, this is typical of water that is sourced from an open, unprotected catchment.

The IBWPP is located in the Bass Hills near Glen Forbes and was constructed in 1990 to improve drinking water quality. This plant uses physical and chemical treatment to remove contaminants and improve the aesthetic quality of the water so that it complies with the ADWG, and is acceptable to consumers. A summary of the processes used at IBWPP and within the reticulation system are shown in Table 2-1.

Table 2-1: Water treatment processes at Westernport Water

Locality	Treatment Process	Added Substances	Comments
Ian Bartlett Water Purification Plant (IBWPP)	Oxidation	Potassium permanganate	As required.
	Taste and odour removal	Powdered activated carbon	Continuous.
	Coagulation / flocculation	Aluminium sulphate	For removal of colour and turbidity.
	Dissolved air flotation / filtration	Nil	Removes flocculated particles.
	pH correction	Caustic soda (sodium hydroxide)	Required to raise pH to ~7.4.
	Fluoridation	Sodium Fluoride	Required to raise fluoride levels to 0.9 mg/L in treated water.
	Disinfection	Chlorine gas	Required to get chlorine residual to desired set point.
Various locations throughout the water supply system	Disinfection	Sodium hypochlorite	Booster chlorination stations used throughout the water supply system to retain an appropriate chlorine residual.
	Disinfection	Sodium hypochlorite and aqua ammonia	Booster chloramination stations used at the San Remo Basin, Kilcunda and Corinella to retain the appropriate total chlorine residual.
	Ultra Violet Disinfection	Nil	The UV system services a distinct water supply area on Phillip Island – The Nobbies.



Disinfection of water is achieved by the addition of chlorine gas after treatment at the IBWPP, with sufficient contact time to ensure appropriate disinfection. Chlorine residual is maintained throughout the supply system via a network of booster chlorination and chloramination stations.

The exception is the water supply to the Penguin Parade and Nobbies area of Phillip Island which uses UV disinfection. Westernport Water commissioned a UV disinfection unit to service this distinct area of Phillip Island in January 2001. The unit is an Australian Ultra Violet Services Pty Ltd model CA-848-NS. The unit has 8 ultra violet lamps that operate at the germicidal waveband of 245 nm. The maximum flow rate of the unit is 13 L/s. The UV unit was installed as an alternative to chlorine at this extremity of Westernport Water's water distribution system. The UV unit continues to be effective and is maintained and operated in accordance with the Westernport Water Operations Manual.

2.1.1 Improvements

Westernport Water strives to provide its customers with the best quality water possible by maintaining and improving the water supply infrastructure and water source. Significant changes and upgrades that have occurred during the 2011/12 period at IBWPP and throughout the water supply system are presented below in Table 2–2.

Table 2–2: Improvements to water treatment and distribution systems during 2011/12

Activity	Outcome / Improvement
Installation and connection of a 450mm high density polyethylene water pipe under the eastern entrance of Western Port between San Remo and Phillip Island in August 2011.	Further securing the water service to Phillip Island.
New chloramination processes have been implemented and have resulted in four chlorine treatment booster stations on Phillip Island being turned off	Since the rollout of chloramination, water quality results have improved, and there have been no non-compliant disinfection by-product results recorded. Chloramination has also reduced free chlorine concentrations in the system, eliminating the negative taste and odour associated with elevated levels of chlorine.
168 kilometres of distribution pipes air scoured.	Better quality water supplied to customers/reduction of non-complying samples.
Reduction in non-complying samples, two in total.	During 2011/12, Westernport Water recorded the least number of non-complying samples in its monitoring history.
Installation of hypo tank and timer dosing at Stanley Rd Tank.	Removed the need to manually dose the tank via chlorine tablets, addressing O & H issues as well as stabilising outlet chlorine residuals
New daily water quality test recording at WPP	Improved tracking of various quality parameters through more of plant's process
Tree planting around reservoir boundary with regards to dam wall upgrade works.	Improved quality of runoff into reservoir, and reduced risks of landslips/erosion.
More sampling done on our distribution system than previous.	Improved monitoring of systems allows for appropriate changes to be made to the chemical dosing as results come in.
Purchasing of testing equipment.	More monitoring of various water quality parameters.

2.2 Issues

2.2.1 Section 18/22 Events

Westernport Water experienced one elevated turbidity result at Kilcunda in December 2011, which was reported to the DH under section 18 of the Safe Drinking Water Act. This event however, was determined by DH not to constitute a section 18 notification, as a single elevated turbidity result does not constitute non-compliance with the turbidity water quality standard. Even though this event was not reportable under section 18, details and remedial actions are described in the Emergency and Incident Management section of this report (Section 4).

2.2.2 Algae in Candowie Reservoir

Candowie Reservoir occasionally experiences high algal counts with a wide range of species being present. Physicochemical and biological conditions of the storage are therefore monitored regularly. This assists Westernport Water to detect and manage any potential algal blooms before they impact on the quality of the raw water.

Constant oxygenation of the bottom waters of Candowie Reservoir assisted in limiting the development of conditions favourable to algal growth. During the 2011/12 financial year, destratification of the reservoir was undertaken using two processes: the WEARS (Water Engineering and Research Solutions) unit (the main aerator used), with a bubble aerator being used when required.

The Candowie Reservoir experienced three algal blooms between December 2011 and March 2012. An increase in the potentially toxic blue-green *Anabaena circinalis* occurred on 7 December 2011 and the reservoir was treated with cupricide on 9 December 2012. Sampling on 11 December 2011 showed that the treatment was successful.

An increase in the potentially toxic blue-green *Microcystis Aeruginosa* occurred on 7 March 2012. Cupricide treatment was applied to the reservoir on 16 March 2012. Sampling on 19 March 2012 showed that the treatment was successful with no *Microcystis Aeruginosa* detected. It was almost immediately replaced by a bloom of the potentially toxic blue-green *Microcystis flos-aquae*. Following discussions with Dr Barbara Bowles, DH and the Department of Sustainability and Environment, the potentially toxic bloom was left to evolve and die out naturally. Sampling on 28 March showed that the *Microcystis flos-aquae* numbers had peaked and were on the way down.

2.2.3 Water Security

The Candowie Reservoir water level over the 2011/12 and 2010/11 financial years can be seen in Figure 2–1. For most of the year, Candowie Reservoir was at its maximum capacity of 2263 ML.

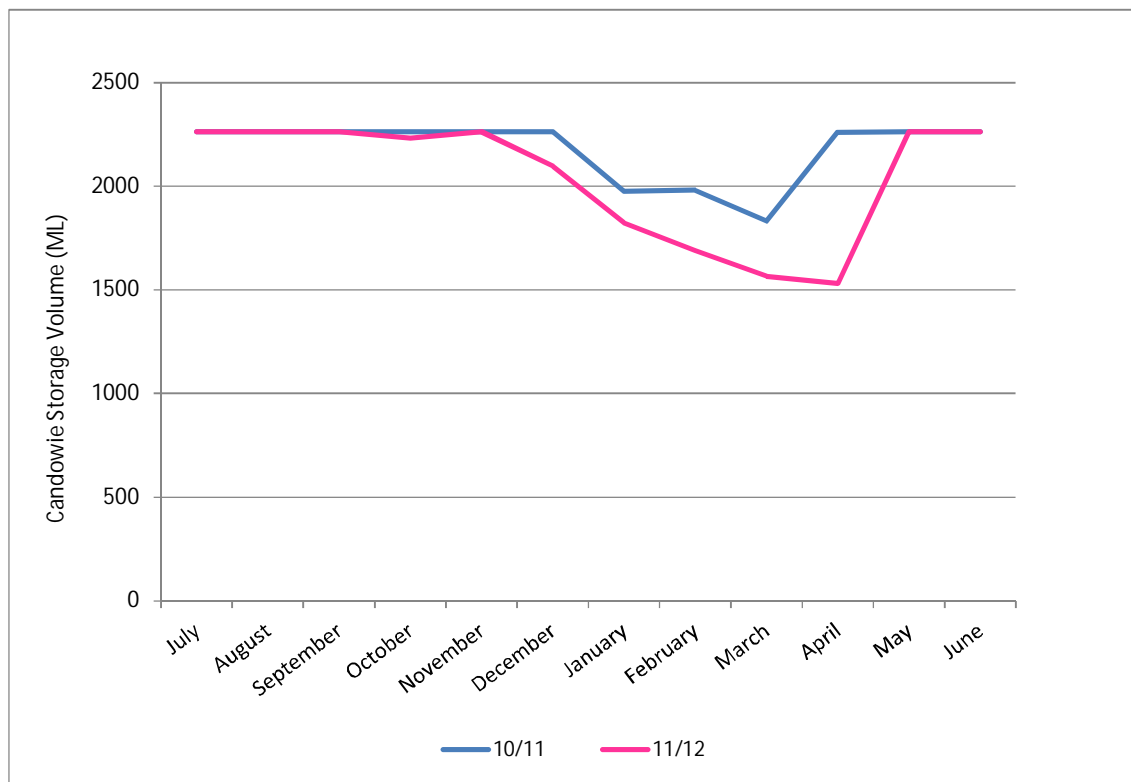


Figure 2-1: Candowie Reservoir storage volumes (1/7/2010 to 30/6/2012)

Westernport Water recognises that any decrease in the yield from the Candowie catchment poses a significant business risk in supplying customers with acceptable water quality and quantity, given on-going population growth in the region.

Westernport Water has budgeted for a major augmentation project within its 2008 – 2013 Water Plan. The option being developed is to raise the Candowie Dam wall. This will increase the full supply level by up to 3 m and increase the stored volume to 4,463 ML resulting in an estimated reliable annual yield of 3,654 ML.

This project requires significant government and environmental requirements to be approved prior to commencement. The level of water supply security provided by the 'Candowie raising' option will depend on future rainfall patterns, but should impose minimal additional operational costs.

Southern Rural Water reissued Westernport Water's bore licence on the 1st September 2010 to take and use water and undertake operational works at 4 bores within the Corinella ground water system - up to a volume of 490 ML during this period. Due to the amount of water in Candowie Reservoir during 2011/12, the bores were not operated this year. Westernport Water are able to use the water from this groundwater source to supplement other water sources as required, up to the annual licensed volume and also within the bounds of a maximum daily extraction rate and volume for each bore.

In September 2009 Westernport Water submitted its application for 1,000ML of water from the Metropolitan Pool (i.e. water sourced from the Desalination Plant located near Wonthaggi). Westernport Water was granted a Bulk Entitlement for this water by the Minister on 14th October 2010. This water from the Metropolitan Pool is to be delivered by pipeline to Westernport Water currently being constructed. The commencement of this Bulk Entitlement is not until July 2012.

In total Westernport Water has, or is seeking to secure, access to sources and volumes of water as set out in Table 2-3.

Table 2-3: Water sources and volumes available to Westernport Water

Water Source	Volume (ML)
Tennent Creek	2911
Bass River	3,000
Corinella Aquifer	490
Metropolitan Pool	1,000
Total	7,431



3. Quality of Drinking Water for 2011/12

The Safe Drinking Water Regulations 2005 (Victoria) stipulate that evidence must be given to indicate a water supplier’s compliance or non-compliance with the regulations. These regulations were in force for the 2011/12 reporting period. Results for each locality are benchmarked against the standards provided in Table 3–1, which are based on the regulations and ADWG.

Table 3–1: Water quality reporting standards

Parameter	Benchmark Standard
Safe Drinking Water Regulations 2005: Schedule 2	
<i>Escherichia coli</i> (<i>E. coli</i>)	At least 98% of all samples of drinking water collected in any 12 months period to contain no <i>Escherichia coli</i> per 100 mL
Chloroacetic acid	Must not exceed 0.15 mg/L
Dichloroacetic acid	Must not exceed 0.1 mg/L
Trichloroacetic acid	Must not exceed 0.1 mg/L
Trihalomethanes	Must not exceed 0.25 mg/L
Aluminium (acid soluble)	Must not exceed 0.2 mg/L
Turbidity	95% upper confidence limit of mean of drinking water samples collected in the preceding 12 months must be ≤ 5.0 NTU.
Bromate	Must not exceed 0.02 mg/L
Formaldehyde	Must not exceed 0.5 mg/L
Australian Drinking Water Guidelines (2011)	
Antimony	Must not exceed 0.003 mg/L
Cadmium	Must not exceed 0.002 mg/L
Copper	Must not exceed 2 mg/L (Health guideline value, aesthetic guideline is 1 mg/L)
Iron	Must not exceed 0.3 mg/L (Aesthetic guideline value)
Lead	Must not exceed 0.01 mg/L
Nickel	Must not exceed 0.02 mg/L
Zinc	Must not exceed 3 mg/L (Aesthetic guideline value)
pH	Range of 6.5 – 8.5 (Aesthetic guideline range)
Manganese	Must not exceed 0.5 mg/L (Health guideline value, aesthetic guideline value is 0.1 mg/L)

The ozone-based disinfection by-products (bromate and formaldehyde) were not monitored in 2011/12 as Westernport Water did not use ozone based disinfectants or water treatment chemicals. Bromate and formaldehyde are not deemed to be a significant risk in drinking water supplied by Westernport Water.

The following nine water sampling localities (also shown in Figure 1–1) were gazetted for Westernport Water on 16th January 2007:

- Bass;
- Cape Woolamai;
- Corinella;
- Cowes;
- Grantville;
- Kilcunda;

- Rhyll;
- San Remo; and
- Ventnor.

Prior to 2007, the Dalyston area was previously separately reported. It was incorporated in the Kilcunda locality of Westernport Water's water sampling localities as gazetted in January 2007. Westernport Water has adopted a conservative approach and continued monitoring the Dalyston area. This is reflective of the length of water main servicing this area and recognition that the area is a non-looped extremity of the reticulation system.

The water quality statistics for Kilcunda have therefore been calculated based on data from both Kilcunda and Dalyston and the frequency of sampling is double that of the other localities.

3.1 Escherichia coli

3.1.1 Results

The Safe Drinking Water Regulations stipulate that at least 98 % of all samples of drinking water collected in any 12 months period contain no *Escherichia coli* (*E. coli*) per 100 mL. The water quality with respect to *E. coli* was compliant with this standard (Table 3–2).

Table 3–2: *Escherichia coli* (*E. coli*)

Water Sampling Locality	Frequency of Sampling	No. of Samples	Samples Containing <i>E. coli</i>	Max Result (orgs/ 100 mL)	% Samples with no <i>E. coli</i>	Complying (Yes/No)
Bass	Weekly	52	0	0	100	Yes
Cape Woolamai	Weekly	52	0	0	100	Yes
Corinella	Weekly	51	0	0	100**	Yes
Cowes	Weekly [#]	53	0	0	100	Yes
Grantville	Weekly	52	0	0	100	Yes
Kilcunda	Twice weekly*	104	0	0	100	Yes
Rhyll	Weekly	52	0	0	100	Yes
San Remo	Weekly	52	0	0	100	Yes
Ventnor	Weekly	52	0	0	100	Yes

Note: [#] the number of samples collected at Cowes exceeded the regulatory requirement as additional *E. coli* sampling was performed at Cowes over the summer period in response to increases in population. * Kilcunda data includes Dalyston area data, both these areas were sampled weekly. ** One of the weekly samples collected at Corinella recorded a value of 8 organisms per 100mL. This result was reported to DH by Westernport Water. Subsequent investigation by Westernport Water demonstrated the water that was sampled was tank water from the property. Because the result did not represent the quality of water being supplied by Westernport Water, DH agreed to the removal of the result from compliance calculations.

3.2 Chlorine Based Disinfection By-product Chemicals

3.2.1 Free Chlorine Results

There is no mandated standard for free chlorine in the Safe Drinking Water Regulations. The ADWG however has a maximum limit for chlorine of 5 mg/L. Table 3–3 shows all locations were below the ADWG value for free chlorine during the reporting period.

Table 3–3: Free Chlorine

Water Sampling Locality	Frequency of Sampling	No. of samples	Non-complying samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Weekly*	51	0	0.48	Yes
Cape Woolamai	Weekly	52	0	0.61	Yes
Corinella	Weekly**	60	0	0.60	Yes
Cowes	Weekly [#]	53	0	0.64	Yes
Grantville	Weekly	52	0	2.05	Yes
Kilcunda	Twice weekly ^{##**}	112	0	1.02	Yes
Rhyll	Weekly	52	0	2.2	Yes
San Remo	Weekly	52	0	0.53	Yes
Ventnor	Weekly	52	0	0.40	Yes

Note: * the number of samples collected at Bass failed to comply with Westernport Water's monitoring requirements as the result was not reported to the laboratory. ** the number of samples collected exceeded Westernport Water's monitoring requirement as additional sampling was performed in response to chloramination. [#] the number of samples collected at Cowes exceeded the regulatory requirement as additional sampling was performed over the summer period in response to increases in population. ^{##} Kilcunda data includes Dalyston area data, both these locations were sampled weekly.

3.2.2 Monochloroacetic Acid

The Safe Drinking Water Regulations stipulate a maximum value of 0.15 mg/L for monochloroacetic acid. All localities were compliant with the water quality standard (Table 3–4).

Table 3–4: Monochloroacetic acid

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Monthly	12	0	<0.005	Yes
Cape Woolamai	Monthly	12	0	<0.005	Yes
Corinella	Monthly	12	0	<0.005	Yes
Cowes	Monthly	12	0	<0.005	Yes
Grantville	Monthly	12	0	0.005	Yes
Kilcunda	Twice monthly*	24	0	<0.005	Yes
Rhyll	Monthly	12	0	<0.005	Yes
San Remo	Monthly	12	0	<0.005	Yes
Ventnor	Monthly	12	0	<0.005	Yes

Note: *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

3.3 Dichloroacetic Acid

The Safe Drinking Water Regulations stipulate a maximum value of 0.1 mg/L for dichloroacetic acid. All localities were compliant with the water quality standard (Table 3–5).

Table 3-5: Dichloroacetic acid

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Monthly	12	0	0.005	Yes
Cape Woolamai	Monthly	12	0	0.011	Yes
Corinella	Monthly	12	0	0.009	Yes
Cowes	Monthly	12	0	0.014	Yes
Grantville	Monthly	12	0	0.021	Yes
Kilcunda	Twice monthly*	24	0	0.012	Yes
Rhyll	Monthly	12	0	0.013	Yes
San Remo	Monthly	12	0	0.011	Yes
Ventnor	Monthly	12	0	0.010	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled monthly.

3.3.1 Trichloroacetic Acid

The Safe Drinking Water Regulations stipulate a maximum value of 0.1 mg/L for trichloroacetic acid. All localities were compliant with the water quality standard (Table 3-6).

Table 3-6: Trichloroacetic acid

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Monthly	12	0	0.008	Yes
Cape Woolamai	Monthly	12	0	0.017	Yes
Corinella	Monthly	12	0	0.009	Yes
Cowes	Monthly	12	0	0.019	Yes
Grantville	Monthly	12	0	0.015	Yes
Kilcunda	Twice monthly*	24	0	0.011	Yes
Rhyll	Monthly	12	0	0.021	Yes
San Remo	Monthly	12	0	0.013	Yes
Ventnor	Monthly	12	0	0.015	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled monthly. Trihalomethanes (THMs)

The following section discusses the forms of trihalomethanes (THMs) that were tested during the 2011/12 reporting period.

3.3.2 Trihalomethanes (Total)

THMs are a group of disinfection by-products that may be found in water treated with chlorine. These compounds include chloroform, bromodichloromethane, bromoform and dibromochloromethane. The Safe Drinking Water Regulations stipulate a maximum value for this group of chemicals of 0.25 mg/L (Total THMs) in potable water. Water quality, with respect to THMs, was compliant at all localities (Table 3-7).



Table 3-7: Total THMs

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Monthly	12	0	0.11	Yes
Cape Woolamai	Monthly	12	0	0.19	Yes
Corinella	Monthly	12	0	0.11	Yes
Cowes	Monthly	12	0	0.22	Yes
Grantville	Monthly	12	0	0.16	Yes
Kilcunda	Twice monthly*	24	0	0.15	Yes
Rhyll	Monthly	12	0	0.22	Yes
San Remo	Monthly	12	0	0.18	Yes
Ventnor	Monthly	12	0	0.25	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled monthly.

3.3.3 Dibromochloromethane

Dibromochloromethane is a THM that is tested by Westernport Water. There is no mandated standard for dibromochloromethane in the Safe Drinking Water Regulations or in the ADWG. The World Health Organization (WHO, 2011) sets a maximum guideline limit of 0.1 mg/L for potable water. The water quality with respect to dibromochloromethane was compliant with the WHO guideline limit at all localities (Table 3-8).

Table 3-8: Dibromochloromethane

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Monthly	12	0	0.041	Yes
Cape Woolamai	Monthly	12	0	0.066	Yes
Corinella	Monthly	12	0	0.042	Yes
Cowes	Monthly	12	0	0.070	Yes
Grantville	Monthly	12	0	0.055	Yes
Kilcunda	Twice monthly*	24	0	0.047	Yes
Rhyll	Monthly	12	0	0.068	Yes
San Remo	Monthly	12	0	0.064	Yes
Ventnor	Monthly	12	0	0.072	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled monthly.

3.3.4 Bromoform

Bromoform is a THM tested by Westernport Water. There is no mandated standard for bromoform in the Safe Drinking Water Regulations or in the ADWG. The WHO sets a maximum guideline limit of 0.1 mg/L. The water quality at all localities with respect to bromoform was compliant with the WHO guideline limit (see Table 3–9).

Table 3–9: Bromoform

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Monthly	12	0	0.012	Yes
Cape Woolamai	Monthly	12	0	0.022	Yes
Corinella	Monthly	12	0	0.014	Yes
Cowes	Monthly	12	0	0.020	Yes
Grantville	Monthly	12	0	0.017	Yes
Kilcunda	Twice monthly*	24	0	0.016	Yes
Rhyll	Monthly	12	0	0.024	Yes
San Remo	Monthly	12	0	0.020	Yes
Ventnor	Monthly	12	0	0.014	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled monthly.

3.4 Bromodichloromethane

Bromodichloromethane is another THM tested by Westernport Water. There is no mandated standard for bromodichloromethane in the Safe Drinking Water Regulations or in the ADWG. The WHO sets a maximum guideline value of 0.06 mg/L. The water quality with respect to bromodichloromethane showed that five locations exceeded the WHO guideline value in a few instances (Table 3–10 and Figure 3–1).

Table 3–10: Bromodichloromethane

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No) [#]
Bass	Monthly	12	0	0.036	Yes
Cape Woolamai	Monthly	12	1	0.066	No
Corinella	Monthly	12	0	0.046	Yes
Cowes	Monthly	12	3	0.088	No
Grantville	Monthly	12	0	0.063**	Yes
Kilcunda	Twice monthly*	24	0	0.058	Yes
Rhyll	Monthly	12	4	0.084	No
San Remo	Monthly	12	1	0.071	No
Ventnor	Monthly	12	5	0.097	No

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled monthly. **Upon rounding to two decimal places, these results are compliant with the WHO guideline values, which have the limit specified to two decimal places only. [#] Non-compliance is illustrative only, as regulatory compliance in Victoria is based on total trihalomethanes. This is consistent with the approach taken in ADWG, which is the authoritative Australian drinking water reference document.

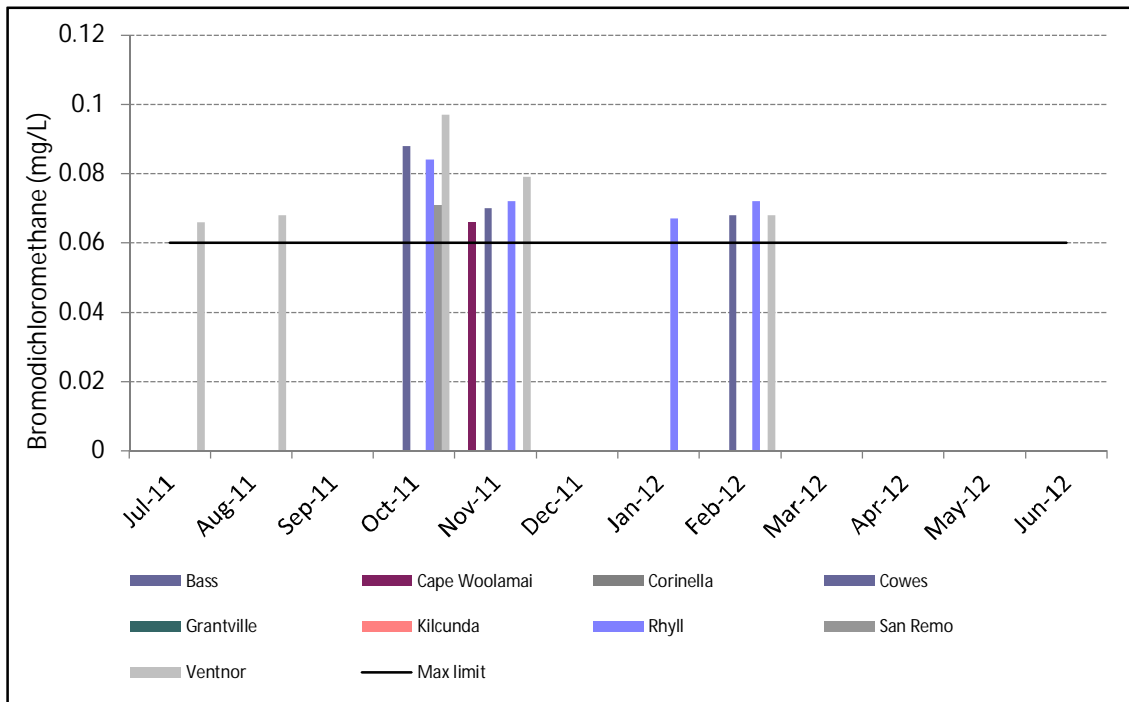


Figure 3-1: Non-conforming maximum bromodichloromethane results for the period July 2011 to June 2012

Actions in Relation to Guideline Non-compliance

Even though Westernport Water exceeded the WHO guideline value of 0.06 mg/L for bromodichloromethane in five occasions, no specific actions were taken. This was because the current advice in ADWG is that the health significance of THMs only arises when the value of total THMs exceeds 0.25 mg/L. Until the advice in ADWG changes no action is considered necessary where an individual THM exceeds a WHO guideline value.

3.4.1 Chloroform

Chloroform is a THM tested by Westernport Water. There is no mandated standard for chloroform in the Safe Drinking Water Regulations or in the ADWG. The WHO sets a maximum guideline value of 0.3 mg/L. The water quality with respect to chloroform was compliant with the WHO guideline value (Table 3-11).

Table 3-11: Chloroform

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Monthly	12	0	0.022	Yes
Cape Woolamai	Monthly	12	0	0.048	Yes
Corinella	Monthly	12	0	0.024	Yes
Cowes	Monthly	12	0	0.072	Yes
Grantville	Monthly	12	0	0.044	Yes
Kilcunda	Twice monthly*	24	0	0.039	Yes
Rhyll	Monthly	12	0	0.067	Yes
San Remo	Monthly	12	0	0.047	Yes
Ventnor	Monthly	12	0	0.081	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled monthly.

3.5 Ozone Based Disinfection By-product Chemicals

Disinfection with ozone may produce by-products such as bromate and formaldehyde. Westernport Water does not use ozone for disinfection, therefore bromate and formaldehyde were not tested for in 2011/12.

3.6 Aluminium (acid soluble)

As is required by the Safe Drinking Water Regulations the concentration of acid-soluble aluminium must not exceed 0.2 mg/L. No health-based guideline is set at present in ADWG. Water quality with respect to aluminium showed exceedances at Kilcunda during the 2011/12 reporting period (Table 3–12 and Figure 3–2).

Table 3-12: Aluminium (acid soluble)

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Monthly	12	0	0.04	Yes
Cape Woolamai	Monthly	12	0	0.05	Yes
Corinella	Monthly	12	0	0.06	Yes
Cowes	Monthly	12	0	0.04	Yes
Grantville	Monthly	12	0	0.05	Yes
Kilcunda	Twice monthly*	24	1	0.90	No
Rhyll	Monthly	12	0	0.05	Yes
San Remo	Monthly	12	0	0.06	Yes
Ventnor	Monthly	12	0	0.04	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled monthly.

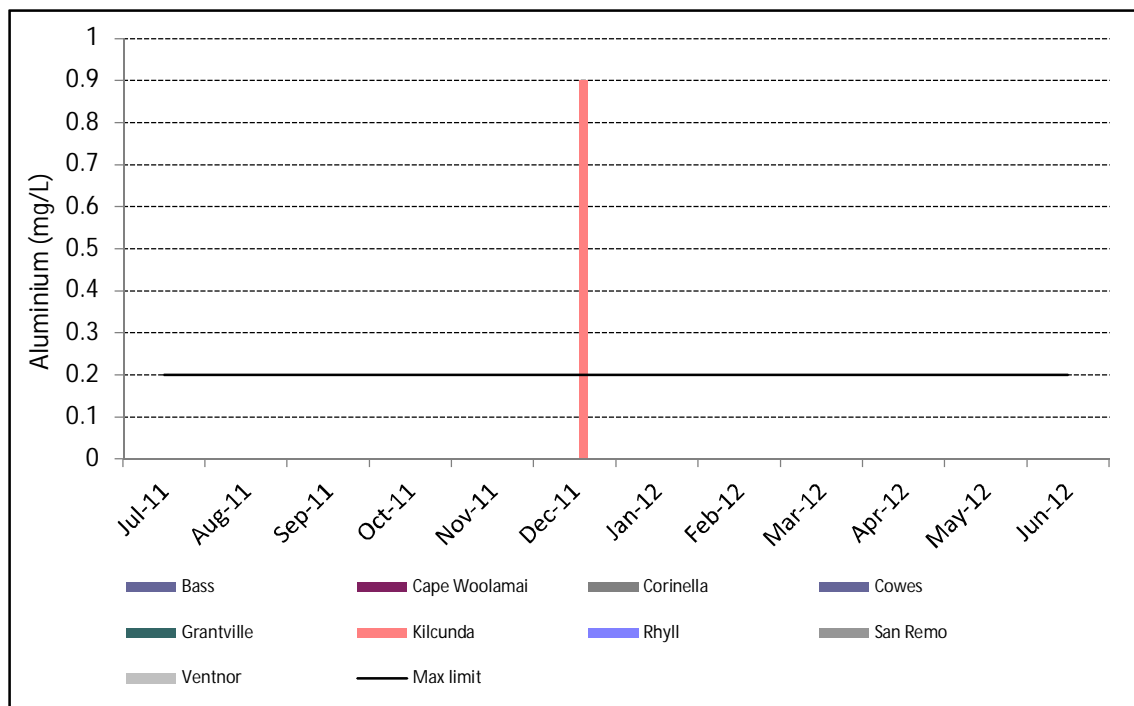


Figure 3-2: Non-conforming maximum aluminium results for the period July 2011 to June 2012



Actions in Relation to Guideline Non-compliance

Westernport Water exceeded the water quality standard for aluminium at Kilcunda on 6th December 2011. The DH was notified under Section 18 of the Act and details of this exceedance and associated actions to resolve it are outlined in Section 4.

3.7 Turbidity

Schedule 2 in the Safe Drinking Water Regulations stipulates that the 95% upper confidence limit (UCL) of the mean of drinking water samples must be ≤ 5.0 NTU. Based on aesthetic considerations in the ADWG, turbidity should not exceed 5 NTU. It is desirable to have a turbidity result of less than 1 NTU at the time of disinfection. Turbidity at all locations was compliant with the Safe Drinking Water Regulations during the reporting period (Table 3–13). Although turbidity was compliant at all localities, one result at Kilcunda was above the ADWG guidelines (Figure 3–3). The number of samples at Grantville failed to meet the regulatory requirement as the paperwork accompanying the samples to the laboratory was incorrect, therefore the analysis of turbidity was missed on one occasion.

Table 3–13: Turbidity

Locality	Frequency of Sampling	No. of Samples	Max NTU	95% UCL of Mean (NTU)**	Complying (Yes/No)
Bass	Weekly	52	1.2	0.4	Yes
Cape Woolamai	Weekly	52	1.2	0.2	Yes
Corinella	Weekly	52	0.5	0.2	Yes
Cowes	Weekly	52	1.0	0.2	Yes
Grantville	Weekly [#]	51	1.6	0.3	Yes
Kilcunda	Twice weekly*	104	10	0.5	Yes
Rhyll	Weekly	52	0.4	0.2	Yes
San Remo	Weekly	52	1.4	0.2	Yes
Ventnor	Weekly	52	1.6	0.3	Yes

Note: [#] the number of samples at Grantville was non-compliant as one sample was not registered for turbidity analysis at the laboratory. *Kilcunda data includes Dalyston area data, both these areas were sampled weekly. ** Note the '95% UCL of Mean' statistic was calculated using Excel, and any 'detection limit' data was converted to half of its detection value for the purpose of statistical analysis.

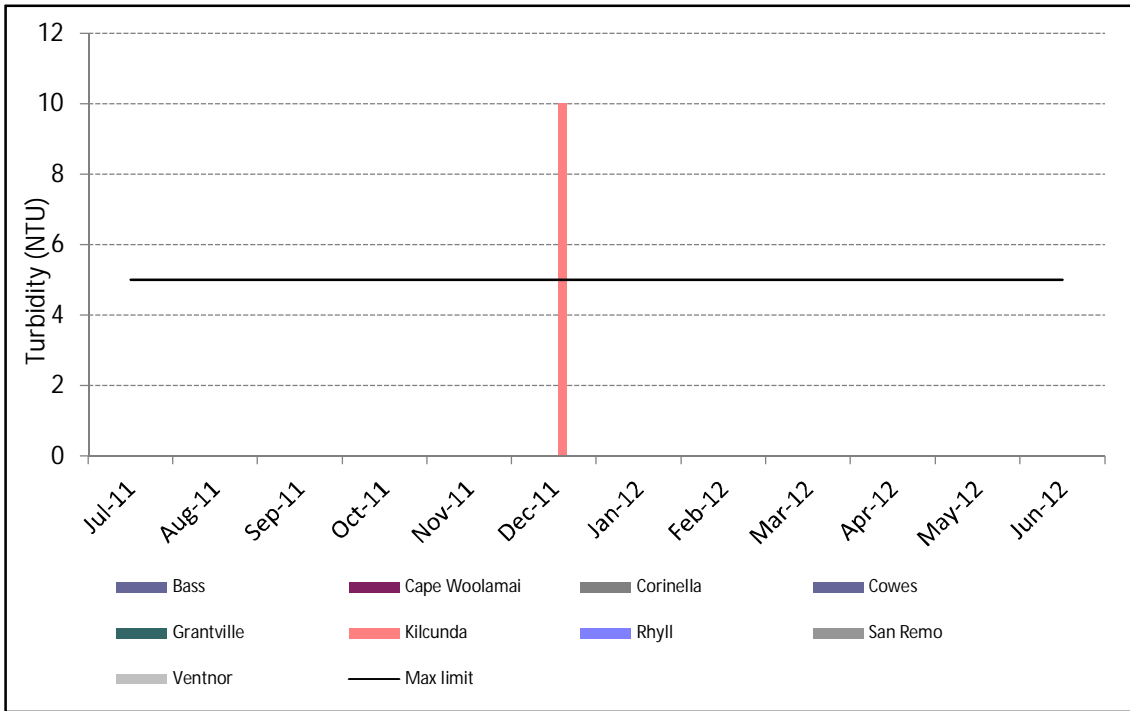


Figure 3-3: Non-conforming maximum turbidity results for the period July 2011 to June 2012

3.7.1 Actions in Relation to Guideline Non-compliance

Westernport Water experienced one elevated turbidity result at Kilcunda in December 2011, which was reported to the DH under section 18 of the Safe Drinking Water Act. This event, however, was determined by DH not to constitute a section 18 notification, as a single elevated turbidity result does not constitute non-compliance with the turbidity water quality standard. Even though this event was not reportable under section 18, details and remedial actions are described in the Emergency and Incident Management section of this report (Section 4).

3.8 Fluoride

The *Health (Fluoridation) Act 1973* states that the annual average for fluoride in drinking water must not exceed 1 mg/L. In addition, any single sample must not exceed a fluoride concentration of 1.5 mg/L. Fluoride concentrations at all locations were compliant during the reporting period (Table 3-14).



Table 3-14: Fluoride

Locality	Frequency of Sampling	No. of Samples	Max mg/L	Min mg/L	Average mg/L	Complying (Yes/No)
Bass	Monthly	12	0.90	0.18	0.70	Yes
Cape Woolamai	Monthly	12	0.83	0.35	0.75	Yes
Corinella	Monthly	12	0.88	0.24	0.75	Yes
Cowes	Monthly	12	0.81	0.56	0.76	Yes
Grantville	Monthly	12	0.83	0.35	0.75	Yes
Kilcunda	Monthly*	24	0.89	0.33	0.75	Yes
Rhyll	Monthly	12	0.83	0.43	0.75	Yes
San Remo	Monthly	12	0.84	0.30	0.75	Yes
Ventnor	Monthly	12	0.83	0.61	0.76	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled monthly.

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

Westernport Water regularly tests for metals in the drinking water they supply to customers. The following sections detail the results for the 2011/12 reporting period.

3.9.1 Antimony

Based on health considerations, the ADWG guideline value is set at 0.003 mg/L. Table 3-15 shows no sample exceeded this guideline value.

Table 3-15: Antimony

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Quarterly	4	0	<0.001	Yes
Cape Woolamai	Quarterly	4	0	<0.001	Yes
Corinella	Quarterly	4	0	<0.001	Yes
Cowes	Quarterly	4	0	<0.001	Yes
Grantville	Quarterly	4	0	<0.001	Yes
Kilcunda	Twice quarterly*	8	0	<0.001	Yes
Rhyll	Quarterly	4	0	<0.001	Yes
San Remo	Quarterly	4	0	<0.001	Yes
Ventnor	Quarterly	4	0	<0.001	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled quarterly.

3.9.2 Cadmium

Based on health considerations, the ADWG guideline value is set at 0.002 mg/L. The cadmium concentration complied with this guideline value at all locations during the reporting period (Table 3–16).

Table 3–16: Cadmium

Water Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Quarterly	4	0	<0.0002	Yes
Cape Woolamai	Quarterly	4	0	<0.0002	Yes
Corinella	Quarterly	4	0	<0.0002	Yes
Cowes	Quarterly	4	0	<0.0002	Yes
Grantville	Quarterly	4	0	<0.0002	Yes
Kilcunda	Twice quarterly*	8	0	<0.0002	Yes
Rhyll	Quarterly	4	0	<0.0002	Yes
San Remo	Quarterly	4	0	<0.0002	Yes
Ventnor	Quarterly	4	0	<0.0002	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled quarterly.

3.9.3 Copper

Based on health considerations, the ADWG health-based guideline value is set at 1 mg/L, and at 2 mg/L for aesthetics. The copper concentration complied with both guideline values at all locations during the reporting period (Table 3–17).

Table 3–17: Copper

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Monthly	12	0	0.38	Yes
Cape Woolamai	Monthly	12	0	0.03	Yes
Corinella	Monthly	12	0	0.10	Yes
Cowes	Monthly	12	0	0.04	Yes
Grantville	Monthly	12	0	0.23	Yes
Kilcunda	Twice monthly*	24	0	0.18	Yes
Rhyll	Monthly	12	0	0.08	Yes
San Remo	Monthly	12	0	0.05	Yes
Ventnor	Monthly	12	0	0.20	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled monthly.

The samples taken for analysis were taken from the reticulation mains. Copper or iron levels may be higher at customer's internal taps, as a consequence of utilising copper plumbing within the homes.

3.9.4 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 locations during the reporting period (Table 3–18).



Table 3-18: Lead

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Monthly	12	0	0.003	Yes
Cape Woolamai	Monthly	12	0	0.001	Yes
Corinella	Monthly	12	0	0.001	Yes
Cowes	Monthly	12	0	<0.001	Yes
Grantville	Monthly	12	0	0.002	Yes
Kilcunda	Twice monthly*	24	0	0.003	Yes
Rhyll	Monthly	12	0	0.001	Yes
San Remo	Monthly	12	0	<0.001	Yes
Ventnor	Monthly	12	0	0.003	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled monthly.

3.9.5 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 locations (Table 3-19).

Table 3-19: Nickel

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Quarterly	4	0	<0.001	Yes
Cape Woolamai	Quarterly	4	0	<0.001	Yes
Corinella	Quarterly	4	0	0.001	Yes
Cowes	Quarterly	4	0	<0.001	Yes
Grantville	Quarterly	4	0	<0.001	Yes
Kilcunda	Twice quarterly*	8	0	0.001	Yes
Rhyll	Quarterly	4	0	<0.001	Yes
San Remo	Quarterly	4	0	<0.001	Yes
Ventnor	Quarterly	4	0	<0.001	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled quarterly.

3.9.6 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 locations (Table 3-20).

Table 3-20: Zinc

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Monthly	12	0	0.22	Yes
Cape Woolamai	Monthly	12	0	0.03	Yes
Corinella	Monthly	12	0	0.02	Yes
Cowes	Monthly	12	0	0.02	Yes
Grantville	Monthly	12	0	0.03	Yes
Kilcunda	Twice monthly*	24	0	0.02	Yes
Rhyll	Monthly	12	0	0.01	Yes
San Remo	Monthly	12	0	0.03	Yes
Ventnor	Monthly	12	0	0.01	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled monthly.

3.9.7 Manganese

The ADWG health-based guideline value is set at 0.5 mg/L, and at 0.1 mg/L for aesthetics. The manganese results met both ADWG guideline values (for aesthetics and health) in all sampling localities (Table 3-21).

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

Table 3-21: Manganese

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Fortnightly [#]	29	0	0.020	Yes
Cape Woolamai	Fortnightly	26	0	0.015	Yes
Corinella	Fortnightly	26	0	0.011	Yes
Cowes	Fortnightly	26	0	0.011	Yes
Grantville	Twice fortnightly*	52	0	0.019	Yes
Kilcunda	Fortnightly	26	0	0.012	Yes
Rhyll	Fortnightly	26	0	0.011	Yes
San Remo	Fortnightly	26	0	0.013	Yes
Ventnor	Fortnightly	26	0	0.025	Yes

Note: [#] Bass sampling was increased following works. *Two sites within Grantville were sampled fortnightly, hence the doubled number of samples compared to other areas.

3.9.8 Raw Water Monitoring

Raw water is monitored all year round - the main reason for monitoring the raw water supply (Candowie Reservoir) is to detect changes in water quality, allowing for the pro-active management of water treatment processes. The schedule is shown in Table 3-22.

Table 3-22: Raw water monitoring schedule 2011/12

Location of Sample	Frequency of Sampling	Test (Parameter)
Off take- Raw Water into lab at Water Treatment Plant	Daily	Fluoride
Off take- Raw Water into lab at Water Treatment Plant	Monthly	Alkalinity
Off take- Raw Water into lab at Water Treatment Plant	Quarterly	Barium, boron, mercury, molybdenum, selenium
Off take- Raw Water into lab at Water Treatment Plant	Quarterly	Herbicide and pesticides*
Off take- Raw Water into lab at Water Treatment Plant	Quarterly	Cryptosporidium and giardia
Off take- Raw Water into lab at Water Treatment Plant	Annually	Radiation**
Reservoir- Surface, 1, 3, 7 and 9 meter samples	Fortnightly (or as required)	Algae (Cyanobacteria)
Raw Water into lab at Water Treatment Plant	Annually	Silver, iodide, tin and beryllium
Raw Water into lab at Water Treatment Plant	Quarterly	Arsenic
Raw Water into lab at Water Treatment Plant	Fortnightly (or as required)	Methylisoborneol (MIB) and geosmin
Raw Water into lab at Water Treatment Plant	Weekly	Colilert (200) <i>E. coli</i> , coliforms, standard plate count DOC, EC
Raw Water into lab at Water Treatment Plant	Weekly	Fluoride
Raw Water into lab at Water Treatment Plant	Daily	Iron and manganese
Raw Water into lab at Water Treatment Plant	Daily	Turbidity, pH
Surface, 1,2,3,4,5,6,7,8,9,10 meter intervals	Fortnightly	Temperature, dissolved oxygen, dissolved oxygen, saturation, pH and electrical conductivity @ 25 °C
Reservoir- Surface, 1, 3, 7 and 9 meter samples	Fortnightly	Nitrate, nitrite, ammonia, phosphorus, silica, iron and manganese

Note: *For Pesticides and Herbicides, all samples below detection limit except for Monocrotophos, which had a result of 0.02 sampled on 6 December 2011. The following pesticides and herbicides were analysed: Bifenthrin, Cyfluthr, Cypermethr, Deltamet, Fenvalerat and Perthrin, Dichlorvos, Monocrotophos, Dimethoate, Diazinon, Met Parathion, Fenthion, Chloropyrifos, Parathion, Azinphos-met, Chlorpyr-met, Malathion, Primophos-et, Chlorfenvinfos E, Chlorfenvinfos Z, Bromophos Ethyl, Fenamiphos, Ethion, Carbophenthion, Methanesulf Met, Methanesulf Et, Safrol, cis-Isosafrole, trans-Isosafrole and Prothiofos. **Radiation was sampled only once in 2011/12, due the previous results indicating minimal risk to the business. Results were below the guideline value for Gross Alpha and Gross Beta and also below the detection limits for Gross Beta.

The quality of water in the Candowie storage is affected by land-use practices, septic tanks and other runoff from the catchment. It is important to monitor the waterways that supply Candowie Reservoir for chemicals and pathogens that may affect human health, because they are likely to be of higher concentration, compared to the storage.

At certain times of the year, algal blooms are likely, and the frequency of monitoring and testing is increased in relation to the increased risk to water quality. Similarly, if chemicals such as manganese,

iron or levels of geosmin and methylisoborneol (MIB) are detected, an increase in sampling frequency would follow.

The pesticide and herbicide results are presented in Table 3–23 and the radiation results are presented in Table 3-24. The herbicide/pesticide, monocrotophos exceeded the ADWG health-based guideline value during the 2011/12 reporting period. Westernport Water were not advised of this exceedence by their consultant laboratory and were therefore unable to take any remedial actions in response to the detection. It is important to note that this result was obtained in the raw water, and the health-based guideline values apply in the treated water.



Table 3-23: Westernport Water herbicides and pesticides results and comparison to ADWG guidelines

Herbicide / Pesticide	Result	ADWG Guideline Value*	ADWG Health Value	Complying (Yes/No/N/A)**
	mg/L	mg/L	mg/L	
Azinphos-methyl	<0.001	0.002	0.003	Yes
Bifenthrin	<0.01	–	–	N/A
Bromophos Ethyl	<0.001	–	0.01	Yes
Carbophenthion	<0.001	–	0.0005	N/A
Chlorfenvinfos E	<0.001	–	0.005	Yes
Chlorfenvinfos Z	<0.001	–	0.005	Yes
Chlorpyrifos	<0.001	–	0.01	Yes
Chlorpyrifos-methyl	<0.001	–	–	N/A
cis-Isosafrole	<0.001	–	–	N/A
Cyfluthrin	<0.01	–	–	N/A
Cypermethrin	<0.01	–	–	N/A
Deltamethrin	<0.01	–	–	N/A
Diazinon	<0.001	0.001	0.003	Yes
Dichlorvos	<0.001	0.001	0.001	Yes
Dimethoate	<0.001	–	0.05	Yes
Ethion	<0.001	–	0.003	Yes
Fenamiphos	<0.001	–	0.0003	N/A
Fenthion	<0.001	–	–	N/A
Fenvalerate	<0.01	–	0.05	Yes
Malathion	<0.001	–	–	N/A
Methanesulfron Ethyl	<0.001	–	–	N/A
Methanesulfron Methyl	<0.001	–	0.03	Yes
Methyl Parathion	<0.001	–	–	N/A
Monocrotophos	0.02	–	0.001	No
Parathion	<0.001	–	0.01	Yes
Permethrin	<0.01	0.001	0.1	Yes
Primophos-ethyl	<0.001	–	0.0005	N/A
Prothiofos	<0.001	–	–	N/A
Safrol	<0.001	–	–	N/A
trans-Isosafrole	<0.001	–	–	N/A

Note: *These are generally based on the analytical limit of determination (the level at which the pesticide can be reliably detected using practicable, readily available and validated analytical methods). If a pesticide is detected at or above this value, the source should be identified and action taken to prevent further contamination. **n/a means not applicable or not assessable: some herbicides or pesticides have no ADWG guideline to assess compliance against, or their detection limit was higher than the ADWG guideline.

Table 3-24: Radiation results and comparison to ADWG guidelines

Radiation	Maximum Result	Guideline value	Complying (Yes/No)
	Bq/L	Bq/L	
Gross Alpha	0.0114	0.5	Yes
Gross Beta	<0.05	0.5	Yes

3.10 Aesthetics

3.10.1 pH

Results

The ADWG (aesthetic) guideline value for pH is between 6.5 and 8.5. The pH of water supplied was within this range for all localities except for Corinella and Ventnor (Table 3-25). The high pH value at Ventnor may be due to the cement mortar lined pipes, which can significantly increase pH. A pH value up to 9.2 may be tolerated provided monitoring indicates no deterioration in microbial quality (Source: ADWG). The number of samples at Grantville failed to meet Westernport Water's monitoring requirements as the paperwork accompanying the samples to the laboratory was incorrect, therefore the pH analysis was missed on one occasion.

Table 3-25: pH

Locality	Frequency of Sampling	No. of Samples	Min	Max	Mean	Complying (Yes/No)
Bass	Weekly	52	6.9	7.7	7.2	Yes
Cape Woolamai	Weekly	52	6.9	7.7	7.3	Yes
Corinella	Weekly [#]	62	6.1	8.4	7.4	No
Cowes	weekly	52	7.2	8.4	7.6	Yes
Grantville	Weekly [*]	51	7.0	8.1	7.4	Yes
Kilcunda	Twice weekly ^{**#}	114	7.0	7.8	7.4	Yes
Rhyll	Weekly	52	7.1	7.8	7.4	Yes
San Remo	Weekly	52	6.9	7.7	7.3	Yes
Ventnor	Weekly	52	7.1	8.7	7.7	No

Note: [#] the number of samples exceeded the monthly requirement as additional sampling was performed in response to the chloramination. ^{*} the number of samples at Grantville was non-compliant as one sample was not registered for pH analysis at the laboratory. ^{**}Kilcunda data includes Dalyston area data, both these areas were sampled weekly.

Actions in Relation to Guideline Non-compliance

Westernport Water exceeded the ADWG guideline value of between 6.5 and 8.5 for pH at Corinella and Ventnor in the 2011/12 reporting period as seen in Figure 3-4. No actions were required following these exceedances.

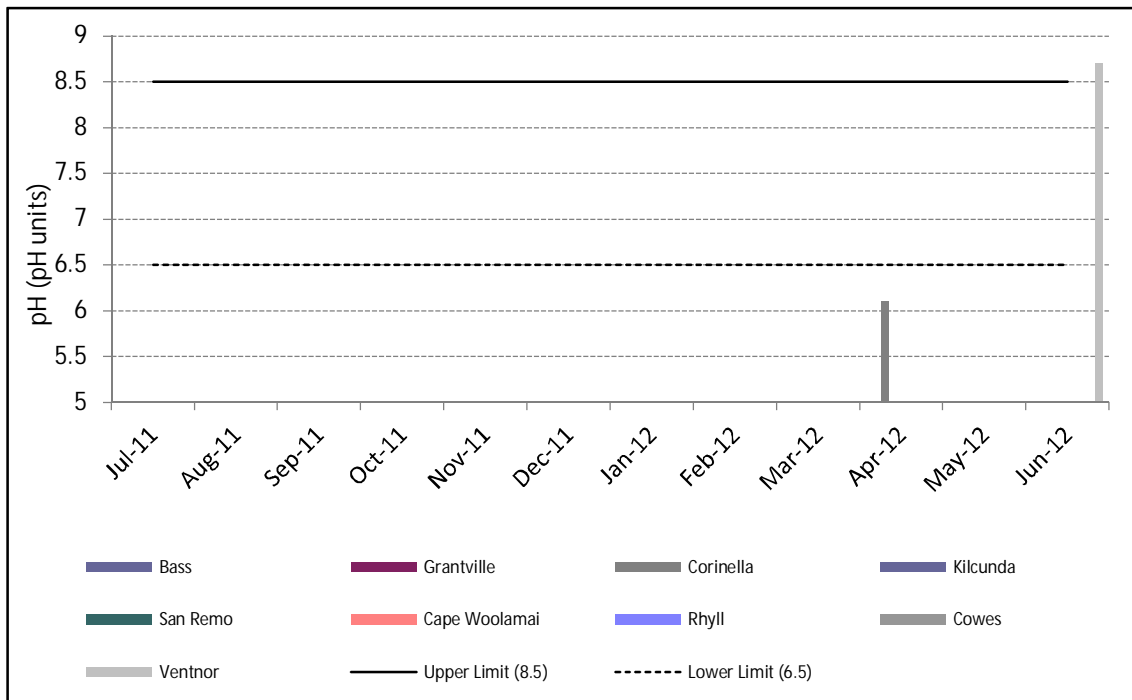


Figure 3-4: Non-conforming maximum pH results for the period July 2011 to June 2012 (where more than one non-compliance within a month has occurred, only the highest value is displayed)

3.10.2 Iron

Based on aesthetic considerations, the ADWG guideline value is set at 0.3 mg/L. No health-based guideline value has been set. The water quality with respect to iron concentrations complied with the ADWG guideline value for all locations (Table 3-26).

Table 3-26: Iron

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	Fortnightly	26	0	0.07	Yes
Cape Woolamai	Fortnightly	26	0	0.10	Yes
Corinella	Fortnightly	26	0	0.03	Yes
Cowes	Fortnightly	26	0	0.06	Yes
Grantville	Fortnightly	26	0	0.09	Yes
Kilcunda	Twice fortnightly*	52	0	0.04	Yes
Rhyll	Fortnightly	26	0	0.06	Yes
San Remo	Fortnightly	26	0	0.05	Yes
Ventnor	Fortnightly	26	0	0.25	Yes

Note: *Kilcunda data includes Dalyston area data, both these areas were sampled fortnightly.

The samples taken for analysis were taken from the reticulation mains. Copper or iron levels may be higher at customer’s internal taps, as a consequence of utilising copper plumbing within the homes. Customers experiencing copper staining or discolouration of their water are encouraged to contact Westernport Water’s Customer Service Centre on 1300 720 711.

3.11 Analysis of Results

Westernport Water's compliance with the Safe Drinking Water Act and Regulation over the last four reporting periods are summarised in the following section.

3.11.1 Drinking Water Quality Standards

E. coli

Results for the 2011-12 period show that all test results were above the compliance limit, and that this has been the case since 2008-09 (Figure 3-5).

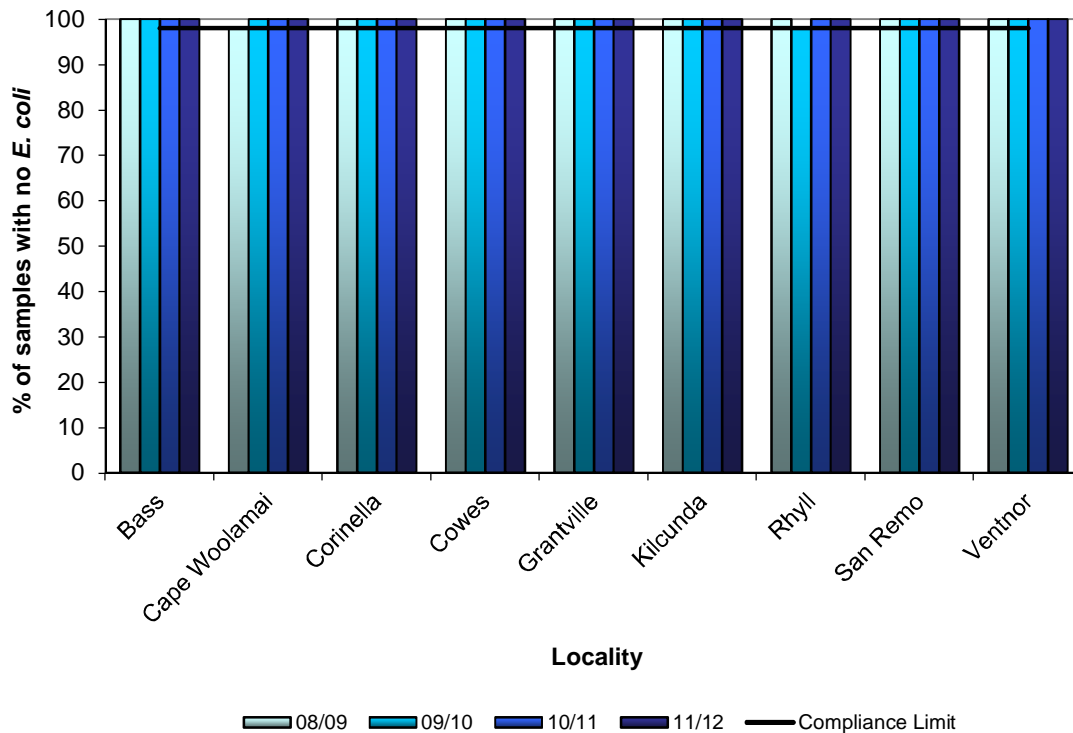


Figure 3-5: Percentage of samples with no *E. coli* from July 2008 to June 2012

Monochloroacetic Acid

A graph is not presented as results have been less than the detection limit for the last four years.

Dichloroacetic Acid

Results for the 2011-12 monitoring period were compliant with the Safe Drinking Water Regulations, and this has been the case since 2008-09 (Figure 3-6)

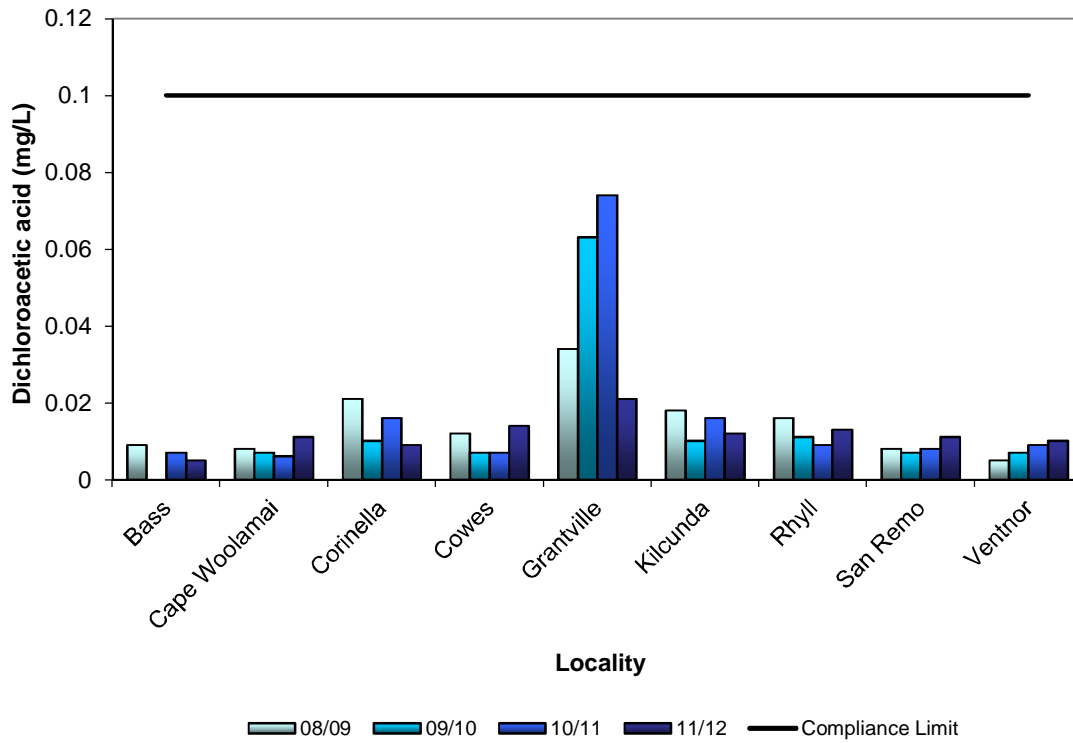


Figure 3-6: Maximum dichloroacetic acid concentration from July 2008 to June 2012

Trichloroacetic Acid

Trichloroacetic acid has been compliant with the Safe Drinking Water Regulations since 2008/09 (Figure 3-7).

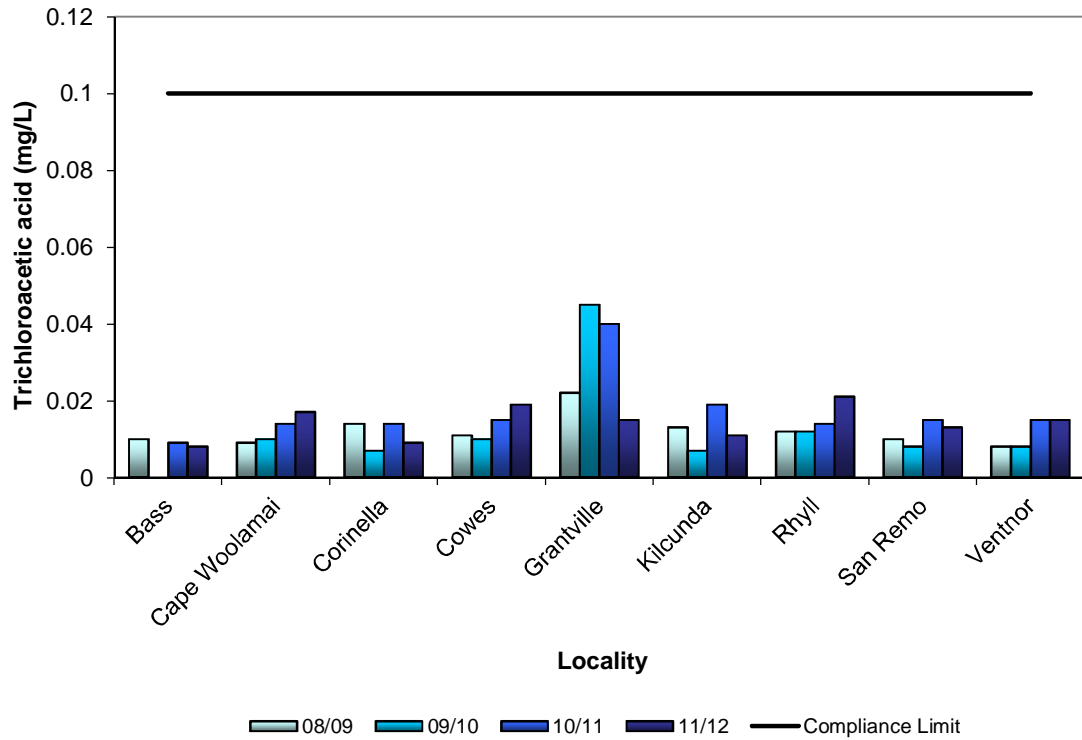


Figure 3-7: Maximum trichloroacetic acid concentration from July 2008 to June 2012

Trihalomethanes

Since 2008, most localities have been compliant with the Safe Drinking Water Regulations. Cowes (2010/11) and Grantville (2009/10) have been the only localities with non-compliance (Figure 3–8).

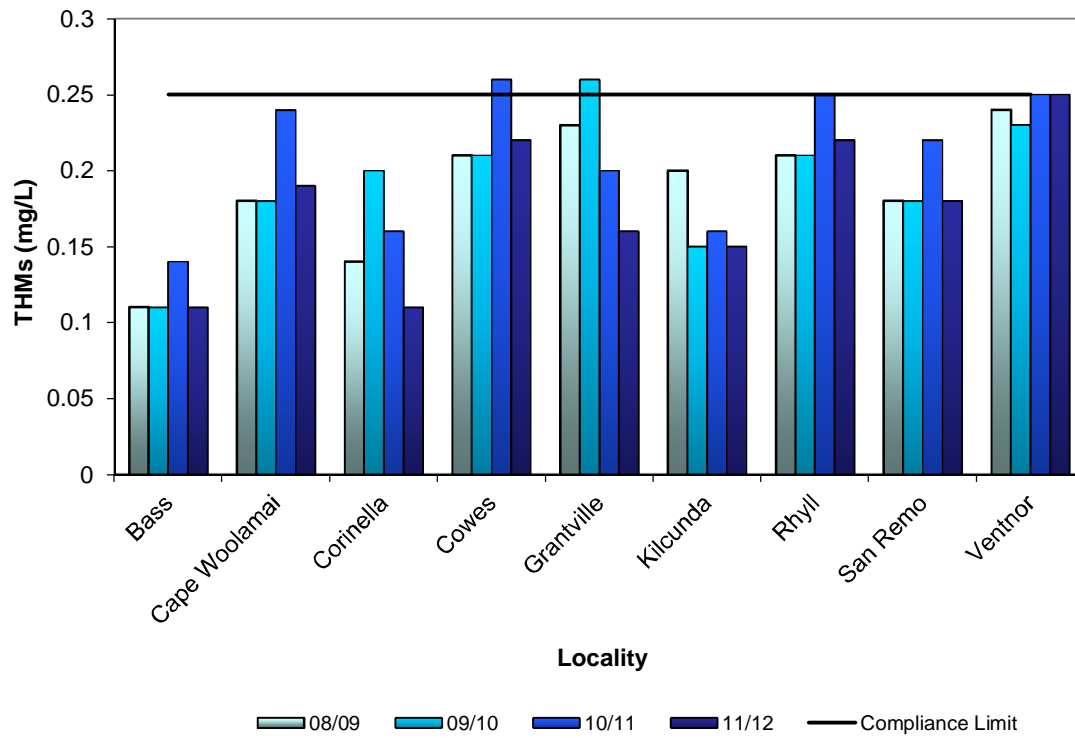


Figure 3–8: Maximum THM concentration from July 2008 to June 2012

Aluminium

There have been three non-compliances since 2008: Kilcunda (2011/12 and 2010/11) and Bass (2010/11). The remaining localities have been compliant over the monitoring period (Figure 3–9).

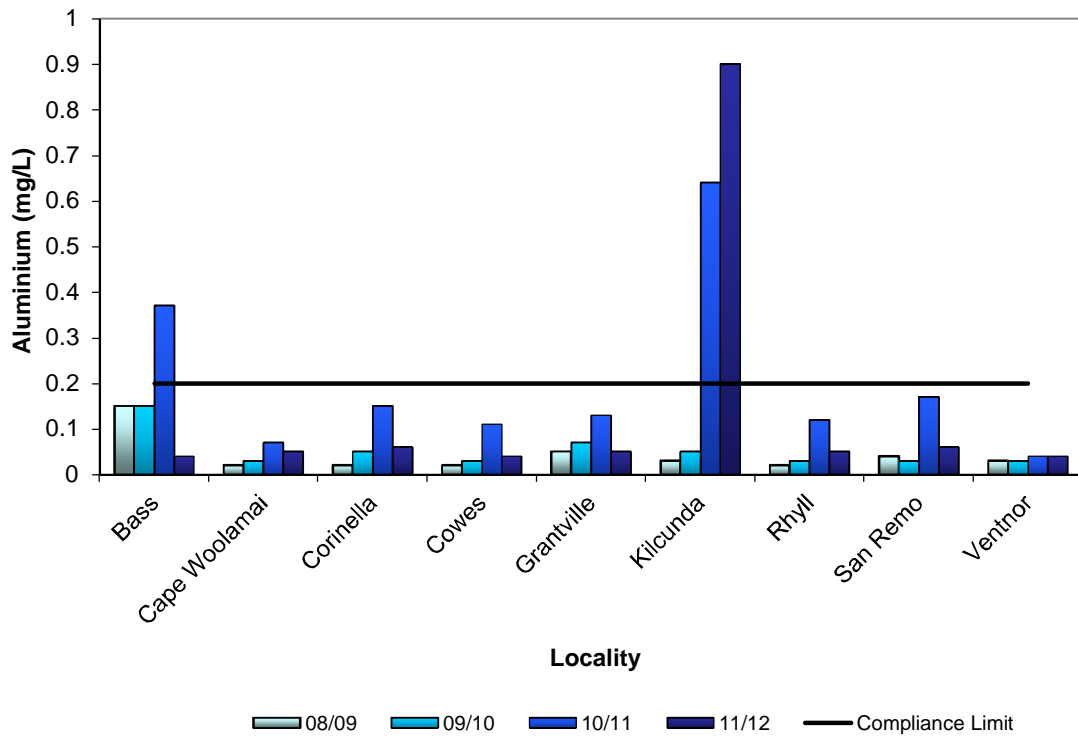


Figure 3–9: Maximum aluminium concentration from July 2008 to June 2012

Turbidity

All localities were compliant during the monitoring period. The turbidity graph does not show the one exceedance during the 2011/12 reporting period, as it plots the 95% upper control limit of the mean (Figure 3–10).

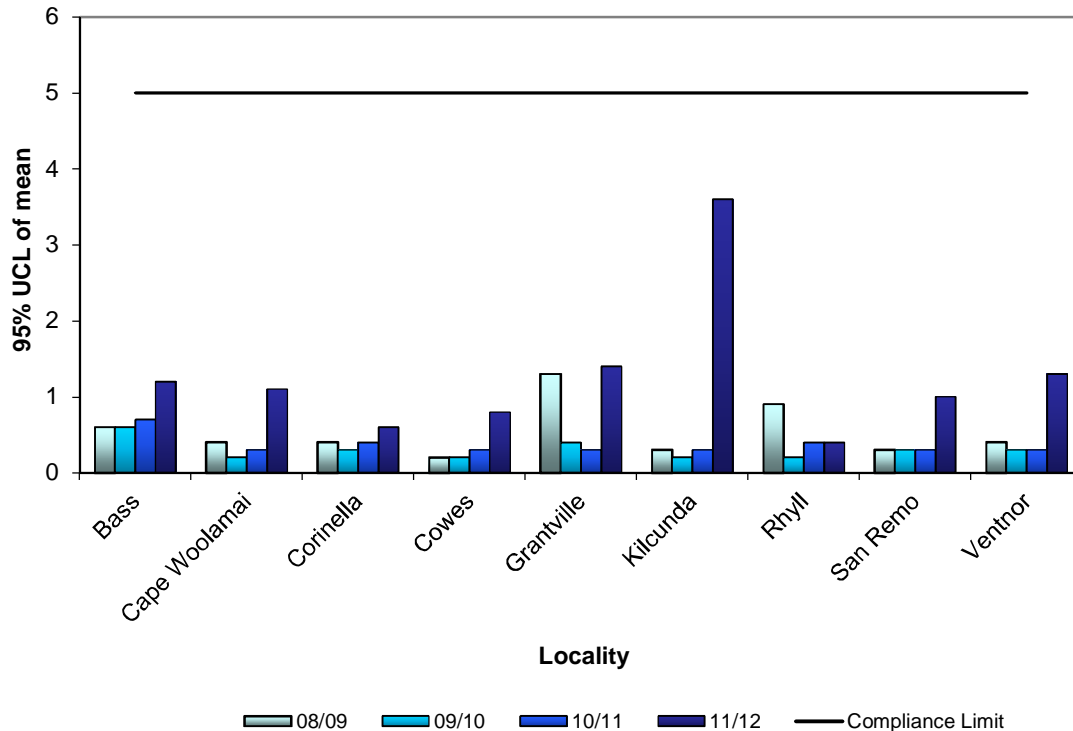


Figure 3–10: Turbidity 95% UCL (upper confidence limit) of mean from July 2008 to June 2012

Overall

Over the years, Westernport Water has achieved a high level of compliance with respect to all Schedule 2 parameters (Figure 3–11 and Figure 3–12) except for aluminium and THMs. Compliance with the THMs water quality standard improved after the introduction of chloramination. Compliance with the aluminium water quality standard has improved with only one locality being non-compliant with the water quality standard during 2011/12. There was only a single non-compliant aluminium result recorded, indicating that there wasn't systematic issues with the water supply system.

The aluminium non-compliance during 2011/12 was located at Kilcunda (Figure 3–2). The Kilcunda location accounts for 4 % of Westernport Water's customers.

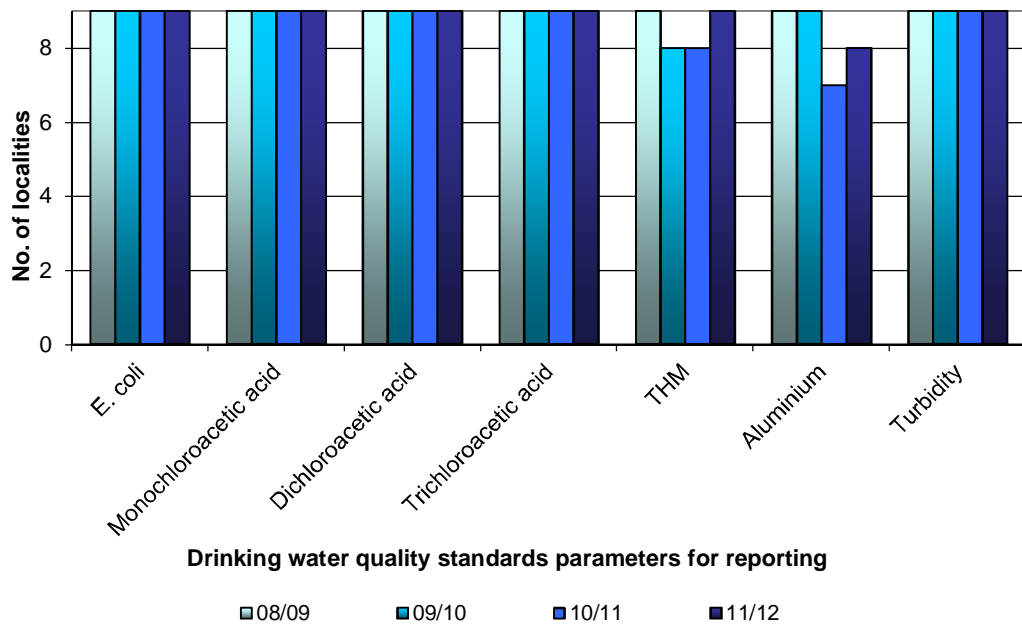


Figure 3-11: Number of localities (out of 9) that were compliant with the parameters in Schedule 2 of the Drinking Water Regulation

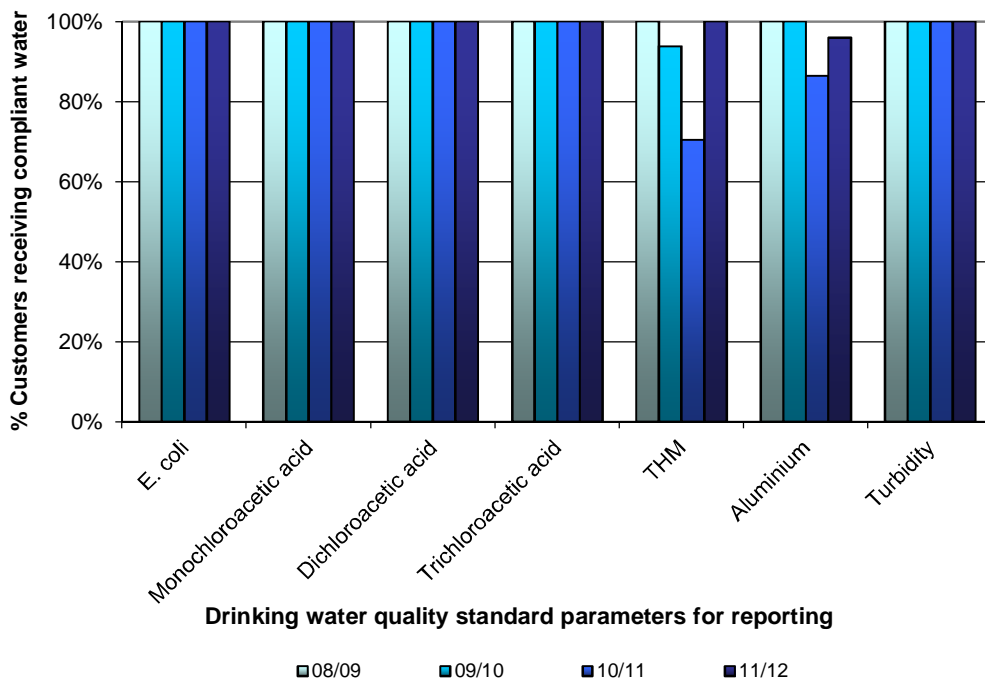


Figure 3-12: Percentage of customers supplied with drinking water that was compliant with the standard¹

¹ Population statistics were based on 2004 and 2006 national regional profile data from the Australian Bureau of Statistics website www.abs.gov.au.

3.11.2 Other Parameters

Free Chlorine

Results for the 2011-12 period were compliant with the Safe Drinking Water Regulations, as has been the case since 2008-09 (Figure 3–13).

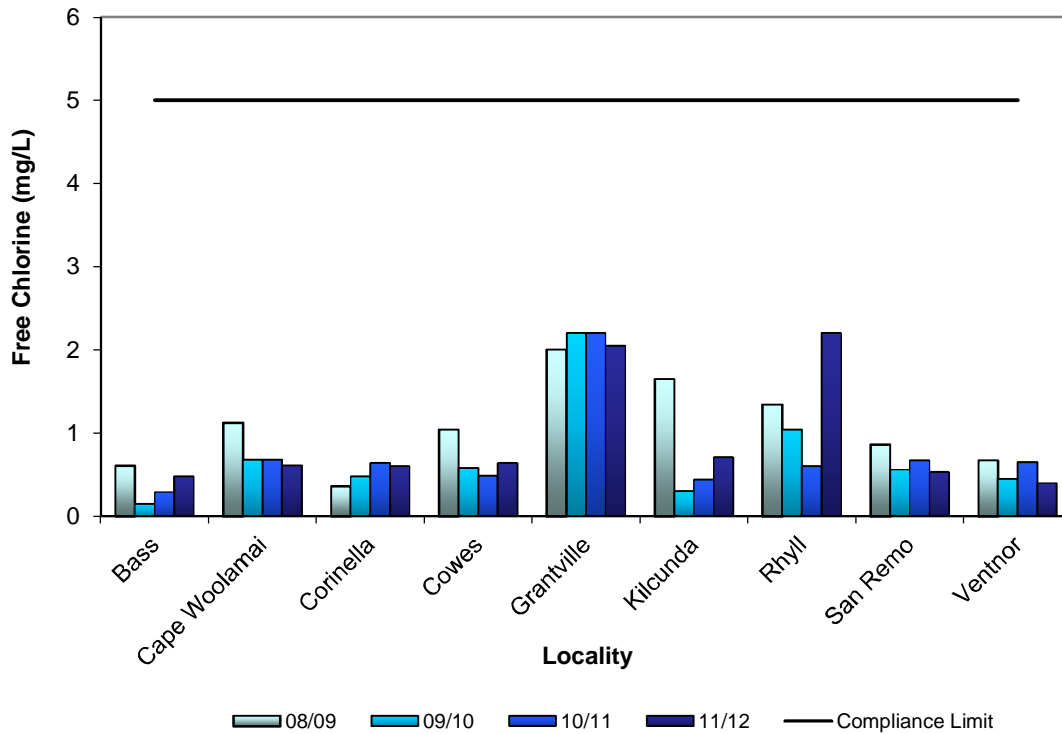


Figure 3–13: Maximum free chlorine concentration from July 2008 to June 2012

pH

Results for trends in pH over the last four years are summarised below and presented in Figure 3–14.

- 2008/09 - Two localities: Kilcunda and Ventnor exceeded the upper pH guideline value of 8.5. As these were minor, the problem areas were flushed and no further actions were required;
- 2009/10 – Two localities: Cowes and Ventnor exceeded the upper pH guideline value. Quarterly flushing programs were developed in 2009/10 for the Cowes and Ventnor areas in response to the elevated pH readings;
- 2010/11 - There was only one instance of raised pH in Ventnor. The sample area was flushed and successfully resampled.
- 2011/12 – Corinella failed to meet the minimum guideline value, whereas Ventnor exceeded the upper pH guideline value. No actions were required.

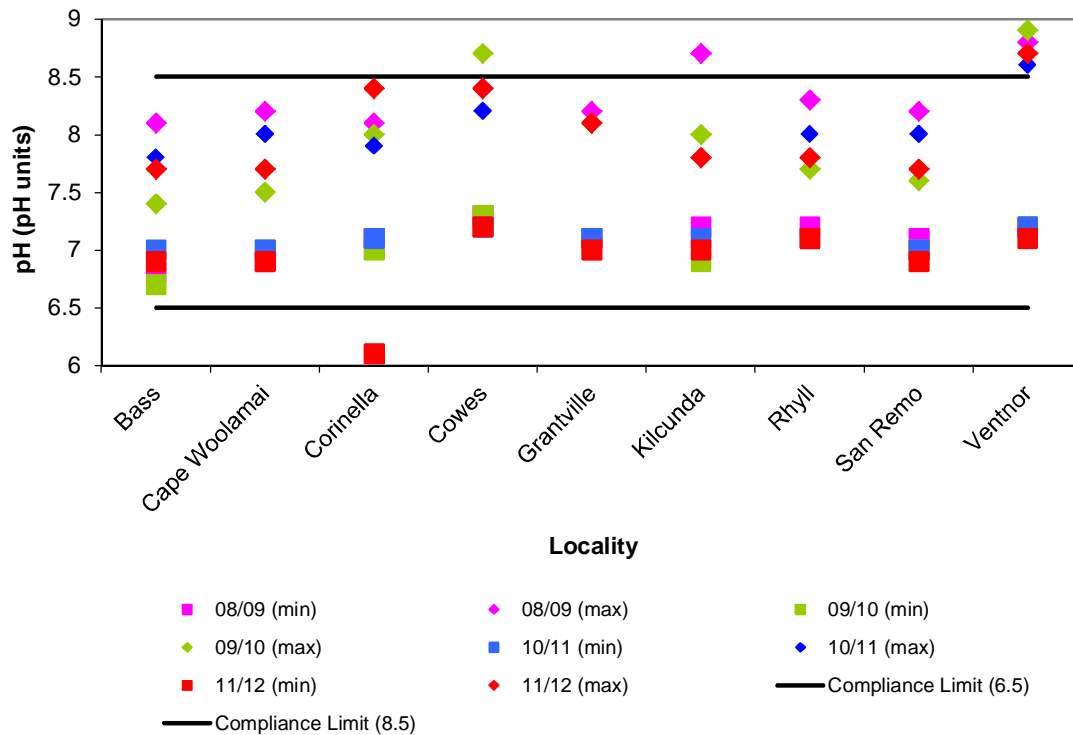


Figure 3-14: pH from July 2008 to June 2012

THM Components

The number of non-compliances in THM components (Figure 3-15 to Figure 3-18) – (except for bromodichloromethane) has generally remained low due to a THM reduction strategy implemented in 2008/09. This strategy included:

- Upgrade of the IBWPP control system that provided better control over chlorine dosing;
- The implementation of a THM reduction strategy (combination of regular air scouring and flushing in the reticulation system and powdered activated carbon dosing at IBWPP)

Customer feedback and improved water quality outcomes have encouraged the Corporation to install a chloramination station at San Remo Basin. This will mean that 95% of our potable supply will be chloraminated. This was implemented in February 2012.

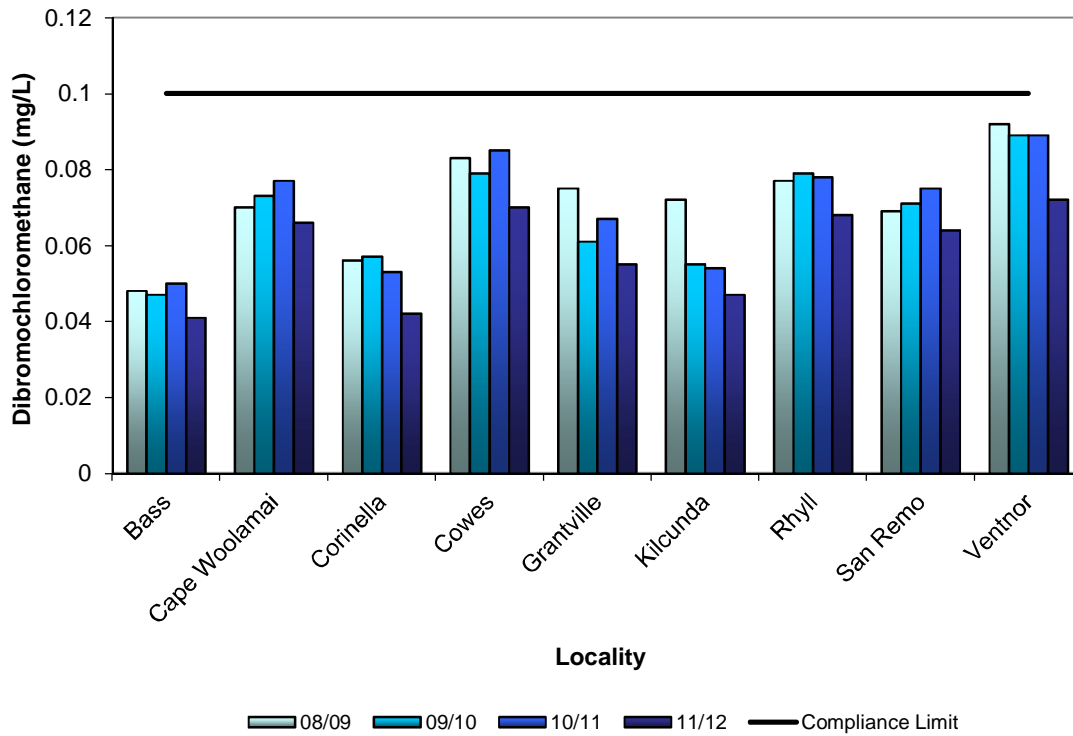


Figure 3-15: Maximum dibromochloromethane concentration from July 2008 to June 2012

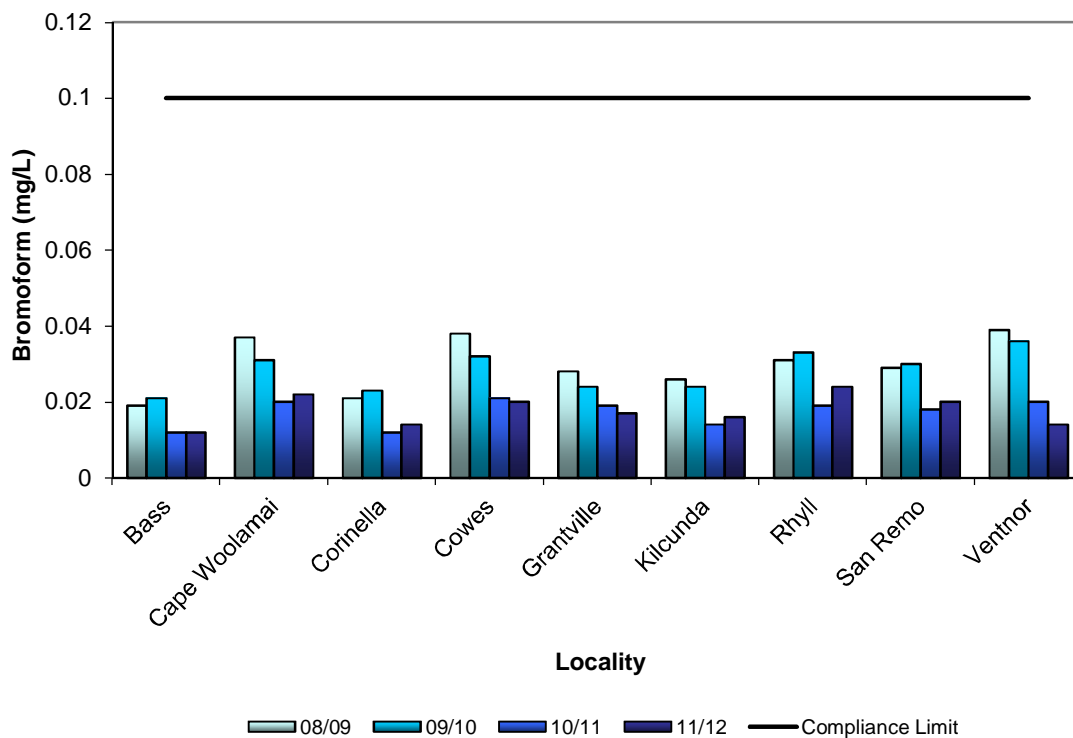


Figure 3-16: Maximum bromoform concentration from July 2008 to June 2012

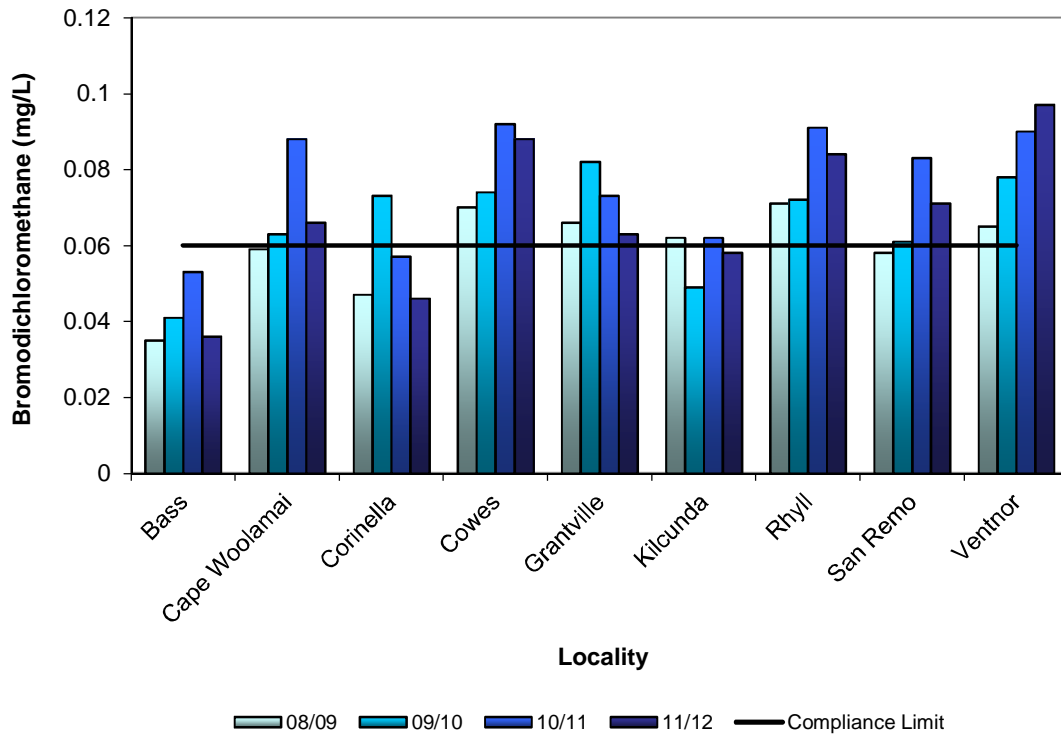


Figure 3-17: Maximum bromodichloromethane concentration from July 2008 to June 2012

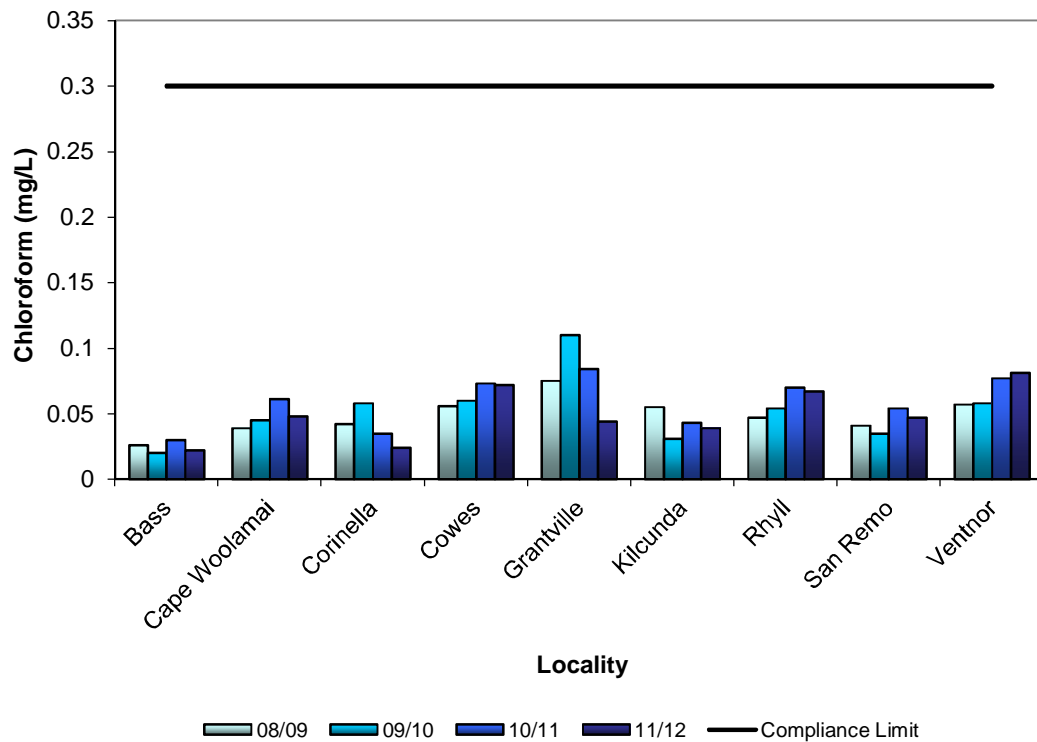


Figure 3-18: Maximum chloroform concentration from July 2008 to June 2012



Metals

Generally the metal concentrations complied with ADWG guideline values over the monitoring period, however there were two exceptions, 1) the iron concentration at Rhyll (2008/09) exceeded the aesthetic guideline value and 2) the lead concentration at Corinella (2008/09) exceeded the health guideline value (Figure 3–19 to Figure 3–24).

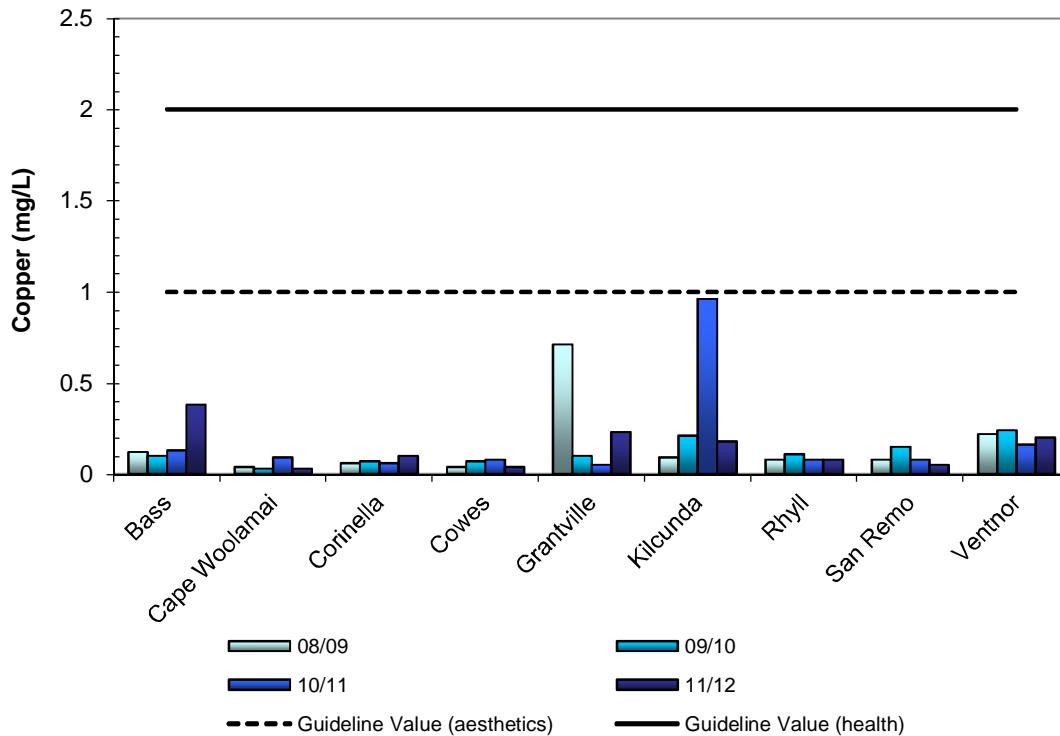


Figure 3-19: Maximum copper concentration from July 2008 to June 2012

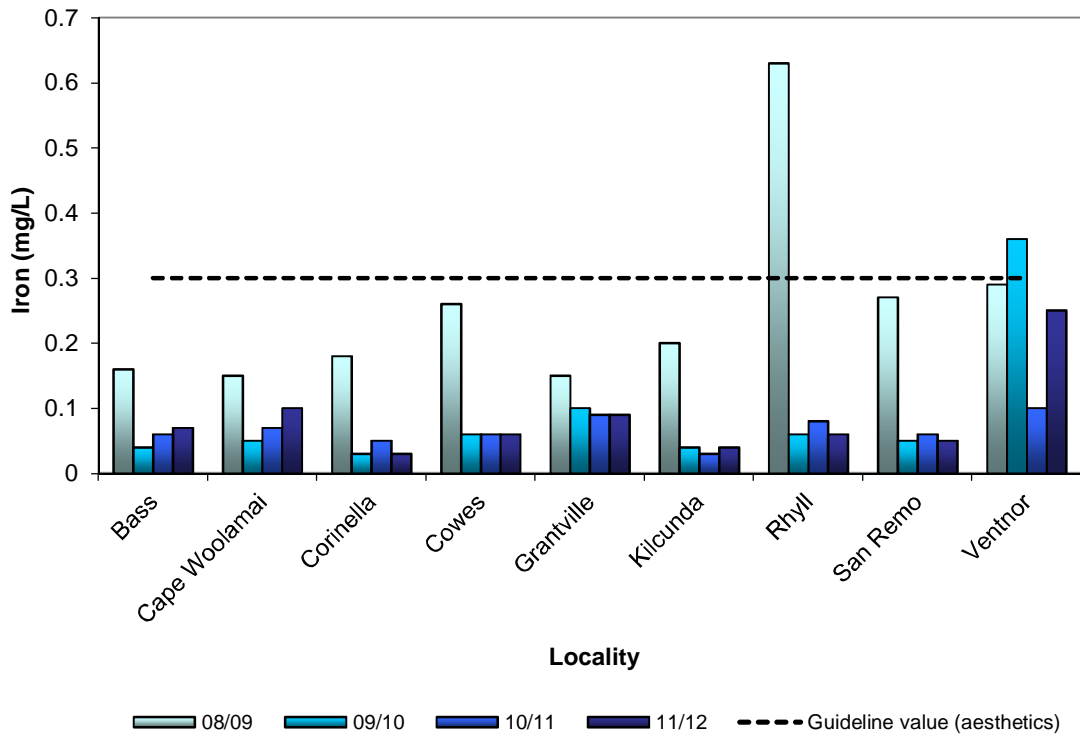


Figure 3-20: Maximum iron concentration from July 2008 to June 2012

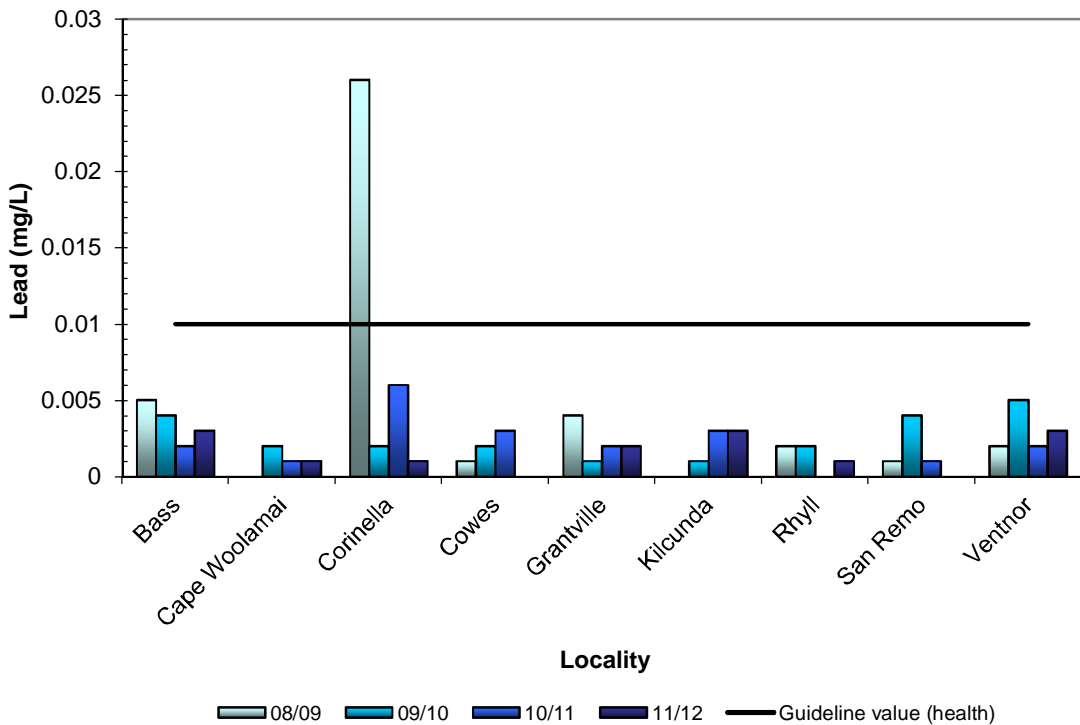


Figure 3-21: Maximum lead concentration from July 2008 to June 2012

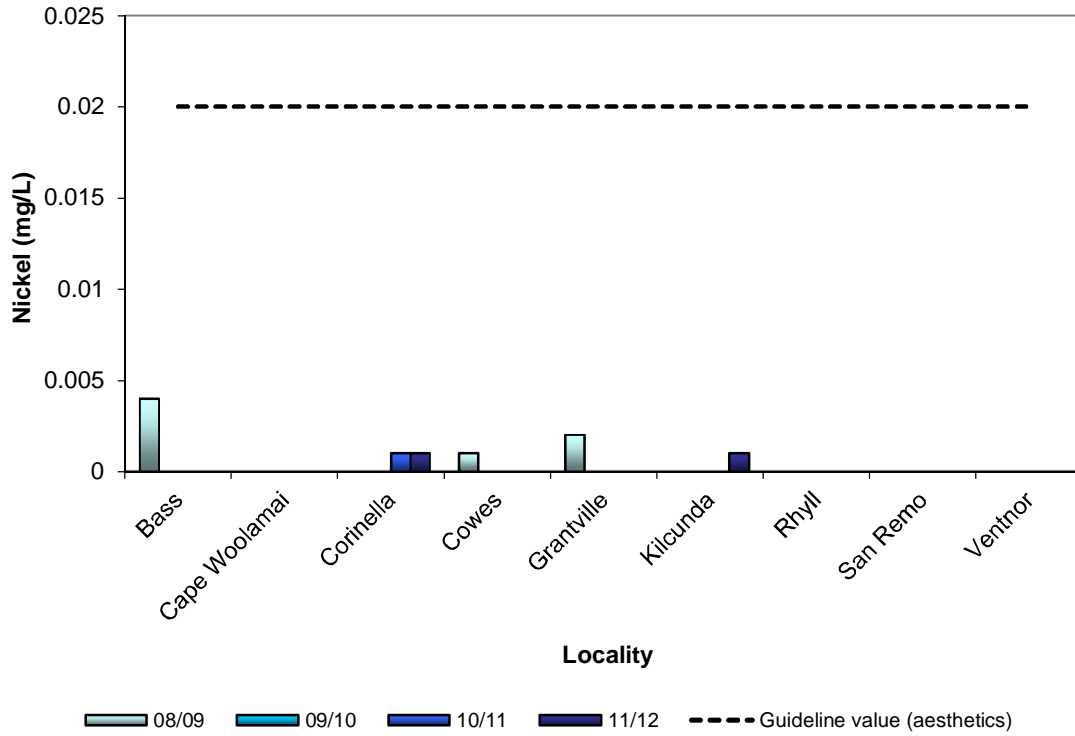


Figure 3-22: Maximum nickel concentration from July 2008 to June 2012

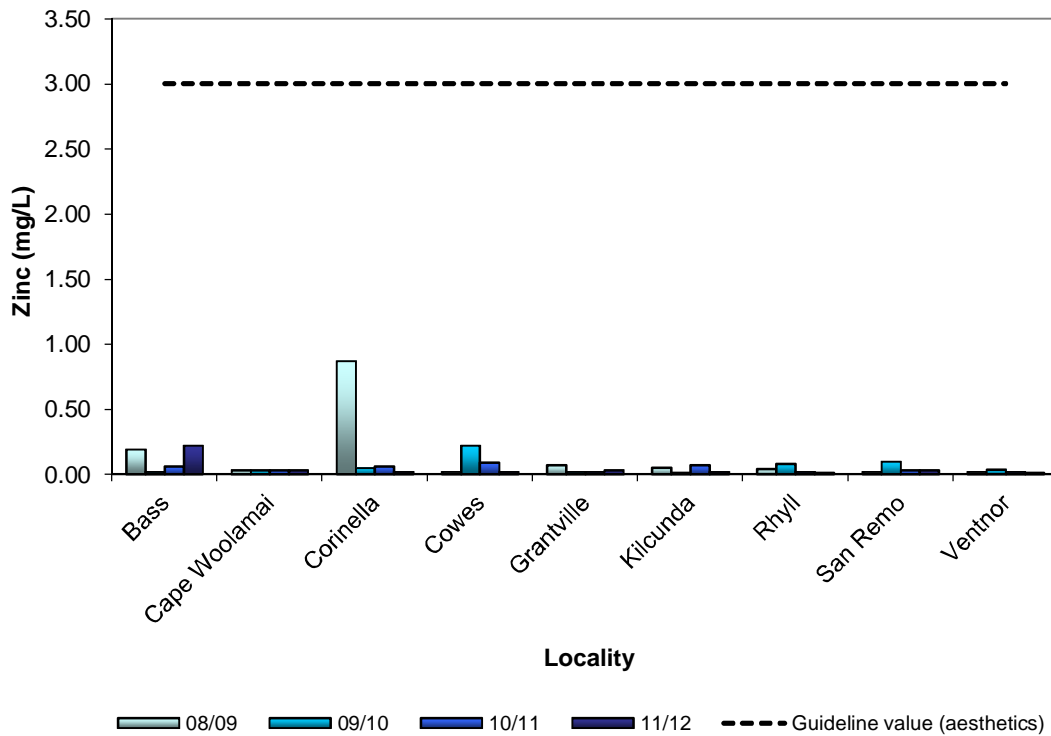


Figure 3-23: Maximum zinc concentration from July 2008 to June 2012

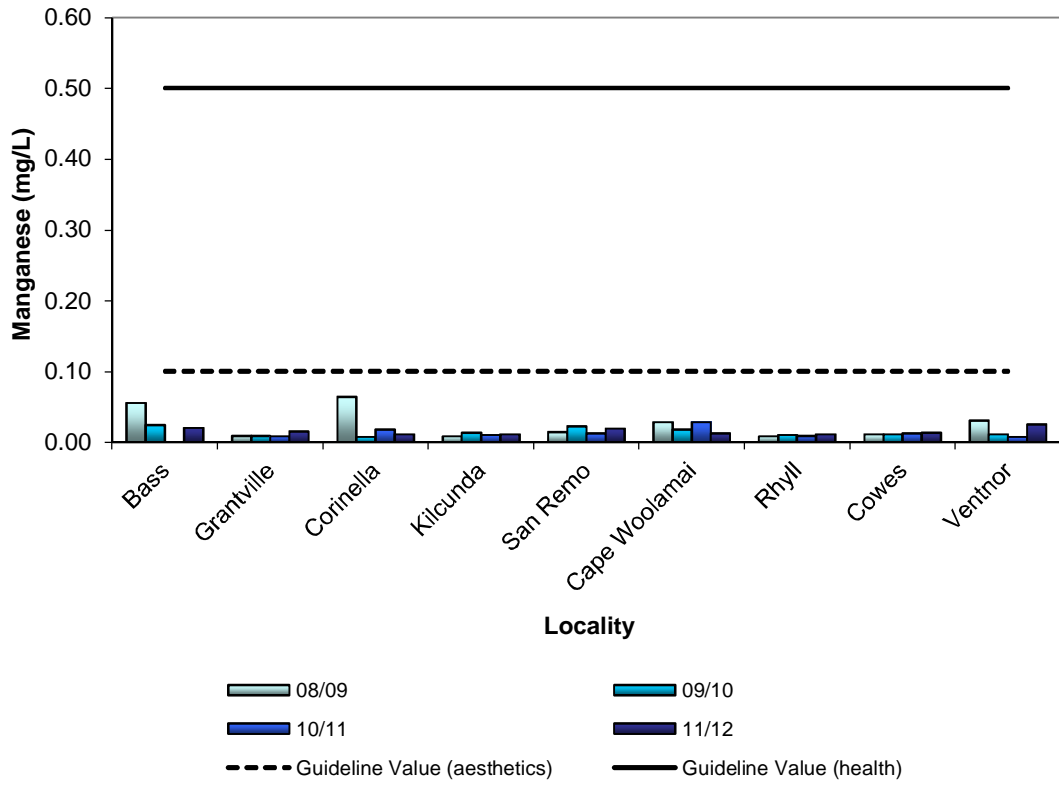


Figure 3-24: Maximum manganese concentration from July 2008 to June 2012



4. Emergency and Incident Management

The management of reportable incidents that occurred during 2011/12 (including water quality incidents at customer taps and Candowie Reservoir) are presented below in Section 4.1.

4.1 Reportable Events under Section 22

No events were reported under Section 22 of the Safe Drinking Water Act during 2011/2012.

4.2 Other events not reportable under Section 22 but had a potential impact on drinking water quality

A sample taken on 6th December 2011 from Archies Creek Rd, Archies Creek, had a turbidity reading of 10 NTU. The high turbidity reading was due to the air scouring works on the Kilcunda supply main undertaken on 3rd December 2012. Following the shut down due to the works, the sample location was flushed and resampled. Resample results complied with the guidelines. No further action was taken as the event was determined by DH not to constitute a notification under Section 18 of the Act.

A sample taken on 24th April 2012 from 7 Barkers Rd, Corinella had an *E. coli* reading of 8 orgs/100mL. This result was reported to DH by Westernport Water. Subsequent investigations by Westernport Water demonstrated that the water that was sampled was tank water from the property. Because the result did not represent the quality of water being supplied by Westernport Water, DH agreed to the removal of the result from compliance calculations. Follow-up actions include a resample taken on 25th April 2012, which recorded 0 orgs/100mL.

4.3 Reportable events under Section 18

A water sample taken on 6th December 2011 from Archies Creek Rd, Archies Creek, had an aluminium reading of 0.90 mg/L, which was 0.7 mg/L above the limit of 0.2 mg/L. This incident was reported to the DH under Section 18 of the Act. The sample location was flushed and resampled. The resample result was <0.03 mg/L.

4.4 Response to Floods

The floods experienced across Victoria had minimal impact on Westernport Water. An increase in the turbidity and dissolved organic carbon in the Candowie raw water was noted and as a result, raw water monitoring was increased. The IBWPP did not experience a decrease in water quality as a result of the increase in water levels in Candowie.

5. Complaints Relating to Water Quality

5.1 Summary of Complaints

The number of potable water quality complaints reported to Westernport Water during the 2011/12 annual reporting period decreased from last reporting period. A summary of the complaints in 2011/12 and 2010/11 can be found in Table 5–1.

Table 5-1: Table of complaints

	Total No. of complaints in 2011/12	Rate per 100 customers* in 2011/12	Total No. of complaints in 2010/11	Rate per 100 customers* in 2010/11
Discoloured Water	13	0.09	13	0.09
Taste and Odour	21	0.14	8	0.06
Blue Water	0	0.00	0	0.00
Illness	0	0.00	0	0.00
Other	5	0.03	4	0.03
Total	39	0.27	25	0.18

Note: * This is based on a permanent population serviced of 13,182 as determined by the 2006 Australian Census (www.abs.gov.au).

The majority of complaints, totalling 21, were in the category of Taste and Odour. There was an increase in customer complaints due to an algal bloom with in Candowie Reservoir, causing taste & odour issues. In general, complaints were resolved through call-backs to the customer, site visits to discuss issues and maintenance (i.e. mains flushing).

Customer complaints, as shown in Figure 5–1, increased during December, (in particular taste and odour complaints) due the effects of the algal bloom and associated levels of MIB and geosmin. Complaints reduced in January before increasing again in March, coinciding with another algal bloom.

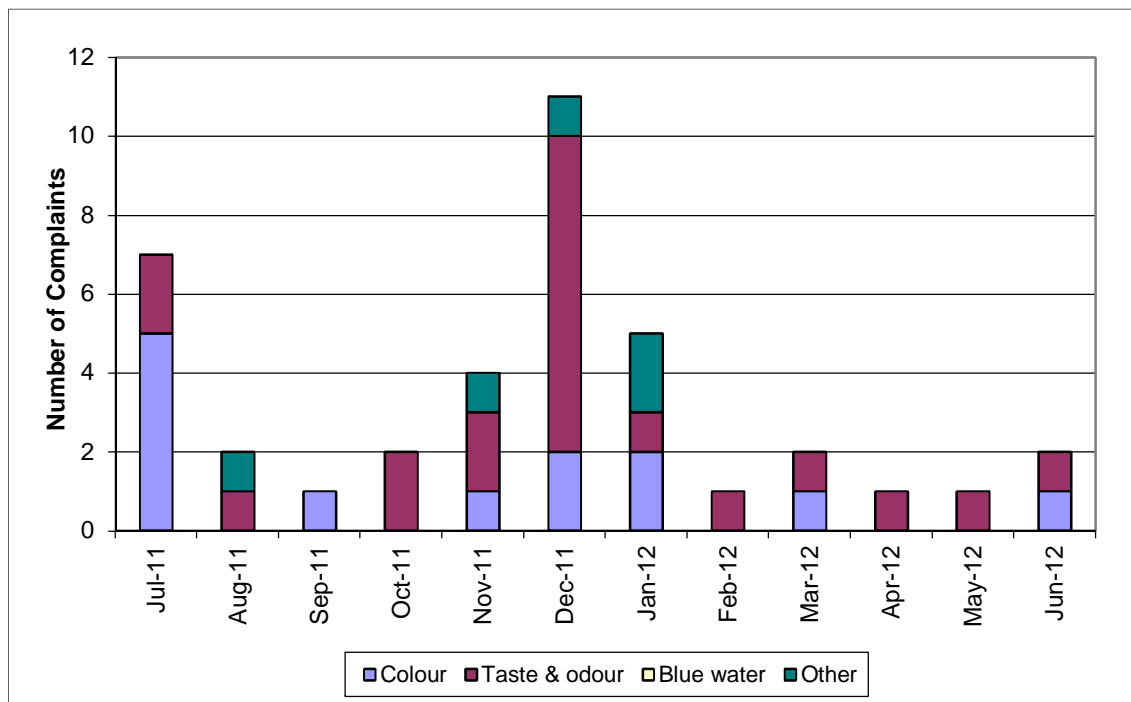


Figure 5-1: Customer complaints for 2011/12 reporting period

5.2 Complaints Response Procedure

Westernport Water is committed to providing its customers with ongoing quality water and services. A customer service division manages customer complaints and each complaint is lodged using a CRM Entry form through the customer request management system. Depending on the nature of the complaint, the details are electronically forwarded to the Assets and 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; and
- Explain to the complainant the multiple barriers and rigorous sampling and testing regime employed to provide a safe and aesthetically acceptable water.

6. Risk Management Plan Audit Outcomes

A regulatory audit was carried out during this 2011/12 reporting period. The audit was performed by Parsons Brincherhoff Australia Pty Ltd in March 2012 covering the period from 1 October 2011 to 9-10 February 2012. The audit found that Westernport Water had not complied with the obligations imposed by section 7(1) of the Safe Drinking Water Act. The audit identified three major non-compliances in the auditable elements:

Risk Management Activities

- 1.4 – Development and implementation of preventative strategies
- 1.5 – Implementation and compliance with the requirements of the risk management plan

Risk Management Plan

- 2.3 – Details of the activities undertaken, and measures taken, to manage hazards and risks to the quality of the water identified in the risk management plan.

The non-compliance was identified as some SCADA alarm limits at the IBWPP did not match the critical control limits in the risk management plan. At the time of the audit, there was no formal process to document changes, to ensure that limits are reinstated and to check that alarm limits match the risk management plan's critical control limits.

7. Undertakings under section 30 of the Act

Westernport Water was required to submit an application for an undertaking following non-compliances identified at the IBWPP as a result of a regulatory risk management plan audit. The non-compliances identified through the audit at the IBWPP. The non-compliances were identified in relation to the following Act includes:

- SDWA 9(1)(d) – development and implementation of preventative strategies
- SDWA 7(1)(b) – implementation and compliance with the requirements of the risk management plan
- Reg 6(1)(b) – details of activities undertaken, and measures taken, to manage hazards and risks to the quality of the water identified in the risk management plan.

To address the non-compliances, Westernport Water was required to formalise an appropriate procedure. The steps to achieve this include inserting a formal process for making changes to the alarm limits in the SCADA system in the Standard Operating Procedure. This includes documenting changes in a dedicated record sheet and a regular process for checking that SCADA alarms match the risk management plan's control point limits.

The avoidance of the possibility of a breach of a critical control point, which may lead to a deterioration of water quality supplied, is a key benefit following these actions.



8. Further Information

Section 23 of the *Safe Drinking Water Act 2003* requires that Westernport Water make available for inspection by the public, the results of any water quality monitoring program that is conducted on any drinking water supplied by Westernport Water.

Customers and members of the public may access drinking water quality data and data for raw water quality, by contacting Westernport Water on the details provided below.

Customer Queries

Phone: 1300 720 711

Email: westport@westernportwater.com.au

Fax: 61 3 5956 4101

Newhaven Office

Opening hours: Monday to Friday 8:30am to 5:00pm

Phone: 61 3 5956 4100

Address: 2 Boys Home Road, Newhaven 3925

9. References

NHMRC/NRMMC, 2011. 'National Water Quality Management Strategy: Australian Drinking Water Guidelines'. National Health and Medical Research Council / National Resource Management Ministerial Council, Australia.

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WHO, 2011. Guidelines for Drinking-water Quality: Fourth Edition, World Health Organization, Geneva.

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		Name	Signature	Name	Signature	Date
1	Bronwyn Stewart	Patty Chier		Patty Chier		3/10/12