WESTERNPORT WATER

ANNUAL DRINKING WATER QUALITY REPORT 2010/11

October 2011

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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 its 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 potable 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 report covers issues relating to the quality of potable drinking water and the management of regulated water.

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 potable water generally complies with the Australian Drinking Water Quality Guidelines (NHMRC, 2004).

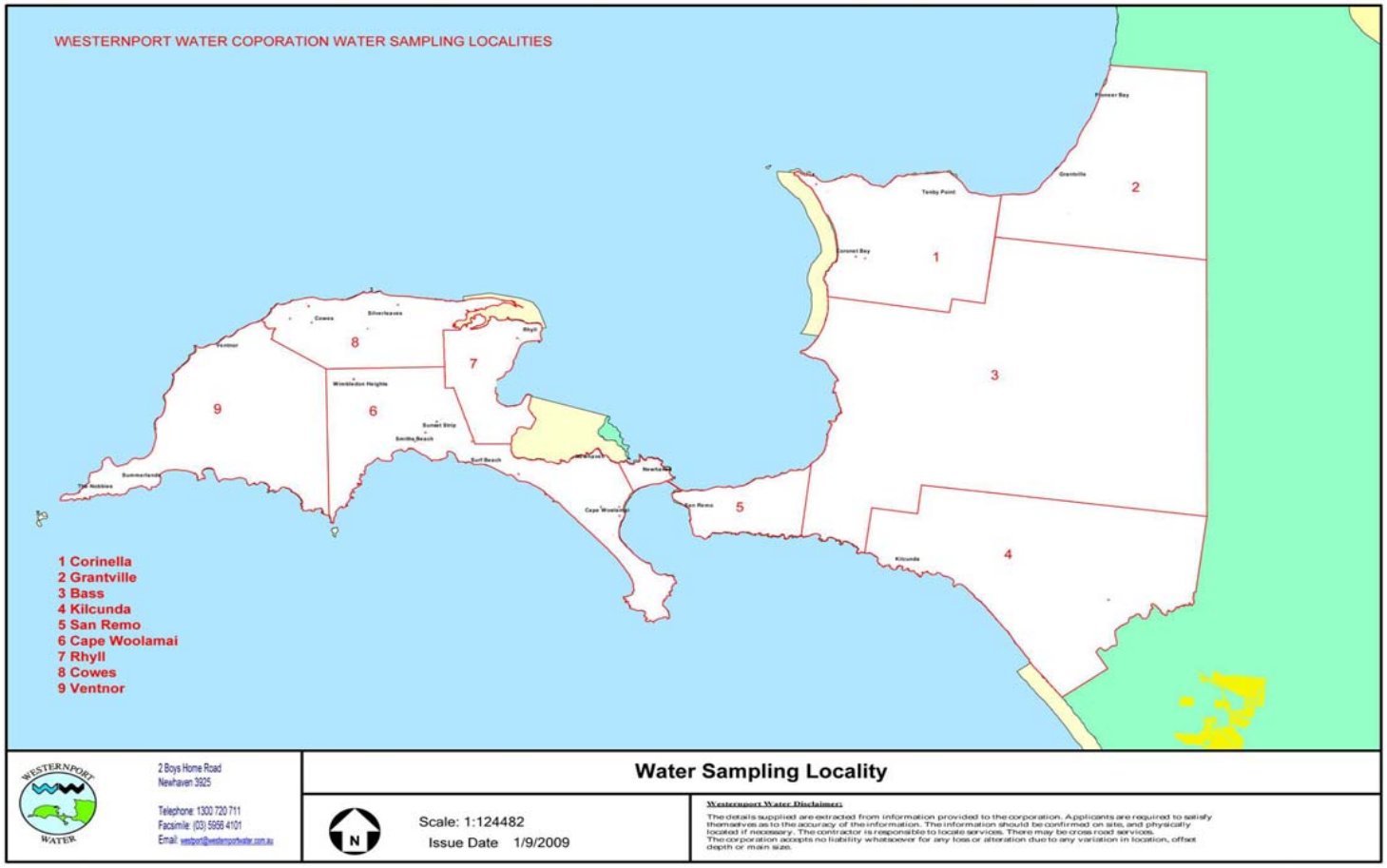


Figure 1-1: Westernport Water service area

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 2010/11 reporting period. The bore depth and application of the bores are listed in Table 1-1.

Table 1-1: Corinella bores

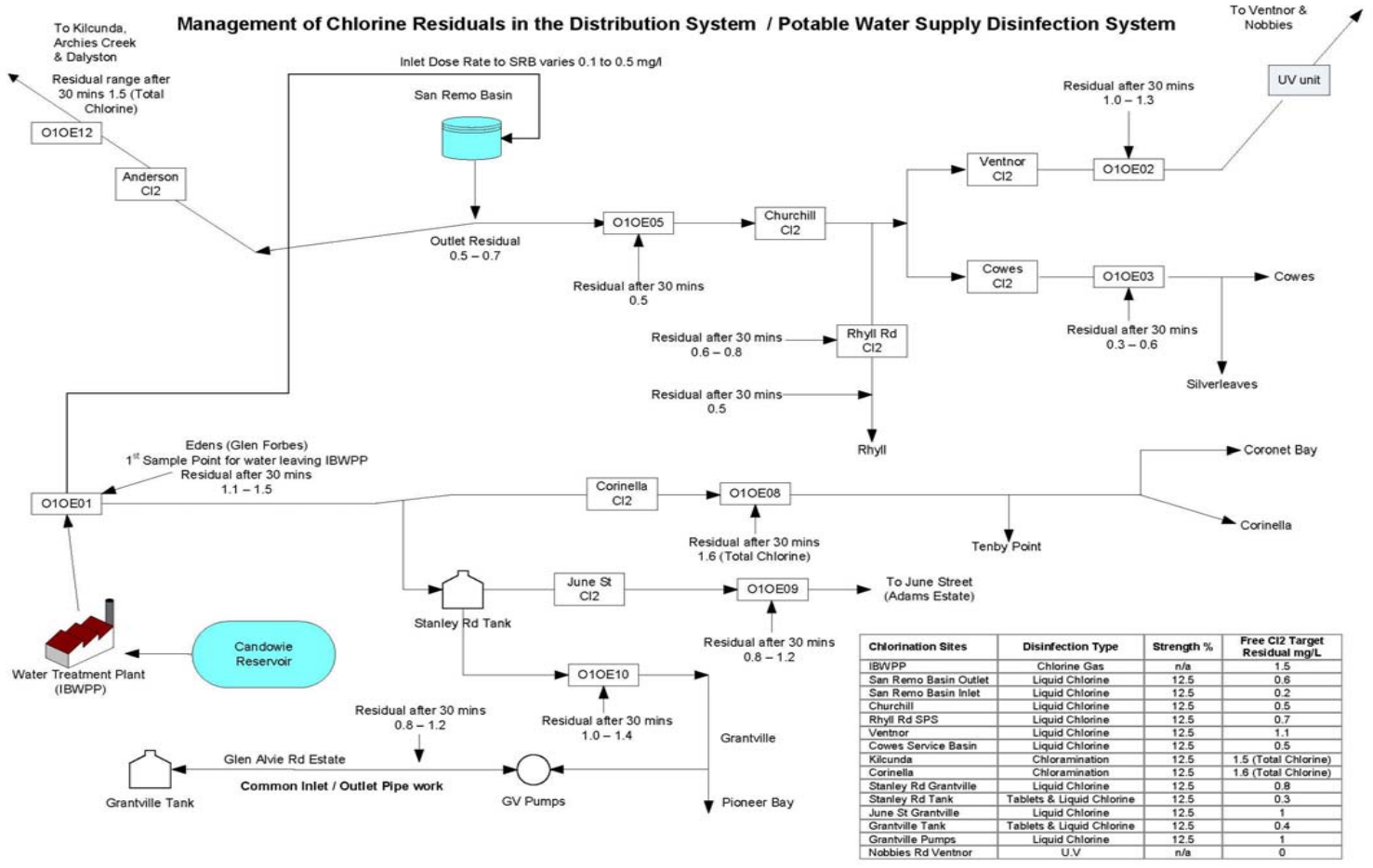
Asset	Location	Bore Depth	Application
KRDB1	King Rd Wastewater Treatment Plant (WWTP)	117 m	Production bore
KRSB2	King Rd 500 m from WWTP	26.6 m	Production bore
KRSB3	Cnr King Rd and Bass Hwy	52.1 m	Production bore
CMSB1	Cemetery Rd	36 m	Production bore

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 two variable speed centrifugal pumps began pumping on 1 July 2010 and ceased on 5 July 2010. During this period, 37 ML was pumped into the Candowie Reservoir.

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 2010/11 reporting period.



Chlorination Sites	Disinfection Type	Strength %	Free Cl2 Target Residual mg/L
IBWPP	Chlorine Gas	n/a	1.5
San Remo Basin Outlet	Liquid Chlorine	12.5	0.6
San Remo Basin Inlet	Liquid Chlorine	12.5	0.2
Churchill	Liquid Chlorine	12.5	0.5
Rhyll Rd SPS	Liquid Chlorine	12.5	0.7
Ventnor	Liquid Chlorine	12.5	1.1
Cowes Service Basin	Liquid Chlorine	12.5	0.5
Kilcunda	Chloramination	12.5	1.5 (Total Chlorine)
Corinella	Chloramination	12.5	1.6 (Total Chlorine)
Stanley Rd Grantville	Liquid Chlorine	12.5	0.8
Stanley Rd Tank	Tablets & Liquid Chlorine	12.5	0.3
June St Grantville	Liquid Chlorine	12.5	1
Grantville Tank	Tablets & Liquid Chlorine	12.5	0.4
Grantville Pumps	Liquid Chlorine	12.5	1
Nobbies Rd Ventnor	U.V	n/a	0

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

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 and 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 0.9mg/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 & aqua ammonia	Booster chloramination stations used at the Kilcunda & 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.

2.1.1 Improvements

Westernport Water strives to provide their 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 2010/11 period at IBWPP and throughout the water supply system are presented below in Table 2-2.

Table 2-2 Improvements to water treatment systems during 2010/11

Activity	Outcome / Improvement
Supply main (648mm) was swabbed.	Improved water quality, reduction in chlorine and taste and odours.
Variable Speed Drives were installed on the high lift pumps.	The Variable Speed Drives allow the raw water flows to be matched with treated water flows, allowing for a more stable chlorine residual leaving the WTP.
San Remo holding basin was inspected and vacuum cleaned	Improved water quality leaving the San Remo Basin.
Clear Water Storage at the Treatment plant was inspected and vacuum cleaned by divers (Nordical Diving).	Improved water quality leaving the water treatment plant.
Catchment works: Weed control, within 300m of the shoreline, undertaken 5 or 6 times during the year.	Reduction of organic matter entering system.
Back Wash tank at the treatment plant was inspected and vacuum cleaned.	Improved water quality when backwashing filters.
30 minute chlorine sample line at the treatment plant was replaced and sleeved inside another pipe.	This will offer protection from the UV rays as well as potential damage by contractors when mowing/slashing the grounds.
Flocculator chains and cogs serviced.	Improved reliability of Flocculators.
Flocculator tanks cleaned walls and floors painted.	Improved water quality entering treatment plant.
Flocculator paddles repaired or replaced.	Better mixing of water during the treatment process.
Replaced the inlet valve to each individual filter.	Reliability improved to each filter with the purchase of these new valves.
Maintenance works at Candowie offtake on Bass River every two months.	Reliability of operation for this asset was increased.
Detention boards were installed at IBWPP.	Improved operation at the treatment plant.

2.2 Issues

2.2.1 Section 22 Events

Westernport Water experienced one elevated turbidity event at Woolamai in November 2010, which was reported to the Department of Health under section 22 of the Safe Drinking Water Act. This event however, was determined by DH not to constitute a section 22 notification, and the water was not considered unsafe to drink. Even though this event was not reportable under section 22, details and remedial actions are described in the Emergency and Incident Management section of this report (Section 5).

2.2.2 Algae in Candowie Reservoir

Candowie Reservoir occasionally experiences high algal counts with a wide range of species 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 lessen 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 2010/11 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.

An increase in the potentially toxic blue-green *Anabaena circinalis* occurred in February and the reservoir was treated with Cupricide on 1 March 2011. Sampling on 3 March 2011 showed that the treatment was successful.

2.2.3 Water Security

The Candowie Reservoir water level over the 2010/11and 2009/10 financial years can be seen in Figure 2-1. Levels were higher in 2010/11 compared to 2009/10 due to increased rainfall in the area. For most of the year, Candowie Reservoir was at its maximum capacity of 2263 ML.

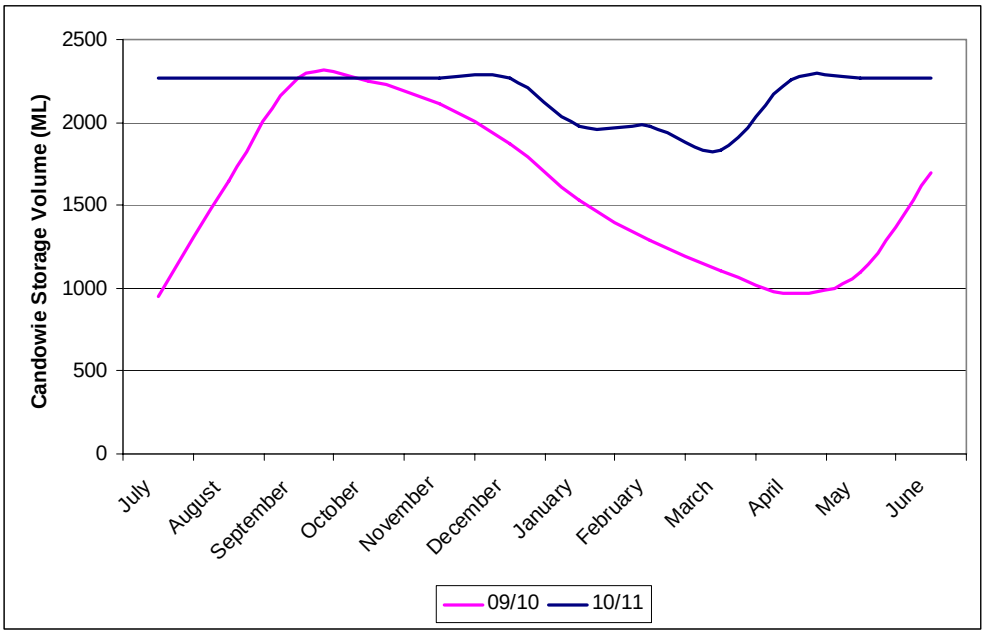


Figure 2-1: Candowie Reservoir storage volumes (1/7/2009 to 30/6/2011)

Westernport Water recognises that any decrease in the yield from 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:

- Raise the Candowie Dam wall – which 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 renewed Westernport Water's bore licence on the 1 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 per year. Due to the amount of water in Candowie Reservoir during 2010/11, the bores were not operated this year. Westernport Water are able to use the water from this groundwater source to supplement the 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 2010/11

The Safe Drinking Water Regulations 2005 (Victoria) stipulate that evidence must be given to indicate the water supplier's compliance or non-compliance with the regulations. These regulations were in force for the 2010/11 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	
Escherichia Coli *(E. coli)*	At least 98% of all samples of drinking water collected in any 12 months period to contain no *Escherichia coli* 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	
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 2010/11 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 16 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 will be 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 (see Table 3-2).

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

Water Sampling Locality	Frequency of Sampling	No. of Samples	Samples Containing E. coli	Max Result (orgs/ 100 mL)	% Samples with no *E. coli*	Complying (Yes/No)
Bass	weekly	52	0	0	100	Yes
Cape Woolamai	weekly	52	0	0	100	Yes
Corinella	weekly	52	0	0	100	Yes
Cowes	weekly#	57	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 locations were sampled weekly.

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	52	0	0.29	Yes
Cape Woolamai	weekly	52	0	0.68	Yes
Corinella	weekly	52	0	0.64	Yes
Cowes	weekly#	57	0	0.49	Yes
Grantville	weekly	52	0	2.20	Yes
Kilcunda	twice weekly*	104	0	0.44	Yes
Rhyll	weekly	52	0	0.60	Yes
San Remo	weekly	52	0	0.67	Yes
Ventnor	weekly	52	0	0.65	Yes

Note: # 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: 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#	14	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: # 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 monthly.

3.2.3 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: 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	0.007	Yes
Cape Woolamai	monthly	12	0	0.006	Yes
Corinella	monthly	12	0	0.016	Yes
Cowes	monthly#	14	0	0.007	Yes
Grantville	monthly	12	0	0.074	Yes
Kilcunda	twice monthly*	24	0	0.016	Yes
Rhyll	monthly	12	0	0.009	Yes
San Remo	monthly	12	0	0.008	Yes
Ventnor	monthly	12	0	0.009	Yes

Note: # 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 monthly.

3.2.4 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: 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	0.009	Yes
Cape Woolamai	monthly	12	0	0.014	Yes
Corinella	monthly	12	0	0.014	Yes
Cowes	monthly#	14	0	0.015	Yes
Grantville	monthly	12	0	0.040	Yes
Kilcunda	twice monthly*	24	0	0.019	Yes
Rhyll	monthly	12	0	0.014	Yes
San Remo	monthly	12	0	0.015	Yes
Ventnor	monthly	12	0	0.015	Yes

Note: # 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 monthly.

3.3 Trihalomethanes (THMs)

The following section discusses the forms of trihalomethanes (THMs) that were tested during the 2010/11 reporting period.

3.3.1 Trihalomethanes (Total)

THM is the 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 non-compliant on one occasion at Cowes.

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	0.14	Yes
Cape Woolamai	monthly	12	0	0.24	Yes
Corinella	monthly	12	0	0.16	Yes
Cowes	monthly#	14	1	0.26	No
Grantville	monthly	12	0	0.20	Yes
Kilcunda	twice monthly*	24	0	0.16	Yes
Rhyll	monthly	12	0	0.25	Yes
San Remo	monthly	12	0	0.22	Yes
Ventnor	monthly	12	0	0.25	Yes

Note: # 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. It is a requirement that resampled data is not included for total THMs. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

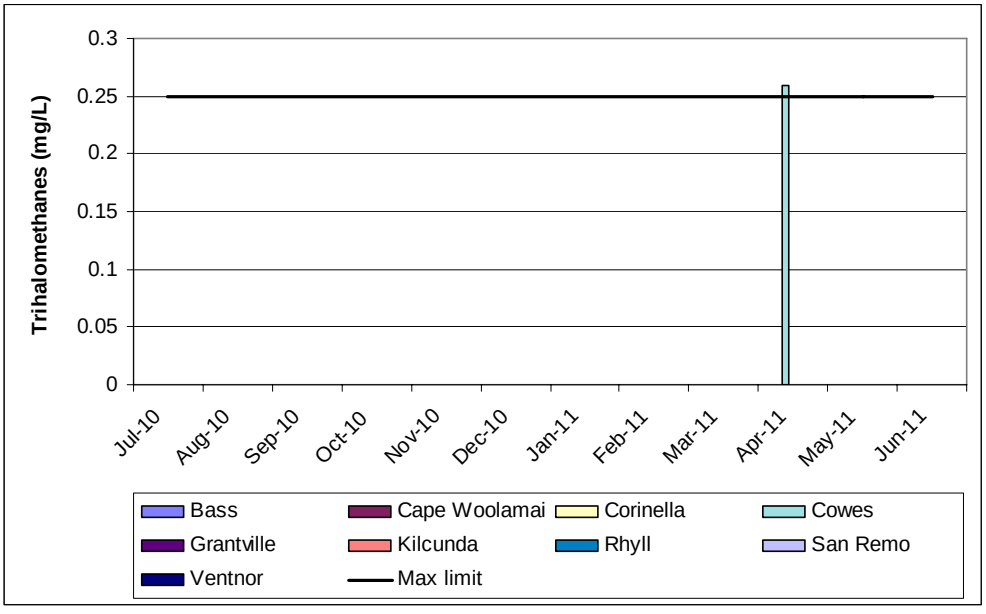


Figure 3-1 Non conforming maximum total THMs -July 2010 to June 2011

3.3.1.1 Actions in relation to non-compliance

Westernport Water exceeded the limit of 0.25 mg/L for THM at Cowes on 12th April 2011. The Department of Health was notified under Section 18 of the Act and details regarding this exceedance are presented in Section 5.

3.3.2 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, 2006) 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: Dibromochloromethane

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.050	Yes
Cape Woolamai	monthly	12	0	0.077	Yes
Corinella	monthly	12	0	0.053	Yes
Cowes	monthly#	14	0	0.085	Yes
Grantville	monthly	12	0	0.067	Yes
Kilcunda	twice monthly*	24	0	0.054	Yes
Rhyll	monthly	12	0	0.078	Yes
San Remo	monthly	12	0	0.075	Yes
Ventnor	monthly	12	0	0.089	Yes

Note: # 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 monthly.

3.3.3 Bromoform

Bromoform is a THM tested by Westernport Water. There is no mandated standard for bromoform 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.

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	0.020	Yes
Corinella	monthly	12	0	0.012	Yes
Cowes	monthly#	14	0	0.021	Yes
Grantville	monthly	12	0	0.019	Yes
Kilcunda	twice monthly*	24	0	0.014	Yes
Rhyll	monthly	12	0	0.019	Yes
San Remo	monthly	12	0	0.018	Yes
Ventnor	monthly	12	0	0.020	Yes

Note: # 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 monthly.

3.3.4 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 (see Table 3-10).

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	0.053	Yes
Cape Woolamai	monthly	12	4	0.088	No
Corinella	monthly	12	0	0.057	Yes
Cowes	monthly#	14	9	0.092	No
Grantville	monthly	12	2	0.073	No
Kilcunda	twice monthly*	24	0	0.062**	Yes
Rhyll	monthly	12	6	0.091	No
San Remo	monthly	12	4	0.083	No
Ventnor	monthly	12	7	0.090	No

Note: # 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 monthly. **Upon rounding to two decimal places, these results are WHO compliant which have the limit specified to two decimal places only.

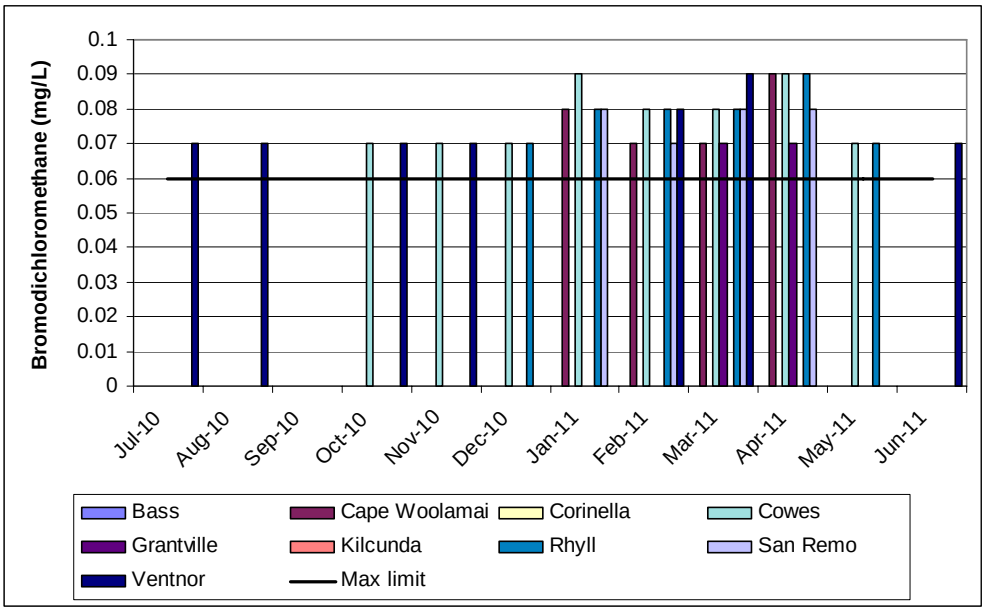


Figure 3-2 Non-conforming maximum bromodichloromethane results for the period July 2010 to June 2011

3.3.4.1 Actions in Relation to Guideline Non-compliance

Even though Westernport Water exceeded the WHO guideline value of 0.06 mg/L for bromodichloromethane in six water sampling localities, actions were only taken on one occasion, as outlined in Section 5, when the total THM value exceeded the Safe Drinking Water Regulations 2005 water quality standard of 0.25 mg/L. 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.

3.3.5 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: Chloroform

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.003	Yes
Cape Woolamai	monthly	12	0	0.061	Yes
Corinella	monthly	12	0	0.035	Yes
Cowes	monthly#	14	0	0.073	Yes
Grantville	monthly	12	0	0.084	Yes
Kilcunda	twice monthly*	24	0	0.043	Yes
Rhyll	monthly	12	0	0.070	Yes
San Remo	monthly	12	0	0.054	Yes
Ventnor	monthly	12	0	0.077	Yes

Note: # 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 monthly.

3.4 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 2010/11.

3.5 Aluminium (acid soluble)

According to both the Safe Drinking Water Regulations the concentration of acid-soluble aluminium should 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 Bass and Kilcunda during the 2010/11 reporting period.

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	1	0.37	No
Cape Woolamai	monthly	12	0	0.07	Yes
Corinella	monthly	12	0	0.15	Yes
Cowes	monthly#	14	0	0.11	Yes
Grantville	monthly	12	0	0.13	Yes
Kilcunda	twice monthly*	24	2	0.64	No
Rhyll	monthly	12	0	0.12	Yes
San Remo	monthly	12	0	0.17	Yes
Ventnor	monthly	12	0	0.04	Yes

Note: # 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 monthly.

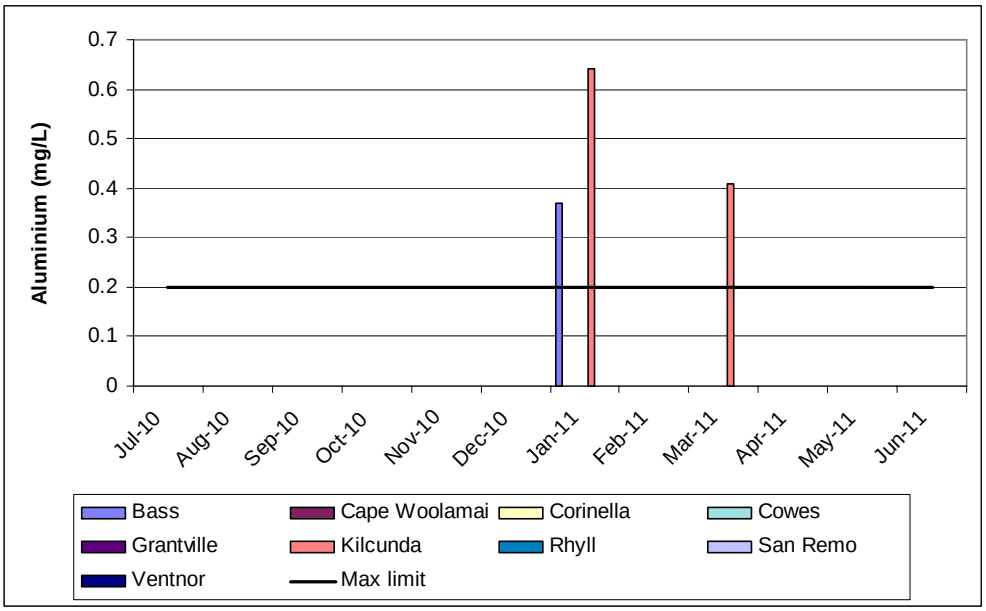


Figure 3-3 Non conforming maximum aluminium results for the period July 2010 to June 2011

3.5.1.1 Actions in Relation to Guideline Non-compliance

Westernport Water exceeded the ADWG value for aluminium at Bass and Kilcunda on 18 January 2011 and again at Kilcunda on 15 March 2011. The Department of Health was notified in under Section 18 of the Act and details of this exceedance and associated actions to resolve it are outlined in Section 5.

3.6 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: Turbidity

Locality	Frequency of Sampling	No. of Samples	Max NTU	95% UCL of Mean (NTU)**	Complying (Yes/No)
Bass	weekly	52	5.5	0.7	Yes
Cape Woolamai	weekly	52	1.4	0.3	Yes
Corinella	weekly	52	2.4	0.4	Yes
Cowes	weekly#	57	0.7	0.2	Yes
Grantville	weekly	52	0.7	0.3	Yes
Kilcunda	twice weekly*	104	1.3	0.3	Yes
Rhyll	weekly	52	2.9	0.4	Yes
San Remo	weekly	52	0.8	0.4	Yes
Ventnor	weekly	52	1.1	0.2	Yes

Note: # 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. ** 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.

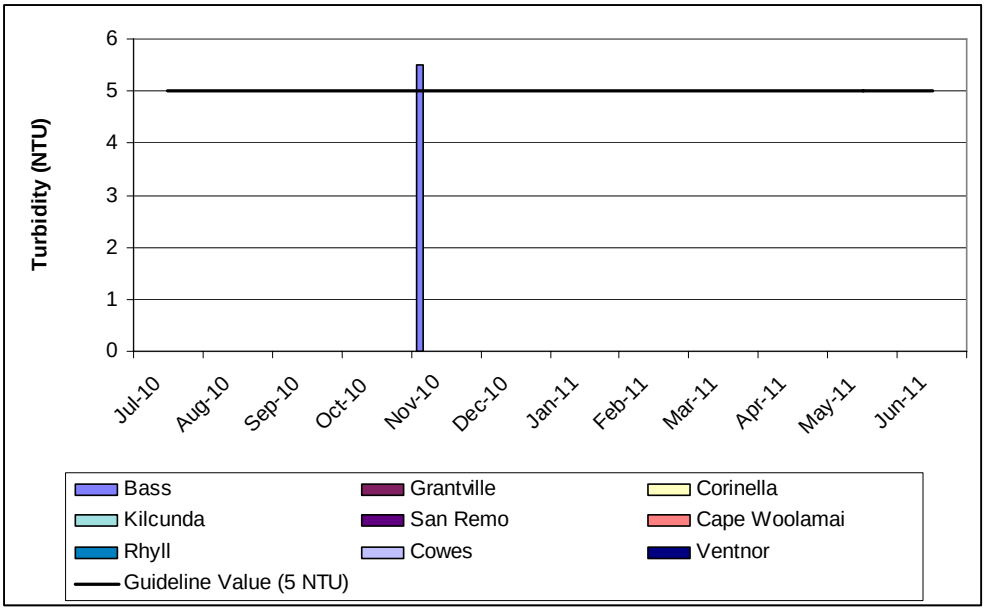


Figure 3-4 Non-conforming maximum turbidity results for the period July 2010 to June 2011

3.6.1 Actions in Relation to Guideline Non-compliance

Westernport Water exceeded the ADWG aesthetic guideline value for turbidity at Bass on 24th November 2010. The Department of Health was notified under Section 22 of the Act. This event however, was determined by DH not to constitute a section 22 notification, and the water was not considered unsafe to drink. Even though this event was not reportable under section 22, details and remedial actions are described in the Emergency and Incident Management section of this report (Section 5).

3.7 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, however the number of samples analysed were non-compliant.

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	10	0.94	0.42	0.74	Yes
Cape Woolamai	monthly	10	0.87	0.40	0.67	Yes
Corinella	monthly	10	0.96	0.42	0.72	Yes
Cowes	monthly	10	0.86	0.37	0.64	Yes
Grantville	monthly	10	0.86	0.41	0.68	Yes
Kilcunda	monthly*	20	0.90	0.41	0.70	Yes
Rhyll	monthly	10	0.86	0.39	0.66	Yes
San Remo	monthly	10	0.88	0.42	0.68	Yes
Ventnor	monthly	10	0.84	0.33	0.62	Yes

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

3.7.1 Actions in Relation to Guideline Non-compliance

The number of samples were reduced for this reporting period as the samples from all localities were not analysed for fluoride during February or March 2011. This was an ALS laboratory information system error and was rectified by April.

3.8 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 2010/11 reporting period.

3.8.1 Antimony

Based on health consideration, 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

*Kilcunda data includes Dalyston area data, both these locations were sampled quarterly.

3.8.2 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: 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

*Kilcunda data includes Dalyston area data, both these locations were sampled quarterly.

3.8.3 Copper

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

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	0.13	Yes
Cape Woolamai	monthly	12	0	0.09	Yes
Corinella	monthly	12	0	0.06	Yes
Cowes	monthly#	14	0	0.08	Yes
Grantville	monthly	12	0	0.05	Yes
Kilcunda	twice monthly*	24	0	0.96	Yes
Rhyll	monthly	12	0	0.08	Yes
San Remo	monthly	12	0	0.08	Yes
Ventnor	monthly	12	0	0.16	Yes

Note: # the number of samples collected at Cowes exceeded the monthly 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 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.

3.8.4 Lead

Based on health considerations, the ADWG guideline value is set at 0.01 mg/L. Lead concentrations complied with this limit at all locations during the reporting period.

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	0.002	Yes
Cape Woolamai	monthly	12	0	0.001	Yes
Corinella	monthly	12	0	0.006	Yes
Cowes	monthly#	14	0	0.003	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	0.002	Yes

Note: #the number of samples collected at Cowes exceeded the monthly 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 monthly.

3.8.5 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 locations.

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

*Kilcunda data includes Dalyston area data, both these locations were sampled quarterly.

3.8.6 Zinc

Based on aesthetic considerations, the ADWG guideline value is set at 3 mg/L. The zinc concentration complies with this guideline value at all locations.

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	0.06	Yes
Cape Woolamai	monthly	12	0	0.03	Yes
Corinella	monthly	12	0	0.06	Yes
Cowes	monthly#	14	0	0.09	Yes
Grantville	monthly	12	0	0.02	Yes
Kilcunda	twice monthly*	24	0	0.07	Yes
Rhyll	monthly	12	0	0.02	Yes
San Remo	monthly	12	0	0.03	Yes
Ventnor	monthly	12	0	0.02	Yes

Note: # the number of samples collected at Cowes exceeded the monthly 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 monthly.

3.8.7 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.

There are no manganese results at the Bass location as the sample for manganese analysis is taken from the distribution system points, 30 minute contact point downstream from chlorinators. Bass does not have a distribution system, 30min point.

Table 3-21: Manganese

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	nil#				
Cape Woolamai	fortnightly	26	0	0.008	Yes
Corinella	fortnightly	26	0	0.018	Yes
Cowes	fortnightly	26	0	0.010	Yes
Grantville	twice fortnightly*	52	0	0.012	Yes
Kilcunda	fortnightly	26	0	0.028	Yes
Rhyll	fortnightly	26	0	0.009	Yes
San Remo	fortnightly	26	0	0.012	Yes
Ventnor	fortnightly	26	0	0.007	Yes

Bass was not sampled due to the absence of a suitable sampling point. *Two sites within Grantville were sampled fortnightly, hence the doubled number of samples compared to other locations.

3.8.8 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 pro-active management of water treatment processes. The schedule is shown in Table 3-22.

The quality of water in 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.

Table 3-22: Raw water monitoring schedule 2010/11

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 & Pesticides*
Off take- Raw Water into lab at Water Treatment Plant	Quarterly	Cryptosporidium & Giardia
Off take- Raw Water into lab at Water Treatment Plant	Annually	Radiation**
Reservoir- Surface, 1, 3, 7 & 9 meter samples	Fortnightly (or as required)	Algae (Cyanobacteria)
Raw Water into lab at Water Treatment Plant	Fortnightly (or as required)	MIB & Geosmin
Raw Water into lab at Water Treatment Plant	Weekly	Colilert (200) E.coli, 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 & Electrical Conductivity @ 25c
Reservoir- Surface, 1, 3, 7 & 9 meter samples	Fortnightly	Nitrate, Nitrite, Ammonia Phosphorus, Silica, Iron and Manganese

*For Pesticides & Herbicides, all samples below detection limit. The following were analysed: Bifenthrin, Cyfluthr, Cypermethr, Deltamet, Fenvalerat & 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 & Prothiofos.

**Radiation was sampled only once in 2010/11, due the previous results indicating minimal risk to the business. Results were below detection limits, including Gross Alpha & Gross Beta.

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/Na)**
	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
Chloropyrifos	<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	<0.001	-	0.001	Yes
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

*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
	Bq/L	Bq/L
Gross Alpha	<0.017	0.5
Gross Beta	<0.07	0.5

3.8.9 Locust Plague

A severe locust plague was experienced across Victoria during the 2010/11 monitoring period. Westernport Water released a letter to the landholders on 15 December 2010 advising of the possibility of locust infestation. A media release was also prepared in the event of an infestation. The spraying of locusts was not required during the monitoring period.

3.9 Aesthetics

3.9.1 pH

3.9.1.1 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 Ventnor.

Table 3-25: pH

Locality	Frequency of Sampling	No. of Samples	Min	Max	Mean	Complying (Yes/No)
Bass	weekly	52	7.0	7.8	7.4	Yes
Cape Woolamai	weekly	52	7.0	8.0	7.3	Yes
Corinella	weekly	52	7.1	7.9	7.4	Yes
Cowes	weekly#	57	7.2	8.2	7.6	Yes
Grantville	weekly	52	7.1	8.1	7.4	Yes
Kilcunda	twice weekly*	104	7.1	7.8	7.4	Yes
Rhyll	weekly	52	7.1	8.0	7.4	Yes
San Remo	weekly	52	7.0	8.0	7.3	Yes
Ventnor	weekly	52	7.2	8.6	7.7	No**

Note: # the number of samples collected at Cowes exceeded the monthly 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. **Cement mortar lined pipes can significantly increase pH and a value up to 9.2 may be tolerated provided monitoring indicates no deterioration in microbial quality (Source: ADWG).

3.9.1.2 Actions in Relation to Guideline Non-compliance

Westernport Water exceeded the ADWG guideline value of between 6.5 and 8.5 for pH at Ventnor in the 2010/11 reporting period as seen in Figure 3-5.

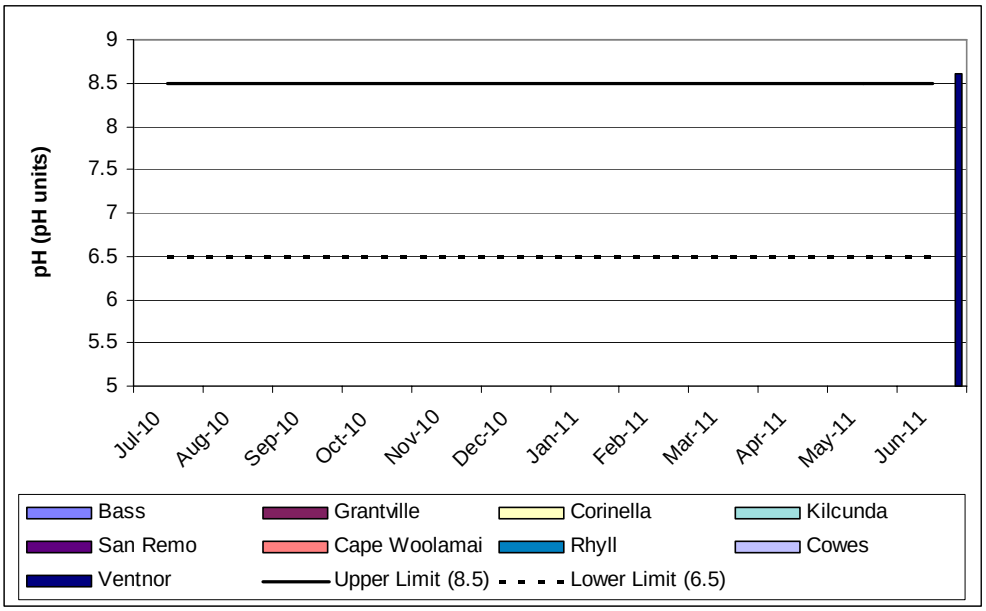


Figure 3-5 Non-conforming maximum pH results for the period July 2010 to June 2011 (where more than one non-compliance within a month has occurred, only the highest value is displayed)

3.9.2 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 guidelines for all locations.

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	0.06	Yes
Cape Woolamai	fortnightly	26	0	0.07	Yes
Corinella	fortnightly	26	0	0.05	Yes
Cowes	fortnightly#	28	0	0.06	Yes
Grantville	fortnightly	26	0	0.09	Yes
Kilcunda	twice fortnightly*	52	0	0.03	Yes
Rhyll	fortnightly	26	0	0.08	Yes
San Remo	fortnightly	26	0	0.06	Yes
Ventnor	fortnightly	26	0	0.10	Yes

Note: # the number of samples collected at Cowes exceeded the fortnightly 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 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. If a customer is experiencing copper staining or discolouration of their water, please contact Westernport Water's Customer Service Centre on 1300 720 711.

4 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.

4.1 Drinking Water Quality Standards

4.1.1 E. coli

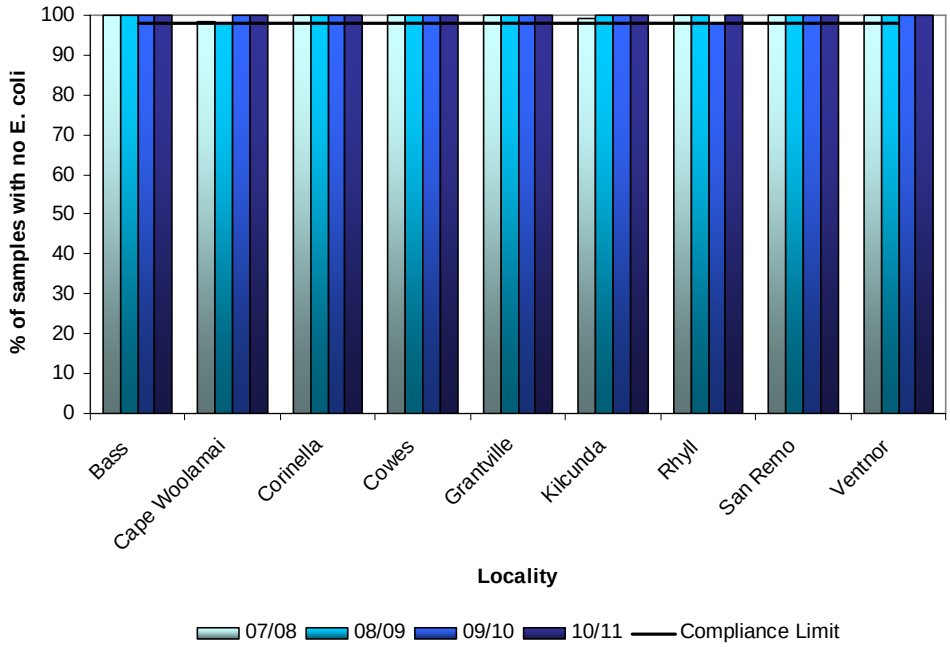


Figure 4-1 Percentage of samples with no E. coli from July 2007 to June 2011

Results for the 2010-11 period show that all test results were above the compliance limit, and that this has been the case since 2007-08.

4.1.2 Monochloroacetic Acid

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

4.1.3 Dichloroacetic Acid

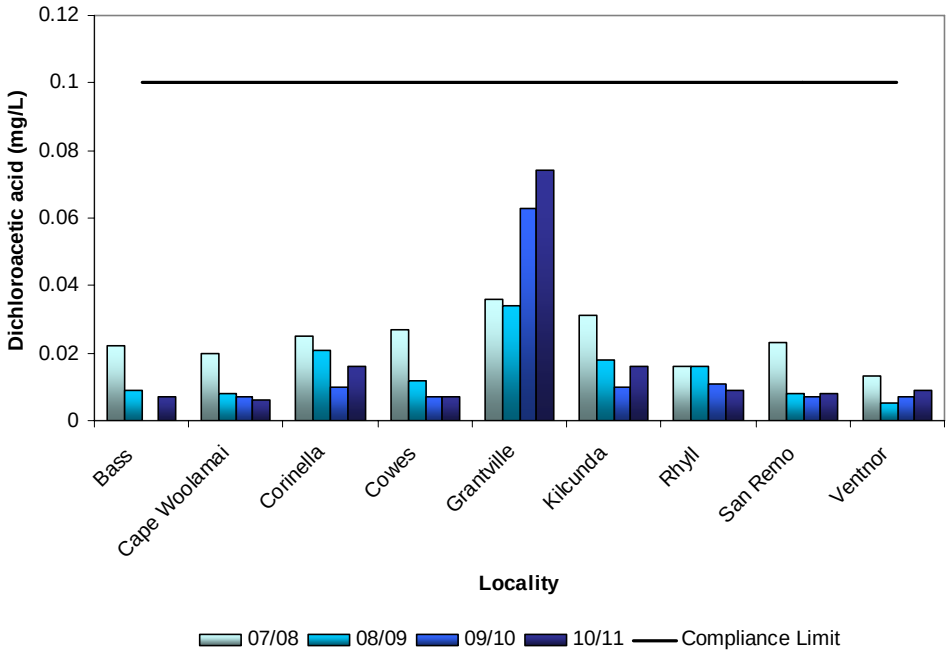


Figure 4-2 Maximum dichloroacetic acid concentration from July 2007 to June 2010

4.1.4 Trichloroacetic Acid

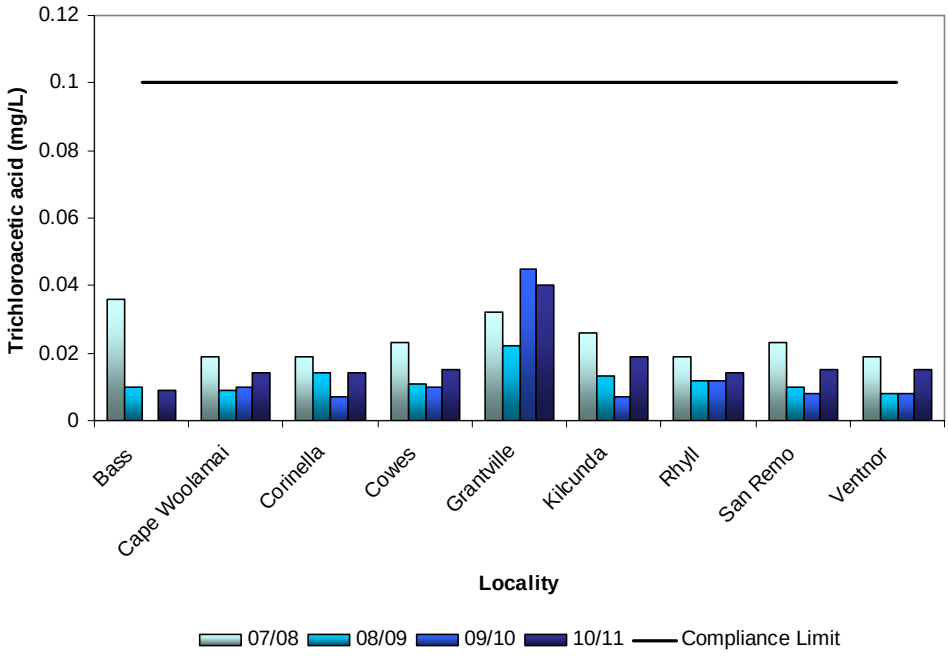


Figure 4-3 Maximum trichloroacetic acid concentration from July 2007 to June 2011

4.1.5 Trihalomethanes

The water quality standard of 0.25 mg/L for total THMs was exceeded at one location during 2010/11 (Cowes in April 2011 - see Figure 4-4). Action to resolve this THM exceedance is discussed in Section 5 of this report.

A THM reduction strategy, involving regular air scouring and flushing of the reticulation system and powder activated carbon dosing at the IBWPP delivers improved performance of the system and reduced THM levels. Powdered activated carbon dosing at the IBWPP is maintained all year round at approximately 1 ppm. This dose rate varies depending on the raw water quality.

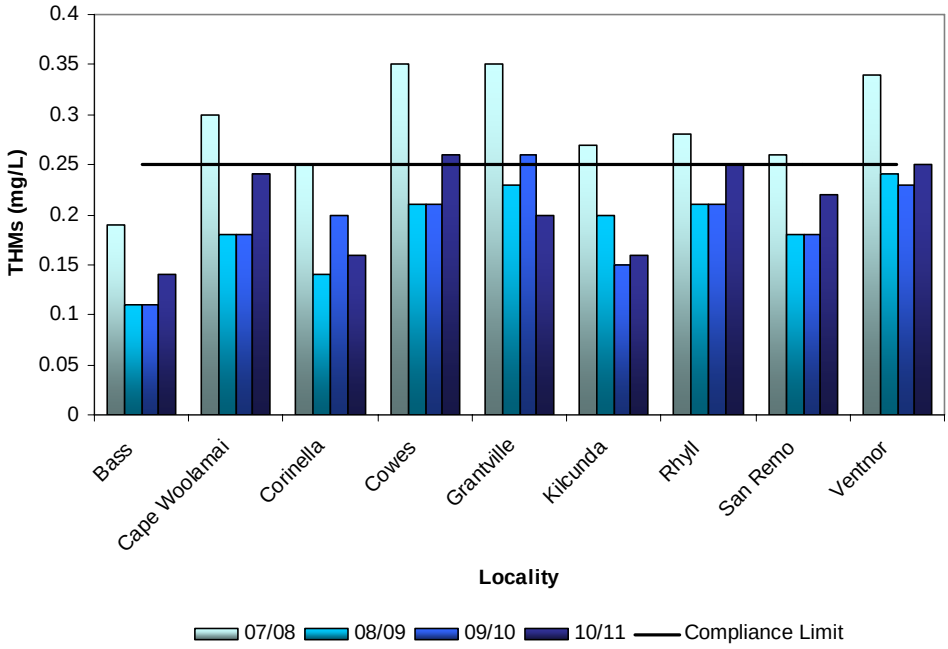


Figure 4-4 Maximum THM concentration from July 2007 to June 2011

4.1.6 Aluminium

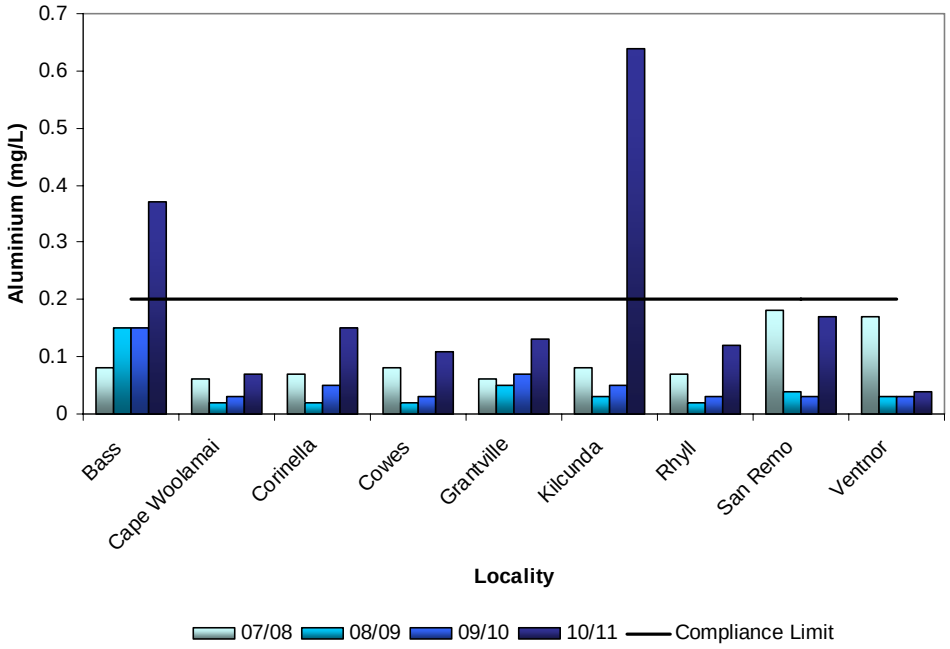


Figure 4-5 Maximum aluminium concentration from July 2007 to June 2011

4.1.7 Turbidity

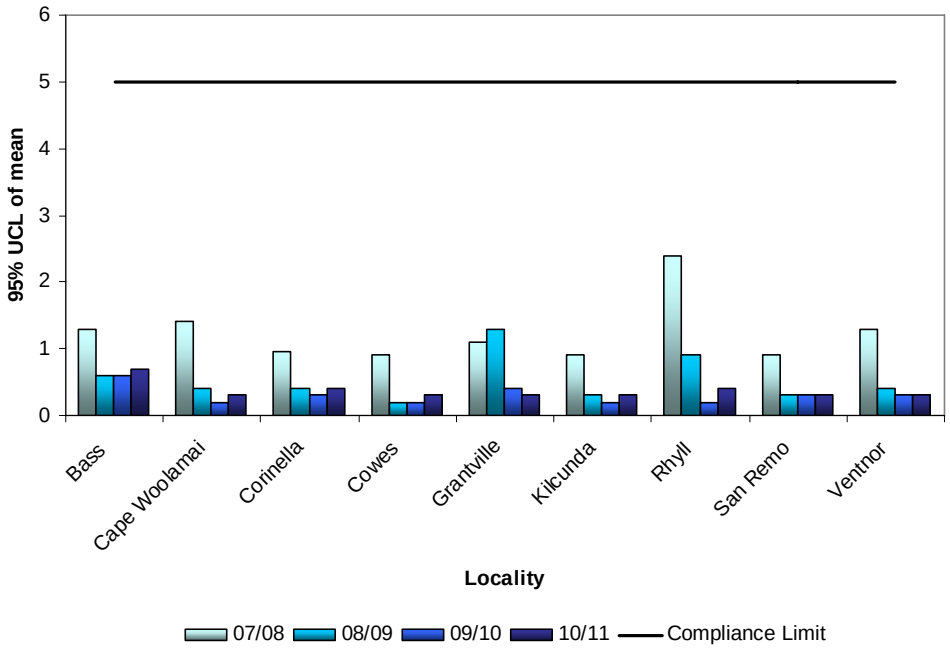


Figure 4-6 Turbidity 95% UCL (upper confidence limit) of mean - July 2007 to June 2011

The turbidity graph does not show the one exceedance during the 2010/11 reporting period, as it plots the 95% upper control limit of the mean.

4.1.8 Overall

Over the years, Westernport Water has achieved a high level of compliance with respect to all Schedule 2 parameters (see Figure 4-7 and Figure 4-8) except for THMs at one locality and aluminium at 2 localities. Regarding the THM graphic shown in Figure 4-8 – even though there was only one THM non-compliance for 2010/11, it was located in Cowes, which accounts for 29% of Westernport Water's customers. As such, 71% of customers received compliant water for THM for 2010/11.

A THM reduction strategy was developed in 2008/09 and this strategy has continued to reduce the natural organic matter levels in the treated water. Except for one THM exceedance this reporting period, generally the THM reduction strategy has proven to be successful in reducing levels of THMs, compared to previous years.

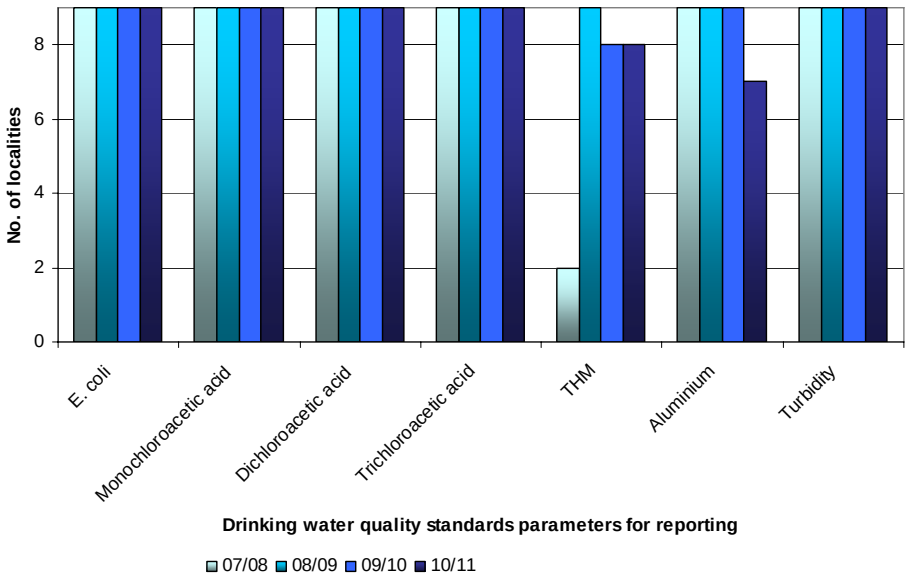


Figure 4-7 Number of localities (out of 9) that were compliant with the parameters in Schedule 2 of the Drinking Water Regulation

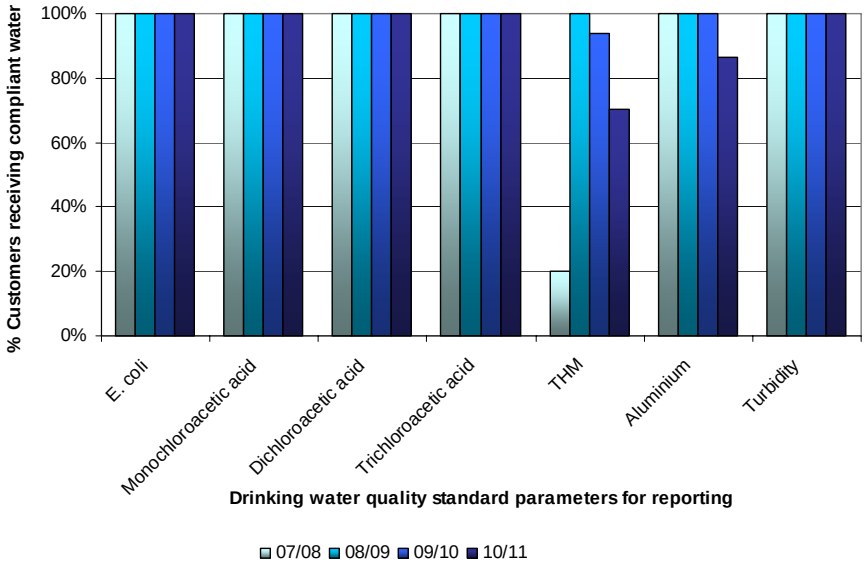


Figure 4-8 Percentage of customers supplied with drinking water that was compliant with the standard[1]

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

4.2 Other Parameters

4.2.1 Free Chlorine

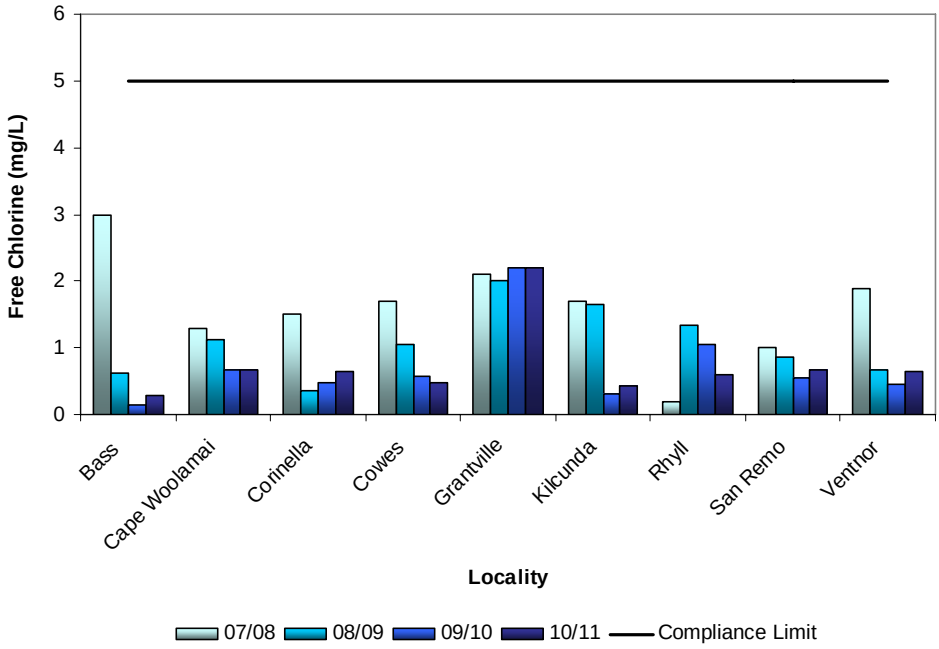


Figure 4-9 Maximum free chlorine concentration from July 2007 to June 2011

4.2.2 pH

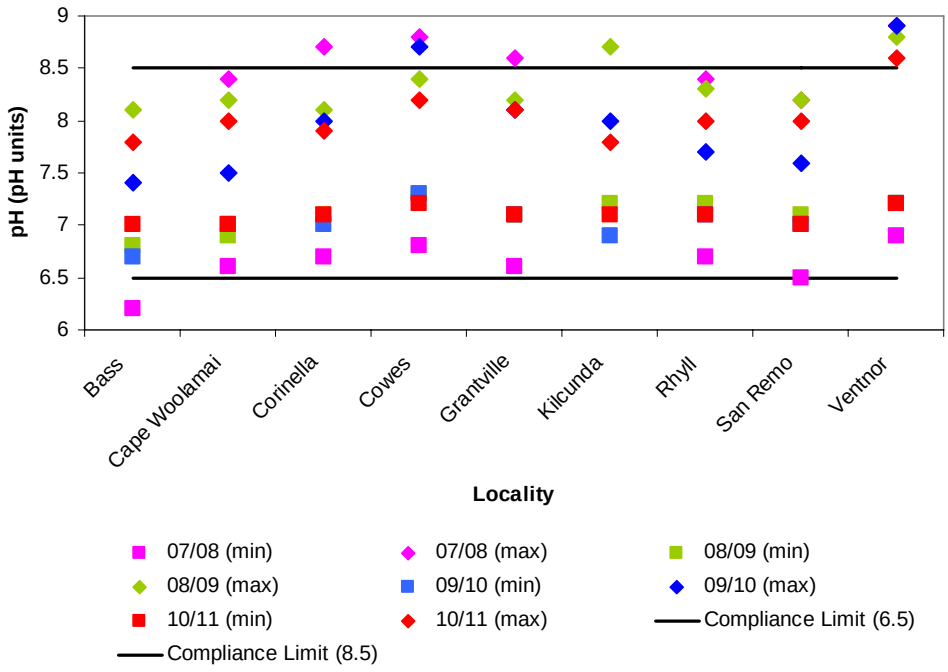


Figure 4-10 pH from July 2007 to June 2011

Results for trends in pH over the last four years are summarised below:

- 2007/08 – Results were outside the ADWG guideline values in 6 locations. The problem areas were flushed as a result of non-compliance and no further action was required, following satisfactory re-testing;
- 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.

4.2.3 THM Components

The number of non-compliances in THM components (see Figure 4-11 to Figure 4-14) – (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 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); and
- relocation of secondary disinfection sites within the reticulation system.

In addition, two chloramination trials at Kilcunda and Corinella were successfully implemented. 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 will be implemented by the end of 2011.

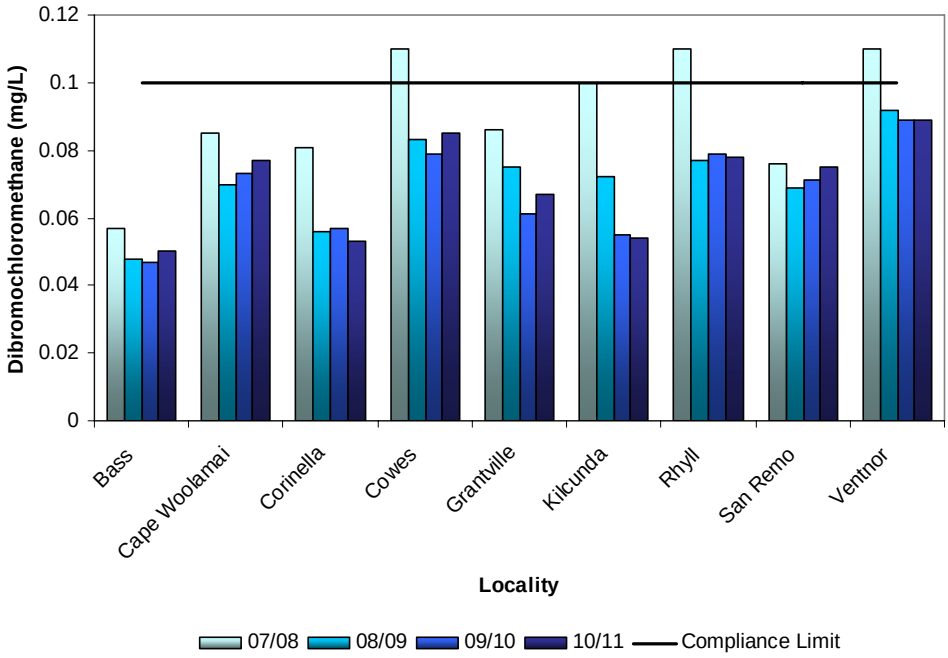


Figure 4-11 Maximum dibromochloromethane concentration from July 2007 to June 2011

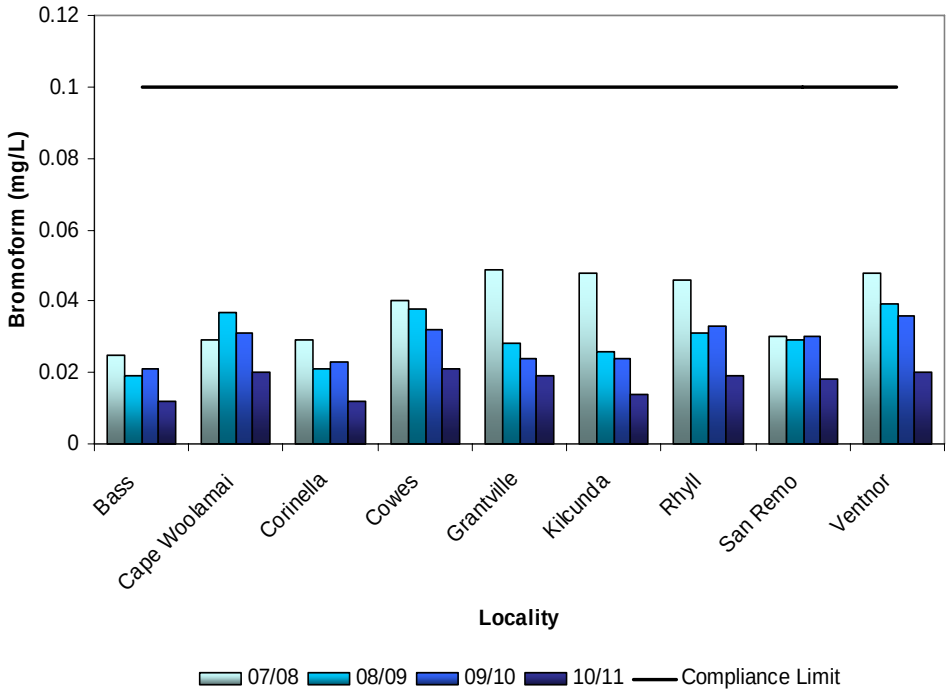


Figure 4-12 Maximum bromoform concentration from July 2007 to June 2011

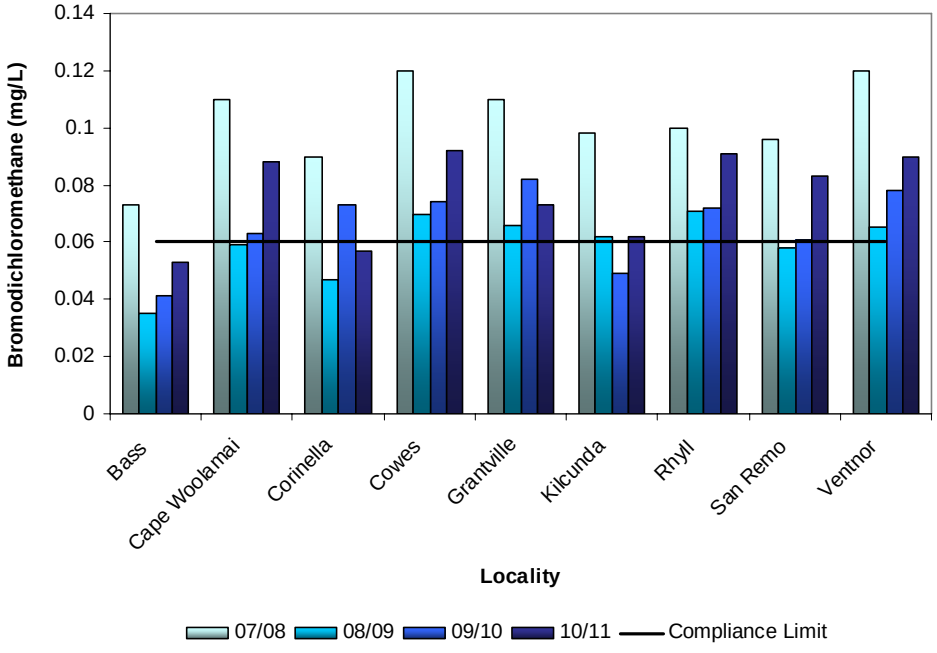


Figure 4-13 Maximum bromodichloromethane concentration from July 2007 to June 2011

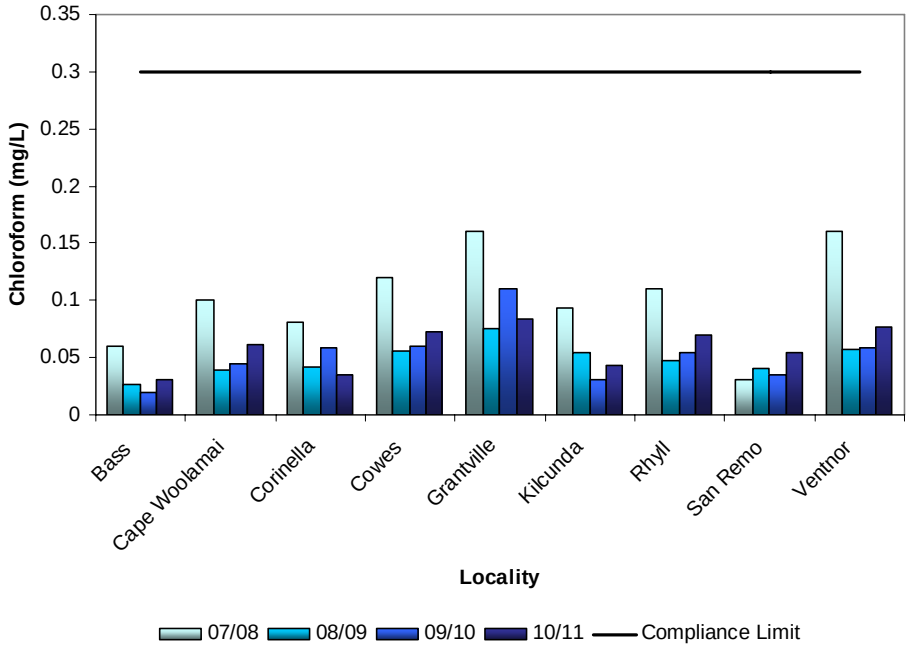


Figure 4-14 Maximum chloroform concentration from July 2007 to June 2011

4.2.4 Metals

For 2010/11, all metal concentrations complied with ADWG guideline values (see Figure 4-15 to Figure 4-20).

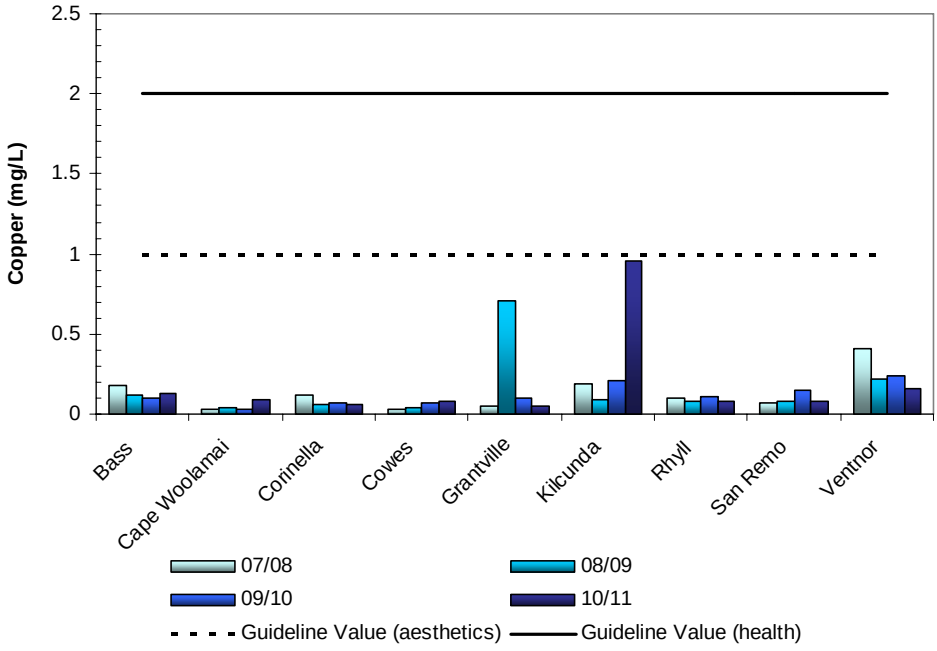


Figure 4-15 Maximum copper concentration from July 2007 to June 2011

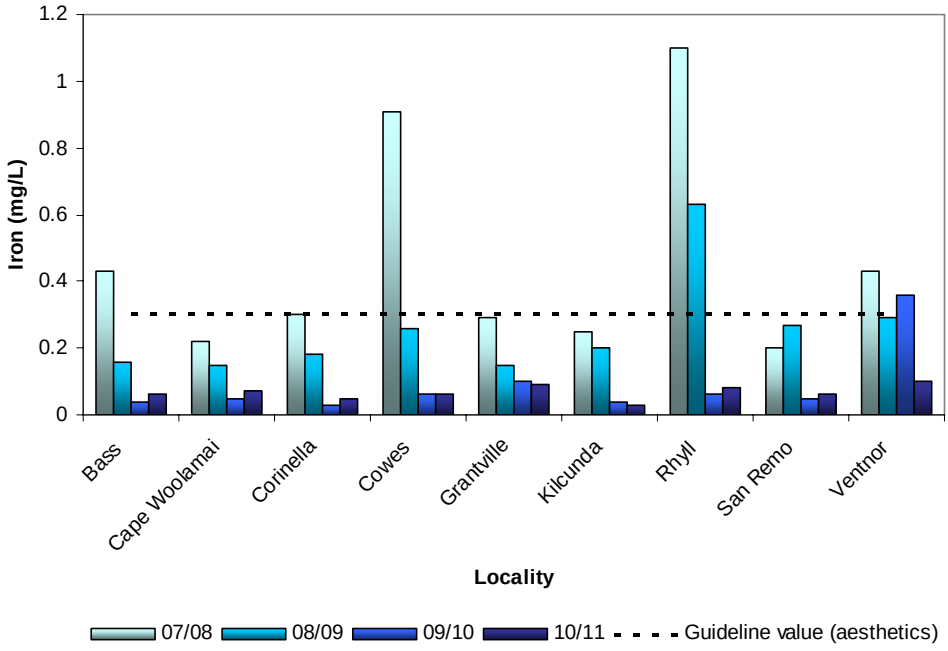


Figure 4-16 Maximum iron concentration from July 2007 to June 2011

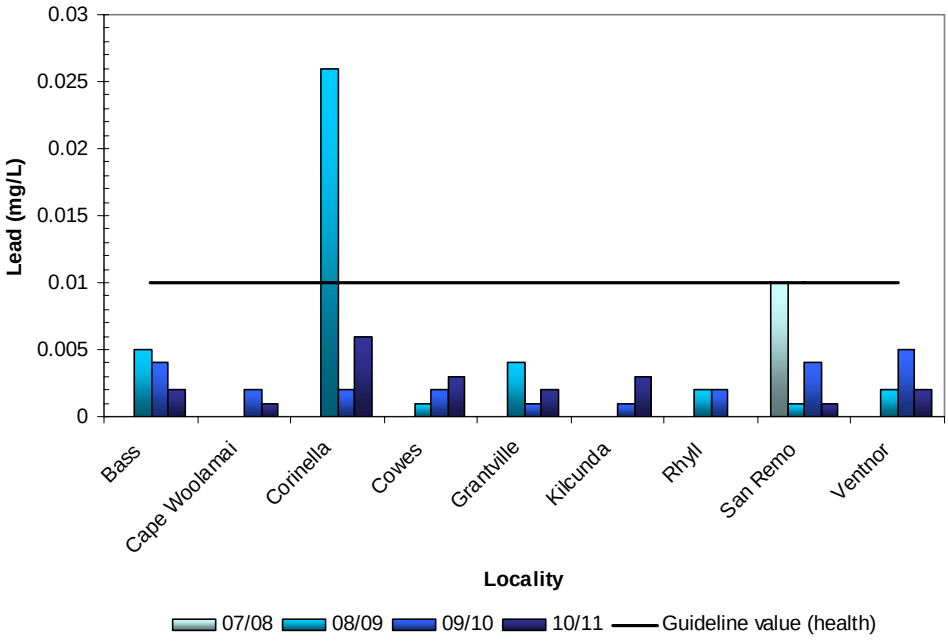


Figure 4-17 Maximum lead concentration from July 2007 to June 2011

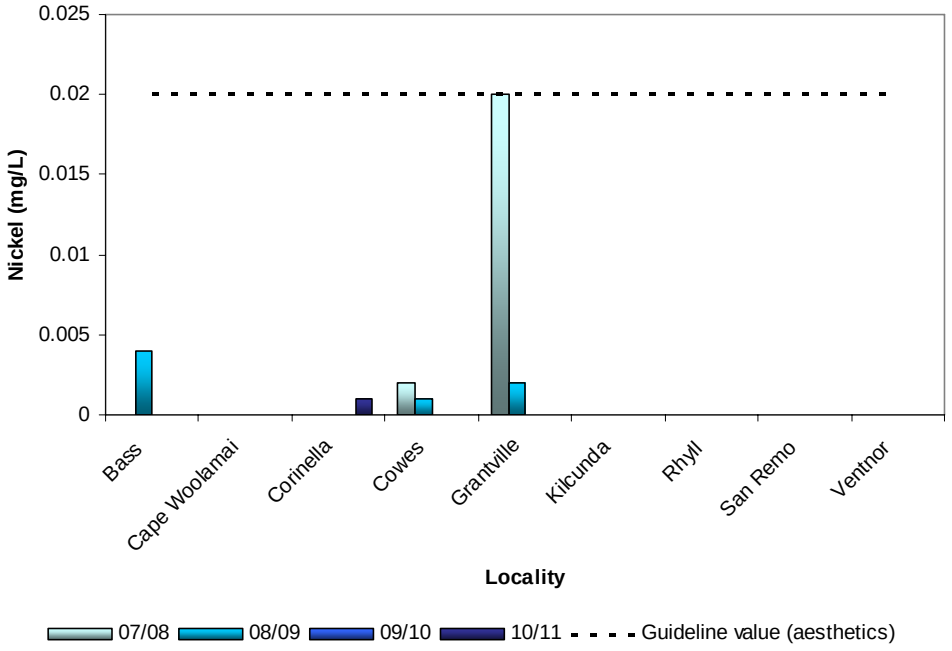


Figure 4-18 Maximum nickel concentration from July 2007 to June 2011

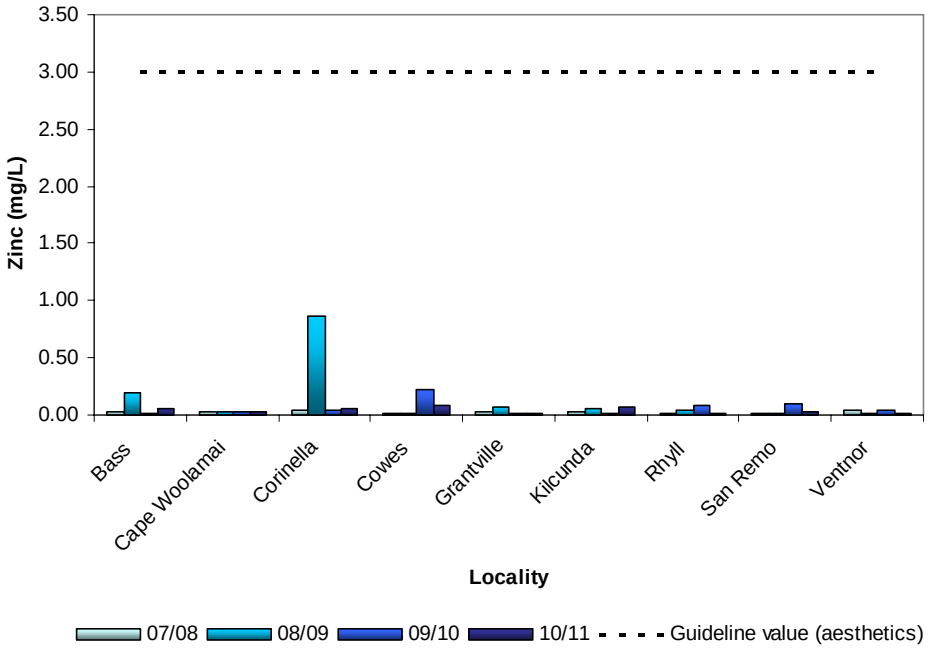


Figure 4-19 Maximum zinc concentration from July 2007 to June 2011

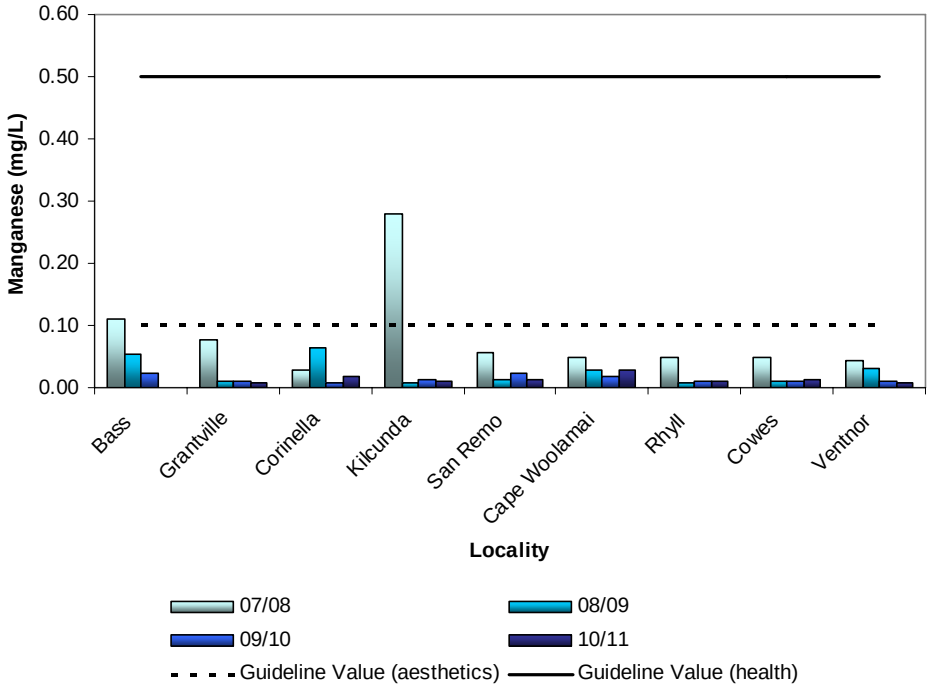


Figure 4-20 Maximum manganese concentration from July 2007 to June 2011

5 Emergency and Incident Management

The management of reportable incidents that occurred during 2010/11 (including water quality incidents at customer taps and Candowie Reservoir) are presented below in Section 5.1.

5.1 Reportable Events under Section 22

A sample taken on 23 November 2010 from Edward Court, Woolamai had a turbidity reading of 5.5 NTU and DH was notified under section 22 of the Safe Drinking Water Act. This event however, was determined by DH not to constitute a section 22 notification, and the water was not considered unsafe to drink.

Follow-up actions include an *in situ* turbidity reading taken on 27 November 2010 recorded at 0.30 NTU. The pipe network in the vicinity of Edward Court was flushed for 10-15 minutes. Another turbidity reading was taken with a result of 0.21 NTU. The site was resampled on 30 November 2010 and the result showed 0.1 NTU.

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

A sample taken on 13 July 2010 from 2 Ventnor Beach Road, Ventnor had a pH reading of 8.9, which was 0.4 about the limit of 8.5. The sample location was flushed and resampled. The resample results were 7.4.

A sample taken on 15 March 2011 from 1 Peppermint Road, Kilcunda had an aluminium reading of 0.41 mg/L. This incident was reported to the Department of Health under Section 18 of the Act. This exceedance occurred due to the cleaning of the supply main. The sample location was flushed and resampled on 22 March 2011 with a result of 0.11 mg/L.

A sample taken on 12 April 2011 from 12 Teddy Bear Lane, Cowes had a THM reading of 0.26 mg/L, which was 0.01 mg/L about the limit of 0.25 mg/L. This incident was reported to the Department of Health under Section 18 of the Act. The sample location was flushed and resampled on 27 April 2011. The resample result was 0.21 mg/L.

5.1.1.1 Reportable events under Section 18

A water sample taken on 18 January 2011 from 1 Peppermint Road, Kilcunda had an aluminium reading of 0.64 mg/L, which was 0.44 mg/L about the limit of 0.2 mg/L. Another aluminium exceedance of 0.37 mg/L was noted on the same day at Lot 7, Edward Court, Woolamai. These incidents were reported to the Department of Health under **Section 18 of the Act**. The aluminium exceedances were due to the works being undertaken on the supply main, which involved replacing the valves. These works allowed for the main to be cleaned and there was a build up of alum, iron and manganese sludge on the inside of the pipe.

5.2 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 coped with the increase in water levels in Candowie.

6 Complaints relating to water quality

6.1 Summary of Complaints

The number of potable water quality complaints reported to Westernport Water during the 2010/11 annual reporting period decreased from last reporting period. A summary of the complaints in 2010/11 and 2009/10 can be found in Table 6-1.

Table 6-1: Table of complaints

	Total No. of complaints in 2010/11	Rate per 100 customers* in 2010/11	Total No. of complaints in 2009/10	Rate per 100 customers* in 2009/10
Discoloured Water	13	0.09	17	0.12
Taste and Odour	8	0.06	19	0.13
Blue Water	0	0.00	0	0.00
Illness	0	0.00	0	0.00
Other	4	0.03	11	0.08
Total	25	0.18	47	0.33

* 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 were in the category of Discoloured Water totalling 13. In general, complaints were resolved through call-backs to the customer, site visits to discuss issues and maintenance (i.e. mains flushing). The Corporation believes that works undertaken during 2010/11 improved water quality and reduced the number of complaints compared to 2009/10.

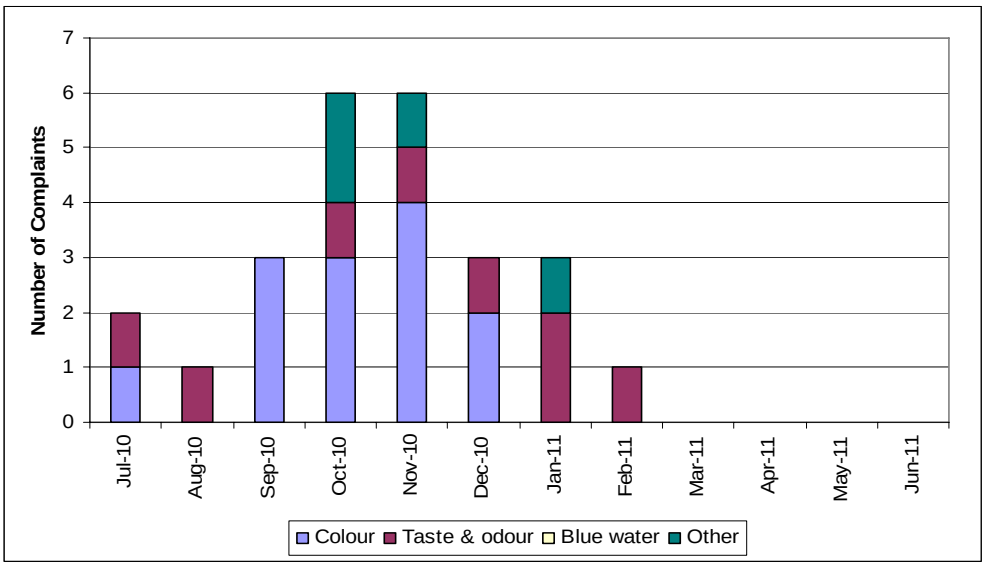


Figure 6-1 Customer complaints for 2010/11 reporting period

Customer complaints, as shown in Figure 6-1, increased during October and November, (in particular dirty water complaints) due elevated iron and manganese caused by swabbing (and associated works) being undertaken on the supply main. Complaints reduced upon completion of these works.

6.2 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 complaints form called the MERIT Request Form. Depending on the nature of the complaint, the details are electronically forwarded to the Assets and Operations group 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 compliant 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.

7 Risk Management Plan Audit Outcomes

A regulatory audit was not carried out during this 2010/11 reporting period. However, Pitcher Partners Consulting was engaged to conduct an internal audit of Westernport Water's Water Quality processes that provide safe and reliable water resources to its customers and measure key performance indicators to ensure Regulatory Compliance. The audit was performed in May 2011 covering the period from 1 January 2010 to 1 May 2011.

Several opportunities for improvement were identified:

Process Documentation

- Major review of the Water Quality Risk Management Plan needs to occur prior to the regulatory water quality audit scheduled for October 2011.
- Ensure required standard operating procedures and corrective actions are in place, that they represent current practices and are easily accessible.

Water Quality Monitoring

- Increased assessment of water quality trends to drive proactive process management
- Implementation of sample tracking and quality control measures relating to verification monitoring to ensure results are received and accurate.
- Improved equipment calibration management via maintaining calibration logs and assessing whether data captured needs to be adjusted for equipment drift.
- Periodic testing of the operation of automated SCADA controls.

Roles and Responsibilities

- Update the Water Quality roles and responsibilities to align with current team structure. Ensure back-up roles have been established and that back-up staff are and continue to be appropriately trained.

Risk Management Practices

- The risk management process and water quality risk register updated to include:
  - Improved definitions regarding the risk and control assessment process
  - Clearer assignment of future mitigation actions and treatment plans.

8 Undertakings under section 30 of the Act

There were no undertakings that Westernport Water had with the Department of Health under section 30 that are required to be reported for the 2010/11 reporting period.

9 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
We are pleased to help you – call us on 1300 720 711

Email: westport@westernportwater.com.au

Fax: (03) 5956 4101

Newhaven Office
Our office is open Monday to Friday 8:30am to 5:00pm
Call us on (03) 5956 4100 or,
Visit us at 2 Boys Home Road, Newhaven 3925

10 References

NHMRC/NRMMC, 2004. 'National Water Quality Management Strategy: Australian Drinking Water Guidelines'. National Health and Medical Research Council / National Resource Management Ministerial Council, Australia.

Parliament of Victoria, 2003. 'Safe Drinking Water Act 2003 (Victoria)', Act No. 46/2003, The Parliament of Victoria, Australia

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