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ANNUAL DRINKING WATER QUALITY
REPORT 2008/09

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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 (DOH) with an annual report on the quality of drinking water supplied to its customers.

1.3 Westernport Water Supply

Westernport Water has a single water supply storage – Candowie Reservoir - an on-stream storage on Tenant Ck 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 district. 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 largely complies with the *Australian Drinking Water Quality Guidelines* (NHMRC, 2004).

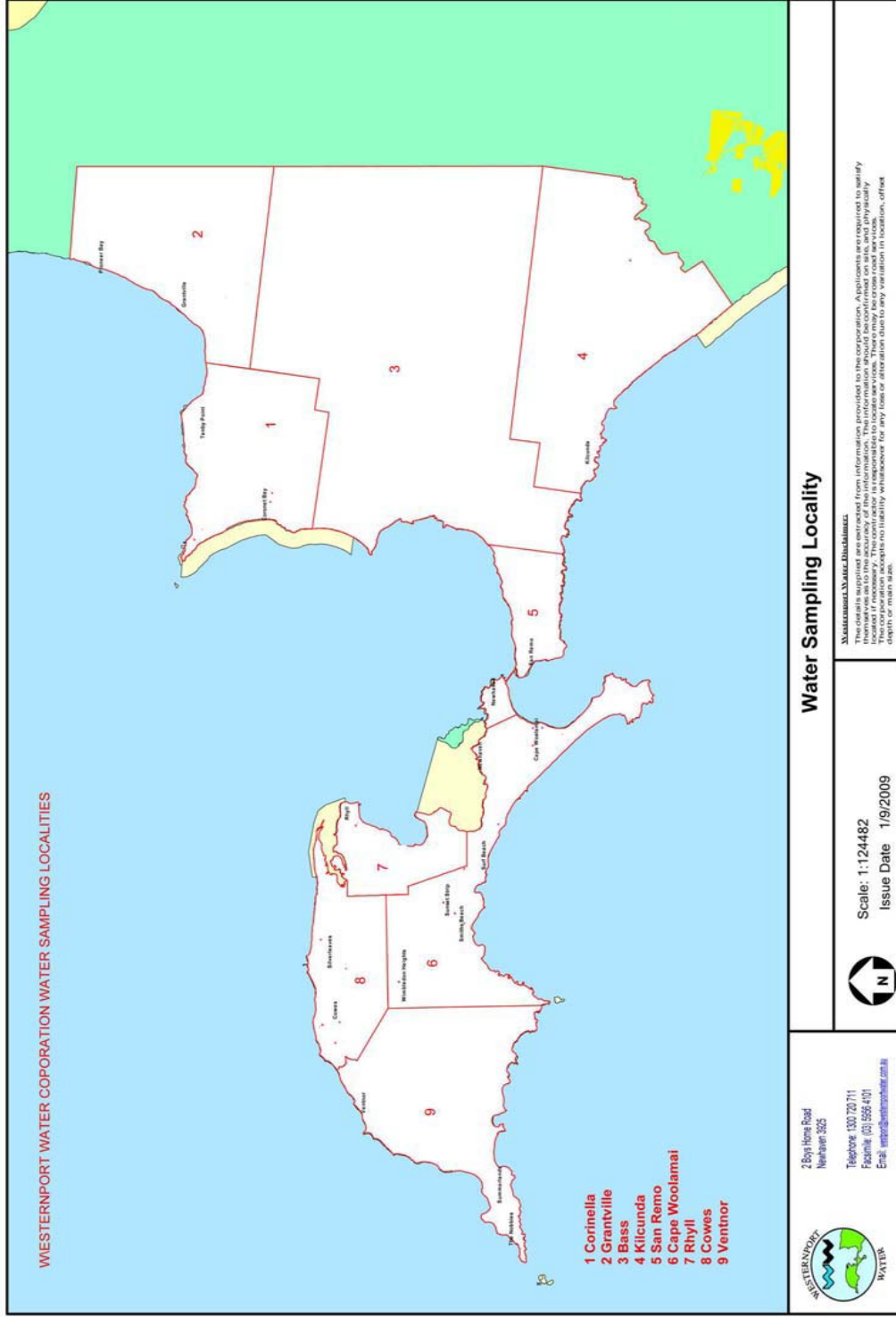


Figure 1-1 Westernport Water Service Area

1.4 Other Water Sources

Low rainfall in recent years has led to reduced water yield from the Tennant Creek catchment flowing into Candowie Reservoir. As such, other sources of water have been utilised to supplement the supply. Water from these alternative sources is pumped to Candowie Reservoir for centralised storage and treatment at the IBWPP. These alternative sources include bores, the Bass River and Lance Creek reservoir.

1.4.1 Bores

A number of groundwater bores are available to Westernport Water located throughout the Corinella Aquifer. Pumping of bores to augment water supply was undertaken from 25 February 2009 to 24 April 2009. The bore depth and application of the bores are listed in Table 1-1. A total of 133.45 ML of water was pumped from the Corinella bores (84.82 ML from the KRDB1 and 48.63 ML from the CMSB1) to the Candowie Reservoir via the Corinella and Grantville Pipeline. All other production bores were not in use during 08/09.

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 the 2nd July, 2008 and ceased on 4th August, 2008. During this period, 299 ML was pumped into the Candowie Reservoir.

1.4.3 Lance Creek Reservoir

Westernport Water is able to share the resources from the Lance Creek Reservoir located within the neighbouring Powlett River catchment. This reservoir is South Gippsland Water's asset. However, this resource was not utilised during the 08/09 reporting period.

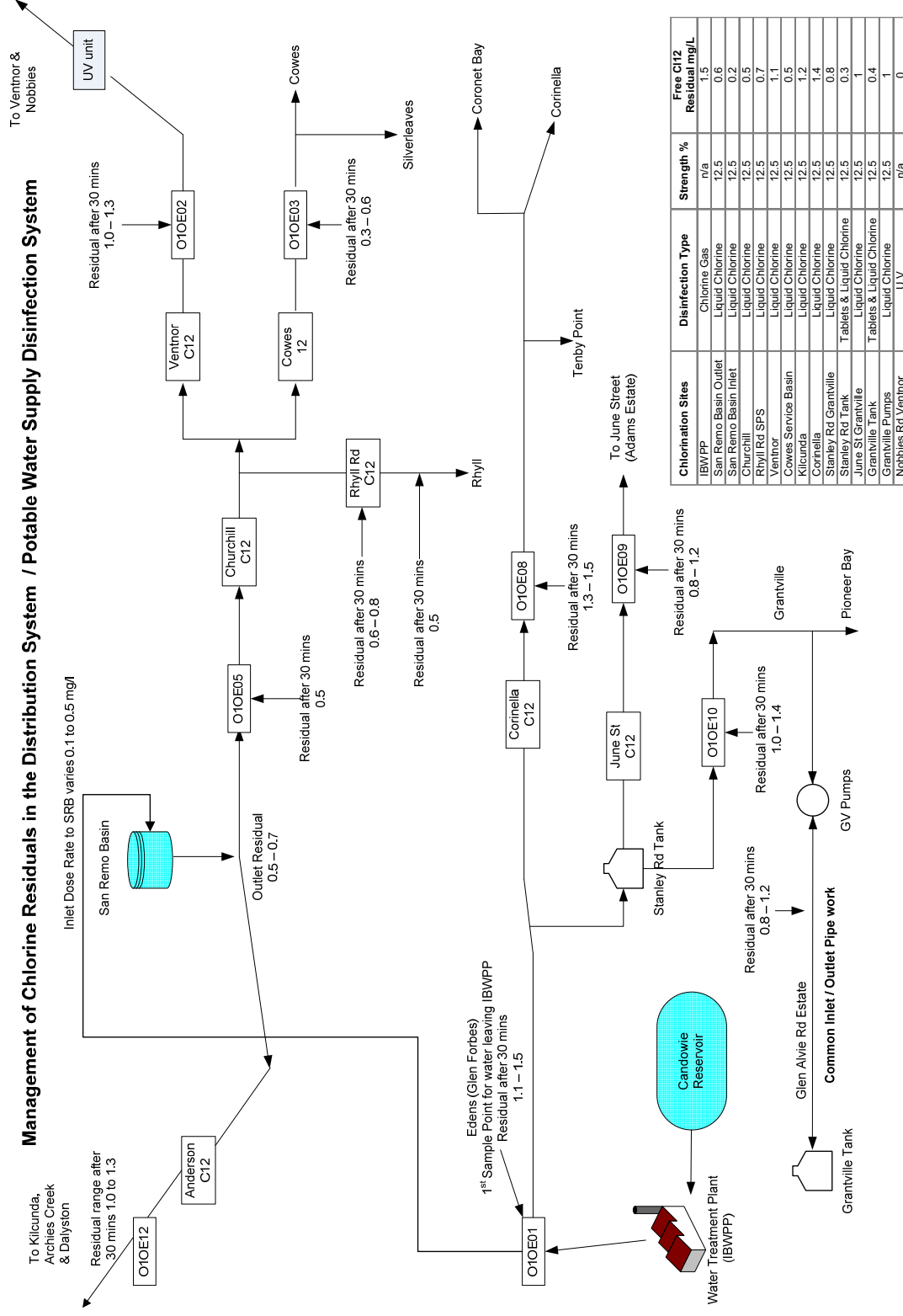


Figure 1-2 Potable Water Supply Disinfection & Distribution System Schematic

2 Quality Management System

Westernport Water operates a comprehensive water quality management system that complies with the *Safe Drinking Water Act*. 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, 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

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
	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
	Ultra Violet Disinfection	nil	The UV system services a distinct water supply area on Phillip Island

Disinfection of the 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 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. It was intended to address the taste and odour issues that are sometimes associated with chlorination throughout the reticulation 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. The following are the significant changes and upgrades that have occurred during the 08/09 period:

- The filters at the IBWPP have been upgraded – gulleys cleaned, new filter nozzles installed, filter cells cleaned and painted, filter media removed and replaced with new filter coal and filter media;
- The existing filters have been enclosed to optimize float removal and protect equipment;
- Upgrade of the SCADA control of the IBWPP, chemical dosing, and remote access via the lap top is continuing;
- The potassium permanganate dosing system building has been constructed; dosing system itself will be completed in the 09/10 financial year;
- A new compressor was fitted to the WEARS de-stratification unit at the Candowie Reservoir as the original unit was failing in hot weather; and
- Automatic back-wash capability installed at the Bass River pumps; this was previously done manually.

2.2 Issues

2.2.1 Algae in Candowie Reservoir

Candowie Reservoir occasionally experiences high algal counts and a range of species, therefore, physicochemical and biological conditions of the storage are monitored regularly. This assists Westernport Water to detect and control any potential algal blooms that may lessen the quality of the raw water.

Constant oxygenation of the bottom waters limited the development of conditions favourable to algal growth. During the 08/09 financial year, the WEARS unit was the main aerator used for reservoir de-stratification, with the bubble aerator being used when required. Nevertheless, blooms of taste and odour causing *Ceratium*, a large dinoflagellate, were detected throughout the reporting period. The behaviour of this *Ceratium* bloom was totally unpredictable even though the nitrogen phosphorus ratio was not ideal for its growth. However, the *Ceratium* bloom may have helped suppress *Anabaena* growth over the summer period.

A significant increase in potentially toxic blue-green *Anabaena circinalis* occurred in April and the reservoir was treated with Cupricide on the 5th of May, 2009. Sampling on the 13th of May,

2009 showed that the treatment was successful. It was also effective in decreasing the amount of *Ceratium* in the water.

A smaller number of taste and odour complaints were made by customers during the 08/09 reporting period compared to previous years and suggests that the algal growth within the reservoir did not cause many issues and that the treatment process was adequate.

2.2.2 Water Security

Similar to 07/08, a steady decline in water level over the year in Candowie Reservoir can be seen in Figure 2-1.

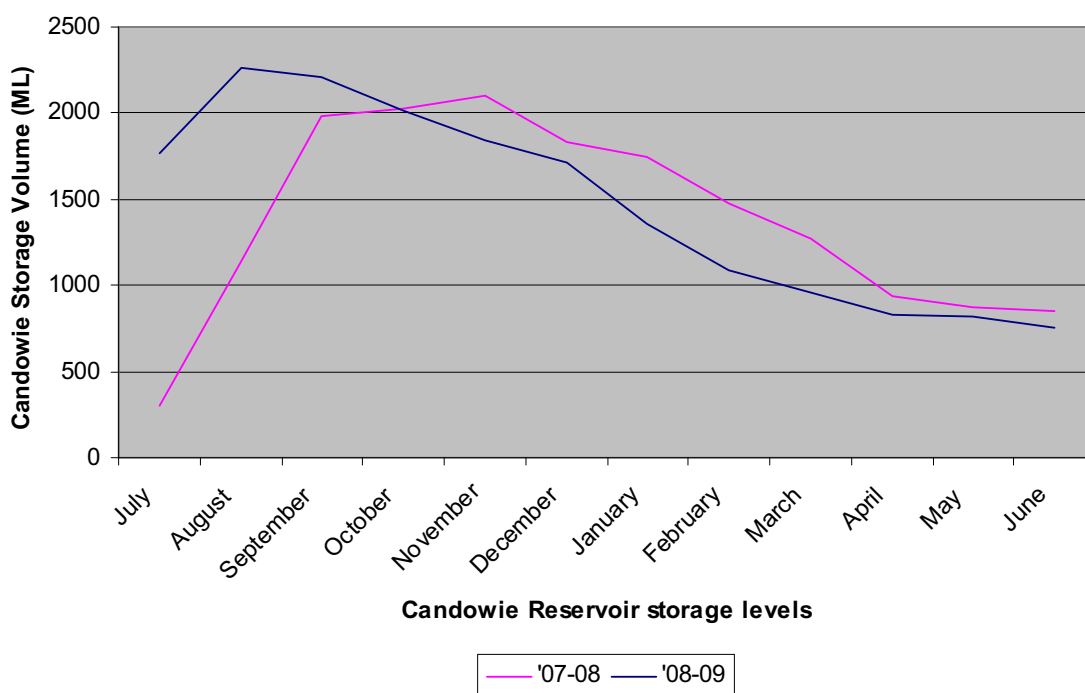


Figure 2-1 Candowie Reservoir storage volumes (1/7/2007 to 30/6/2009)

During the 07/08 monitoring period, Candowie Reservoir was resurveyed and found that the measured capacity of 2,264 ML was higher than previously surveyed, 2,207 ML.

Westernport Water recognises that the yield from Candowie Reservoir is a significant business risk in supplying customers with acceptable water quality and quantity, given on-going growth in the region and recent trends in rainfall reduction.

Westernport Water has budgeted for a major augmentation project within its 2008 – 2013 Water Plan. The option being considered is:

- Raise Candowie's dam wall – will increase the full supply level by up to 3 m and increase the stored volume to 4,497 ML resulting in an estimated reliable annual yield of 3,654 ML.

This project has 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 will impose minimal additional operational costs. There

may be opportunities to source water from the Wonthaggi Desalination plant, when it becomes operational in the future.

3 Water Quality for 2008/09

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 have been in force for the 2008/09 reporting period. Results for each locality are benchmarked against the standards provided in Table 3-1, which are based on the ADWG.

Table 3-1 Water quality reporting standards

Parameter	Benchmark Standard
<i>Safe Drinking Water Regulations 2005: Schedule 2</i>	
<i>Escherichia 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	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 0.02mg/L
Formaldehyde	Must not exceed 0.5mg/L
<i>Australian Drinking Water Guidelines</i>	
Antimony	Must not exceed 0.003 mg/L
Cadmium	Must not exceed 0.002 mg/L
Copper	Must not exceed 1 mg/L (Aesthetic guideline value, health guideline 2 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)

The ozone-based disinfection by-products (bromate and formaldehyde) were not monitored in 2008/09 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 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 Jan 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* and ADWG 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 and ADWG (see Table 3-2).

Table 3-2 E. coli (orgs/100mL)

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	53	0	0	100	Yes
Cape Woolamai	weekly	53	0 ¹	0	100	Yes
Corinella	weekly	53	0	0	100	Yes
Cowes	weekly	59	0	0	100	Yes
Grantville	weekly	53	0	0	100	Yes
Kilcunda	twice weekly*	106	0	0	100	Yes
Rhyll	weekly	53	0	0	100	Yes
San Remo	weekly	53	0	0	100	Yes
Ventnor	weekly	54	0	0	100	Yes

Note: the number of samples collected exceeded the requirement as additional *E. coli* sampling was performed at Cowes and Ventnor over the summer period in response to increases in population.

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

¹ See section 5 for details – One sample contained *E. coli* however the water was subsequently found not to be supplied from Westernport Water.

3.2 Chlorine Based 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 (mg/L)

Water Sampling Locality	Frequency of Sampling	No. of samples	Non-complying samples	Max Result (mg/L)	Complying (Yes/No)
Bass	weekly	53	0	0.61	Yes
Cape Woolamai	weekly	53	0	1.12	Yes
Corinella	weekly	53	0	1.14	Yes
Cowes	weekly	59	0	1.04	Yes
Grantville	weekly	53	0	2.00	Yes
Kilcunda	twice weekly*	106	0	1.65	Yes
Rhyll	weekly	53	0	1.34	Yes
San Remo	weekly	53	0	0.86	Yes
Ventnor	weekly	57	0	0.67	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor 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 (mg/L)

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	13	0	<0.005	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor 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 (mg/L)

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	0.008	Yes
Corinella	monthly	12	0	0.021	Yes
Cowes	monthly	14	0	0.012	Yes
Grantville	monthly	12	0	0.034	Yes
Kilcunda	twice monthly*	24	0	0.018	Yes
Rhyll	monthly	12	0	0.016	Yes
San Remo	monthly	12	0	0.008	Yes
Ventnor	monthly	13	0	0.005	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor 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 (mg/L)

Water Sampling Locality	Frequency of Sampling	No. of Samples	No. of Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.010	Yes
Cape Woolamai	monthly	12	0	0.009	Yes
Corinella	monthly	12	0	0.014	Yes
Cowes	monthly	14	0	0.011	Yes
Grantville	monthly	12	0	0.022	Yes
Kilcunda	twice monthly*	24	0	0.013	Yes
Rhyll	monthly	12	0	0.012	Yes
San Remo	monthly	12	0	0.010	Yes
Ventnor	monthly	13	0	0.008	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor 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 08/09 reporting period. Compared to the levels in 07/08, the chlorination by-products concentrations in 08/09 is significantly lower.

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* and ADWG stipulate a maximum value for this group of chemicals of 0.25 mg/L (Total THMs) in potable water. The water quality, with respect to THMs, was compliant at all localities.

Table 3-7 Total THMs (mg/L)

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.114	Yes
Cape Woolamai	monthly	12	0	0.178	Yes
Corinella	monthly	12	0	0.144	Yes
Cowes	monthly	14	0	0.210	Yes
Grantville	monthly	12	0	0.228	Yes
Kilcunda	twice monthly*	24	0	0.186	Yes
Rhyll	monthly	12	0	0.212	Yes
San Remo	monthly	12	0	0.177	Yes
Ventnor	monthly	13	0	0.235	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

3.3.2 Dibromochloromethane

Dibromochloromethane is one 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 Organisation (WHO, 2004) 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 (mg/L)

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.048	Yes
Cape Woolamai	monthly	12	0	0.070	Yes
Corinella	monthly	12	0	0.056	Yes
Cowes	monthly	14	0	0.083	Yes
Grantville	monthly	12	0	0.075	Yes
Kilcunda	twice monthly*	24	0	0.072	Yes
Rhyll	monthly	12	0	0.077	Yes
San Remo	monthly	12	0	0.069	Yes
Ventnor	monthly	13	0	0.092	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor 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 another 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 (mg/L)

Water Sampling Locality	Frequency of Sampling	No. of Samples	No. of Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.019	Yes
Cape Woolamai	monthly	12	0	0.037	Yes
Corinella	monthly	12	0	0.021	Yes
Cowes	monthly	14	0	0.038	Yes
Grantville	monthly	12	0	0.028	Yes
Kilcunda	twice monthly*	24	0	0.026	Yes
Rhyll	monthly	12	0	0.031	Yes
San Remo	monthly	12	0	0.029	Yes
Ventnor	monthly	13	0	0.039	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor 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 limit of 0.06 mg/L. The water quality with respect to bromodichloromethane showed that five locations exceeded the WHO guideline limit in a few instances (see Table 3-10).

Table 3-10 Bromodichloromethane (mg/L)

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.035	Yes
Cape Woolamai	monthly	12	0	0.059	Yes
Corinella	monthly	12	0	0.047	Yes
Cowes	monthly	14	3	0.070	No
Grantville	monthly	12	2	0.066	No
Kilcunda	twice monthly*	24	1	0.062	No
Rhyll	monthly	12	2	0.071	No
San Remo	monthly	12	0	0.058	Yes
Ventnor	monthly	13	1	0.065	No

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

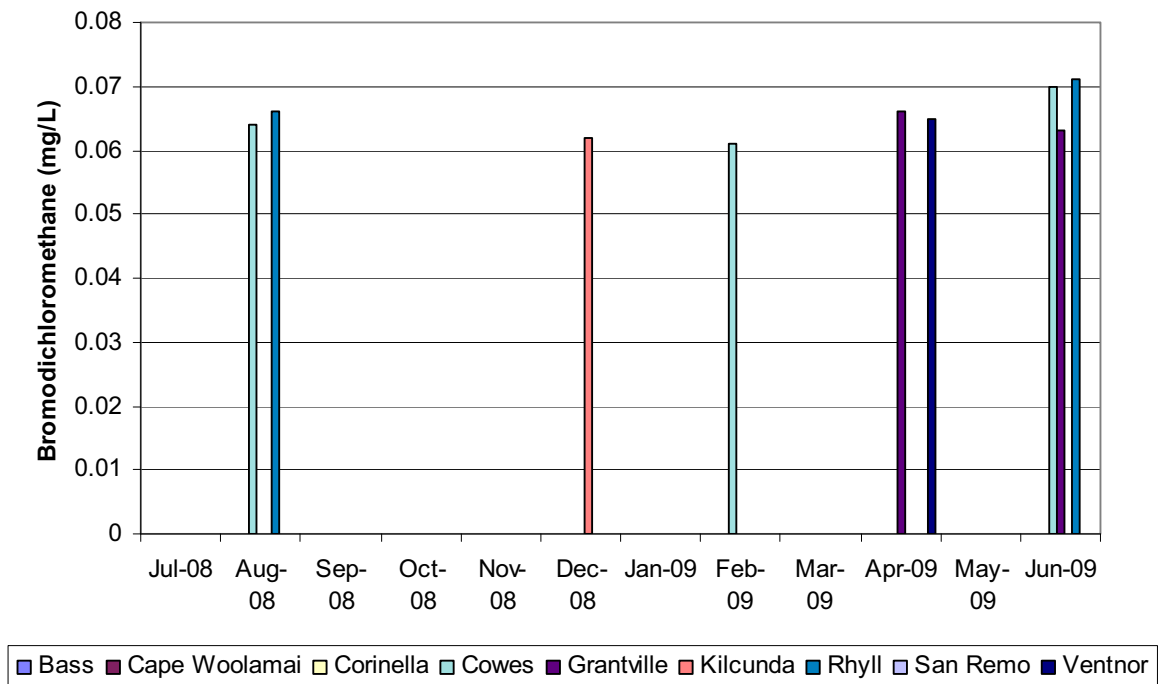


Figure 3-1 Non-conforming maximum bromodichloromethane results for the period July 08 to June 09

3.3.4.1 Actions in Relation to Guideline Non-compliance

Although Westernport Water exceeded the WHO guideline value of 0.06 mg/L for bromodichloromethane in five water sampling localities, no actions were taken as the total THM did not exceed *Safe Drinking Water Regulations* guideline limit of 0.25 mg/L.

3.3.5 Chloroform

Chloroform, is another 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 limit of 0.3 mg/L. The water quality with respect to chloroform was compliant with the WHO limit.

Table 3-11 Chloroform (mg/L)

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.026	Yes
Cape Woolamai	monthly	12	0	0.039	Yes
Corinella	monthly	12	0	0.042	Yes
Cowes	monthly	14	0	0.056	Yes
Grantville	monthly	12	0	0.075	Yes
Kilcunda	twice monthly*	24	0	0.055	Yes
Rhyll	monthly	12	0	0.047	Yes
San Remo	monthly	12	0	0.041	Yes
Ventnor	monthly	13	0	0.057	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor 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

Disinfection with ozone produces by-products such as bromate and formaldehyde. Westernport Water does not use ozone for disinfection and therefore, bromate and formaldehyde were not tested for in 2008/09.

3.5 Aluminium

According to both the *Safe Drinking Water Regulations* and ADWG, the concentration of acid-soluble aluminium should not exceed 0.2 mg/L. No health-based guideline is set at present. The water quality with respect to aluminium was compliant during the reporting period.

Table 3-12 Aluminium (mg/L)

Water Sampling Locality	Frequency of Sampling	No. of Samples	No. of Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.15	Yes
Cape Woolamai	monthly	12	0	0.02	Yes
Corinella	monthly	12	0	0.02	Yes
Cowes	monthly	14	0	0.02	Yes
Grantville	monthly	12	0	0.05	Yes
Kilcunda	twice monthly*	24	0	0.03	Yes
Rhyll	monthly	12	0	0.02	Yes
San Remo	monthly	12	0	0.04	Yes
Ventnor	monthly	13	0	0.03	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

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 during the reporting period.

Table 3-13 Turbidity (NTU)

Locality	Frequency of Sampling	No. of Samples	Max NTU	95% UCL of Mean (NTU)	Complying (Yes/No)
Bass	weekly	52	4.7	0.7	Yes
Cape Woolamai	weekly	53	3.4	0.4	Yes
Corinella	weekly	52	2.0	0.4	Yes
Cowes	weekly	57	0.9	0.2	Yes
Grantville	weekly	53	17	1.4	Yes
Kilcunda	twice weekly*	106	2.1	0.2	Yes
Rhyll	weekly	53	13	1.0	Yes
San Remo	weekly	53	2.0	0.4	Yes
Ventnor	weekly	46	0.9	0.4	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled weekly.

3.6.1 Exceedence Details

The high turbidity (17 NTU) detected at Grantville on the 24 February 2009 was due to a water tanker being filled for road works from a hydrant nearby the property a few minutes prior to sampling. This incident generated a Section 22, which was reported to Dept of Health. Refer to section five of this report for more details.

The high turbidity (13 NTU) at Rhyll on the 14 October 2008 was due to the air scouring program on Phillip Island. The sample was taken at the time the air scouring was being done. The main was flushed and another turbidity sample was taken, which returned a reading of 0.3 NTU.

3.6.2 Sample Frequency Non-compliance

The monitoring of the groundwater sites is very comprehensive and controlled by an established schedule. However, in one sampling event, two turbidity results from two sites (Bass and Corinella) were not included. A subsequent review of the information could not establish the definitive reason for this oversight. However, it is suspected that turbidity was tested on the wrong sample.

Turbidity was not measured for seven Ventnor samples from January 09 to March 09. This was due to the incorrect specification of tests submitted to the laboratory.

Westernport Water and its laboratory services provider Ecowise Environmental have investigated these sample frequency non-compliances. Apart from human error with the chain of bottle supply, sample taking, labelling, transport, laboratory receiving, testing, reporting and final client acceptance and signoff of reports, it was difficult to determine the exact cause of these non-conformances. Both Westernport Water and Ecowise have reviewed the each link in the chain of service provision to minimise the chance of reoccurrence of sample frequency non-compliances happening again.

3.7 Fluoride

Fluoride is not added to Westernport Water's drinking water and was therefore not monitored.

3.8 pH

3.8.1 Results

The ADWG limit for pH is between 6.5 and 8.5. The pH of water supplied was within this range for all localities except for Kilcunda and Ventnor.

Table 3-14 pH (pH units)

Locality	Frequency of Sampling	No. of Samples	Min	Max	Mean
Bass	weekly	52	6.8	8.1	7.5
Cape Woolamai	weekly	53	6.9	8.2	7.7
Corinella	weekly	52	7.1	8.1	7.7
Cowes	weekly	55	7.3	8.4	7.9
Grantville	weekly	53	7.1	8.2	7.7
Kilcunda	twice weekly*	106	7.2	8.7	7.8
Rhyll	weekly	53	7.2	8.3	7.7
San Remo	weekly	53	7.1	8.2	7.7
Ventnor	weekly	46	7.2	8.8	7.8

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled weekly.

3.8.1.2 Actions in Relation to Guideline Non-compliance

Westernport Water exceeded the ADWG limit of between 6.5 and 8.5 for pH at two localities in the 08/09 reporting period as seen in Figure 3-2. Non-compliances were mostly minor and problem areas (i.e. mains at the end of the system) were flushed as required and no further action was taken.

3.8.2 Sample Frequency Non-compliance

As with turbidity, in one sampling event (9 September 2008), two pH results from two sites (Bass and Corinella) were not included. A subsequent review of the information could not establish the definitive reason for this oversight. However, it is suspected that pH was tested on the wrong sample.

pH was not measured for seven Ventnor samples from January 09 to March 09. This was due to the incorrect specification of tests submitted to the laboratory.

Westernport Water and its laboratory services provider Ecowise Environmental have investigated these sample frequency non-compliances. Apart from human error with the chain of bottle supply, sample taking, labelling, transport, laboratory receiving, testing, reporting and final client acceptance and signoff of reports, it was difficult to determine the exact cause of these non-conformances. Both Westernport Water and Ecowise have reviewed the each link in the chain of service provision to minimise the chance of reoccurrence of sample frequency non-compliances happening again.

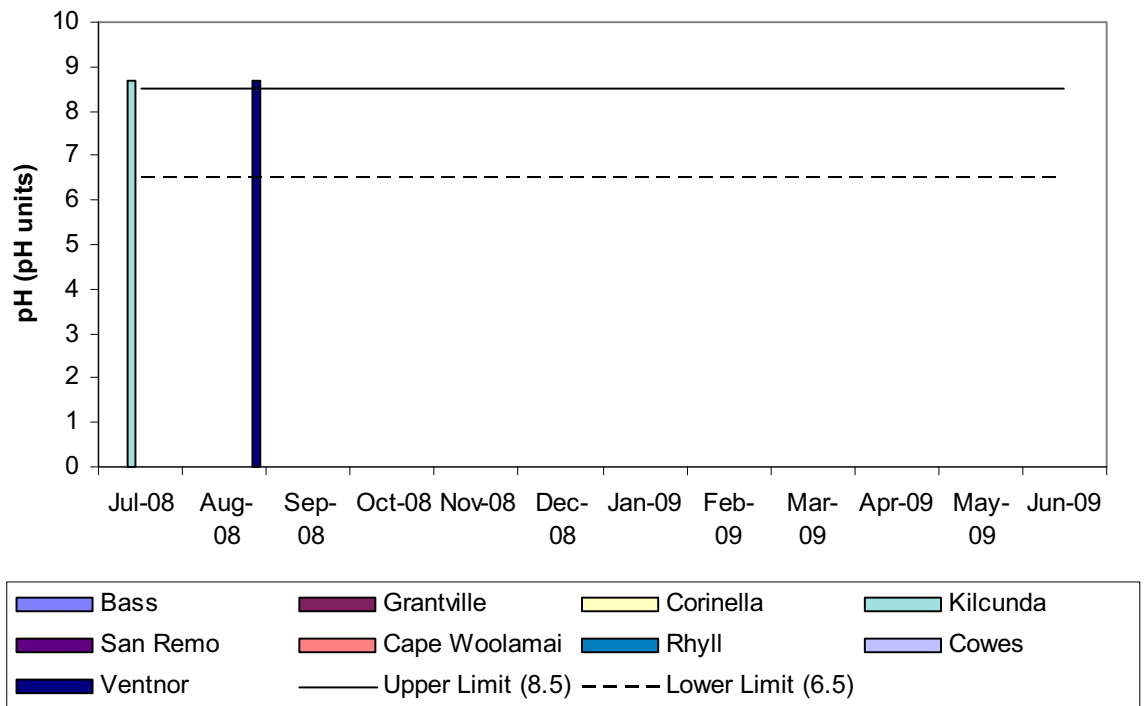


Figure 3-2 Non-conforming maximum pH results for the period July 08 to June 09 (where more than one non-compliance within a month has occurred, only the highest value is displayed)

3.9 Metals

Westernport Water regularly tests for metals in the drinking water they supply. The following sections detail the results for the 08/09 reporting period.

3.9.1 Antimony

Based on health consideration, the ADWG limit is set at 0.003 mg/L. As can be seen from Table 3-15, no sample exceeded this limit.

Table 3-15 Antimony (mg/L)

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.

3.9.2 Cadmium

Based on health considerations, the ADWG limit is set at 0.002 mg/L. The cadmium concentration complied with this limit at all locations during the reporting period.

Table 3-16 Cadmium (mg/L)

Water Sampling 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.

3.9.3 Copper

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

Table 3-17 Copper (mg/L)

Water Sampling Locality	Frequency of Sampling	No. of Samples	No. of Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.12	Yes
Cape Woolamai	monthly	12	0	0.04	Yes
Corinella	monthly	12	0	0.06	Yes
Cowes	monthly	14	0	0.04	Yes
Grantville	monthly	12	0	0.71	Yes
Kilcunda	twice monthly*	24	0	0.09	Yes
Rhyll	monthly	12	0	0.08	Yes
San Remo	monthly	12	0	0.08	Yes
Ventnor	monthly	13	0	0.22	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor 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. If a customer is experiencing copper staining or discolouration of their water, please contact the Customer Service Centre on 1300 720 711.

3.9.4 Iron

Based on aesthetic considerations, the ADWG limit is set at 0.3 mg/L. No health-based guideline value has been set. The water quality with respect to iron concentrations showed an exceedance in Rhyll in October 2008.

Table 3-18 Iron (mg/L)

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	fortnightly	27	0	0.16	Yes
Cape Woolamai	fortnightly	27	0	0.15	Yes
Corinella	fortnightly	27	0	0.18	Yes
Cowes	fortnightly	27	0	0.26	Yes
Grantville	fortnightly	27	0	0.15	Yes
Kilcunda	twice fortnightly*	54	0	0.20	Yes
Rhyll	fortnightly	27	1	0.63	No
San Remo	fortnightly	27	0	0.27	Yes
Ventnor	fortnightly	27	0	0.29	Yes

*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 the Customer Service Centre on 1300 720 711.

3.9.4.3 Actions in Relation to Guideline Non-compliance

The high iron result at Rhyll on the 14 October 2008 was again due to the air scouring program on Phillip Island. The sample was taken at the time the air scouring was being done. The main was flushed and a subsequent sample returned a result of 0.05 mg/L.

3.9.5 Lead

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

Table 3-19 Lead (mg/L)

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	<0.001	Yes
Corinella	monthly	12	1	0.026	No
Cowes	monthly	14	0	0.001	Yes
Grantville	monthly	12	0	0.004	Yes
Kilcunda	twice monthly*	24	0	<0.001	Yes
Rhyll	monthly	12	0	0.002	Yes
San Remo	monthly	12	0	0.001	Yes
Ventnor	monthly	13	0	0.002	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

3.9.5.4 Actions in Relation to Guideline Non-compliance

A sample was taken on 10 February, 2009 at 67 Bayview Road Tenby Point. The lead reading of 0.026 mg/L was above the ADWG limit of 0.01 mg/L.

The cause of the high lead result was difficult to determine. After receiving notification of this lead reading, the main was flushed and no further actions were taken. Because of the time taken to receive this non-compliance result, Westernport Water decided it was too late to resample, as this would not have been a representative sample of the original sample date.

The above elevated lead reading requires a Section 22 to be forwarded to DHS; however in this instance, it did not occur. Westernport Water and its laboratory services provider, Ecowise Environmental, investigated the processes related to the sample and the timing of exceedence-report generation. Apart from human error associated with the sample, it was difficult to determine the exact cause of non-reporting. Both Westernport Water and Ecowise have reviewed the way the exceedence reports are reported to minimise the chance of reoccurrence happening again.

3.9.6 Nickel

Based on health considerations, the ADWG limit is set at 0.02 mg/L. The nickel concentration complied with this limit at all locations.

Table 3-20 Nickel (mg/L)

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	quarterly	4	0	0.004	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	0.002	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.

3.9.7 Zinc

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

Table 3-21 Zinc (mg/L)

Water Sampling Locality	Frequency of Sampling	No. of Samples	Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	monthly	12	0	0.19	Yes
Cape Woolamai	monthly	12	0	0.03	Yes
Corinella	monthly	12	0	0.87	Yes
Cowes	monthly	14	0	0.02	Yes
Grantville	monthly	12	0	0.04	Yes
Kilcunda	twice monthly*	24	0	0.05	Yes
Rhyll	monthly	12	0	0.04	Yes
San Remo	monthly	12	0	0.02	Yes
Ventnor	monthly	13	0	0.02	Yes

Note: the number of samples collected exceeded the requirement as additional sampling was performed at Cowes and Ventnor over the summer period in response to increases in population. *Kilcunda data includes Dalyston area data, both these locations were sampled monthly.

3.9.8 Manganese

The ADWG limit is set at 0.5 mg/L for health considerations and 0.1 mg/L for aesthetics. The manganese results met the ADWG limit for aesthetics in all sampling localities.

Table 3-22 Manganese (mg/L)

Water Sampling Locality	Frequency of Sampling	No. of Samples	No. of Non-complying Samples	Max Result (mg/L)	Complying (Yes/No)
Bass	fortnightly	27	0	0.055	Yes
Cape Woolamai	fortnightly	27	0	0.009	Yes
Corinella	fortnightly	27	0	0.064	Yes
Cowes	fortnightly	27	0	0.008	Yes
Grantville	fortnightly	27	0	0.014	Yes
Kilcunda	twice fortnightly*	54	0	0.028	Yes
Rhyll	fortnightly	27	0	0.008	Yes
San Remo	fortnightly	27	0	0.011	Yes
Ventnor	fortnightly	27	0	0.030	Yes

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

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

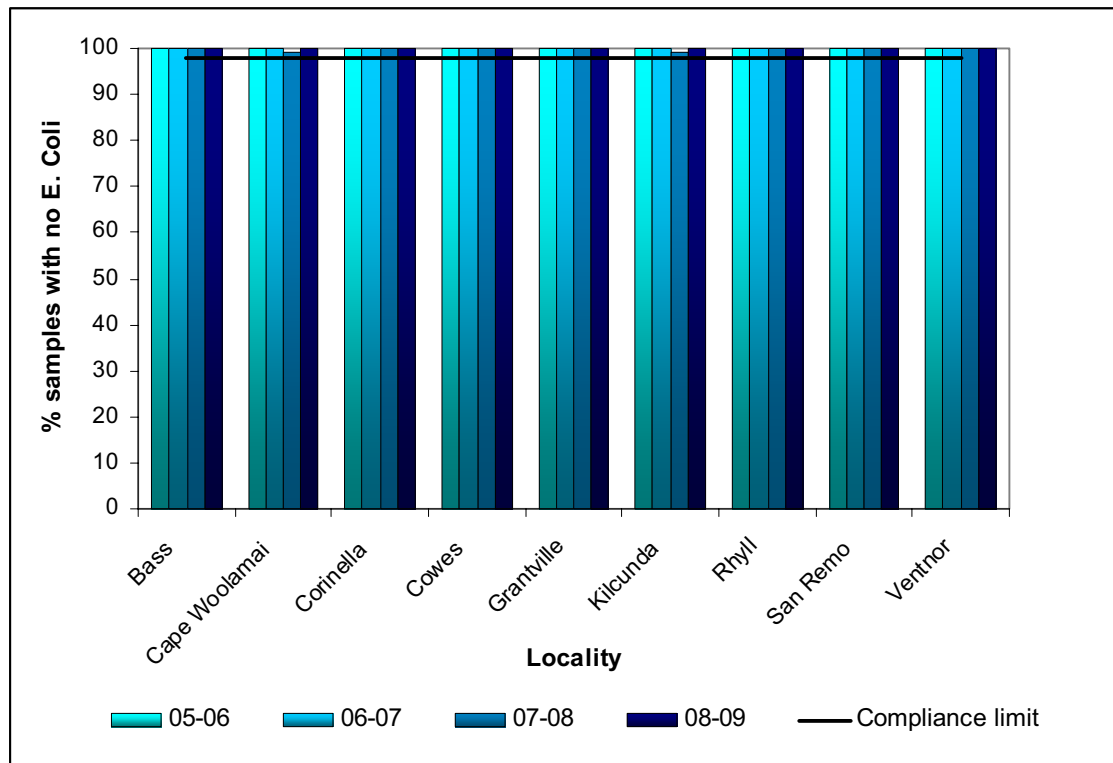


Figure 4-1 Percentage of samples with no *E. coli* from July 05 to June 09

4.1.2 Monochloroacetic Acid

Note that results that were less than the detection limit have been represented as zero in the graphs.

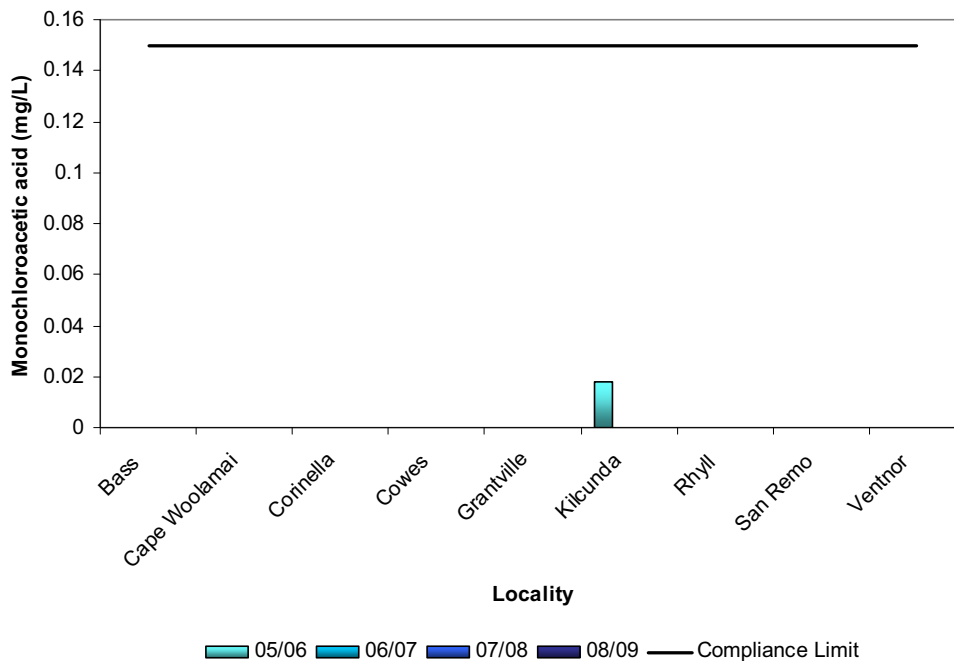


Figure 4-2 Maximum monochloroacetic acid concentration from July 05 to June 09

4.1.3 Dichloroacetic Acid

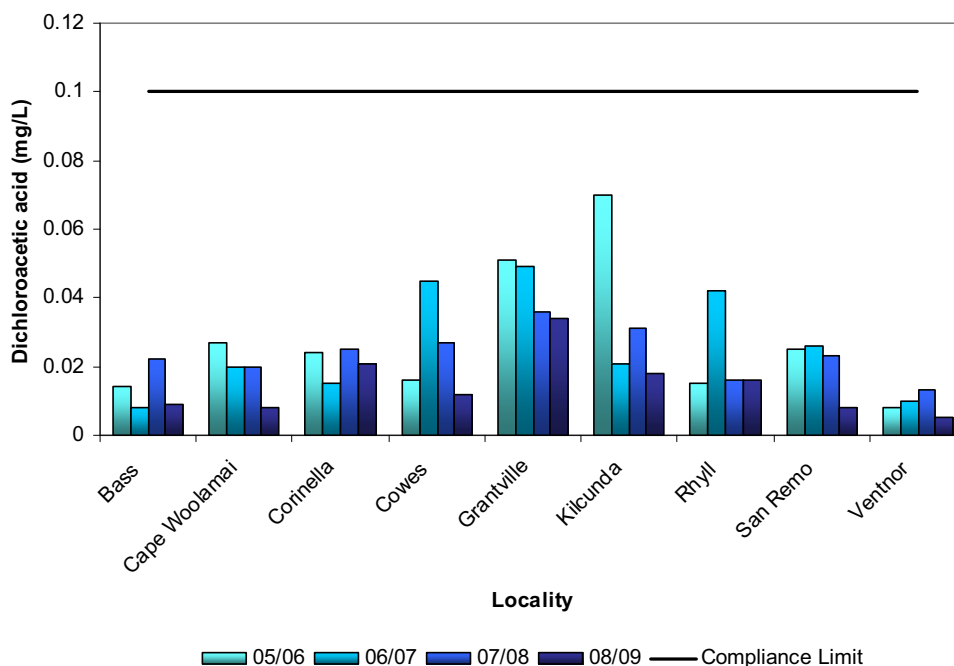


Figure 4-3 Maximum dichloroacetic acid concentration from July 05 to June 09

4.1.4 Trichloroacetic Acid

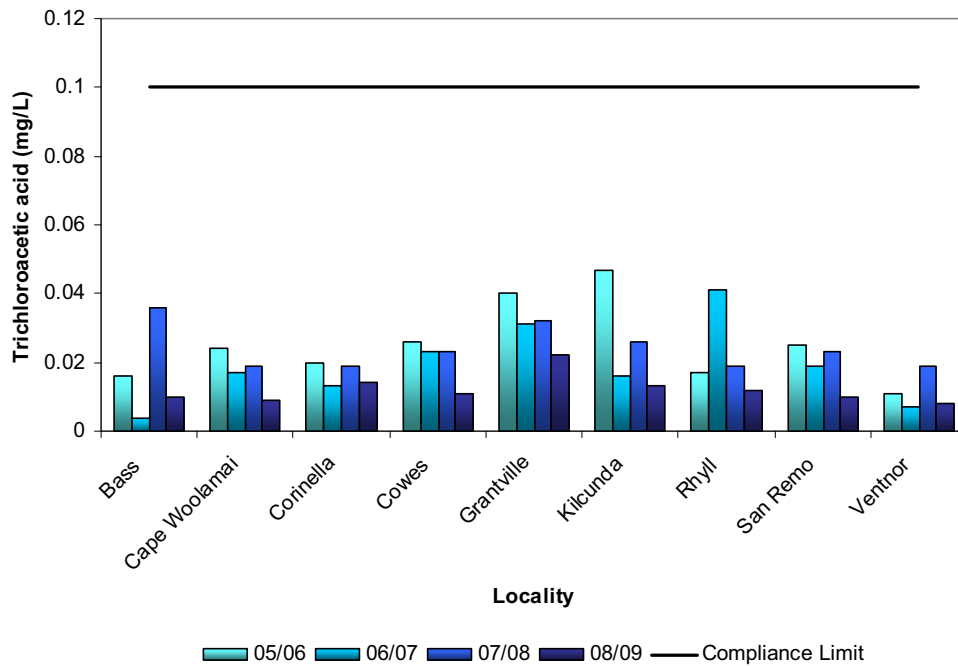


Figure 4-4 Maximum trichloroacetic acid concentration from July 05 to June 09

4.1.5 Trihalomethanes

Westernport Water did not exceed the water quality standard of 0.25 mg/L for total THMs in 08/09. With an upgrade to the IBWPP's chemical dosing system in 2007, the total THM concentration decreased to below regulation limit as plant operators are able to control the chlorine dosing more efficiently (see Figure 4-5).

A THM reduction strategy was developed in 07/08 to address the on-going elevated THM levels detected at several sites particularly over the summer period. Trials were undertaken in 07/08 to reduce the natural organic matter levels in the treated water. It was found that the combination of regular air scouring in the reticulation system, powder activated carbon dosing at the IBWPP and relocation of secondary disinfection sites in the reticulation system would deliver improved performance of the system and reduce the THM levels. Powder activated carbon dosing at the IBWPP is now maintained all year round at approximately 1 ppm. This dose rate can deviate depending on the raw water quality. The effectiveness of these strategies can be seen in the improvement to water quality in 08/09.

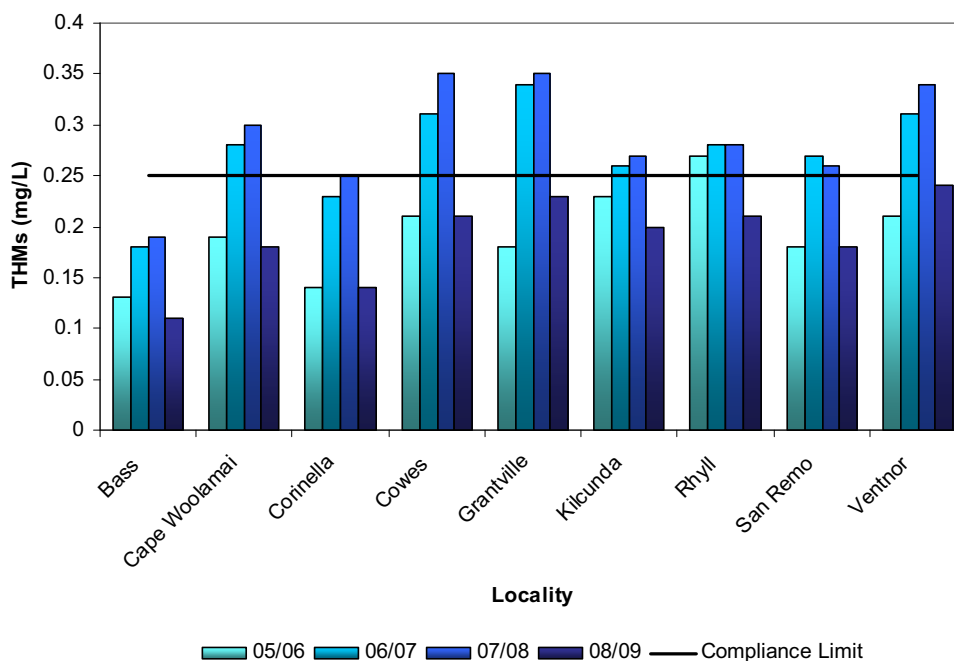


Figure 4-5 Maximum THM concentration from July 05 to June 09

4.1.6 Aluminium

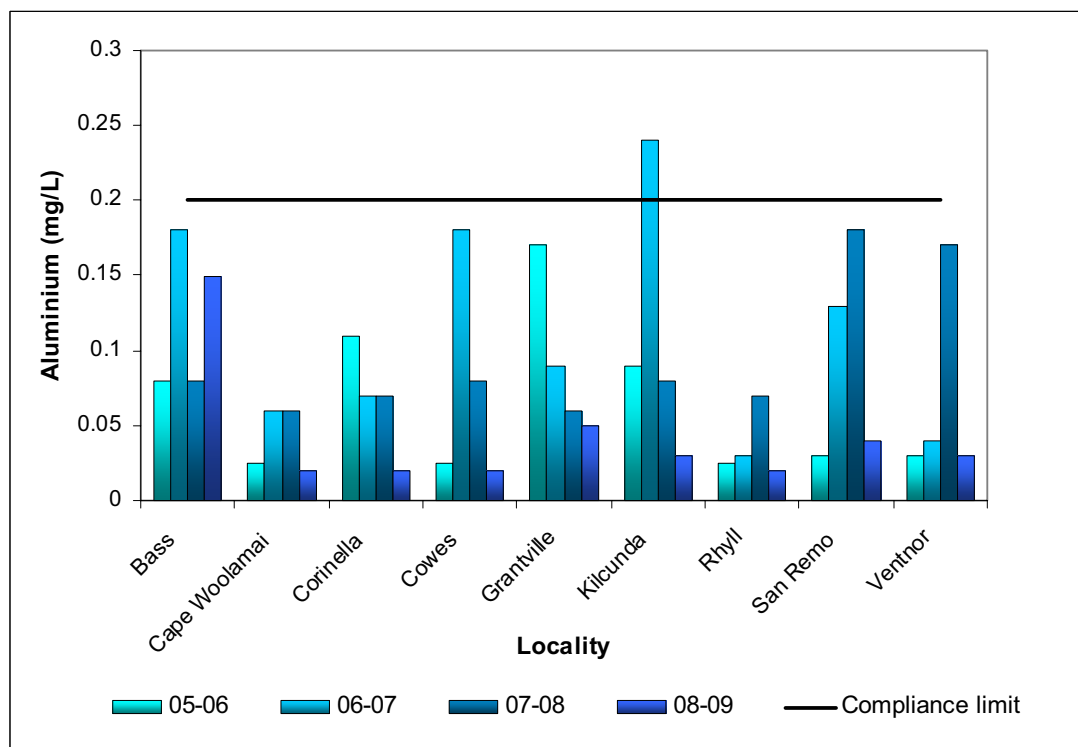


Figure 4-6 Maximum aluminium concentration from July 05 to June 09

Note: Kilcunda data for 2006/07 was acceptable but was reported above the limit due to Dept of Health data rounding.

4.1.7 Turbidity

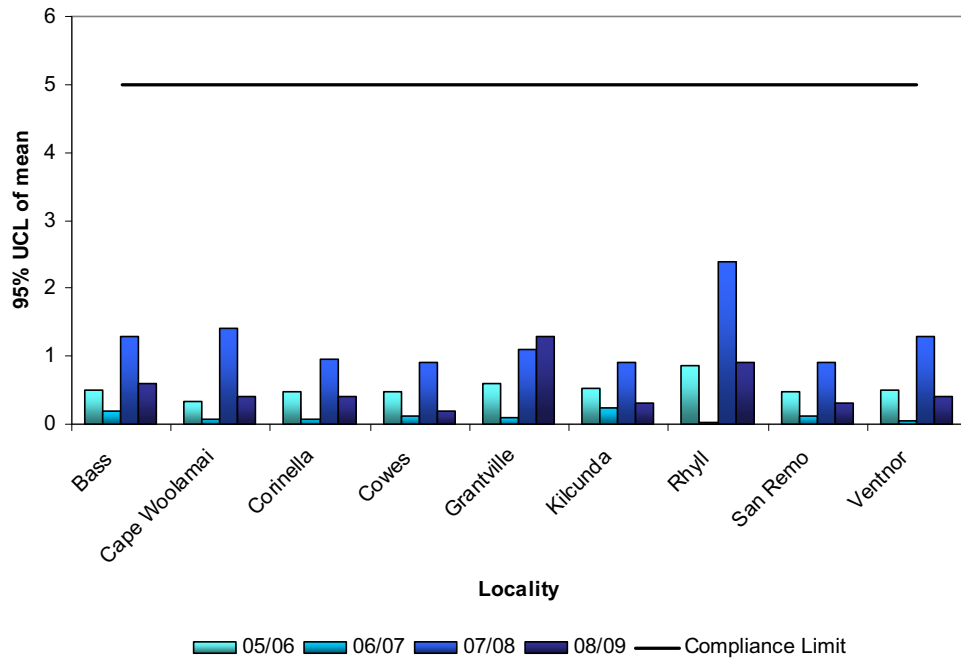


Figure 4-7 95% UCL (upper confidence limit) of mean from July 05 to June 09

4.1.8 Overall

Over the years, Westernport Water has achieved a high level of compliance with respect to all Schedule 2 parameters except for THMs (see Figure 4-8 and Figure 4-9). A THM reduction strategy was developed and trials undertaken to reduce the natural organic matter levels in the treated water has proven to be successful in contributing to the reduction in THMs.

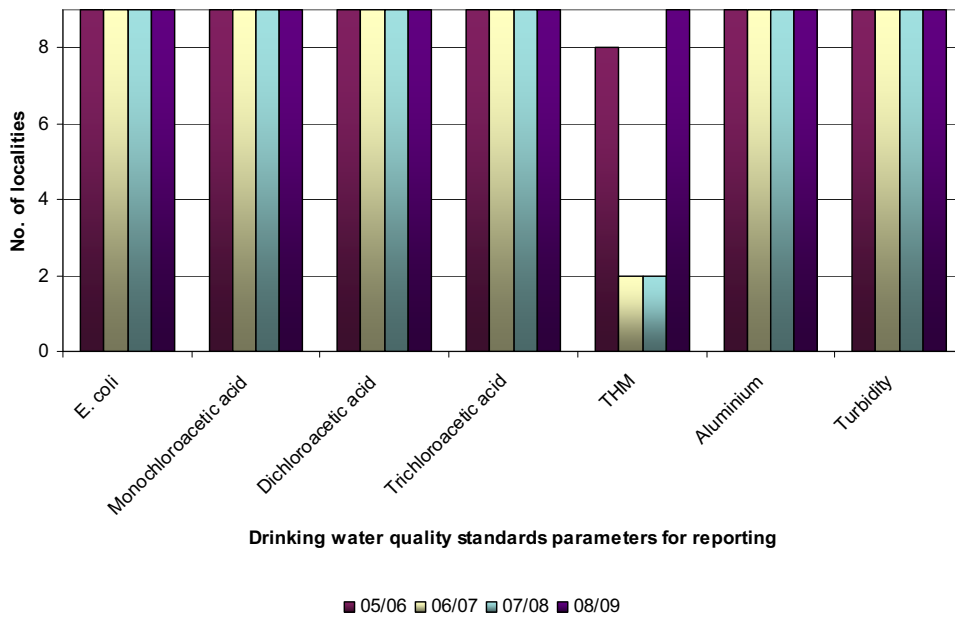


Figure 4-8 Number of localities (out of 9) that were compliant with the parameters in Schedule 2 of the Drinking Water Regulation

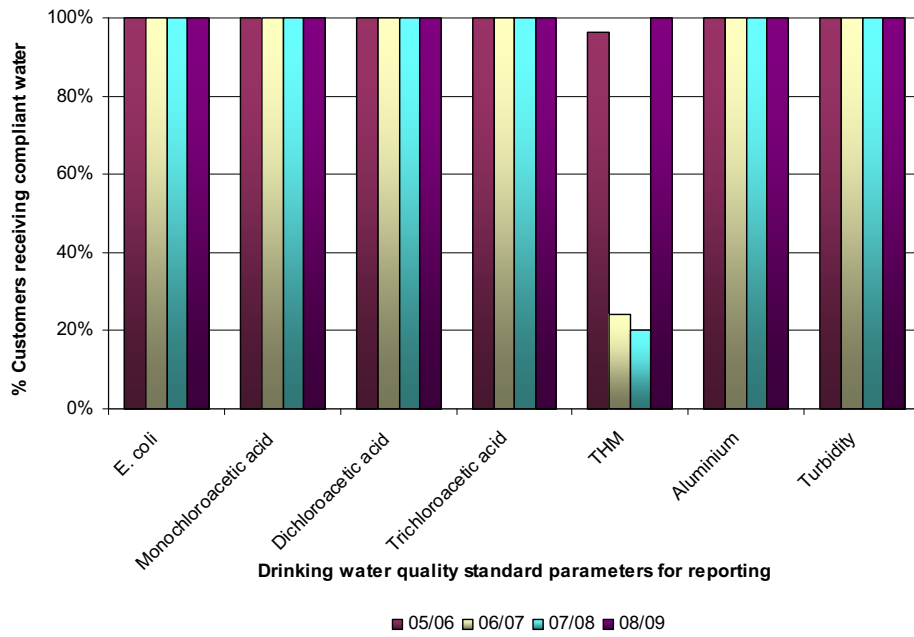


Figure 4-9 Percentage of customers supplied with drinking water that was compliant with the standard²

4.2 Other Parameters

4.2.1 Free Chlorine

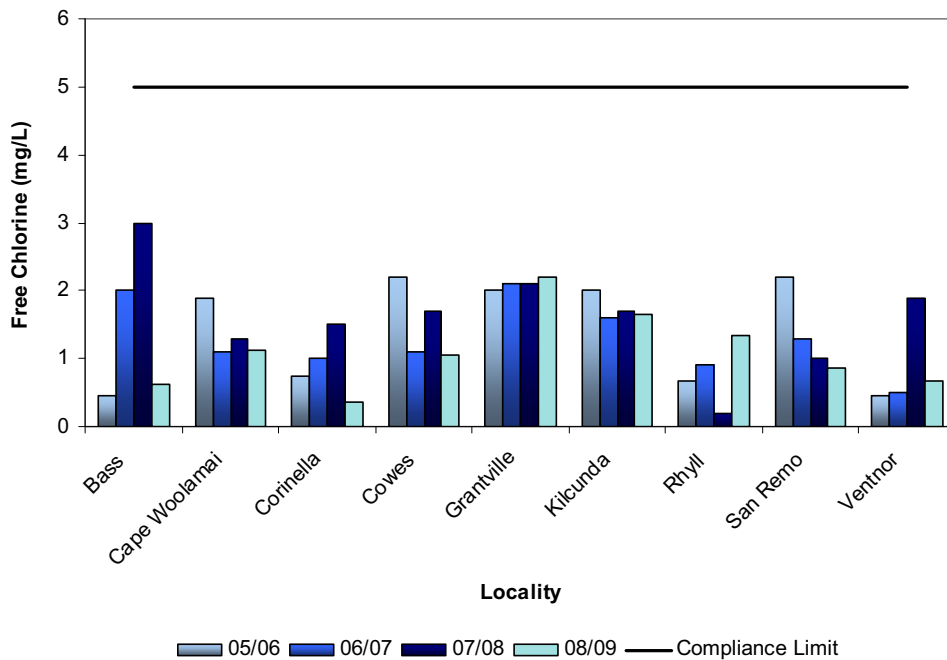


Figure 4-10 Maximum free chlorine concentration from July 05 to June 09

² Population statistics were based on 2004 and 2006 national regional profile data from the Australian Bureau of Statistics website www.abs.gov.au.

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

4.3.1 Results

Regulation 10 (b) requires a water supplier to ensure that drinking water supplied by it to another person does not contain any chemical, toxin, pathogen or substance at levels that may pose a risk to human health. The information is to be presented in the report in either a tabular or graph form.

For each parameter that was monitored, the frequency of sampling, the health related guideline value for that parameter from the 2004 Australian Drinking Water Guidelines, and whether any results representing drinking water supplied to customers exceeded that value during the reporting period, need to be detailed.

4.3.2 pH

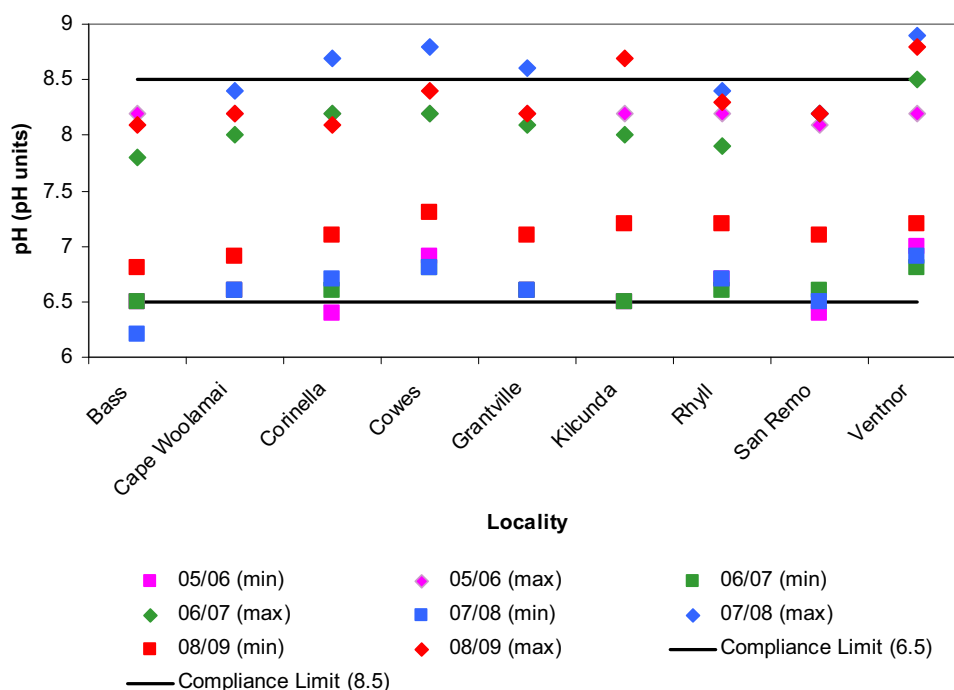


Figure 4-11 pH from July 05 to June 09

The pH results were outside the ADWG limits in 2 locations in 2005. As these were isolated events at one out of over 50 locations, no action was taken. The next sampling event showed that the water quality results had returned to within the guideline limits. No further action was required. pH results were outside the ADWG limits in 6 locations in 07/08, the problem areas were flushed as a result of non-compliance and no further action was required, following satisfactory re-testing. In 08/09, two localities exceeded the upper pH limit of 8.5. As these were minor, the problem areas were flushed and no further actions were required.

4.3.3 THM Components

The upgrade of the IBWPP control system provided better control over chlorine dosing, and the implementation of the THM reduction strategy (combination of regular air scouring in the reticulation system, powder activated carbon dosing at the IBWPP and relocation of secondary disinfection sites in the reticulation system) reduced the number of non-compliance in total THM to zero (see Figure 4-12 to Figure 4-15).

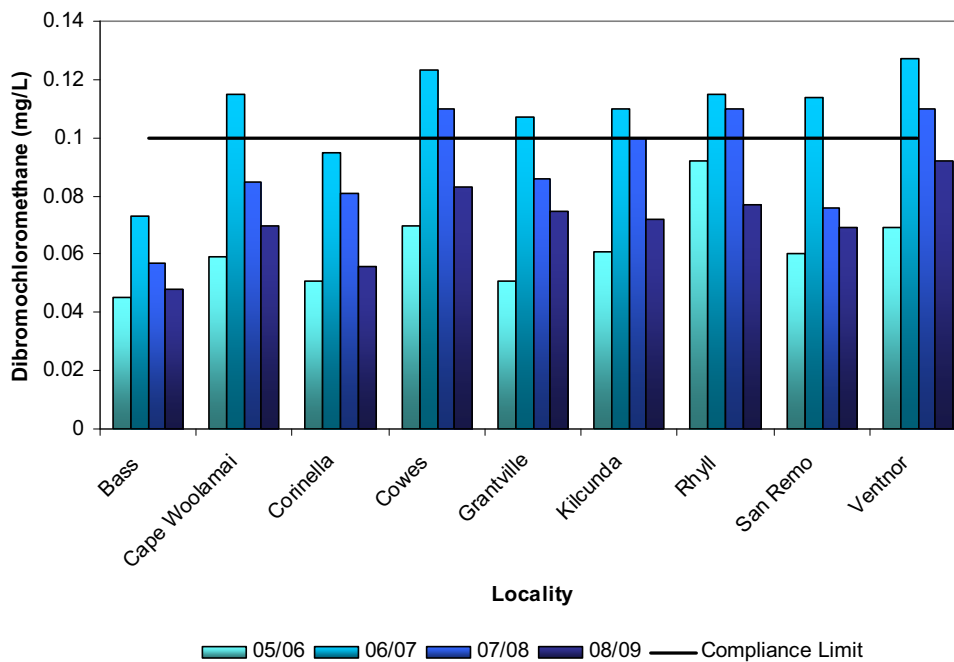


Figure 4-12 Maximum dibromochloromethane concentration from July 05 to June 09

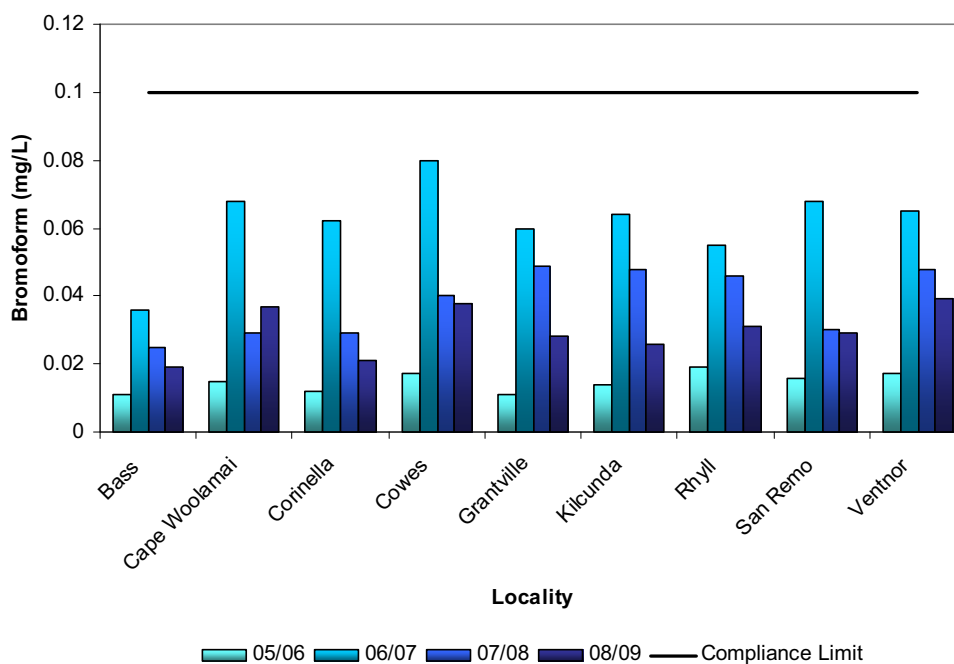


Figure 4-13 Maximum bromoform concentration from July 05 to June 09

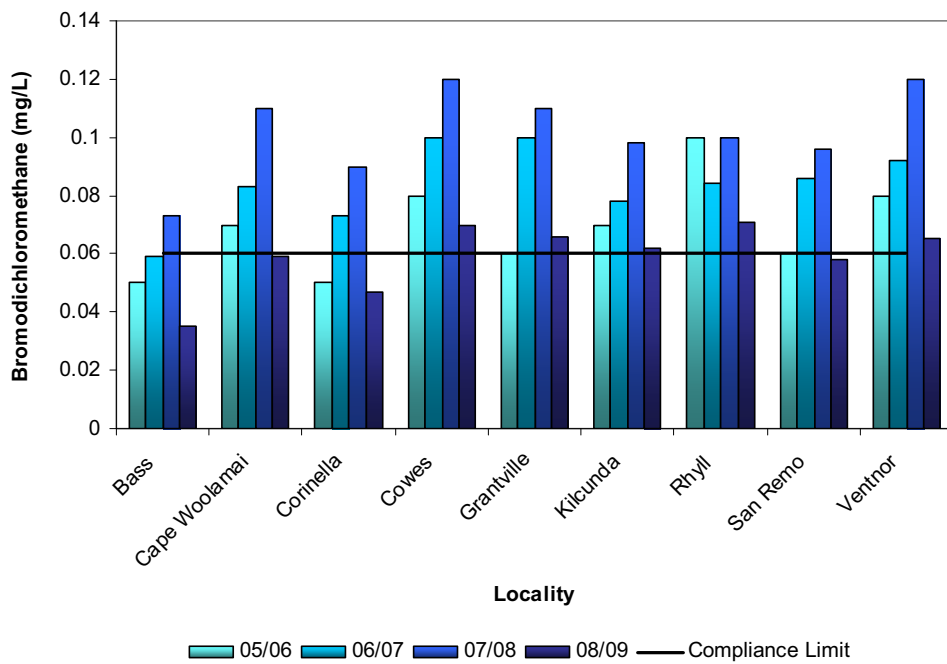


Figure 4-14 Maximum bromodichloromethane concentration from July 05 to June 09

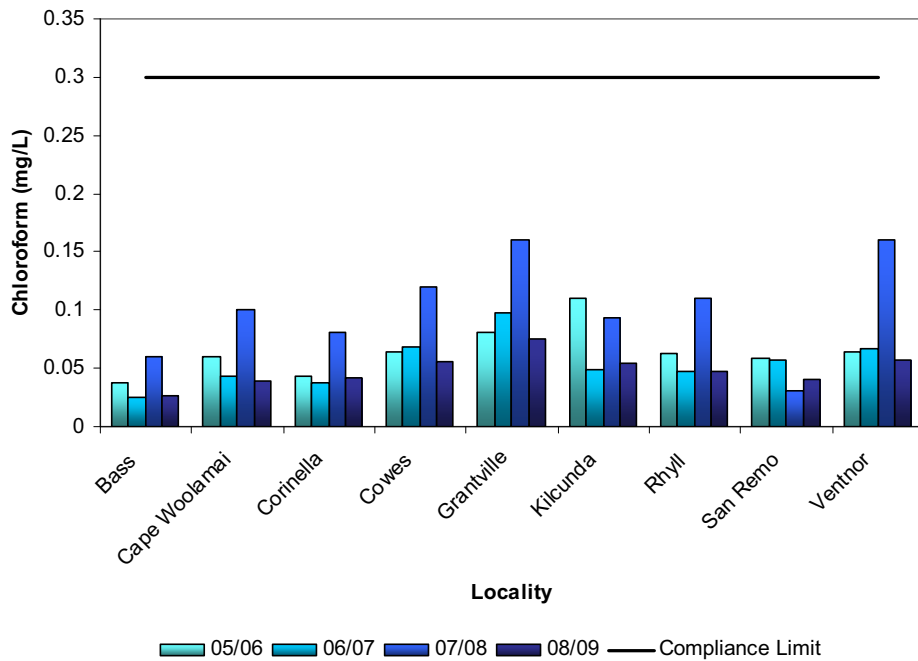


Figure 4-15 Maximum chloroform concentration from July 05 to June 09

4.3.4 Metals

All metal concentrations complied with ADWG limits except for iron and lead (see Figure 4-16 to Figure 4-21). The iron exceedance was due to air scouring of the mains, however, the cause of

the lead exceedance was difficult to determine. In both cases, the reticulation system was flushed in the appropriate areas where non-compliances were detected.

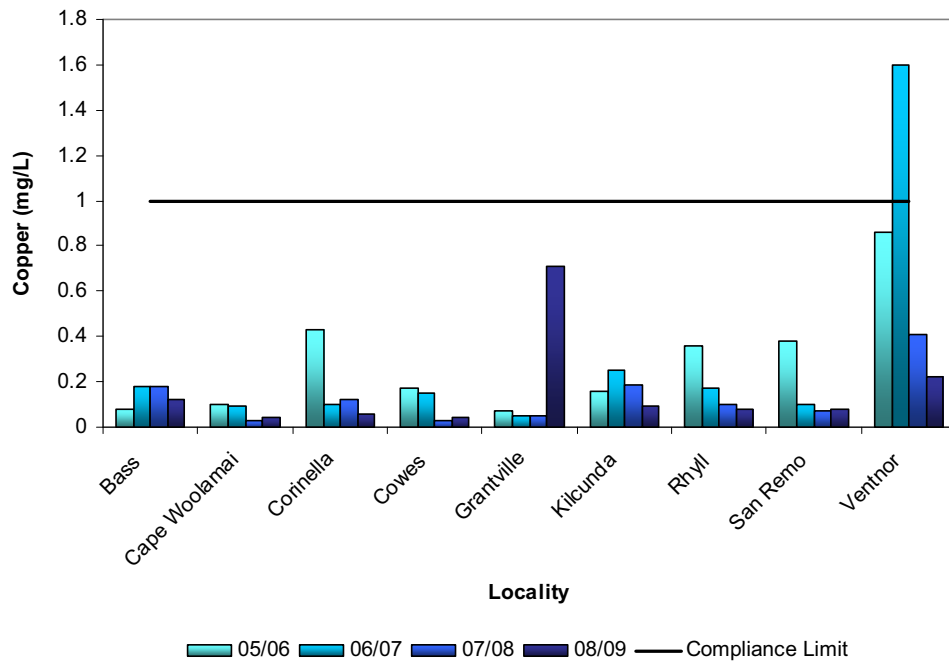


Figure 4-16 Maximum copper concentration from July 05 to June 09

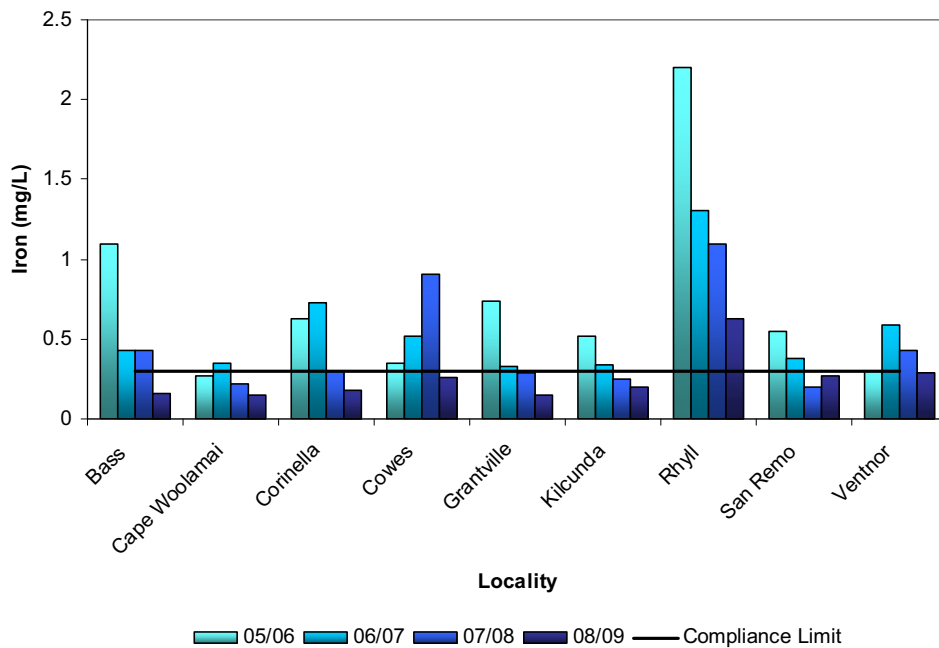


Figure 4-17 Maximum iron concentration from July 05 to June 09

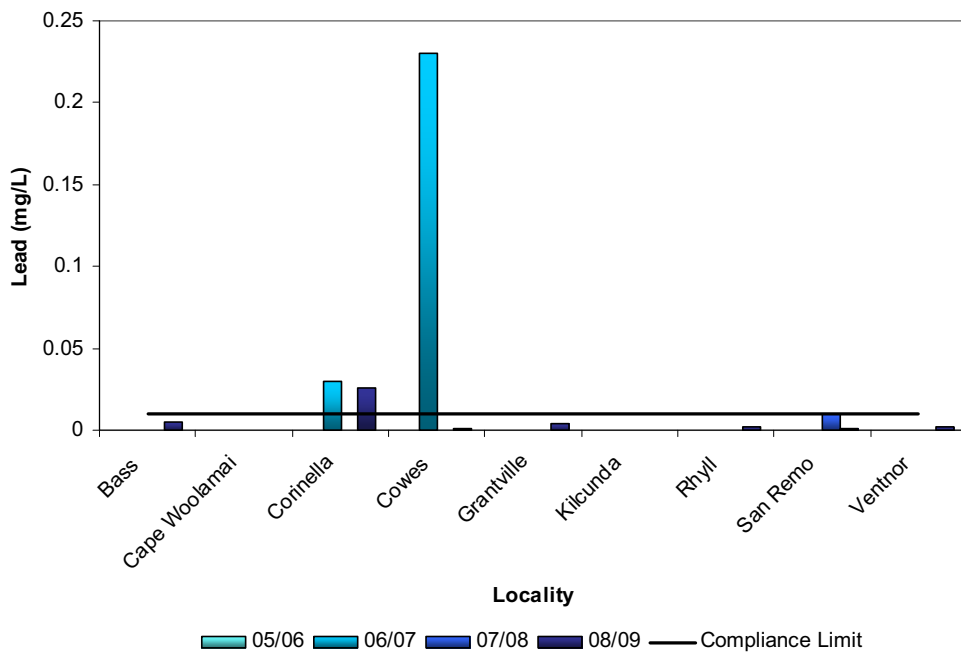


Figure 4-18 Maximum lead concentration from July 05 to June 09

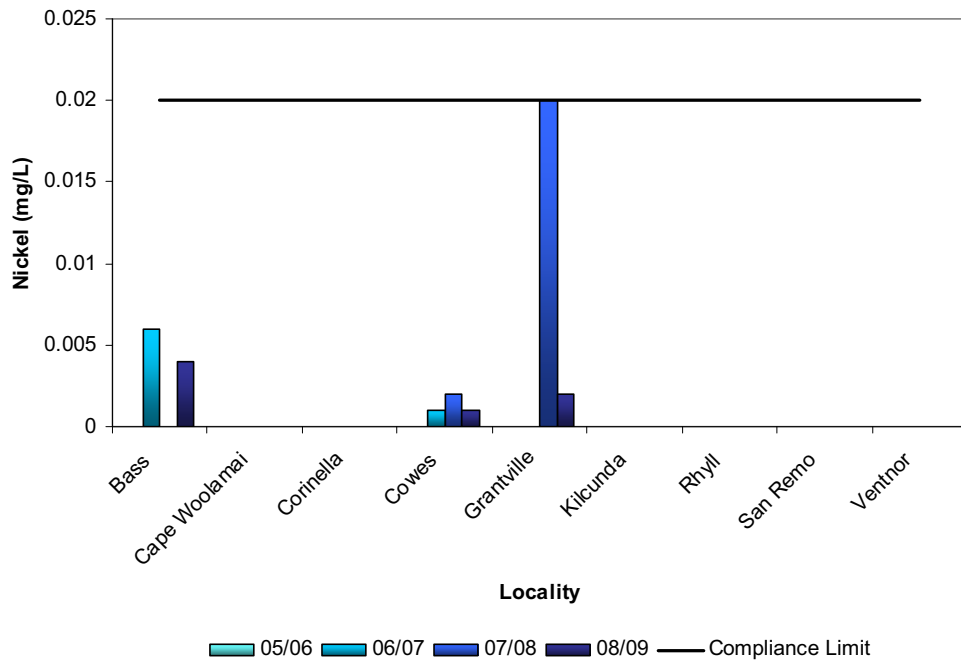


Figure 4-19 Maximum nickel concentration from July 05 to June 09

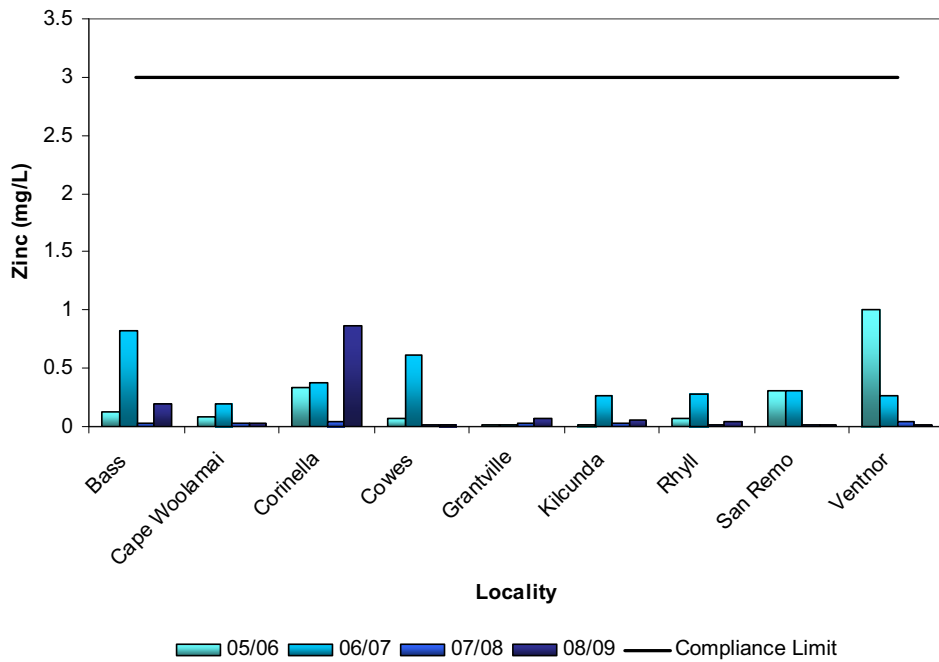


Figure 4-20 Maximum zinc concentration from July 05 to June 09

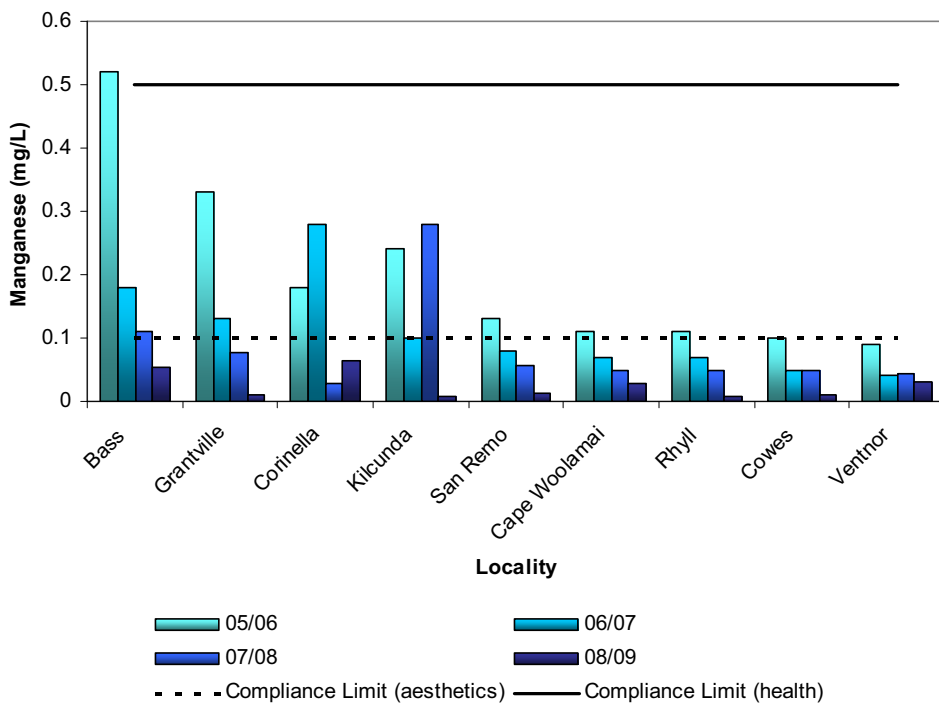


Figure 4-21 Maximum manganese concentration from July 05 to June 09

4.3.5 Raw Water Monitoring

Raw water is monitored all year round - the main reason for monitoring the raw water supply (Reservoir) is to detect change in water quality, allowing for pro-active management of water treatment processes. The schedule is shown in Table 4-1.

The quality of water in Candowie storage is affected by land-use practices, septic tanks etc, in 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. Other water sources that are monitored are bore water pumping, Bass River and Lance Creek Reservoir, when in use. These sources are monitored as regularly as Candowie storage.

At certain times of the year, algal blooms are likely, so the frequency of monitoring and testing is increased. Similarly, if chemicals such as manganese, iron or levels of Geosmin Methylisoborneol (MIB) are detected, an increase in sampling frequency would follow.

Table 4-1 Raw Water Monitoring schedule 2008-09

Location of Sample	Frequency sampling	Test (Parameter)
Off take- Raw Water into lab at Water Treatment Plant	Monthly	Herbicide & Pesticides
Off take- Raw Water into lab at Water Treatment Plant	Monthly	Radiation
Off take- Raw Water into lab at Water Treatment Plant	Monthly	Cryptosporidium & Giardia
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	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

5 Emergency/Incident Management

The following information regarding any incidents that occurred during 2008/09 includes any water quality incidents at customer taps as well as the Candowie Reservoir.

5.1 Reportable Events under Section 22

A sample taken on 7 July 2008 from Wimbledon Heights had a positive *E. coli* reading of 250 orgs/100mL and DHS was notified under section 22 of the Safe Drinking Water Act. The tap was resampled on the day of the notification. This subsequent sample recorded zero *E. coli*.

As there was no obvious reason for the positive *E. coli* reading, the property was inspected by the Water Quality Officer. It was discovered that the stop tap at the meter was turned off, but there was still water at the tap and through the entire property. On speaking with the owner of the property, the water supply was coming from a private tank and pressurised via a pump. The owner was made aware of the positive *E. coli* reading and the risks involved in consuming the water as well as the risk of *E. coli* flowing back into the mains. As this incident was not attributed to the quality of the water supplied by Westernport Water, the DHS notification was retracted.

Westernport Water arranged for the installation of a dual backflow device on the property's water meter for back up to avoid contamination of the distribution system. As a result of this incident, the following actions were taken:

- Customers with private tanks and the potential risk of infiltration from these tanks into the distribution system were identified;
- The backflow register of all of Westernport Water's assets with backflow devices were reviewed to highlight any potential risks to water quality;
- Westernport Water is in the process of setting up a commercial properties backflow register and offering the option of Westernport Water's in-house qualified plumber to service the backflow systems at a slightly reduced rate;
- It was ensured that Westernport Water's in-house licensed plumber has the appropriate qualifications to install backflow systems and is registered to do so;
- It was ensured that new water meters being installed have a dual backflow device; and
- A committee was formed to manage backflow device registration, maintenance and installation.

A sample was taken on 3 March 2009 from the Stanley Road Tank, had a positive *E. coli* reading of 2 orgs/100mL.

Stanley Rd Tank has down stream chlorine dosing; the down stream sample recorded zero *E. coli* at time of original sample being taken. A second sample was taken from the tank for analysis on 5 March, with the retested sample recording a zero *E. coli* & zero coliforms, liquid chlorine was added to the tank to achieve free chlorine residual of 0.35 mg/L.

A sample was taken on 17 March 2009 from Edens Property – Ian Bartlet 30 minute contact point, which had a positive *E. coli* reading of 1 orgs/100mL.

There was a very low free chlorine reading at the time of the sample being taken of 0.08 mg/L, which was an indication the sample tap wasn't flushed long enough as the free chlorine residual from this location should have had a minimum reading of 0.70 mg/L.

- A weekly chlorination check list for samplers was introduced to identify problems and to assist the samplers at the time of taking the samples with desired chlorine residuals at various location through out the distribution system.
- A second sample was taken from the Edens Water entering point for analysis on 19 March 2009, with the retested sample recording a zero *E. coli* & zero coliforms.

A sample was taken on 19 December 2008 from Lot 2 Smiths St, Grantville, with a high plate count reading >10,000.

Heterotrophic Plate Count (HPC) is an indicator that the distribution main may need to be cleaned or there may be a problem around the area of where the sample has been taken, and actions are required to investigate. Growth of bacteria following drinking water treatment is normally referred to as re-growth. This type of growth is typically reflected in higher HPC values. Re-growth generally occurs in areas of the distribution system where the water may remain stationary for a longer amount of time.

In order to ensure that re-growth of bacteria is kept to a minimum, general water safety practices such as maintenance protocols, regular cleaning, management and maintenance of a disinfectant residual (e.g. Chlorine) should be in place. If there is a high plate count, one should consider looking at whether the system has been adequately cleaned, whether the disinfectant residual is effective. A failing in any of these areas could lead to elevated HPC levels.

- The distribution main at the time this exceedence was reported was then flushed
- Samples tested on site, with and a free chlorine residual 0.32 mg/L and turbidity 0.2 NTU
- In discussion with the department (DHS) we agreed that the incident didn't present a potential health issue.

This site was retested, with the sample sent to Ecowise Environmental, with a zero result.

A sample was taken on 10 February, 2009 at 67 Bayview Road Tenby Point, with a lead reading of 0.026 mg/L.

The cause of the high lead result was difficult to determine. After receiving notification of this lead reading, the main was flushed and no further actions taken.

- Because of the time taken to receive this non compliance result, Westernport Water decided it was too late to resample, as this would not have been a representative sample for the original date.
- This high lead reading required a Section 22, to be forwarded to DHS; this was not the case. (See section 3.9.5.4 of this report for further detail)
- Westernport Water and its laboratory services provider, Ecowise Environmental, investigated the processes related to the sample and the timing of exceedence report generation. Apart from human error associated with the sample, it was difficult to determine the exact cause of non-reporting. Both Westernport Water and Ecowise have reviewed the way the exceedence reports are reported to minimise the chance of reoccurrence happening again.

A sample was taken on 24 February, 2009 at Pier Rd Grantville, with a turbidity reading of 17 NTU.

The high turbidity (17 NTU) was due to a water tanker being filled for road works from a hydrant nearby the property a few minutes prior to sampling.

- This was a sampling error combined with some bad luck due to the truck scouring the main prior to the sample being taken.
- Treated water leaving the Water Treatment Plant at the time of the high turbidity sample was 0.25 NTU.
- There were no other high turbidity samples from any of the other samples taken on this sample run.
- This incident generated a Section 22, which was reported to Dept of Health.
- On notification of the high NTU reading a sample was tested on site with an NTU reading of 0.3 NTU.
- This was resampled on 26 February with a turbidity reading of 0.2 NTU.

6 Complaints

6.1 Summary of Complaints

The number of potable water quality complaints reported to Westernport Water during the 08/09 annual reporting period decreased significantly from last reporting period. A summary of the complaints in 07/08 and 08/09 can be found in Table 6-1.

Table 6-1 Table of complaints

	Total No. of complaints in 08/09	Rate per 100 customers* in 08/09	Total No. of complaints in 07/08	Rate per 100 customers* in 07/08
Discoloured Water	16	0.12	117	0.84
Taste and Odour	14	0.11	15	0.11
Blue Water	1	0.01	3	0.02
Illness	0	0	1	0.01
Other	9	0.07	11	0.08
Total	40	0.30	147	1.06

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

Once again, discoloured water was the majority of aesthetic complaints with 16 complaints. Overall, most of the complaints were about dirty water and a strong taste of chlorine. In general, complaints were resolved through call-backs, site visits to discuss issues and maintenance (i.e. mains flushing).

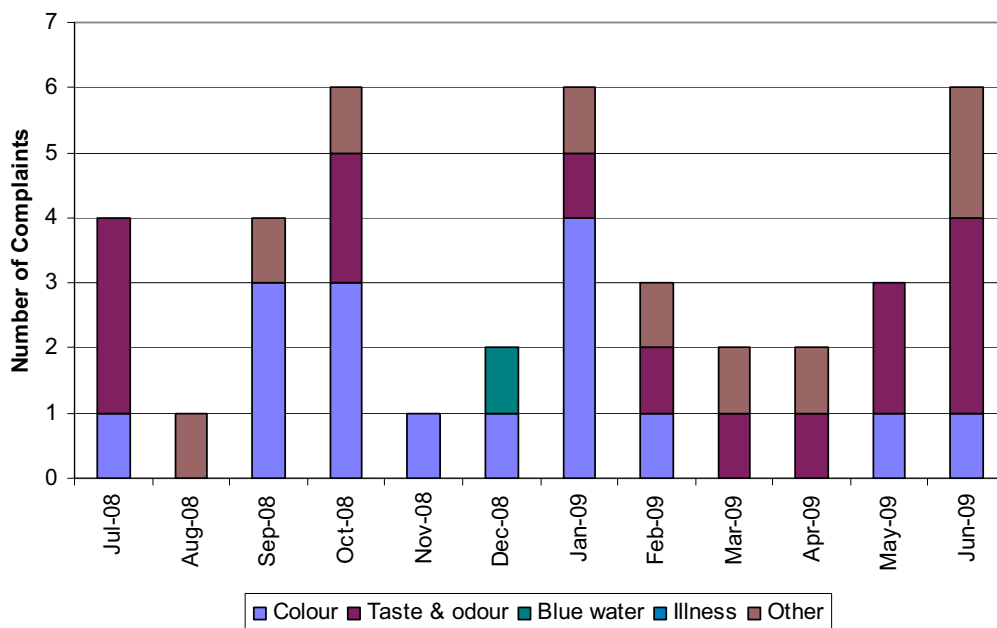


Figure 6-1 Customer complaints for 08/09 reporting period

6.2 Complaints Response Procedure

Westernport Water is committed to providing their 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 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 Mn and/or Fe 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

Westernport Water is committed to supplying the best possible quality water to their customers. A detailed Water Quality Risk Management Plan (WQRMP) was developed in March 2008 to ensure that the risks are identified and managed to maintain a high water quality level. Parsons Brinckerhoff was engaged to conduct an external audit of the Westernport Water Drinking Water Risk Management Plan, related documents and practices to determine its compliance with the obligations imposed by section 7(1) of the *Safe Drinking Water Act*. The audit was performed during June 2008, several areas of non-compliance were identified and corrective actions were recommended to address these.

The following tasks were Major Non-Compliances from the Water Quality Audit. These non-compliances resulted in an Undertaking, that was schedule for conclusion on 31 December 2008. These action items have been implemented and addressed, by this date, and have been added to the Water Quality Risk Management.

Major Non Compliances from the Water Quality Audit:

1. The absence of radiation testing being addressed as a risk;
2. The risk of radiation being present in the water supply (including the risk to human health), via the risk assessment process;
3. The lack of recognition in the risk of cryptosporidium and Giardia being present and response protocol (incident management) to cryptosporidium and Giardia. Also the management of risk to water quality, associated with cryptosporidium and Giardia;
4. The absence of a monitoring program (base line and event based) to address the above, has been implemented; and
5. The need to introduce formal communication protocols regarding water quality, and water quality data with South Gippsland Water, during and prior to when Lance Creek Reservoir is to supply water to Westernport Water.

Table 7-1 below is a summary of the minor non compliances and recommendations from the Water Quality Audit, and our proposed actions:

Table 7-1 Update of corrective actions- Minor non compliances & recommendations.

Auditable element	Legal Ref	Compliance grading & comments/recommendations arising from the audit	Proposed action	Completion date & Responsible person	Status
Identification of risk	SDWA 9(1)(b)	Some of the hazards identified in the original risk assessment INT08-06125 have not been transferred to the IRIS risk register as water quality hazards.	Align the water quality hazards/risks to match those within IRIS	October 2008 Risk & Environment Manager	Completed
Identification of risk	SDWA 9(1)(b)	It is recommended that risks 'posed by water quality', such as toxic algal blooms and <i>E. coli</i> , be listed as separate hazards, since they may result from a number of different hazardous events (high rainfall events, unusually warm conditions in spring, contaminated inflows, etc), and their presence in drinking water is a hazard in itself.	Identify the risks as separate hazards, and put into the WQRMP	December 2008 Water Quality Officer (WQO)	Completed
Identification of risk	SDWA 9(1)(b)	It is recommended that information about the initial hazard identification workshop and attendees be included in the WQRMP	Adopt recommended action. Include WQRMP & TRIM	November 2008 WQO	Completed
Risk assessment	SDWA 9(1)(C)	There was no evidence that a quantitative approach, such as the use of historical operational data or documentation of previous incidents, was formally used in the determination of likelihood and consequence. However, experienced personnel could be reasonably expected to have knowledge of this.	By the next review, there will be documentation on previous incidents and operational data in the absence of experienced personal.	July 2009 Risk & Environment Manager, & WQO	Completed

Auditable element	Legal Ref	Compliance grading & comments/recommendations arising from the audit	Proposed action	Completion date & Responsible person	Status
Risk assessment	SDWA 9(1)(C)	It is recommended that information about the risk assessment workshop and attendees are included in the WQRMP.	Include method/competencies of risk assessments	October 2008 Risk & Environment Manager	Completed
Development and implementation of preventative strategies (including appropriate control and monitoring measures)	SDWA 9(1)(D)	It is recommended that the physical location of control points be shown on a diagram(s) of the raw water supply, the water plant, and possibly also the entire supply system. The control points could also be numbered for ease of tracking of the locations of alarms.	Include controls points on distribution matrix, raw water monitoring & the treatment plant process map.	December 2008 Water Treatment Plant Supervisor	Completed
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, including the method by the effectiveness of these activities and measures is verified.	Reg 6(1)(b)	It is recommended that a register or record book of calibration and maintenance for all equipment be kept centrally to ensure that the calibration schedule is maintained. This should include calibration or maintenance certificates wherever possible. It is understood that this may form part of the complete maintenance system currently under development.	Develop manual records centrally located at the treatment plant for calibration and maintenance. All certificates and service reports to be scanned for recording in TRIM	February 2009 Water Treatment Plant Supervisor Maintenance Planner	Completed

Auditable element	Legal Ref	Compliance grading & comments/recommendations arising from the audit	Proposed action	Completion date & Responsible person	Status
<p>Details of procedures and management systems for:</p> <p>(i) ensuring that the amount and purity of chemicals added to drinking water does not adversely affect the quality of that water or pose a risk to human health; and;</p> <p>(ii) Controlling any residue or chemical by-products imparted to drinking water as a result of the addition of chemicals to water supplied for drinking purposes.</p>	<p>Reg 6(1)(e)(i) 6(1)(e)(ii))</p>	<p>A minor opportunity for improvement has been identified: 1) Where chemical suppliers do not agree to provide a certificate of compliance prior to or post delivery, then Westernport Water should request detailed information about the suppliers quality assurance process and satisfy themselves that a sufficiently rigorous QA process is in place to ensure chemical purity.</p>	<p>Review purchases policies for those suppliers without COC & alternative options. Development of a documented acceptance and check procedure, upon the delivery of chemicals. Request and obtain copies (prior to usage of the chemicals) of routine testing & certificates of analysis and put into a procedure.</p>	<p>December 2008 Water Treatment Plant Supervisor In conjunction with WQO</p>	<p>Completed</p>

Auditable element	Legal Ref	Compliance grading & comments/recommendations arising from the audit	Proposed action	Completion date & Responsible person	Status
<p>Details of emergency management arrangements and procedures for dealing with an incident, event or emergency that may adversely affect the quality or safety of drinking water, or result in water being supplied that poses a risk to human health including- (i) the names and contact details of, and the positions held by, the persons responsible for dealing with such an incident, event or emergency; and (ii) methods for communicating or disseminating information to the public in relation to any such incident, event or emergency.</p>	<p>Reg 6(1)(f)</p>	<p>An area of the incident management system that lacks robustness was identified: 1) note that the draft Corporate Incident Management Plan (CIMP), which was still undergoing testing at the time of the audit, contains alert levels for water quality based on blue-green algae levels from the DSE Blue Green Algae (BGA) Circular for recreational waters, rather than the limits for drinking water, based on the BGA Circular and the ADWG 2004. The INT07-06322: BGA – Monitoring & Management Procedure and the CIMP NEED TO BE CONSISTENT. The CIMP needs to be reviewed with respect to water quality incidents in general. 2) The BGA procedure does not include detailed information about communication and notifications. The E.coli detection and Boil Water Alert procedures do this well with the ‘process flowchart’, so a similar approach is recommended. 3) The WQRMP Section 2.6.3 Table 2-11 currently includes a list of triggers of section 18 and 22 notifications to the DHS. These need to be revised. Also, BGA to be added to the Section 22 triggers.</p>	<p>1) Water Quality events included into Incident & Emergency Mgt Manual – Emergency response protocol with specific reference to BGA & Boiled Water Alert (BWA) procedures.</p> <p>2) Modify BGA procedure communication & notifications per E. coli & BWA procedures</p> <p>3) Adopt recommendations modify Table 2.11 of WQRMP</p>	<p>October 2008 Risk & Environment Manager</p> <p>November 2008 WQO / CS Manager</p> <p>November 2008 WQO</p>	<p>Completed</p>
<p>CV211677 Final</p>					<p>51</p>

Auditable element	Legal Ref	Compliance grading & comments/recommendations arising from the audit	Proposed action	Completion date & Responsible person	Status
<p>(a) The risk to human health that arises from the presence in water of- (iii) organic chemicals, including pesticides, pesticide residues and organic disinfection by-products.</p>	<p>6(2)(a)(ii) i)</p>	<p>The lack of pesticide or herbicide monitoring (base line and event) during the audit period has been assessed as a minor non-compliance, as pesticides are not considered to be a high potential risk to human health and some progress with this was evident at the time of the audit. This will be done over the 12 month period. The results of this raw water monitoring programme may warrant the need for treated water monitoring to verify the effectiveness of the control measures in place.</p>	<p>Monthly monitoring program, to include base line and event monitoring. Identification of the potential risks, to be incorporated into in the WQRMP. The monitoring program put in place to assess impact over annual basis to determine future cycle for routine testing Results of the both monitoring raw water and risks to be put into the WQRMP. The monitoring programme and actions arising from this are to be put into the WQRMP.</p>	<p>Commenced July 08 Completed June 09 WQO</p>	<p>Completed</p>

Auditable element	Legal Ref	Compliance grading & comments/recommendations arising from the audit	Proposed action	Completion date & Responsible person	Status
Any document or operating manual, procedure or protocol created pursuant to the risk management plan or containing material relating to the content of the risk management plan.	Reg 7(b)	The Blue Green Algae procedure was not referred to in the latest WQRMP. It is recommended that it be added to WQRMP Table 2.12 summary of WQ Management procedures in the next WQMP revision.	Include BGA procedure in table 2.12 – Summary of Water Quality Management Procedures	October 2008 WQO	Completed
	Reg 7(b)	The Procedure for Management of Chlorine Residuals in the Distribution system, which appears to be in use, states that there are no low or high residual alarms in the distribution system. However, all other documentation and interviewees testified that there are. This procedure needs to be corrected.	Update procedure with Low/High alarms	February 2009 Water Treatment Plant Supervisor In conjunction with WQO	Completed
	Reg 7(b)	It was evident that there is currently no central recording system for maintenance and calibration of instruments, however, the WQRMP, action plans and interviewees indicated that the maintenance system is under review.	1) Refer to 6.1 (b) for recording system. 2) Overall schedule for maintenance of equipment included in plant maintenance plan which is to be developed during 2008/09	December 2008 Water Treatment Plant Supervisor June 2009 Maintenance Planner	Completed

Auditable element	Legal Ref	Compliance grading & comments/recommendations arising from the audit	Proposed action	Completion date & Responsible person	Status
<p>Any training and competency manual relating to the responsibilities of the staff of the water supplier or water storage manager (as the case requires) to manage and deal with- (ii) risks identified in the risk management plan; and (ii) emergencies, incidents or events that may adversely affect the quality of- (A) in the case of a water supplier, drinking water; (B) in the case of a water storage manager, the water supplied or to be supplied.</p>	<p>7(c)(ii)</p>	<p>A minor area of improvement was identified: 1) In WQRMP Section 2.9 Table 2-23 training requirements for Water Treatment Plant Operators and Distribution System Operators interviewees indicated that operators and maintenance staff also have an important role to play in flushing parts of the distribution system after repairs and then disinfection that part of the system. Hence, it is recommended that these staff be included in this table, receive disinfection training and be made familiar with the WQRMP.</p>	<p>Assess suitable training session for water disinfection via Dr Peter Mosse. Schedule appropriate training program during 2009.</p>	<p>December 2008 WQO</p>	<p>Completed</p>

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

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

9 References

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