Water Quality Annual Report

2015/16

Legislative Background and Purpose

Section 26 of the *Safe Drinking Water Act 2003* (the Act) requires water suppliers and water storage managers to provide to the Secretary of the Department of Health and Human Services (DHHS) an annual report each financial year. Falls Creek Resort Management ('FCRM') is the water supplier for the Falls Creek Alpine Resort. This report is for the 2015-16 reporting period and covers issues relating to the quality of drinking water.

FCRM's obligations under the Act include:

- A requirement to prepare, implement and review plans to manage risks in relation to drinking water;
- A requirement to have the risk management plan audited by approved auditors;
- To ensure that the drinking water meets quality standards specified by the regulations;
- To disclose to the public information concerning the quality of drinking water; and
- To report known or suspected contamination of drinking water to the Secretary of the DHHS.

Information to be included in the annual report is specified by regulation 15 of the Safe Drinking Water Regulations 2005 for the period 1 July to 17 July 2015 and regulation 16 of the Safe Drinking Water Regulation 2015 from 18 July to 30 June 2016.

Introduction

FCRM is responsible for the development, promotion and management of the Falls Creek Alpine Resort which is located 120 kilometres south of the Albury/Wodonga area is situated at an altitude of 1210-1830 metres, and is surrounded by the Alpine National Park.

The entire resort area of 1495 hectares is Crown land, which is deemed to be permanently reserved as an alpine resort under the *Crown Land (Reserves) Act 1978*. The Resort area is not part of any municipal district for the purposes of the *Local Government Act 1970* and the Board acts on behalf of the Crown under the direction and guidance of the Minister for Energy, Environment and Climate Change ("the Minister").

The Board is established by the *Alpine Resorts (Management) Act 1997* which sets out the objectives for the management of Victoria's alpine resorts.

The resort is set aside for alpine recreation and tourism. The development, promotion, management and use of the resort is to be undertaken in a manner which is compatible with the alpine environment having regard to economic, environmental and cultural considerations. The village area supports administrative, retail and commercial business as well as a large variety of accommodation.

FCRM provides a range of services to the community and resort visitors determined by clearly defined functions under the Act. These include the provision of a range of utility services including the supply of drinking water.

Falls Creek Resort Management is committed to producing safe and aesthetically pleasing drinking water. During 2015-16 FCRM has continued to meet all of its regulatory obligations and produce safe drinking water to its customers.

The village population, and consequent demand for water, is highly seasonal. Approximately 146,000 people visited the resort during the 2015 winter season resulting in 376,000 visitor days.

This report outlines drinking water quality achieved for the 2015-16 financial year and has been prepared to provide our customers with information relating to the quality of water supplied and to comply with the annual reporting requirements under Section 26 of the Act. The report covers issues

relating to the quality of drinking water and is structured in accordance with the 2015-16 Water Quality Annual Report Guidance Note issued by the DHHS in July 2016.

The report is divided into 11 sections:

1. Overview
2. Drinking Water Treatment Processes
3. Emergency, Incident and Event Management
4. Drinking Water Quality Standards
5. Analysis of Water Sample Information
6. Aesthetic Characteristics
7. Water Quality Complaints
8. Risk Management Plan Audit
9. Undertakings
10. Regulated Water
11. Glossary of terms and further information.

For further information, please contact FCRM's Director Infrastructure and Mountain Response, Callum Brown on (03) 5758-1200 during business hours.

1 Overview

FCRM strives to provide quality drinking water services for our customers and the most effective means of doing so is through a preventative risk management approach that encompasses all steps in water production from the catchment to the consumer.

1.1 Water Supply System

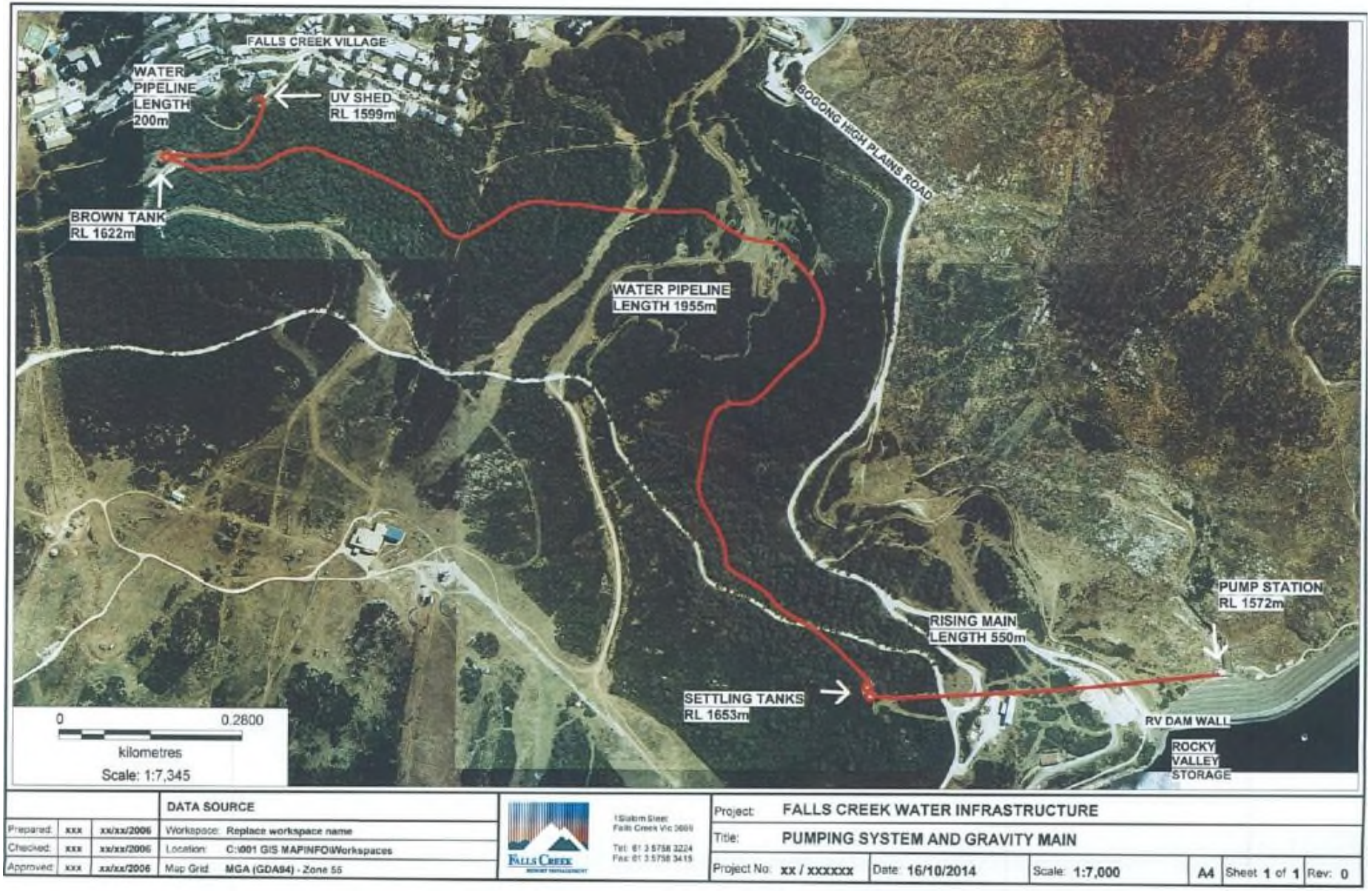
1.1.1 Overview

The drinking water for Falls Creek during 2015/16 was mainly sourced from Rocky Valley Dam which is located in the Alpine National Park and is operated by AGL Hydro for hydro electricity generation. A new source water supply, from a groundwater bore was commissioned in late May 2016. The drinking water supply system that services the Falls Creek Alpine Resort is comprised of the following elements:

Table 1: Falls Creek Water Supply System Elements and Localities

Element	Description	Location and key information about infrastructure
Catchment	Falls Creek Alpine Resort and Alpine National Park	Catchment is upstream of village area and predominantly within the National Park with no dwellings, farming or industry.
Source Water	Rocky Valley Lake Groundwater Bore (from 23 May, 2016)	Operated by AGL Hydro Groundwater bore installed and operated by FCRM.
Headworks	Pump Station and Rising Main	Water is pumped from the dam to the settling tanks.
Distribution System	Settling Tanks, Distribution Main and Brown Tank	Pumped water passes through settling tanks and it is gravity to the service tank (Brown Tank) above the village. From the Brown Tank water is fed by gravity through the UV treatment and into the reticulation system serving the Resort.
Treatment System	UV	Two units installed in parallel: (a) 5 kW medium pressure lamp. (b) 4 kW medium pressure lamp.
Reticulation	Network of pipelines delivering to consumers within the village	Total of almost 4 km reticulation system
Populations Supplied	120 -1,500 (Summer) to 5,000 (Winter)	
Substances Added	Nil	

Figure 1 – System Diagram



1.1.2 Source Water Protection

The water supply catchment for Rocky Valley Dam is upstream of the Falls Creek village. Runoff in the catchment is from snow melt and rain runoff which is collected in a series of aqueducts and small-mountain streams before flowing into the dam which has a full supply capacity of 28,000 megalitres. The new groundwater bore is also located above the village area in close proximity to the storage tanks and has been assessed as not under the influence of surface water.

There are no significant point sources of faecal pollution entering the Rocky Valley Dam. There are no intensive livestock or cattle grazing operations, dairies, grazing properties, hobby farms, sewage treatment plant discharges, manure spreading applications, aggregations of septic tanks or sewer overflow structures.

The water source is at no immediate risk of gross contamination and there is a need to maintain that position through protecting the source. There is recreational access within the catchment with skiing and related activities in winter and hiking and boating activities in summer. Some water reaching the dam flows through the resort area and may pick up material leaching or being spilt within the Resort. Therefore, the source is at some risk from trace levels of contamination from occasional open human defecation, occasional water entry acts by persons, some runoff or exfiltration seepage and some wildlife faecal material. Therefore, like any surface water, there is sufficient risk present to justify disinfecting the source.

The long-term results of raw water monitoring typically show very few detectable *E. coli* in 100 ml samples and what detections there are typically show single digit concentrations per 100 ml. Therefore, the level of risk is adequately mitigated by the current level of disinfection in place involving sedimentation and UV disinfection with the option to draw from one of two quite distinct points in the Rocky Valley Dam source as well as the Frying Pan Spur Aqueduct.

It is possible that the levels of activity in and around the dam may increase in future. Improvements in treatment automation and reliability should help to offset some of the risks of additional contamination that may arise from these increased activities. However, there is a need for FCRM to work with Parks Victoria and AGL Hydro to maintain a good understanding of the level of risk associated with this source. At some point it may be judged necessary to introduce an additional treatment barrier beyond the sedimentation tanks and UV systems currently in place. The logical next step would be to introduce a package membrane filtration system or ozone disinfection system if levels of activity on the lake increase beyond low levels.

1.1.3 Headworks System

Water is drawn from the Rocky Valley Dam which is owned and operated by AGL Hydro and principally used for the commercial generation of electricity.

There is an aerator in the dam itself and a compressor line into the dam. The aerator is important to help reduce stratification of the dam and, in turn, reduce the risk of iron or manganese causing problems with UV disinfection system performance or causing problems with aesthetic water quality.

The Resort supply is pumped from an off-take point on the dam low level outlet to a pair of settling tanks.

There is no telemetry at the pumping station requiring that the pumps be inspected daily. Access to the pump station in the winter months is usually by oversnow vehicle.

1.1.4 Distribution System - Settling Tanks, Gravity Main and Brown Tank

The settling tanks (0.6ML – constructed in 2004) are located on the hillside above the dam. After a nominal settling period in the tanks, the water flows for just under 2km by gravity to the header tank 'Brown Tank'. The water then flows by gravity to the UV disinfection plant before entering the reticulation that services the village. The capacity of the Brown Tank is about 15% greater than the current maximum daily demand.

Both tanks are inspected regularly (daily in winter) and there is now telemetry and an alarm system for the UV plant operation and the storage tank level.

1.1.5 Reticulation System

The majority of the 3.86km reticulation system is constructed from rubber ring jointed cement lined ductile iron pipe (DICL)., There is a short section of AC pipeline remaining, which is still in use and the remaining uPVC pipes that are still in service are located between the Snow Ski Apartments and the top of Falls Creek Road, and from the Waste Water Treatment Plant to Bogong High Plains Road.

Because of the limited space in many instances most of the utility services have been laid in a common trench.

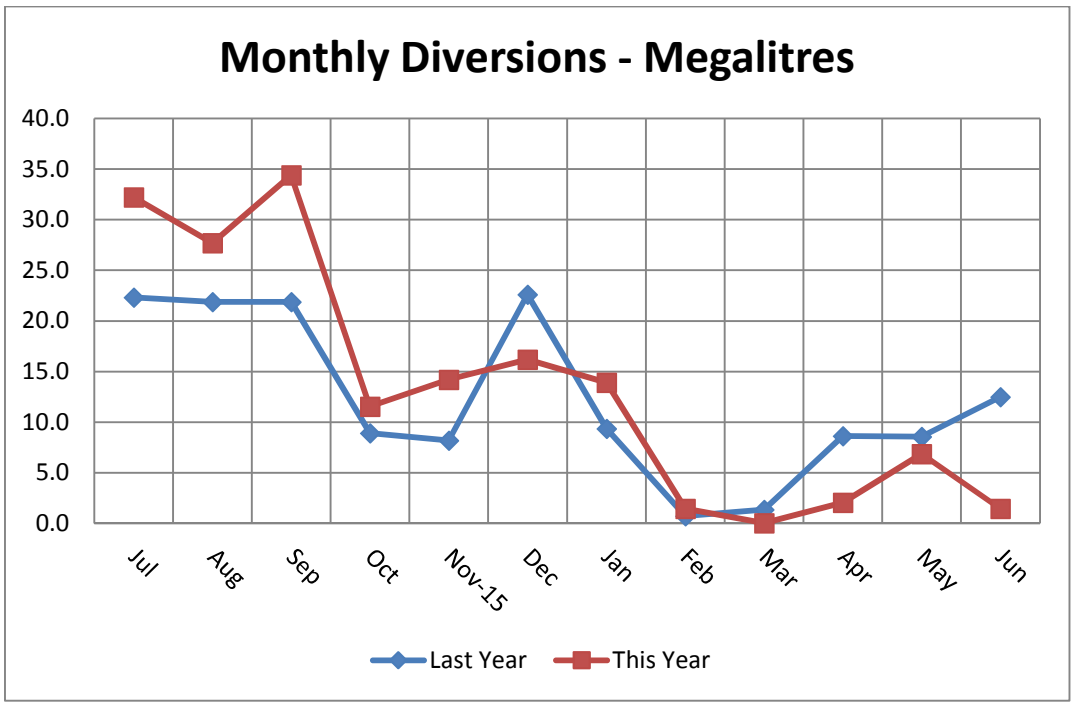
1.2 Demand

System demand varies with seasonal visitation and the average daily flow fluctuates from around 0.25 megalitres per day (ML/d) up to 1.5 ML/d during the peak of winter (population approx. 5000). The total volume pumped from Rocky Valley Dam for the last four years is as per Table 2 below.

Table 2: Consumptive Water Usage

Year	Volume Diverted (ML)
2015-16	162
2014-15	147
2013-14	180
2012-13	195

The winter seasonal nature of highest consumptive use is demonstrated in the following graph of monthly diversions.



1.3 Recent System Improvements

In 2015/16 FCRM embarked on a major upgrade of the water supply infrastructure and the establishment of a new supply source. The works were completed and commissioned on 23 May, 2016 and have considerably improved the ability of FCRM to effectively manage the risks to drinking water supplied to the resort. Details of the improvements consisting of a new groundwater supply source, increased storage capacity, new and upgraded treatment facilities and remoted monitoring and the effectiveness of the improvements will be provided in next year's annual report.

2 Drinking Water Treatment Processes

2.1 Water Treatment

Water entering the reticulation from the storage tank is disinfected using UV treatment. The UV disinfection plant installed at Falls Creek is adequate to safely disinfect the raw water under normal circumstances and under higher demand than at present.

Disinfection is provided by two UV units in installed in parallel with automatic switching should a failure occur.

The UV treatment plant was completely upgraded with two new units which were commissioned in June, 2016 (see section 11.3.2).

High turbidity can reduce the amount of UV radiation reaching microorganisms and necessitate higher doses of applied radiation for effective disinfection. Units require regular cleaning and maintenance to remain effective. FCRM has established a Target Level of 3 NTU and a Critical Limit of 5 NTU based on past experience that demonstrates that disinfection of water under such conditions is effective. The maximum turbidity reading in 2015-16 was 2.1 NTU and there were no issues arising out of the process used to disinfect drinking water in 2015-16.

The basic online remote sensing equipment with dial out alarm functionality which was installed in 2010-11 was upgraded to full SCADA surveillance in June 2016 which has further enhanced the water treatment system security.

There are no chemicals used for both water treatment and disinfection.

Locality	Source Water	Treatment Process	Added Substances	Comments
Falls Creek	Rocky Valley Lake	UV Disinfection	Nil	Nil

2.2 Issues - Lake Stratification

Stratification occurs in deep reservoirs and is a common cause of poor water quality, especially where the water supply is taken from the bottom of the reservoir. The source water for the Falls Creek water supply coming from the Rocky Valley Lake is of a poorer quality during two periods of the year which correspond with a stratified condition of the lake. This in turn has the potential to impact on the quality of the drinking water within the village.

There is a marked decrease in dissolved oxygen during the period of stratification. The dissolved oxygen in the hypolimnion (deeper) waters is reduced due to normal biological activity and as this oxygen is not being replenished the water eventually becomes stagnant and anoxic with consequent increase in dissolved iron and manganese and other detrimental changes in the water supply. As the stratification persists obnoxious smelly gases are also generated.

When this water is drawn off and comes in contact with oxygen, the iron dissolved as ferrous carbonate is precipitated as red ferric oxide and the dissolved manganese comes out of solution and causes a build-up of black slime, and there is often a smell of hydrogen sulphide in the water.

The bushfires in December 2006 and January 2003 have exacerbated the effects of lake stratification by increasing chemical levels in the lake. Immediately after the fires, iron and turbidity levels in the lake were extremely high caused by ash being washed into the reservoir.

The two periods in the year when water quality in Rocky Valley falls off are late summer to early autumn and late winter to early spring which is much less pronounced and is not a cause of concern to the supply of drinking water.

Since the 2006 bushfires the impact of summer stratification on water quality has been more pronounced.

From 2007 a connection to the snowmaking system which draws water from the upper reaches of the lake has been employed as an alternative source to mitigate the stratification effects. While this has been an effective procedure in past years it is not a reliable long-term answer to the problem. This was highlighted in 2011 when the snowmaking system was down for maintenance purposes which in turn prompted the need to seek an alternative source from the aqueduct which runs above the village and feeds water into the lake in close proximity to the existing pumping station.

Stratification of the lake occurred earlier than usual last summer starting in the last week of December and reaching a peak iron level of 1.4mg/L by the second week of January. This caused a minor spike in the reticulation levels. The stratified conditions within the lake persisted until mid-March – a period of 12 weeks, or 4 weeks longer than usual.

This issue will not be present in the future with the supply of water from the groundwater bore.

3 Emergency, Incident and Event Management

Although preventive strategies are intended to prevent incidents and emergency situations from occurring, some events cannot be anticipated or controlled, or have such a low probability of occurring that providing preventive measures would be too costly. For such incidents, there must be the ability to respond promptly, constructively and efficiently.

There are a number of hazards or events that can lead to emergency situations, including:

- Failing to meet guideline values and other requirements;
- Accidents that increase levels of contaminants (e.g. spills in catchments, incorrect dosing of chemicals);
- Equipment breakdown and mechanical failure;
- Prolonged power outages;
- Extreme weather events (e.g. flash flooding, cyclones);
- Natural disasters (e.g. fire, earthquakes, lightning damage to electrical equipment); and
- Human actions (e.g. serious error, sabotage, strikes).

FCRM has an Emergency Management Plan under the *Emergency Management Act 1986* and this plan is regularly updated and audited. The action statement for a potable water supply incident is detailed in Appendix C of the plan. The most recent independent audit of this plan was conducted in June 2011, which found the plan compliant.

3.1 Known or Suspected Contamination Reported Under Section 22

There was one incident requiring notification under Section 22 of the Act during the reporting period.

3.2 Incidents

3.2.1 Lightning Strike – 13 November, 2015

At approximately 7:00pm on Thursday 12th of November the UV treatment facility was struck by lightning. The lightning strike caused some internal electrical damage to the control switchboard within the UV shed rendering both of the UV lamps ineffective in the disinfection of potable water. The damage was repaired and normal disinfection resumed at 11:30am on 13th November.

In mid-November the population at Falls Creek is at its lowest and the risk of supplying untreated water to consumers and food premises is much lower than would otherwise be the case during the snow season. A Boil Water Notice was issued to the entire community by 2:00am on 13th November and notices were posted within the village. Water samples were collected from the delivery side of the UV facility at 1:00am, 1:30am and 12:45pm on 13 November 2015. Water samples were also collected from the reticulation system at 1:30am and 1:00pm on 13 November 2015. Flushing of the reticulation was then carried out and completed just before midday. All water samples were free of *E.coli*.

The Boil Water notice was rescinded at midday on 13th November.

The department of Health and Human Services were verbally notified of the incident on 13 November 2015 and a Section 22 report was submitted on 19th November.

4 Drinking Water Quality Standards

4.1 Safe Drinking Water Regulations 2005 (1 July to 17 July 2015)

Drinking water supplied during 1 July to 17 July 2015 was required to meet the Schedule 2 water quality standards specified in Safe Drinking Water Regulations 2005. To meet regulatory obligations, the parameters tested on a weekly basis were *Escherichia coli* and turbidity.

Parameter	Sampling Frequency	Number of samples	Result	Water Quality Standard	Standard Met
Escherichia coli	Weekly	53	0	At least 98% of all samples of drinking water collected in any 12 month period contain no *Escherichia coli* in 100 mL of drinking water.	Yes
Turbidity	Weekly	53	0.8 NTU	95% upper confidence limit of the mean of samples of drinking water collected in any 12 month period must be less than or equal to 5.0 NTU	Yes

4.2 Safe Drinking Water Regulations 2015 (18 July 2015 to 30 June 2016)

Drinking water supplied during 18 July to 30 June 2016 was required to meet the water quality requirements of the Safe Drinking Water Regulations 2015.

Parameter	Sampling Frequency	Number of samples	Water Quality Standard	Results
Escherichia coli	Weekly	53	No *Escherichia coli* per 100 millilitres of drinking water, with the exception of any false positive sample.	No *Escherichia coli* detected in 100 mL of all samples.
Turbidity	Weekly	53	The 95th percentile of results for samples in any 12 month period must be less than or equal to 5.0 NTU.	0.8 NTU

Other water quality parameters monitored that may pose a risk to human health

Results for the reporting period are as shown in the Table below. All tested parameters met the health guideline values in the Australian Drinking Water Guideline (ADWG).

Data recorded since 1997 shows that, apart from copper and magnesium, all of these parameters have continually tested below the detectable limits. In this time period the highest copper reading was 0.61 mg/L (30% of guideline) and manganese 0.2 mg/L (40% of guideline value). Annual testing is conducted in accordance with the risk assessment of the risk management plan.

Testing of these parameters from the groundwater source indicates that all are below the detectable limits.

Parameter	Frequency of Sampling	Number Samples	No. of non-complying Samples	Parameter Health Guideline Value (mg/L)	Max test value (mg/L)	Met the Standard (Yes/No)
Arsenic	Annually	1	0	0.01	<0.001	Yes
Cadmium	Annually	1	0	0.002	<0.0002	Yes
Chromium	Annually	1	0	0.05	<0.001	Yes
Copper	Annually	1	0	2	0.05	Yes
Fluoride	Annually	1	0	1.5	<0.05	Yes
Lead	Annually	1	0	0.01	<0.001	Yes
Manganese	Annually	1	0	0.5	0.2	Yes
Mercury	Annually	1	0	0.001	<0.0001	Yes
Nickel	Annually	1	0	0.02	<0.001	Yes
Selenium	Annually	1	0	0.01	<0.001	Yes
Sulphur	Annually	1	0	500	<0.5	Yes

Drinking Water Quality Reports

FCRM met all water quality standards for the reporting period. Section 23 of the Act requires FCRM to make available for inspection by the public the results of the water quality monitoring program. Customer and members of the public may access drinking water quality data by contacting FCRM on (03) 5758-1200 during business hours or by email to fcrm@fallscreek.com.au

5 Analysis of Water Sample Information

5.1 Comparison of previous years water quality data

FCRM has consistently delivered good quality and safe drinking water. As the data below demonstrates, Schedule 2 water quality parameters have been met for the previous five reporting periods. All other parameters monitored have met the health guideline values stated in the ADWG during the 2015-16, 2014-15 and 2014-14 reporting periods. This is due to the combination of high quality source water and good risk management practices.

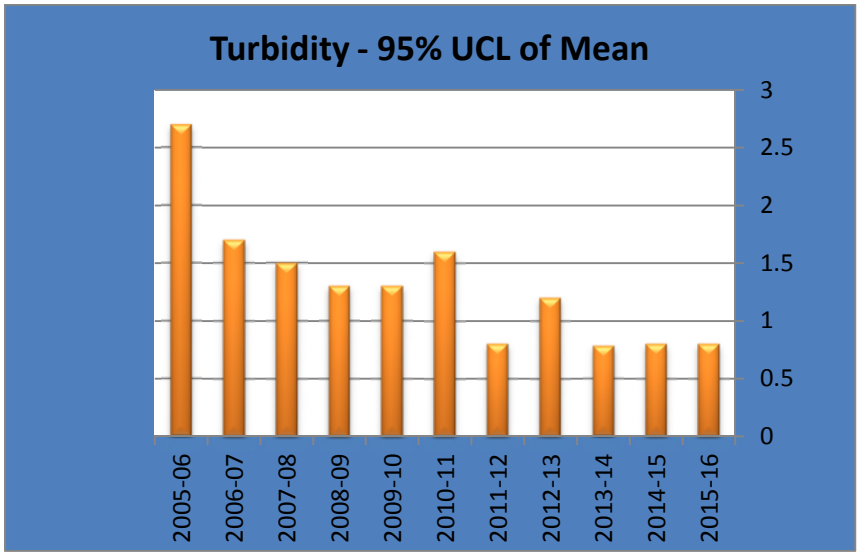
5.1.1 E. coli

Year	Sampling Frequency	No. of samples	No. of samples containing *E. coli*	Max Result (orgs/100mL)	% Samples with no *E. coli*	Complying (Yes/No)
2015-16	Weekly	104	0	0	100%	Yes
2014-15	Weekly	104	0	0	100%	Yes
2013-14	Weekly	104	1	1	99%	Yes
2012-13	Weekly	104	0	0	100%	Yes
2011-12	Weekly	104	0	0	100%	Yes
2010-11	Weekly	104	0	0	100%	Yes

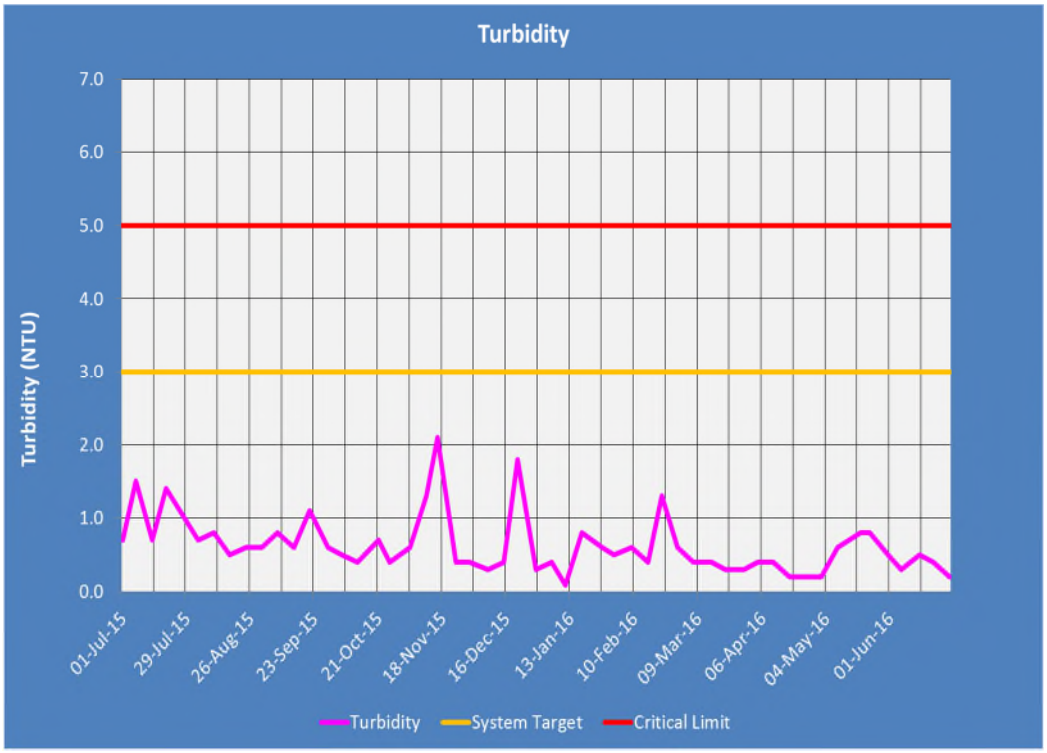
5.1.2 Turbidity

Year	Sampling Frequency	No. of samples	Max NTU	Min NTU	95% UCL of mean	Complying (Yes/No)
2015-16	Weekly	52	2.1	0.1	0.8	Yes
2014-15	Weekly	52	3.1	0.1	0.8	Yes
2013-14	Weekly	52	2.3	0.2	0.8	Yes
2012-13	Weekly	52	4.4	0.2	1.3	Yes
2011-12	Weekly	52	0.2	1.6	0.8	Yes
2010-11	Weekly	51	12	0.3	1.6	Yes

Improved operational procedures in relation to the source water in recent years has seen a gradual improvement in the 95% upper confidence limit of the mean as demonstrated in the graph below.



Weekly turbidity readings for the year are show graphically below.



5.1.3 Arsenic

Year	Frequency of Sampling	Number Samples	Min test value (mg/L)	Max test value (mg/L)
2015-16	Annually	1	<0.001	<0.001
2014-15	6 Monthly	2	<0.001	<0.001
2013-14	Annually	1	<0.001	<0.001

5.1.4 Cadmium

Year	Frequency of Sampling	Number Samples	Min test value (mg/L)	Max test value (mg/L)
2015-16	Annually	1	<0.0002	<0.0002
2014-15	6 Monthly	2	<0.0002	<0.0002
2013-14	Annually	1	<0.0002	<0.0002

5.1.5 Chromium

Year	Frequency of Sampling	Number Samples	Min test value (mg/L)	Max test value (mg/L)
2015-16	Annually	1	<0.001	<0.001
2014-15	6 Monthly	2	<0.001	<0.001
2013-14	Annually	1	<0.001	<0.001

5.1.6 Copper

Year	Frequency of Sampling	Number Samples	Min test value (mg/L)	Max test value (mg/L)
2015-16	Annually	1	0.05	0.05
2014-15	6 Monthly	2	0.27	0.61
2013-14	Annually	1	0.051	0.051

5.1.7 Fluoride

Year	Frequency of Sampling	Number Samples	Min test value (mg/L)	Max test value (mg/L)
2015-16	Annually	1	<0.05	<0.05
2014-15	Annually	1	<0.05	<0.05
2013-14	Annually	1	<0.05	<0.05

5.1.8 Lead

Year	Frequency of Sampling	Number Samples	Min test value (mg/L)	Max test value (mg/L)
2015-16	Annually	1	<0.001	<0.001
2014-15	6 Monthly	2	<0.001	<0.001
2013-14	Annually	1	<0.001	<0.001

5.1.9 Manganese

Year	Frequency of Sampling	Number Samples	Min test value (mg/L)	Max test value (mg/L)
2015-16	Annually	1	0.2	0.2
2014-15	4 Monthly	3	0.00	0.2
2013-14	Annually	1	0.001	0.001

5.1.10 Mercury

Year	Frequency of Sampling	Number Samples	Min test value (mg/L)	Max test value (mg/L)
2015-16	Annually	1	<0.0001	<0.0001
2014-15	6 Monthly	2	<0.0001	<0.0001
2013-14	Annually	1	<0.0001	<0.0001

5.1.11 Nickel

Year	Frequency of Sampling	Number Samples	Min test value (mg/L)	Max test value (mg/L)
2015-16	Annually	1	<0.001	<0.001
2014-15	6 Monthly	2	<0.001	<0.001
2013-14	Annually	1	<0.001	<0.001

5.1.12 Selenium

Year	Frequency of Sampling	Number Samples	Min test value (mg/L)	Max test value (mg/L)
2015-16	Annually	1	<0.001	<0.001
2014-15	6 Monthly	2	<0.001	<0.001
2013-14	Annually	1	<0.001	<0.001

5.1.13 Sulphur

Year	Frequency of Sampling	Number Samples	Min test value (mg/L)	Max test value (mg/L)
2015-16	Annually	1	<0.5	<0.5
2014-15	6 Monthly	2	<0.5	<0.5
2013-14	Annually	1	<0.5	<0.5

5.1.14 Chlorine based disinfection by-product chemicals

Falls Creek does not use chlorine based disinfection products so this parameter is not monitored.

5.1.15 Ozone based disinfection by-product chemicals

Falls Creek does not use ozone based disinfection products so this parameter is not monitored.

5.1.16 Aluminium

Falls Creek does not use aluminium based products in its treatment process so this parameter is not monitored.

6 Aesthetic Characteristics

With the exception of iron, all parameters tested met the ADWG aesthetic guideline values for the reporting period.

Test Results

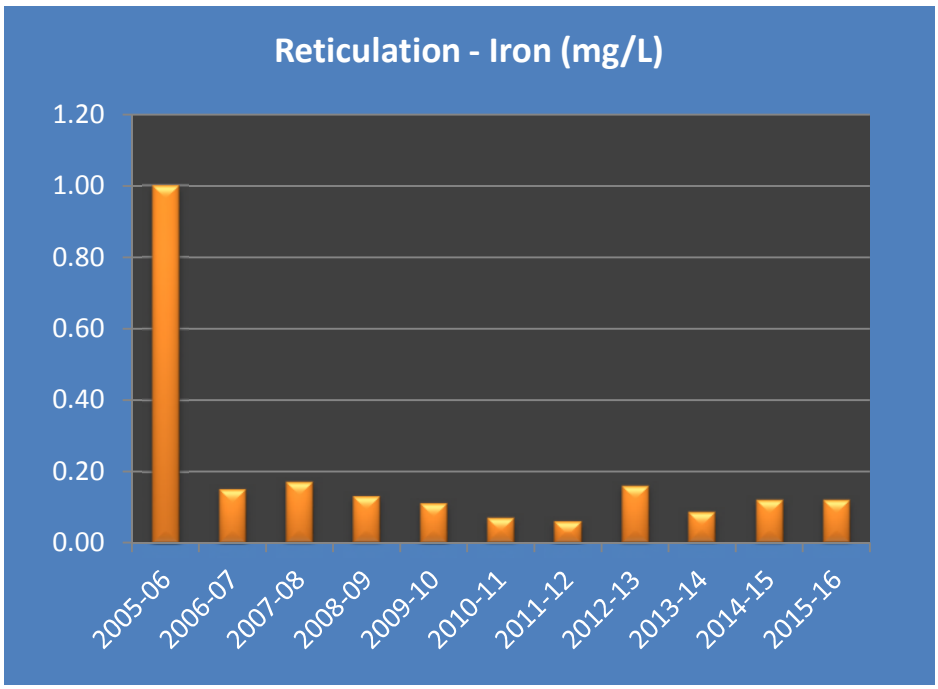
Parameter	Frequency of Sampling	Number Samples	Units	Mean Value	Maximum test value	Minimum test value	ADWG Guideline
pH	Quarterly	4	pH units	6.8	6.8	6.8	6.5-8.5
Total Dissolved Solids	Quarterly	4	EC	12.5	17	10	1000
Colour	Quarterly	4	HU	8	12	4	15
Total Alkalinity	6 Monthly	2	mg/L	5	6	4	N/A
Calcium	6 Monthly	2	mg/L	1.1	1.2	1.0	N/A
Chloride	6 Monthly	2	mg/L	<1	<1	<1	250
Hardness	6 Monthly	2	mg/L	4.0	4.0	4.0	200
Iron	Weekly	52	mg/L	0.11	0.62	<0.05	0.3
Magnesium	6 Monthly	2	mg/L	0.2	0.2	0.2	N/A
Potassium	6 Monthly	2	mg/L	0.2	0.2	0.2	N/A
Silica	6 Monthly	2	mg/L	2.1	2.6	1.6	N/A
Sodium	6 Monthly	2	mg/L	0.6	0.7	0.5	180
Zinc	Annually	1	mg/L	0.00	0.00	0.00	3

6.1 Actions undertaken where aesthetic guideline value is not satisfied.

On 18 January, 2016 the concentration of dissolved iron in the reticulation sample was 0.62mg/L which is above the guideline value and double that of the preceding week indicating that there has been another very rapid onset of stratification of the lake. The supply was immediately switched to the snow making system and iron level fell back to 0.21mg/L within a week.

6.2 Iron

As previously discussed the source water in the Rocky Valley dam suffers from aesthetic problems in late summer and mid-winter. This is reflected in elevated levels of dissolved iron and manganese in the dam which causes a characteristic brown tinge to the water. Improved operational responsiveness to the change in water quality by taking supply from alternative sources (aqueduct or the snow making system) during periods of stagnation in summer started in 2006-07. This has produced a marked improvement in the iron levels detected in the reticulated supply. The trend in dealing with this issue is demonstrated in the graph of annual average levels shown below.



The summer stratification of the lake was earlier than normal this year with the source water iron level rising above the aesthetic guideline of 0.3mg/L in the last week of December reaching a peak of 1.4mg/L by 13 January. After switching to the snow making system which draws water from the surface, the iron levels in the reticulation were maintained below 0.3mg/L during the lake stratification period.

7 Water Quality Complaints

There were no complaints received from customers during the reporting period.

Type of Complaint	No of Complaints	No. of complaints per 100 customers supplied.	Comparison with previous year
Discoloured water	0	0	0
Taste/Odour	0	0	3
Blue water	0	0	3
Air in water	0	0	0
Suspected illness	0	0	0
Other	0	0	0

8 Risk Management Plan Audit

The Secretary to the Department of Health and Human Services required Falls Creek Resort Management to undertake an audit of their drinking water risk management plan prior to 30 June 2016.

8.1 Audit Summary

FCRM's audit was conducted on 20th April, 2016 for the period from 8th April, 2014 to 20th April, 2016. The audit certificate was issued to FCRM on 28th June, 2016.

8.2 Overall Finding and Key Issues

- The Falls Creek water quality management system was found to be compliant with section 7(1) of the Act and the associated regulations.
- The recent upgrade program of the drinking water treatment system will improve the robustness of this system.
- The system will be further enhanced if the ground water trial is successfully completed and brought into operation.

8.3 Opportunities for Improvement (OFI)

The following improvement opportunities were identified by the auditor:

- OFI 1 - A water quality mock exercise should be carried out in due course.
- OFI 2 - A major update of the risk assessment should be undertaken.
- OFI - 3 Preventive measures, controls, monitoring measures, and assessments of effectiveness should be collected and summarised in the RMP documentation.

These OFI's have been accepted by FCRM and the DHHS was informed of plans to implement these by letter of 15 August 2016.

9 Undertakings

Falls Creek does not have any undertakings with the Department of Health and Human Services.

10 Regulated Water

FCRM does not manage any regulated water supplies.

11 Glossary of Terms and Further Information

Act ..... See SDWA4
ADWG..... Australian Drinking Water Guidelines 2011
AWA..... Australian Water Association
Class A water ..... Recycled water that has been treated to a standard that enables unrestricted public use
CMA..... Catchment Management Authority
DHHS ..... Department of Health and Human Services
DELWP ..... Department of Environment, Land, Water and Planning
DWQMS..... Drinking Water Quality Management System
E. coli ..... Escherichia coli – organism that indicates faecal contamination. Used as an indicator of safe drinking water
EMP ..... Emergency Management Plan
EPA ..... Environment Protection Authority
FCRM ..... Falls Creek Resort Management
kL ..... Kilolitre – 1,000 litres
ML..... Megalitre – 1,000,000 litres
MOU ..... Memorandum of Understanding
NTU..... Nephelometric Turbidity Units (see Turbidity)
OHS..... Occupational Health and Safety
pH ..... Measure of the acidity or basicity of water e.g.: pH = 7 is neutral; pH < 7 is acidic; pH > 7 is basic
Potable ..... Drinkable, suitable for human consumption
2005 Regulations.. Safe Drinking Water Regulations 2005
2015 Regulations.. Safe Drinking Water Regulations 2015
SDWA..... Safe Drinking Water Act 2003
Turbidity ..... A measure of the muddiness of water which may be caused by suspended fine clay particles, silts, algae, organic plant and animal debris
UV ..... Ultra Violet