

WATER SUPPLY ANNUAL REPORT 2020-21



Southern Alpine Resort Management Board

Water supply
2020-21 Annual Report

For year ending 30 June 2021

Lake Mountain Alpine Resort and Mount Baw Baw Alpine Resort

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Acknowledgement of Country

We acknowledge and respect the Victorian Traditional Owners as the original custodians of Victoria’s land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

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INTRODUCTION

1. Legislative framework

The Southern Alpine Resort Management Board ('the Board') was established on 1 January 2017 as a result of an amendment to the *Alpine Resorts (Management) Act 1997*. It is the successor to the Lake Mountain Alpine Resort Management Board and the Mount Baw Baw Alpine Resort Management Board.

2. Board governance

The Board is established by the *Alpine Resorts (Management) Act 1997* s34 (2). The Board is deemed to be the committee of management of all the Crown land within the Lake Mountain Alpine Resort and Mount Baw Baw Alpine Resort that is permanently reserved under the *Crown Land Reserves Act 1978*.

3. Vision for the resorts

Recognised as providing memorable, accessible, all seasons alpine adventures.

4. Mission for management of the resorts

Building a dynamic, passionate, customer focused culture and pursuing relationships to adapt to climate change and deliver exciting all-seasons adventures.

5. Water supply for the resorts

The Board is committed to the delivery of quality reliable water service for its visitors and meeting all of its regularity obligations to the resorts. The aim is to provide safe and aesthetically pleasing drinking water for Mount Baw Baw Alpine Resort and provide a regulated water supply for Lake Mountain Alpine Resort that its water is not intended for drinking water and cannot be mistaken for drinking water.

6. Reporting requirements

This report has been prepared for the Secretary, to the Department of Health as outlined in Section 26 of the *Safe Water Drinking Act 2003* and Section 16 of the *Safe Drinking Water Regulations 2015*. The report is provided each year on the issues relating to the quality of drinking water and regulated water supplied by that water supplier.

SECTION A - LAKE MOUNTAIN ALPINE RESORT

1. The location and scope of activities

Lake Mountain Alpine Resort is located approximately 120km northeast of Melbourne, is the closest alpine resort to Melbourne and the premier family snow play destination in the State. Lake Mountain's summit elevation is 1,433m. Located adjacent to the Yarra Ranges National Park and with 37km of groomed trails, and access to over 2,400 hectares of skiable terrain in the National Park, the resort is also one of Victoria's premier cross-country alpine resorts. The resort covers an area of 465 hectares. The resort comprises of toboggan slopes, cross-country ski trails, the visitor centre and administration building which are all situated at an elevation of approximately 1,400m.

During the green season Lake Mountain is an event venue, hosts guided walking tours, mountain biking, road cycling and provides several nature-based adventure activities within the resort.

Lake Mountain is located at the edge of the Yarra Valley, one of Victoria's key gourmet produce and wine regions. The resort is close to and has a strong relationship with the town of Marysville, 22 kilometres away. Once a prospering tourism and conference hub, with a strong day visitation market, Marysville and the surrounding region continue to rebuild the tourism offer after the devastating 'Black Saturday' bushfires of early February 2009 and have seen growing overnight stay visits.

2. Water supply system

Lake Mountain Alpine Resort is a Regulated Water System as defined under the *Safe Drinking Water Act 2003* ('the Act'). The storage and supply of water to the Resort is untreated as declared and gazetted by the Minister for Health on the 23rd of October 2005.

Regulated Water

The Act defines 2 types of water – 'drinking water' and 'regulated water'.

Declaration concerning regulated water:

- The Minister may, by notice publish in the Government Gazette, declare any water that is not drinking water to be regulated water for the purposes of this Act.
- The Minister may only make a declaration in relation to particular water if the Minister is satisfied that the water may be supplied to the public in circumstances in which it may be mistaken as being drinking water.
- In making a declaration, the Minister may identify the water that is the subject to the declaration by reference to its source, its method of supply, its composition or in any other way the Minister considers to be appropriate.

'Regulated Water' is defined in Section 6 of the Act as, water that is not intended for drinking but could be reasonably mistaken as drinking water. .

The water supplier is responsible, under the Act to:

- Prepare a risk management plan for the regulated water.

SECTION A - LAKE MOUNTAIN ALPINE RESORT

- Ensure that the risk management plan contains the matters detailed in Regulation 6 of the *Safe Drinking Water Regulations* (except those that specifically relate to drinking water only).
- Have the Risk Management Plan audited, when required, by the Secretary to the Department of Health by an approved auditor.
- Take all reasonable steps to ensure that the intended recipients of the water are made aware of the nature of the water and of the health risks that may arise from the use of the water.
- Include a summary of their management activities for regulated water in their annual report.

Actions taken as the responsible water supplier during this reporting period are referred to in the section for Risk Management.

Source Water, Gerratys

Water is sourced from the Upper Taggerty River. This small stream is fed by the bog and heath catchment area of Echo Flat. This plateau is within the Yarra Ranges National Park and considered a pristine environment, the only possible human contact is from some of the cross-country ski trail network that borders the catchment area, or from people camping where there are no toilets, which is limited.

Storage and distribution

The main water supply system for Gerratys, the resort's village centre, consists of a small concrete weir directing water, via a series of 50mm poly pipes under a gravity/syphons process from the Taggerty River to 3 enclosed concrete tanks. The combined storage capacity of these tanks is 800kl. The storage tanks supply water to resort's facilities via a 100mm ductile iron pipe.

2.1 Snowy Hill

Water is sourced from the storage and distribution system from Gerratys. The delivery line works on gravity/syphons process via 50mm polythene line that supplies the Snowy Hill amenities.

2.2 Arnold Gap

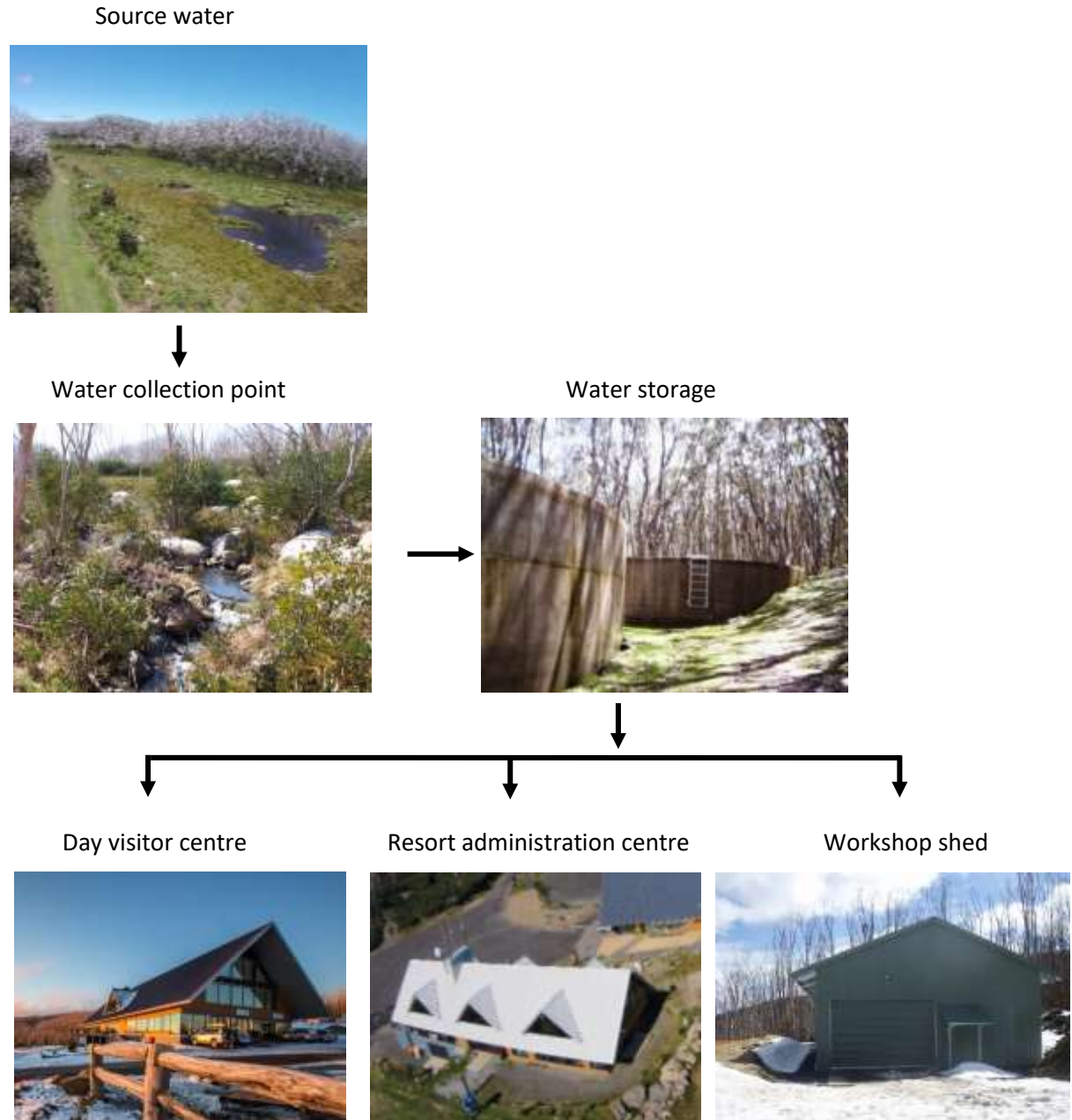
Water is sourced from a small tributary and stored in 1000 litre polythene tanks. The supply and delivery lines for systems work on gravity/syphons process via 50mm polythene lines which in turn supplies water to the amenities building located at Arnold Gap.

2.3 Cascades

Water is sourced from a small tributary and stored in a 2270 litre polythene tank. The supply and delivery lines for systems work on gravity/syphons process via 50mm polythene lines which in turn supplies water to the amenities building located at Cascades. In addition, a water tank was installed in 2020, which is roof fed and services the staff toilet at the ticket box.

SECTION A - LAKE MOUNTAIN ALPINE RESORT

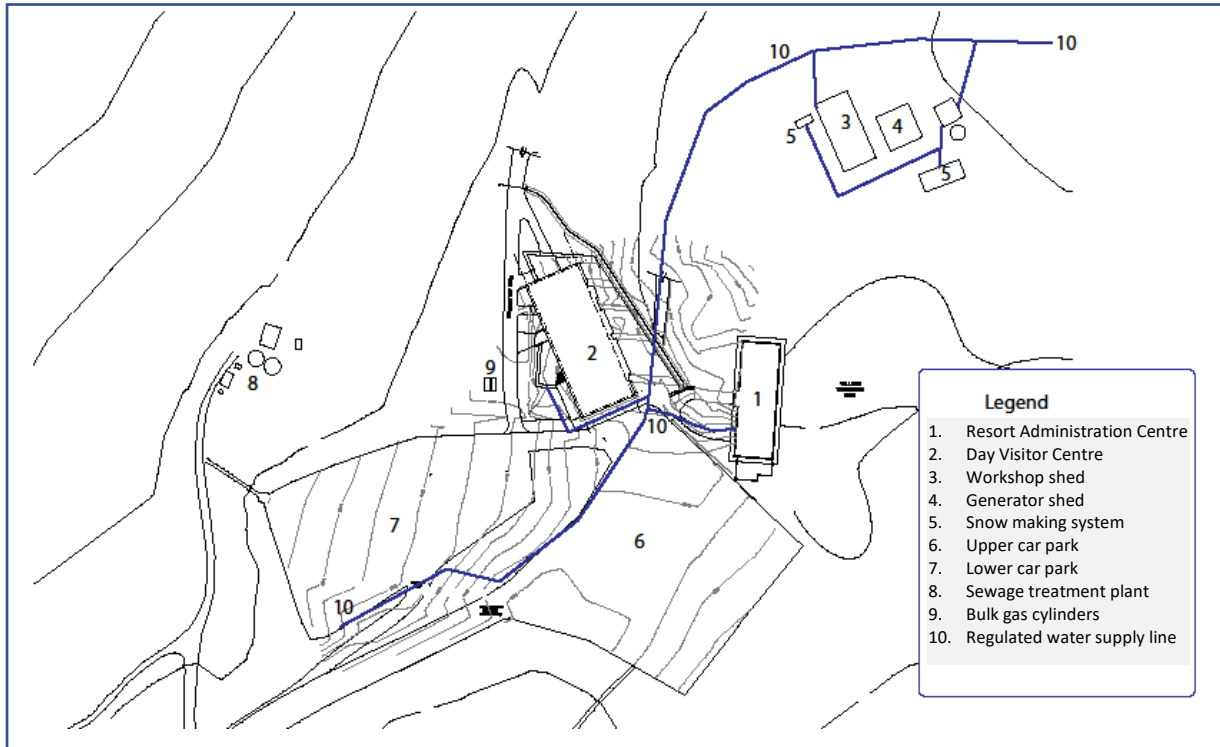
Resort Water Supply, Storage and Reticulation System, Gerratys



SECTION A - LAKE MOUNTAIN ALPINE RESORT

3. Schematic Drawing

Water Supply Lake Mountain Alpine Resort



4. Water (Regulated) Supply

Lake Mountain Alpine Resort is the sole water (regulated) supplier to the following facilities on Lake Mountain.

- Day Visitor Centre which includes;
 - Public space
 - Public amenities
 - Food outlet
 - Ski patrol/ first aid
 - Resort ticketing outlet
 - Retail outlet
- Resort Administration Centre which includes;
 - Snow sports centre
 - Rental department
 - Public space
 - Administrative offices
- Workshop shed
- Snowy Hill amenities building
- Snow making system.

SECTION A - LAKE MOUNTAIN ALPINE RESORT

5. Quality Management Systems

There is no treatment applied to the water supply at Lake Mountain. With this in mind, resort management is taking steps to minimize the possibility of potential health risks by raising public awareness through the placement of Do Not Drink signage above all the resort water outlets, advising resort visitors that the water is not treated, nor is it suitable for consumption. Water that feeds into the food preparation outlets is filtered with both multiple 20-micron and 5-micron cartridge units. Testing occurs offsite by ALS Water on a fortnightly basis to analyse turbidity, *E.coli*, Coliforms and Plate Counts.

As part of the management of the water supply system, water quality monitoring is undertaken, catchment and associated water delivery and storage infrastructure inspections are conducted to minimize any potential for supply failure and contaminants which may affect water quality and impact the water supply system. The management of the storage and water diversion infrastructure includes the purging of the reticulation system coupled with the cleaning of the storage tanks which is undertaken on a twice yearly basis.

6. Regulated Water Risk Management Activities

The management activities that have been implemented in relation to regulated water supply, in particular those that pertain to Section 25 of the *Safe Drinking Water Act 2003*, warning to be given if regulated water supplied are described as follows:

- A blanket signage program for all water outlets on the resort has been completed and maintenance schedule that is monitored through the resort Water Supply Risk Management Plan. All water outlets have been signed warning visitors to Lake Mountain that water is untreated and of the health risks that may arise from its use.



- User groups of the mountain through public forums and stakeholder meetings are advised of the issues pertaining to the non-treatment of the resorts water supply and of the health risks that may arise from its use.
- All managers and staff working within the commercial operations on the resort are briefed on issues pertaining to the non-treatment of the resorts water supply and the health risks that may arise from its use.
- As a part of the resort staff induction information sessions, the non-treatment and health risks that may arise from the use of water on the resort are covered both verbally and as inclusion in the resort employee handbook, which all employees receive prior to commencement of employment.
- To minimise risk to employees the resort management have installed water coolers and supply potable water for consumption.

SECTION B - MT BAW BAW ALPINE RESORT

1. Drinking water supply system

1.1 Overview

The Resort is located on the south-west face of the Baw Baw Plateau, two and a half hours' drive east of the Melbourne CBD. Mt Baw Baw has a summit elevation of 1,565 metres and gently sloping terrain with gradients of 15% to 25%. It consists of and is surrounded by a rich variety of diverse alpine and sub-alpine native vegetation. The resort is surrounded by Crown land with the Baw Baw National Park on the northern and eastern boundaries and Tanjil State Forest towards the western and southern sides. Whilst the resort covers 355 hectares, just 37 hectares have been developed. Developed land includes groomed ski runs, 7 ski lifts, a seasonal terrain park, toboggan runs and 10 kilometres of groomed cross-country ski trails. The village has 43 surveyed sites, 34 of which are developed, and land occupied by site holders is under leasehold or licence. The resort at peak operation during the white season offers 7 surface lifts, with a mix of terrain of for beginners, intermediate skiers and more advanced skiing, 2 toboggan parks, 2 magic carpets, a beginners area, a small terrain park and is home to 2 alpine dingoes.

During the green season, the resort is home to mountain biking trails, offers guided walking tours, road cycling (including part of the Seven Peaks) and is an access point for hikes into the surrounding Baw Baw National Park.

Parking is available for up to 700 cars (approx. 2,600 guests) and at least 20 buses at any time. With occupancy highest during the white season, the resort offers almost 578 accommodation beds, with a variety of styles covering most budgets.

1.2 Characterisation of the system

Mt Baw Baw Alpine Resort is classified a Drinking Water Supplier as defined under the *Safe Drinking Water Act 2003*.

As a water supplier, the Board must:

- Prepare, implement, review and revise a risk management plan in relation to its supply of drinking water and regulated water.
- Prepare for the Secretary to Department of Health an Annual Report on drinking water quality.
- Monitor drinking water supply from catchment to tap (water sampling points).
- Ensure all drinking water supplied meets water quality standards.
- Notify the Secretary if non-complying water is supplied or is likely to be supplied.

1.3 Source of water

Dam Valley Catchment

The water used throughout the Resort is supplied by the '*Dam Valley*' catchment, a protected valley slightly elevated above the village. Runoff in the catchment is collected by a minor tributary of the headwaters of the Tanjil River – Eastern Branch. The runoff, a mixture of rainfall and snowmelt, flows through sphagnum moss which provides a minor form of natural filtration for suspended particulate matter. A weir constructed in the stream below Dam Valley captures and

SECTION B - MT BAW BAW ALPINE RESORT

directs water to a draw off pipe supplying 2 x 200,000 litre concrete storage tanks to service the village.

The catchment is heavily vegetated by shrubs and trees, with the exclusion of a single access trail through the north-western side of the catchment, the environment is considered to be in pristine condition. There is limited recreational access to the catchment area, primarily used by cross country skiers in winter and bushwalkers and mountain bikers in summer. Clear signage is located at both ends of the trail advising users of the importance of catchment preservation, to remain on track and prevent contamination.

Raw water sampling is conducted in the catchment area monthly to monitor the raw water quality including monitoring for parameters such as turbidity and organic chemicals. The catchment is inspected monthly. Visual inspections are conducted to assess the condition of management features (e.g. signage, access track, drainage boards and the weir). Catchment condition is assessed to identify any potential contaminants, signs of pollutants and any other reportable items (e.g. significant snow cover). These assessments allow for constant understanding of catchment health and assist to identify the source of potential raw water contamination.

Raw water storage

Raw water supply is contained within 2 x 200,000 litre concrete storage tanks at the south western end of the catchment. Water is fed by gravity from the weir and connected by a 150mm ductile iron, concrete lined (DACL) pipe to the village treatment, distribution, and reticulation network. Overflow from the supply tanks, as untreated water, is discharged back into the headwaters of the Tanjil River – Eastern Branch before any treatment occurs. This overflow runs most of the time, indicating that the flow through the weir currently exceeds the village demand.

Regular weekly monitoring of raw water in the supply tanks is undertaken to understand any potential contamination which may be hindering quality. Results obtained from raw water quality sampling are utilised to assist with identification of potential issues prior to final treatment of water and supply to the village reticulation network.

1.4 Service area

Distribution System

The service area encompasses the entirety of the Baw Baw Village which can be seen in figure 2. Water is treated at the potable water treatment units (figure 1) on demand before being distributed throughout the village under a pressurised system. The majority of the village reticulation is made from 100mm galvanised or DACL pipework. There are 4 scour valves within the reticulation system, and these are typically run at monthly intervals to ensure that there is no accumulation of sediments within the network. More or less sluicing is conducted dependent on water quality or availability.

SECTION B - MT BAW BAW ALPINE RESORT



Figure 1: Aerial plan of the Baw Baw Village catchment locality and drinking water treatment and supply network

SECTION B - MT BAW BAW ALPINE RESORT



Figure 2: Baw Baw Village drinking water reticulation network, scour valves and sample locations

SECTION B - MT BAW BAW ALPINE RESORT

2. Water Treatment and Quality Management Systems

2.1. Treatment processes

r.16(e)(i)

The Resort utilises a multibarrier approach to drinking water treatment which includes peroxidation with chlorine dioxide and disinfection by UV and sodium hypochlorite.

Chlorine Dioxide

Chlorine Dioxide (installed May 2021) is used as pre oxidising agent to enhance effectiveness of disinfection treatment systems and improve aesthetic properties. Chlorine Dioxide is generated onsite and dosed into two 23,000L holding tanks to reduce the volume of organic matter, before being treated as required via UV and Sodium Hypochlorite. As a byproduct of Chlorine Dioxide, Chlorite is monitored frequently to ensure compliance with health and aesthetic guidelines.

UV Treatment

The UV treatment plant consists of one Hanovia PMD200F Ultra Violet (UV) treatment system which acts as the resort’s primary treatment barrier. The UV unit is an unvalidated system with dose calculated using flow rate, UVT (assumed static rate) and UV intensity. There are nil by-products to be monitored as a result of UV treatment.

Sodium Hypochlorite

A residual trim unit provides automated sodium hypochlorite dosing post UV treatment. Dose rates are set to a manual dose rate or flow pace dependent on current system demand. The residual trim unit acts as a secondary disinfection barrier in the resort’s multiple barrier approach to water treatment. This unit provides the ability to control the level of dosing remotely and maintain a disinfection residual within the reticulation system. As a byproduct of sodium hypochlorite, trihalomethanes (THMs) are monitored frequently to ensure compliance with health and aesthetic guidelines.

Table 2.1.1: Drinking Water Treatment processes, added substances and byproducts monitored
r.16(e)(ii)

Location	Treatment Process	Added Substances	Byproducts monitored
Drinking Water Treatment Units (figure 1)	Pre-oxidation	Chlorine Dioxide	Chlorite
	Ultra Violet (UV) Hanovia PMD200F	N/A	N/A
	Chlorination C-Tech Residual Trim Unit	Sodium Hypochlorite	THMs

SECTION B - MT BAW BAW ALPINE RESORT

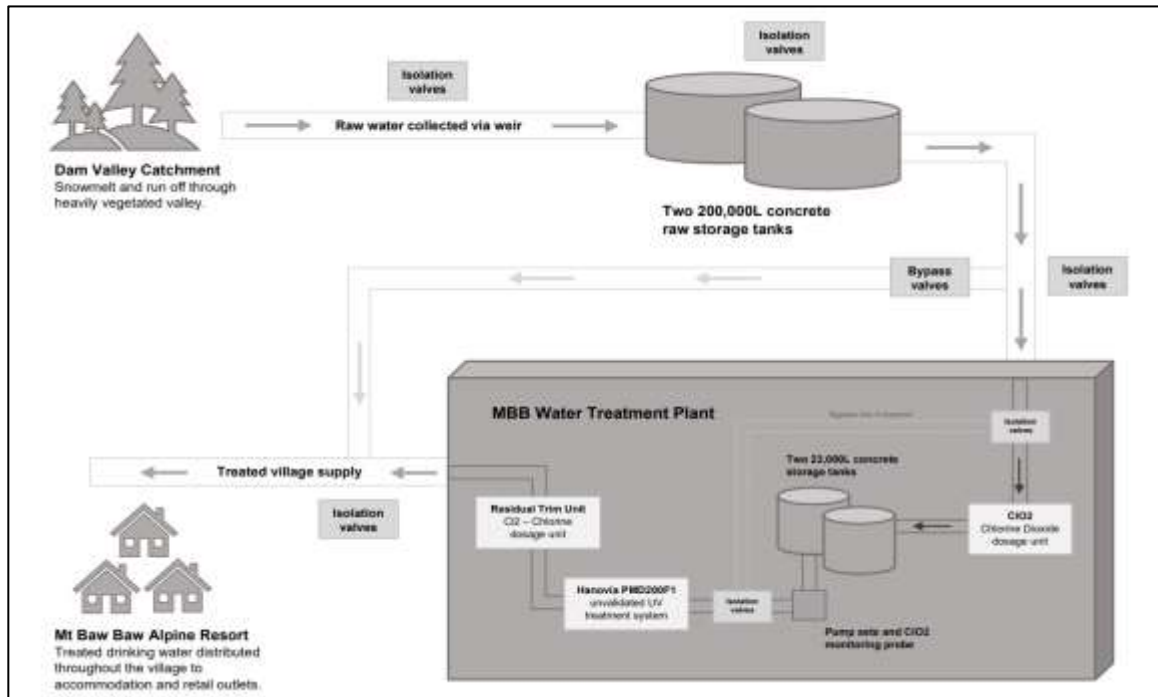


Figure 3: Mt Baw Baw schematic diagram of village treatment systems.

3. Drinking Water Quality Standards

- r.16(f)
- r.16(g)
- r.16(h)

3.1 Performance monitoring

During the 2020-21 reporting period, the resort constructed microbiological and chemical performance monitoring in accordance with the SDWR.

To ensure the resort supplies safe, high quality drinking water to consumers, weekly treated water samples are collected from dedicated sampling points within consumer facilities (figure 2). All samples are collected following standard procedures and transported to a NATA accredited laboratory. As required under regulation 8 of the SDWR, samples are taken from rotating sample locations to ensure no two consecutive samples are taken from the same locality.

3.2 Compliance performance summary

During the 2020-21 reporting period, the resort reported three occasions of known or suspected contamination to drinking water, where water quality standards have not been met. Non-compliance events were managed following regulatory requirements including notification to the Department of Health. Management actions following included catchment to tap investigations, network flushing, alteration of treatment systems and operational and capital improvements.

The Resort reported an additional noncompliance to the Department of Health with regard to section 13 and 14 of the SDWR after a significant weather event impacted the Resorts ability to conduct regular quality analysis sampling.

Details on all noncompliance during the reporting period can be found in the Emergency and Incident Management section of this report.

SECTION B - MT BAW BAW ALPINE RESORT

3.3 Schedule 2 Drinking water quality standards

r.16(f)

r.16(g)

Escherichia coli (E.coli)

Table 3.3.1 Summary of E.coli results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No. of samples collected	No. of samples containing <i>E.coli</i>	No. of investigations conducted (s.22)	No. of investigations where standard not met
20-21	Weekly	51	1	1	1
19-20	Weekly	52	0	0	0
18-19	Weekly	52	0	0	0

Standard as stated in Schedule 2 of Safe Drinking Water Regulations 2015:: All samples of drinking water collected are found to contain no Escherichia coli per 100 millilitres of drinking water, with the exception of any false positive sample. Samples to be taken weekly.

All drinking water samples have demonstrated compliance with the SDWR criteria, with the exception of the one *e.coli* detection during weekly sampling after preventative maintenance works were completed. There was one non-compliance with the SDWR criteria with regards to frequency of sampling. Specific details of the non-compliance can be found in the Emergency and Incident Management section of this report.

Total Trihalomethanes

Table 3.3.2 Summary of Trihalomethanes results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No of samples	Max (mg/L)	Average (mg/L)	No. of Non-Complying Samples
20-21	Monthly	12	0.1	0.05	0
19-20	Monthly	12	0.083	0.026	0
18-19	Monthly	12	0.15	0.038	0

Standard as stated in Schedule 2 of Safe Drinking Water Regulations 2015: less than or equal to 0.25 milligrams per litre of drinking water. One sample to be taken per month.

All drinking water samples have demonstrated compliance with the SDWR criteria with the exception of one which did not meet the required sampling frequency. Specific details of the non-compliance can be found in the Emergency and Incident Management section of this report.

Minor increase in trends across previous reporting periods with regard to the average recorded value. This trend is representative of increased dosing volumes in the 2020-21 reporting period, all values remain well below SDWR limits.

SECTION B - MT BAW BAW ALPINE RESORT

Turbidity

Table 3.3.3 Summary of Turbidity results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No of samples	Maximum NTU	95 th percentile
20-21	Weekly	51	0.5	0.4
19-20	Weekly	53	0.8	0.7
18-19	Weekly	52	0.8	0.6

Standard as stated in Schedule 2 of Safe Drinking Water Regulations 2015: The 95th percentile of results for samples in any 12 month period must be less than or equal to 5.0 Nephelometric Turbidity Units. One sample to be taken per week

All drinking water samples have demonstrated compliance with the SDWR criteria with the exception of one which did not meet the required sampling frequency. Specific details of the non-compliance can be found in the Emergency and Incident Management section of this report.

No significant trends from the previous two reporting periods are evident.

SECTION B - MT BAW BAW ALPINE RESORT

3.4 Other Water Quality Standards

As previously discussed in section 2.1, MBBAR utilised 2 forms of disinfection, UV and chlorine, to mitigate microbial risks in the drinking water supply in addition to oxidation through chlorine dioxide (May 2021 addition). Water testing is conducted on a regular basis for the presence and levels of chlorine disinfection by-products, chloroacetic acid, dichloroacetic acid and trichloroacetic acid. Chlorite, as the by-product of chlorine dioxide will be incorporated in the 2021-22 Annual Report.

Chloroacetic Acid

Chloroacetic acid sampled post treatment within the reticulation network at the points shown in figure 2 to determine levels of chlorine treatment by-products.

Table 3.4.1 Summary of Chloroacetic Acid results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No of samples	No of Non - Complying Samples	Max mg/L	Average mg/L	No. of Non-Complying Samples
20-21	Monthly	12	0	<0.005	<0.005	0
19-20	Monthly	12	0	<0.005	<0.005	0
18-19	Monthly	12	0	<0.01	0.0054	0

ADWG: concentrations of chloroacetic acid in drinking water should not exceed 0.15 mg/L.

All drinking water samples have demonstrated compliance with the ADWG criteria.

No significant trends from the previous two reporting periods are evident.

Dichloroacetic Acid

Dichloroacetic acid sampled post treatment within the reticulation network at the points shown in figure 2 to determine levels of chlorine treatment by-products.

Table 3.4.2 Summary of Dichloroacetic Acid results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No of samples	No of Non - Complying samples	Max mg/L	Average mg/L	No. of Non-Complying Samples
20-21	Monthly	12	0	0.043	0.016	0
19-20	Monthly	12	0	0.019	0.007	0
18-1	Monthly	12	0	0.029	0.0095	0

ADWG: concentrations of dichloroacetic acid in drinking water should not exceed 0.10 mg/L.

All drinking water samples have demonstrated compliance with the ADWG criteria.

SECTION B - MT BAW BAW ALPINE RESORT

No significant trends from the previous two reporting periods are evident.

Trichloroacetic Acid

Trichloroacetic acid sampled post treatment within the reticulation network at points shown in figure 2 to determine levels of chlorine treatment by-products.

Table 3.4.3 Summary of Trichloroacetic Acid results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No of samples	No of Non - Complying samples	Max mg/L	Average mg/L	No. of Non-Complying Samples
20-21	Monthly	12	0	0.044	0.015	0
19-20	Monthly	12	0	0.054	0.012	0
18-19	Monthly	12	0	0.014	0.0077	0

ADWG: concentrations of trichloroacetic acid in drinking water should not exceed 0.10 mg/L.

All drinking water samples have demonstrated compliance with the ADWG criteria.

No significant trends from the previous two reporting periods are evident.

Alpha Radiation

Alpha Radiation has been tested using raw water samples sourced from Dam Valley catchment (figure 1) to determine screening levels.

Table 3.4.4 Summary of Alpha Radiation results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No of samples	No of Non – Complying samples	Max Bq/L	No. of Non-Complying Samples
20-21	Annually	1	0	<0.05	0
19-20	Annually	1	0	<0.05	0
18-19	Annually	1	0	<0.05	0

ADWG: recommended screening levels for alpha radiation are 0.5 Bq/L

All drinking water samples have demonstrated compliance with the ADWG criteria.

No significant trends from the previous two reporting periods are evident.

SECTION B - MT BAW BAW ALPINE RESORT

Beta Radiation

Beta Radiation has been tested using water samples sourced from Dam Valley catchment (figure 1) to determine screening levels.

Table 3.4.5 Summary of Beta Radiation results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No of samples	No of Non - Complying samples	Max Bq/L	No. of Non-Complying Samples
20-21	Annually	1	0	<0.1	0
19-20	Annually	1	0	0.23	0
18-19	Annually	1	0	0.23	0

ADWG: recommended screening levels for beta radiation are 0.5 Bq/L

All drinking water samples have demonstrated compliance with the ADWG criteria.

No significant trends from the previous two reporting periods are evident.

Copper

Copper tests were sampled from raw water supply tank samples (figure 1).

Table 3.4.6 Summary of Copper results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No of samples	No. of non-complying samples	Maximum mg/L	Average mg/L	No. of Non-Complying Samples
20-21	Monthly	12	0	<0.001	<0.001	0
19-20	Monthly	12	0	0.001	0.001	0
18-19	Monthly	12	0	0.001	0.001	0

ADWG: for health considerations, concentrations of copper should not exceed the guideline value of 2 mg/L.

All drinking water samples have demonstrated compliance with the ADWG criteria.

No significant trends from the previous two reporting periods are evident.

SECTION B - MT BAW BAW ALPINE RESORT

Manganese

Manganese tests were sampled from raw water supply tank samples (figure 1).

Table 3.4.7 Summary of Manganese results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No of samples	No. of non-complying samples	Maximum mg/L	Average mg/L	No. of Non-Complying Samples
20-21	Monthly	12	0	0.008	0.002	0
19-20	Monthly	12	0	0.002	0.001	0
18-19	Monthly	12	0	0.001	0.001	0

ADWG: manganese may cause health considerations if exceeding 0.5 mg/L however, for aesthetic considerations drinking water should not exceed 0.1 mg/L at point of consumption.

All drinking water samples have demonstrated compliance with the ADWG criteria.

No significant trends from the previous two reporting periods are evident.

SECTION B - MT BAW BAW ALPINE RESORT

3.5 Aesthetic Water Quality

pH

pH tests were assessed within the reticulation network at 5 points shown in figure 2.

Table 3.5.1 Summary of pH results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No of samples	Minimum pH	Maximum pH	Mean pH
20-21	Weekly	51	5.8	10.1	6.9
19-20	Weekly	52	5.6	9.8	6.7
18-19	Weekly	52	5.5	10.1	6.98

ADWG: with respect to aesthetic considerations and to reduce corrosion of pipes and fittings, drinking water pH levels should be between 6.5 and 8.5. There are no health-based guideline values for pH.

Average pH from drinking water samples have demonstrated compliance with the ADWG criteria. During the reporting period, minimum and maximum values exceeded the desired range, with fluctuation across sample sites. Investigation as to what is influencing the fluctuation in pH is being completed.

Specific details of the non-compliance of sample frequency can be found in the Emergency and Incident Management section of this report.

No significant trends from the previous two reporting periods are evident.

True Colour

True colour tests were assessed using samples taken within the reticulation network at the points shown in figure 2.

Table 3.5.2 Summary of True Colour results from the current and previous two reporting periods.

Reporting period	Frequency of sampling	No. of samples	Minimum - HU	Maximum - HU	Mean - HU
20-21	Weekly	51	14	30	24.6
19-20	Weekly	52	10	40	27.5
18-19	Weekly	52	10	48	27.5

ADWG: with respect to aesthetic considerations, true colour for drinking water should not exceed 15HU. There are no health-based guideline values for true colour.

The monthly mean true colour readings for the reporting period were above the ADWG aesthetic guideline value of 15 Hazen Units (HU) (table 5.2.1) from July through to mid May. Historically, the Resort has recorded high colour HU due to the volume of organic matter in the raw water. Though it is understood the Resorts catchment is of high quality, a significant volume of organic particulate

SECTION B - MT BAW BAW ALPINE RESORT

contributes to aesthetic quality issues the Resort faces. High organic content in the supply has potential to reduce effectiveness of UV disinfection thus, having a multilayer treatment system is critical. Typical mitigation measures in place to control organic matter levels includes closing of supply tank inlet prior to major rainfall events in addition to regular sluicing. During system assessments by the Resorts external water consultants, organic load was noted as a contributing factor to the low chlorine residuals recorded through the reticulation network. Mitigation measures rely heavily on constant monitoring of water quality and manual processes, however efforts are limited by other factors such as catchment flow and system loading which are out of our control.

Following the introduction of Chlorine Dioxide in late May, almost immediate improvement of colour within the reticulation network was recorded. June recorded a mean value of 16HU with a minimum of 14HU and maximum 18HU, while raw supply pre treatment remained high (25HU). It is understood over time, through further treatment with Dioxide and further capital investment of new treatment systems (expected December 2021) colour readings will continue to improve.

Specific details of the non-compliance of sample frequency can be found in the Emergency and Incident Management section of this report.

SECTION C – EMERGENCY AND INCIDENT MANAGEMENT

1. Risk Management Plan

In accordance with the Act, the Board as the responsible water supplier has:

- Prepared a risk management plan for the regulated water.
- That the risk management plan contains the matters detailed in Regulation 6 of the *Safe Drinking Water Regulations* (except those that specifically relate to drinking water only).
- Undertaken a risk management plan audit as required, by the Secretary to the Department of Health by an approved auditor.

1.1 Review of the Risk Management Plan

The risk management plan is proposed for next reporting period, to be divide into an individual plan for each of the Resort. The division will ensure both Resorts have a comprehensive risk management plan that details the specific systems and be operationally accessible. In its current state, it is difficult to ensure all aspects of the plan remain under consistent review.

1.2 Findings of the most recent risk management plan audit

r.16(d)

Department of Health requires the Board to undertake an audit approximately every 2 years of the safe drinking water risk management plan (which encompasses both Lake Mountain Alpine Resort and Mount Baw Baw Alpine Resort) and were found to be complaint in June 2020 with section 7(1) of the *Safe Drinking Water Act 2003*.

The opportunities for improvement support the ongoing implementation of good risk management and have been prioritised to reinforce a culture of effective risk management in the organisation's responsibilities for the Victorian water industry.

The findings and recommendations of the previous audits that occurred on 9 April 2018 and 27 June 2020 are summarised in appendix 1 and 2 below. A copy of the audit certificate can be seen in appendix 3 below.

2. Customer feedback

Complaints

Southern Alpine Resort Management Board did not receive any water related complaints or issues during this reporting period at Mount Baw Baw Alpine Resort or Lake Mountain Alpine Resort.

3. Known or suspected contamination

r.16(a)(i)

r.16(a)(ii)

r.16(b)

SECTION C – EMERGENCY AND INCIDENT MANAGEMENT

3.1 Section 18 incident summary

Table 3.1.1 Summary table of section 18 incidents.

Date of incident	Location of incident	Nature of incident	Actions taken in response to incident
3/02/2021 4/02/2021	Mt Baw Baw Alpine Resort	<i>E.coli</i> – 1org/100ml (3/2/21) <i>E.coli</i> – 4org/100ml (4/2/21)	<p>Following preventative maintenance works on the village reticulation network, the introduction of raw water resulted in <i>E.coli</i> detections in sampling conducted 3/2/21 and secondary sampling on 4/2/21. Department of Health was notified of the incident and with their support, the Resort began catchment to tap investigations.</p> <p>Immediate response actions included system flushing to achieve residuals at the flush point and artificially increasing the demand on the system to ensure constant treatment with sodium hypo. Further laboratory testing confirmed there was no longer <i>E.coli</i> present in the reticulation network. The volume of organics present in the raw supply however, continue to consume any chlorine residuals present therefor public health risks still existed. The BWA remained in place.</p> <p>Consultants were engaged by the Resort and provided short, medium and long term solutions to ensure public safety. Mesh filtration was installed on the inlet of the supply tanks to manage the volume of large organic solids entering the treatment system. Chlorine dioxide treatment was introduced as a medium term solution eliminating organic matter to further enhance existing treatment systems and reduce years of biofilm build up present in Village pipework. Chlorine dioxide treatment provided an immediate improvement in treated water quality and aesthetic properties. At this point, after extended testing and treatment performance monitoring the BWA was lifted as the drinking water network no longer posed a risk to public health.</p> <p>Funding was obtained by the Resort to implement the consultants long term solution, an upgraded treatment system which included organic removal processes, validated UV treatment and clear water storage (delivery during the next reporting period). The Resort continues to take an active approach in monitoring water quality and treatment performance until the new system is installed.</p>

3.2 Section 22 incident summary

Table 3.2.1 Summary table of section 22 incidents.

Date of incident	Location of incident	Nature of incident	Actions taken in response to incident
2/02/2021	Mt Baw Baw Alpine Resort	<i>Likely contamination of drinking water</i>	Refer to section 3.1.
3/02/2021	Mt Baw Baw Alpine Resort	<i>E.coli</i> – 1org/100ml	Refer to section 3.1.

SECTION C – EMERGENCY AND INCIDENT MANAGEMENT

3.3 Other incidents/events

Mt Baw Baw Alpine Resort

Regular weekly drinking water testing undertaken in accordance with section 13 and 14 of the safe drinking water regulations was not be completed for the week starting Monday 7 June 2021. The weeks sampling was scheduled for Thursday 10 June 2021, however due to this week's significant weather event, sampling could not be safely undertaken. The main access roads to the resort were heavily affected by local and regional flooding, landslides and fallen trees, following over 300mm of rain. On both Thursday 10 June 2021 and Friday 11 June 2021, it was unsafe for staff to travel to and from the resort except in an emergency.

The water testing laboratory service used by the Resort was also impacted by flooding, leaving them without power. Given long weekend closures and further severe weather impacts in West Gippsland, the next available opportunity to complete regular testing will be Tuesday 15 June 2021. As a boil water advisory was already in place at this time and treatment systems fully operational the Resort established there was no significant risk identified by the missed test.

APPENDIX

APPENDIX 1 - Risk Management Plan Audit Outcome – 27 June 2020

Auditor's opportunity for improvement	Alpine Resort	Findings and recommendations to be undertaken as per the report dated 27 June 2020	Management response		
			Priority rating	By who	Expected completion date
Follow up on previous opportunities for improvements for Mt Baw Baw					
1.	Mount Baw Baw	Suggest continuing to develop Standard Operating Procedures (SOP) for example: a) Promote the option of flushing drinking water taps in ski lodges before use or if taken offline. Maintenance and servicing of backflow prevention valves could also be considered as a support service. b) If there is a higher pH in the reticulating system, to consider a small bleed during very low use periods, when water permits.	High	Environmental Officer	Complete. March 2021
2.		Suggest further developing chlorine dosing and training with CTech to optimise chlorine dosing, for example, during the summer when water use is minimal. Possibly also consider a post chlorination tank.	High	Environmental Officer	Water Industry Operator Training underway, expected completion June 2022 (COVID 19 delay). Consideration of post treatment tank has been incorporated in capital investments.
3.		Suggest as a high priority a UPS or back up power supply systems for your chlorine dosing system.	Medium	Environmental Officer/IT	No action as village back up generators have been updated to cease the need for a UPS.
4.		Consider extending UV training and review upgrades, for example, further developing alarms, and matching UV to system turbidity.	High	Environmental Officer	Water Industry Operator Training underway, expected completion June 2022 (COVID 19 delay).

APPENDIX

Auditor's opportunity for improvement	Alpine Resort	Findings and recommendations to be undertaken as per the report dated 27 June 2020	Management response		
			Priority rating	By who	Expected completion date
5.		Suggest continuing to review plans for a further catchment, possibly a borehole as an option. The waterflow may be low during the summer periods.	Low	Environmental Officer	No action required. Current resort capacity does not require additional supply.
6.		We note that a drone has been considered and is not seen as practical at this stage given the smaller size of the catchments.	Low	No action required	No action required
Follow up on previous opportunities for improvements for Lake Mountain					
1.	Lake Mountain	Of very high priority is the training program, as part of the merger between Mt Baw Baw and Lake Mountain, especially if Lake Mountain is to be upgraded to be also of a potable water supply.	Medium	Environment and Safety Officer	September 2022
2.		While increasing the range of water chemistry and microbiology tests is still under review, this could be part of the plan and research into any future plant upgrades.	Medium	Environment and safety Officer/Operations Manager	September 2022
3.		While an increase to security cameras and signage is still under review, suggest this is considered a higher priority.	Medium	Operations Manager	September 2022
Opportunities for improvements for both sites					
1.	Mount Baw Baw	While installing a new SCADA system for both sites is still under review, suggest this considered as a high priority.	Medium	Environmental Officer	Complete. Implementation of a SCADA system has been incorporated in capital investments.
	Lake Mountain		Low	Operations Manager	December 2022
2.	Mount Baw Baw	It is also very encouraging to note that upgrading the Lake Mountain supply to also be of a potable water supply is under review. Suggest	N/A	No action required	No action required

APPENDIX

Auditor's opportunity for improvement	Alpine Resort	Findings and recommendations to be undertaken as per the report dated 27 June 2020	Management response		
			Priority rating	By who	Expected completion date
	Lake Mountain	considering the consultant who assisted with your previous Risk Management Plan also to assist.	Low	Operations Manager	December 2022

Reference: Page 17, 2020 Drinking Water Quality Risk Management Plan Regulatory Audit, RMP Systems Pty Ltd, 27 June 2020

APPENDIX

APPENDIX 2 - Risk Management Plan Audit Outcome – 9 April 2018

Auditor's opportunity for improvement	Alpine Resort	Actions to be undertaken as per the report dated 9 April 2018	Management response	
			Priority rating	Status
1. We suggest an increased emphasis on training, especially as there have been staff changes. Possibly also consider using the consultant who assisted with your Safe Drinking Water Risk Management Plan assisting with this; including further standardising and developing site documentation. We suggest this, though we note that there is a training program upgrade as part of the merger integration of Baw Baw and Lake Mountain.	Mount Baw Baw	a) Key water operations staff to be identified. b) Staff training matrix to be completed by all key water operations staff to identify shortfalls in knowledge of potable water operations processes and procedures. c) Existing Standard Operating Procedures relating to potable water to be reviewed and updated as required.	High	a) Complete. June 2018. b) Complete. June 2018. c) Complete. December 2020.
	Lake Mountain	d) Staff training to be offered as per point b) and c) above.	High	Ongoing training.
2. For your sampling taps, suggest considering a yearly audit, and replacement where required.	Mount Baw Baw	e) Existing operating procedures are currently in place as part of weekly potable water testing program. f) Standard Operating Procedure to be reviewed as per point c) above.	High	Complete. Procedures in place. Complete 2020.
	Lake Mountain	g) As per point f) above.	High	Completed December 2020.
3. Suggest considering further developing Standard Operating Procedure (SOP) for flushing of pipework systems. If there is a higher pH in the reticulating system, during very low use periods, to consider, for	Mount Baw Baw	h) Existing operating procedures are currently in place as part of fortnightly potable water operations program should catchment inflows permit. i) Standard operating procedure to be developed to cover sluicing of village supply main.	High	Complete. Complete 2021.

APPENDIX

Auditor's opportunity for improvement	Alpine Resort	Actions to be undertaken as per the report dated 9 April 2018	Management response	
			Priority rating	Status
example, a small bleed, when water permits.	Lake Mountain	j) Review Standard Operating Procedure.	High	Completed.
4. Suggest further upgraded security measures near water systems. Possibly, also standardising between your 2 sites.	Mount Baw Baw	k) Village Supply Catchment is an open catchment with little ability to close due to operational constraints relating to trail usage. Monthly catchment inspections are in place to minimise the potential impact on potable water supply due to contamination. l) All hatches, doors and entrances at Village Supply Tanks, Ultra Violet Treatment Plant and Chlorine Dosing Plant are kept secured (locked) at all times when unattended.	Medium	Complete. Monthly catchment inspections exist. Complete. Weekly and monthly catchment/plant inspections exist.
	Lake Mountain	m) Further review of signage and fencing to improve security will be undertaken and installed where identified.	High	Completed

APPENDIX

Auditor's opportunity for improvement	Alpine Resort	Actions to be undertaken as per the report dated 9 April 2018	Management response	
			Priority rating	Status
<p>5. It was encouraging to note C-Tech are managing your chlorine dosing system. Suggest C-Tech graph both pH and free active chlorine residual. Other parameters could also be considered to optimize water chemistry. Suggest, a yearly chemistry performance review with suggestions for upgrades and tightening Key Performance Indicators.</p> <ul style="list-style-type: none"> • Suggest C-Tech also provide a training course during the yearly overhaul of your chlorine dosing system. • Suggest also considering a yearly chemical alarm test. 	Mount Baw Baw	<p>n) Key Consult C-Tech Technicians to ascertain potential for provision of required data on an annualised basis. Suggest this data is provided to coincide with annual reporting period.</p> <p>o) Consult C-Tech Technicians to ascertain potential for regular training to be conducted for key water operations staff related to operation and maintenance of the chlorine dosing plant.</p> <p>p) Alarm tests conducted as part of regular servicing by C-Tech technicians.</p>	Medium	<p>Complete. Data available through C-Tech SCADA system as required.</p> <p>Complete.</p> <p>Complete.</p>
<p>6. Suggest considering a UPS or back up power system dedicated just to your chlorine dosing system.</p>	Mount Baw Baw	<p>q) UPS is currently linked to Ultra Violet Treatment Plant and Chlorine Dosing Plant and has covered all power outages experienced to date. Investigate potential for requirement of larger UPS across next reporting period.</p>	Medium	Complete.
<p>7. Suggest considering your UV over hauler also giving a yearly training course. During this time contingency procedures could also be further discussed and developed.</p>	Mount Baw Baw	<p>r) Consult Hanovia Technicians to ascertain potential for regular training to be conducted for key water operations staff related to operation and maintenance of the Ultra Violet Treatment Plant.</p>	High	Water Industry Operator Training underway, expected completion June 2022 (COVID 19 delay).

APPENDIX

Auditor's opportunity for improvement	Alpine Resort	Actions to be undertaken as per the report dated 9 April 2018	Management response	
			Priority rating	Status
8. We note that you are considering long-term plans to include an additional catchment to increase water resources. Suggest considering sampling from this catchment as well. Currently, utilised for snowmaking.	Mount Baw Baw	<p>s) Consult ALS Laboratory Traralgon to perform additional testing at Snowmaking Supply Tanks on a quarterly basis commencing 1st January 2019.</p> <p>t) Investigate capital expenditure required and ability to install a new pipeline, pre- treatment from the existing 1.8 Megalitre Snowmaking Storage Supply Tanks into the Village Supply Main.</p>	Medium	<p>Complete. Incorporated into 2020-21 sampling schedules.</p> <p>Complete. Not feasible at this time.</p>
9. Suggest considering using your current drone to assist with catchment inspections.	Lake Mountain	u) Undertake a trial using existing drone to identify if it can offer benefit to inspections.	Low	On hold due to no licensed operator on location for drone.

Reference: Page 15, 2020 Drinking Water Quality Risk Management Plan Regulatory Audit, RMP Systems Pty Ltd, 9 April 2018

APPENDIX

APPENDIX 3 - Copy of the risk management plan audit certificate



Schedule 1 - Risk Management Plan Audit Certificate

Safe Drinking Water Regulations 2015

Certificate Number: 175

Audit Period: 10th April 2018 to 18th March 2020

To: Gail Conman
CEO
Southern Alpine Resort Management Board
PO Box 117
Alpine Resort
Rawson 117, VIC 3825

Australian Business Number (ABN): 80 841 224 798

I, Thomas Teunissen, after conducting a risk management plan audit of the water supplied by Southern Alpine Resort Management Board, am of the opinion that:

Southern Alpine Resort Management Board has complied with the obligations imposed by Section 7(1) of the *Safe Drinking Water Act 2003* during the audit period.

Date: 27th June 2020

Signature of approved auditor:

Thomas Teunissen

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Email: tom@rmpsystems.com



SOUTHERN ALPINE
Resort Management Board