

INDICATIVE DEVELOPMENT PLAN 2019- 2029



TUROA SKI AREA

INDICATIVE DEVELOPMENT PLAN 2019

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Version Control

Version	Updated Date	Updated By
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1. INTRODUCTION

1.1 Tongariro National Park

Turoa Ski Area is located on the south western slopes of Mt Ruapehu and within Tongariro National Park. The Park is administered by Department of Conservation under the National Parks Act 1980.

The Tongariro National Park Management Plan requires a ski area concessionaire to “prepare and maintain indicative development plans which provide for the operation of ski areas for approximately ten years”.

This Indicative Development Plan (IDP) has been prepared to outline those facility developments Ruapehu Alpine Lifts (RAL) would like to implement on Turoa Ski Area during the period through to 2030. This plan updates the previous IDP which was prepared in 2011 and updated for installation of the Nga Wai Heke Chairlift in 2013.

We emphasise the term "indicative" as used in the title. Prior to each stage of development being implemented it must be accepted that the effects of previous developments and other planning concepts incorporated within the document will be further considered. The plan must be flexible and continuously under review. Proposed facilities have been outlined as to use and location. No detailed architectural or engineering drawings are included.

The intention of RAL and the Department is to review the IDP annually or as required.

1.2 Tangata Whenua.

Tongariro National Park and in particular the three mountains of Ruapehu, Ngauruhoe and Tongariro includes land of special significance to local Iwi. In accordance with section 3.2c(ii), of the Turoa Ski Area Concession dated 21 September 2017, the Crown has identified that land on which Turoa Ski Area is located is the traditional lands of Ngati Rangi & Te Korowai o Wainuiarua (formerly Ngati Uenuku). Accordingly RAL is required to formally consult with these Iwi with respect to development and operational matters for the ski areas over the 10 year term of this IDP unless otherwise notified by the Crown. This is in addition to our ongoing wider consultation activities with other Iwi and general public on various matters of importance or interest.

1.3 Ruapehu Alpine Lifts Ltd

Turoa Indicative Development Plan

Ruapehu Alpine Lifts Ltd (RAL) was incorporated in 1953. Its purpose is best described by the following extract from the Company Constitution:

4 Capacity and Powers

- 4.1 Full capacity:** Subject to this Constitution, the Act, any other enactment and the general law, the Company has both within and outside New Zealand, the capacity, rights, powers and privileges to carry on or undertake any business or activity, do any act or enter into any transaction.
- 4.2 Principal Objects:** Notwithstanding Regulation 4.1 the Company's principal business or activity shall be promotion and development of amateur mountain sports activities for the general public and the promotion and development of the Tongariro National Park area.
- 4.3 Pecuniary Benefit Excluded:** For the avoidance of doubt it is not a purpose of the Company to provide any pecuniary benefit to any Shareholder directly or indirectly in their capacity as Shareholder whether by way of Distribution, financial assistance, discount, commission or otherwise, with the exception of reasonable remuneration for services performed for the Company or reimbursement of expenses reasonably incurred on behalf of the Company.

1.4 License

RAL has the right to operate Turoa Ski Area under a license issued by Department of Conservation. The current license was issued in September 2017 and has a term of up to 60 years.

1.5 Tongariro National Park Management Plan

No development proposed is in conflict with the objectives and policies outlined in the Tongariro National Park Management Plan.

1.6 Ruapehu District Scheme & Resource Management Act.

The activities and developments proposed within this Indicative Development Plan are subject to the Ruapehu District Plan and the consent processes required under the Resource Management Act.

2. SUMMARY

2.1 Developments

In most cases developments proposed in this Indicative Development Plan will replace an existing facility or provide for the removal of an existing facility. The development strategy for RAL is best characterised by “less but better” – infrastructure consolidation and enhancement has been a feature of the past decade and continues to be a focus for the company alongside lifting the quality and safety of the asset base for both staff and visitors.

Developments of lifts, buildings etc will be concentrated to within a central “wide corridor” of terrain with the outlying natural terrain to the east and west of this corridor remaining free of structures. This outlying terrain accounts for an estimated 40% of terrain within the current ski area boundaries. This constrains the extent of physical developments proposed for the ski area and is in line with conservation objectives which have been advocated by DOC.

Terrain modifications, required to ensure all trails can be managed to provide safe travel for skiers and snowboarders, that are now proposed are significantly less than planned under earlier development plans. RAL believes that safety requirements can be met from a smaller scale of terrain modifications but only if snowmaking capacity and coverage plus the snow fencing and associated minor earthworks projects identified within the IDP can be achieved.

2.2 Design Carrying Capacity - number of persons on a day

Turoa Ski Area Concession

The concession allows RAL “to erect, maintain, replace and operate the lifts, tows and facilities for a maximum carrying capacity of **5500 skiers per day** on the land for the use of the public”.

The Tongariro National Park Management Plan 2006 – 2016

The TNMP states the following in section 5.1.1.3;

The ski area of Turoa is approximately 496 hectares. Turoa has been extensively developed and comprises a base area with buildings for the concessionaire, park management, and public use, beginner slopes, and other facilities such as the terminus of the access road and car parking. Chairlifts, T-bars, or rope-tows extend up the slopes to the skiable areas (see Map 11 Turoa Ski Area).

*Earlier ski area planning identified a maximum PAOT (persons at one time) as a planned target for ski area use. The intention of this plan is not to establish hard maxima but to define ski area boundaries within which the various concessionaires can maintain and enhance operations. This plan acknowledges the constraints to further growth, which include road capacity and constraints on sites for further development of car parks and other facilities. The previous comfortable carrying capacity of the ski area was focused on the skier experience. This altered as standards of service and facilities for skiers increased, to the extent that the skier market was the most appropriate mechanism for ensuring maintenance of skier service. The comfortable carrying capacity of Turoa Ski Area is now far more likely to be set by environmental determinants and infrastructure limitations. The comfortable carrying capacity of Turoa Ski Area is **5500 skiers per day**. This is unlikely to change significantly as the determinants described above cannot readily be altered.*

Accordingly, this IDP provides for changes to the ski area which are targeted at increasing the quality of experience optimised for a design capacity of 5500 skiers per day. Additionally non-skier's of approximately 20% of skier capacity are anticipated at Turoa and catered for in this IDP as part of an increasing trend toward non-skiing winter usage of the ski areas.

2.3 Facility Developments

The strategy for lift development at Turoa is as follows:

- Consolidate lift towers to reduce risk to skiers, de-icing requirements (and therefore risk to staff), cultural, landscape and visual effects;
- Utilise existing tower locations or previously disturbed sites for new infrastructure wherever practical;
- Use the data available from avalanche flow modelling conducted in 2018 & 2019 to reduce risk of future avalanche damage;
- Improve access and safety for beginner skiers and young people;
- Replace two aged fixed-grip chairlifts at the base area with a Gondola to mitigate the effects of climate change and to enhance skier safety and quality by;
 - allowing groups of children to travel together with their instructor (10 passenger cabin vs 3 or 4 seat chair);
 - eliminating the risk of children sliding under a safety bar or raising the bar too soon and falling out which occurs periodically on the existing lifts;
 - allow skiers the ability to transfer downhill to the base area from either the mid or top loading point in the event that snow conditions below that level are insufficient for safe skiing;
 - improving performance and passenger safety in high wind reducing the number of 'closed days'.
- The Gondola is not intended to operate in summer as a sightseeing lift for the foreseeable future, it is specifically designed for skiers to support the improved level of service and safety required by skiers at Turoa while providing a quality skier experience even in years with poor snow cover.

The major developments proposed through this planning period include

- **Lifts**

- Turoa Gondola – replacement of the Movenpick and Parklane chairlifts with a single Gondola lift following the exact alignment and using the same tower locations as the existing Movenpick Chairlift. Like the Movenpick chairlift, the Gondola will have a mid-station at the Wintergarden area servicing the needs of this important beginner area and allowing beginner skiers to safely download from this area if they are not confident to ski down.
- Sunset Express – replacement of the Jumbo TBar with a new detachable chairlift finishing uphill from the former location of the Jumbo T-Bar top bullwheel. This lift is longer and located adjacent to (not on) the existing Jumbo TBar line to reduce its exposure to avalanche paths.
- Giant Express – replacement of the Giant chairlift with a new detachable chairlift.
- Beginner lifts – renewal of beginner lift facilities at Wintergarden including replacement of the existing platter lift with an enclosed carpet lift, relocation of the Alpine Meadow platter back to its previous location at the Wintergarden.

- **Chalet Buildings**

Total seating in and outside Chalet facilities will increase to 1,200 seats. A new 400 seat chalet will be developed at Blyth Flat. A patrol and groomer maintenance base would remain at the current location of the Giant Café however the existing café facilities for the general public would be removed and the site restored.

The Alpine cafe in the base area and the Snowflake Cafe at Wintergarden will both be extended to provide an increase in current floor area. The Wintergarden will become an important focal point for beginner skiers and is likely to require additional outdoor seating and bathrooms.

An umbrella style café (as shown in the adjacent image) will be developed at the top of the Turoa Gondola as an interim measure to address urgent capacity needs. This style of construction has an extremely light footprint with no permanent foundations or structure required allowing easy disassembly and removal at the end of its useful life, or when the Blyth Flat

Chalet is developed. It is able to be constructed rapidly from kitset materials and is designed to withstand wind and snow conditions found in alpine environments. Consideration will also be given to refitting and extending the High Noon Express drive building for use as a café space in the interim to address the shortage of indoor space and shelter available at Turoa when conditions deteriorate, the area vacated by the Generator (relocated to the base area) will be utilised as a space for bathroom facilities given the sewer line already exists at this location and can be readily plumbed in.



- **Snowmaking**

Snowmaking reticulation will be extended to cover trails:

- Upper Freeway & Yahoo trails from Blyth Flat to top of Giant Chairlift
- Under the full length of the Nga Wai Heke Quad Chairlift
- Across to the base of the Jumbo Express and then down Home Run to the Base Area
- From Little Burn trail down to The Sisters and back to the base area
- Down Clarrys track to the base area

This snowmaking expansion will require an increase in the water available. This can be achieved from either:

- access to an additional water supply from a spring at the Amphitheatre which is in the Mangawhero Catchment plus from a spring located in the headwaters of the Mangaehuehu Catchment with this water then being stored in the existing reservoir prior to being used for snowmaking across trails in both of the Mangawhero and Mangaehuehu catchments.

OR

- the construction of an additional two storage ponds
 - with one utilising water from the Mangaehuehu Catchment for snowmaking on trails under the Nga Wai Heke Quad which are in this catchment, and
 - the second supplementing the current reservoir for snowmaking in the Mangawhero catchment

- **Terrain Modifications – ski trails**

Terrain modifications proposed for ski trails (refer to trail map below for reference) includes:

- Additional trails back to Base Area at the lower elevations of the Ski Area to address safety and congestion issues
- Minor modifications on Upper Freeway, Buttresses and on some lower trails under the new Nga Wai Heke Quad
- Return access trail to the Nga Wai Heke Quad from the Triangle
- Wintergarden beginner area development works to suit new carpet lifts and reinstatement of the two Wintergarden Platter lifts
- Minor relocation of prominent rocks to reduce requirement for energy and water consumption associated with snowmaking on core trails
- Creation of an alternative summer access trail to Blyth Flat. Options under consideration include up Home Run where a former summer trail existed, or from Wintergarden, up Indecision and following the ridge between Boneyard and Lower Freeway. In either case the objective is to mitigate the risk to staff and erosion caused by the existing summer access trail.

- Installation of the Turoa Gondola will necessitate modification of some levels around the unload of the lift – works that will be undertaken alongside the project. A large flat area will be created around the top of the Gondola extending under the Nga Wai Heke chairlift and across toward the High Noon Express.

The purpose of terrain modification is as follows:

- Skier Safety: injury 'hot spots' are identified by plotting the location of skier injuries. This allows analysis to determine the root cause of the injury which could be due to trail camber, corner radius or a narrow section. Experience across the ski industry has proven one of the single most effective methods of preventing skier injuries is to undertake localised earthworks in high-risk locations.
- Trail capacity: Addressing bottlenecks in trails can increase the overall capacity of the trail without requiring significant or extensive volume of earthworks. Trail capacity must exceed lift capacity or congestion occurs. At best, congestion on piste is inconvenient, but more often it results in increased injuries to physically smaller, less capable or less confident skiers and riders.
- Snow retention: in order to build a piste the snow depth must be approximately 30cm deeper than the highest tip of any rock or mound on trail. Minor terrain modifications can reduce the variability of the piste surface dramatically reducing the required volume of snow. This allows trails to open sooner in winter and close later in spring and results in significant energy and water consumption reduction on trails equipped with snowmaking technology where average trail snow depths can be reduced.
- Gradient correction: terrain with gradient of less than 5% is insufficient for skiers to move. Equally terrain gradients >12% are too steep for beginner skiers to master and stop on.
- Traverse trails: a number of the trails required for skiers to link up different pistes need to be built out of snow. These are typically the first trails to disappear during periods of warm weather or rain severely restricting the movement of skiers and causing bottlenecks to occur. Benching in traverse trails allows snow to be retained on the surfaces keeping the trails operable and resilient.

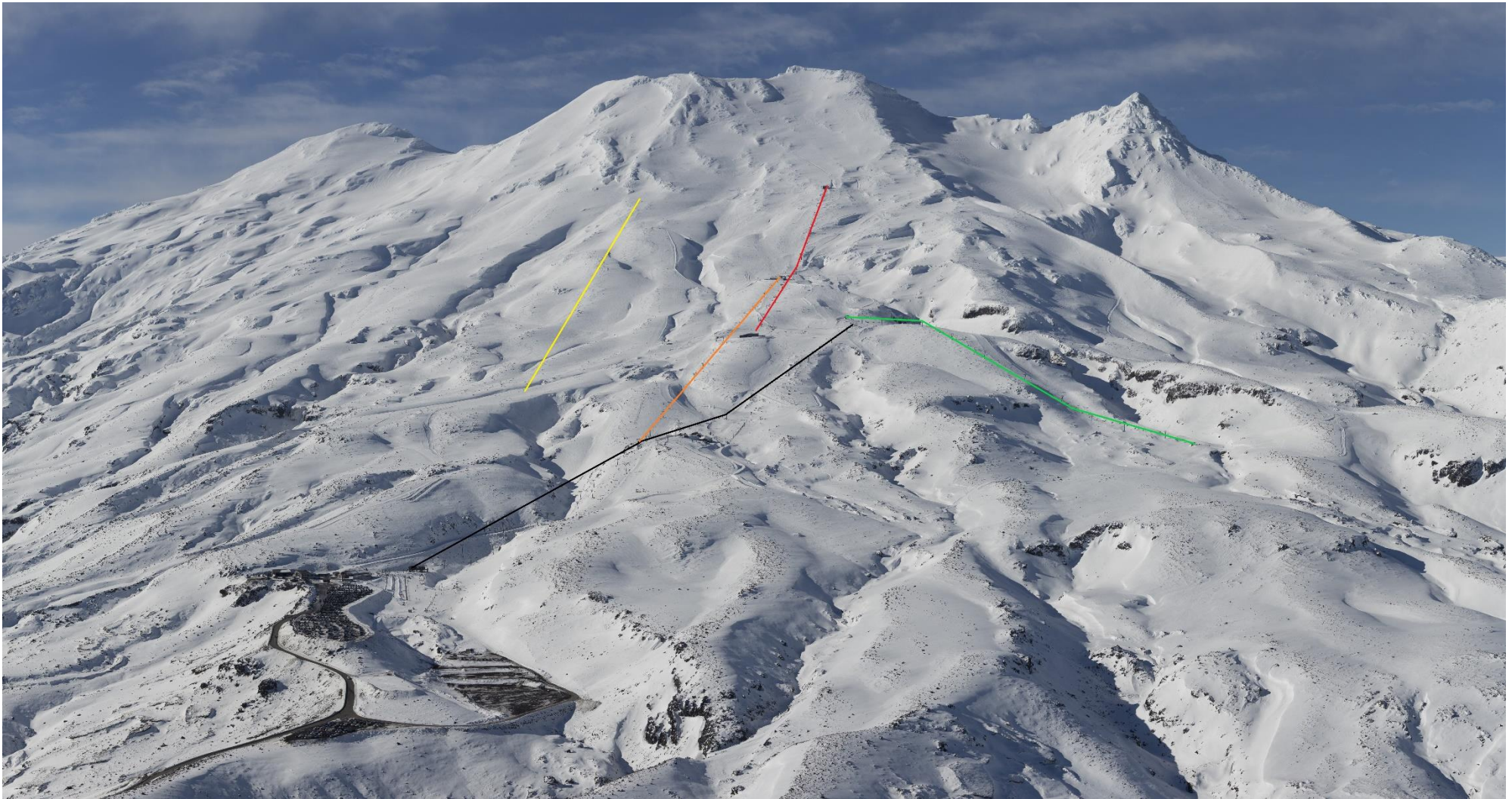







Figure: Turoa Developed Lifts 2030, Yellow = Sunset, Red = High Noon, Green = Nga Wai Heke, Black = Turoa Gondola

Legend

-  Ski Patrol - First Aid
-  Toilets
-  Food & Beverage
-  Vertical Retail Shop
-  Parking
-  Information & Sales
-  Urgent Care Clinic
-  Ski & Ride School
-  Rentals
-  Sledding Area
-  Slow Zones
-  Alpine Café & Bar
-  Snowflake Café
-  Giant Café
-  Ski Area Boundary
-  Ski & Ride School Freestyle Zone

-  **Easiest Trails**
Least difficult terrain
-  **Intermediate Trails**
Most suitable for intermediate skiers and snowboarders
-  **Advanced Trails**
Most suitable for advanced skiers and snowboarders
-  **Expert Trails**
Suitable only for expert skiers and snowboarders
-  **Freestyle Terrain**
Tūroa Parks may contain jumps, boxes, rolls, half/quarter pipes & other constructed or natural freestyle features

SAFETY SIGNAGE

-  **DANGER**
This sign warns of a hazard that could result in serious injury or death. It is used to warn of a hazard that is not covered by a warning sign.
-  **CLOSED**
This sign warns of a hazard that could result in serious injury or death. It is used to warn of a hazard that is not covered by a warning sign.
-  **CAUTION**
This sign warns of a hazard that could result in serious injury or death. It is used to warn of a hazard that is not covered by a warning sign.
-  **SKI AREA BOUNDARY**
This sign is used to mark the boundary of the ski area. It is used to warn of a hazard that is not covered by a warning sign.
-  **HAZARDOUS AREA**
This sign is used to mark a hazardous area. It is used to warn of a hazard that is not covered by a warning sign.

mtruahehu.com


Figure: Existing lift layout 2019, Green line = former Jumbo T-Bar

3. PRIORITY OF DEVELOPMENT

3.1 The priority for implementation of the main developments which are included within this IDP will be (to be updated annually):

	Priority 1	Priority 2
Lifts	<ul style="list-style-type: none"> • Turoa Gondola • Wintergarden Beginner Lifts 	<ul style="list-style-type: none"> • Sunset Express
Chalets	<ul style="list-style-type: none"> • Snowflake & Alpine Cafe expansion • Giant café improvements • Replacement Giant Chairlift 	<ul style="list-style-type: none"> • Top of the Road Staff and Retail Expansion • Blythe Chalet
Snowmaking	<ul style="list-style-type: none"> • Home Run trail to Sunset Express • Clarrys track to Base Area 	<ul style="list-style-type: none"> • Trail under Nga Wai Heke Chairlift • Home Run trail to Base Area
Terrain Modifications	<ul style="list-style-type: none"> • Trail safety modifications all trails • Trail exit from the Triangle to Nga Wai Heke • Alternative summer access trail • Wintergarden beginner slope works • Home run trail back to base area • Blythe flat works to support Turoa Gondola project 	<ul style="list-style-type: none"> • Trail safety modifications

3.2 This schedule which provides the indicative order of development does not include a number of minor developments which are proposed; e.g. covering the carpet lift in Alpine Meadow, Car Park alignment corrections, access control and re-surfacing, and smaller building modifications around the Base Area. Business as usual infrastructure replacement and renewals such as electrical transformers, switchgear, cell towers etc is also considered appropriate for processing using the minor works approval process. The priority order for these smaller scale developments, which will have far lesser effects, must be more flexible.

4. ASSESSMENT OF EFFECTS

- 4.1** All developments identified will require preparation of a Works Approval Application for presentation to DOC and many projects may also require lodging of Resource Consent applications to District and/or Regional Councils. Either of these applications will involve detailed consideration of effects of the development proposed.

As stated in the introduction this IDP is prepared to provide an “outline” of developments proposed and no engineering or architectural details are included. Therefore within this IDP there cannot be a detailed Assessment of Effects for each proposal. The following is therefore a very broad assessment of some principal effects.

4.2 Infrastructure

The infrastructure required for ski area operations has predominately been achieved in recent years. Implementation of developments proposed in this IDP requires:

- No further capacity increase is required for the access road although safety improvements and realignments/run-off areas to reduce risk to both light and heavy vehicles will be ongoing as expectations and road engineering techniques evolve over time.
- Minor changes to carparks. This is all within terrain which has already been modified for roads or carparks. The focus will be on better management of existing parking using controlled access to incentivise car-pooling and public transport, improving capacity and reducing erosion by surfacing and line-marking, improving pedestrian safety by introducing grade separation for walkways and improving access for public transport which is the core focus of our sustainable transport planning.
- Extension of mains power supply to the terminals of the Turoa Gondola, Sunset Express chairlift and along the additional snowmaking reticulation lines and pump-houses.
- Upgrade of the sewage storage and reticulation on mountain to ensure it remains best practice and least-risk of spills. As technology improves steps will also be taken to further reduce the water content of sewerage and the remove grey-water from kitchens for a separate on-site recycling process (for example utilising treated-grey water for toilet flushing) rather than offsite disposal which is both costly and has a high environmental impact due to the transportation required to the final treatment facility. There is also potential to recycle suitably treated grey-water through the snowmaking system.
- Relocation of standby generator capacity to the base area to eliminate generator/backup drive motor fuel handling risk on upper mountain.

- Expansion of standby generator capacity to 3MW to allow phasing-out of diesel auxiliary motors on old chairlifts to reduce diesel handling and storage risks, centrally located generators allow the electric motor to evacuate the chairlift at normal speed in the event of a power outage which is a frequent occurrence and risk.
- Extension to snowmaking reticulation water, comms and power to support proposed snowmaking developments.
- Access to additional water supply for snowmaking may require additional pumping capacity or piping.
- Consolidation of upper mountain groomer fuel storage and handling equipment within Turoa Gondola project to reduce fuel transfer risks (this includes decommissioning of the underground fuel transfer line between Movenpick return station and Highnoon Express drive station which is no longer required after the generator is relocated).
- Development of new toilets within the High Noon Express drive building in the location vacated by the Generator to reduce usage of upper mountain sewerage line from Giant café.

4.3 Cultural Effects

RAL has been engaged with Ngati Rangi, Te Korowai o Wainuiarua (formerly Ngati Uenuku), Ngati Tuwharetoa, Ngati Hikairo plus other Iwi for many years and placed significant resource and effort to developing a better understanding of the cultural effects of ski area operation and development. Some examples of material changes which are now consistently applied in ski area operations and planning include, but are not limited to;

Effluent Disposal

All human effluent which emanates from the Ski Area is reticulated to the Base Area and then transported to Ohakune for treatment and disposal in the Ohakune Sewage Treatment Plant. This has eliminated the very negative cultural effect from discharge of human waste, no matter how well treated in an environmental sense, into the mountain. Further steps will be taken over the next 10 years to continue upgrading this system to reduce inherent risks associated with reticulation and bulk-storage of sewerage in a mountain environment.

Terrain Modifications

Iwi have expressed concerns with respect to significant earthworks projects and have some divergence of opinion on the most appropriate ways to handle redundant infrastructure, in particular the buried component of concrete foundations for chairlift towers. Over the past ten years ski area management has developed a more effective understanding of these concerns and will now always first endeavour to achieve the required outcome through greater use of snow management techniques including snowmaking, snow fencing and snow grooming. Terrain modification proposals referred to in this IDP are relatively minor in scale compared to what was more normal 15 or more years ago. This significant rethink and close examination of alternatives to extensive trail-building (which is still the norm at other ski areas in New Zealand and around the world, including in UNESCO World Heritage areas) is the result of proactive engagement with Iwi who have emphasised the cultural impacts of large-scale earthworks. While every effort will be made to find suitable alternatives, we note that the regulatory environment continues to evolve rapidly and the expectations around injury prevention and the benefits of

minor earthworks to enhance these outcomes can be substantial so managing earthworks in a culturally appropriate way will be an important part of our next 10 years of development at Turoa. We also observe that there are substantial energy and water efficiency benefits to undertaking rock-grooming (as described in the Tongariro National Park Management Plan) on core ski trails serviced by snowmaking due to the significant reduction in snow volume required to be produced to cover the most prominent rocks.

Infrastructure Consolidation

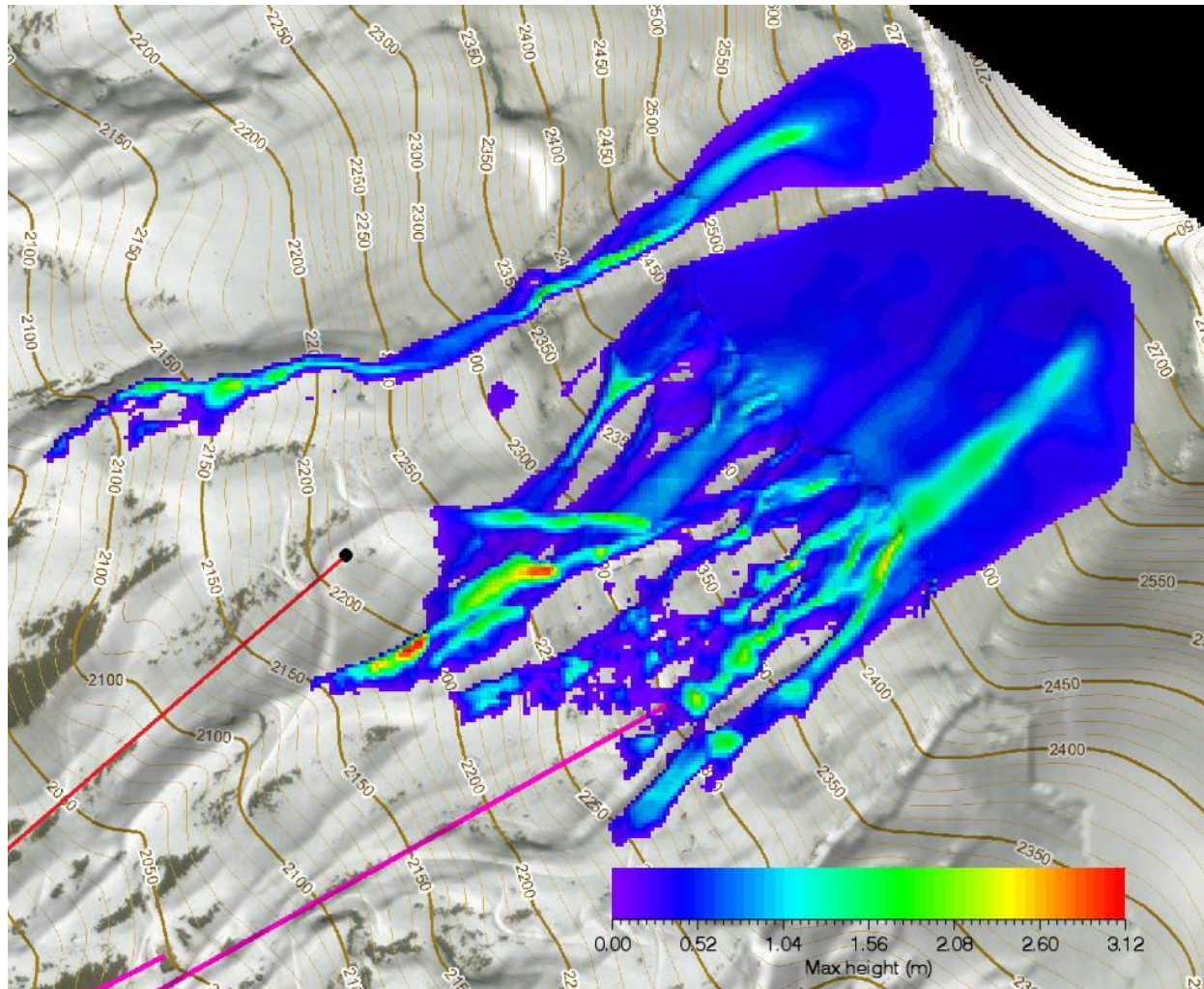
The Turoa Gondola is a good example of infrastructure consolidation which has become a feature of our design thinking. It requires fewer than 50% of the towers required on the existing fixed-grip chairlifts reducing the visual impact, earthworks and number of structures. Where possible we will consolidate and develop infrastructure in 'central corridors' and seek to use smart solutions to improve safety, reliability and to reduce the cultural and environmental impacts of the infrastructure.

4.3 Safety Effects

All developments proposed are assessed with respect to their proximity to principal avalanche paths, and the avalanche hazard is mitigated through the Ski Area Safety Management System. We were reminded in 2018 that the avalanche hazard remains a very real risk and must be given serious consideration when planning infrastructure.

Management of the Gliding Gladys avalanche path which originates well above the upper boundary of the ski area will likely necessitate a more permanent avalanche control solution rather than the use of hand placed or projectile explosives. RAL is investigating the use of gaseous avalanche control equipment (detonates a gas mixture rather than explosive) which can be flown in and out of these remote sites above the ski area boundaries in both environmentally and culturally sensitive areas to control what has now been proven to be a high risk mass-casualty potential avalanche zone if weak snow layers are not appropriately managed. Modelling has shown that these start zones have potential to produce avalanches which would flow right through the ski area necessitating a robust approach to control.

There are no major lahar paths which traverse through Turoa Ski Area.



**Figure 1: Computer model of the 2018 avalanche which damaged the High Noon Express and destroyed a snow groomer.
Pink = High Noon Express. Red = Jumbo T-Bar. Colour scale indicated avalanche debris depth.**

4.4 Visual & Ecological Effects

RAL believes that the limited number of lifts proposed for the upper slopes and the review of design and siting undertaken for all developments will result in the Ski Area having an overall lower visual impact, especially when viewed from below the Ski Area. Most major developments will require Visual and Ecological Impact Assessments as part of the design and approval processes.

5. DESIGN CARRYING CAPACITY

- 5.1** This IDP provides for changes to the ski area which are targeted at increasing the quality of experience and therefore better meeting customer's ever increasing expectations, rather than targeted at providing for any material increase in the daily number of visitors which the ski area will provide for. The upgraded facilities proposed will provide for a Design Carrying Capacity of 5,500 skiers per day in line with the limits outlined in the licence. In addition, facilities will cater for up to 20% non-skiers accessing the ski area.

Proposed Developments

6. LIFTS

- 6.1** Stage 1 lift developments will include:

- Two additional carpet lifts at the Wintergarden, replacement of the existing Wintergarden platter with covered carpet lift and relocation of the Alpine Meadow platter back to the Wintergarden Hansel Platter line (to its former location)
- Upgrade of the Movenpick Quad Chairlift to a gondola lift with a mid-station at the Wintergarden area.

Stage 2 lift developments will include:

- Replacement of the Jumbo T Bar with a detachable chairlift; the Sunset Express.
- Replacement of the Giant Chairlift with a detachable chairlift;

- 6.2** A further review of lifts servicing the beginner and low intermediate terrain below the Wintergarden area and down to include Alpine Meadows will be undertaken once an outcome is determined from a review of the Alpine Flush and Mangawhero Gully zones which are currently excluded from ski area developments.

7. SNOW MANAGEMENT & TERRAIN MODIFICATIONS

There are many trails where the safety and ease of movement by skiers and boarders can be significantly enhanced through any or all of:

- the provision of additional snowmaking capacity, and/or
- management techniques to more effectively catch and use natural snow falls, and/or
- selective modification to the natural terrain.

Snow management options will be explored prior to any works application being developed for terrain modifications. These modifications will be evaluated in light of skier and boarder traffic flows, safety and the company's growing knowledge and expertise in snow management. Evolving techniques of terrain modification and restoration will also ensure any changes are more 'conservation friendly'.

SNOW MANAGEMENT

This section will cover all activities of snow management including snowmaking, snow grooming, and snow fencing.

7.1 Snow Making

Current

The existing snow making system provides for a water resource and reticulation system which enables coverage on the beginner terrain of Alpine Meadow and Wintergarden plus the main trails of Clarrys Track, Boneyard and Lower Freeway. The current water resource is from a 45,000 m³ main reservoir located below Wintergarden which is supplied from the natural spring flows from one of the tributaries of the upper Mangawhero Stream. These flows are initially fed into a small 2,000 m³ reservoir below Alpine Meadow and then pumped up to the main reservoir.

All of the trails on which snowmaking currently occurs, or is approved for, are in the Mangawhero Catchment.

Snowmaking generally occurs from early June through to the end of August. During this period water is being taken out of the Mangawhero Catchment. At the cessation of snowmaking the main reservoir would normally be near empty. Water will continue to be taken for a further 2 to 4 weeks and by late September in a normal year both reservoirs will be full. Once the reservoirs are full no further water will then be taken until snowmaking recommences in early June of the following year.

The existing infrastructure does not provide sufficient water for the approved snowmaking extension to Upper Freeway and Yahoo.

Proposed Development

Extensions to the reticulation system is proposed which will provide snowmaking capacity on the following terrain:

- Priority 1
 - Home Run trail from the lower Why Not trail past the bottom terminal of the Sunset Express and then down to the Base Area (combined with snowfencing along entire trail to passively harvest snow)
 - Clarrys track to base area
- Priority 2
 - Upper Freeway & Yahoo trails from Blythe Flat to top of Giant Chairlift
 - Trails under the Nga Wai Heke Chairlift

The trails under the Nga Wai Heke Chairlift are in the Mangaehuehu Catchment. All other trails on which snowmaking is proposed are in the Mangawhero Catchment.

The existing water take from the Mangawhero Catchment and the existing Reservoirs do not provide sufficient capacity for any expansion of the snowmaking system. An additional water resource would be required. RAL proposes this be provided by a new water take from a spring-fed stream located 50m east of the former High Flyer chairlift site in the Mangaehuehu Catchment. This water would be reticulated to the existing main reservoir and then pumped through the snowmaking system.

If this new water take is not approved, an alternate development will involve:

- to enable snowmaking on the trails under the Nga Wai Heke Chairlift, which are in the Mangaehuehu Catchment, a new consent for water take will still be required from the Mangaehuehu stream mentioned above and this water will then be stored in a new 40,000 m³ reservoir with own pumping and reticulation system. This water will be recycled annually from snow melt in Spring.
- To enable expansion of the snowmaking system for trails in the Mangawhero Catchment an additional 50,000 m³ reservoir will be required. The water supplied to this reservoir will allow snow melt water to be captured.
- The addition of these two reservoirs will allow spring snow melt water to be captured during periods of high flow reducing the requirement to take water from the stream. A suitable technical location for either of the required reservoirs has not yet been identified and would be the subject of a detailed engineering study.

7.2 Grooming Machines

Total Skiable Area	500 hectares
Area Groomed Consistently	150 hectares
Groomer Vehicles Required	7

It is expected that the frontline grooming fleet will consist of up to 7 vehicles at the peak of the winter. All machines would be similar to the current Kassbohrer PB 400 & PB 600 models.

These grooming machines will be supplemented by up to three excavators and up to two tracked dump trucks which will be used for snow shifting activities from around buildings, lift terminals and some key trails. It is also envisaged that two to four oversnow tracked vehicles will be set up for other general uses eg carrying snow making guns, staff transport, maintenance servicing, food transport etc.

7.3 Snow Fences

Over several decades the company has installed a number of snow fences which are used to catch and/or trap wind driven snow. The climatic conditions experienced at Mt Ruapehu, especially the high winds which frequently accompany snow falls, ensure that snow fencing has an important role to play in maximising the utilisation of natural snow for creation and maintenance of ski trails. In simple terms "we must endeavour to keep the snow where we ski regularly and not where we do not ski".

It is envisaged that snow fences will continue to be similar to the current designs which require installation of small concrete foundations for each post. Alternative technologies such as 'Surefoot' ground-pinning technology will also be explored to reduce the requirement for concrete footings. On-going liaison will be maintained with DOC to ensure this activity continues to be an important and acceptable feature of our snow management techniques. The use of snowfences is the lowest impact form of snow management we can achieve – it requires no energy, water, communication equipment, pumps, computer controls or human labour. The snow fence is a passive device which is optimally suited to Mt Ruapehu conditions and is extremely low impact due to its low height, low visual impact and simple construction. This plan anticipates installation of approximately 2000m of snow fence over the development period.

TERRAIN MODIFICATIONS

7.4 Clarry's Track, Clarry's Track #2, Home Run

Currently Clarry's Track is the only trail which provides a reliable skiable return to the Base Area. The other trail, Home Run, does not have snowmaking coverage and is only usable during periods of the season with very good natural snowcover. Clarry's Track is therefore frequently very crowded and has a high incidence of collision accidents.

To alleviate this congestion RAL has proposed that additional routes be developed:

- A second Clarry's Track traversing down Mangawhero Gully under the Movenpick Chairlift at a lower elevation than the current Clarrys Track. This would be reticulated for snowmaking.
- Snowmaking reticulation on Home Run.

Some terrain modifications to the natural terrain would be required for the second Clarrys Track. Minor terrain modifications are required for Home Run concentrated around two steep areas and general rock relocation. Preliminary discussions on these proposals have been held with DOC and RAL is now reviewing whether any alternate options could also be practicable and therefore considered. One option under consideration is widening Clarrys track using fencing to retain the snow.

7.5 There are relatively minor terrain modifications for ski trail improvements proposed for Upper Freeway, Buttresses and in the lower Nga Wai Heke Quad trails. These relatively few proposed modifications reflect a change in management thinking with regard to ski trail development. The cultural concerns advocated by Iwi with regard to terrain modifications has been the dominant influence to this change.

The great majority of required improvements to ski trails, including those which have been considered in recent years, will be achieved from an increase in snowmaking capacity and reticulation rather than further modifications to the natural terrain; with this snowmaking being supplemented by the other snow management practises (grooming and additional snow fences).

8. CHALETS

- 8.1 A new mid mountain chalet is proposed for Blyth Flat; this will replace the Giant Cafe.

The Alpine Cafe will be extended providing an additional 80-100 inside seats plus additional toilet facilities.

The Snowflake Cafe will have the “snowflake” roof structure altered to provide more effective seating in the upstairs area and be extended to include inside toilet facilities. This will allow removal of the separate toilet block which is currently in the Wintergarden area. It is possible that economics will dictate that the Snowflake Café is essentially rebuilt from scratch in the current location rather than ‘modified’ due to significant changes in building consents which may necessitate uneconomic modifications.

We have looked at options to refit an area within the High Noon Express drive building as a café including fitting toilets in the area vacated by the generator which has been removed, this may be an interim measure if funding or other delays prevent construction of the Blythe Flat chalet on the required timeframe or if the Giant Café deteriorates to the extent that it is no longer suitable for public dining space.

Other semi-permanent structures may be used to supplement café space such as umbrella café style facilities which don’t require significant foundations or create a permanent structure.

- 8.2 It is assumed that at any one time 25% of skiers and non-skiers will be using a cafe facility. It is felt that required seats can be adequately provided through a combination of inside and outside seating, with a minimum 80% of seats required being inside.

- 8.3 Toilets will be provided at all Chalets. The number of pans/urinals will comply with NZ Building Codes but should also reflect a minimum number calculated at
- | | | | |
|--------|-------------------|-----|-------------------|
| Ladies | 1 : 30 cafe seats | Men | 1 : 40 cafe seats |
|--------|-------------------|-----|-------------------|

8.4 **Services**

Sewerage

All effluent emanating from company facilities is now reticulated to the Base Area and then transport to Ohakune for treatment and disposal in the Ohakune Sewage Treatment Plant. This will continue to be the only method used for disposal of effluent. Alternative methods for greywater recycling into the

blackwater system (ie used for toilet flushing) are being considered to reduce environmental impact of transporting what is essentially 'clean' but non-potable water.

Water Supply

Water supply will be principally from existing spring fed supplies supplemented by some stored rain water. All water available for public consumption will be treated and comply with appropriate water quality legislation. We are currently undertaking work to better identify all existing water supplies.

Fire Fighting

RAL continues to improve fire safety throughout all buildings at Turoa. This includes external reviews of all buildings to ensure compliance and best practice are achieved. This may include the installation of fire suppressant sprinkler systems and fire retardent materials in all large buildings. In the event that sprinkler systems are installed, each system, which may service sprinklers in a number of buildings within one general location (eg one system would service all buildings in the Base Area), will require dedicated water storage tank(s) with minimum total capacity of 80cum plus pumping and control systems.

9. CARPARKS

- 9.1** Carpark developments at Turoa have essentially been completed. Changes are relatively minor and focussed more on facilitating bus access, controlling parking access, surfacing and improving pedestrian safety. The lower disused portion of the Alpine Meadow is likely to be returned to parking space over time due to climate-change impacts in warm seasons making it difficult to retain snow. This area has previously been used as carpark and is serviced by an existing concrete road.
- 9.2** To mitigate the negative environment effects of gravel migration to surrounding terrain RAL proposes that in the long term all carparks are hard surfaced. This will also allow efficiencies in snowclearing and management of icy surfaces.
- 9.3** It is expected the number of persons using public transport will increase significantly. RAL and DOC may implement a charging regime of some form (eg carpark fee) to influence people to use more public transport and have more occupants per car. RAL will also introduce barrier access to manage access to car parks at Turoa to facilitate control of these areas. This will require power and communication to be installed at each barrier location and minor foundations for the barriers themselves. Management of carparking spaces with a booking system is an essential tool for preventing overcrowding and congestion on roads and will likely be implemented at some time during the plan.

10. BASE AREA PLAZA

- 10.1** The Base Area Plaza is the principle interface between the Ohakune Mountain Road and the Ski Area. During the past 20 years the Plaza has been significantly upgraded and now functions more effectively in providing the spaces and services necessary for the customer transition from road end to lift start.
- 10.2** Current planning indicates further developments will all be relatively minor compared to what has been undertaken during the past 10 years. The main changes will involve extensions to:
- Alpine Cafe to provide both additional seats and additional toilets
 - Rental building to provide for Ski Workshop and additional circulation space for rental customers
 - Kids Centre as demand for this service increases
 - Maintenance Workshop to provide an additional 2 – 3 bays
 - Administration building to provide additional office and staff facilities and a more effective layout for the Medical Centre.
 - TOR 1 snowflake shaped building will be either upgraded or replaced with a new building of similar scale to provide for staff room needs

11. OPERATION & MAINTENANCE FACILITIES

This section serves to outline any projected changes to the maintenance and operational facilities required to ensure the effective operation of Turoa Ski Area, excluding those located in the base area.

11.1 Groomer Workshop

Currently all on mountain servicing and refuelling of Groomers occurs in the Armco workshop located in the Wintergarden area. When the Blyth Flat Chalet is constructed, and the Giant Cafe then closed, it is proposed to relocate groomer maintenance into the space immediately under the Giant Chairlift Top Terminal which is currently used as part of the Giant Cafe. The Armco workshop will then be used for maintenance and servicing of snowmaking equipment.

Mains Power standby

In 2007 a 1.2 megawatt diesel generator was installed in the drive terminal of the High Noon Express. This generator capacity has been relocated to the base area to mitigate the risk of transporting fuel via a complex system to the High Noon Drive. RAL proposes to install a further 1.2 megawatts of generator capacity at the base of the ski area in a location beside the workshop. This generation capacity will provide mains power backup for all lift and chalet facilities and allow for removal of the existing 2 standby diesel drives for lifts and 3 current smaller diesel generators.

This generator capacity may also provide additional power supply to the ski area should future peak demand be greater than the existing reticulation from Ohakune can provide to mitigate the considerable effects of creating a new trench or laying a new feeder cable up the Ohakune Mountain Road. Load modelling shows that peak loads are for very short durations perfectly suited to short duration operation of generators.

11.2 Other changes to operational and maintenance facilities are expected to only occur where the service required may be included as relatively small spaces within new lift terminal buildings or within the Blyth Flat Chalet.

11.3 Removal of Old Structures

The company is committed to removing all structures that are not required. This includes above ground remnants of foundations, buildings, cables etc. Once structures have been removed every effort will be made to restore ground to natural contours and, where appropriate, a program of replanting with native vegetation will be implemented. RAL will work with DOC and Iwi to determine appropriate methods for rehabilitating redundant infrastructure assets.