

Manning Park Resort

SKI RESORT DEVELOPMENT PLAN

AUGUST 2026





Planning for:

Kevin Demers, Owner
Don Sharpe, VP of Operations



Manning Park Resort
7500 Hwy #3
Manning Park, BC V0X 1R0
1.800.330.3321
info@manningpark.com
www.manningpark.com

Planning by:

Brent Harley
Kyle Vash
Matt Bakker
Ryan Robertson
Sue Clark



Brent Harley and Associates Inc. (BHA)
4 - 1005 Alpha Lake Rd.
Whistler, BC, V0N 1B1
604.932.7002
bha@brentharley.com
www.brentharley.com

Statement of Limitations: The information included in this report has been compiled by BHA from a variety of sources. The intent of this document is to illustrate the spatial relationship between the existing and proposed development, as well as environmental, economic, and cultural realities. Further, the historic weather information provided is solely to illustrate existing climate conditions. The impacts of climate change on temperature, precipitation, snowfall, and other associated factors as they relate to this project will require ongoing assessment and review as new information and data become available. As such, BHA makes no representation or warranty, expressed or implied, as to the accuracy, completeness, timeliness or rights to the use of such information. BHA shall not be liable for any general, special, indirect, incidental or consequential damages including, but not limited to, lost revenues or lost profits. Detailed design, survey, architecture, geotechnical assessment, engineering approvals, etc., must be completed prior to construction.

This report is prepared for the sole use of Manning Park Resort unless otherwise stated. No representations of any kind are made by BHA or its employees to any party with whom BHA does not have a contract. © 2026 Brent Harley and Associates Inc.

All photos are credited to Manning Park Resort unless otherwise attributed.

CONTENTS

1	SKI RESORT DEVELOPMENT PLAN INTRODUCTION	1-1
1.1	OVERVIEW	1-1
1.2	OWNERSHIP – HOLIDAY TRAILS RESORTS	1-1
1.3	SKI RESORT DEVELOPMENT PLAN STRUCTURE.....	1-3
1.3.1	<i>Ski Area Plan</i>	1-3
1.3.2	<i>Lodge Area Plan</i>	1-4
1.3.3	<i>Support Services Area Plan</i>	1-5
1.3.4	<i>Conclusion</i>	1-6
1.4	SKI RESORT DEVELOPMENT PLAN CONTEXT AND BACKGROUND	1-7
1.4.1	<i>Project Overview</i>	1-7
1.4.2	<i>Manning Park Resort Guiding Values</i>	1-7
1.4.3	<i>Location and Access</i>	1-8
1.4.4	<i>Regional Context</i>	1-8
1.4.5	<i>E.C. Manning Provincial Park</i>	1-9
1.4.6	<i>Provincial Legislative Framework</i>	1-9
1.4.7	<i>Historic Context</i>	1-10
1.4.8	<i>Environmental Context</i>	1-12
1.4.9	<i>Climate Change Analysis</i>	1-19
2	SKI AREA PLAN.....	2-1
2.1	EXISTING ALPINE SKI AREA CONTEXT	2-1
2.1.1	<i>Ski Area Plan Goals and Objectives</i>	2-1
2.1.2	<i>Existing Mountain Facilities</i>	2-2
2.1.3	<i>Existing Mountain Base Area Facilities</i>	2-17
2.2	SITE ANALYSIS	2-21
2.2.1	<i>Introduction</i>	2-21
2.2.2	<i>Mountain Terrain Analysis</i>	2-21
2.2.3	<i>Mountain Base Area Analysis</i>	2-28
2.3	SKI AREA PLAN	2-31
2.3.1	<i>Introduction</i>	2-31
2.3.2	<i>Mountain Development Plan</i>	2-31
2.3.3	<i>Alpine Base Area Development Plan</i>	2-41
2.3.4	<i>Infrastructure</i>	2-45
2.3.5	<i>Controlled Recreation Area Boundary</i>	2-46
2.3.6	<i>Phased Development</i>	2-48
2.4	SKI AREA PLAN – ALTERNATIVE SKI AREA CONCEPTS.....	2-56
2.5	SKI AREA PLAN – ALTERNATIVE BASE AREA CONCEPTS	2-58
3	LODGE AREA PLAN.....	3-1
3.1	INTRODUCTION	3-1
3.1.1	<i>Purpose of the Lodge Area Plan Concept</i>	3-1
3.1.2	<i>Preferred Concept Goals and Objectives</i>	3-2
3.2	BACKGROUND	3-3
3.2.1	<i>Development Vision, Goals and Objectives</i>	3-3
3.2.2	<i>Location and Existing Conditions</i>	3-4
3.3	DEVELOPMENT POTENTIAL	3-7
3.3.1	<i>Introduction</i>	3-7
3.3.2	<i>Base Area Slope Analysis</i>	3-7
3.3.3	<i>Base Area Elevation Analysis</i>	3-7
3.3.4	<i>Parking Evaluation</i>	3-9

3.3.5	Site Servicing.....	3-9
3.4	LODGE AREA DEVELOPMENT REALITIES AND OPPORTUNITIES	3-10
3.5	LODGE AREA PLAN CONCEPT	3-11
3.5.1	Village Core.....	3-11
3.5.2	Overnight Accommodation	3-14
3.5.3	Recreation Facilities.....	3-15
3.5.4	Visitor Information Centre.....	3-16
3.5.5	Access and Parking.....	3-17
3.6	PHASED DEVELOPMENT	3-18
3.6.1	10-Year Plan	3-18
3.6.2	Buildout.....	3-19
4	SUPPORT SERVICES AREA PLAN.....	4-1
4.1	INTRODUCTION	4-1
4.2	STAFF HOUSING.....	4-1
4.2.1	Archaeological Overview Assessment – Staff Housing	4-2
4.3	MANNING PARK RESORT MAINTENANCE YARD.....	4-5
4.4	STAFF HOUSING & WILDLIFE ATTRACTANTS MANAGEMENT PLAN	4-5
4.4.1	Staff Housing Management	4-5
4.5	FUTURE PLANS	4-6
5	APPENDIX	5-1
5.1	ENVIRONMENTAL OVERVIEW ASSESSMENT – SARTORI ENVIRONMENTAL	5-1

List of Figures

FIGURE 1-1. REGIONAL CONTEXT MAP.....	1-2
FIGURE 1-2. SKI RESORT DEVELOPMENT PLAN – PLANNING AREAS.....	1-3
FIGURE 2-1. MANNING PARK RESORT - EXISTING CONDITIONS	2-3
FIGURE 2-2. EXISTING SKI TERRAIN AT MPR	2-7
FIGURE 2-3. EXISTING NORDIC AND SNOWSHOE TRAIL NETWORKS.....	2-13
FIGURE 2-4. EXISTING NORDIC AND SNOWSHOE TRAIL NETWORKS (DETAILED).....	2-14
FIGURE 2-5. EXISTING ALPINE BASE AREA.....	2-20
FIGURE 2-6. MOUNTAIN SKI SLOPE ANALYSIS.....	2-23
FIGURE 2-7. MOUNTAIN ELEVATION ANALYSIS	2-25
FIGURE 2-8. MOUNTAIN ASPECT ANALYSIS	2-27
FIGURE 2-9. BASE AREA SLOPE ANALYSIS.....	2-29
FIGURE 2-10. MANNING PARK RESORT AT BUILDOUT	2-34
FIGURE 2-11B. GLADED TREE SPACING DIAGRAM	2-36
FIGURE 2-11A. ILLUSTRATIVE EXAMPLE OF GLADING.....	2-36
FIGURE 2-12. PROPOSED ALPINE BASE AREA - BUILDOUT.....	2-44
FIGURE 2-13. PROPOSED CONTROLLED RECREATION AREA BOUNDARY ADJUSTMENT	2-47
FIGURE 2-14. MANNING PARK RESORT – 10 YEAR PLAN BASE AREA	2-49
FIGURE 2-15. MANNING PARK RESORT – 10 YEAR PLAN MOUNTAIN	2-51
FIGURE 2-16. MANNING PARK RESORT – BUILDOUT BASE AREA.....	2-53
FIGURE 2-17. MANNING PARK RESORT – BUILDOUT MOUNTAIN	2-54
FIGURE 3-1. LODGE AREA – EXISTING CONDITIONS.....	3-4
FIGURE 3-2. BASE AREA SLOPE ANALYSIS.....	3-8
FIGURE 3-3. BASE AREA ELEVATION ANALYSIS	3-8
FIGURE 3-4. LODGE AREA PREFERRED CONCEPT.....	3-12
FIGURE 3-5A. LODGE AREA PHASING PLAN – 10-YEAR PLAN.....	3-20
FIGURE 3-5B. LODGE AREA PHASING PLAN - BUILDOUT.....	3-21
FIGURE 4-1. SUPPORT SERVICES AREA EXISTING CONDITIONS.....	4-3

FIGURE 4-2. SUPPORT SERVICES AREA – PREFERRED CONCEPT	4-7
---	-----

List of Tables

TABLE 1-1. DRIVE TIMES AND DISTANCE TO MANNING PARK RESORT	1-8
TABLE 1-2. BIOGEOCLIMATIC ZONES WITHIN STUDY AREAS	1-13
TABLE 1-3. WATERCOURSES AND FISH OCCURRENCE WITHIN THE STUDY AREA	1-14
TABLE 1-4. HISTORICAL WEATHER DATA FOR ALLISON PASS WEATHER STATION (1979-84).	1-17
TABLE 2-1. MANNING PARK RESORT - EXISTING CHAIR LIFTS.....	2-4
TABLE 2-2: SKI TRAIL CLASSIFICATION BY GRADIENT.....	2-5
TABLE 2-3. EXISTING SKI TRAILS AT MANNING PARK RESORT.....	2-5
TABLE 2-4. ACCEPTABLE SKIER DENSITIES BY SKILL CLASS.....	2-8
TABLE 2-5. DOWNHILL CAPACITY BY SKIER SKILL CLASS	2-9
TABLE 2-6. SKIER MARKET DISTRIBUTION BY SKILL CLASS.....	2-10
TABLE 2-7. UPHILL AND DOWNHILL CCC	2-11
TABLE 2-8. EXISTING BALANCED RESORT CAPACITY.....	2-17
TABLE 2-9. EXISTING BUILT SPACE REQUIREMENTS.....	2-18
TABLE 2-10. SLOPE BY SKIER SKILL CLASS.....	2-22
TABLE 2-11. SKI RESORT ELEVATION AND SKIABLE VERTICAL	2-24
TABLE 2-12. ACCEPTABLE BASE AREA SLOPES.....	2-28
TABLE 2-13. DOWNHILL CAPACITY OF SKI TERRAIN AT BUILDOUT.....	2-37
TABLE 2-14. EXISTING AND PROPOSED SKI LIFTS	2-37
TABLE 2-15. PROPOSED LIFT BALANCE ASSESSMENT.....	2-38
TABLE 2-16. BALANCED RESORT CAPACITY AT BUILDOUT.....	2-40
TABLE 2-17. PROPOSED SKIER-RELATED BUILT SPACE	2-42
TABLE 3-1. BREAKDOWN OF EXISTING OVERNIGHT ACCOMMODATION CAPACITY.....	3-6
TABLE 3-2. ACCEPTABLE BASE AREA SLOPE GRADIENTS	3-7
TABLE 3-3. EXISTING AND PROPOSED OVERNIGHT ACCOMMODATION	3-14

List of Charts

CHART 1-1. HISTORIC SNOWFALL AND SNOWPACK FROM THE ALLISON PASS WEATHER STATION	1-18
CHART 1-2. HISTORIC SNOWPACK FROM THE BLACKWALL PEAK SNOW STATION	1-18
CHART 1-3. CHANGE IN MEAN WINTER TEMPERATURE (DEC - FEB)	1-20
CHART 1-4. CHANGE IN WINTER (DEC - FEB) DEGREE DAYS BELOW 0°C.....	1-21
CHART 1-5. CHANGE IN MEAN WINTER (DEC - FEB) SNOWFALL (CM)	1-22
CHART 2-1. EXISTING TERRAIN DISTRIBUTION ANALYSIS	2-10
CHART 2-2. EXISTING LIFT BALANCE ASSESSMENT	2-11
CHART 2-3. PROPOSED LIFT BALANCE ASSESSMENT	2-38



1 SKI RESORT DEVELOPMENT PLAN

INTRODUCTION

1.1 Overview

Manning Park Resort is a regional ski resort located in southwestern British Columbia, at the northern extent of the Cascade Mountains (Fig. 1-1). This mountain-based resort provides year-round outdoor recreation for day-use visitors and overnight guests, within E.C. Manning Provincial Park.

The Ski Resort Development Plan (SRDP) for Manning Park Resort has been created to guide the phased development and improvement of the Resort over the coming decades, addressing current challenges and capitalizing on the Resort's strengths, in alignment with the Resort's Park Use Permit and BC Parks' Ski Area Policy.

The planning process for the Manning Park Resort SRDP was guided by a clear vision and progressed from an initial analysis of existing facilities and capacities, identifying challenges and opportunities, through to a series of preliminary concepts which were then refined and synthesized into a proposed preferred concept for Manning Park Resort.

Manning Park Resort has several new operational initiatives underway and many more planned for the future, all of which are presented and discussed in the SRDP. In the following sections, the SRDP provides background on the Resort and the planning process (Sec. 1), the on-mountain recreation and lift-accessed activities (Sec. 2), the planned changes to Manning Park Lodge and associated staging facilities (Sec. 3), and supporting services and facilities, such as employee housing, community space, and the maintenance yard (Sec. 4).

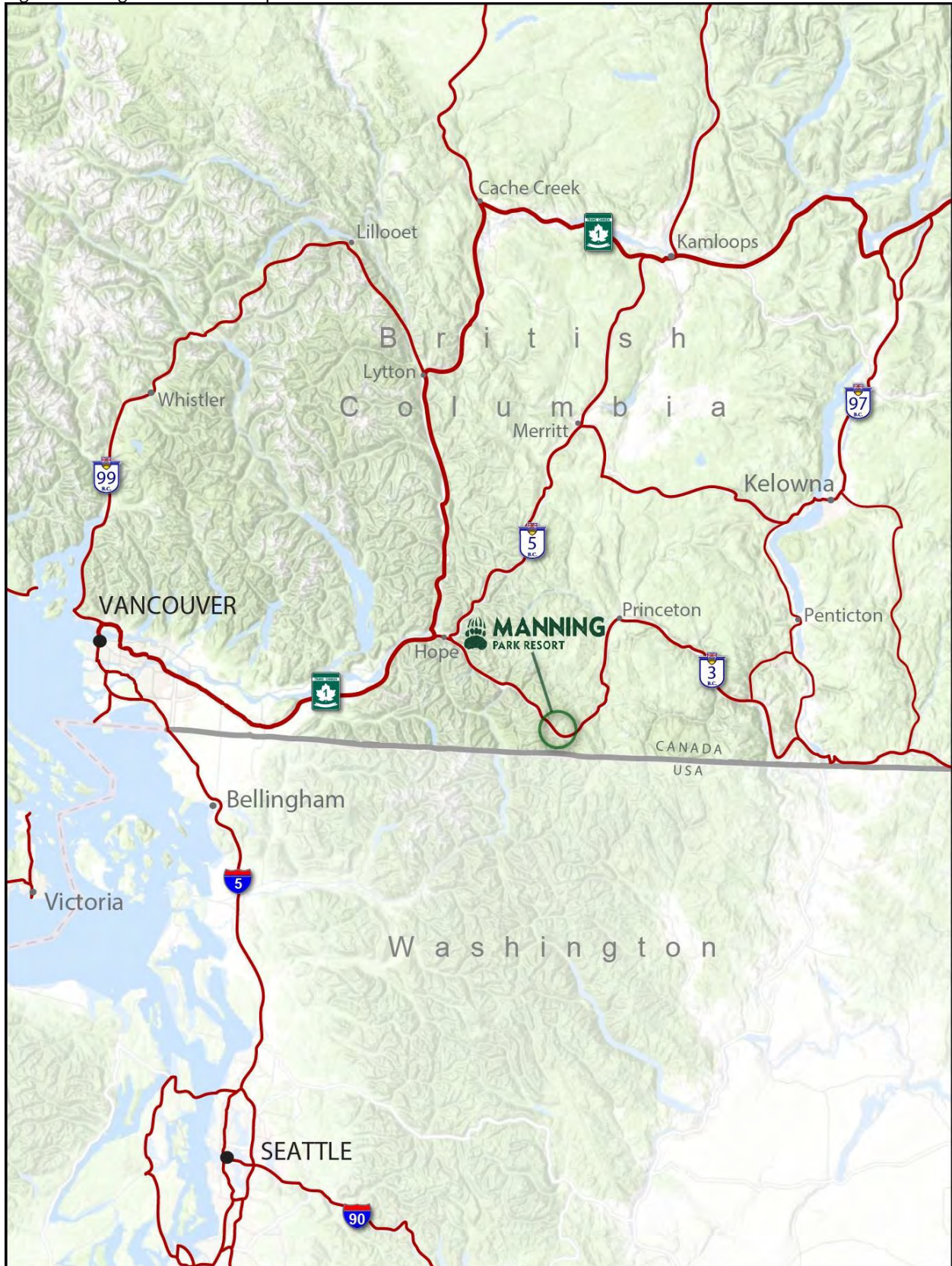
The SRDP for Manning Park Resort lays out a comprehensive plan for the continued improvement and evolution of this successful regional ski area, guided by a clear vision that recognizes the unique beauty and potential of the ski area and its role within E.C. Manning Provincial Park.

1.2 Ownership – Holiday Trails Resorts

Manning Park Resort is owned and operated by Holiday Trails Resorts (HTR), a family-owned company that has been in business since 1983. The Demers family, Kevin and Donna, are the owners and continue to provide the leadership to ensure that all their businesses fulfill the mandate to operate with integrity and to provide quality recreational experiences. HTR operates fully equipped RV Resorts and campgrounds, and also owns and operates the successful Bridal Falls Waterpark and Bridal Falls Motel.

In 2013, the Demers family purchased Manning Park Resort and took it out of receivership. With smart investment and savvy operational skill, this gem of a resort is once again flourishing.

Figure 1-1. Regional Context Map



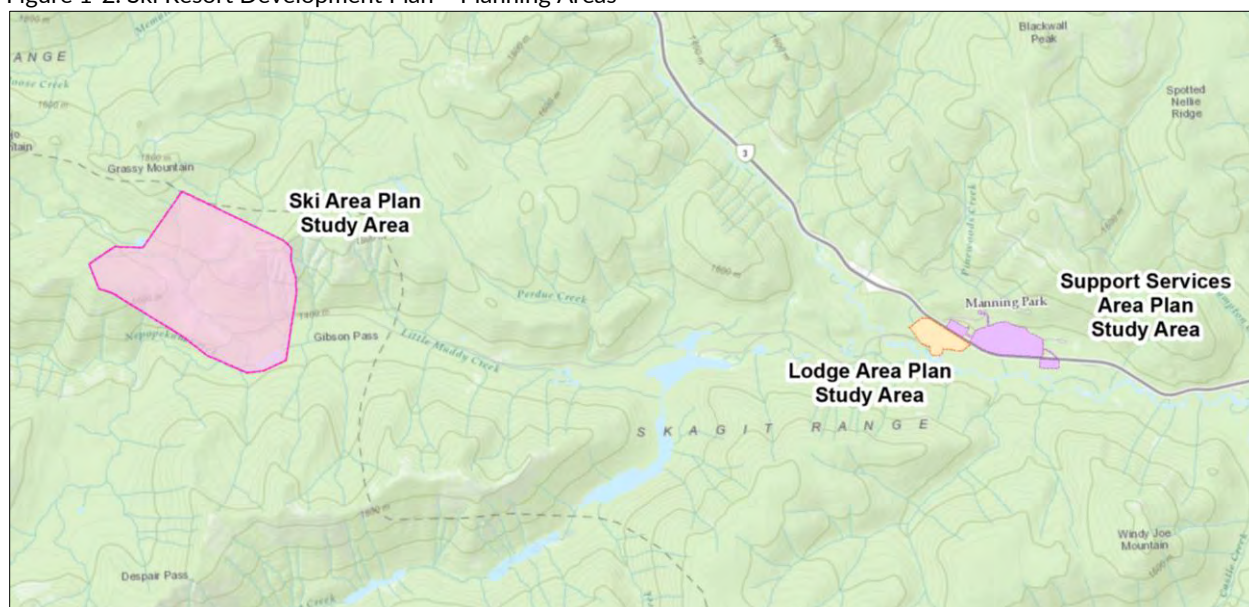
1.3 Ski Resort Development Plan Structure

The Ski Resort Development Plan (SRDP) for Manning Park Resort has been divided into three sections (Fig. 1-2):

- Ski Area Plan (SAP)
- Lodge Area Plan (LAP)
- Support Services Area Plan (SSAP)

The Ski Area Plan addresses the future development of the alpine ski area at the end of Gibson Pass Road, including all ski lifts, trails, lodges, parking, and required infrastructure. The Lodge Area Plan is focused on the resort facilities along Highway 3, including lodges, overnight accommodation, parking, and staging facilities. Finally, the Support Services Area Plan addresses staff housing and the maintenance yard opposite the Lodge Area on Highway 3.

Figure 1-2. Ski Resort Development Plan – Planning Areas



For the purposes of the Ski Resort Development Plan for Manning Park Resort, the lands that surround the Ski Area, Lodge Area, and Support Services Area were considered as part of the respective Study Areas. While this land is not under the authority of Manning Park Resort, it was important to consider adjacent land use and contextual factors in the planning process that may influence the future direction of MPR.

1.3.1 Ski Area Plan

In April 2018, Brent Harley and Associates (BHA) was retained to create a new SAP to guide the development of the alpine ski area at MPR. Their mandate was to focus on the planning for alpine skiing and snowboarding at the mountain and the associated alpine base area (e.g., day lodge, ancillary buildings, parking, maintenance, etc.). This work is built upon past planning exercises, notably the 2003 Lodge Area Concept, and preliminary work in 2004 for an expanded Downhill and Nordic Ski Area Resort Concept. Over the past 14 years, BHA has worked with MPR on its long-term planning and the implementation of those plans. The SAP is an extension

of these efforts aligned with the Vision for MPR and requirements of the BC Parks Ski Resort Policy and the Park Management Plan for E.C. Manning Provincial Park.

The SAP for MPR was initiated by re-inventorying the existing conditions at the Resort and the larger study area. In combination with TRIM mapping data and 5-metre elevation data of the alpine base area, knowledge of the physical, environmental, and social realities of the Resort was used to carefully review and analyze the undeveloped potential of the study area with an eye to update the skiing product. The objective was to consider existing development at MPR, identify opportunities for the improvement of the existing ski terrain, and incorporate terrain that would improve the balance of the winter offering, reflecting changes in the expectations of the skier marketplace.

A detailed terrain analysis of the study area confirmed the physical capacity of the area to support the upgrade and expansion of the on-mountain recreation opportunities. This was complemented by an in-depth analysis of the base area lands which identified parcels well-suited to the development of skier services. Collectively, these analyses shaped the creation of potential development concepts for the expansion and upgrade of the mountain facilities and amenities, in balance and integrated with an improved alpine base area. The development concepts were refined through collaboration with the management team at MPR to arrive at the preferred concept, which is presented in detail in the Ski Area Plan for Manning Park Resort.

As an overview, the SAP proposes the following updates and improvements:

- Expanded ski terrain that better aligns with the skier marketplace.
- The realignment of several chairlifts to optimize use of existing terrain and skier circulation throughout the resort.
- Improved skier movement and circulation through the alpine base area.
- A significantly revised and updated pedestrian-focused alpine base area, with increased built space for a range of skier services.
- Expanded parking capacity in the alpine base area that integrates on-mountain recreation and base area amenities, improving the transition between vehicles and the mountain.

1.3.2 Lodge Area Plan

The Lodge Area Plan incorporates the thoughts and concepts of the 2003 Lodge Area Concept planning but has been updated to reflect the current realities at Manning Park Resort, new opportunities, and the vision of its new ownership. It was undertaken as a complement to the SAP and acts as a foundational piece within the SRDP.

The Lodge Area includes accommodations, banquet and meeting facilities, restaurants, pool and hot tubs, the Nordic Center, skating rink, basketball nets, a general store, electric vehicle charging stations, a rest area and parking located adjacent to Highway 3.

As planned, development in the Lodge Area will continue over the coming years and will include:

- An additional 6 premium cabins that will be built over the next ten years to complete the 19 cabins that exist.
- The potential relocation of the tube park from the Ski Area to the Lodge Area.
- The continued expansion of summer activities such as horseshoes, volleyball, tennis, and basketball, among others.
- Increased parking capacity through infill development and the optimization of existing parking areas.
- The possible expansion of the Manning Park Lodge to address current deficiencies in built space and create space for an elevator, should it be needed.
- An additional three Chalet units, built in the same area as the existing units.

There is also an opportunity to relocate the BC Parks Visitor Information Centre to a site central to the envisioned Village Core at Manning Park Lodge. This decision would only be made after discussion and a consensus decision with BC Parks that addressed the Lodge Area and Support Services Areas, including staff accommodation and parking.

Other projects in the Lodge Area may include:

- Landscaping and grooming of the grounds and terrain.
- Trail development from the Lodge Area to better link it to other locations in the Park.

1.3.3 Support Services Area Plan

The Support Services Area (SSA) is comprised of staff housing, maintenance shop and yard, and BC Parks Visitor Information Center and maintenance yard. While it plays a distinct role within MPR's operations, it is intimately tied to development, use, and operations in the Lodge Area.

1.3.3.1 Staff Housing

Currently, the vast majority (+90%) of Resort staff live onsite. However, rapidly evolving technology and resulting remote work opportunities, as well as demographic trends, are all expected to influence the utilization of staff housing over the coming decades. This will impact who lives at Manning Park Resort, whether on a full-time, part-time, seasonal, or occasional basis. With these shifts in the Resort's population and demographics, the Resort must continue to provide a range of services and amenities to meet the needs of its staff community.

There are numerous houses and buildings within the footprint of the SSA with a variety of configurations. The area includes modular homes, houses, mobile homes, RV units, an eight-unit hostel, and two 12-person apartments. These units can accommodate up to 170 staff at any given time through the summer or winter.

Looking to the future, the Resort will continue to invest in staff housing as an integral part of its business model. The future will see the Resort continue to develop a combination of individual units while considering the options for multi-person units as well.

1.3.3.2 Manning Park Resort Maintenance Yard

Located across Highway 3 from the Lodge Area, next to staff housing, is the Resort's maintenance yard and shop facilities. This area contains a variety of buildings with very specific purposes and is used to store materials and manage all projects at the Resort.

The facilities include:

- A generator building with a refurbished 500 kW unit that was installed in 2024.
- A carpenter's shop.
- Three vehicle bays for repair and maintenance of the Resort's vehicle fleet.
- Three high bay units for parking heavy equipment out of the elements.
- A painting bay, staff laundry facilities and multiple outbuildings with varied use.
- Storage areas.

In addition, the Support Services Area also includes the Last Resort, a group accommodation facility, and the BC Parks Visitor Information Center and maintenance yard.

1.3.4 Conclusion

The SAP, LAP, and SSAP, while separate for the purposes of the SRPD document, have been developed in unison to mutually support and complement each other and ensure that Manning Park Resort continues to flourish as a four-season destination that offers unique and memorable recreation experiences to all guests.

1.4 Ski Resort Development Plan Context and Background

1.4.1 Project Overview

Manning Park Resort is looking to revitalize and refine its on-mountain recreation opportunities, lodge area experiences, and the support services area. The BHA SRDP for Manning Park Resort describes an exciting opportunity for the Resort to enhance its alpine skiing¹ experience, provides direction for the addition of new terrain, updates and improves its lodge area experience, and upgrades existing resort activities and infrastructure.

The SRDP for Manning Park Resort describes the planning process, reviews the technical analyses that served as the foundation for design, and details the proposed on-mountain and lodge area concepts. The overall intent of the SRDP is to reinforce Manning Park Resort's well-established reputation as an open, friendly, and family-oriented regional resort while providing a blueprint for future improvements. The SRDP will guide the development of the winter and summer recreation opportunities to cater to a growing population of outdoor recreationalists, while respecting and complementing the ecological and recreational values of the surrounding E.C. Manning Provincial Park.

1.4.2 Manning Park Resort Guiding Values

RESPECT

- We respect each other and our guests.
- We respect the natural environment we work and live within.
- We respect and strive to foster a caring attitude in our community.

INTEGRITY

- We treat people with respect - no exceptions.
- We are authentic, transparent, and non-political.
- We are accountable for our words and actions.

INCLUSION

- We embrace and seek out diverse opinions and ideas to enhance decision-making processes.
- We collaborate effectively with those of diverse backgrounds and ideals.
- We ensure no team or community member is marginalized or unfairly treated.

SUSTAINABILITY

- We look for sustainable approaches to ensure longevity in both staffing and business.
- We design operations to be sustainable towards our surrounding environment and natural resources.

EXCELLENCE

- We strive to be the best we can be and to improve every day.

¹ For simplicity, within the SRDP the terms "skiers" or "skiing" refer to both skiers and snowboarders.

- We have a professional approach to our work - appearance, positive attitude, work ethic and solutions-based approaches.
- We inspire and support others to reach greater heights both personally and professionally.

1.4.3 Location and Access

Manning Park Resort is in E.C. Manning Provincial Park and acts as the primary staging area for recreation in the Park. The Lodge Area is situated on Highway #3 (Crowsnest Highway), approximately 67 km east of the town of Hope and 66 km west of the town of Princeton, while the Ski Area is located 10.5 km west of the Lodge Area along Gibson Pass Road (Fig. 1-1).

Manning Park Resort is easily accessible by road from Highway #3. Approximate travel times and distances from regional population centers are provided in Table 1-1.

Table 1-1. Drive Times and Distance to Manning Park Resort

Location	Drive Time (minutes)	Distance (km)
Hope, BC	45	67
Princeton, BC	45	66
Abbotsford, BC	110	155
Vancouver, BC	150	220

1.4.4 Regional Context

The Resort sits entirely within E.C. Manning Provincial Park, straddling the boundary between Fraser Valley Regional District (FVRD) and the Regional District of the Okanagan-Similkameen (RDOS), with the Ski Area located in the former and the Lodge Area and Support Services Area in the latter. Highway #3 links the FVRD and RDOS and forms the primary corridor between the major population centres of British Columbia, the Lower Mainland, and the Southern Okanagan, a popular tourism and recreation region. On average over the past decade, 1,750 passenger vehicles pass by Manning Park Resort each day, leading to annual vehicle traffic just under 650,000 vehicles².

As the surrounding landscape has been designated as a Provincial Park, the full-time population in and around the Resort is minimal. The small villages of Sunshine Valley and Eastgate sit at the western and eastern ends of the Park, respectively, and combined have a population of approximately 225 full-time residents. Sunshine Valley has developed as a small recreation and holiday destination, and Eastgate serves as a staging area to the Park, offering guests services and accommodation.

² BC Ministry of Transportation and Infrastructure (2018). *P-17-6EW - Traffic Data 10 Year Annual Summary for 2017*. Retrieved from: <https://prdoas3.pub-apps.th.gov.bc.ca/tig-public/Report.do?pdbSiteId=14096>

1.4.5 E.C. Manning Provincial Park

Manning Park Resort is situated within E.C. Manning Provincial Park (83,671 ha), a Class A Provincial Park that prioritizes its conservation values and opportunities for a range of recreation opportunities through all four seasons. Owing to the Park's proximity to the Lower Mainland, its rich biodiversity, and the extensive range of recreational opportunities available, the Park has become extremely popular. In the early 2000's, annual visitation exceeded 950,000, with approximately 80% of guests as day users³. It is reasonable to assume that this number has only continued to grow in recent years and that annual visitation now exceeds 1 million visitors. While not all these guests would have visited Manning Park Resort, these numbers demonstrate that guests from outside the region, specifically the Lower Mainland, are eager to travel to the area to experience the unique recreation opportunities found in the Provincial Park.

Further details on the history of the Park and the recreation opportunities on offer are presented in Section 1.4.7.2 and Section 1.4.7.3, respectively.

Manning Park Resort recognizes that members of the public are drawn to backcountry recreation experiences beyond its CRA but are only accessible through the ski area. As MPR continues to evolve and improve the experience for its guests, it will likewise continue to ensure that the public has access to the recreation experiences accessed through its CRA. Further, it believes that it can support these experiences through services offered at its Lodge Area and Alpine Base Area (e.g., washrooms, food and beverage).

1.4.6 Provincial Legislative Framework

The terms by which Manning Park Resort operates within E.C. Manning Provincial Park are established in its Park Use Permit (PUP). The intent of PUPs is to manage and mitigate the impacts of commercial activity within the parks system, and ensure activities align with the goals and objectives of BC Parks and the specific park in question. The PUP for MPR was issued in 1984 and has been revised as needed over subsequent years.

In addition to the PUP, development at MPR is guided by the BC Parks Ski Resort Policy. The policy was created as a framework to guide ski resort development within the Provincial Parks and address management concerns not included in other policies or legislation. The Ski Resort Policy calls for the creation of a Ski Resort Development Plan to convey the current state of the ski resort as well as planned developments or improvements to BC Parks and the broader public. Ski Resort Development Plans illustrate a resort's recreational benefits to the public, its long-term viability, environmental mitigation measures, how plans align with park management objectives, and reflect stakeholder interests and aspirations. The Ski Resort Policy is applied to decisions on planned ski resort developments or improvements with consideration of the Parks Act, the Park's Class and Management Plan, and needs of other PUPs within the park.

³ BC Parks (2004). *Management Plan for E.C. Manning Provincial Park*. Retrieved from: https://nrs.objectstore.gov.bc.ca/kuwyyf/Manning_Cascade_Final_Management_Plan_e158317b77.pdf

1.4.7 Historic Context⁴

1.4.7.1 First Nations

Manning Park Resort resides on the ancestral and traditional territory of several First Nations. The Nlaka'pamux Nation, the Stó:lō Nation, the Okanagan Nation, and their member communities have, at one time, expressed an interest in the lands within and surrounding Manning Park Resort. Manning Park Resort is committed to fostering and maintaining a strong relationship with local First Nations and will work to recognize and integrate First Nations culture and history into its planning, operations, and the guest experience at MPR, as directed by the respective Communities, as it grows and pursues the projects detailed in this SRDP.

As part of the planning process for the SRDP, Manning Park Resort engaged Ursus Heritage Consulting to undertake an Archaeological Overview Assessment (AOA) of the SRDP study area⁵. Its mandate was to collect background research for the area, identify and evaluate areas of archaeological potential, and provide recommendations regarding future archaeological work in the area. The process incorporated the geological and environmental context, archaeological records, past archaeological work, and the traditional and ethnographic context.

From this, Ursus confirmed that the three study areas do not overlap within any known archaeological sites. They also identified areas of high and moderate potential for archaeological sites within the Ski, Lodge, and Support Services study areas. Specifically, they note that Nepopekum Creek, known as '*Lexwpopeqwem*' in Halkomelem, is likely culturally significant, and the surrounding mountain summits, lakes, waterfalls, and mountain passes could also have spiritual connections. Following the recommendations of the AOA, where future development has the potential to impact areas of moderate to high archaeological potential, MPR will undertake a Preliminary Field Reconnaissance or Archaeological Impact Assessment, as appropriate, which in turn will direct future planning and development work.

1.4.7.2 E.C. Manning Provincial Park

The first non-Indigenous visitors arrived in the area now known as E.C. Manning Provincial Park in 1813, travelling what is now called the Skyline Trail in search of furs and trading partners. In the following decades, fur trading became prominent, with trappers moving goods to the coast, first by the Columbia River and its tributaries and later overland via the Brigade Trails (1840s).

In 1855, gold was discovered on the Columbia River, followed a year later by discoveries on the Fraser and the Thompson Rivers. With this came a rush of prospectors through the region and renewed efforts to create an effective route through the Northern Cascades as a means to control the flow of men, equipment, and minerals. Through the 1860s, several trails were built through the region to facilitate the efficient transport of prospectors and materials from the coast to BC's interior. One of these, the Dewdney Trail, connected the Lower Mainland to the Interior of BC and established much of the route Highway #3 would follow. During this period,

⁴ Fraser, Farr, Ramsay, & Turner (1989). *Natural and Human History Interpretive Theme Document for Manning Provincial Park*. Retrieved from: http://www.env.gov.bc.ca/bcparks/explore/parkpgs/ecmanning/manning_complete_history.pdf?v=1534444241979

⁵ The AOA has been shared with BC Parks but will not be made available for public review.

the region was increasingly used by workers for recreation and by the 1870s the lakes in the area were being regularly visited by anglers in search of rainbow trout.

A section of Highway #3 connecting Allison Pass to Princeton was completed in 1930, opening the area up to further resource use, and increasingly recreationalists. The ease of access for hunters and anglers led to overexploitation of local lakes and damage to the landscape. In response, the Province established fish stocking programs and opened dedicated camping sites in 1945. The full length of the Highway connecting Hope, BC to Princeton, BC was not officially opened until 1949.

Growing public recognition of the area's environmental values prompted the Province to establish the Three Brothers Mountain Reserve (6,440 ha) in 1931 over parts of the land that is now within E.C. Manning Provincial Park. This area was doubled in 1934, becoming the Three Brothers Wildlife Reserve. The Park itself was created in 1941, covering 69,460 ha, and named in honour of Ernest Callaway Manning, the former Chief Forester of BC. It was established to conserve rare and sensitive ecosystems, manage the considerable recreation opportunities in the region, and preserve historic sites, such as the Dewdney Trail. Since its inception, the Park has grown to 83,671 ha.

Skagit Provincial Park, immediately to the east of E.C. Manning Provincial Park, was established in 1973 to serve as a more primitive wilderness area in contrast to E.C. Manning Provincial Park and as a connection to large National Parks in the United States. In 1987, the Cascade Recreation Area, situated along Manning Park's northern border, was established to better manage the significant recreational use in the area.

1.4.7.3 Manning Park Resort

Skiing at E.C. Manning Provincial Park started in 1952 with the installation of a rope tow on Sugarloaf Hill. The lift was removed during construction of Blackwall Road in 1956 but was replaced by a chairlift on a different site in 1960.

Development of skiing in the Park was accelerated by a 1962 bid to host the Winter Olympics. The bid was soon dropped but spurred interest in skiing in the area, leading to the construction of the Gibson Pass Road in 1964 and the installation of two rope tows in 1965. In 1966, the chairlift installed in 1960 was relocated to the new ski area in Gibson Pass and replaced a year later by the Blue Chair. Rapid development continued in the following years, with the creation of a beginner area (1967) and the installation of a T-Bar (1969) and Orange Chair (1970). Manning Park Lodge was constructed in 1972, which in turn opened much of the area to its south to summer and winter recreation.

The ski area was owned and operated by BC Parks until 1984, when the government chose to divest itself of the ski area and all associated infrastructure. A 50-year lease was signed with the new owners soon after, with an option for a 50-year renewal.

1.4.8 Environmental Context

As part of the planning process for the Manning Park Resort Ski Resort Development Plan, Sartori Environmental was engaged to produce an Environmental Overview Assessment (EOA) of the Ski, Lodge, and Support Service Areas and the surrounding landscape.

The EOA was intended to provide a high-level description of aquatic and terrestrial wildlife, vegetation, habitat features, and species at risk present or potentially present within and near MPR and the adjacent areas. It was intended to inform future Environmental Impact Assessments that may be required as part of the proposed development by making recommendations for Valuable Ecosystem Components. To complete the EOA, Sartori Environmental completed a desktop analysis based on Provincial data followed by a high-level site reconnaissance that focused on species of management concern identified during the desktop review.

The results of this detailed study, as well as complementary background research, informed the planning process, concept design, and the mitigation measures for MPR. The full Sartori Environmental EOA can be found in the Appendix of the SRDP.

1.4.8.1 Environmental Setting

Manning Park Resort is located within the Hozameen Range Ecoregion, within the Northern Cascade Ranges Ecoregion. This is a rugged mountainous area, with peaks that are serrated, showing the effects of intense alpine glaciation. The mountains in the region are rugged and increase in elevation as they move from north to south.

The climate in the Ecoregion is transitional, greatly influenced by both moist Pacific air that can enter via the Fraser, Coquihalla, and upper Skagit valleys, and dry interior air that can enter westward and southward from the Fraser, Nicola, and Similkameen valleys.

Subalpine forests and rugged alpine dominate the higher slopes, dry montane forests dominate the lower elevations, and moist Douglas-fir and western hemlock forests occur in most southwestern valleys.

Resulting from the variation in temperature and precipitation patterns brought by the influx of moist and dry interior air systems, the mountain facilities at Manning Park Resort overlap with a range of Biogeoclimatic Zones (BEC) (Table 1-2).

Engelmann Spruce - Subalpine Fir (Dry Hot) Cascade Variant

Extending up to elevations of approximately 1,300 m, the Engelmann Spruce – Subalpine Fir Cascade variant is characterized by cool and wet winters, mild and wet springs, warm and dry summers, and warm and moist falls. contains the most diverse coniferous forests in the Thompson–Okanagan Region with Subalpine fir, Engelmann spruce, and lodgepole pine as dominant species, complemented by Douglas-fire, western redcedar, and amabilis fir.

The Resort areas along Highway 3 and portions of Gibson Pass Road fall into this zone.

Engelmann Spruce - Subalpine Fir (Moist Warm) Cascade Variant

This BEC can be found at elevations from 1,300 m to 1,850 m, receiving up to 2,000 mm of precipitation at higher elevations. This zone is characterized by winters and springs that are cool and wet, summers that are cool and dry, and falls that are warm and wet. Precipitation is consistent from fall through spring, with monthly mean precipitation ranging from 65 mm to 300 mm. The zone is similarly dominated by Subalpine fir, Engelmann spruce, and lodgepole pine, but is known to also be home to whitebark pine, a species at risk.

The Ski Area, extending from 1,350 m to 1,780 m, occupies this BEC subzone.

Engelmann Spruce - Subalpine Fir (Moist Warm Woodland)

The moist warm woodland variant of the Engelmann Spruce – Subalpine subzone is found at elevations above 1,750 m. Due to the high elevation and a short growing season, this subzone is typically less biologically productive and has more open, unvegetated areas. Engelmann spruce is not as dominant at these elevations, and whitebark pine is relatively abundant.

Only the highest areas in the Ski Area, such as the top terminal of the Bear Chair, overlap with this BEC Subzone.

Table 1-2. Biogeoclimatic Zones within Study Areas

Biogeoclimatic Zone (BEC)	Subzone	Label
Engelmann Spruce - Subalpine Fir	Dry Hot (Cascade Variant)	ESSFdH1
Engelmann Spruce - Subalpine Fir	Moist Warm (Cascade Variant)	ESSFmw1
Engelmann Spruce - Subalpine Fir	Moist Warm Woodland	ESSFmww

1.4.8.2 Wildlife

E.C. Manning Provincial Park contains a rich diversity of wildlife. There are over 200 species of birds and 60 species of mammals within the Park. These include large mammals such as black bear, Grizzly bear, deer, elk, and moose, as well as smaller mammals including marmot, mink, muskrat, and beaver.

The North Cascades are home to an important but declining Grizzly bear (*Ursus arctos horribilis*) population. MPR will work with BC Parks, apply best management practices, such as bear-proof facilities and waste containers, and utilize information from bear management reports developed for E.C. Manning Park to minimize negative impacts on Grizzly bear or their habitat.⁶

1.4.8.3 Fish and Fish Habitat

Manning Park Resort overlaps with two watersheds, the Skagit River and the Similkameen River, with Gibson Pass Road representing the divide between the two. Each watershed contains a number of watercourses (Table 1-3), some of which are home to fish populations. Of note, though not all watercourses have recorded occurrences of fish, the lower reaches of both river systems contain fish populations, and as such MPR will be mindful of indirect impacts, such as changes to water quality and volume.

⁶ Retrieved from: https://www.env.gov.bc.ca/wld/documents/ncgb_rp0101.pdf

Table 1-3. Watercourses and Fish Occurrence within the Study Area

Watershed	Watercourse	Watershed Code	Fish Occurrence
Similkameen River Watershed	Similkameen River	310-367800	Yes – Rainbow Trout and longnose dace found near the Lodge Area
	Pinewoods Creek	310-367800-90700	No
	Little Muddy Creek	310-367800-91000	Yes – Rainbow trout in the lower reaches of Lightning Lake
	Unnamed Tributary	N/A	Note: The existence of the tributary could not be confirmed through field reconnaissance
Skagit River Watershed	Nepopekum Creek	970-110000-80900	No – Fish present in the lower reaches, but not adjacent to MPR
	Unnamed Tributary of Nepopekum Creek	970-110000-80900-86700	No

1.4.8.4 Species and Ecosystem at Risk

A review of at-risk species data found an occurrence of Sonora Skipper (*Polites sonora*) and an occurrence of Mountain Beaver (*Aplodontia rufa*) within the study area. Sonora Skipper is a Red listed species in BC and are listed Federally as Special Concern. They were last observed near the Pacific Crest Trail parking area in 2014. Mountain Beaver is a Yellow listed species in BC and are Federally Listed as Special Concern. There are numerous observations of Mountain Beaver in association with the Unnamed Tributary of the Nepopekum Creek dating from 2005.

No occurrences of at-risk species were found within the Lodge and Support Services Areas.

Sartori Environmental also assessed the Ski, Lodge, and Support Services Areas for at-risk species potential to occur based on known habitat types and breeding and overwintering ranges. The results of this assessment are presented in Table 1 of the EOA available in the Appendix and informed the recommended Valuable Ecosystem Components presented in the following section.

1.4.8.5 Recommended Valuable Ecosystem Components

Following the findings of the EOA, Sartori Environmental provided recommended Valuable Ecosystem Components to be considered during future planning and development at MPR. The following is a brief overview of these recommended VECs, but a more detailed discussion is available in the EOA included in the Appendix.

- Species At Risk

All at-risk species identified as having a moderate to high potential to occur in the MPR study area should be considered in future planning and development. Further, Mountain Beaver (known occurrence) as well as Grizzly bear and wolverine (rare, large range, low tolerance for disturbance) should be included for consideration. Finally, whitebark pine have been observed in alpine areas surrounding the Ski Area and the White-flowered Rhododendron/ Sitka Valerian plant community have the potential to occur. Future planning will include field surveys by qualified professionals with experience with whitebark pine to confirm their presence/absence before any alterations to the land occur.

- Birds and Bird Habitat

Birds, their eggs and nests, and bird habitat are protected under Provincial and Federal legislation. Adherence to legislation and Best Practices⁷ should inform future planning and development at MPR.

- Ungulate Overwintering Areas

Provincial Parks are understood to provide *de facto* protection for ungulates, and as such, overwintering sites have not been defined. The Ski, Lodge, and Support Services Areas and surrounds should be assessed for potential overwintering sites for ungulates to minimize potential disturbance from future development.

- Bats

Bats continue to face a variety of threats across BC. The presence of a wide variety of habitats within and near MPR suggests that the area is likely suitable for at least a few bat species. Additional bat surveys could confirm their presence and understand potential risks from planned development.

- Fish and Fish Habitat

As fish-bearing creeks, the Similkameen River, Little Muddy Creek, and Nepopekum Creek, and their associated lakes, wetlands, and riparian areas, should be considered high-sensitivity habitats. Further surveys of these watercourses should be conducted to understand their physical extents and the potential for impacts from development.

⁷ BC Ministry of Environment (2005). *Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia*. Retrieved from <https://a100.gov.bc.ca/pub/eirs/finishDownloadDocument.do?subdocumentId=2759>

- Aquatic Invertebrates

The presence of aquatic invertebrates can be a good indicator of the health of wetlands and lakes. This reality combined by a lack of available data on aquatic invertebrates from the MPR area provide the rationale to integrate aquatic invertebrates as a VEC.

- Amphibians

The MPR study area contains a range of interconnected watercourses, wetlands, and riparian habitat, which is highly suitable for a variety of amphibians, particularly the Coastal tailed frog. All wetland and riparian areas should be considered as suitable habitat for amphibians and further field surveys should be conducted to inform future planning and development.

- Butterflies

The alpine meadows in the Ski Area may provide suitable habitat for a variety of butterfly species, and additional surveys may be needed to further refine and update existing data and inform future development and management.

- Alpine/Sub-alpine Meadows

Alpine and sub-alpine meadows are particularly sensitive ecosystems that sustain a variety of species. Further, the current alpine in the Ski Area has been colonized by Columbian ground squirrel, which is protected by Provincial legislation and would require special consideration during planning and development.

1.4.8.6 Climate and Weather

Records from Manning Park Resort indicate that the ski area receives an average of 550 cm of snow each season. These measurements align with historical weather data from the Allison Pass Weather Station, located approximately 6 km north northeast of the mountain facilities and an elevation of 1,330 m.a.s.l. As detailed in Table 1-4, the mean annual temperature at the weather station is 1.9°C, with winter season averages ranging from -10.7°C (Dec) to 1.2°C (Apr.).

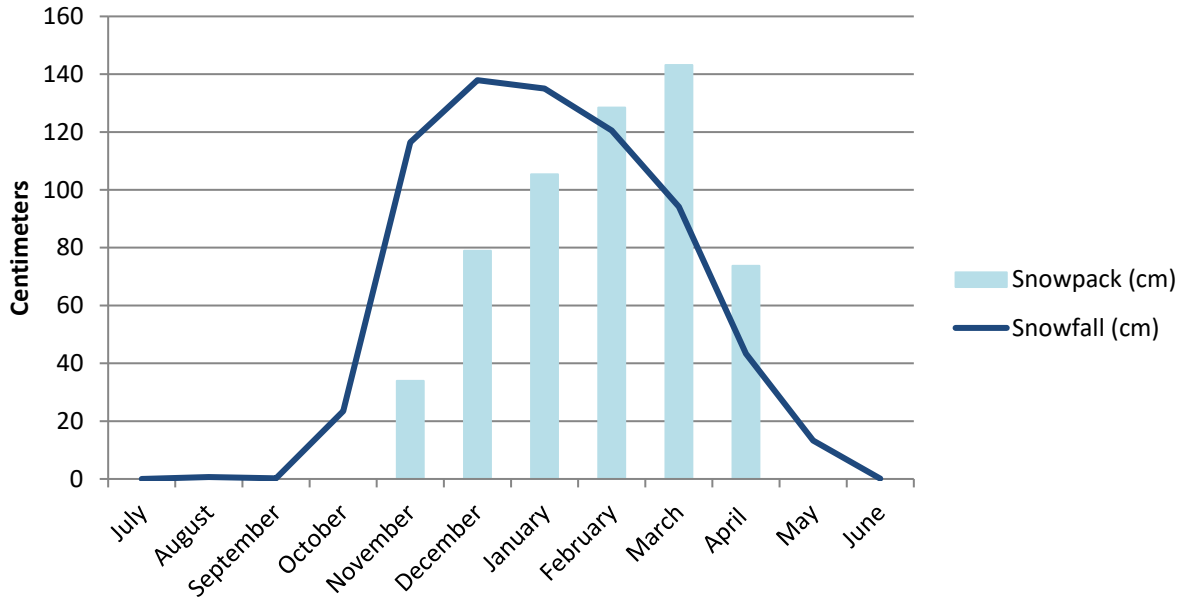
Table 1-4. Historical Weather Data for Allison Pass Weather Station (1979-84)⁸.

Month	Mean Max Temp (°C)	Mean Min Temp (°C)	Mean Temp (°C)	Extr. Max Temp (°C)	Extr. Min Temp (°C)	Total Rain (mm)	Total Snow (cm)	Total Precip. (mm)	Snow Grnd Last Day (cm)
Jan	-3.38	-10.65	-7.05	4.08	-24.11	16.48	135.05	151.54	105.36
Feb	-0.32	-9.51	-4.95	6.74	-22.80	9.98	120.56	130.54	128.45
Mar	3.31	-7.19	-1.96	10.29	-17.39	9.14	94.13	107.61	143.17
Apr	6.88	-4.47	1.22	16.70	-11.51	11.78	43.31	56.52	73.73
May	10.36	-1.31	4.56	21.44	-5.41	31.04	13.30	44.03	0.00
Jun	15.13	1.90	8.54	25.26	-2.33	49.04	0.09	49.14	0.00
Jul	18.99	4.54	11.79	28.80	-0.77	46.83	0.00	46.83	0.00
Aug	19.12	4.35	11.76	27.71	-1.26	34.35	0.64	35.09	0.00
Sep	14.48	1.04	7.77	24.72	-3.68	50.14	0.23	50.44	0.00
Oct	9.13	-2.07	3.56	19.78	-9.13	56.04	23.46	81.94	0.00
Nov	-0.59	-7.50	-4.06	7.94	-20.35	28.16	116.45	146.12	33.91
Dec	-3.95	-10.71	-7.35	3.02	-24.23	14.28	137.93	150.24	78.91
TOTAL						357.25	685.16	1,050.02	
AVERAGE	7.43	-3.47	1.99	16.37	-11.91				
MAX	19.12	4.54	11.79	28.80	-0.77				
MIN	-3.95	-10.71	-7.35	3.02	-24.23				

Based on the readings taken at the Allison Pass Weather Station, annual precipitation at Manning Park Resort averages just over 1 metre, with more than 65% of this falling as snow between Oct. and May (Chart 1-1). This results in a snowpack suitable for skiing (>40 cm) from December to April.

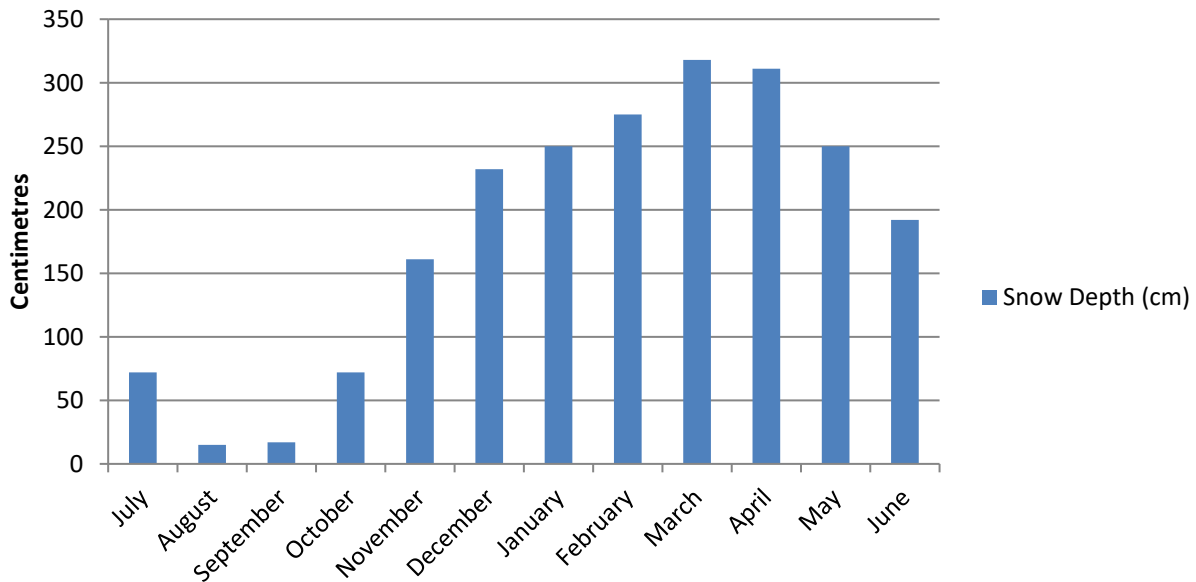
⁸ Historical Data (2018) Government of Canada. Retrieved from: http://climate.weather.gc.ca/historical_data/search_historic_data_e.html

Chart 1-1. Historic Snowfall and Snowpack from the Allison Pass Weather Station



Near the summit, snowfall is likely greater still. Records from the Blackwall Peak Snow Station (1,940 m.a.s.l.)⁹ approximately 10 km east of MPR's mountain facilities indicates that snowfall can reach 12 metres annually, while snow depth can exceed 300 cm (Chart 1-2).

Chart 1-2. Historic Snowpack from the Blackwall Peak Snow Station



⁹ AQUARIUS Web Portal - Blackwall Peak (2018) Province of British Columbia. Retrieved from: <http://aqrt.nrs.gov.bc.ca/Data/Location/Summary/Location/2G03P/Interval/Latest>

1.4.9 Climate Change Analysis

The growing influence of climate change presents a challenge to ski areas across British Columbia. Changes to temperature and precipitation regimes will alter the timing and amount of annual snowfall, influencing the length of season and the quality of the guest experience. These changes threaten MPR's existing alpine skiing and winter recreation offerings. A greater understanding of the potential impacts of climate change and the resulting implications for MPR was needed to inform the proposed ski area developments.

To assess future climate change at Manning Park Resort and its potential impacts, projections were generated for Mean Winter Temperature, Winter Degree Days $< 0^{\circ}\text{C}$, and Mean Annual Snowfall to 2085 using the ClimateBC online tool¹⁰. Projections were based on two future climate scenarios, or Representative Concentration Pathways (RCP). Representative Concentration Pathways are greenhouse gas concentration scenarios that capture a range of possible greenhouse gas emissions. They were developed as part of the Intergovernmental Panel on Climate Change's Fifth Assessment Report (IPCC AR5) and are intended to help with climate change modelling and projections. There are four RCPs: 2.6, 4.5, 6, and 8.5. These values refer to the projected radiative forcing (heat gained from the sun minus heat lost to space) in the year 2100 relative to pre-industrial levels. For instance, the RCP4.5 scenario equates to $4.5\text{W}/\text{m}^2$ greater than pre-industrial levels in 2100. Recent analysis indicates that the increase in radiative forcing, relative to pre-industrial levels, has increased from $2.16\text{W}/\text{m}^2$ in 1990 to $3.03\text{W}/\text{m}^2$ in 2016¹¹. As such, the RCP2.6 scenario is unlikely. For this analysis, the RCP4.5 and RCP8.5 were chosen as they provide a reasonable range of climate change projections following the IPCC AR5.

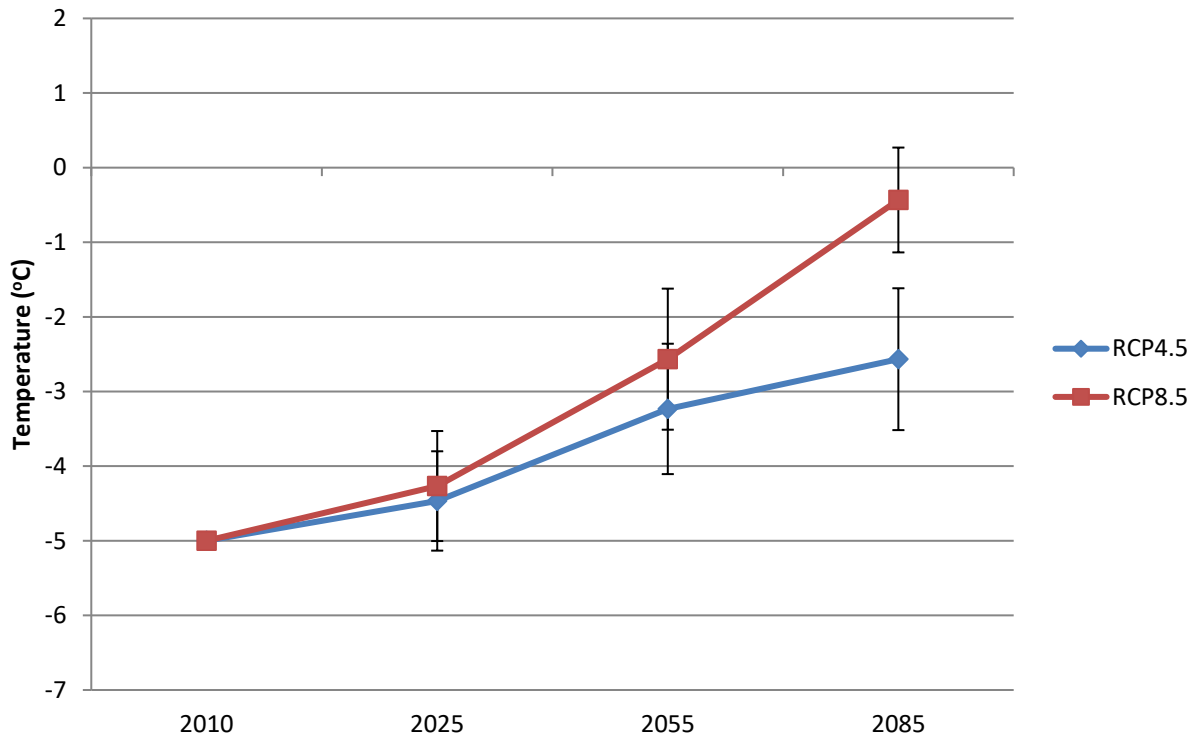
The charts presented below represent the averages of three climate change models (CanESM2, CNRM-CM5, and HadGEM2) calculated by the ClimateBC tool. Taking the average of multiple climate change projections, or ensemble mean, helps to account for model uncertainty, in turn lending confidence to model projections. Model uncertainty, calculated as the standard deviation of model projections, is represented by the error bars in the following charts. The projections included here focus on the winter season (Dec. – Feb.) as this season is critical to the viability of winter recreation activities at MPR. Values for 2010 were derived from recorded weather data for the 2001 - 2010 period.

Of note, the projections are made at 30-year intervals extending to 2085. However, decisions regarding the development and management of MPR take place on much shorter timescales, reflecting dynamic changes in the ski industry and skier marketplace. Thus, the SRDP must address current realities but also include the flexibility to adapt to climate trends that are realized over the span of decades.

¹⁰ Available at: http://www.climatewna.com/ClimateBC_Map.aspx

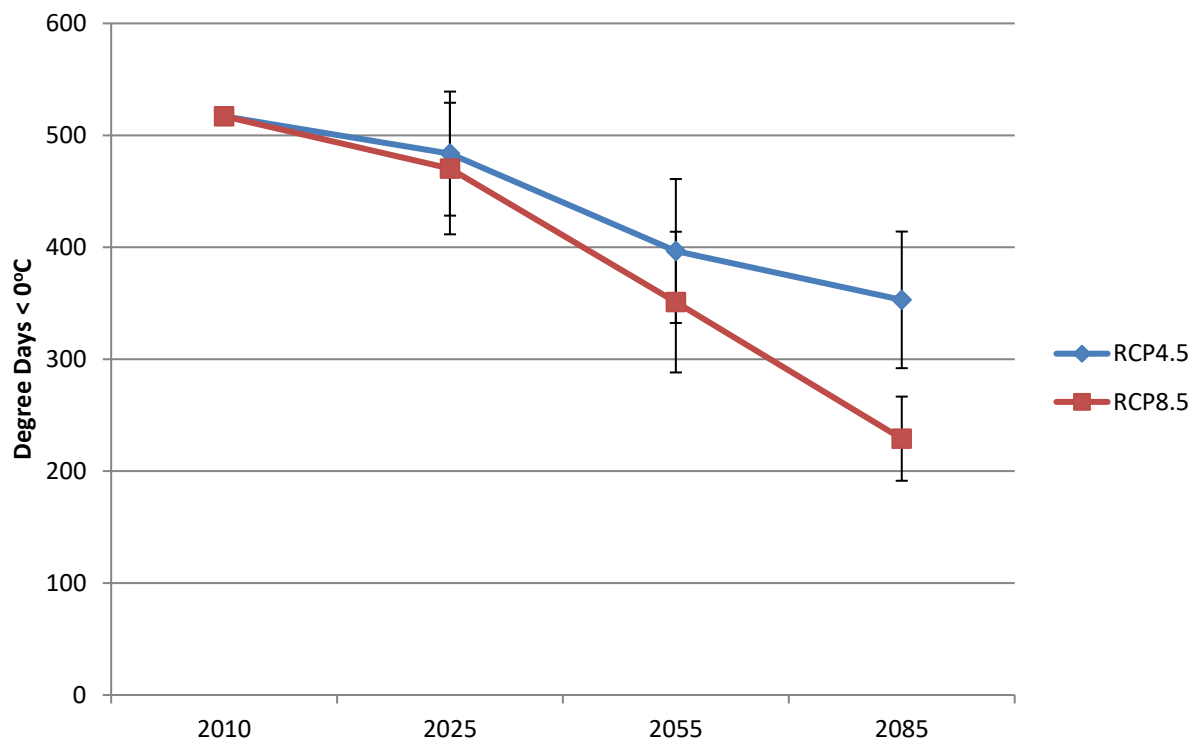
¹¹ Butler, J. H. & Montzka, S. A. (2017). THE NOAA ANNUAL GREENHOUSE GAS INDEX (AGGI). Retrieved from: <https://www.esrl.noaa.gov/gmd/aggi/aggi.html>

Chart 1-3. Change in Mean Winter Temperature (Dec - Feb)



The average winter temperature at MPR is projected to increase in the coming decades (Chart 1-3). Under the RCP4.5 scenario, the average winter temperature is projected to rise by approximately 2.5°C by 2085, while the RCP8.5 scenario indicates that the average winter temperature will rise by approximately 4.5°C by 2085. Uncertainty surrounding both projections is notable, with the RCP4.5 and RCP8.5 showing a range of 1.9°C and 1.4°C in 2085, respectively.

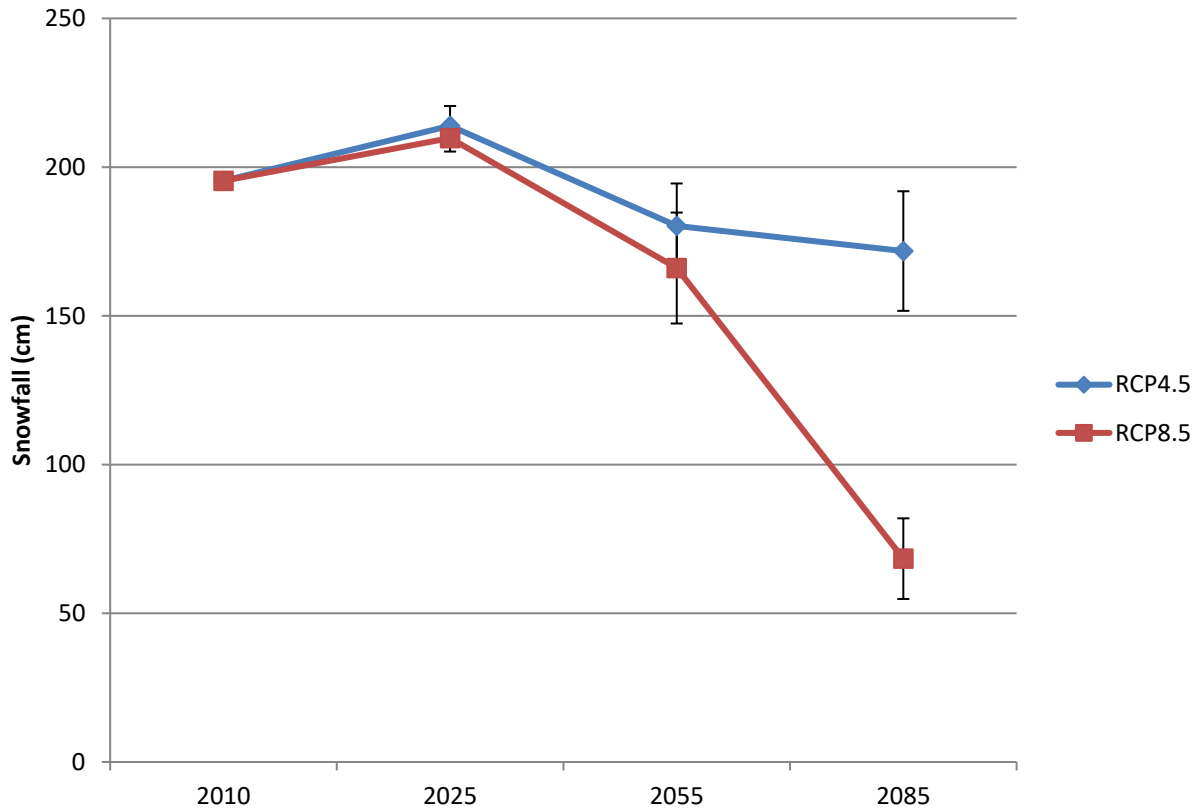
Chart 1-4. Change in Winter (Dec - Feb) Degree Days below 0°C



Degree days are a measure of how long (in days) and how much (in degrees) the temperature sits above or below a temperature threshold. For example, looking at degree days less than 0°C, if the temperature over five days was -5°C, 3°C, -1°C, 4°C, and -2°C, Degree Days < 0°C would equal 8 (i.e., -5°C + -1°C + -2°C).

As can be seen in Chart 1-4, the number of degree days below 0°C between December and February is projected to decline at MPR in the coming decades. The RCP4.5 scenario projects that Degree Days below 0°C will decrease by approximately 160 by 2085, while degree days below 0°C are projected to drop by approximately 200 by 2085 in the RCP8.5 scenario. Uncertainty surrounding the RCP4.5 is notable in 2085 (122), while uncertainty for the RCP8.5 is largest at 2055 (125).

Chart 1-5. Change in Mean Winter (Dec - Feb) Snowfall (cm)



As would be expected given increased average temperature and fewer cold days, the amount of snowfall at MPR is projected to decline in both the RCP4.5 and RCP8.5 scenarios (Chart 1-5). However, the RCP4.5 scenario projects only a minimal decline (40 cm) over the coming 70 years, albeit with substantial uncertainty (40 cm). In contrast, the RCP8.5 scenario projects a significant decline in snowfall by 2085 (140 cm) with relatively little uncertainty (26 cm).

Examining these three metrics together, if these projections are realized, MPR will undoubtedly face the challenging task of ensuring adequate snow for winter activities, such as skiing, snowshoeing, and tubing. This stresses the need for adaptation measures to address uncertainty in annual snowfall, such as developing recreational opportunities in all seasons, to maintain the viability of MPR as a recreation destination.



PLEASE
WASH
YOUR
HANDS
FREQUENTLY

LET'S KEEP
OUR SEASON SAFE!

FACE COVERINGS ARE REQUIRED

MAINTAIN PHYSICAL DISTANCE

BE WELL, BANTOCK!

BE WELL, BANTOCK!

BE WELL, BANTOCK!

2 SKI AREA PLAN

2.1 Existing Alpine Ski Area Context

Manning Park Resort is a family-friendly regional ski resort with exceptional powder skiing within E.C. Manning Provincial Park. It is located between the Lower Mainland and the Southern Okanagan along Highway #3. Initially developed through the 1950s and 1960s, Manning Park Resort has grown to become the 'locals' mountain while its high-quality snow attracts 'powder hounds' and family skiers from outside the region.

A comprehensive analysis of the existing skiing opportunities established that Manning Park Resort can comfortably accommodate 2,300 guests each day. It offers a considerable amount of novice and intermediate ski trails, but lacks sufficient advanced and expert ski terrain, relative to the distribution of skier skill classes found in the skier marketplace.

Complementing the skiing opportunities, the Alpine Base Area provides a host of skier services needed to ensure a positive skiing experience. However, the orientation and position of base area buildings could be improved to create a stronger, pedestrian-centred base area experience.

2.1.1 Ski Area Plan Goals and Objectives

The primary goal of the Ski Area Plan planning process is to create a new alpine ski area master plan for MPR that will guide the ongoing development in the alpine ski area and support projects in the larger Ski Resort Development Plan. It must reflect the:

- Unique development opportunities at MPR, reinforcing the established resort ambience and experience offered.
- Defined Vision, Goals, and Objectives.
- Changes in the mountain resort marketplace.
- Requirements and expectations of owners Kevin and Donna Demers, and MPR management.
- Requirements of BC Parks and the BC Parks Ski Area Policy.

The intent of this project is to:

Create the Ski Area Plan for the alpine skiing winter facilities (e.g. lifts and facilities) and the directly associated on-mountain base area. At its completion, this will act as the alpine ski area component of a Ski Resort Development Plan for Manning Park Resort.

The study objectives include:

- Create a plan and supporting documentation for the approval of the short and long-term development of alpine skiing facilities at Manning Park Resort.
- Consider the long-range potential of the alpine ski area as a logical and incremental upgrade complementing the existing ski lift and trail configuration.
- Utilize low skier densities to define capacities and reinforce the skier experience that Manning Park Resort is renowned for.

- Consider connections to land beyond for winter backcountry touring.
- Explore the relocation of the existing tube park.
- Define the appropriate on-mountain base area development upgrades, balanced with existing and proposed Comfortable Carrying Capacity (CCC) of the mountain.
- Define a preferred Controlled Recreation Area boundary.

2.1.2 Existing Mountain Facilities

2.1.2.1 Introduction

The existing winter attractions at Manning Park Resort include lift-serviced alpine skiing, tubing, snowshoeing, and backcountry skiing. Alpine skiing and snowboarding are the dominant attractions at the Resort, while the other activities act as complements that round out the recreational opportunities on offer. The following section describes MPR in its current configuration, detailing the existing skier capacity, the distribution of ski terrain in relation to the skier marketplace, the balance between uphill and downhill capacity, and the capacity of secondary winter attractions.

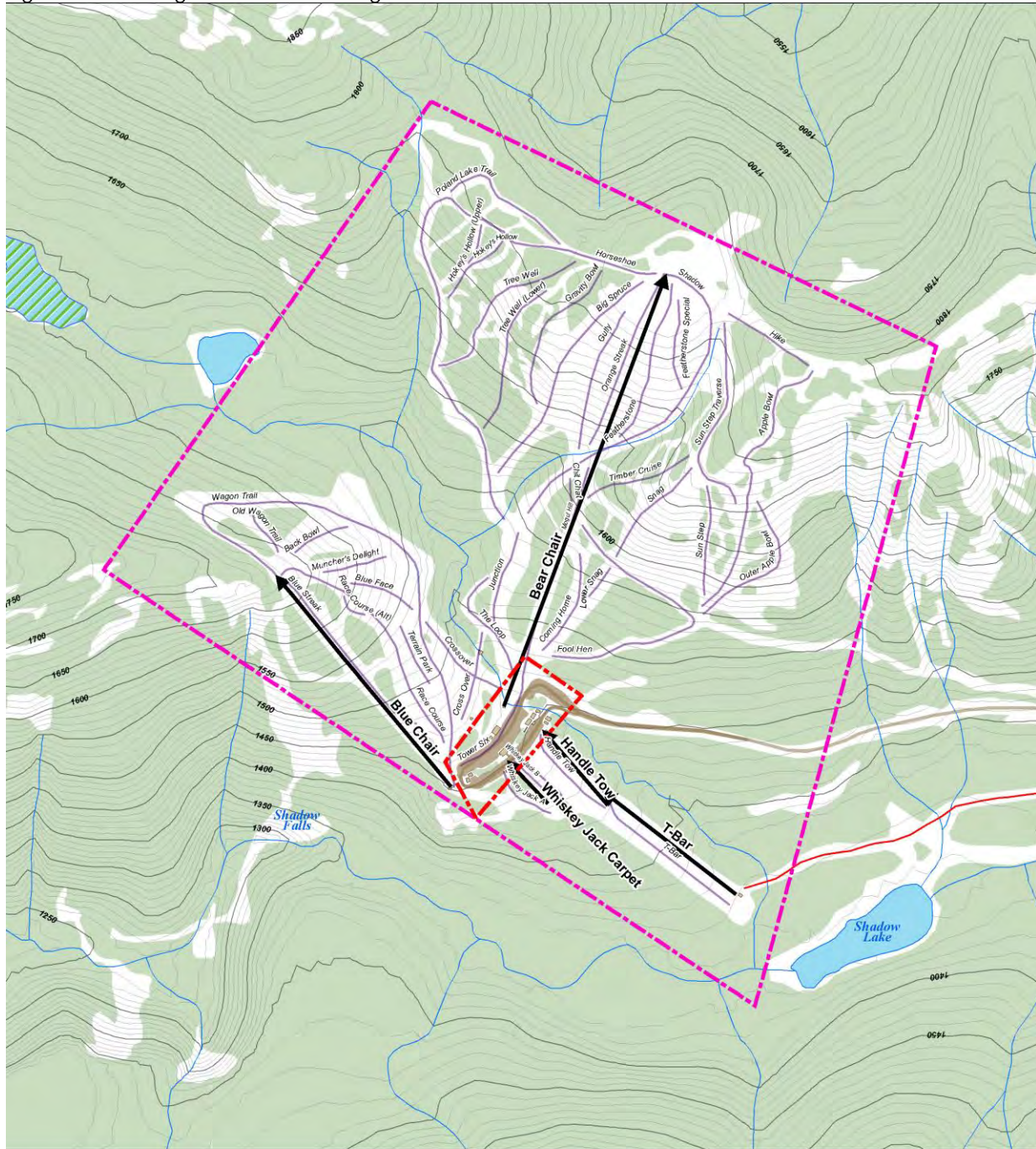
2.1.2.2 Skiing and Snowboarding Comfortable Carrying Capacity

Comfortable Carrying Capacity (CCC) is a measure of the optimum number of skiers who can utilize the Resort at any one time, being guaranteed a pleasant recreational experience without causing a decline in the quality of the environment.

A lift-serviced ski area has both an Uphill CCC and Downhill CCC, where uphill capacity is a function of lift characteristics, hours of operation, and access, and downhill capacity is a function of the skiable area and acceptable skier densities defined by skier skill class and the Resort's target market. Ideally, Uphill and Downhill CCC are in balance for each chairlift and for the entire resort, though this is rarely achieved. As such, the resort CCC is determined as the lower of uphill CCC and downhill CCC to ensure that both thresholds are respected and CCC is never compromised.

The estimation of the CCC for a ski area is the single most important planning criterion for the resort. Based on the proper identification of the resort's true capacity, all other related skier service facilities such as restaurants, retail outlets, resort services, parking, overnight accommodation, and other destination facilities can be planned.

Figure 2-1. Manning Park Resort - Existing Conditions



Manning Park Resort
Ski Area Plan
Existing Conditions
2026

1:12,500
0 100 200 400 Meters



Legend

- Existing Lifts
- Existing Trails
- Existing XC Ski
- Loose Surface Road
- Existing Buildings
- Alpine Base Area
- Existing CRA

Planning by:



Prepared for:



Statement of Limitations:
The information included on this map has been compiled by BHA from a variety of sources and is subject to change without notice. BHA makes no representation or warranty, expressed or implied, as to accuracy, completeness, timeliness or rights to the use of such information. BHA shall not be liable for any general, special, indirect, incidental or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map.

2.1.2.3 Existing Uphill Comfortable Carrying Capacity

Manning Park Resort currently has five uphill conveyances, including 1 fixed grip quad chair, 1 fixed grip double chair, a T-Bar, a Handle Bar, and a Magic Carpet. The Uphill CCC for each lift is calculated by considering the vertical serviced, the lift's capacity, the hours of operation, the lift's loading efficiency, access reduction, and the vertical skier demand, as determined by the dominant type of skier using the lift. The cumulative Uphill CCC for each lift yields the total Uphill CCC for the resort.

In total, the chairlifts at MPR provide an uphill capacity of approximately 2,177 skiers per day. Figure 2-1 and Table 2-1 provide an illustration and specifications for the existing chairlifts at Manning Park Resort.

Table 2-1. Manning Park Resort - Existing Chair Lifts

Lift Name	Lift Type	Vertical Drop (m)	Slope Length (m)	Hourly Capacity (Theoretical)	Hourly Capacity (Actual)	Weighted Vertical Demand	Loading Efficiency	Hours of Operation	Access Reduction	Uphill CCC
Bear Chair	4C	321	1,220	2,400	2,200	3,500	90%	7	0%	1,271
Blue Chair	2C	221	728	1,200	1,100	2,853	90%	7	0%	537
T-Bar	T	52	419	1,200	800	1,576	85%	7	0%	369
Handle Bar	T	23	241	1,200	800	1,510	85%	7	0%	73
Magic Carpet	MC	17	137	1,200	1,000	1,510	85%	7	0%	67
Total			2,745	8,400	6,900					2,177

2.1.2.4 Existing Downhill Comfortable Carrying Capacity

Manning Park Resort has 34 ski trails, gladed areas, and a terrain park resulting in 68 ha of skiable terrain. To complete an accurate analysis of MPR's downhill capacity, BHA overlaid the existing trail network onto 20-metre TRIM mapping data and organized them into groups of trails or 'pods' that are associated with each lift. Trails that cross into one or more pods are generally associated with the lift to which they return. Some ski pods may be associated with one or more lifts depending on the flow and layout of the mountain.

With the network of existing ski trails assembled by ski pod, BHA then categorized the existing ski trails by skier ability level based on the criteria detailed in the All Season Resort Guidelines (Table 2-2).

Table 2-2: Ski Trail Classification by Gradient

Skill Class	Range of Acceptable Gradients (%)
Beginner	8 - 15
Novice	15 - 25
Low Intermediate	25 - 35
Intermediate	35 - 45
Advanced	45 - 60
Expert	60 - 80
Extreme	80+

A detailed list of the existing ski runs at MPR is provided in Table 2-3, and Figure 2-2 illustrates the existing inventory of ski trails at MPR. Of note, classification of the ski trails using the ASRG criteria differed from the ski trail classification applied by MPR in some instances. To ensure consistency with the broader ski industry and skier marketplace, BHA utilized the ASRG criteria for the ski trail analysis.

Table 2-3. Existing Ski Trails at Manning Park Resort

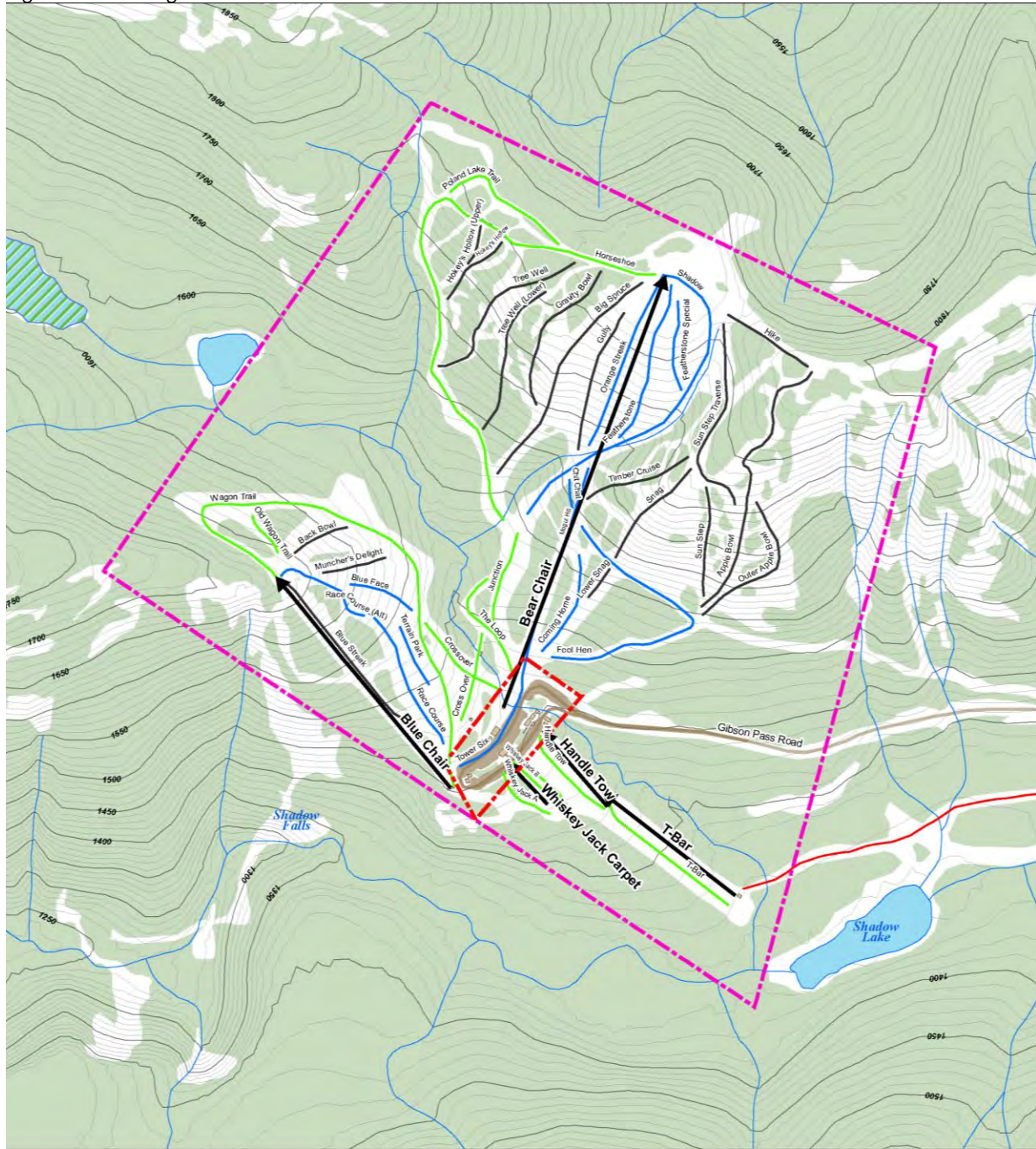
Run Number	Run Name	Slope Length (m)	Maximum Slope (%)	Average Slope (%)	Vertical Drop (m)	Average Width (m)	Trail Area (ha)	Skill Class
Bear Chair (POD A)								
A1	Sun Step Traverse	525	39	11	179	50	2.6	Low Intermediate
A10	Gully	370	59	42	163	90	3.3	Intermediate
A11	Big Spruce	623	67	35	216	80	5.0	Advanced
A12	The Loop	299	23	17	144	35	1.0	Novice
A13	Junction	235	34	19	387	75	1.8	Novice
A14	Featherstone Special	230	41	26	100	80	1.8	Low Intermediate
A15	Sun Step	277	61	54	115	120	3.3	Advanced

Run Number	Run Name	Slope Length (m)	Maximum Slope (%)	Average Slope (%)	Vertical Drop (m)	Average Width (m)	Trail Area (ha)	Skill Class
A16	Featherstone	419	54	32	200	55	2.3	Intermediate
A17	Orange Streak	473	60	33	81	65	3.1	Advanced
A18	Mogul Hill	195	42	30	211	30	0.6	Low Intermediate
A19	Coming Home	274	37	28	284	30	0.8	Low Intermediate
A2	Snag	299	65	46	24	150	4.5	Advanced
A20	Shadow	892	45	25	320	40	3.6	Intermediate
A21	Hike	241	32	18	323	30	0.7	Novice
A22	Tower Six	634	30	15	318	40	2.5	Novice
A23	Chit Chat	72	19	16	261	15	0.1	Novice
A24	Apple Bowl	729	61	33	77	60	4.4	Advanced
A25	Poland Lake Trail	361	27	6	46	30	1.1	Novice
A26	Horseshoe	1497	37	16	35	25	3.7	Low Intermediate
Total Skiable Area							46.3	

Run Number	Run Name	Slope Length (m)	Maximum Slope (%)	Average Slope (%)	Vertical Drop (m)	Average Width (m)	Trail Area (ha)	Skill Class
Blue Chair (POD B)								
B1	Race Course (Alt)	76	43	39	107	30	0.2	Low Intermediate
B10	Terrain Park	163	27	25	54	35	0.6	Novice
B2	Race Course	649	45	32	84	35	2.3	Low Intermediate
B3	Wagon Trail	1,440	35	16	49	40	5.8	Novice
B4	Old Wagon Trail	115	29	24	16	35	0.4	Novice
B5	Back Bowl	150	52	41	13	100	1.5	Intermediate
B6	Blue Face	174	44	39	28	70	1.2	Low Intermediate
B7	Muncher's Delight	163	46	42	223	45	0.7	Intermediate
B8	Blue Streak	509	55	38	292	50	2.5	Intermediate
B9	Crossover	258	32	24	303	45	1.2	Novice
Total Skiable Area							16.4	

Run Number	Run Name	Slope Length (m)	Maximum Slope (%)	Average Slope (%)	Vertical Drop (m)	Average Width (m)	Trail Area (ha)	Skill Class
T-Bar/Handle Bar/MC (POD C)								
C1	Handle Tow	255	11	9	85	50	1.3	Beginner
C2	T-Bar	404	17	12	78	50	2.0	Novice
C3	Whiskey Jack A	166	19	10	79	40	0.7	Novice
C4	Whiskey Jack B	158	13	9	80	30	0.5	Beginner
C5	Whiskey Jack C	155	15	8	81	30	0.5	Beginner
Total Skiable Area							4.9	

Figure 2-2. Existing Ski Terrain at MPR



Manning Park Resort
Ski Area Plan
Existing Terrain
2026

1:12,500
0 100 200 400 Meters



Legend

- Existing Lifts
- Beginner/Novice Trails
- Intermediate Trails
- Advanced/Expert Trails
- Existing XC Ski
- Loose Surface Road
- Existing Buildings
- Alpine Base Area
- Existing CRA

Planning by:



Prepared for:



Statement of Limitations:
The information included on this map has been compiled by BHA from a variety of sources and is subject to change without notice. BHA makes no representation or warranty, expressed or implied, as to accuracy, completeness, timeliness or rights to the use of such information. BHA shall not be liable for any general, special, indirect, incidental or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map.

Downhill Comfortable Carrying Capacity of a trail is a function of the acceptable density of users per hectare, rated by skier-skill class. Successful regional ski resorts looking to provide a family-friendly, powder-oriented skiing experience are best served by maintaining trail densities at the lower end of the spectrum. This ensures that runs are not "skied out" early in the day. The range of acceptable densities for ski trails by skill class, and the densities used for the analysis of MPR, are presented in Table 2-4.

Table 2-4. Acceptable Skier Densities by Skill Class

Skill Class	Skier Density/Ha*	Density Applied at MPR
Beginner	35 - 75	35
Novice	30 - 60	30
Low Intermediate	20 - 40	20
Intermediate	15 - 30	15
Advanced	10 - 20	10
Expert	5 - 10	5

*The acceptable density of skiers on gladed trails is generally 15% to 30% of the comparable skier skill class, depending on the spacing of the trees and the acceptable densities of the trails around them.

It should be noted that the preferred and acceptable skier densities have decreased considerably in recent years (for all skill classes). The advent of shaped skis, combined with snowboarding's relatively easy learning curve, has enabled a larger number of skiers to negotiate steeper and more adventuresome slopes sooner and with greater control than ever before. What was considered "experts-only" terrain ten years ago is now accessible to a much broader segment of the skiing population. This has often resulted in faster speeds and greater ski trail congestion. In addition, new terrain has opened in areas that were traditionally too steep to ski or ride.

The issue of what is acceptable, what is expected, and what is desirable must be given careful consideration. Regional ski resorts, such as MPR, must continually assess the demands of the skier marketplace and adjust the winter experiences on offer accordingly.

Accounting for the vision of MPR, its role as a regional resort, and its desired target market, BHA applied the densities noted in Table 2-4 to determine that the existing downhill capacity of Manning Park Resort is 1,674 skiers (Table 2-5).

Table 2-5. Downhill Capacity by Skier Skill Class

Pod	Vertical (m)	Skiable Area (ha)	Downhill Capacity by Skill Class						Total Downhill Capacity
			Beginner	Novice	Low Intermediate	Intermediate	Advanced	Expert	
A (Bear Chair)	443	68	24	287	216	402	202	0	1,130
B (Blue Chair)	396	16	0	237	74	72	0	0	383
C (T-Bar/Handle Bar/Magic Carpet)	314	5	78	81	0	0	0	0	158
Totals		89	102	605	290	474	202	0	1,674



Great terrain and great views at Manning Park Resort.

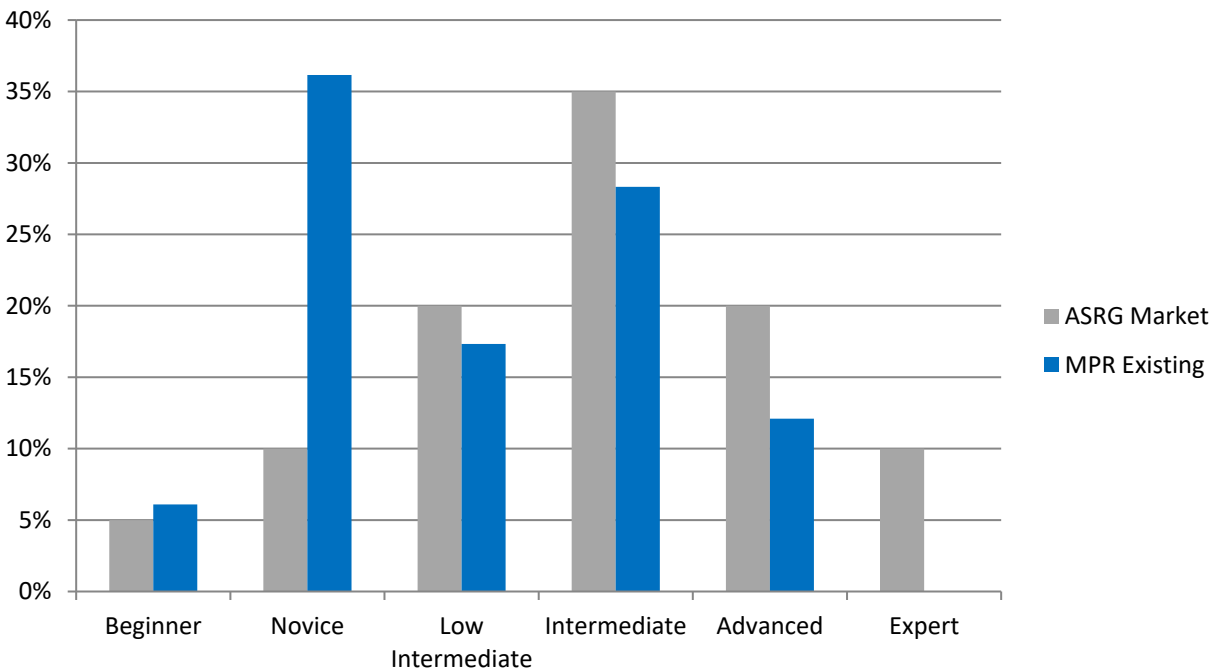
2.1.2.5 Existing Terrain Distribution Analysis

The existing ski trails at MPR were assessed in terms of their degree of consistency with the accepted distribution of the skier marketplace. The accepted distribution, as defined in the All Season Resort Guidelines, is used as a benchmark to compare existing and proposed skier distribution within this plan (Table 2-6). Chart 2-1 graphically illustrates the assessed market distribution of the existing terrain at MPR.

Table 2-6. Skier Market Distribution by Skill Class

Skill Class	Market Distribution (%)	MPR Distribution (%)
Novice	5	6
Beginner	10	36
Low Intermediate	20	17
Intermediate	35	28
Advanced	20	12
Expert	10	0

Chart 2-1. Existing Terrain Distribution Analysis



As evident in Chart 2-3, MPR has an abundance of Novice terrain and a lack of Advanced and Expert terrain. Low Intermediate and Intermediate ski terrain approximates the skier marketplace, which is a significant strength since this is the largest segment of the skier marketplace. Moving forward, MPR is committed to addressing these terrain imbalances to the greatest extent possible through the improvements detailed in the Ski Area Plan (see Sec. 2.3)

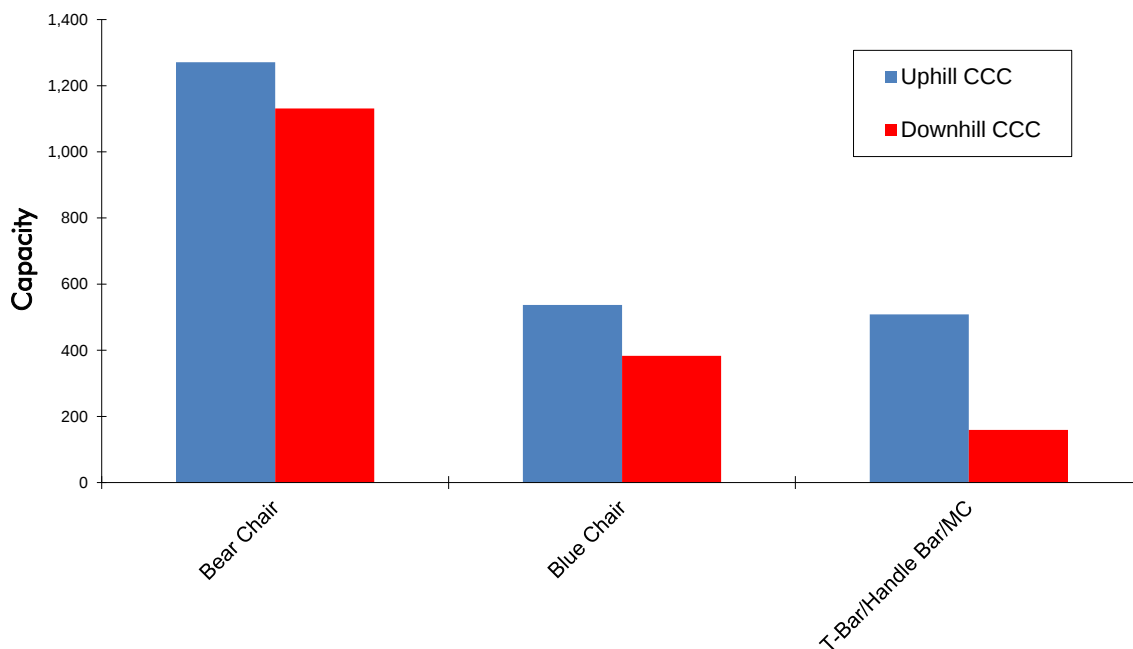
2.1.2.6 Existing Lift Balance Assessment

BHA evaluated the Uphill CCC of the existing lift network in relation to the capacity of the ski trails that each serves. The Uphill and Downhill CCC of each lift are presented in Table 2-7 and illustrated in Chart 2-2.

Table 2-7. Uphill and Downhill CCC

Pod	Lifts	Uphill CCC	Downhill CCC
A	Bear Chair	1,271	1,131
B	Blue Chair	537	383
C	T-Bar/Handle Bar/MC	508	159
Total		2,317	1,674

Chart 2-2. Existing Lift Balance Assessment



Overall, Uphill CCC at MPR exceeds Downhill CCC, with each chair offering more uphill capacity than that of the associated ski terrain. However, it should be noted that Downhill CCC is governed by the desired skier density (Table 2-7) and the imbalance noted above does not mean that guests at MPR are experiencing extended wait times. Instead, it suggests that additional terrain could be developed in these ski pods to achieve a lower and desired skier density. The concepts put forward in Section 2.3 of this Ski Area Plan work to address this issue and ensure the desired on-mountain guest experience is achieved.

2.1.2.7 Existing Comfortable Carrying Capacity

As noted, the Comfortable Carrying Capacity (CCC) is a measure of the optimum number of skiers/snowboarders who can utilize the resort at any one time, being guaranteed a pleasant recreational experience without causing a decline in the quality of the environment. It is calculated as a function of the uphill capacity of the ski lifts combined with the downhill capacity of the ski trails and terrain as dictated by the market breakdown of skier skill classes.

As illustrated in Table 2-7, based on the existing lift configuration, the downhill capacity of the ski trails is 1,674 skiers per day, and the uphill capacity of the ski lifts is 2,317 skiers per day. As the uphill capacity surpasses the downhill capacity, the resort CCC of MPR's existing facilities is set at 1,674 skiers per day. Utilizing the lower of the two values as the resort CCC ensures that neither the Uphill nor Downhill CCC are exceeded.

2.1.2.8 Additional Existing Winter Activities

With a resort that focuses primarily on winter skiing and snowboarding like MPR, the calculation of the lift and trail capacities becomes the single most important planning indicator. However, additional attractions that add to the overall capacity of the resort must be included in the determination of overall resort capacity. In today's competitive tourism market, it is becoming increasingly necessary for resort developers to provide a variety of on-mountain activities that complement and enhance the area's alpine skiing product. The capacity of additional facilities and attractions, such as tubing, snowshoeing, cross-country skiing, and backcountry touring, must be calculated and added to determine the total carrying capacity of the resort.

The concept of Comfortable Carrying Capacity must help ensure a balanced use of the land and avoid overwhelming the site's physical and natural limitations. Likewise, the perceived guest experience offered must be integrated into the calculation of the resort's capacity. That is, the expectations of the target market must be accounted for. Just as there are limits to growth in terms of the actual size that an attraction can reach before it compromises the environmental integrity of the site, there are thresholds beyond which the numbers of users, or the mix of user types, compromise the quality of guest experience, to the detriment of the resort. Again, a balance must be calculated and adhered to. The objective is to determine a "balanced resort capacity".

The definition of the Balanced Resort Capacity (BRC) per the ASRG is the optimum number of visitors that can utilize a resort's facilities each day in such a way that their recreational expectations are being met while the integrity of the site's physical, natural, and sociological environment is maintained throughout the year. This number serves as the baseline for determining annual guest capacity potential and utilization rates, as well as all development and market projections for the resort on a seasonal basis. Most importantly, the BRC becomes the cornerstone of efforts to define the appropriate amount of base area facilities (built space, infrastructure, parking, bed units, etc.) to be established at the resort.

- **Nordic Skiing**

Manning Park Resort maintains approximately 32 km of Nordic ski trails that wind their way from the Lodge Area near Highway #3 to the base of the ski area (Fig. 2-3 & Fig 2-4). This includes 7.5 km (23%) of beginner ski trails, 5 km (16%) of intermediate ski trails, and 19.5 km (61%) of advanced ski trails, as classified by MPR. Nordic skiing acts as both a complement to the

Figure 2-3. Existing Nordic and Snowshoe Trail Networks

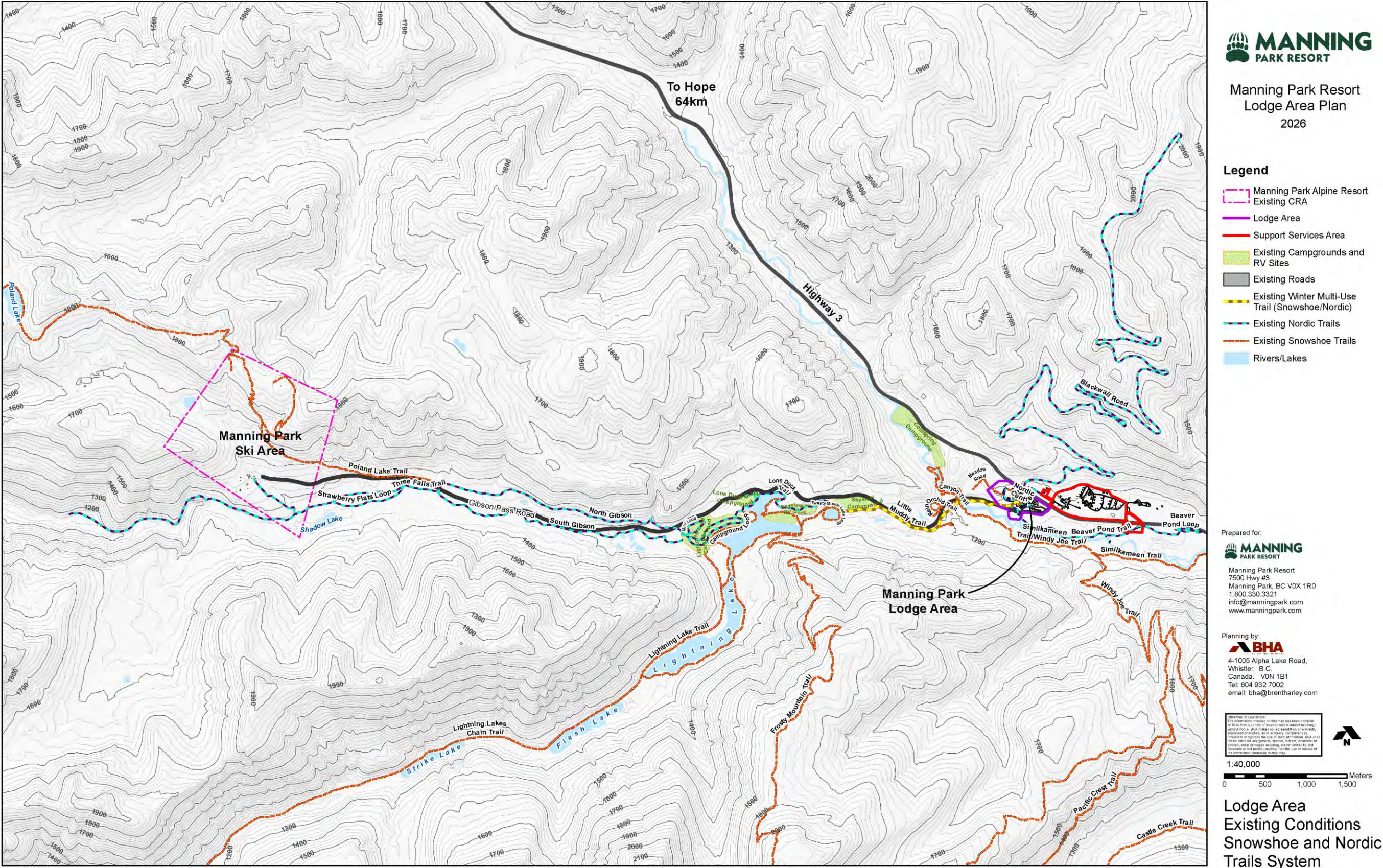
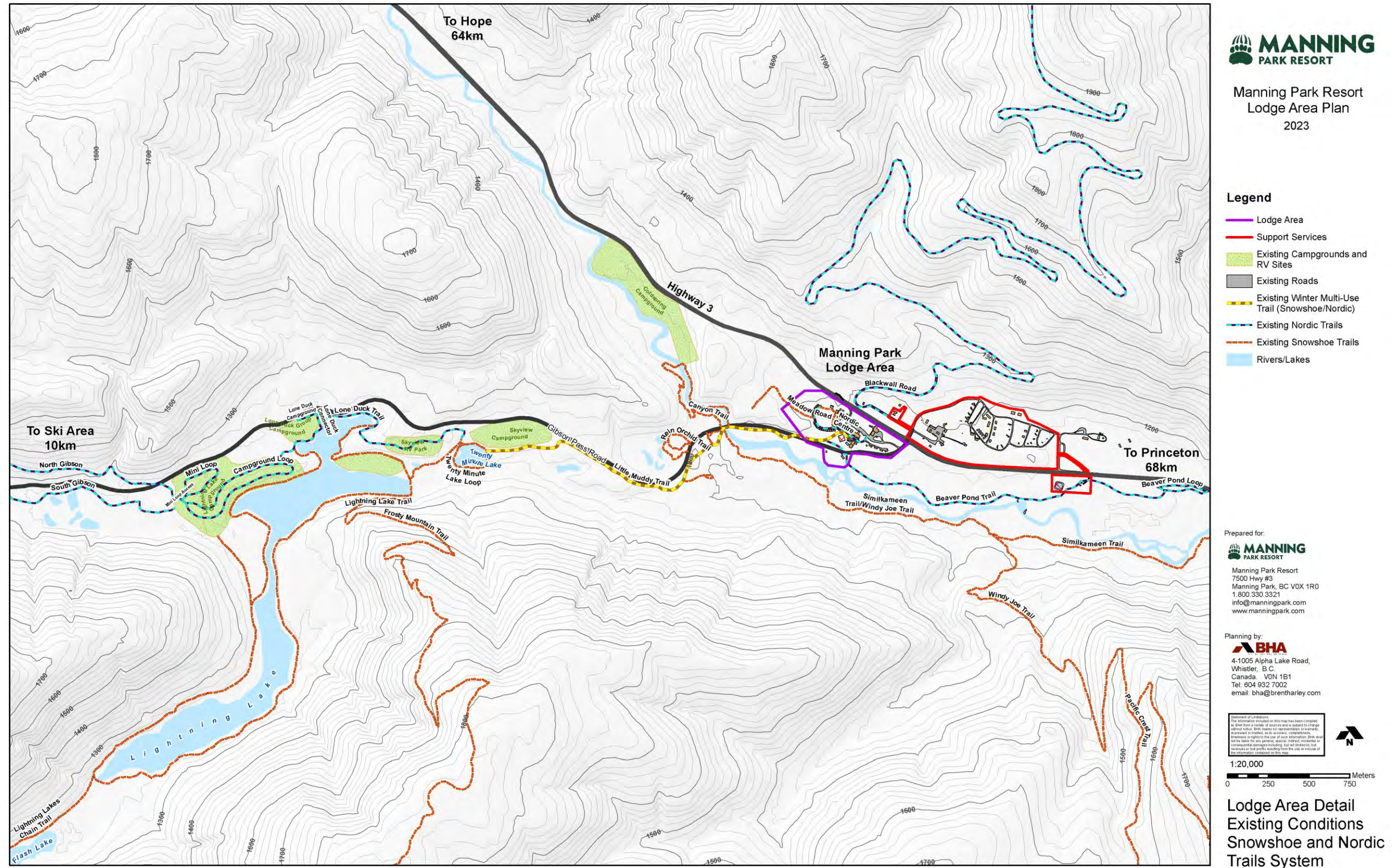


Figure 2-4. Existing Nordic and Snowshoe Trail Networks (Detailed)



downhill ski area, offering an accessible, low-key outdoor experience, and a standalone attraction. Guests looking to make use of the network are supported by the Nordic Centre, located in the Lodge Area near Highway #3. MPR estimates that Nordic skiing attracts up to an additional 150 guests to the Resort each day.

- Tubing

The Polar Coaster tube park is located just below the day lodge. Guests can have fun tubing down two runs that range in difficulty from beginner to advanced, with operation open from 10 am to 3 pm every day. Historic visitation indicates that the Polar Coaster tube park attracts 170 additional guests on Saturdays and Sundays.

- Snowshoeing

Manning Park Resort has approximately 20 km of snowshoe trails that stretch along the valley from the Main Lodge adjacent to Highway #3 to the bottom of the Alpine Ski Area (Fig. 2-3 & 2-4). The majority of these are accessible to Beginners (14.5 km), with a few Intermediate (3.0 km) and Advanced options (2.0 km). Further, this trail network connects to snowshoe trails maintained by BC Parks that extend into the surrounding parklands, providing an extended network for snowshoers. It is estimated that these snowshoe trails attract up to an additional 100 guests per day to the Resort.

- Backcountry Skiing

While not yet a dominant activity in the surrounding mountains, the opportunities for backcountry skiing around MPR are arguably some of the best in southwestern BC. MPR understands its role as that of a staging and service area for backcountry enthusiasts. From past experience, MPR estimates that the backcountry skiing and touring opportunities attract an additional 25 skiers per day at this time.

- Passive Guests

In addition to active visitors, non-participating guests must be considered when determining the amount of accommodation and space use requirements at the resort. This includes drivers, parents, siblings, and grandparents. Typically, this number equates to another 8% to 15% of guests at a resort like MPR. Applying the conservative end of the range (8%) adds 169 passive guests.

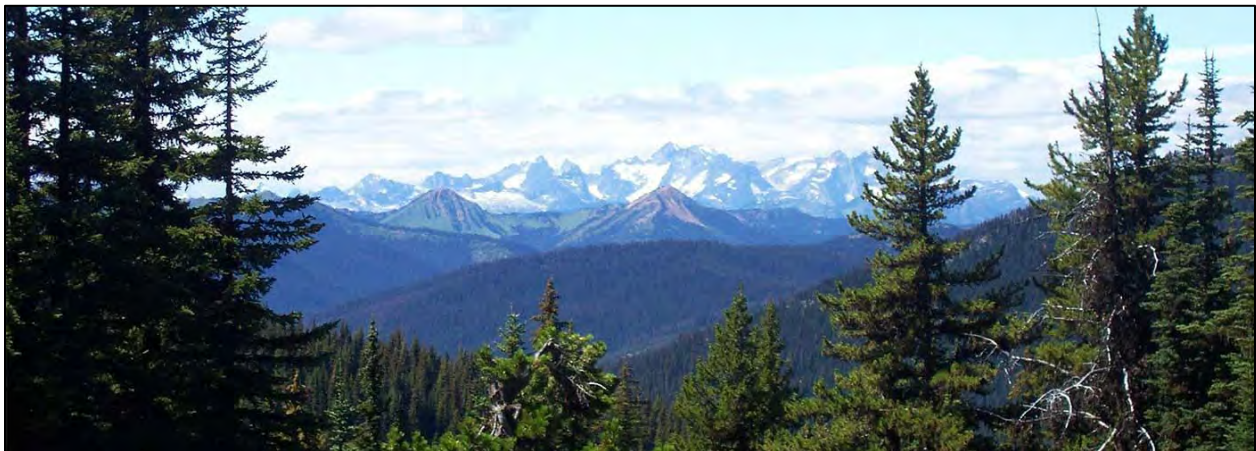
2.1.2.9 Existing Summer Activities

Manning Park Resort has, to date, been focused on offering a family-friendly winter recreation experience. However, the surrounding lands in E.C. Manning Provincial Park host an array of summer recreation opportunities. There is an extensive network of hiking trails and campsites in the surrounding area. Within the Park, there are 330 km of hiking trails, with 17 km (5%) of Easy trails, 66 km (20%) of Moderate trails, and 250 km (75%) of Difficult trails¹². There are also 7 trails open to mountain biking, with another 6 available for Equestrian use.

These trails offer access to all corners of the Park and connect visitors to a network of camping areas. Largest among these is the recently upgraded Lightning Lakes area, which offers 143 sites, and lies between the Lodge and Alpine areas. The Park offers another 4 frontcountry campgrounds which provide 305 campsites, the Buckhorn backcountry campground with 21 basic sites (e.g., pit toilet, fire rings), and another 10 wilderness camping areas that provide 55 campsites with limited amenities.

Finally, the lakes and rivers in the Park are open to swimming, with fishing permitted on Poland and Nicomen Lake, provided visitors have secured the requisite permits.

It is estimated that the summer activities hosted by MPR (excluding camping) and those on the surrounding parklands draw up to 1,500 guests to the Resort each day throughout the summer. However, as MPR is primarily a winter snowsport-based recreation destination, summer visitation will not surpass winter season visitation. As such, while summer activities are important to the fabric and vitality of MPR as a resort, summer visitation will not increase MPR's Balanced Resort Capacity.



Summer hiking opportunities extend in every direction, and views stretch on for miles at Manning Park Resort

¹² Trail classification by BC Parks.

2.1.2.10 Existing Balanced Resort Capacity

The Balanced Resort Capacity of the activities and attractions at a resort is the baseline for determining all necessary supporting facilities such as restaurants, retail outlets, resort services, parking, day-use facilities, and services. With the additional capacity and the passive guests, the BRC at MPR is calculated to be 2,288 guests per day at the resort (Table 2-8).

Table 2-8. Existing Balanced Resort Capacity

Total Mtn CCC	1,674
Additional Activities (Winter)	
Nordic	150
Tube Park	150
Snowshoeing	100
Backcountry Skiing	25
Total Additional	445
Total Facility Capacity	2,119
Passive Guests (8% of Capacity)	169
BRC	2,288

Of note, the Ski Area Plan for Manning Park Resort is limited in scope to the on-mountain facilities and amenities. As such, though analysis will identify recommended levels of built space for all aspects of the guest experience, including Lodge Area facilities, planning and design efforts for built space have been limited to the Alpine Base Area (i.e., the facilities directly associated with the chairlifts and skiing).

2.1.3 Existing Mountain Base Area Facilities

2.1.3.1 Existing Mountain Base Area Skier Related Built Space

Given MPR's current CCC and BRC, the ski resort requires approximately 23,000 ft² of built space to meet the expectations of its guests (Table 2-9). Skier-related built space provides the expected and required services for a ski area to function properly during the day of skiing. These services include all built space (restaurants, retail, equipment rental, restrooms, ski patrol, lockers, resort information, administration, etc.) catering to day-use skiers and destination guests alike.

Table 2-9. Existing Built Space Requirements

Alpine CCC	1,674
BRC	2,288
Service/Function	Space Required (ft²)
Restaurants and Related Facilities	
Restaurant	7,388
Kitchen/Scramble	2,955
Bar/Lounge	739
Subtotal	11,083
Retail	
Equip Rental/Repair	1,261
Retail Sales	1,108
Subtotal	2,369
Skier Services	
Washrooms	1,351
Ski Patrol/First Aid	450
Ski School	540
Public Lockers	1,621
Ticket Sales	180
Subtotal	4,143
Operations / Storage	
Administration	901
Employee Lockers	540
Subtotal	1,441
Programmed Space	
Total Attraction Related Space	19,036
Back of House	
Mechanical/Furnace	1,142
Storage	1,333
Circulation, Walls, and Waste	1,523
Subtotal	3,998
Total Built Space	
Total Built Space (ft²)	23,034

2.1.3.2 Existing Alpine Base Area

The extent, position, and orientation of the existing Alpine Base Area is defined by the parking areas with the existing base area amenities and services dispersed along their edges (Fig. 2-5). Three long parking lots form an oblong loop, with the existing Day Lodge located at their centre. As a result, to reach the Day Lodge from any of the existing lifts or ski runs, guests must traverse a parking lot. While the distances and grades of the parking lots do not present a challenge to guests, the amount of guest interaction with vehicles that are coming and going to MPR is an issue that will be addressed to the greatest degree possible through future development.

Equipment rentals, tickets, and guest services are condensed in an area north of the Day Lodge, forming a small base area core with the intent to enhance the walkability and enhance base area ambience. MPR will look to preserve and expand the pedestrian-scaled design of this area, while addressing the issues of vehicle-pedestrian interaction.

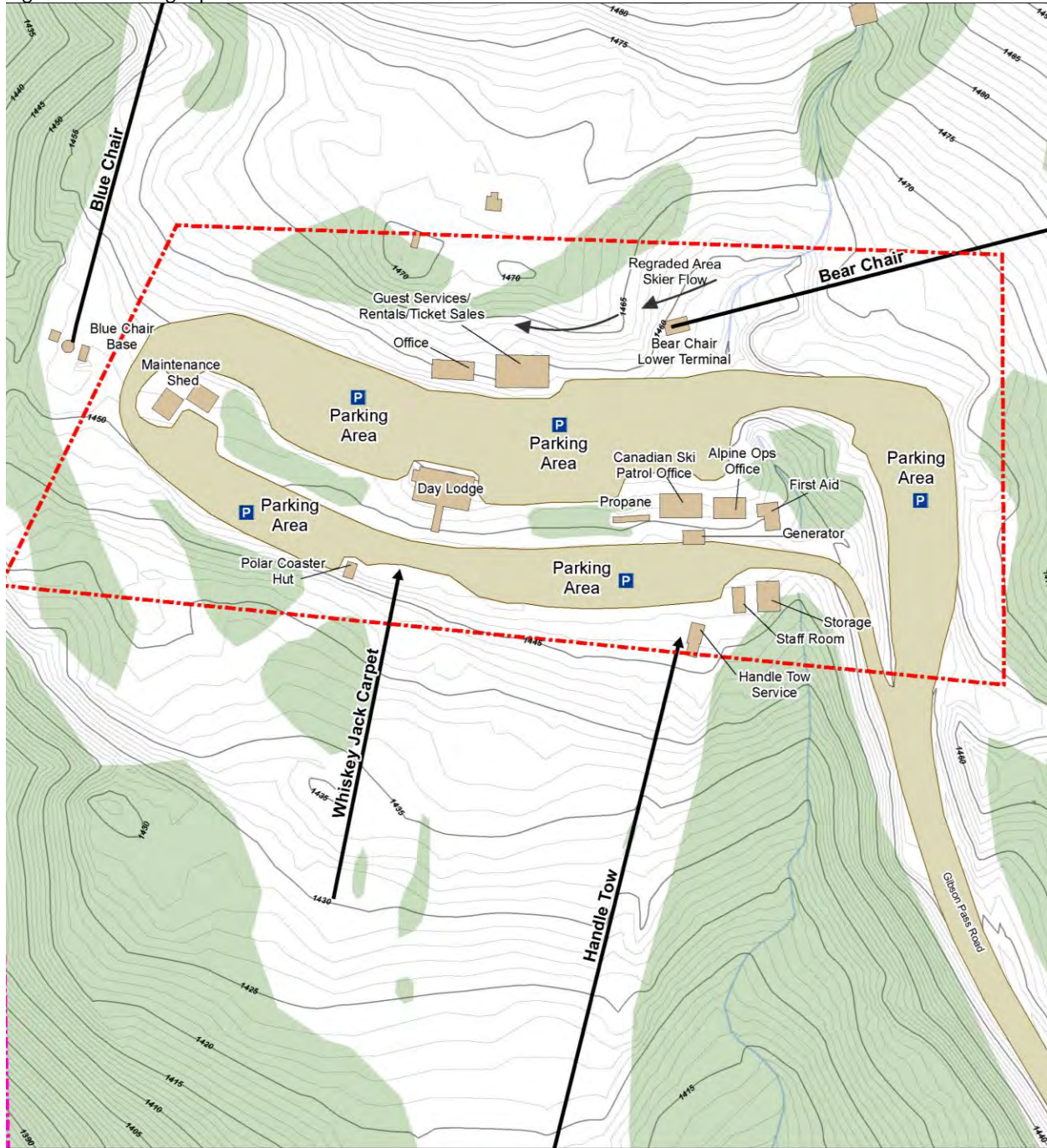
The maintenance and generator buildings are located at the southern end of the parking area, the distance effectively buffering guests from mechanical operations and preserving the mountain experience. Lastly, additional storage and support buildings are located near the upper terminal of the existing Handle Tow, close enough to effectively support base area operations while remaining unobtrusive.

2.1.3.3 Existing Parking

The existing parking areas in the Alpine Base Area are divided into 3 lots that cover approximately 1.4 ha. Using a conservative standard of 250 cars per hectare, the existing parking areas are estimated to have capacity for approximately 350 cars with space for an additional 3-4 buses. Assuming 2.8 guests per car and 40 guests per bus, MPR can accommodate approximately 1,140 guests at one time. This capacity is complemented by parking capacity at the Lodge Area, adjacent to Highway #3, and regular shuttle services between the Lodge Area and Alpine Base Area.

The estimated parking capacity does not appear to meet demand based on the calculated BRC (2,288), and experience at MPR indicates that parking is a consistent challenge. Further, the estimates of parking capacity, with their assumptions, should be seen only as a guide and not a definitive rule by which to assess and determine appropriate parking capacity at MPR. The planned transformation of the base area and parking area concepts, presented in Section 2.3, address the shortfall in parking and incorporate the on-the-ground experience at MPR.

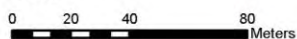
Figure 2-5. Existing Alpine Base Area



Manning Park Resort

Ski Area Plan
Alpine Base Area
Existing Conditions
2026

1:2,000



Legend

- Existing Lifts
- Loose Surface Roads and Parking
- Existing Buildings
- Alpine Base
- Existing CRA
- Contours (1m)

Planning by:



Prepared for:



Statement of Limitations:
The information included on this map has been compiled by BHA from a variety of sources and is subject to change without notice. BHA makes no representation or warranty, expressed or implied, as to accuracy, completeness, timeliness or rights to the use of such information. BHA shall not be liable for any general, special, indirect, incidental or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map.

2.2 Site Analysis

The physical, environmental, and climatological realities of Manning Park Resort's Controlled Recreation Area and surrounding lands were assessed using advanced GIS tools. The results indicate that MPR has tremendous potential to expand the skiable terrain on offer, incorporating new advanced and expert ski terrain into the Resort, in turn bringing the distribution of ski terrain available into closer alignment with the skier marketplace. Terrain immediately to the west and north of the existing CRA offers significant contiguous areas of intermediate and advanced ski terrain with considerable vertical drop that could be easily integrated into the existing ski product. However, the ski terrain to the north of the alpine base area is predominantly south- and southeast-facing, with high solar exposure. This reality, in conjunction with the projected impacts of climate change, stresses the importance of developing the north-facing terrain available to the west, associated with the Blue Chair, and the need for effective ski trail design as critical pieces of future on-mountain development.

2.2.1 Introduction

An analysis of the MPR Ski Area study area was undertaken to assess the development potential to upgrade and expand the existing ski resort. Given the defined project goals and objectives, a study area of approximately 1,100 hectares (2,718 acres) was identified. Utilizing a combination of TRIM topographic mapping data with 20 metre contour intervals and 5 metre elevation data for the base area, BHA completed a digital terrain analysis to initiate and guide the mountain and base area planning processes.

2.2.2 Mountain Terrain Analysis

To gain an understanding of the alpine skiing potential of the Ski Area study area, BHA analyzed the physical characteristics of the study area in terms of slope, elevation, and aspect. This GIS analysis, combined with available weather data and site knowledge gained from a series of site visits and past planning exercises with MPR, culminated in an understanding of the study area's capability to physically and environmentally support an improved and expanded on-mountain ski product. BHA's previous planning endeavours at MPR, particularly the 2004 Downhill and Nordic Ski Area Concepts, informed this process.

With the initial assessments complete, BHA prepared multiple mountain and base area concepts to identify ski pod locations and potential lift alignments. BHA then carried out a coarse analysis of these potential pods to get a general idea of their potential individual and collective capacities. The results of our analysis identified the slopes beneath Mara Peak and terrain adjacent to the existing CRA as having significant development opportunities with connections to the existing mountain terrain, infrastructure, base area, and surrounding lands.

This development potential represents a significant opportunity to improve upon the existing ski product at MPR. Development of the potential terrain would result in an increase in the CCC to approximately 2,100 skiers per day as compared to the existing CCC of 1,674 skiers per day. Further, initial analysis confirmed that developing this terrain would improve skier distribution at MPR by providing much-needed advanced and expert skiing, enabling the Resort to match the accepted market distribution of skier skill classes more closely.

2.2.2.1 Mountain Ski Slope Analysis

Through a Slope Analysis, BHA can divide the topography of the study area into a range of skiable gradients defined by skier skill class (Table 2-10).

Table 2-10. Slope by Skier Skill Class

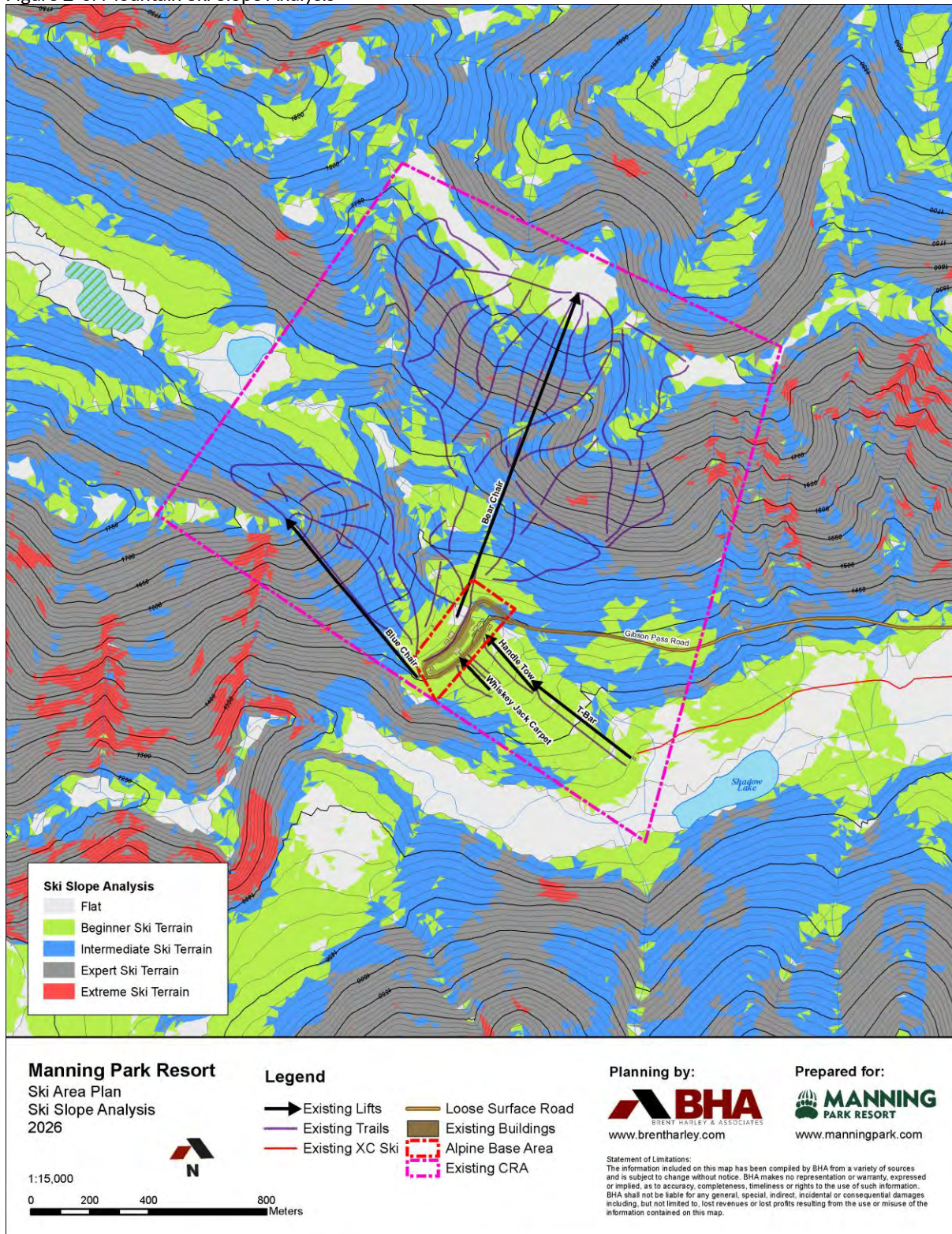
Skill Class	Acceptable Low Gradient (%)	Acceptable High Gradient (%)
Beginner	8	15
Novice	15	25
Low Intermediate	25	35
Intermediate	35	45
Advanced	45	60
Expert	60	80
Extreme	80	+

The resulting map delineates the general character of the land and illustrates that there is a good mix of beginner, intermediate, and advanced slopes within the study area (Fig. 2-6). Within the CRA, beginner slopes dominate the lower elevations, intermediate terrain is found primarily mid-mountain under the Blue and Bear Chairs, and advanced slopes are condensed to the higher elevations to the east of the Bear Chair.

Outside the existing CRA, immediately to the northwest under the summit of Grassy Mountain, the terrain offers a good balance of beginner, intermediate, and advanced slopes. The mountain slopes immediately east and west of the CRA are dominated by advanced slopes and a significant number of areas with extreme gradients formed by creeks and water runoff. Across the valley from the CRA the mountains have a considerable amount of intermediate and advanced slopes, with a few pockets of beginner terrain and scattered areas with extreme slopes.

The valley bottom are dominated by large contiguous areas of flat land, though smaller parcels can be found at higher elevations in the northwest, and to the southwest across Nepopekum Creek.

Figure 2-6. Mountain Ski Slope Analysis



2.2.2.2 Mountain Elevation Analysis

The Elevation Analysis (Fig. 2-7) slices the topographic features of the study area into 50 m increments, effectively illustrating the height and “flow” of the land.

The flow of the land surrounding MPR is defined by the valley in which it resides. Nepopekum Creek runs west from Shadow Lake just south of the CRA, defining the valley bottom that extends east out to Highway 3, with mountains rising to the south, west and north of the Controlled Recreation Area. Mara Peak (1,801 m) to the west and Grassy Mountain (1,889 m) to the northwest stand out on the landscape. The Blue Chair runs up the ridge towards Mara Peak, while the Bear Chair reaches the top of the ridge dominated by Grassy Mountain. From these high points, the terrain in the ski area descends to Shadow Lake (1,359 m) in the south before rising again to over 1,940 m on the ridge opposite the ski area.

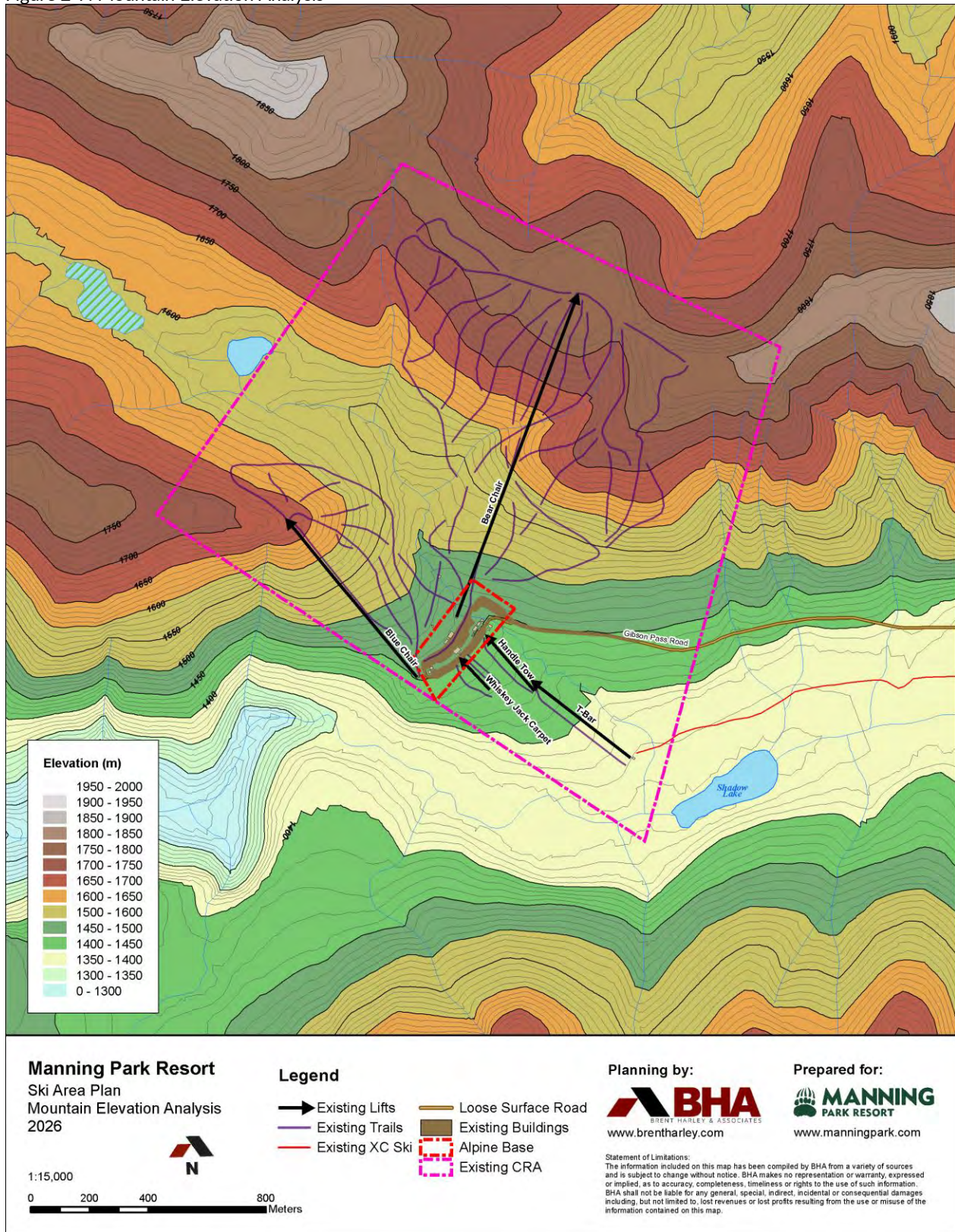
The highest point within the CRA is the top terminal of the Bear Chair (1,789 m), with the top terminal of the Blue Chair reaching 1,679 m. The Mountain base area sits at 1,454 m while the lowest developed skiable terrain is 1,357 m, providing a total skiable vertical of 432 m.

The summit elevation at MPR is higher than other resorts to its west (in the Fraser Valley), but lower than those in the Okanagan to its east. Its base elevation is similar to that of resorts in the Okanagan, but its skiable vertical is low relative to other ski areas in the Fraser Valley and Okanagan (Table 2-11).

Table 2-11. Ski Resort Elevation and Skiable Vertical

Resort	Summit Elevation (m)	Base Elevation (m)	Skiable Vertical (m)
Manning Park Resort	1,789	1,357	432
Sasquatch Mountain Resort	1,371	975	396
Apex Mountain Resort	2,180	1,575	605
Baldy Mountain Ski Resort	2,303	1,658	645
Mt. Seymour Resort	1,265	935	330
Grouse Mountain Resort	1,440	830	610
Cypress Mountain Resort	1,250	850	400

Figure 2-7. Mountain Elevation Analysis

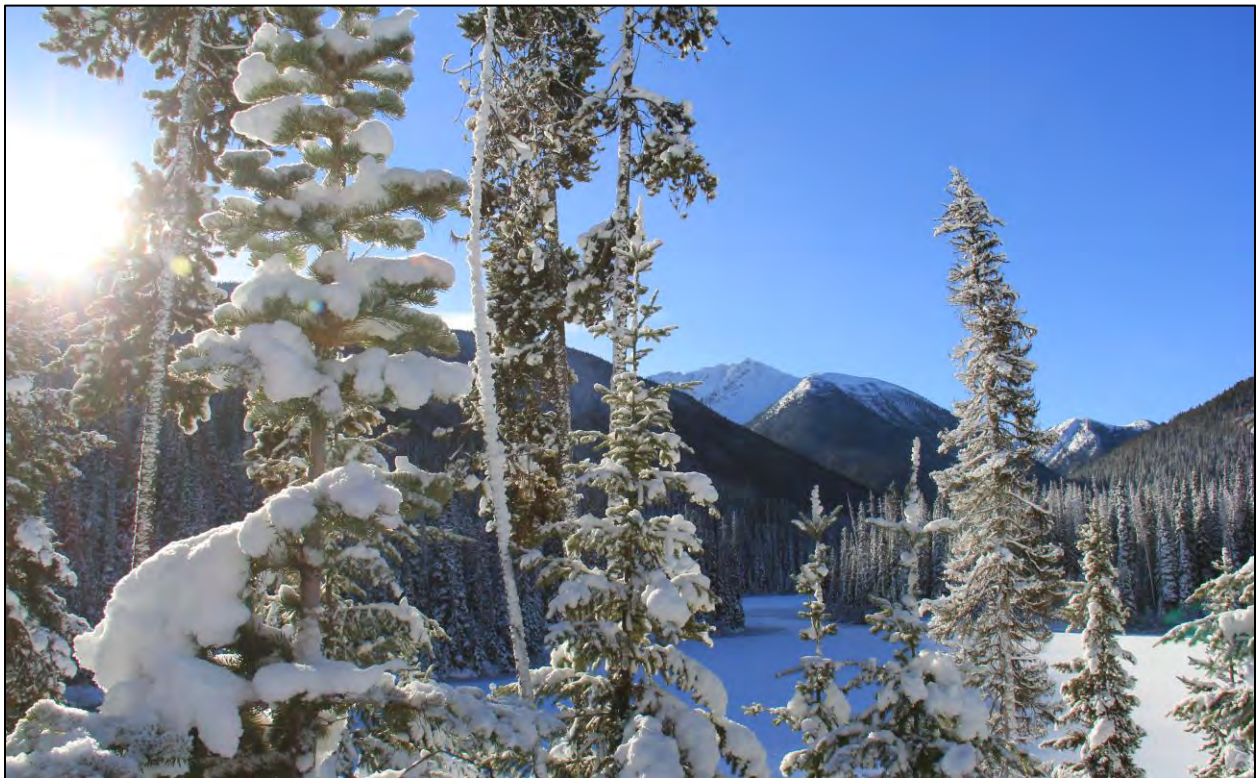


2.2.2.3 Mountain Aspect Analysis

Through an Aspect Analysis, BHA is able to colour-code the topographic features of the study area to illustrate the orientation and geographical exposure with respect to the eight points of the compass. Receiving reduced direct sunlight, northern exposures are better suited for snow retention, and therefore better suited for ski trail development. Southern exposures can prove to be problematic for skiing terrain due to reduced snow retention capabilities and a greater probability of 'solar burnout'. However, southern exposures are ideal for both base area developments and on-mountain lodges as the heating capability of the sun is maximized.

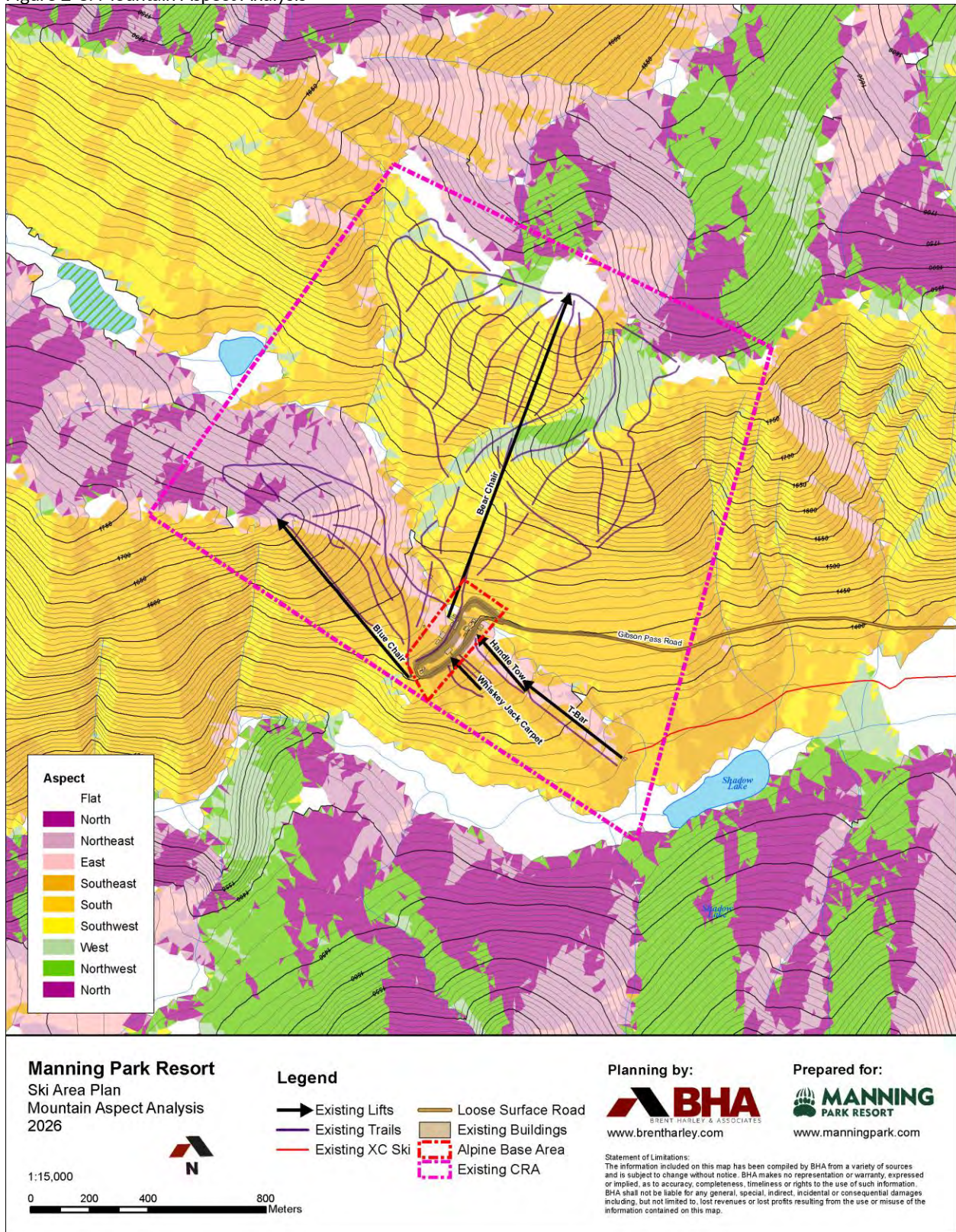
Ski trails that have a high degree of solar exposure can have the solar burnout minimized through careful design, including detailed grading (e.g., angling trails away from direct exposure), reduced trail width (e.g., maximizing shade from edge vegetation), and erosion control (e.g., directing melt waters away from the trails).

At MPR, the east-west orientation of the mountains and valleys effectively divides the slopes in the area into northern and southern aspects (Fig. 2-8). The existing CRA is dominated by south- and southwest-facing slopes (Bear Chair and T-Bar), with the Blue Chair offering the only slopes with north and northeast orientation. Across the valley to the south, there are large areas with northern and western orientations. Likewise, the slopes to the north of the CRA are also primarily north, northeast, and west in orientation. The valley bottom, to the west and east of Shadow Lake, is effectively flat.



Great snow and plenty of sunshine at Manning Park Resort

Figure 2-8. Mountain Aspect Analysis



2.2.3 Mountain Base Area Analysis

A base area terrain assessment was undertaken to identify terrain well-suited to development of a day lodge (e.g., food service, warming areas), service buildings, and parking lots associated with the Alpine Base Area.

2.2.3.1 Base Area Slope Analysis

The Base Area Slope Analysis of the base lands study area was completed as illustrated in Figure 2-9. The slopes of the lands were categorized based on the physical capability to support specific types of development (Table 2-12).

The dark green areas represent areas with slopes less than 5%. Generally, this land is ideal for all types of built development (e.g., base lodge, accommodation, campground, various resort activity infrastructures; playground, plaza, commercial and low to high density residential development, parking lots, and services/infrastructure amenities such as maintenance area, settlement ponds, etc.). However, it is important to note that these same areas, because they are flat, limit the ski in/ski out qualities. In addition, these lands can be wet and environmentally sensitive, adding to the development challenges.

Lands with slopes between 5% and 10% (light green) that surround the 'flat' lands (less than 5%) have significant development potential. With some minimal grading, these lands can all be tied together into a contiguous development opportunity.

The yellow slopes represent lands with slopes between 10% and 20%. These lands may be utilized for built development, subject to more difficult access issues. While they are generally too steep for base area staging capabilities and high-density development, they are still conducive to medium and low-density residential development.

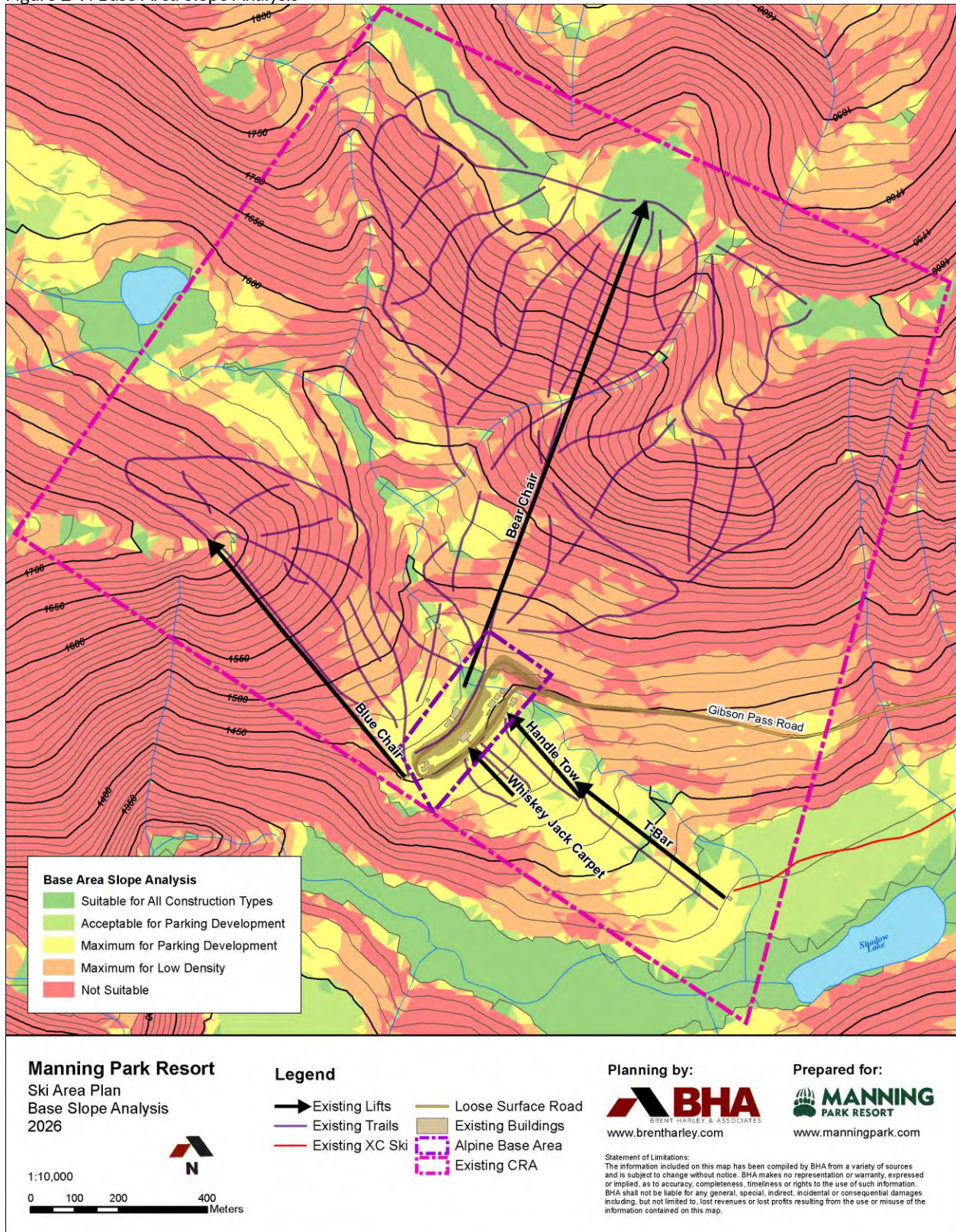
Slopes between 20% and 30% gradients (indicated by orange) are lands where medium density development becomes more challenging. The key to entertaining such development is both vehicular access and the establishment of enough off-street parking in an economically viable fashion. The benefits of development on these slopes usually include ski-to/ski-from capabilities, unrestricted views, and good solar access.

Finally, red-coloured areas represent slopes greater than 30%. These areas should largely be avoided due to the difficulties of access and the expense of building unless special circumstances prevail.

Table 2-12. Acceptable Base Area Slopes

Slope	Building and Development Potential Use
0 - 5%	Capable of accommodating all types of base area development with limited grading. Typically, identifying parking potential as well as lands that may be wet and environmentally sensitive to development
5 - 10%	Capable of accommodating all types of base area development with minimal grading.
10 - 20%	Lands that will require some grading to accommodate development. Upper limits to base area/village and golf course development.
20 - 30%	Upper limits to multifamily development with grading.
30%+	Generally, too steep for development. However, dependent on reasonable access and geotechnical considerations, some development may be possible.

Figure 2-9. Base Area Slope Analysis



Assessing MPR, large contiguous areas of land between 0 – 10 % are restricted to the valley bottoms, but most often contain water features, such as rivers, lakes, and wetlands. Small pockets of suitable land are found between the Bear and Blue Chairs and east of the T-bar/Handle Bar ski pod, though most are too far from the existing base area to be considered for base area development. If ski terrain were developed on the southern slopes of Grassy Mountain, the land in the valley could be considered for a satellite base area (e.g., warming hut), but drainage and environmental sensitivity may be a challenge. Finally, the ridge extending southeast from Grassy Mountain to the top terminal of the Bear Chair contains areas suitable for most types of built development. While this location is not suitable for extensive development, the grades are conducive to a mountain top café and sightseeing and interpretive space, for example.

The existing Alpine Base Area extends from a small pocket of land with grades of 5 – 10% across onto a large parcel of terrain with grades between 10 – 20%, the maximum for parking development. These grades extend downslope of the existing base area under the existing Polar Coaster Tube Park and the T-Bar/Handle Bar ski pod, and uphill into the Blue Chair terrain pod.

Aside from these two areas directly adjacent to the existing base area, most of the terrain within the existing ski pods is too steep for the development of structures or parking.



Deep turns in Manning Park Resort's endless champagne powder
Photo: Tim Barker

2.3 Ski Area Plan

The BHA Ski Area Plan lays out the proposed improvement and expansion of Manning Park Resort, capitalizing on significant opportunities to improve the on-mountain and base area guest experience. On the slopes, the development of two new ski pods and the realignment of existing lifts will result in approximately 20 ha of new skiable terrain. Importantly, much of this new terrain will cater to advanced and expert skiers currently underserved at MPR or be on shaded, north-facing slopes with the potential to offer a high-quality skiing experience throughout the day, all season long.

Complementing the expansion of on-mountain terrain, skier-related built space will expand in response to increasing visitation. The alpine base area will transform into a centralized, pedestrian-scale core offering a full range of skier services. Further, Manning Park Resort will develop additional onsite parking that meets existing and projected demand while easing the guests' transition between their vehicles, the base, and the slopes.

Together, the expansion of ski terrain and the base area will see the uphill capacity increase by 370 skiers per day and downhill capacity by 450 skiers per day – a 27% increase in Resort capacity. This will enhance the recreation potential of Manning Park Resort, strengthening its reputation as a fun, family-friendly resort, and supporting a range of complementary recreation activities at the Resort and in the surrounding E.C. Manning Provincial Park.

The path to achieving all the proposed improvements and expansion is established by the implementation plan, which details a well-defined course of action to guide development at Manning Park Resort over the next 10 years and well into the future.

2.3.1 Introduction

The Ski Area Plan for MPR has been divided into two pieces: the development and expansion of the mountain facilities, and the expansion of the alpine base area facilities. Each is detailed in its proposed 'resort buildout' condition. However, it must be noted that the expansion of Manning Park Resort will only be initiated when market conditions, ongoing resort utilization, and resort area trends all indicate that there is a business case for doing so.

Section 2.3.2 details the Mountain Development Plan, while Section 2.3.3 is dedicated to specifying the scale and scope of the associated Alpine Base Area Development Plan.

2.3.2 Mountain Development Plan

After synthesizing the results of the various analyses, several conceptual alternatives for ski trail and lift development were explored. Well-integrated skiing potential was identified within several pods, each complemented by other mountain attractions and supported by and in balance with the proposed base area facilities.

Ski pods are defined by terrain characteristics and the potential skier type (i.e., beginner, intermediate, advanced, and expert). The shape of the ski pods was delineated by the height and flow of the land and skiable terrain present, with potential ski runs radiating out from an upper elevation and returning naturally to a lower focal point. The areas identified were tied to a skier

skill class and potential lift terminal locations. This terrain analysis illustrates that there is potential to develop the much-needed intermediate, advanced, and expert skiing.

The total area of potential skiable terrain within the MPR study area is approximately 198 hectares (489 acres). To account for unskiable areas, slopes over 80% and under 8% were removed. Typically, the actual skiable terrain within a ski pod ranges from 25% to 50% of the total area. According to these preliminary analyses, the MPR study area had the potential to develop approximately 69 hectares (170 acres) of additional ski terrain (using 35% trail development per unit of potentially skiable terrain). Additional gladed terrain could be developed on an additional 15% of the expansion area.

In combination with further improvement and infill of the existing ski pods, the new terrain presented below will ensure the skiing experience at MPR will cater to all skill levels and segments of the skier marketplace, and further strengthen MPR's established reputation as a fun, family-friendly resort with great powder skiing. However, before development of any of the projects described below occurs, MPR will complete detailed site-specific assessments to fully understand and account for a site's environmental, archaeological, and physical realities.

2.3.2.1 Mountain Development Goals

Building on the goals and objectives identified for the resort (Sec. 2.1.1), the following development goals were envisioned for the mountain area:

- Develop terrain that offers something for everyone, from traditional ski runs to gladed, adventure terrain for all ability levels, that reinforces the diverse needs of MPR's guests.
- Develop terrain that encourages the advancement of skier skill and confidence.
- Develop glades that are 'feathered' into traditional ski runs.
- Realize efficiencies within existing terrain through modifications to ski run and lift alignments.
- Upgrade and modernize the lift system.
- Connect to the BC Hydro power grid.
- Create exciting new terrain that will inspire the recreational market.

It is the intent of the mountain development to provide the blueprint to define, describe, and develop an alpine environment that anticipates and capitalizes on evolving market trends, establishes a unique and distinctive character, and ultimately is fundamentally about 'mountain play'.

2.3.2.2 Proposed Ski Terrain Development

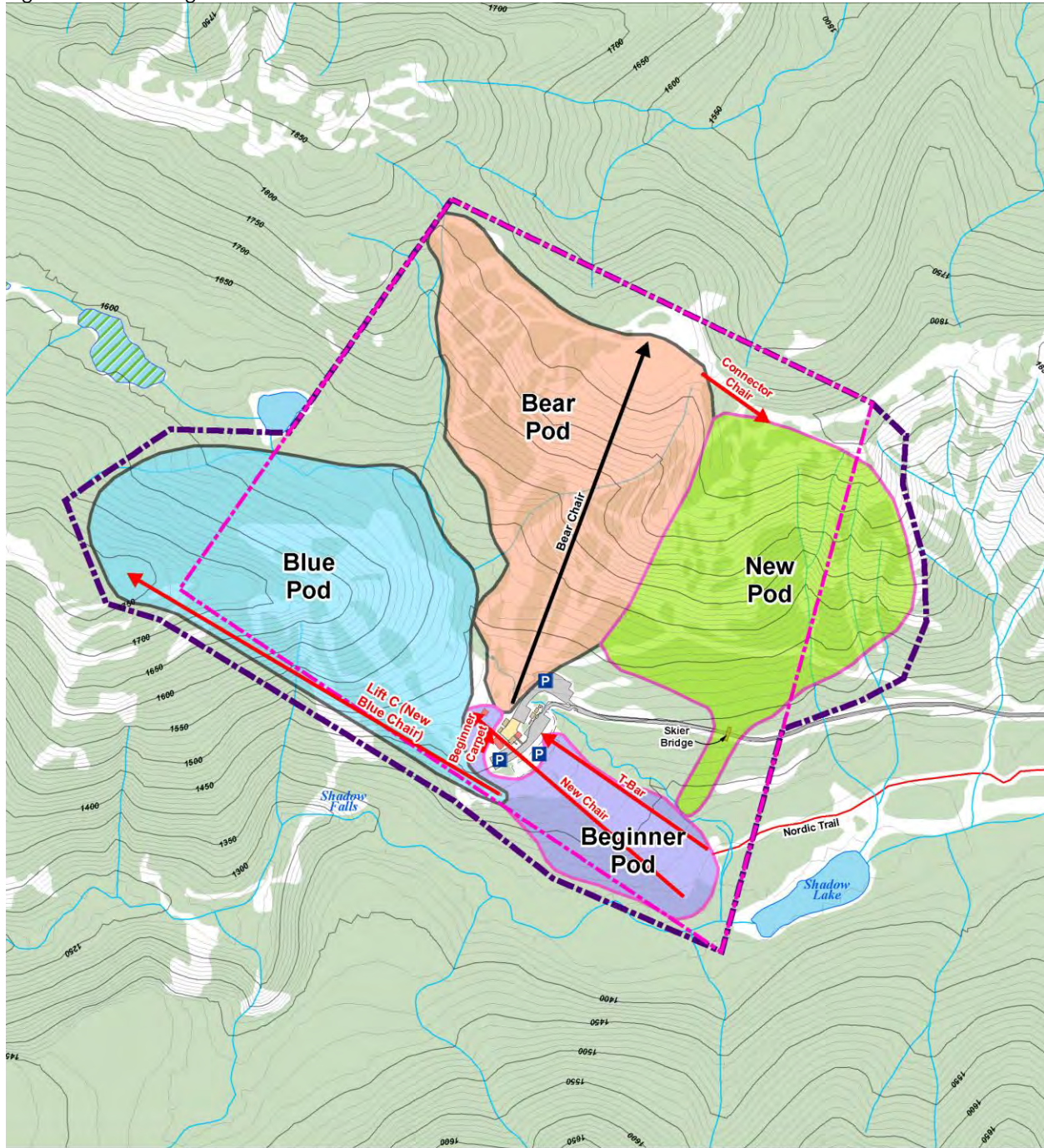
The proposed expansion of lifts and ski runs at MPR will see the realignment of existing ski lifts plus the addition of 1 new ski pod and result in a total of 4 ski pods at buildout. Each ski pod, whether reimagined or new, is designed to expand the ski terrain on offer, better align the distribution of ski terrain with the demand found in the skier marketplace and improve skier circulation throughout the mountain and within the upgraded base area. Figure 2-10 illustrates the proposed ski pods at resort buildout.

BEAR POD

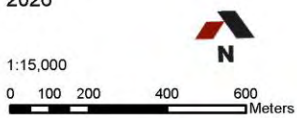
The Bear Chair was upgraded and realigned in the Summer of 2019, increasing Uphill CCC and relocating the lower terminal further down the slope, closer to the base area. In addition to the benefit of increased uphill capacity, the new alignment improves skier circulation through the Resort, and guests' transition between their vehicles and the slopes by reducing the required walking distance.

The Bear Chair will continue to be the primary out-of-base lift for MPR, offering access to much of the proposed ski terrain, described in detail below. While no changes to the Bear Chair are considered in the Ski Area Plan, additional work to improve the ski terrain accessed from the chair or to connect the Chair with neighbouring ski pods will be pursued by MPR as dictated by resort visitation, operational requirements, and MPR's priorities.

Figure 2-10. Manning Park Resort at Buildout



Manning Park Resort
Ski Area Plan
Buildout
2026



Legend

Ski Pods		Proposed Building
Beginner Pod	Orange Pod	Existing Buildings
Blue Pod	New Pod	Plaza
Existing Lifts	Proposed Lifts	Proposed Parking
		Existing CRA Boundary
		Proposed CRA Boundary

Planning by:



Prepared for:



Statement of Limitations:
The information included on this map has been compiled by BHA from a variety of sources and is subject to change without notice. BHA makes no representation or warranty, expressed or implied, as to accuracy, completeness, timeliness or rights to the use of such information. BHA shall not be liable for any general, special, indirect, incidental or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map.

BEGINNER POD

Collectively, the New Chair, T-Bar, and Magic Carpet form Manning Park Resort's new beginner skier development area. They have been laid out as a well-integrated, comprehensive beginner ski product, allowing skiers to easily progress from a 'never-ever' experience with the Carpet, to the gentle slopes of the T-Bar, before tackling the longer ski runs under the New Chair. In addition, each has been located and integrated with the upgraded and expanded alpine base area, allowing guests to easily access beginner-oriented skier services, such as equipment rentals and ski school, and reducing walking distances for young skiers. This reduces barriers to participation for those new to the sport, creating a more positive experience and encouraging lifelong participation.

NEW BLUE POD

As planned, the existing Blue Chair will be realigned and shifted slightly to the south of its existing alignment. The upper terminal will be moved to a higher elevation along the ridge, closer to Mara Peak, to increase the skiable vertical and offer access to additional north-facing ski terrain. The lower terminal will be moved approximately 140 m to the south to create more space for those skiers using the Beginner Pod and a larger staging area (e.g., lift lines) for the Blue Chair, as well as access from the Bear Chair and the New Chair.

In addition to freeing up the space needed for the New Chair, the extension of the lift will open additional intermediate ski terrain on the north-facing slopes below Mara Peak, strengthening the ski product offering to the largest segment of the skier marketplace and creating ski runs protected from direct solar exposure. This is crucial for afternoon or late season operations (e.g., April), when south-facing snowpack can degrade quickly, impacting the guest experience.

NEW POD

The ski terrain in the New Pod is currently accessed by dedicated skiers looking for steep, challenging ski runs and glades at Manning Park Resort. However, at present this requires skiers to hike a short distance along the ridge east of the upper terminal of the Bear Chair. Further, to return to the Bear Chair, skiers must cut back west towards the Resort after a few short turns to connect to the existing trail network or hike back to the base area from Gibson Pass Road. Through the Ski Area Plan, MPR will look to better integrate this well-proven advanced ski terrain into the on-mountain resort offering.

As envisioned, the New Pod will be serviced by the Connector Lift that will replace a hike-in traverse and open the area to greater use. This will be pursued in tandem with a skier crossing (e.g., overpass) of Gibson Pass Road that will direct skiers to the lower terminal of the New Chair. As part of the development of this pod, MPR will develop additional ski runs and glades on the terrain above Gibson Pass Road to increase downhill skier capacity.

2.3.2.3 Proposed Gladed Terrain

In combination with the expansion and improvement of ski terrain at MPR, additional gladed runs will be developed on ski terrain that caters to intermediate to advanced skiers. The extent of gladed terrain within each ski pod will be determined by MPR in collaboration with BC Parks based on the physical and environmental realities of the terrain and the potential to create a high-quality gladed ski experience that complements and is well-integrated with the traditional open ski runs.

It is proposed that the gladed terrain will be developed using a feathering technique from the ski run edges (Fig 2-11a & 2-11b). Moving into the trees from the clear-cut of the ski trail, the tree spacing initially would be wide (5 to 7 metres). Progressively, the glading spacing closes to a minimum of 2 metres. The lower branches of gladed trees should also be limbed to a height of 3 metres above the maximum snow depth to facilitate clear paths for skiers and boarders.

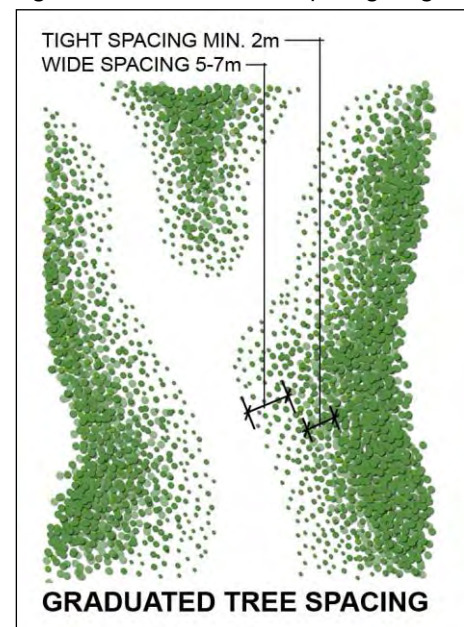
Feathering ski trail edges is beneficial from both an environmental and a recreational point of view. Feathering forest edges through tree thinning encourages a brushy transition zone between the clear opening and the denser stand, which promotes food growth and improved wildlife habitat. In addition, the feathered edge protects against wind blowdown and provides greater visual quality across the forest stand.

From a recreational point of view, feathering the edges of ski trails provides an excellent skills development opportunity by making a semi-gladed transition zone between the fully cut ski run and the denser gladed areas in between runs. Overall, feathering the edges of runs and glading in between runs will provide great adventure terrain for all ability levels and encourage all ability levels to progress to new levels of enjoyment.

Figure 2-11a. Illustrative Example of Glading



Figure 2-11b. Gladed Tree Spacing Diagram



2.3.2.4 Proposed Downhill Capacity

Using the proposed ski pods detailed above, BHA applied the appropriate densities (see Table 2-4) to the ski terrain in terms of skiers per hectare, to establish the total downhill capacity of the existing and proposed ski terrain at MPR. In total, the downhill capacity of MPR at buildout is 2,126 skiers (Table 2-13).

Table 2-13. Downhill Capacity of Ski Terrain at Buildout

Lift	Downhill CCC
Bear Chair	1,008
(New) Blue Chair	520
New Pod	320
Beginner Pod	278
TOTAL	2,126

Of note, the downhill capacity associated with the Bear Chair decreases from existing conditions as some of its downhill terrain will become integrated into the New Pod at resort buildout.

2.3.2.5 Proposed Ski Lift Inventory

The proposed ski lift system has been planned to act as the uphill balance to the downhill capacity of the ski run network. The following tables illustrate the specific characteristics, capacities, and design parameters for each of the existing and proposed ski lifts (Table 2-14). At buildout, MPR will have increased their ski lift inventory from 4 to 6 lifts, realigning and relocating existing lifts and installing new lifts where required.

Table 2-14. Existing and Proposed Ski Lifts

Lift Name	Lift Type	Vertical Drop (m)	Slope Length (m)	Hourly Capacity (Theor.)	Hourly Capacity (Actual)	Weighted Vertical Demand	Loading Efficiency	Hours of Operation	Access Reduction	Uphill CCC
Bear Chair	4C	321	1,220	2,400	2,200	3,500	95%	7	2%	1,312
New Blue Chair	2C	336	1,355	1,200	1,000	3,500	90%	7	0%	605
New Chair	2C	98	803	1,200	600	1,000	90%	7	8%	340
T-Bar	T	18	174	1,200	600	1,000	90%	7	0%	68
Connector Lift	TBD	341	244	1,200	800	5,000	90%	7	0%	344
Carpet	Car	5	46	1,200	800	1,000	90%	7	0%	25
Total			3,842	8,400	6,000					2,694

The Connector Lift replaces a hike-in traverse and serves the New Pod. As such, its uphill capacity should approximately be in balance with the Downhill CCC of the New Pod. Also, as envisioned, skiers accessing the terrain in the New Pod would use the New Chair to return to the base area and the Bear Chair. This accounts for the 8% access reduction on the New Chair, as it is expected that these guests will be coming from the New Pod and returning to the Bear Chair/Connector T-Bar.

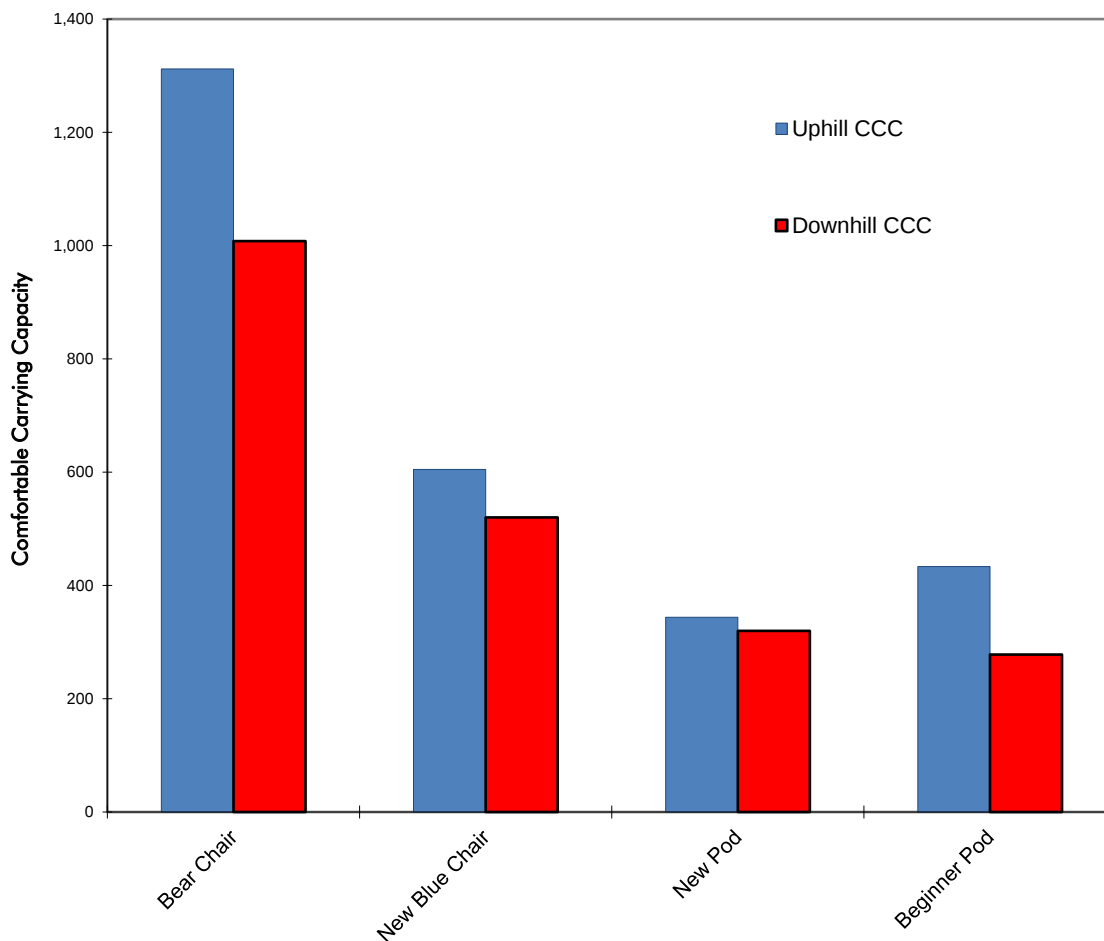
2.3.2.6 Proposed Lift Balance Assessment

The following summary demonstrates the balance between the proposed capacity of the lift infrastructure and the capacity of the associated trails (Table 2-15 & Chart 2-3). The intent is to achieve a balance between uphill and downhill capacity for each ski pod and for the resort as a whole.

Table 2-15. Proposed Lift Balance Assessment

Lifts	Uphill CCC	Downhill CCC
Bear Chair	1,312	1,008
New Blue Chair	605	520
New Pod	344	320
Beginner Pod	433	278
TOTAL	2,694	2,126

Chart 2-3. Proposed Lift Balance Assessment



2.3.2.7 Proposed Comfortable Carrying Capacity

The Comfortable Carrying Capacity (CCC) is a measure of the optimum number of skiers who can utilize the resort over the course of a day while being guaranteed a pleasant recreational experience without causing a decline in the quality of the physical or socio-cultural environment. It is a dynamic number that considers the use of the mountain throughout the day.

The CCC for each of the proposed lifts is calculated by considering the vertical serviced, the capacity of the lift, the hours of operation, the lift loading efficiency, access reduction, and the vertical demand (as determined by the type of skiers using the lift). As the existing lifts have been impacted, removed, or realigned, their CCC has been recalculated and included. The cumulative CCC for each lift yields the total CCC for the resort. Ideally, this uphill capacity of the lifts should match the downhill capacity of the trails. Generally, depending on weather and snow conditions, 40% of the total CCC will be actively skiing, 25% will be on the lifts, 10% will be waiting in lift queues, and the remaining 25% of skiers are rated as passive and will be using the skier service facilities and amenities.

Based on the proposed lift configuration, the uphill capacity of the proposed and existing lifts is 2,694 skiers per day (Table 2-15). As the uphill capacity of the lifts surpasses the downhill capacity of the terrain (2,126), the CCC of MPR at buildout was determined to be 2,126 skiers and snowboarders per day. Utilizing the lower of the two values as the resort CCC ensures that neither the uphill nor downhill CCC are exceeded.

2.3.2.8 Additional Winter Activities

Historically, winter activities at MPR have been limited to lift-accessed alpine skiing. However, increasing effort in recent years has been placed on providing complementary attractions, such as tubing, snowshoeing, and ice skating. With the improvement and expansion of its alpine skiing offerings, MPR will also explore opportunities to develop additional winter activities, providing a more diverse mountain experience and attracting a wider group of visitors.

- **Nordic Skiing**

No significant changes to the Nordic Ski Trail network are considered in the Ski Area Plan. However, opportunities to connect the existing trail network directly to the alpine base area, thereby eliminating the need for Nordic skiers to use a lift to access the alpine base area, will be explored as the alpine base area is redeveloped. Early discussions have identified a new trail alignment parallel to Gibson Pass Road, but this will require further study.

Given that overall trail network capacity is unlikely to change as a result of developments proposed in the Ski Area Plan, the number of Nordic skiers utilizing the alpine base area is not anticipated to increase significantly. As such, it is estimated that the Nordic trail network will attract an additional 150 guests to MPR each day.

- Tube Park

If the Tube Park were relocated to the Lodge Area, it is anticipated that guests participating in those activities will remain in the Lodge Area near Highway #3 and will not use the facilities of the Ski Area. As such, their needs will be met by facilities in the Lodge Area.

- Snowshoeing

No significant changes to the existing snowshoe network are considered in the Ski Area Plan. As such, the number of additional guests utilizing the alpine base area is anticipated to remain at up to 100 guests per day.

- Backcountry Skiing

While backcountry skiing is not a dominant activity in the mountains around MPR, the growing popularity of backcountry skiing coupled with the planned improvements to MPR's base area are anticipated to result in a modest increase in backcountry skiers visiting the alpine base area. MPR remains committed to ensuring park users can continue to access and enjoy the backcountry for as long as MPR is in operation. As such, with the intent to provide base area services that cater to the needs of backcountry skiers, it is expected that backcountry skiing will result in approximately 35 additional guests at MPR each day.

2.3.2.9 *Balanced Resort Capacity at Buildout*

The Balanced Resort Capacity (BRC) of MPR is equal to the total capacity of the alpine skiing, Nordic skiing, ice skating, backcountry skiing, snowshoeing, and snowplay, plus additional passive guests (8% in addition). As per Table 2-16, this equates to 2,604 guests per day. This number determines the appropriate amount of base area development that should be in place at MPR at buildout.

Table 2-16. Balanced Resort Capacity at Buildout

Total Mtn CCC	2,126
Additional Activities (Winter)	
Nordic	150
Snowshoeing	100
Backcountry Skiing	35
Total Additional	285
Total Facility Capacity	2,411
Add Passive Guests (8% of Capacity)	193
BRC	2,604

2.3.3 Alpine Base Area Development Plan

2.3.3.1 Proposed Skier Related Built Space

At buildout, MPR must have enough built space to provide for the needs of approximately 2,604 guests on any given day. The types of built space necessary to provide for the needs and expectations of the guests range from restaurants, bars, rental and repair shops, guest services, ski school, patrol/first aid, and lockers to resort administration and employee facilities. Specific space use requirements for MPR are listed in Table 4-5. The total requirements at buildout are detailed to give a sense of the scale of development necessary for MPR to be in balance in the future.

Of note, the space use numbers detailed in Table 2-17 apply to both the Alpine Base Area as well as the Lodge Area adjacent to Highway #3. The key objective in allocating built space is to ensure that these two areas complement and do not duplicate required guest services. The base area planning exercise accounted for this unique arrangement and allocated built space to the Alpine Base Area that was essential to a high-quality day-use ski experience while ensuring built space was not duplicated. Looking forward, decisions regarding future base area development should adopt this perspective, prioritizing the development of essential day-use facilities (e.g., equipment rentals, ski school, ticket sales, etc.) at the Alpine Base Area.

Lastly, the required built space detailed in Table 2-17 reflects industry standards and may not accurately reflect the experience at Manning Park Resort. As such, these numbers should be seen as a guideline, informed by experience and the realities at MPR, rather than a prescriptive formula that must be adhered to.

Table 2-17. Proposed Skier-Related Built Space

Alpine CCC	2,126
BRC	2,604
Service/Function	Space Required (sq. ft)
Restaurants and Related Facilities	
Restaurant	8,408
Kitchen/Scramble	3,363
Bar/Lounge	841
Subtotal	12,612
Retail	
Equip Rental/Repair	1,602
Retail Sales	1,261
Subtotal	2,863
Skier Services	
Washrooms	1,716
Ski Patrol/First Aid	572
Ski School	686
Public Lockers	1,144
Ticket Sales	229
Subtotal	4,348
Operations / Storage	
Administration	1,281
Employee Lockers	686
Subtotal	1,968
Programmed Space	
Total Attraction Related Space	21,791
Back of House	
Mechanical / Furnace	1,307
Storage	1,525
Circulation, Walls and Waste	1,743
Subtotal	4,576
Total Built Space	
Total Built Space (sq. ft)	26,367

2.3.3.2 Proposed Base Area Development

As detailed in the preferred concept (Fig. 2-10), the Alpine Base Area at Manning Park Resort will evolve into a centralized, pedestrian-oriented base area that improves guest access to essential skier services and eases guests' transition between their vehicles, the skier services, and the slopes. Buildings hosting skier services will be gradually relocated to a central position just north and northwest of the existing Day Lodge, while the Maintenance facilities will potentially shift west, above the parking area, making way for additional beginner ski terrain. The layout of the new Alpine Base Area, in conjunction with the newly realigned Bear Chair and proposed New Chair, improves skier access, limits required walking distance to lifts, services, and vehicles, and, by separating vehicles and pedestrians, will foster a more intimate 'mountain village' atmosphere.

The existing parking areas will be realigned to spatially separate pedestrians and vehicles, a drop-off area will be developed next to the core of the base area, and new parking capacity will be created through the expansion of existing parking areas and, if needed, the development of a new parking area on the flat lands below parking lot #2 (see Sec. 2.3.3.3).

To accommodate the preferred base area concept, the "base area", as defined in MPR's Park Use Permit (Amended April 12, 2017), will need to be expanded to encompass all proposed "base area operations". With the overall intent of the base area planning process to centralize the skier's base area experience, the adjustment of the "base area" boundary, as proposed, is minimal (+3 ha).

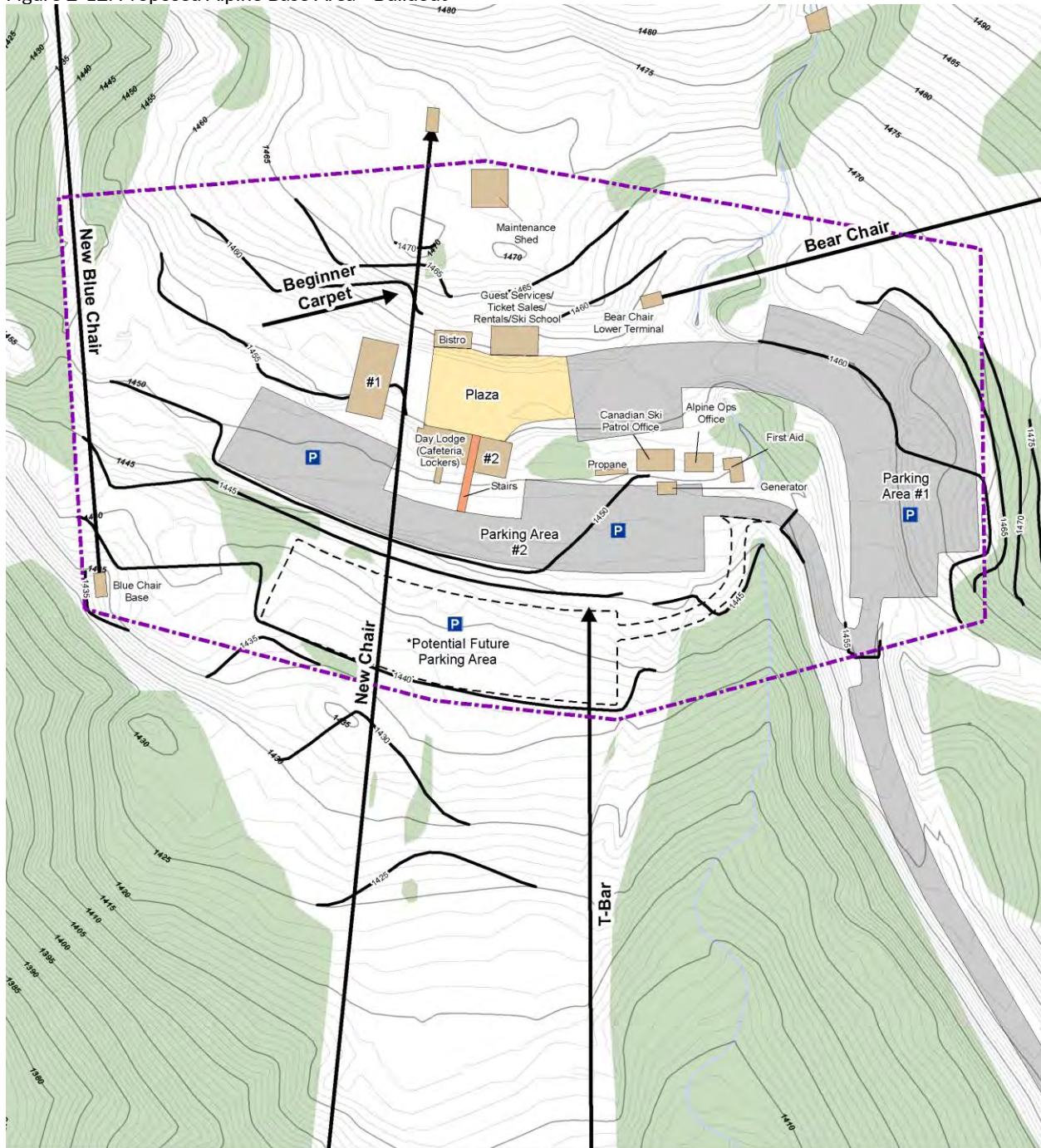
2.3.3.3 Proposed Parking

As part of the base area development, and with the intent to provide parking in balance with the proposed Comfortable Carrying Capacity, the parking area at the Alpine Base Area will expand from approximately 1.4 ha up to 2.4 ha. The expansion will be realized through the extension of the existing parking lots and, if needed, the development of an additional parking lot on the flat lands south of the existing base area, near the top of the existing Tube Park and Handle Tow (Fig. 2-12).

In total, using a conservative standard of 250 cars per hectare, the proposed parking area is estimated to have capacity for approximately 630 cars with space for an additional 6-8 buses. Assuming 2.8 guests per car and 40 guests per bus, MPR can accommodate approximately 2,091 guests at one time. This represents an increase of approximately 1,000 guests over the current parking capacity.

In tandem with increased parking capacity, as the Resort grows in popularity and visitation increases, focus will be placed on the existing shuttle system, carpooling, and mass transit solutions. It is MPR's intent to maintain an intimate mountain ambience within the Alpine Base Area and limit the impacts of personal vehicles to the greatest degree possible.

Figure 2-12. Proposed Alpine Base Area - Buildout



Manning Park Resort

Alpine Base Area Plan
Preferred Concept
Buildout
2026

1:2,250

0 20 40 80 120 Meters



Legend

-  Existing Lifts
-  Existing Buildings
-  Proposed 5m Contours
-  Proposed Alpine Base Area Boundary

Planning by:



www.brentharley.com

Prepared for:



www.manningpark.com

Statement of Limitations:

The information included on this map has been compiled by BHA from a variety of sources and is subject to change without notice. BHA makes no representation or warranty, expressed or implied, as to accuracy, completeness, timeliness or rights to the use of such information. BHA shall not be liable for any general, special, indirect, incidental or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map.

2.3.4 Infrastructure

2.3.4.1 Utilities

Currently, the Ski Area at Manning Park Resort is powered entirely by a diesel generator located near the south end of the parking area. Looking to the future, MPR has identified replacing this generator and connecting to BC's power grid as a key priority. It would address MPR's needs for a sufficient and reliable source of power, enhancing guest comfort and safety, while eliminating an auditory distraction, diesel exhaust fumes, and reducing MPR's environmental footprint within the Park.

At present, only the Lodge Area near Highway #3 is connected to the power grid. However, BC Parks has committed to extending power to the 20 Minute Lake site (near Lightning Lake) as part of a campground improvement project. With power committed to this site, the opportunity exists to extend power to the Alpine Base Area. Manning Park Resort is committed to working with BC Parks to explore this opportunity and determine the best means by which power can be extended to the Alpine Ski Area.

2.3.4.2 Wastewater

Wastewater from MPR is currently treated onsite through a septic field system located adjacent to the base area, and pit toilets that are emptied annually. At present, the septic system is in good working order and, together with the pit toilets, provides sufficient capacity to meet the needs of MPR's Alpine Ski Area guests. However, as guest capacity increases with the addition of ski terrain and base area developments, additional strain will be placed on these systems, and they may need to be expanded or upgraded. Manning Park Resort is currently investigating the maximum capacity of the existing wastewater system to understand what improvements may be needed in the future.

2.3.4.3 Water

All potable water used by MPR is sourced from a well on-site. The capacity of this well is sufficient to meet the existing and proposed ski area capacity, but the location of the well may need to be relocated to accommodate the proposed base area developments and skier staging areas. Manning Park Resort will work with its staff, engineers, and BC Parks to ensure the Alpine Base Area continues to have a secure and sufficient source of potable water.

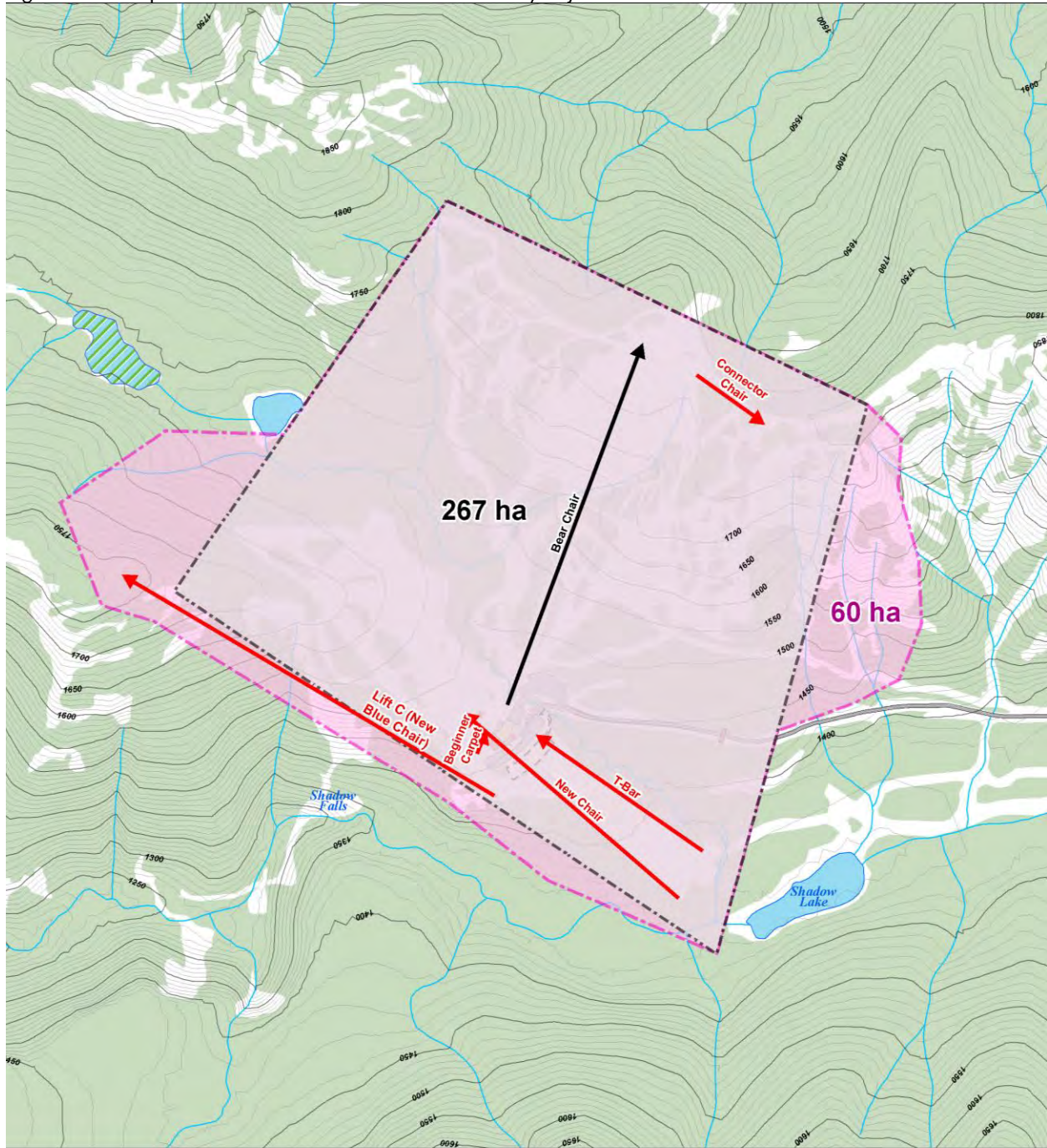
2.3.5 Controlled Recreation Area Boundary

To accommodate the proposed improvements and expansions to the ski terrain at Manning Park Resort, the current Controlled Recreation Area Boundary will need to be adjusted. As illustrated in Figure 2-13, the existing CRA is approximately 267 ha (660 acres). However, to include the proposed ski terrain, the CRA boundary will need to be expanded to approximately 60 ha (148 acres). The developments proposed in the SRDP depend on whether the CRA is expanded or is maintained in its current form. The boundaries are included here to indicate the existing extent of the CRA and its potential expansion, but it is recognized that any boundary realignment will require discussion between Manning Park Resort and BC Parks.



*A family snowshoe adventure at Manning Park Resort
Photo: Lance Fryling*

Figure 2-13. Proposed Controlled Recreation Area Boundary Adjustment



Manning Park Resort
CRA Boundary
2026

1:15,000

0 100 200 400 600 Meters



Legend

- Proposed CRA
- Existing CRA
- Existing Lifts
- Proposed Lifts

Planning by:



Prepared for:



Statement of Limitations:
The information included on this map has been compiled by BHA from a variety of sources and is subject to change without notice. BHA makes no representation or warranty, expressed or implied, as to accuracy, completeness, timeliness or rights to the use of such information. BHA shall not be liable for any general, special, indirect, incidental or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map.

2.3.6 Phased Development

The development of Manning Park Resort to Resort Buildout condition will not occur immediately but will take place over a series of Phases. Importantly, pursuit of each of these Phases will only occur when resort visitation, market trends, infrastructure capacity, and MPR's priorities indicate that it is appropriate to do so.

As planned, development of MPR is understood to take place over two or more phases. To delineate this progression, the implementation strategy has been divided into a 10-year Plan stage and a *Buildout* stage. However, it should be noted that the development of many of the concepts detailed below will not occur until the Ski Area at MPR is connected to the power grid. The ownership and management team at MPR will support BC Parks in their continued efforts to extend power from the Skyview campground to the Ski Area.

It is critical to note that even in the early phases of construction, the grading undertaken for alpine base area development must respect the Buildout stage of the preferred concept. Wherever possible, grading exercises should be proactive and address future phases of development. The concern is that if this perspective is not adopted, early stages of development and grading may effectively prevent future alpine base area projects, and in turn, create imbalances and inefficiencies with the proposed on-mountain lifts and ski trails. Further, by taking a long-term perspective, MPR will likely realize efficiencies and cost savings in the development process.

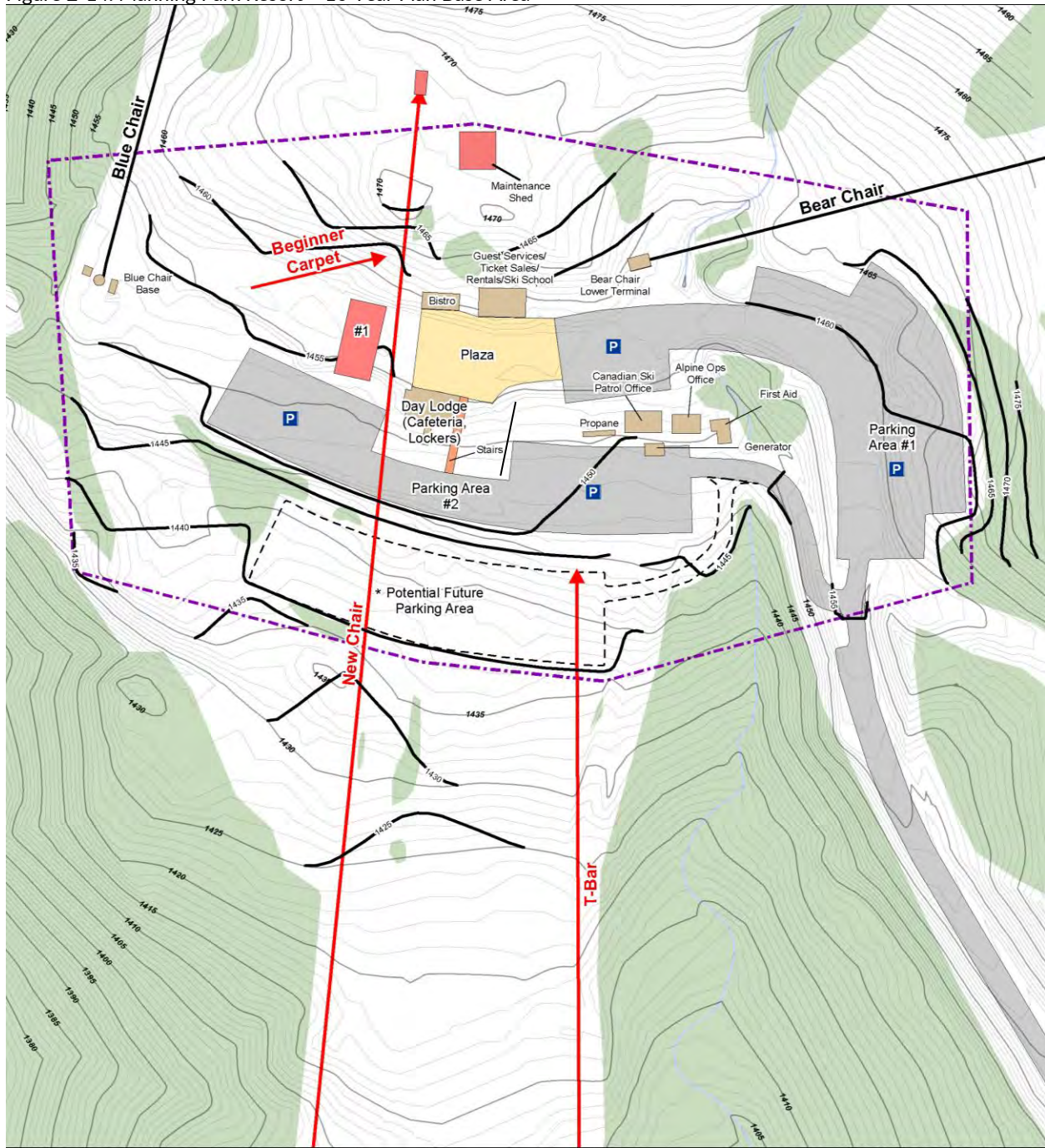
Proposed grading is illustrated on the proposed base area maps (Fig. 2-14 & Fig. 2-16) as enlarged contour lines labelled with the required elevation.

2.3.6.1 10-Year Plan

Acknowledging the need to be connected to the power grid, it is MPR's intent that within the first 10 years following approval of this SRDP, the alpine base area will add additional space for day-use skier services located and oriented in a manner to create a spatially separated, enclosed pedestrian-scaled skier plaza (Buildings #1 and #2). As a result, the space available for parking in the upper lot will be reduced, and vehicles will no longer be able to drive through the base area. To compensate for this and maintain overall parking capacity, MPR will redevelop Parking Lot #2, south of the Day Lodge, to add additional parking capacity for day-use guests.

Note that the grading required for all future Phases of implementation are represented in the illustration of *10-year Plan* the proposed base area (i.e., enlarged contour lines labelled with elevation). Not only is the detailed grading critical for base area development, but as seen for the proposed Carpet and the area south of the redeveloped parking area, also key to the achieving the required ski slope gradients needed for the successful development of the expanded and improved beginner ski pod.

Figure 2-14. Manning Park Resort – 10 Year Plan Base Area



Manning Park Resort
Base Area
10 Year Plan
2026

1:2,250

0 20 40 80 Meters



Legend

- Proposed Lifts
- Existing Lifts
- Proposed Building
- Proposed Parking
- Proposed Vegetation
- Existing Buildings
- Proposed Alpine Base Area
- Proposed 5m Contours

Planning by:



www.brentharley.com

Prepared for:



www.manningpark.com

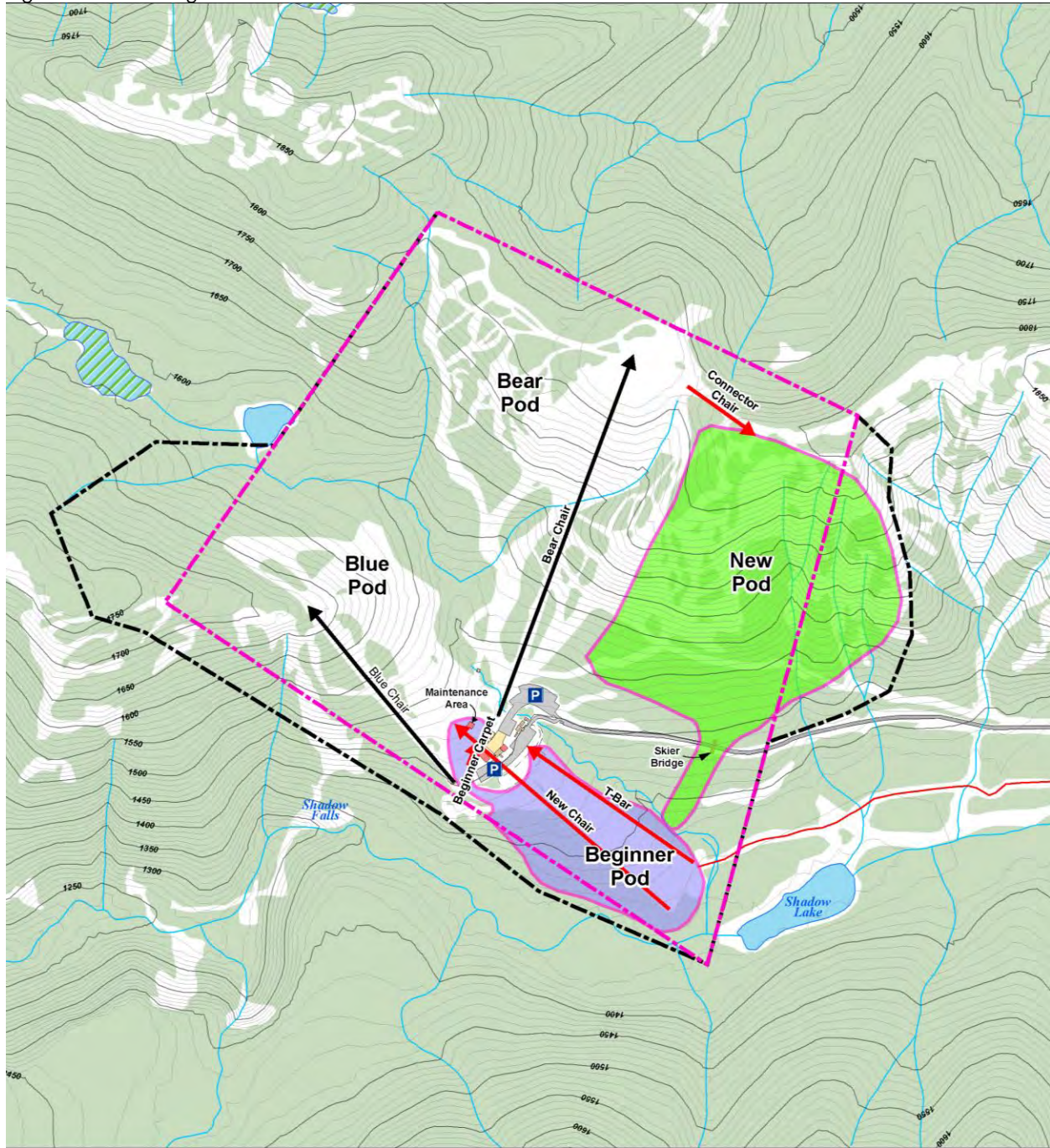
Statement of Limitations:
The information included on this map has been compiled by BHA from a variety of sources and is subject to change without notice. BHA makes no representation or warranty, expressed or implied, as to accuracy, completeness, timeliness or rights to the use of such information. BHA shall not be liable for any general, special, indirect, incidental or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map.

With the base area evolving to meet the expectations of skiers, Manning Park Resort will pursue a series of projects and developments that will result in significant improvements to the skiing. Within the *10-year Plan*, MPR plans to undertake the new beginner skier development area in combination with the expansion of ski terrain in the New Pod (Fig. 2-15). This entails the development of the New Chair and T-Bar, the creation of a new 'never-ever' ski pod with the Beginner Carpet. New ski terrain will also come online via the formalization of the 'New Pod' to the east of the Bear Chair, offering advanced and expert-level ski trails and glades. These developments will result in an increase of approximately 370 skiers to Uphill CCC and approximately 450 skiers to Downhill CCC. MPR acknowledges that the proposed increase in skier capacity and resulting visitation may require an update to or expansion of the septic system in the Alpine Base Area. MPR will complete an evaluation of the septic system as part of detailed site-specific assessments, based on the proposed development and capacity increase.



The realigned Blue Chair will open up more amazing ski terrain at Manning Park Resort

Figure 2-15. Manning Park Resort – 10 Year Plan Mountain



Manning Park Resort
Ski Area Plan
10 Year Plan
2026

1:15,000

0 100 200 400 600 Meters



Legend

Proposed Ski Pods (10 Year Plan)

- Beginner Pod
- New Pod
- Existing Lifts
- Proposed Lifts
- Existing Buildings
- Proposed Buildings

- Plaza
- Future Parking
- Proposed Parking
- Proposed CRA Boundary
- Existing CRA Boundary

Planning by:



Prepared for:



Statement of Limitations:
The information included on this map has been compiled by BHA from a variety of sources and is subject to change without notice. BHA makes no representation or warranty, expressed or implied, as to accuracy, completeness, timeliness or rights to the use of such information. BHA shall not be liable for any general, special, indirect, incidental or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map.

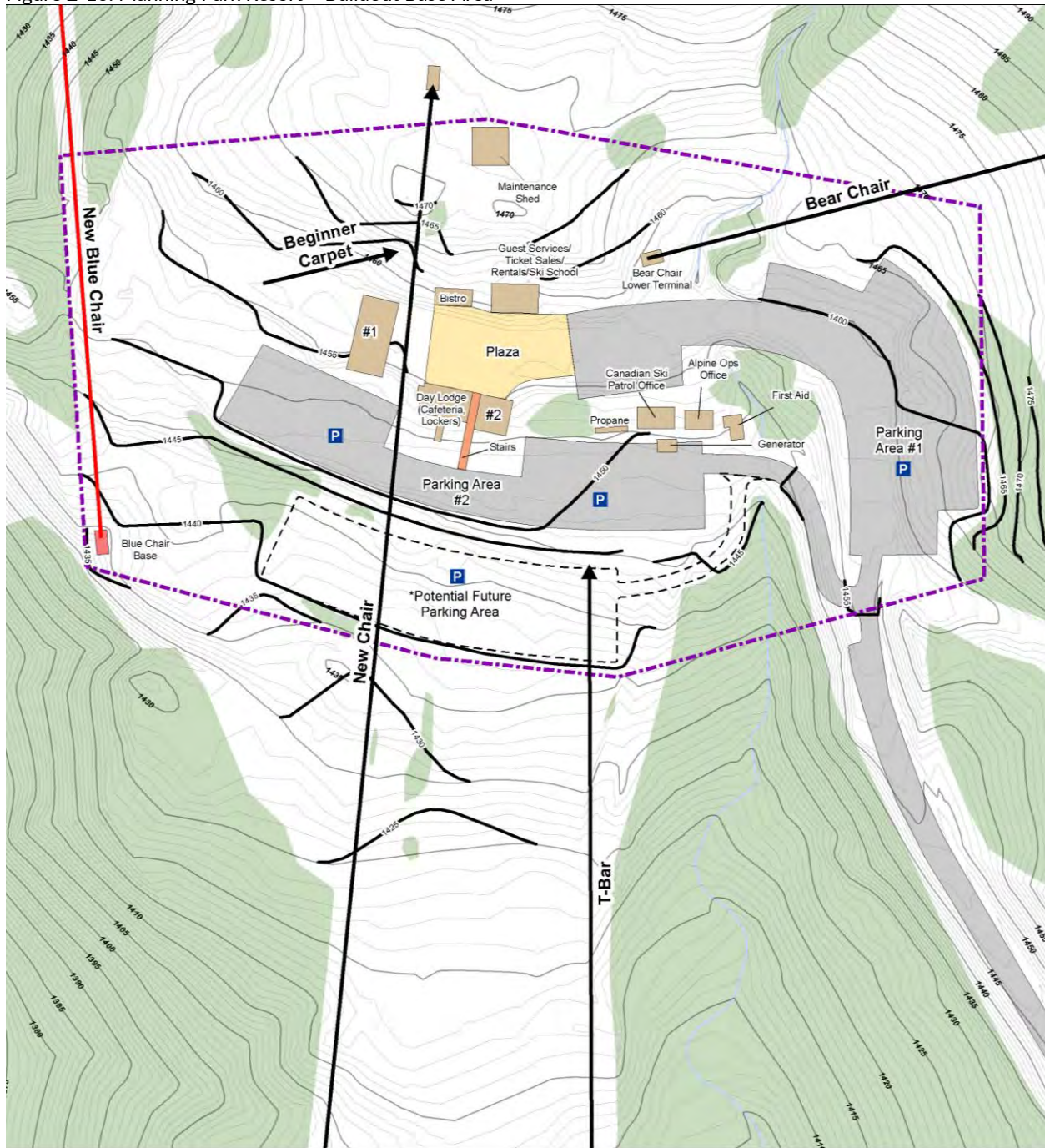
2.3.6.2 Buildout

Looking beyond the first 10 years, Manning Park Resort will look to realign and upgrade the Blue Chair, adding skiable vertical and skiable terrain well-suited to intermediate skiers, and further add to the 'New Pod' by installing a Connector Lift for access and a skier bridge across Gibson Pass Road that will connect skiers to the bottom of the New Chair (Fig. 2-16 & Fig. 2-17). In the base area, the shift of the Blue Chair's lower terminal will create greater ski terrain in the Beginner Pod and ease the movement of beginner skiers around the 'never-ever' magic carpet down to the lower terminal of the New Chair, while relocating the upper terminal further up Mara Peak will create additional north-facing, intermediate skiing.



The future is looking bright at Manning Park Resort
Photo: Chris Barker

Figure 2-16. Manning Park Resort – Buildout Base Area



Manning Park Resort Base Area Proposed at Buildout 2026

1:2,250
0 20 40 80 Meters

Legend

- Existing Lifts
- New Blue Chair
- Proposed Lift Terminal
- Existing Buildings
- Parking
- Vegetation
- Proposed Alpine Base Area Boundary
- Grading Contours

Planning by:



www.brentharley.com

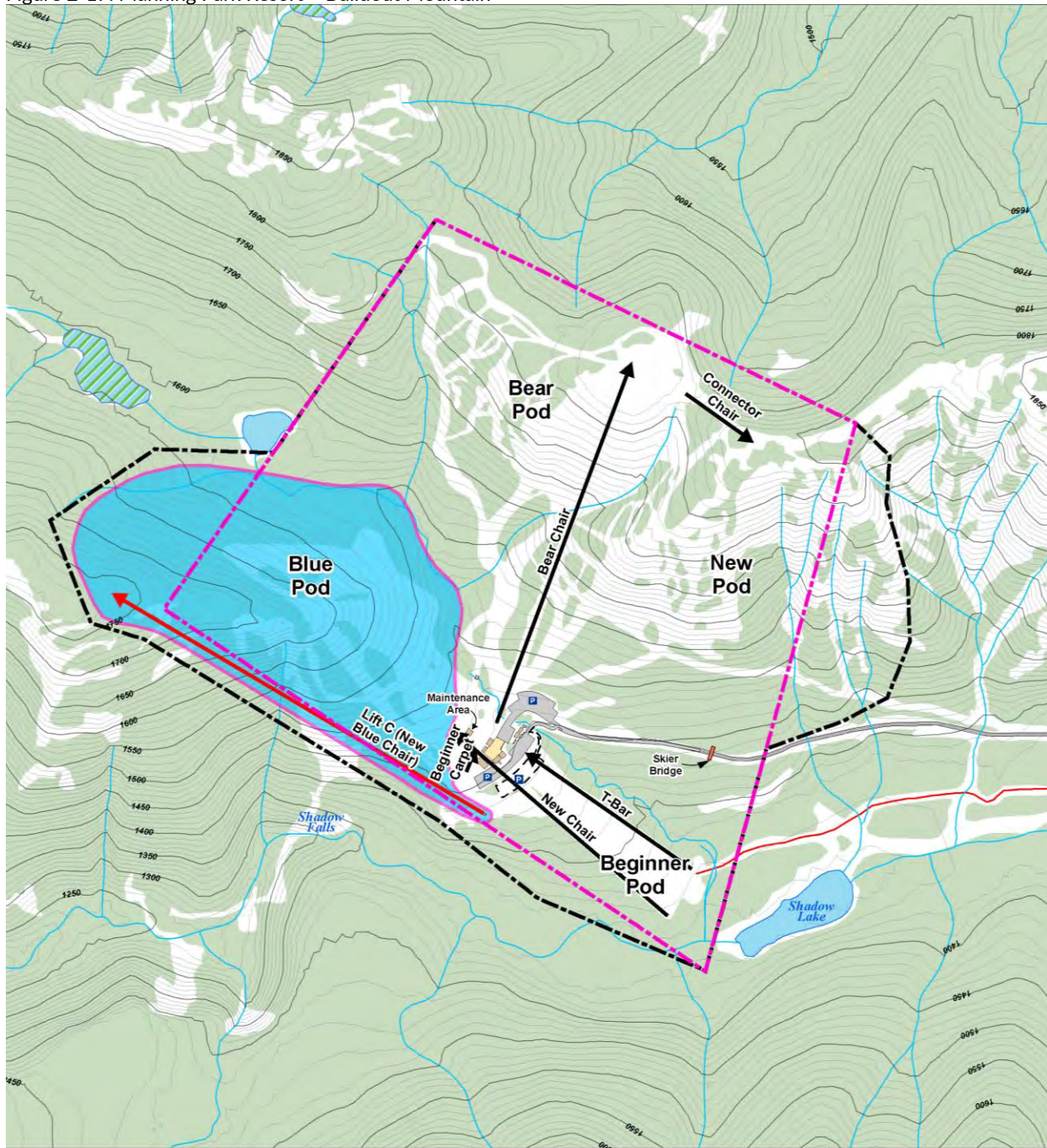
Prepared for:



www.manningpark.com

Statement of Limitations:
The information included on this map has been compiled by BHA from a variety of sources and is subject to change without notice. BHA makes no representation or warranty, expressed or implied, as to accuracy, completeness, timeliness or rights to the use of such information. BHA shall not be liable for any general, special, indirect, incidental or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map.

Figure 2-17. Manning Park Resort – Buildout Mountain



Manning Park Resort
Ski Area Plan
Buildout
2026

1:15,000

0 100 200 400 600 Meters



Legend

- | | |
|--------------------------|-----------------------|
| Proposed Ski Pods | Existing Buildings |
| Blue Pod | Plaza |
| Existing Lifts | Existing CRA Boundary |
| Proposed Lifts | Proposed CRA Boundary |

Planning by:



www.brentharley.com

Prepared for:



www.manningpark.com

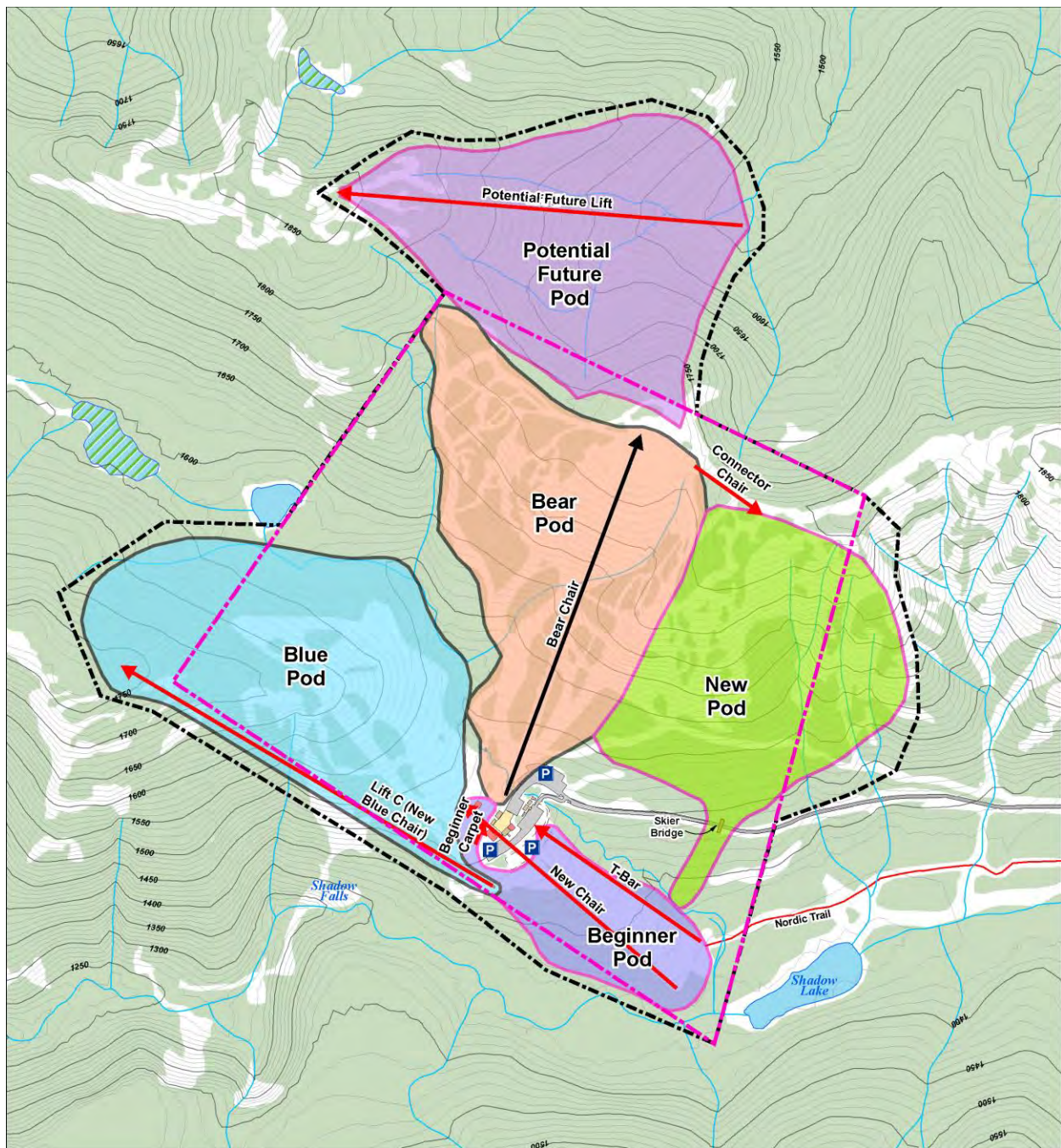
Statement of Limitations:
The information included on this map has been compiled by BHA from a variety of sources and is subject to change without notice. BHA makes no representation or warranty, expressed or implied, as to accuracy, completeness, timeliness or rights to the use of such information. BHA shall not be liable for any general, special, indirect, incidental or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map.



Christmas Eve at Manning Park Resort – A celebration of community and more great skiing.

2.4 Ski Area Plan – Alternative Ski Area Concepts

Through the planning and design process for the lift infrastructure and ski terrain, BHA explored several preliminary concepts to address the identified needs and objectives of MPR. Through collaboration with the team at MPR, an iterative refinement process led to the preferred mountain development concept presented in Section 2.3.2. However, a potential future scenario for the ski area was also identified, responding to future threats and opportunities. It is presented below as a foundation for future discussions between Manning Park Resort and BC Parks, and subsequent planning work.



Manning Park Resort
Ski Area Plan
Potential Future Concept
2026

1:15,000
0 100 200 400 600 Meters



Legend

- | | |
|-----------------|-------------------------------|
| Ski Pods | Proposed Building |
| Beginner Pod | Existing Buildings |
| Orange Pod | Plaza |
| Blue Pod | Proposed Parking |
| Future Pod | Existing CRA Boundary |
| New Pod | Potential Future CRA Boundary |
| Existing Lifts | |
| Proposed Lifts | |

Planning by:



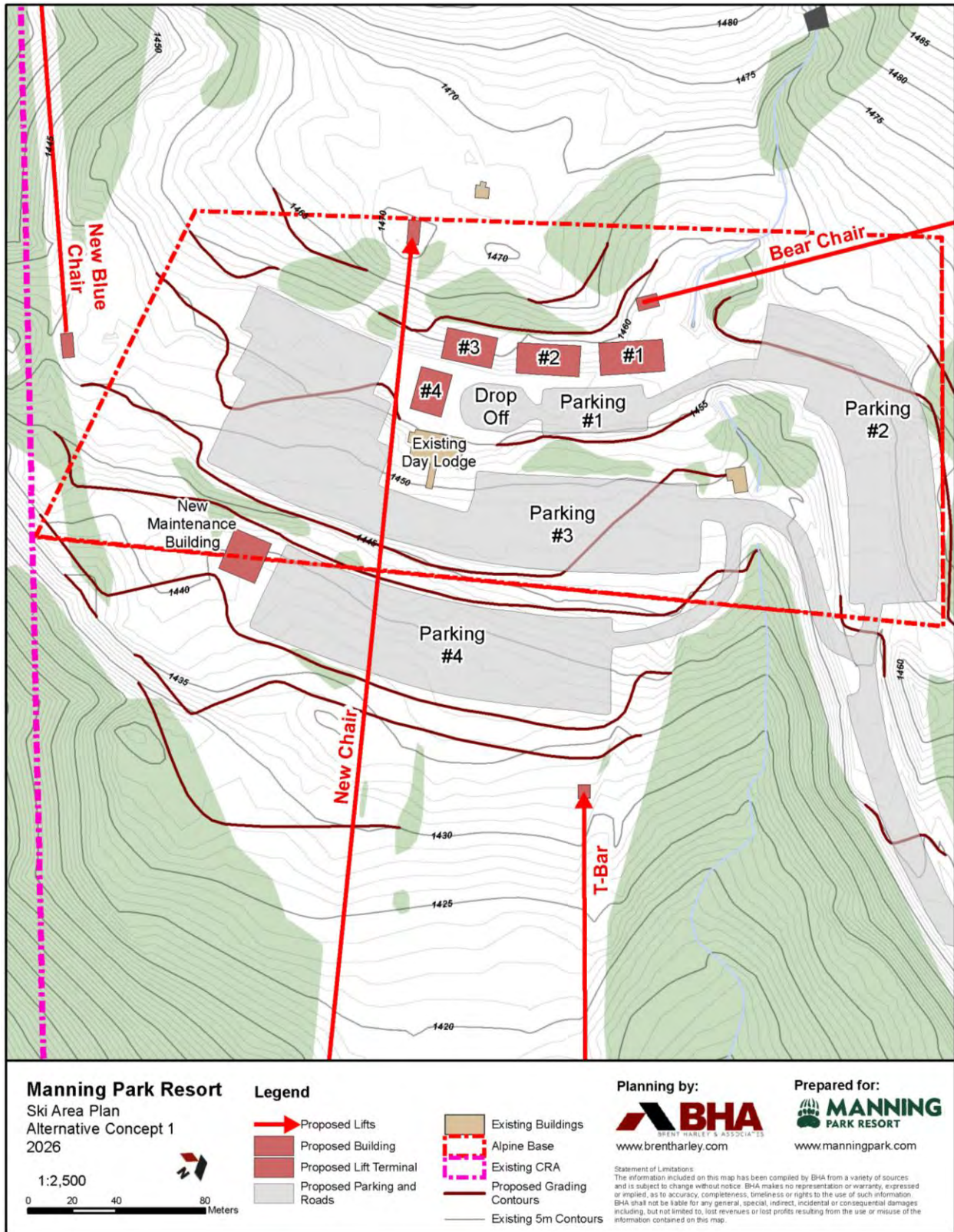
Prepared for:

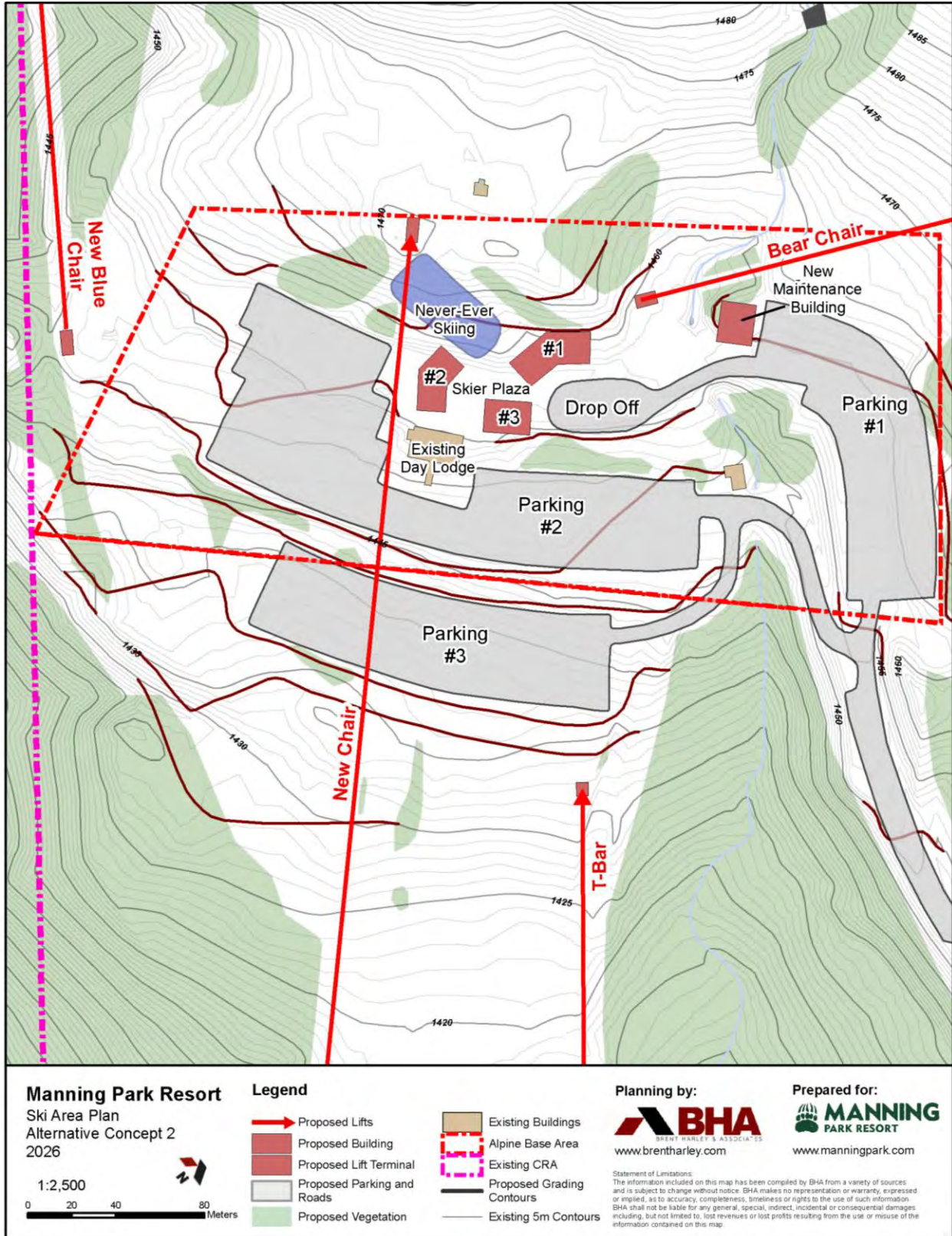


Statement of Limitations:
The information included on this map has been compiled by BHA from a variety of sources and is subject to change without notice. BHA makes no representation or warranty, expressed or implied, as to accuracy, completeness, timeliness or rights to the use of such information. BHA shall not be liable for any general, special, indirect, incidental or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map.

2.5 Ski Area Plan – Alternative Base Area Concepts

Through the alpine base area planning and design process, several preliminary concepts were developed to address the identified needs and objectives of MPR. Through collaboration with the team at MPR, an iterative refinement process led to the preferred base area concept presented in Section 2.3.3. The alternative alpine base area concepts are presented here to illustrate that design process and highlight the opportunities and constraints that informed base area design.







MANNING
PARK
RESORT

MANNING
LODGE
ACCOMMODATION

MANNING
LODGE
INFORMATION

3 LODGE AREA PLAN

3.1 Introduction

Sunshine Valley Recreation Inc. wishes to make significant improvements to the Manning Park Resort Lodge Area. The intent is to upgrade and diversify its park-oriented offering by:

- Consolidating the day-use core of facilities and amenities.
- Incorporating expanded destination accommodation.
- Establishing facilities to cater to groups, enhanced recreation, retreat, and lifestyle markets.

The following Lodge Area Plan has been created to initiate dialogue with BC Parks and to guide the formal planning, architecture, and engineering of the Lodge Area near Highway 3 and the Gibson Pass ski area.

3.1.1 Purpose of the Lodge Area Plan Concept

On behalf of Sunshine Valley Recreation Inc., Brent Harley and Associates Inc. and Resort staff prepared the Manning Park Resort Lodge Area Concept. This Concept provides direction for the enhancement of the Lodge Area to the point of buildout, consistent with the agreed-upon limits to development. The Lodge Area Plan was created to go hand in hand with the Ski Area Plan (see Sec. 2) and the Support Services Area Plan (see Sec. 4).

3.1.2 Preferred Concept Goals and Objectives

As defined by Manning Park Resort, the primary goal of the Lodge Area Plan is to act as a long-term guide to the redevelopment of the Lodge Area in a fashion that will establish Manning Park Resort as a high-quality, year-round destination resort that will meet the needs of the future and align with the BC Parks Management Plan for E.C. Manning Provincial Park.

In support of this goal, the Lodge Area Plan specifically provides:

- A "blueprint" for the ongoing development and enhancement of the Lodge Area at Manning Park Resort;
- Improved sense of arrival to the Resort;
- Adequate parking for day use, destination use, and larger vehicles (i.e., buses)
- A central village core to concentrate staging activities, amenities and services, in order to energize the Lodge base area and village character;
- Additional accommodation and day-use space that supports the needs of year-round visitors;
- Separation between day-use and destination use activities, while continuing to offer each group a unique resort experience;
- A continuous trail system to support alternative access to the village core and surrounding areas via walking, biking and cross-country skiing and a summer trail network;
- Direct vehicular access to facilities while still maintaining a pedestrian-friendly core.
- Minimal impacts using natural elements and blending with the environment while maintaining the natural setting that guests and residents of Manning Park Resort recognize and wish to preserve.

3.2 Background

3.2.1 Development Vision, Goals and Objectives

The ongoing Vision of Manning Park Resort is to establish itself as an open, friendly, and family-oriented destination resort, which provides "super service with a smile". As part of the Resort's primary development goal, Manning Park Resort is eager to develop a Lodge Area Plan to support the long-term development, renovations, expansion, and operations of the Resort while maintaining the integrity of E.C. Manning Provincial Park.

To create an all-encompassing Lodge Area Plan Concept, an evaluation of existing elements and potential development was necessary. A resort trends analysis was also completed to help establish a development program. In addition, the analysis of strengths, weaknesses, opportunities, and threats was completed, providing a concise summary of the Resort's potential. This information was focused on developing a comprehensive and well-integrated Lodge Area, designed to provide visitors with a unique and enjoyable experience.

Consistent with the goal to establish Manning Park Resort as a multi-faceted destination resort, the need to balance the proposed development with existing facilities was deemed equally important. By providing additional dining opportunities, retail outlets, staging areas, and specialized amenities, Manning Park Resort will establish the balance of activities necessary for greater year-round customer satisfaction.

The development of the concept will be designed to enhance the Lodge Area of Manning Park Resort by fully complementing the character, ambiance, environment, and history of Manning Provincial Park.

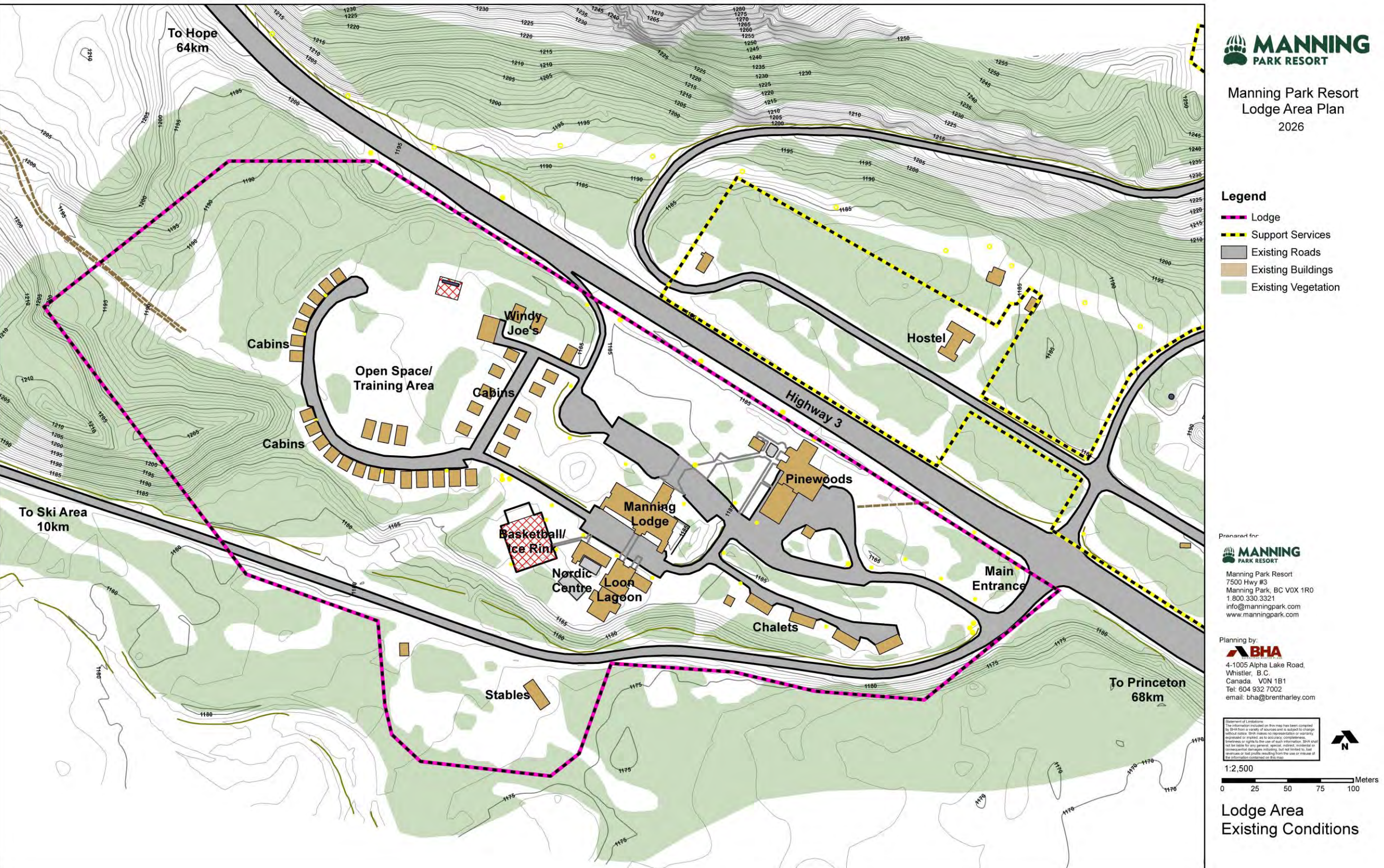
**This Master Plan Concept was first started in 2004.
The current plan builds on the past and looks to the future.**

3.2.2 Location and Existing Conditions

The Manning Park Resort Lodge Area consists of a variety of major facilities and amenities. These include:

- Manning Park Lodge
 - o 41 hotel rooms
 - o Central check-in
 - o Games room
 - o Meeting rooms
 - o Administration
- Pinewoods Lodge
 - o Pinewoods Dining Room
 - o Cascade Café
 - o Bear's Den Lounge
 - o Country Store & Bistro
 - o Alpine Banquet Room
- Loon Lagoon Recreation Centre (pool, hot tub, sauna, steam room, exercise room)
- Nordic Centre (Nordic skis, skates, snowshoes, and rental)
- Chalets (4 triplex accommodation units)
- Deluxe Cabins (5 accommodation units)
- Premium Cabins (19 accommodation units)
- Standard Cabins (15 accommodation units)
- Windy Joe's Hall (meeting and convention space)
- Parking (+/- 200 cars)
- 17 Electric Vehicle Charging stations
- Outdoor Recreation Facilities/ Amenities
 - o Ice rink
 - o Tobogganing
 - o Nordic trails and instructional area
 - o Hiking/biking trails
 - o Playground and picnicking areas

Figure 3-1. Lodge Area – Existing Conditions



This page has been intentionally left blank

3.2.2.1 Accommodation Capacity

Sunshine Valley Recreation Inc. operates Manning Park Resort under a Class 'A' Permit, from an agreement established in 1984, allowing a maximum of 200 rooms of overnight accommodation. The Resort offers a variety of lodging options such as a main hotel, four chalets, five deluxe cabins, five premium cabins, fourteen premium plus cabins, and fifteen standard cabins, as well as the Last Resort building.

Bed Units have been used to quantify the capacity of overnight accommodation at Manning Park Resort. A Bed Unit equates to overnight accommodation for 1 guest.

Based on a ratio of 2 Bed Units per King, Queen, and Pullout Couch, and 1 Bed Unit per Single, with 145 bedrooms of overnight accommodation, Manning Park Resort can currently accommodate 656 guests (Table 3-1).

Table 3-1. Breakdown of Existing Overnight Accommodation Capacity

Room type		No. of Buildings	Total Bedrooms	Total King Beds	Total Queen Beds	Total Single Beds	Total Pullout Couches	Total Bed Units
Premium Plus Cabins		14	28	0	28	56	28	168
Premium Cabins		5	10	0	10	15	10	55
Chalets		4	8	0	8	32	4	56
Deluxe Cabins		5	15	10	0	20	5	50
Standard Cabins		15	30	0	15	60	0	90
Manning Lodge	Junior King/ADA	1	2	2	0	0	0	4
	Mini suite		8	0	16	0	8	48
	Queen Room		31	0	62	0	0	124
The Last Resort		1	13	0	10	41	0	61
TOTAL		45	145	12	149	224	55	656

3.3 Development Potential

3.3.1 Introduction

To determine the development potential of the Lodge Area, the lands were analyzed in terms of their:

- Relationship to existing developments and existing land use.
- Slope gradients.
- Elevation range.
- Environmental character.

The inventory and analysis findings assisted in the creation of development concepts that were visually desirable, economically balanced, and environmentally sensitive on the site. They also enable the generation of plans that are well integrated with the existing and proposed facilities and consider the issues of well-coordinated access; resort guest requirements and expectations, and; vehicular, pedestrian, bike and skier circulation patterns throughout the day.

3.3.2 Base Area Slope Analysis

The Base Area Slope Analysis is designed to identify the range of slope gradients suitable for potential land use developments. The topographic information has been color coded into slope gradient categories as follows:

Table 3-2. Acceptable Base Area Slope Gradients

Slope	Building and Development Potential Use
0 - 5%	Capable of accommodating all types of base area development with limited grading. Typically, identifying parking potential as well as lands that may be wet and environmentally sensitive to development
5 - 10%	Capable of accommodating all types of base area development with minimal grading.
10 - 20%	Lands that will require some grading to accommodate development. Upper limits to base area/village and golf course development.
20 - 30%	Upper limits to multifamily development with grading.
30 - 40%	Generally too steep for development. However, dependent on reasonable access and geotechnical considerations, some development may be possible.
40%	Unsuitable for Development

As is readily apparent, there is a significant amount of flat developable land in the Village Base Area (Figure 3-2).

3.3.3 Base Area Elevation Analysis

The Elevation Analysis is designed to identify areas of equal elevation and has been graphically delineated to identify the general "flow" of the land. As illustrated, the site can be characterized as relatively flat and rises on the north side as well as a lower hilltop to the west of the village area (Figure 3).

Figure 3-2. Base Area Slope Analysis

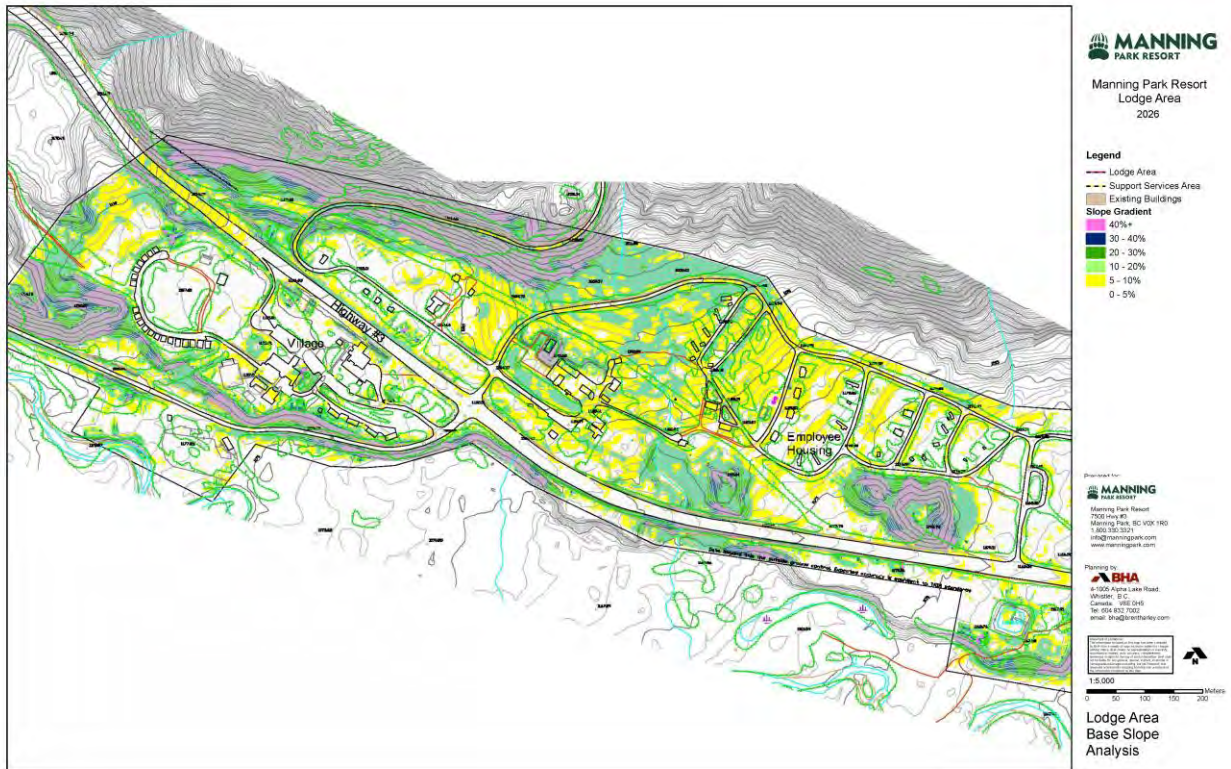
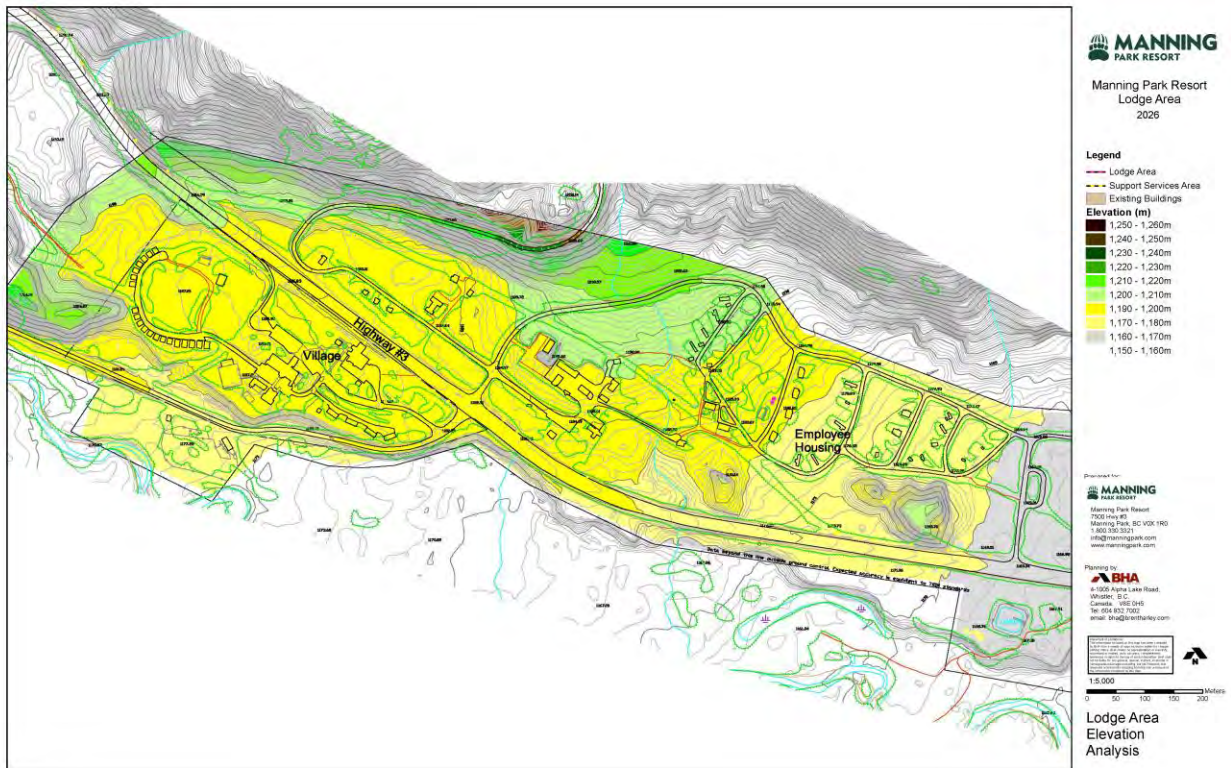


Figure 3-3. Base Area Elevation Analysis



3.3.4 Parking Evaluation

In considering the redevelopment of the Lodge Area, it is critically important to ensure that the Resort will have enough parking capacity. The following are critical numbers pertaining to existing conditions and parking requirements at Manning Park Resort:

- The Lodge Area currently provides parking for more than 200 cars, which, assuming 2.5 guests per car, equates to 500 guests at one time.
- The parking lot capacity is undersized on peak days throughout the year.
- The existing parking area divides the Lodge Area, isolating Manning Lodge and effectively breaking all pedestrian circulation desire lines.
- Electric Vehicle charging stations (Tesla and BC Hydro) have been added in key areas.
- To accommodate growth in a coordinated fashion, a reconfiguration of the parking lot(s) will have to be considered for the long term.

3.3.5 Site Servicing

Manning Park Resort's sewage treatment plant is currently operating under a permit, which allows a maximum daily treatment of 455 cubic meters of effluent. Historically, the existing development at MPR has resulted in daily volumes ranging from 116 to 275 cubic meters on peak days. The Resort's water reservoir comfortably services current conditions and would require minor upgrades to ensure proper fire protection for future development with additional water storage.

As per the Manning Park Resort's Class 'A' Permit, the Resort can accommodate a total of 200 rooms at buildout. Currently, the Resort has enough water supply and sewage treatment capacity; however, potential development may require electrical upgrades and longer-term sewer and water upgrades to accommodate the additional allowable rooms.

3.4 Lodge Area Development Realities and Opportunities

In summary, throughout the evaluation process, the following development realities and opportunities became apparent:

- The existing Manning Lodge accommodation, while serving its purpose, is not able to accommodate the recent and projected increase in destination visitors.
- There is an opportunity to improve operational efficiencies by converting the Lodge Area into a Village Core that would provide various specific services for day use and destination use.
- The base area provides minimal linkage between facilities, amenities, and staging areas.
- There is an opportunity to improve the parking configuration adjacent to the village area and create greater parking capacity for Manning Park Resort.
- Redevelopment will enable the improvement of Manning Park Resort's character, image, and visual ambiance by enhancing an older facility with an attractive, resort image setting and architectural statement.
- Redevelopment will enable the improvement of the arrival and departure statement of the Lodge Area of the Resort.

In conclusion, a review of the parking capacities, operational efficiencies, resort facility opportunities, and visitor experience impacts, all in conjunction with the unique character at Manning Park Resort, illustrates that the enhancement of the Lodge Area from a day-use staging area to include a destination-oriented focus may prove to achieve an improved land use than the current configuration. MPR acknowledges that the proposed development and evolution of the Lodge Area may require an update to or expansion of the sewage treatment plant. MPR will complete an evaluation of the septic system as part of detailed site-specific assessments for the component projects considered in the Lodge Area Plan at the time each project is being considered.

3.5 Lodge Area Plan Concept

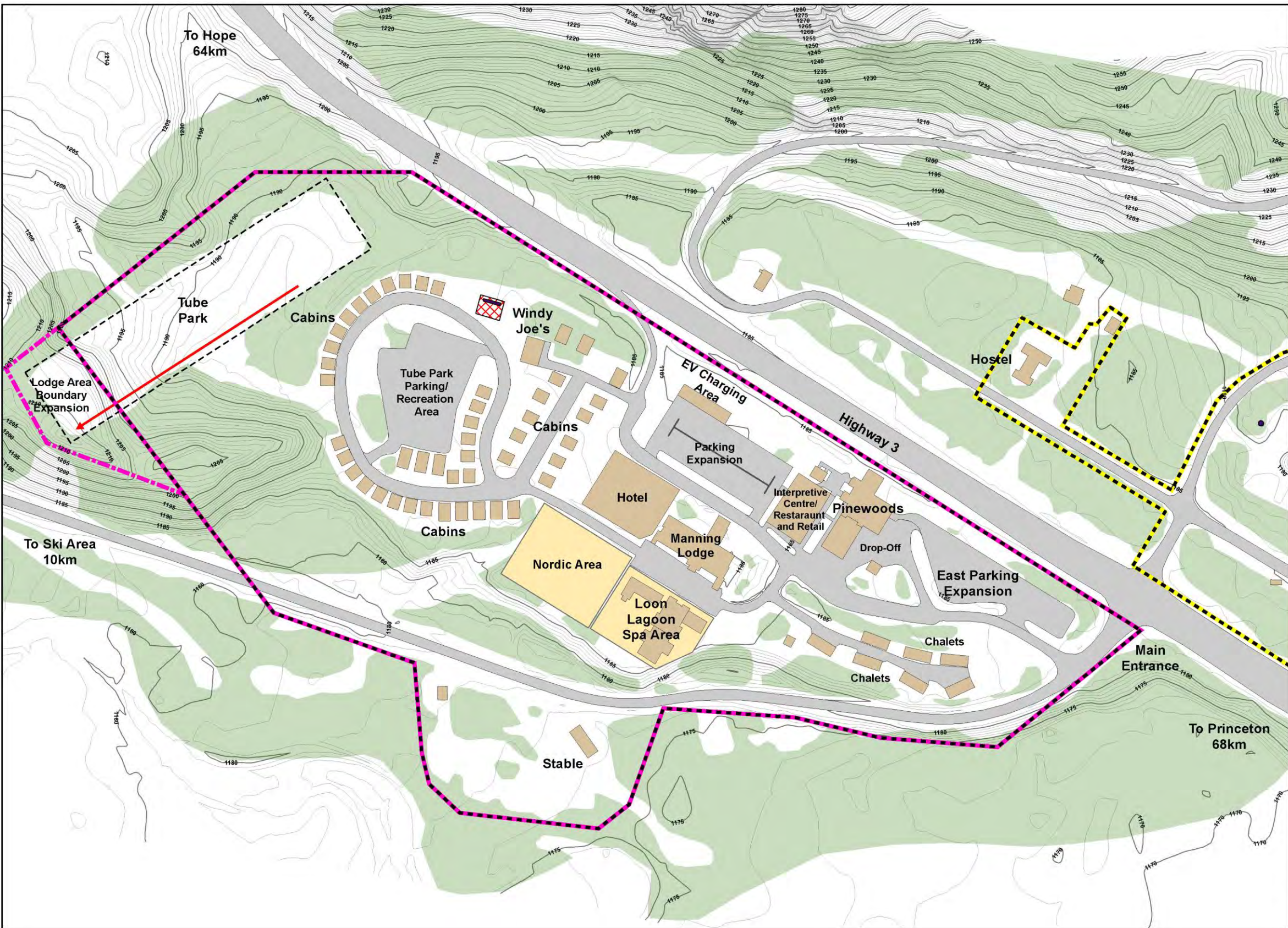
BC Parks and Manning Park Resort operate under a Park Use Operational Policy that provides direction and administration for three ski resorts in Provincial Parks. The proposed development and expansion of the Lodge Area builds on the Vision and history of the Resort. The plan effectively delineates the reconfiguration of the spaces around existing buildings to establish a park-like, pedestrian-oriented place. Building on this, the Lodge Area has been reorganized to improve vehicle and pedestrian movement, overall guest capacity, and to provide for the shifting needs and expectations of day use and destination guests. The following pages describe the various components found within the Master Plan Concept, which are illustrated on Figure 3-4.

3.5.1 Village Core

The Village Core area has been designed to be the key focal point of the Lodge Area, catering to day-use and destination guests alike. It is anchored by the Pinewoods building to the east, and Manning Lodge to the west. To further establish the Village Core as the centre of activity in the Lodge Area, two new buildings are proposed: a new hotel and a new multi-use building, the latter of which could include restaurants, outdoor patios, retail outlets, and a wellness centre. The Village Core will also shift to be more pedestrian-oriented, with expanded parking areas on the periphery to pull drivers out of their vehicles, and buildings and amenities linked together by walkways.

The architecture and facades of Village Core buildings will be low-profile, designed to reflect the character of Manning Park Resort and E.C. Manning Provincial Park's ambiance and values. The Pinewoods will continue to offer restaurant and food service, a retail store, a pub along with the Alpine Conference and Meeting room.

Figure 3-4. Lodge Area Preferred Concept



Manning Park Resort
Lodge Area
2026

Legend

- Proposed Tube Lift
- Lodge Area
- Support Services
- Proposed Planning Features**
- Boundary
- Buildings
- Parking
- Tube Park
- Existing Features**
- Fenced Areas

Prepared for:
MANNING
PARK RESORT
Manning Park Resort
7500 Hwy #3
Manning Park, BC V0X 1R0
1 800 330 3321
info@manningpark.com
www.manningpark.com

Planning by:
BHA
4-1005 Alpha Lake Road,
Whistler, B.C.
Canada V0N 1B1
Tel: 604 932 7002
email: bha@brentharley.com

Statement of Limitations:
The information included on this map has been compiled
by BHA from a variety of sources and is subject to change
without notice. BHA makes no representation or warranty,
expressed or implied, as to accuracy, completeness,
knowledge or rights to the use of such information. BHA shall
not be liable for any damages, direct, indirect, incidental or
consequential damages including, but not limited to, loss
of revenue or lost profits resulting from the use or misuse of
the information contained on this map.



1:2,500
0 25 50 75 100 Meters

Lodge Area
Preferred Concept

This page has been intentionally left blank

3.5.2 Overnight Accommodation

3.5.2.1 Central Lodging and Accommodation

The Village Core serves as the central lodging and accommodation area at MPR and is made up of Manning Lodge and the proposed hotel. As planned, the front desk of the existing Manning Lodge will act as the central reservations and check-in for the resort. The Lodge itself will continue to have 41 hotel rooms, with another 25 rooms added in the Lodge Area through the development of a hotel immediately northwest of Manning Lodge. Also planned is a modest extension to the Lodge and the potential for an elevator to access the second floor of the current lodge, to support an aging population and those with disabilities. A new service and back-of-house extension may be added to accommodate current shortfalls in service space.

3.5.2.2 Cabins and Chalets

The 39 existing cabins (15 standard, 5 deluxe, 5 premium, and 14 premium plus) will be upgraded as needed to improve their architectural quality and park-like presentation, but otherwise left unaltered. In addition to the 5 premium cabins already constructed, an additional 6 units will be built south and west of Windy Joe's. This will be complemented by 3 new chalets opposite the 4 existing chalets in the south of the Lodge Area.

With the proposed hotel, cabins, and chalets, at buildout MPR will have room to accommodate 864 overnight guests (Table 3-3).

Table 3-3. Existing and Proposed Overnight Accommodation

Room type		No. of Buildings	Total Bedrooms	Total King Beds	Total Queen Beds	Total Single Beds	Total Pullout Couches	Total Bed Units
EXISTING								
Premium Plus Cabins		14	28	0	28	56	28	168
Premium Cabins		5	10	0	10	15	10	55
Chalets		4	8	0	8	32	4	56
Deluxe Cabins		5	15	10	0	20	5	50
Standard Cabins		15	30	0	15	60	0	90
Manning Lodge	Junior King/ADA	1	2	2	0	0	0	4
	Mini suite		8	0	16	0	8	48
	Queen Room		31	0	62	0	0	124
The Last Resort		1	13	0	10	41	0	61
PROPOSED								
Hotel		1	25	0	50	0	0	100
Premium Cabins		6	12	0	12	18	12	66
Chalets		3	6	0	6	24	3	42
TOTAL		55	188	12	217	266	70	864



Family-oriented Cabins to the west of Manning Lodge.

3.5.3 Recreation Facilities

3.5.3.1 Recreation Plaza: Loon Lagoon and Nordic Centre

Located behind Manning Lodge (south), the new Recreation Plaza will be anchored by the existing Loon Lagoon building and a new, purpose-built Nordic Centre. The Loon Lagoon building would continue to house workout facilities, a hot tub, sauna, steam room, and a swimming pool. Adjacent to the Loon Lagoon, the existing Nordic Centre would be redeveloped to create a “Spa Experience” centred on health and wellness treatments. The Nordic Centre services would be moved west to the site of the existing tennis courts and housed in a new building. This expanded and enhanced facility will act as a premier Nordic centre supporting snowshoeing, skiing, skating and other sports. There would also be space for change rooms and lockers, ticket facilities, instruction rooms, a waxing and repair room, among others, while just outside there would be a warm-up and wax-testing area that could serve as a meeting point and staging area.

Conceptually, the Recreation Plaza will be utilized for outdoor events, workouts, seminars, and training sessions through all four seasons. There is also an opportunity to establish an outdoor patio, lounge, juice bar, or café to cater to Nordic skiers, snowshoers, hikers, and sightseers.

3.5.3.2 Potential Tube Park

The physical potential of lands at the northwest edge of the Lodge Area creates an opportunity to create a new, lit Tube Park close to the Lodge. Having a tube park close to the Lodge Area services and accommodation would eliminate the need for Lodge guests to drive to the Alpine Area, in turn reducing a barrier to access and participation for guests that are not interested in alpine skiing. This, in turn, creates additional parking capacity in the Alpine Base area for downhill skiers. With the addition of lighting, the Tube Park would also be enjoyed in the evenings, extending short winter days for guests when snowshoeing, Nordic skiing, and Alpine skiing are not an option.

With these opportunities and the enhanced visibility from the highway, should this opportunity be pursued, it is anticipated that there would be a 100% increase over current participation numbers.

To ensure the Tube Park has the appropriate length, drop, and run-out area, the Lodge Area boundary would need to be expanded by approximately 0.57 ha (see Fig. 3-4).

3.5.4 Visitor Information Centre

The Visitor Information Centre (VIC) is jointly operated by MPR and BC Parks. Any future development or relocation would only follow detailed discussions and a consensus decision to move forward. As proposed, the VIC could be relocated to the new multi-use building adjacent to the Pinewoods facility. This would facilitate easier access and engagement with the VIC for both guests and park users. The current center is across and down Hwy 3, isolated and inconvenient for guests and travellers. The new VIC space would be central within the Village Core, have plenty of parking, and become a focal point for guests looking to gather information on Manning Provincial Park.

3.5.5 Access and Parking

Over time, as the various proposed amenities, accommodation units, and recreation facilities are established, the existing parking and access layout will be reconfigured to allow for growth and address the current parking deficit in the Lodge Area. As proposed, new parking areas will be developed in front of Manning Lodge, adjacent to the Cabins west of the Lodge, and to the east of the Pinewoods building. There will also be a more formalized drop-off area and short-term parking space closely associated with the Village Core.

All effort will be made to maintain the existing trees to preserve the character and to define the entranceway, separating it from the parking areas. Additional indigenous plant material will be used to strengthen the landscape qualities of these borders.

The parking lots will be reconfigured and expanded to a total capacity of approximately 520 cars and 4 buses. Assuming 2.5 guests per car and 40 guests per bus, the theoretical maximum capacity of the proposed parking area will be 1,460 guests at one time. This is an increase of approximately 960 guests over the current parking layout. As noted, this expansion would be gradual over a period of years, in balance with and guided by guest visitation and parking demand.

3.6 Phased Development

The proposed Preferred Concept for the Manning Park Lodge Area has been designed to incorporate both the Vision and history of the resort. Through a well-structured Phasing Plan, delineated into two phases, the *10-Year Plan* and *Buildout*, and aligned with the Ski Area Plan (see Sec. 2.3.6), the preferred concept will be achieved in a balanced and well-integrated fashion.

3.6.1 10-Year Plan

The changes and enhancements planned for the first 10 years of development in the Lodge Area focus on providing additional overnight accommodation, improved parking capacity, and easier vehicle and pedestrian circulation.

MPR will build on its existing cabin area experience, adding 6 premium cabins next to the existing cabins to the northwest of Manning Lodge. This will be supported by a new parking area that will double as a recreation area. The cabins add to MPR's family- and group-oriented accommodation offering while meeting increasing demand from guests who are looking to spend a long weekend or their full summer vacation at MPR and the surrounding parklands. The expanded parking area will cater to the existing and proposed cabins and would also serve as additional parking for snowshoe, Nordic skier, and snowplay guests. Outside of peak periods, when the additional parking capacity is not required, the space could be used for organized or unstructured outdoor sports and recreation.

In the Village Core, MPR will develop a hotel immediately adjacent to Manning Lodge. The new hotel will provide an additional 25 hotel rooms to the existing 41 hotel rooms. With the addition of the 6 premium cabins noted above, by the end of the 10-year period, MPR will have room to accommodate 864 overnight guests.

With the development of the additional cabins and hotel, MPR will also undertake a significant upgrade of the existing parking lot and related access road in front of Manning Lodge. Parking along the current access road will be shifted into a dedicated parking lot opposite the Lodge, towards the highway. The new parking lot will be approximately 0.37 ha and provide parking for approximately 130 cars. The access road will follow its current alignment, but with the roadside parking removed, vehicle circulation and access to the Lodge and other areas will be improved.

Finally, additional hard surfaces/walkways will be incorporated to provide linkages between the buildings and revised parking area and improve the inter-connection of the emerging Village Core.

3.6.2 Buildout

Looking beyond the first 10 years, the Lodge Area Plan is focused on the reconfiguration and upgrade of existing recreation facilities, additional accommodation, the development of new tourism-oriented space in the Village Core, and expanded parking capacity in balance with the expected growth in guest visitation.

The Recreation Plaza, consisting of the Loon Lagoon, expanded health and wellness facilities, and a new Nordic Centre, will be a major piece of the long-term redevelopment and upgrade of the Lodge Area. Collectively, these developments will create a new focal point for recreation at Manning Park Resort. At the same time, MPR will explore and evaluate the opportunity to relocate the Tube Park to the Lodge Area, just west of the existing cabins, creating an accessible, family-oriented recreation experience within walking distance of all accommodations.

In the Village Core, the multi-purpose building will complete the redevelopment of this area, creating a more pedestrian-oriented guest experience. In collaboration with BC Parks, this could become the home of the Manning Provincial Park Visitor Information Centre.

The Resort will also look to round out its accommodation offering, adding three more chalets opposite its existing chalets.

Finally, in the east of the Lodge Area, just off the Main Entrance, MPR will expand its parking capacity, adding approximately 124 new stalls.

If the full buildout concept of the Lodge Area is realized, it may offer:

- 200 overnight accommodation rooms,
- A new visitor center,
- Additional meeting space,
- Restaurant and retail outlets,
- A relocated tube park,
- An information/interpretive center,
- Administration offices,
- Activity centers,
- Improved indoor and outdoor recreation facilities,
- Improved common outdoor patios and plazas,
- Integrated pedestrian linkages, and
- Additional parking and drop-off areas within the Village Core.

Figure 3-5a. Lodge Area Phasing Plan – 10-Year Plan

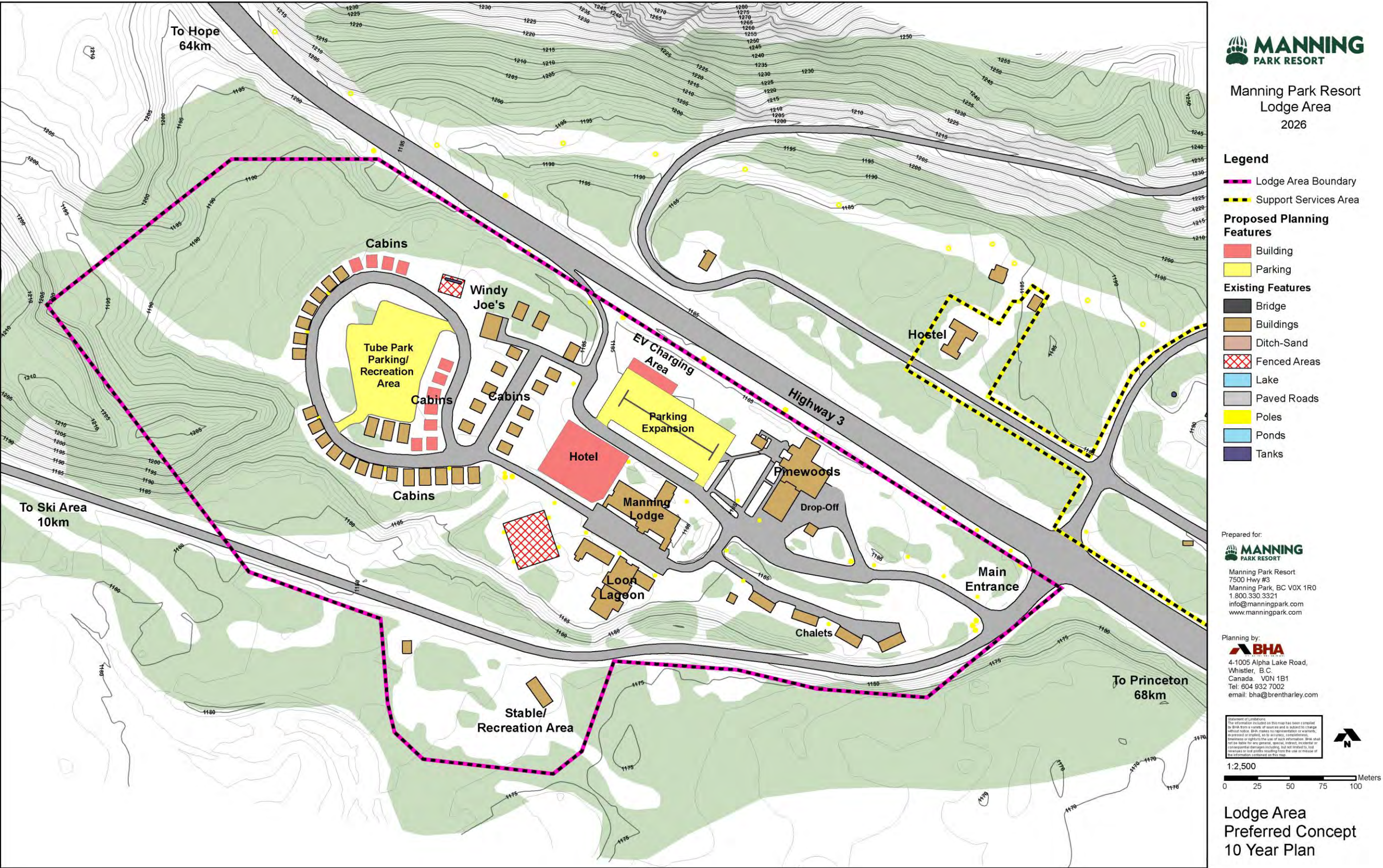
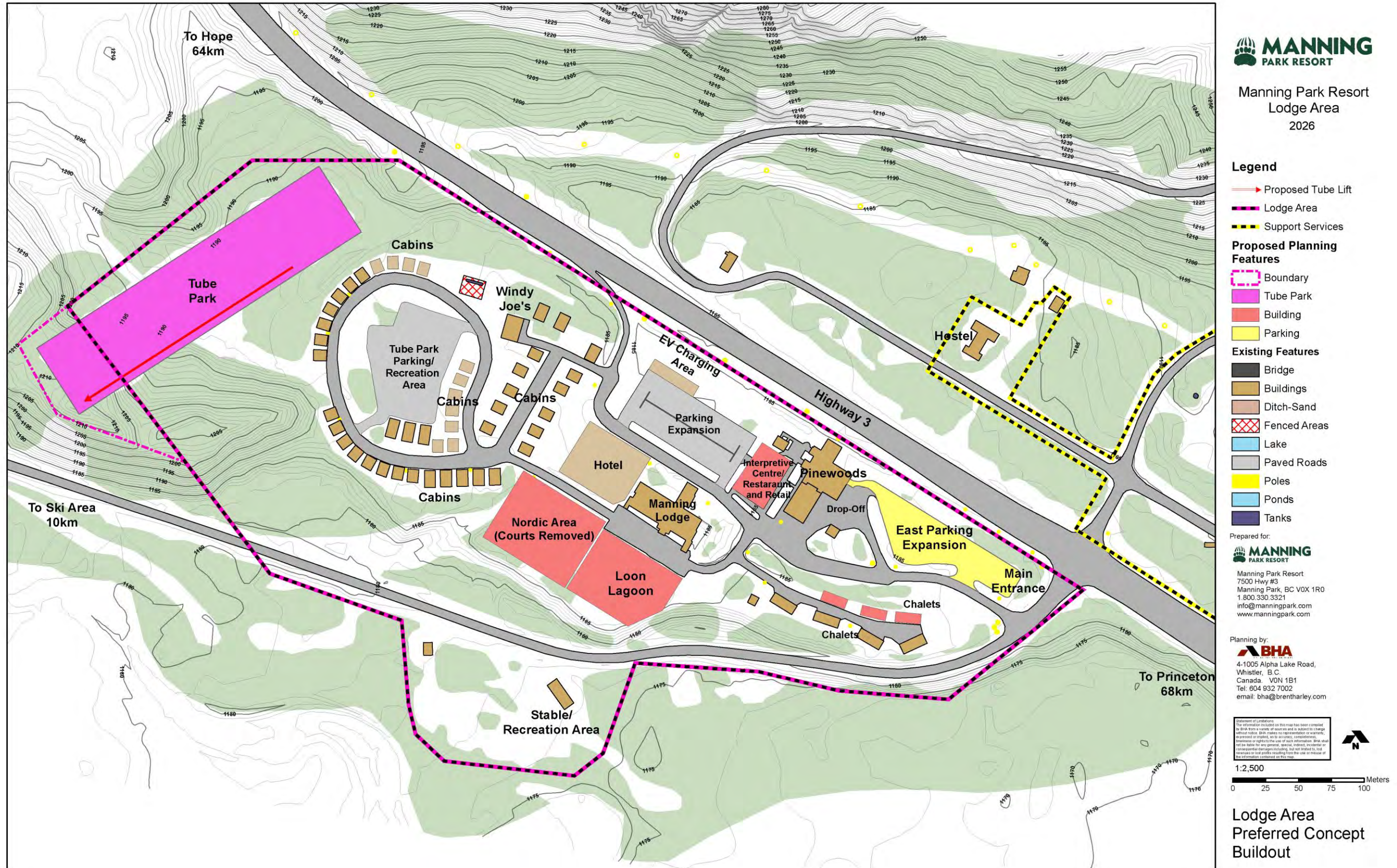
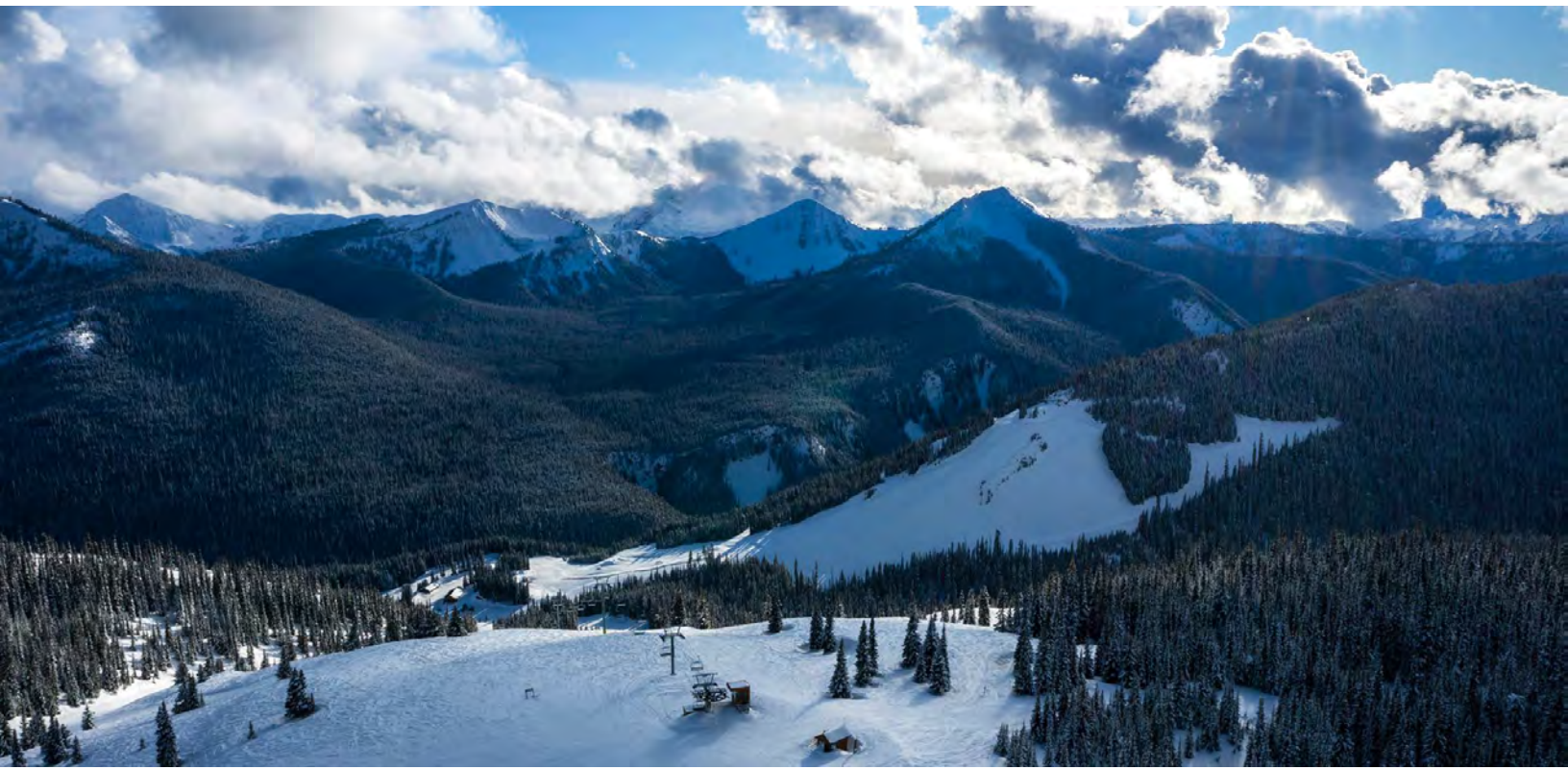


Figure 3-5b. Lodge Area Phasing Plan - Buildout





4 SUPPORT SERVICES AREA PLAN

4.1 Introduction

The Support Services Area (SSA) is comprised of staff housing, maintenance shop and yard, and the BC Parks Visitor Information Center and maintenance yard.

4.2 Staff Housing

Currently, the vast majority (+90%) of Resort staff live onsite. However, rapidly evolving technology and the resulting remote work opportunities, as well as demographic trends, are all expected to influence the utilization of staff housing over the coming decades. This will impact who lives at Manning Park Resort, whether on a full-time, part-time, seasonal, or occasional basis. With these shifts in the Resort's population and demographics, the Resort must continue to provide a range of services and amenities to meet the needs of its staff community.

There are numerous houses and buildings within the footprint of the SSA with a variety of configurations. The area includes modular homes, houses, mobile homes, RV units and an eight-unit hostel. These units can accommodate up to 170 staff at any given time through the summer or winter.

In recent years, MPR has made significant investments in staff housing. This includes:

- In 2019, MPR added 5 modular homes to the staff housing pool, each of which sleeps 3 people.
- In 2020, significant renovations were undertaken at the 8-person hostel, a number of cabins were upgraded and renovated, and several houses were painted.
- In 2021, the Resort built two new 12-person housing units that provided 24 individual suites. Opening in the Spring of 2022, these modern one-bedroom apartments have a kitchen, bedroom, and bathroom each. There were two units that are accessible.
- In 2025, MPR purchased a 16-person modular housing building with kitchen facilities. It is aiming to develop and open in time for the Winter 2026/27 season.

The Resort will continue to invest in the expansion and improvement of staff housing as an integral part of its business model.

As a component of the SSA, a new 1,000 sq. ft. Recreation Hall was opened in the Fall of 2022. This facility acts as a gathering place for staff and provides a center for the Manning Park Resort community to gather.

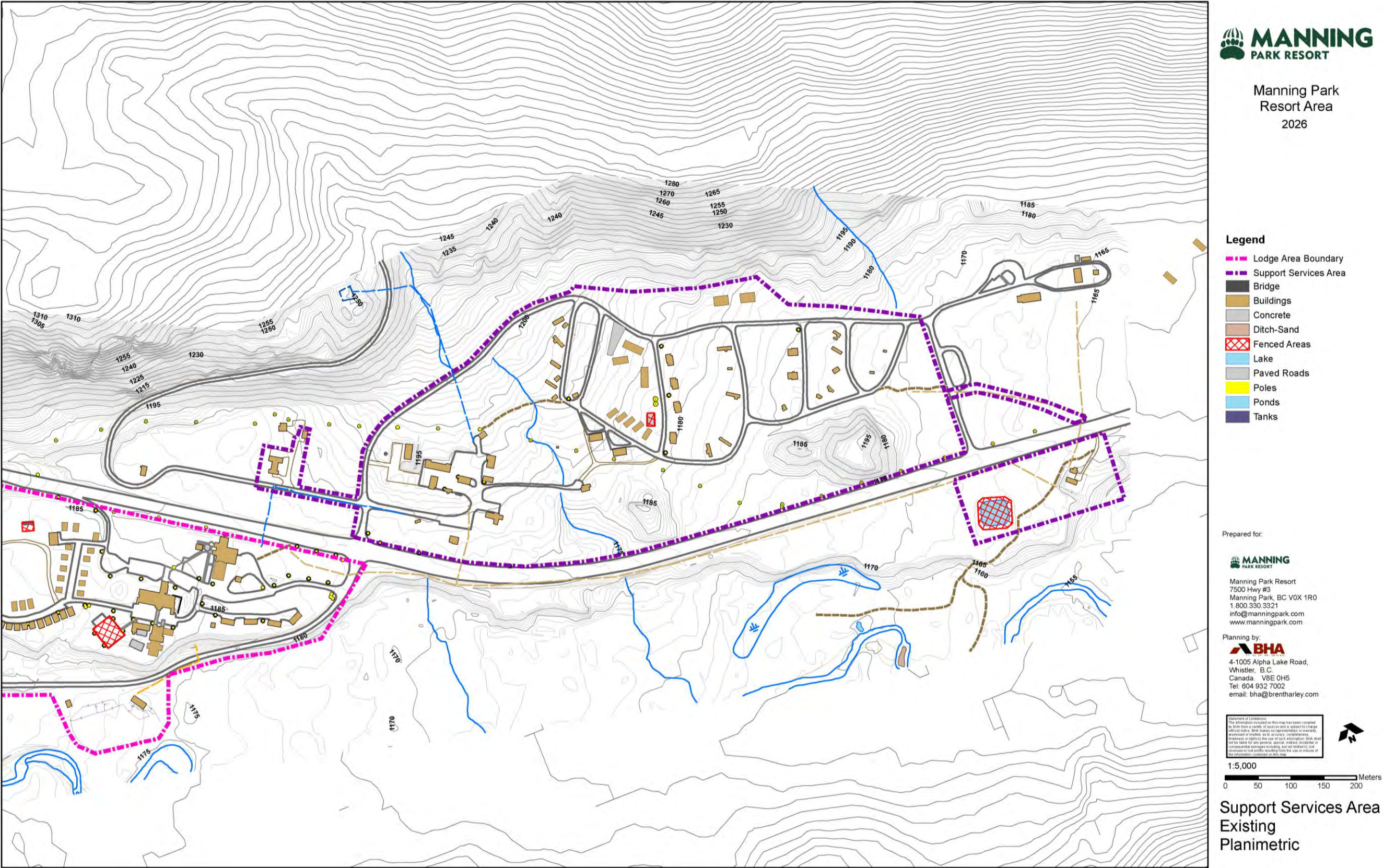
The future will see the Resort continue to develop a combination of individual units while considering the options for multiple-person units as well.

4.2.1 Archaeological Overview Assessment – Staff Housing

The following is an excerpt from the Archaeological Overview Assessment (AOA) and Preliminary Field Reconnaissance (PFR) of the proposed Manning Park Resort Staff Housing.

No archaeological remains or areas with archaeological potential were identified during the PFR of the Staff Housing Site. The AOA of the proposed development evaluated the archaeological potential at this locale as low. The low archaeological potential rating is based primarily on the absence of naturally occurring, archaeologically significant landforms (i.e., level benches, terraces and/or promontories), lack of potable water sources, and the high level of impact and alteration of the natural landscape that resulted from the original development of the site including land clearing and logging. Sediments observed at the Staff Housing Site consist of a small angular pebble matrix. Logged stumps were charred from slash burns in the eastern section. The majority of the natural terrain within the Staff Housing site has been levelled and landscaped by cutting and filling the naturally hummocky terrain.

Figure 4-1. Support Services Area Existing Conditions



This page has been intentionally left blank

4.3 Manning Park Resort Maintenance Yard

Located across the highway from the Resort and next to Staff housing are the Maintenance Yard and Shop facilities. Made up of a variety of buildings with very specific purposes, this area is used to store materials and manage all projects happening at the Resort and the Ski Area.

The facilities include:

- A generator building with a refurbished 500kW unit, installed in 2024.
- Carpenter shop, three vehicle bays for repair and maintenance of the fleet.
- Three high bay units for parking heavy equipment out of the elements.
- A painting bay, staff laundry facilities and multiple outbuildings with varied use.
- Storage

In addition, the Support Services Area also includes the Last Resort (a group accommodation facility) and the BC Parks information center and Parks maintenance yard.

4.4 Staff Housing & Wildlife Attractants Management Plan

This management plan outlines the process used to ensure that garbage and recycling are collected in an efficient and thorough manner, keeping a clean site and eliminating all bear and wildlife attractants on a regular/consistent basis.

4.4.1 Staff Housing Management

The Resort has a full-time Staff Housing Manager who is assigned and dedicated to the management of staff housing, including garbage and recycling collection. With numerous buildings and 170 people (at peak) living in staff housing, it is critical to have a good waste collection process in place.

- Education – all staff are required to attend a seasonal training session¹³ taught by Wildsafe BC, normally held in the Spring and Fall. Posters are put up in all the households with information about Bear Awareness.
- Collection - Garbage and recycling are kept in each of the individual accommodations and houses. They are not to be put outside. The garbage is collected weekly (or as needed) by our Staff Housing Manager.
- Compactor - The garbage is delivered to an on-site compactor, put inside the lockable door of the unit, and compacted. This unit is fully enclosed and lockable. The waste contractor collects the compactor bin when needed and returns it later that same day.
- Recycling – Recycling is stored in sea can storage units that are always kept closed and sealed. The recycling is delivered on a regular basis to both Hope and Princeton,

¹³ For reference: <https://bcparks.ca/visiting/responsible-recreation/>

depending on the week, as part of other operational needs (e.g., water sample drop-offs, mail runs).

- Other Garbage – There is a backup bin for any extra garbage in the Maintenance yard that has a secure lid that is kept sealed. Metal, non-recyclable and other non-food items (landfill items) that we are unable to dispose of in the compactor are placed in a bin which is removed and replaced when needed. Wood and non-toxic burnable items are burned, when possible, as per BC Parks regulations, BC Air Quality Ventilation Index, and the provincial fire ban guidelines.

The Staff Housing Manager is responsible for ensuring that attractants are not present in any location in the staff housing area. Additional information on bears is included in our Employee Handbook and is part of our onboarding procedures with new employees.

4.5 Future Plans

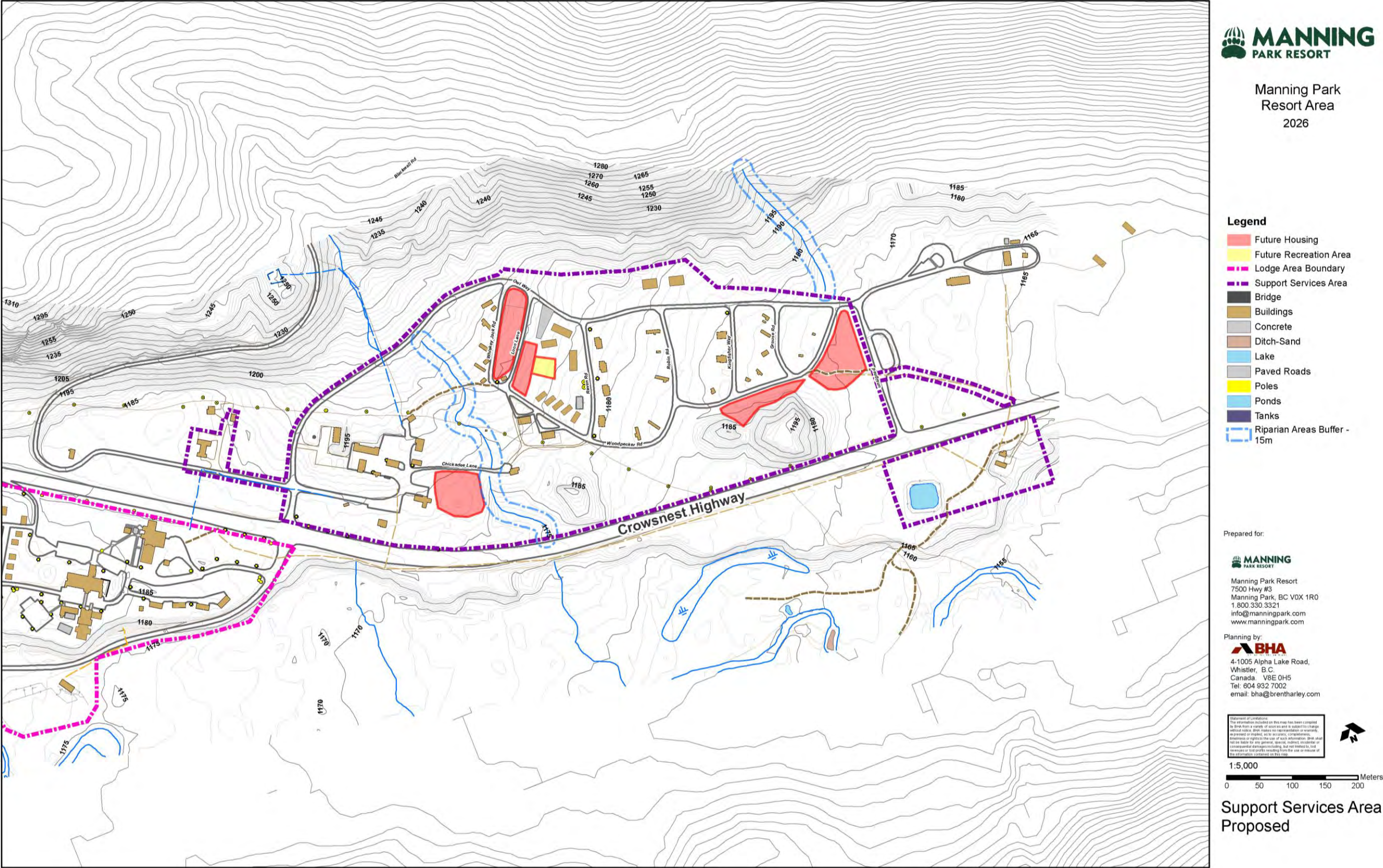
The SSA will see the following in the future:

- Continued expansion and upgrades to staff housing. The Resort will review its staff housing needs on an ongoing basis and prepare detailed applications for BC Parks as needed, supported by site-specific assessments of each project, as required.
- Creation of amenities that enhance the staff living area, such as laundry facilities, outdoor activity areas, and a community fire pit.
- Potential relocation of the Visitor Information Center to a more accessible location.

The goal for staff housing in the SSA is to create a place of comfort for staff to live and enjoy the outdoor experience. Additional amenities such as enhanced laundry facilities, outdoor activity areas, and gathering spots will be developed as needed.

Proposed future housing and staff recreation areas in the SSA are illustrated on Figure 4-2. One of the proposed future housing areas lies outside the existing Support Services Area boundary. However, no development proposed outside of the existing boundary will take place unless the requisite approvals are secured from BC Parks.

Figure 4-2. Support Services Area – Preferred Concept



This page has been intentionally left blank

5 APPENDIX

5.1 Environmental Overview Assessment – Sartori Environmental

ENVIRONMENTAL OVERVIEW ASSESSMENT

Manning Park Resort



Prepared for:

Manning Park Resort Inc.

500 HWY #3

Manning Park, BC

VOX 1R0

Prepared by:

Roe Environmental Inc.

106 – 185 Forester Street

North Vancouver, BC

V7H 0A6

(604) 987-5588

CONTENTS

1	INTRODUCTION	1
2	METHODOLOGY	2
3	EXISTING ENVIRONMENTAL CONDITIONS	3
3.1	BIOPHYSICAL SETTING.....	3
3.2	FISH AND FISH HABITAT	4
3.3	SPECIES AT RISK.....	5
3.4	OTHER PROTECTED ECOSYSTEMS AND HABITAT FEATURES	18
4	RECOMMENDED VALUABLE ECOSYSTEM COMPONENTS	18
4.1	SPECIES AT RISK.....	18
4.1.1	<i>Identified Species with Moderate to High Potential Presence Rating</i>	<i>18</i>
4.1.2	<i>Mountain Beaver</i>	<i>18</i>
4.1.3	<i>Endangered Carnivorous Species</i>	<i>18</i>
4.1.4	<i>Rare Plants and Plant Communities</i>	<i>19</i>
4.2	BIRDS AND BIRD HABITAT.....	19
4.3	UNGULATE OVERWINTERING AREAS	20
4.4	BATS	20
4.5	FISH AND FISH HABITAT	20
4.6	LAKES AND WETLANDS.....	20
4.7	AQUATIC INVERTEBRATES.....	21
4.8	AMPHIBIANS.....	21
4.9	BUTTERFLIES.....	21
4.10	ALPINE/SUB-ALPINE MEADOWS	22
5	CONCLUSIONS	22
6	ENDORSEMENT	23
7	REFERENCES	24

LIST OF FIGURES

Figure 1: Location map of the three Manning Park Areas covered in the Environmental overview Assessment (Map source: BC CDC iMap online tool).....	1
Figure 2: Map of watercourses and waterbodies within the study area. Known wetlands are indicated as green polygons. (Map Source: iMap BC, accessed July 2022).	5
Figure 3: Map showing gazetted species and ecosystems at risk within 5km around the Alpine area (Map Source: iMap BC, accessed July 2022).....	6
Figure 4: Map showing gazetted species and ecosystems at risk within 5km around the Lodge and Resort Service study areas (Map Source: iMap BC, accessed July 2022).....	7

LIST OF TABLES

Table 1: Province of BC, COSEWIC, and SARA-listed wildlife and plant species of management concern potentially present in the vicinity of the MPR areas.	9
---	---

1 INTRODUCTION

Roe Environmental Inc. (Roe) was retained by Manning Park Resort Inc. to conduct a preliminary Environmental Overview Assessment (EOA) of the Manning Park Resort (MPR) in E.C. Manning Provincial Park (Manning Park), an 83,671 ha Class A Park, for general planning purposes. The MPR is comprised of three separate areas, comprising a Study Area for EOA. The Study Area includes the Alpine, Lodge, and Resort Service areas (see Figure 1). The Lodge and the Resort Service areas, which serve as the primary staging point for recreation in Manning Park, are situated on Highway #3 (Crowsnest Highway), approximately 67 km east of the town of Hope and 66 km west of the town of Princeton. The Alpine area is located an additional 10.5 km west of the Lodge and Resort Service Areas along Gibson Pass Road, and includes a ski area operated by Manning Park Resort Inc. within Manning Park.

The EOA is intended to provide a high-level description of aquatic and terrestrial wildlife, vegetation, habitat features, and species at risk present or potentially present within and near the MPR and adjacent areas. Further, this EOA is intended to inform future Environmental Impact Assessment by making recommendations for Valuable Ecosystem Components (VECs) for consideration under future MPR environmental management planning and/or development planning under the BC Parks Impact Assessment (BCPIA) process, as required.

The scope of this EOA does not include socio-economic, cultural, or recreational use assessment. Additional Valuable Components (VC's) identifiable through assessment under these categories are undoubtedly present in the Study Area, but are not identified or discussed herein.

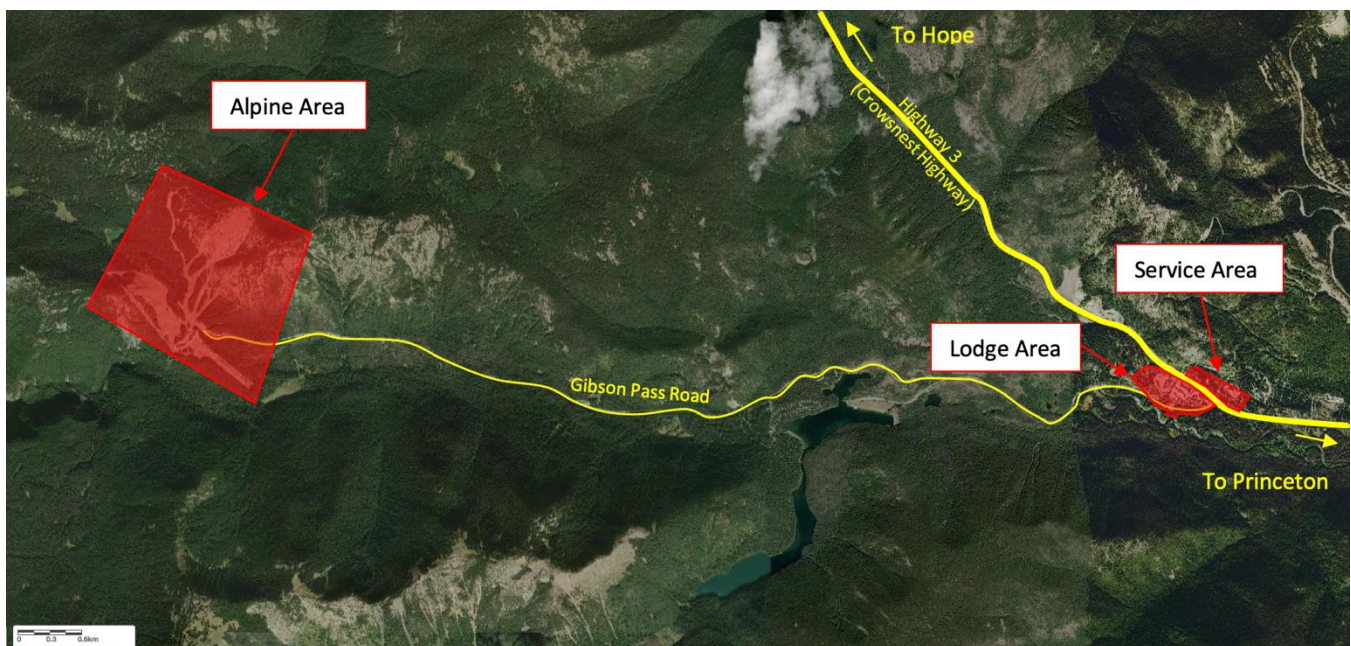


Figure 1: Location map of the three Manning Park Areas covered in the Environmental overview Assessment (Map source: BC CDC iMap online tool)



2 METHODOLOGY

This EOA is based on a reconnaissance level site visit conducted on 26 July 2022, supplemented with a desktop review of available information from a variety of sources. A review of gazetted (known) occurrences of species and ecosystems of management concern potentially present in the vicinity of the MPR areas was conducted within a 5 km radius using the BC Conservation Data Centre (BC CDC) iMap¹ online GIS tool for (See Figure 3 and Figure 4). It was supplemented with an area-based search using the BC Ministry of Environment's *BC Species and Ecosystems Explorer*² (BC SEE) database for potentially present species and plant communities (see Table 1). Citizen science information available from the annual Hope Mountain Centre for Outdoor Learning (HMC) Skagit Valley Bird Blitzes³ (occurring annually in June, with data available from 2000 to 2019), and on the eBird⁴, and iNaturalist⁵ databases were also consulted as additional sources of information.

Once the desktop review was complete, a reconnaissance level site visit was conducted by two biologists, with a special focus on the species of management concern identified during the desktop review and their essential habitat requirements. A detailed survey of wildlife and wildlife habitat, plant, and plant communities was beyond the scope of this preliminary EOA, however, the field reconnaissance allowed to refine the potential presence ratings for species at risk, and gain an understanding of the various existing habitat types in the MPR areas (See Section 3.3). Due to time constraints and limited scope, only part of the alpine area (i.e., Blue Chair area along wagon trail) could be investigated during field investigations. Similarly, reconnaissance of the Lodge and Service areas focussed on ground-truthing of gazetted watercourses, and general characterization of terrestrial habitat types present.

Ecological information and species range summarized in Table 1 were obtained from e-Flora BC⁶, e-Fauna BC⁷, BC Breeding Bird Atlas⁸, and a variety of other relevant field guides and publications provided in the REFERENCES section. Information regarding the biophysical conditions of the MPR areas, biogeoclimatic classification, and typical plant species were obtained from the iMap tool and the BC Ministry of Forests, Lands and Natural Resource Operations and Rural Development's Ecosystem Classification information for the relevant biogeoclimatic subzones.

¹ <https://maps.gov.bc.ca/ess/hm/imap4m/>

² <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/conservation-data-centre/explore-cdc-data/species-and-ecosystems-explorer>

³ <http://hopemountain.org/programs/skagit-valley-bird-blitz-may-7-16-2021/>

⁴ <https://ebird.org/canada/home>

⁵ <https://inaturalist.ca/>

⁶ <https://ibis.geog.ubc.ca/biodiversity/eflora/>

⁷ <https://ibis.geog.ubc.ca/biodiversity/efauna/>

⁸ <https://www.birdatlas.bc.ca/>



3 EXISTING ENVIRONMENTAL CONDITIONS

3.1 Biophysical Setting

Situated approximately between 1200m and 1790 m above sea level (masl), MPR spans three different biogeoclimatic subzones. MPR areas along Highway 3 and Gibson Pass Road up to approximately 1300 masl lie within the *dry – hot Engelmann Spruce - Subalpine Fir*, Cascade variant (ESSFdh1) subzone. This subzone is rather restricted geographically and occurs on leeward slopes of the Cascade Mountains between Manning Park and west of Merritt (Ryan et al., 2021). Much of the low elevation areas of Manning Provincial Park between 1100 and 1400 masl are within this subzone (Fraser et al., 1989). Along Highway 3, ESSFdh1 starts at Allison Pass and extends along the valley bottom to Hampton Creek, east of the Lodge. Climate is characterized by cool and wet winters, mild and wet springs, warm and dry summers, and warm and moist falls (Ryan et al., 2021). Soil moisture deficits are uncommon except during July and August on drier sites. Most of the precipitation occurs as snow during the winter months between November and March. The ESSFdh1 subzone contains the most diverse coniferous forests in the Thompson–Okanagan Region. Subalpine fir (*Abies lasiocarpa*), Engelmann spruce (*Picea engelmannii*) and lodgepole pine are the dominant species, with more moderate amounts of Douglas-fir (*Pseudotsuga menziesii*), western redcedar (*Thuja plicata*), and amabilis fir (*A. amabilis*). Falsebox (*Paxistima myrsitines*) and black huckleberry (*Vaccinium membranaceum*) are generally abundant in the understorey at drier sites, which also include saskatoon (*Amelanchier alnifolia*), birch-leaved spirea (*Spiraea betulifolia*), white-flowered rhododendron (*Rhododendron albiflorum*) and Utah honeysuckle (*Lonicera utahensis*). Moist sites have diverse shrub and herb layers that commonly include black gooseberry (*Ribes lacustre*), thimbleberry (*Vaccinium parvifolium*), Sitka alder (*Alnus sitchensis*), false azalea (*Menziesia ferruginea*), oak fern (*Gymnocarpium dryopteris*), five-leaved bramble (*Rubus pedatus*), and Sitka valerian (*Valeriana sitchensis*). The herbaceous layer typically includes queen's cup (*Clintonia uniflora*), bunchberry (*Cornus canadensis*), rattlesnake plantain (*Goodyera oblongifolia*), twinflower (*Linnaea borealis*), and several species of clubmoss.

Above the valley bottom, between approximately 1300 and 1850 masl, lies the *moist - warm Engelmann Spruce - Subalpine Fir*, Cascade variant (ESSFmw1). This subzone occurs along the western edge of the Thompson Plateau and the leeward slopes of the Cascade Mountains from Lytton south to the US border. Being at higher elevation than ESSFdh1, both winters and springs are cool and wet, summers are cool and dry, and falls are warm and wet. Vegetation is rather similar to that of ESSdh1 but with more white-flowered rhododendron and Sitka valerian in the understorey of zonal sites⁹, the presence of some whitebark pine (*Pinus albicaulis*), and the absence of oak fern at wetter sites.

The moist warm woodland *Engelmann Spruce - Subalpine Fir* subzone (ESSFmww) is present at the higher elevations, above approximately 1750masl. This subzone is typically less productive due to elevation and growing season constraints, with more open areas. Engelmann spruce is not as dominant at these altitudes while whitebark pine becomes more abundant. Parkland¹⁰ species such as pink mountain-heather (*Phyllodoce empetrifomis*) and partridge foot (*Luetkea pectinata*) are abundant in this biogeoclimatic subzone.

⁹ Zonal sites support the plant community that best reflects the regional climate of that subzone/variant, with average soil moisture levels.

¹⁰ Parkland is a transitional subzone identified within the ESSF biogeoclimatic zone, which lies between lower altitude (subalpine) woodland and true alpine areas. ESSF Parkland subzones contain some less productive forest stands that are discontinuous with more open areas of alpine vegetation.



Detailed vegetation inventory and assessment was not conducted under the scope of this EOA, however field observations of undisturbed areas in and around the study area indicate that vegetative cover is in keeping with the biogeoclimatic subzone variant descriptions above.

3.2 Fish and Fish Habitat

The Study Area overlaps two distinct watersheds: the Skagit River and the Similkameen River, with Gibson Pass representing the divide between the two watersheds. The BC Habitat Wizard online GIS database identifies the following watercourses near the various MPR areas, presented by watershed:

Similkameen River Watershed:

- The **Similkameen River** (Watershed Code: 310-367800), which represents the main watershed east of Allison Pass along Highway 3 and flows immediately south of the Lodge area. Rainbow trout (*Oncorhynchus mykiss*) and longnose dace (*Rhinichthys cataractae*) are known to inhabit the upper Similkameen River near the Lodge and Service areas. It is noted that the fish inventory data is from 1984 and may no longer be representative of current fish populations.
- **Pinewoods Creek** (Watershed Code: 310-367800-90700), flowing immediately east of the Resort Services area (see Figure 2). Fish presence is not gazetted on the provincial database, but is possible in the lower reaches south of Highway 3 due to the connection with the Similkameen River and suitable habitat. The confluence area was not assessed during the preliminary reconnaissance on 26 July 2022, but the creek was observed to be approximately 2m wide near Highway 3, with a gentle slope, riffle-pool habitat, and gravel/cobble substrate, suitable for fish presence. It is noted that the width of the Highway 3 road prism, and associated culvert crossing, in the area may be an obstacle to fish upstream migration.
- **Little Muddy Creek** (Watershed Code: 310-367800-91000), which drains the area east of Gibson Pass and flows through Lightning Lake before feeding into the Similkameen River immediately south of the Lodge Area. Rainbow trout populations are known to inhabit the lower reaches downstream of Lightning Lake.
- Habitat Wizard also gazettes a short, **unnamed left bank tributary to the Similkameen River**, immediately west of the Lodge area. Presence of this tributary could not be confirmed during field investigations.
- Several lakes and wetlands are also present within the Study Area general MPR operations area, especially within the Little Muddy creek watershed, including Lightning Lake. These wetlands are known or potential breeding habitats for a variety of invertebrates and amphibians.

Skagit River Watershed:

- **Nepopekum Creek** (Watershed Code: 970-110000-80900) flowing west of Gibson Pass, immediately south of the T-Bar in the Alpine area, attributing to the Skagit River. Fish presence is not likely due to three significant waterfalls downstream of the Alpine area and no known fish occurrence in Shadow Lake, however, rainbow trout, dolly varden (*Salvelinus malma*), and bull trout (*S. confluentus*) presence is known in the lower reaches.
- An **unnamed tributary to Nepopekum Creek** (Watershed Code: 970-110000-80900-86700) with multiple branches draining the northern extent of the Alpine area. The main branch flows in a densely vegetated ravine between the Wagon and Horseshoe trails. Several small lakes and



wetlands are present along the westernmost branch. Fish presence in this creek is unknown but is deemed unlikely whereas Coastal tailed-frog presence is possible given the suitable habitat present.

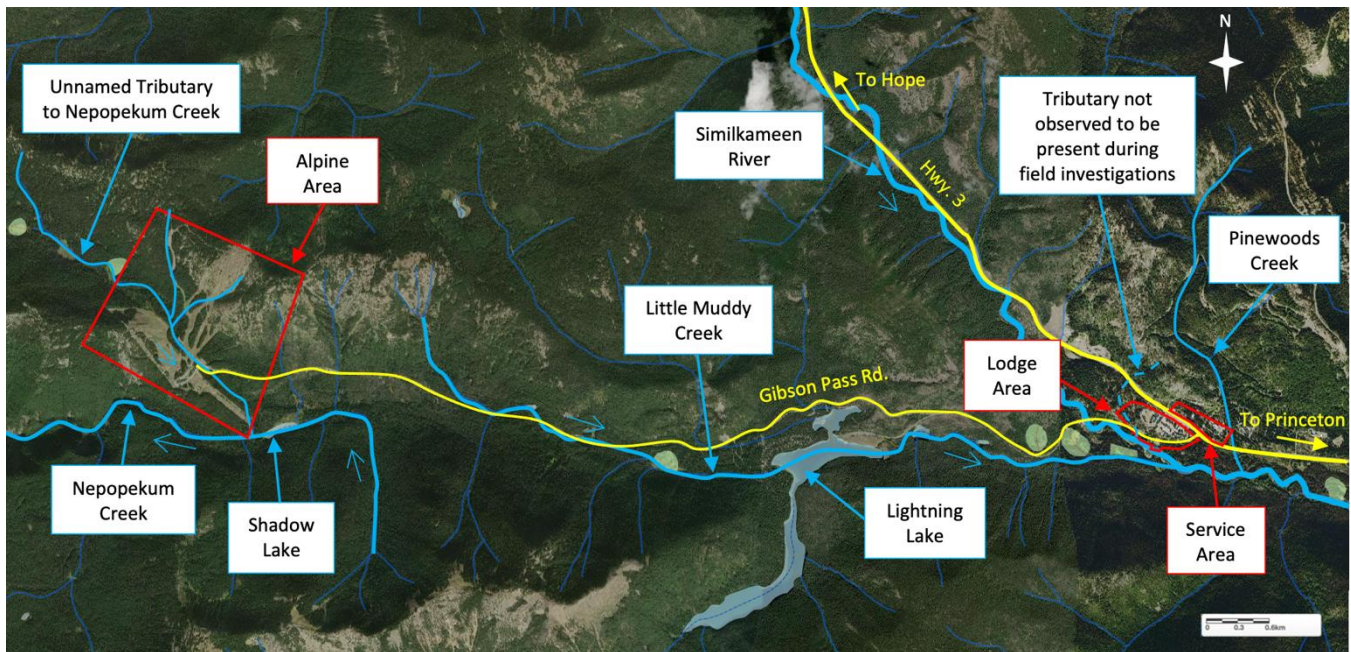


Figure 2: Map of watercourses and waterbodies within the study area. Known wetlands are indicated as green polygons. (Map Source: iMap BC, accessed July 2022).

3.3 Species at Risk

For the purposes of this EOA, species at risk, and associated management concern, are considered those listed as Endangered (E), Threatened (T), and Special Concern (SC) under Schedule 1 of the Canada *Species at Risk Act* (SARA), and red- and blue-listed species as maintained by the BC Conservation Data Center (BCCDC). Figure 3 and Figure 4 below summarize the gazetted (known) occurrences of species and ecosystems of management concern potentially present within a 5 km radius of the MPR areas. It is noted that information is displayed regardless of the last observation date.



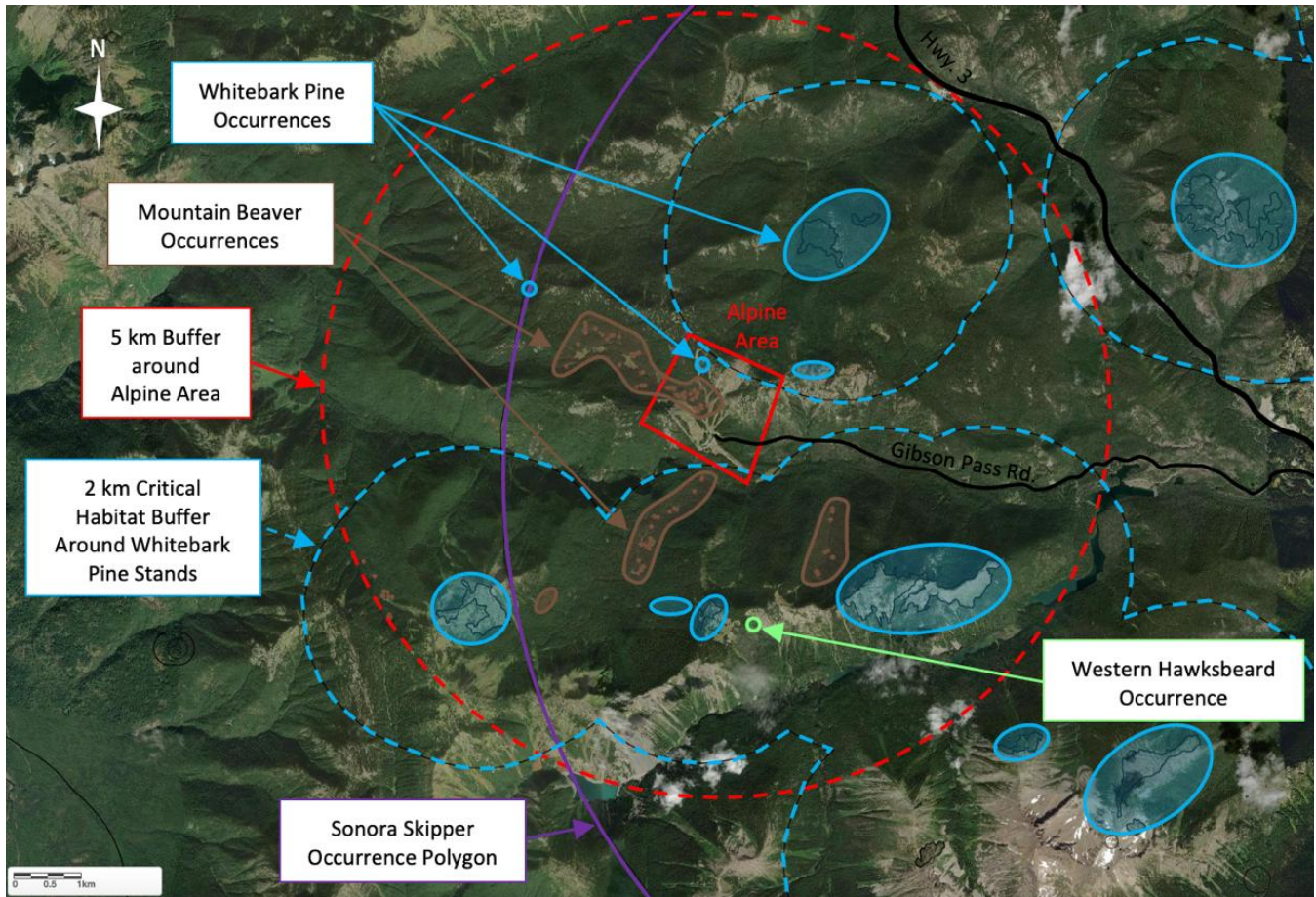


Figure 3: Map showing gazetted species and ecosystems at risk within 5km around the Alpine area (Map Source: iMap BC, accessed July 2022)



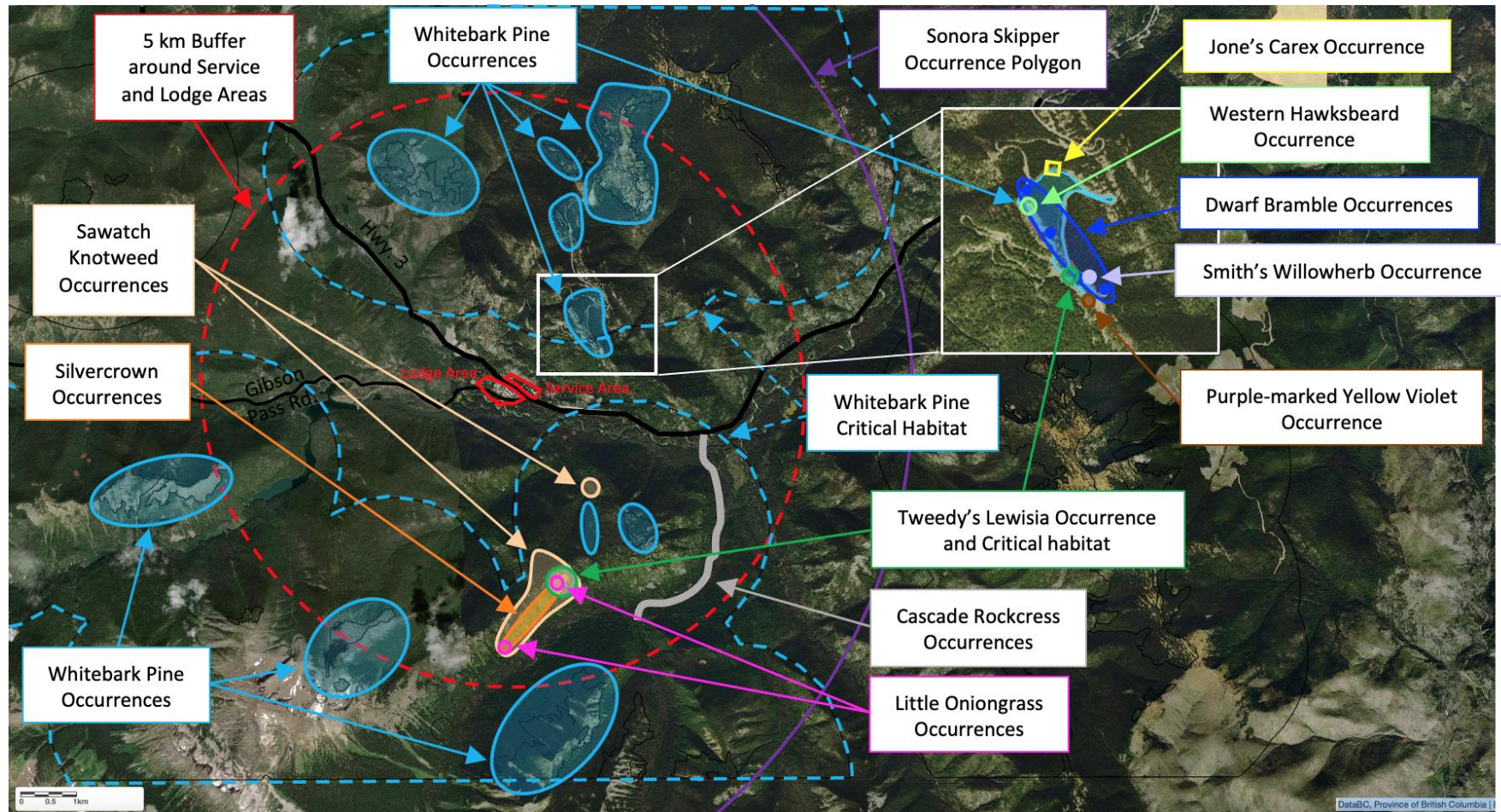


Figure 4: Map showing gazetted species and ecosystems at risk within 5km around the Lodge and Resort Service study areas (Map Source: iMap BC, accessed July 2022)



A “Potential Presence Rating” of each species, either confirmed or possibly present within the general MPR area, was further evaluated based on known habitat types on site, species breeding and overwintering ranges, using the following rating system:

- **Low:** species unlikely to be present within the MPR areas or their immediate vicinity.
- **Moderate:** species possibly present within the MPR areas or their immediate vicinity, at least periodically (e.g., during foraging/feeding activities), but not expected during a critical time of their life cycle (e.g., breeding).
- **High:** species either confirmed present or expected to use existing habitat in the immediate vicinity of the MPR areas for breeding, foraging, and/or overwintering.

Table 1 below presents a list of rare or locally significant wildlife potentially present within a 5 km radius of the MPR areas. It is noted that species or plant communities identified in the BC SEE database query with a negligible potential presence rating within the MPR areas due to unsuitable habitat conditions (e.g., shrubland, low elevation, or coastal species) were omitted from the list at the discretion of the authoring Qualified Environmental Professional (QEP).



Table 1: Province of BC, COSEWIC, and SARA-listed wildlife and plant species of management concern potentially present in the vicinity of the MPR areas.

Common Name	Scientific Name	Provincial Classification*	COSEWIC Classification**	SARA Classification**	Potential Presence Rating***	Comments
Birds						
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	Blue	SC (2021)	1-SC (2011)	Moderate	Irregularly observed during HMC Bird Blitzes. Uncommon, few specimens observed some years since 2000. Nests in a variety of habitats including closed-canopy conifer stands, forest edges and openings, urban parks, golf courses, and orchards (ECCC, 2019)
Barn Swallow	<i>Hirundo rustica</i>	Yellow	SC (2021)	1-T (2017)	High	Several specimens observed every year during HMC Bird Blitzes, especially near Lightning Lake and Strawberry Flats. Observed during field reconnaissance in the Alpine area with confirmation of nesting on chair lift structures and resort buildings. Typically nests on man-made structures.
Black Swift	<i>Cypseloides niger</i>	Blue	E (2015)	1-E (2015)	Moderate	Regularly observed in low abundance (1-12 specimens) during HMC Bird Blitzes in various areas of Manning Park. Nests behind waterfalls, on ledges of steep rock faces, on cliffs, and in caves and canyons (COSEWIC, 2015). Potential nesting sites on the cliffs north of Highway 3 near the Service area.
Common Nighthawk	<i>Chordeiles minor</i>	Yellow	SC (2018)	1-T (2010)	Moderate	Few specimens irregularly observed during HMC Bird Blitzes. Nests on the ground in open, sparsely vegetated areas, typically between 400 and 1000 masl throughout BC, with the highest densities recorded in the Southern and Central Interior valley systems (Boyd, 2015).



Common Name	Scientific Name	Provincial Classification*	COSEWIC Classification**	SARA Classification***	Potential Presence Rating***	Comments
Eared Grebe	<i>Podiceps nigricollis</i>	Blue	-	-	Low	Single specimen overserved on Twenty-minute Lake in 2002 during MHC Bird Blitz. Nesting in Manning Park unlikely.
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Yellow	SC (2016)	-	High	Regularly observed in various areas of the Park during HMC Bird Blitizes. Nesting occurs in coniferous and mixed wood forests on the mid-elevation plateaus of the province between 1,000 and 1,250 masl (Martel, 2015).
Great Blue Heron	<i>Ardea Herodias</i>	Blue	-	-	Moderate	Single specimen observed irregularly during the HMC Bird Blitizes. Possible coastal (<i>fannini</i> subspecies) and/or Interior (<i>herodias</i> subspecies) visitors. No known nesting sites within Manning Park.
American Goshawk	<i>Accipiter atricapillus laingi</i>	Red	T (2013)	1-T (2003)	Moderate	Only 3 observations during the HMC Bird Blitz, with the latest record in 2012 along Lower Lightning Lake Road. One Gazetted nesting site approx. 8km southwest of the Alpine area in 2000 but subsequent nesting was not confirmed. Nesting habitat includes extensive mature forested stands with open understories, mostly under 900 m of elevation and up to approximately 1,400m of elevation (Fenger et al., 2006).
Northern Spotted Owl	<i>Strix occidentalis</i>	Red	E (2008)	1-E (2003)	Low	No remaining known extant populations exist in the Cascades Natural Resource District (Hobbs, 2019). Only a few specimens remaining in the wild but captive breeding efforts are underway with expected release within suitable old-growth forest habitats, including in the Skagit Range where Long-Term Owl Habitats are identified on iMap BC.



Common Name	Scientific Name	Provincial Classification*	COSEWIC Classification**	SARA Classification***	Potential Presence Rating***	Comments
Olive-sided flycatcher	<i>Contopus cooperi</i>	Yellow	SC (2018)	1-T (2010)	High	Regularly observed during the HMC Bird Blitzes including near Lightning Lake and Strawberry Flats. Observed during site reconnaissance Nests in cool, mesic, or moist conifer forests with tall trees, mainly along forested edges, often near water or wetlands (COSEWIC, 2018).
Peregrine Falcon <i>anatum</i> subspecies	<i>Falco peregrinus anatum</i>	Red	NAR (2017)	1-SC (2012)	Low	Few isolated observations during the HMC Bird Blitzes. Nests on cliff ledges, usually beside water, either along the coast, or beside larger rivers, lakes, and wetland. Potential nesting sites on the cliffs north of Highway 3 near the Service area.
Rough-legged Hawk	<i>Buteo lagopus</i>	Blue	-	-	Low	One specimen observed during the HMC Bird Blitz in 2003. Breeding occurs only in the Arctic. Nesting within MPR unlikely.
Western Grebe	<i>Aechmophorus occidentalis</i>	Red	SC (2014)	1-SC (2017)	Low	Single specimen observed on Lightning Lake in 2006. Nesting within MPR unlikely.
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	Blue	E (2017)	1-E (2006)	Low	Historically observed during the HMC Bird Blitzes but not observed since 2001. Western larch (<i>Larix occidentalis</i>) is generally the preferred nesting tree, but the species is known to use to use Douglas fir and mature trembling aspens in the southern interior (BC MOE, 2012).



Common Name	Scientific Name	Provincial Classification*	COSEWIC Classification**	SARA Classification***	Potential Presence Rating***	Comments
Mammals						
Grizzly Bear	<i>Ursus arctos</i>	Blue	SC (2016)	1-SC (2003)	Low	Grizzly bear - North Cascade Population is estimated at 6 individuals (FLNRORD, 2020). Although recovery plans and strategies have been prepared by various agencies on both sides of the Canadian – American border, they were never implemented.
Hoary Bat	<i>Lasiurus cinereus</i>	Blue	-	-	Moderate	Migratory species typically present in BC between March and October (Lausen et al., 2022). Roosts in the foliage of deciduous or coniferous trees. The species does not typically form maternity colonies unlike other species. Can be found from sea level up to up to 1775 masl. Known from the Ross Lake area approximately 14 km to the southwest of the alpine area (ibid.).
Little Brown Myotis	<i>Myotis lucifugus</i>	Yellow	E (2013)	1-E (2014)	High	A common and widespread species in BC. Roosts in a variety of natural and man-made features, including buildings, bat boxes, tree cavities, loose bark, and crevices in cliffs and talus slopes (Environment Canada, 2015)
Mountain Beaver	<i>Aplodontia rufa</i>	Yellow	SC (2012)	1-SC (2003)	High	Several Gazetted occurrences on iMap BC within the Alpine area along the unnamed tributary to Nepopekum Creek, and on the right bank of the Similkameen River southeast of the Lodge area. Presence of recent burrows confirmed in the Alpine area during the site reconnaissance. No specimens actually observed.



Common Name	Scientific Name	Provincial Classification*	COSEWIC Classification**	SARA Classification***	Potential Presence Rating***	Comments
Mountain Goat	<i>Oreamus americanus</i>	Blue	-	-	Low	Found in low densities in the Park according to BC SEE range map. South-facing slopes north of Highway 3 could potentially be favourable for the species in the winter. Closest Ungulate Winter Range for the species is located within the upper Sliverhope Creek watershed, approximately 20km to the northwest according to iMap BC.
Northern Bog Lemming, artemisiae subspecies	<i>Synaptomys borealis artemisiae</i>	Blue			Low	Few historical records within Manning Park but no recent data.
Spotted Bat	<i>Euderma maculatum</i>	Blue	SC (2015)	1-SC (2005)	Low	Presence recorded from the Skagit River Watershed near Ross Lake (Lausen et al., 2022). Roosts in crevices in cliffs, generally below 900 masl.
Townsend's Big-eared Bat	<i>Corynorhinus townsendii</i>	Blue	-	-	Moderate	Maternity roosts are typically found in areas that offer cooler micro-climates such as abandoned buildings, mines, and caves (Lausen et al., 2022).
Wolverine, luscus subspecies	<i>Gulo gulo luscus</i>	Blue	SC (2014)	1-SC (2018)	Moderate	Known to be present within in the Park boundaries. Solitary and wide ranging. Occurs at relatively low population densities.
Fish						
Bull Trout	<i>Salvelinus confluentus</i>	Blue	-	-	Low	Only known from lower reaches of Nepopekum Creek and associated Skagit River watershed. Presence not gazetted in the Similkameen River.



Common Name	Scientific Name	Provincial Classification*	COSEWIC Classification**	SARA Classification***	Potential Presence Rating***	Comments
Amphibians						
Coastal Tailed Frog	<i>Ascaphus truei</i>	Yellow	SC (2011)	1-SC (2003)	High	Gazetted presence in the Similkameen River. Potentially present in Little Muddy Creek, Pinewoods Creek, and Nepopekum Creek watersheds.
Northern Red-legged frog	<i>Rana aurora</i>	Blue	SC (2015)	1-SC (2005)	High	Gazetted presence near Lightning Lake and potentially present throughout the Similkameen and Little Muddy creek watersheds. Breeds in a variety of permanent and temporary waterbodies, including potholes, beaver ponds, ditches, swamps, marshes, and margins of lakes and slow-moving rivers.
Western Toad	<i>Anaxyrus boreas</i>	Yellow	SC (2012)	1-SC (2008)	High	Gazetted presence near Lightning Lake and potentially present throughout the Similkameen and Little Muddy creek watersheds. Breeds in a variety of aquatic habitats, including lake edges, artificial waterbodies, and temporary and permanent ponds, usually with shallow water (<0.5m) and sandy or silty bottom substrate
Insects						
Claudius Apollo	<i>Parnassius clodius pseudogallatinus</i>	Blue	-	-	Moderate	Several gazetted occurrences within Manning Park and the Cascades, including along Gibson Pass Road. Pacific bleeding heart is the caterpillar host plant (Pyle & LaBar. 2018; e-Fauna BC, 2022). Adults are typically found in wet meadows and riparian habitats.



Common Name	Scientific Name	Provincial Classification*	COSEWIC Classification**	SARA Classification***	Potential Presence Rating***	Comments
Hoffman's Checkerspot	<i>Chlosyne hoffmanni</i>	Red	-	-	Moderate	Few gazetted records from Manning Park along Gibson Pass Road. Found in meadow associated with dry Douglas fir habitat. Asters (<i>Aster sp.</i>) are the caterpillar host plant (Pyle & LaBar. 2018; e-Fauna BC, 2022).
Indra Swallowtail	<i>Papilio indra</i>	Red	-	-	Moderate	Few occurrences gazetted on iMap, exclusively within the upper Nepopekum Creek valley. More common in the Cascades south of the US border. Found in subalpine areas. Parsley species (<i>Lomatium spp.</i>) are the typical caterpillar host plant (Pyle & LaBar. 2018; e-Fauna BC, 2022).
Sonora Skipper	<i>Polites sonora</i>	Blue	NAR	1-SC (2007)	Moderate	Few occurrences gazetted on iMap BC within a 10km radius area centered around Twenty-Minute Lake. Latest known record from 2014. Found in meadows and disturbed areas. Uses a wide range of host plants (BC MOE, 2013).
Plants and Plant Communities						
Dwarf Bramble	<i>Rubus lasiocarpus</i>	Blue	-	-	Moderate	Few occurrences in Manning Park and southern Vancouver Island. More common in the Cascade south of the US border. Grows in mesic to moist thickets and open forests in the montane and lower subalpine zones.
Cascade Rockcress	<i>Boechea cascadiensis</i>	Blue	-	-	Moderate	Few occurrences gazetted on iMap BC in Manning Park, the southern Okanagan and Fraser River canyon areas. Grows on cliffs and rocky area in subalpine areas.



Common Name	Scientific Name	Provincial Classification*	COSEWIC Classification**	SARA Classification***	Potential Presence Rating***	Comments
Jone's Sedge	<i>Carex jonesii</i>	Blue	-	-	Low	Only three known populations in BC, two in Manning Park one and near Mount Outram. Grows on stream banks and meadows.
Little Oniongrass	<i>Melica fugax</i>	Red	-	-	Moderate	Few occurrences gazetted on iMap BC in the Lower Mainland and in Manning Park from the Castle Creek Watershed. Grows on volcanic soils in open forests and exposed areas.
Purple-marked Yellow Violet	<i>Viola purpurea</i> var. <i>venosa</i>	Blue	-	-	Moderate	Few occurrences gazetted on iMap BC, all within Manning Park. Grows on dry gravelly or rocky talus slopes in the alpine zone.
Sawatch Knotweed	<i>Polygonum sawatchense</i> ssp. <i>oblivium</i>	Blue	-	-	Moderate	Few occurrences gazetted on iMap BC in Manning Park within the Castle Creek watershed. Grows in dry meadows and forests, on sandy, gravelly, or rocky substrates.
Silvercrown	<i>Cacaliopsis nardosmia</i>	Red	-	-	Moderate	Only a few occurrences gazetted on iMap BC, all from Manning Park. Grows on mesic to dry rocky slopes, meadows and forest margins in the montane and subalpine zones.
Smith's willowherb	<i>Epilobium smithii</i>	Blue	-	-	Moderate	Three populations all gazetted within Manning Park, North of Highway 3. Recently added to the BC flora in 2015. Found on dry gravelly roadsides.



Common Name	Scientific Name	Provincial Classification*	COSEWIC Classification**	SARA Classification**	Potential Presence Rating***	Comments
Subalpine Fir / White-flowered Rhododendron/ Sitka Valerian	<i>Abies lasiocarpa</i> / <i>Rhododendron albiflorum</i> / <i>Valeriana sitchensis</i>	Blue	-	-	High	All plant species of this community are found within the MPR areas. Sitka Valerian and White-flowered Rhododendron are associated with moist streambanks, meadows, and forests in the montane and subalpine zones. Potentially presence along the unnamed tributary to Nepopekum Creek in the Alpine area.
Tweedy's Lewisia	<i>Lewisiopsis tweedyi</i>	Red	E (2013)	1 – E (2018)	Moderate	Only a few known occurrences on iMap BC, all from Manning Park, all associated with a 50 m Critical Habitat buffer around the occurrence. Grows on south-facing, rocky outcrops and open in the upper montane zone.
Western Hawksbeard	<i>Crepis occidentalis conjuncta</i>	Blue	-	-	Moderate	Found on the Thompson Okanagan Plateau and Cascade Range from Merritt to Manning Park. Gazetted occurrence approximately 2.5 km south of the Alpine area. Grows in dry grassland and shrubland habitat.
Whitebark Pine	<i>Pinus albicaulis</i>	Blue	E (2010)	1-E (2012)	High	Gazetted occurrences within and immediately east and west of the Alpine area (at least 10 trees across 3 separate populations according to iMap BC). Some 2-km critical habitat buffers (median dispersal distance of Clark's Nutcracker, which the whitebark pine relies on for seed dispersal) around known stands overlap with the Alpine area boundaries.

* Red: Endangered or Threatened; Blue: Special Concern; Yellow: Least Risk.

** E: Endangered; T: Threatened; SC: Special Concern; NAR: Not at Risk.

*** Potential presence rating given by endorsing Professional Biologist.



3.4 Other Protected Ecosystems and Habitat Features

There are no other provincially-regulated ecosystems (e.g., critical habitat for SARA-listed species) or habitat features (e.g., Ungulate Winter Ranges or other Habitat Units protected under Ministerial Orders, etc.) identified within 5 km of the Study Area areas since all wildlife, plants and ecosystems present within the EC Manning Provincial Park boundaries are *de facto* protected through the BC *Parks Act*, unless a Park Use Permit is granted for some activities (including MPR operations) or natural resource exploitation. This, therefore, does not indicate absence of valuable habitat units within the Study Area.

4 RECOMMENDED VALUABLE ECOSYSTEM COMPONENTS

Following completion of the EOA as above, the following Valued Ecosystem Components (VECs) are recommended for consideration during future MPR development and/or environmental management planning, subject to the BC Parks Impact Assessment (BCPIA) process.

4.1 Species at Risk

A number of Species at Risk (Sec. 3.3) have been identified as potentially present in the Study Area, many of which could be impacted through future development and/or operations by MPR.

4.1.1 Identified Species with Moderate to High Potential Presence Rating

Species at risk identified in the present report as having a 'moderate' to 'high' potential of presence can be expected in and around the various MPR operation areas (Table 1). They should, therefore, be considered in any future planning exercise as new development projects or changes in land use have the potential to affect these species. In addition, the following Species at Risk should be specifically considered with future MPR operations and/or development.

4.1.2 Mountain Beaver

The presence of several known mountain beaver colonies within the watershed of the unnamed tributary to Nepopekum Creek has some management implication for the Alpine area as burrows were observed immediately adjacent to the trails. Loose soils in seepage areas where the burrows are typically found can easily be disturbed by trail grooming maintenance machinery, especially during periods of shallow snowpack. A survey to confirm the current extent of mountain beaver colonies and potential habitat not yet colonized by the species should be conducted prior to any new development or changes in management practices. Additionally, buffers from the edge of the forested areas adjacent to the trails should be considered year-round to protect this species of management concern and maintain natural drainage.

4.1.3 Endangered Carnivorous Species

Grizzly bear and wolverine are expected to be rare, occasional visitors in the park due to their low densities, low tolerance to human presence, and large home range. Their presence is most likely near the Alpine area rather than in the Similkameen River valley with the occurrence of large connected forested areas. Management implications for these two species for MPR planning should be linked to habitat protection, public awareness, and recovery plans undertaken by BC Parks since both species are threatened by habitat loss and fragmentation, and increased interactions with humans amongst other threats. Future development and management planning, particularly in the Alpine area should consider conservation of these species and their habitat.



4.1.4 Rare Plants and Plant Communities

The gazetted occurrence of whitebark pine within the Alpine area should be confirmed through a field survey and a suitable buffer zone to protect at minimum the critical root zone of the trees should be established in collaboration with BC Parks. Similarly, the potential occurrences of the Subalpine Fir / White-flowered Rhododendron/ Sitka Valerian plant community should also be confirmed, especially along all the branches of the unnamed tributary to Nepopekum Creek, which represent potentially suitable conditions for this community.

Most of the other rare plants identified during the desktop review have very limited range, linked to suitable site conditions within the Castle Creek watershed or the plateau near Blackwall Peak north of Highway 3. Although the Lodge and Service areas are not expected to be suitable to any of these rare plants due in part to the high disturbance levels, areas within and adjacent to the Alpine areas could be further assessed for rare plant presence prior to any further development.

4.2 Birds and Bird Habitat

A variety of bird species are known to breed in the MPR areas every year, which requires special consideration during any vegetation maintenance and clearing (including shrubs and low-lying vegetation) during the bird nesting window provided for the Canadian Nesting Zone A2¹¹ of April 04 to August 17 as all birds, their eggs, and their nests (while occupied) are protected under Section 34 of the BC *Wildlife Act*. Breeding at higher altitude may be restricted to a shorter time period while warmer winters and springs may trigger early bird nesting, especially for resident birds. Additionally, the nests of some species observed in the Park are protected year-round under the Act, including bald eagle (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*), peregrine falcon (*Falco peregrinus*), and great-blue heron (*Ardea herodias*). Some raptor species have extended breeding periods in comparison with passerine birds, with mating starting as early as January and juveniles present near the nest into September. The Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia¹² provides specific breeding windows for the raptors in found the province.

The identification of any existing raptors nest within the MPR areas will be required to minimize potential disturbance during future maintenance or new development. It is noted that a red-tailed hawk (*Buteo jamaicensis*; not at risk) was observed in the Alpine area during field investigations, suggesting the potential presence of a nest nearby. It is noted that pileated woodpecker (*Dryocopus pileatus*; not considered at risk) nesting cavities are now awarded year-round protection for up to three years after last being occupied under the modernized Migratory Bird Convention Regulation (2022), which can have implications for future development in areas where the species is present.

While all areas within the MPR can offer some foraging and nesting opportunities (including buildings) during the breeding period for migrant and resident birds, forested and edge areas are most likely to be occupied by resident birds during winter months. Disturbance within these wintering areas should be avoided as it can affect bird survival.

¹¹ <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html#toc2>

¹² https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/raptor_conservation_guidelines_2013.pdf



4.3 Ungulate Overwintering Areas

Ungulate overwintering areas are important habitat for the survival of these species during this critical time of year. These habitats offer both protection from predators and suitable food sources. Disturbance of ungulate species should be avoided during rut (fall) and overwintering. Since no Ungulate Winter Ranges (UWR) are designated within the Park due to the *de facto* protection, potential ungulate overwintering sites are not known and should be further assessed to minimize potential disturbance during winter.

4.4 Bats

The range, summer roosting, and overwintering habitats of many of the 15 bat species present in BC are still not well known in the Province. Bats face many threats including habitat loss and fragmentation, intentional and unintentional colony disruption, mortality due to wind turbines, and the potential arrival of white-nose syndrome (WNS) in BC. The latter is caused by *Pseudogymnoascus destructans*, a rapidly spreading fungal disease that has decimated bat populations in eastern North America and has recently been found in Washington State (BC MOE, 2017). Although most bat species are known to typically overwinter in caves, old mines or buildings, smaller colonies have been shown to use rock crevices in cliffs or talus slopes (Neubaum, 2018; Johnson et al., 2017). The presence of a wide variety of habitats suitable to bats within and near the MPR areas such as cliffs, watercourses, lakes, and forested areas, is likely suitable to at least a few bat species, including the little brown myotis, which is one of the most widespread and abundant bat species in Canada (Environment Canada, 2015).

Bat surveys using bat detectors over different times of year could be conducted to confirm the number of species inhabiting the MPR areas and potential risks for disturbance during the various stages of their life cycle, especially in old or unoccupied buildings and other man-made structures.

4.5 Fish and Fish habitat

The Similkameen River and Little Muddy Creek Nepopekum Creek, are the two major fish-bearing creeks near the MPR area and should be considered high-sensitivity habitats, including the adjacent riparian areas. Although fish are not known to be present in the upper reaches of Nepopekum Creek, any changes in water quality or quantity may affect downstream fish populations. In absence of known data, fisheries inventories of Nepopekum Creek and the unnamed tributary within the Alpine area could be considered to guide operational management and future development opportunities.

4.6 Lakes and Wetlands

Several lakes and wetlands are present within and near the various MPR areas, most notably within the lower Little Muddy Creek watershed and the Similkameen River riparian areas. These waterbodies are important habitat features for a variety of aquatic, amphibious and terrestrial wildlife species at various life stages. Recent changes in precipitation patterns and rising average temperatures are threatening these sensitive habitats but also can changes in land use in their vicinity (e.g., increase in impervious surfaces). A survey of all permanent and temporary wetlands within the MPR and immediately adjacent areas should be conducted to gain an understanding of the extent of the wetland networks, especially within the Alpine and Service areas.



4.7 Aquatic Invertebrates

Aquatic invertebrates, including freshwater benthic invertebrates, are an important component of aquatic ecosystems (i.e., watercourses, lakes, and wetlands) as they provide a food source to a variety of wildlife, including fish, amphibians, bats, and birds. Aquatic invertebrate communities are sensitive to changes in water quantity and quality, temperature, and nutrient levels and are, therefore considered good bioindicators of aquatic habitat health. There is limited information available regarding aquatic/benthic invertebrates in the MPR areas, but a review of the Canadian Aquatic Biomonitoring Network¹³ (CABIN) database identified several benthic invertebrate sampling sites near the MPR area, including on the upper Nepopekum Creek west of the Alpine area, on the Similkameen River east of Alisson pass, and on a few tributaries to the Similkameen River. The CABIN database allows to enter the benthic invertebrate data collected from any test site and compare it to a set of suitable 'reference' sites to evaluate the severity of the potential human disturbance at those locations. The collection of benthic invertebrate samples following the CABIN protocol should be considered to guide management decisions related to the MPR areas watercourses.

Although only a few odonate (dragonflies and damselflies) species are listed provincially and federally, their presence and diversity can be a good indicator of the health of wetland and lakes as they can spend several years as aquatic larvae and feed on other insects during their adult stage. Thus, odonate species richness could be integrated as a component of any wetland/lake health assessment.

4.8 Amphibians

The presence of a variety of interconnected wetlands, lakes, streams, and associated riparian habitat are highly suitable for all listed amphibian species. Coastal tailed frog presence is deemed possible in the tributary to Nepopekum Creek, Nepopekum Creek, and Pinewoods Creeks, and should be confirmed by field surveys. Activities in riparian areas, disturbance to large woody debris and rock piles (potential hibernacula), and works below the high-water marks of waterbodies have the potential to disturb amphibians. In light of the ecology and known range of the listed amphibian species known to inhabit the area, any wetland and riparian areas can be considered potential breeding and foraging habitat for these species, regardless of their size or temporary nature. Additionally, any suitable overwintering habitat (e.g., talus slopes, coarse woody debris, and wetlands) adjacent the wetlands and riparian areas should be protected by default or require further assessment.

4.9 Butterflies

The abundance of alpine and subalpine meadows is particularly attractive to a variety of butterfly species, which feed on the nectar of the abundance of flowers. In effect the availability of foraging and larval host plants associated with temperature patterns are two key factors influencing butterfly distribution. The North Cascades represents the northern range limit for some butterfly species such as the indra swallowtail or the Hoffman's checkerspot, explaining their relative rarity in the Canadian context. Due to the lack of information regarding Canadian range and larval host plants for many listed butterfly species in BC and scattered or old records, management implications for butterflies may need to be refined through additional surveys, especially within the Alpine area.

¹³ <https://data.ec.gc.ca/data/substances/monitor/cabin-canadian-aquatic-biomonitoring-network/?lang=en>



4.10 Alpine/Sub-alpine Meadows

Alpine and sub-alpine meadows are particularly sensitive ecosystems that benefit and sustain a variety of invertebrates (e.g., butterflies), and herbivorous wildlife species (e.g., deer). Meadow-type habitat created during the creation of the Alpine area have been colonized by Columbian ground squirrel (*Uroditellus columbianus*) colonies. Although not an endangered species, they are nonetheless protected under the BC *Wildlife Act*, which would require special consideration in case of changes in land uses or development in the area.

5 CONCLUSIONS

Any proposed 'Action' (e.g., new development, change in land use, etc.) within an area identified as a Park or Protected area in BC, such as EC Manning Park, if it is deemed reviewable¹⁴ by BC Parks, requires a formal assessment under the BCPIA process¹⁵. The BCPIA process requires the assessment of potential negative impacts of any given Action on the ecological, cultural, and recreational values. For future Action and/or environmental management planning for MPR operations in E.C. Manning Park, Roe recommends assessment of potential impacts on VECs identified in Sec. 4 be considered. Roe does not provide recommendations for cultural, socio-economic, or recreational Valuable Components through the completion of EOA works presented herein.

Beyond the direct impacts of any proposed Action on the recommended VECs and listed species, the BCPIA also requires the consideration of cumulative impacts resulting from the combined effects of past, present, and potential future human activities and natural processes, which is guided by the BC Cumulative Effects Framework¹⁶. Natural processes include climate change, which is already affecting the mountain ecosystems as warmer summers result in earlier snowmelt, more frequent forest fires, changes in distributions of plants and wildlife, while changes in weather patterns and the occurrence of more frequent extreme weather events can dramatically affect species and habitats. Roe recommends inclusion of Cumulative Effects of future proposed Actions and/or environmental management planning, commensurate and appropriate to both the spatial and temporal scope of proposed Action/management planning.

¹⁴ Non-reviewable Actions are listed here: <https://bcparks.ca/conservation/impact/non-reviewable-actions/>

¹⁵ <https://bcparks.ca/conservation/impact/>

¹⁶ <https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/cumulative-effects-framework/overview>



6 ENDORSEMENT

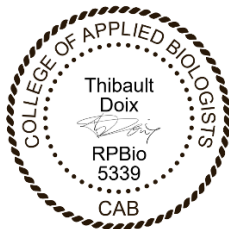
Should you have any further questions or comments regarding this document, please contact the undersigned at your convenience.

Kind Regards,

Roe Environmental Inc.

Authored and Endorsed by:

The undersigned certifies the work described herein fulfills standards acceptable of a Professional Biologist.



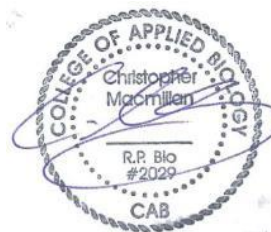
[Digital Signature]

Thibault Doix, R.P. Bio.

Senior Biologist, Principal

Reviewed and endorsed by:

The undersigned certifies the work described herein fulfills standards acceptable of a Professional Biologist.



[Digital Signature]

Chris Macmillan, R.P. Bio.

Senior Biologist, Director



7 REFERENCES

- Altman, B and R Sallabanks. 2012. Olive-sided Flycatcher (*Contopus cooperi*), version 2.0. In The Birds of North America (P. G. Rodewald, editor). Cornell Lab of Ornithology, Ithaca, New York, USA.
- Boyd, M. 2015. Common Nighthawk in Davidson, P.J.A., R.J. Cannings, A.R. Couturier, D. Lepage, and C.M. Di Corrado (eds.). The Atlas of the Breeding Birds of British Columbia, 2008-2012. Bird Studies Canada. Delta, B.C.
- BC Ministry of Environment. 2014. Management Plan for the Sonora Skipper. Victoria, BC. 23pp.
- Corkran, C.C., and C. Thoms. 1996. Amphibians of Oregon, Washington and British Columbia. Lone Pine Publishing, Washington State.
- COSEWIC. 2015. COSEWIC Assessment and Status Report on the Black Swift *Cypseloides niger* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 50 pp.
- COSEWIC. 2018. COSEWIC assessment and status report on the Olive-sided Flycatcher *Contopus cooperi* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 52 pp.
- Davidson, P.J.A. 2015. Band-tailed Pigeon in Davidson, P.J.A., R.J. Cannings, A.R. Couturier, D. Lepage, and C.M. Di Corrado (eds.). *The Atlas of the Breeding Birds of British Columbia, 2008-2012*. Bird Studies Canada. Delta, B.C. Retrieved from: <http://www.birdatlas.bc.ca/accounts/speciesaccount.jsp?sp=BTPI&lang=en>
- Environment Canada. 2015. Recovery Strategy for Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. ix + 110 pp.
- Environment and Climate Change Canada. 2018. Management Plan for the Coastal Tailed Frog (*Ascaphus truei*) in Canada. Species at Risk Act Management Plan Series. Environment and Climate Change Canada, Ottawa. 2 parts, 4 pp. + 49 pp.
- Environment and Climate Change Canada. 2019. Management Plan for the Band-tailed Pigeon (*Patagioenas fasciata*) in Canada. Species at Risk Act Management Plan Series. Environment and Climate Change Canada, Ottawa. iii + 14 pp.
- Environment and Climate Change Canada. 2019c. Status of Birds in Canada 2019. Evening Grosbeak. Retrieved from: <https://wildlife-species.canada.ca/bird-status/oiseau-bird-eng.aspx?sY=2019&sL=e&sM=a&sB=EVGR> (Accessed August 2022).
- Fenger, M., Manning, T., Cooper, J., Guy, S., and Bradford, P. 2006. Wildlife & Trees in British Columbia. Lone Pine Publishing. Vancouver, BC. 336 pp.
- Fraser, D. F., Farr, D. R., Ramsay, L. R., and Turner, N. J. 1989 Natural and Human History Interpretive Theme document for Manning Provincial Park. Arenaria Research and Interpretation. Prepared for BC Ministry of Parks. Victoria, BC. 272 pp.
- Hobbs, J. 2019. Spotted Owl Survival and Recovery in British Columbia: Expert report. 73 pp. Retrieved from: www.wildernesscommittee.org/sites/default/files/2019-05/2019%2002%2014%20WC%20SPOW%20Expert%20Report_0.pdf



- Johnson, J. S., J.J. Treanor, M.J. Lacki, M.D. Baker, G.A. Falxa, L.E. Dodd, A.G. Waag, and E.H Lee. 2017. Migratory and winter activity of bats in Yellowstone National Park. *Journal of Mammalogy* 98(1): 211-221.
- Klinka, K. and R.N. Green. 1994. A Field Guide for Site Identification and Interpretation for the Vancouver Forest Region. Land Management Handbook Number 28. BC Ministry of Forests. 59 pp.
- Lausen, C. L., Nagorsen, D. W., Brigham, R. M., and Hobbs, J. 2022. Bats of British Columbia. Royal BC Museum Handbook.
- Martell, A. 2015. Evening Grosbeak in Davidson, P.J.A., R.J. Cannings, A.R. Couturier, D. Lepage, and C.M. Di Corrado (eds.). *The Atlas of the Breeding Birds of British Columbia, 2008-2012*. Bird Studies Canada. Delta, B.C.
- Ministry of Forests, Lands, Natural Resource Operations and Rural Development. November 2021. Order for the Recovery of the Marbled Murrelet (*Brachyramphus marmoratus*). Retrieved from: https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/biodiv-hab-mngt/mamu/mamu_luor_2dec2021.pdf
- Pyle, R. M., & LaBar C.C. 2018. Butterflies of the Pacific Northwest. Timber Press Field Guide. Portland, OR.
- Ryan, M., Lloyd, D., and Iverson, K. 2021. A Field Guide to Ecosystem Classification and Identification: Southern Thompson--Okanagan (Interim draft). FLNRORD. Land Management Handbook. LMH7.





Brent Harley and Associates Inc.

4 -1005 Alpha Lake Road

Whistler, BC, V8E 0H5

604.932.7002

bha@brentharley.com

www.brentharley.com