KICKING HORSE MOUNTAIN RESORT
PHASE 1 - TECHNICAL ASSESSMENT

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I. INTRODUCTION

.1 Location and Regional Context

The Kicking Horse Resort is located 13 kilometers west of Golden, British Columbia; a town of approximately 4,000 residents. The area is accessed via the Trans Canada highway, 145 kilometers west of Banff (1.5 hours by automobile) and 270 kilometers west of Calgary. Travel time to the resort from Calgary is 2.5 hours. The resort is situated in the Selkirk Mountains amid six National Parks. Kicking Horse Resort is located 426 miles (682 km) northeast of Vancouver.

The existing ski facility is comprised of an eight-passenger gondola, two quadruple chairlifts, one double chairlift and a magic carpet conveyor lift which services the beginner and tubing areas. The highest lift at Kicking Horse Mountain Resort is the Stairway to Heaven fixed grip quadruple chairlift, at 2,450 meters, while the base area and the bottom terminal of the gondola sit at 1,264 meters. This results in a total skiable vertical drop of 1,186 meters, (3,890 feet). Winter activities focus on alpine skiing/snowboarding, cross-country skiing, snowshoeing, heli-skiing and back country treks. Other winter activities include skating, tubing, ice climbing and snowmobiling.

View of the Columbia River Valley from Kicking Horse Mountain

Summer activities at Kicking Horse include horseback riding, golfing, whitewater rafting, river safaris, paragliding, rock climbing and mountain biking.

Figure 1 graphically illustrates the Area Location for Kicking Horse Mountain Resort and Figure 2 illustrates the Regional Context. The mapped area encompasses approximately 5,900 hectares (14,500 acres) of terrain, as shown on Figure 3, while the Controlled Recreation Area covers approximately 1,685 hectares (4,160 acres).

.2 Historical Perspective

Kicking Horse Mountain Resort is named after the renowned river and the famous high alpine pass that were instrumental in opening the Canadian West to the rest of the world. The Kicking Horse name reflects a sense of adventure, discovery and exploration.

In 1858, the Imperial Government sent John Palliser out to find a feasible route from the Prairies through the mountains so it could extend the railway. A geologist named Sir James Hector was among those on the expedition team and following a string of bad events, ended up stumbling upon the Kicking Horse Pass. While they were camped out at the Great Divide, one of the team's packhorses got loose and crossed the river. Sir James jumped into the water and swam after it, eventually rounding the horse up. While trying to tie it to a tree near his horse, the two animals became enraged and started fighting. During the ruckus, Sir James suffered a vicious kick from his own steed and he broke three of his ribs and was knocked out. In fact, he was unconscious for so long, his three Native guides were convinced he was dead and decided to bury him. As they were carrying Sir James's lifeless body to a grave some distance away, he suddenly came to. When he was well enough to move around, he explored the valley and eventually discovered the pass that became the route through the mountains. The pass and the river were dubbed "Kicking Horse" in his honour.

The Canadian Pacific Railway first went through the area in 1885 and then tourists began coming to see the magnificent scenery. The railway opened the first hotel in 1887.

The potential for tourism in the area had long been recognized, but skiing wasn’t a large part of the sports activities (mostly hiking and climbing) until a ski club formed in the 1940’s. In 1986, the first chair lift was opened in the Whitetooth Ski Area in Golden, a logging town.

In the mid-nineties a Vancouver architect named Oberto Oberti proposed building a world-class resort based at the Whitetooth Ski Area in Golden and on March 7, 2000, Kicking Horse Mountain Resort opened for business.

The Kicking Horse Grizzly Bear Refuge operates a wilderness centre for research, education, and conservation at Kicking Horse Mountain Resort. The 22-acre sanctuary is the largest protected enclosed grizzly bear refuge in the world, providing a home and a second chance at life for two orphaned grizzly bear cubs, Cari and Boo.

.3 Planning Issues

The successful design and operation of a mountain resort requires a solid footing on three separate pillars. The three critical resort elements, as illustrated in Plate I.1, are: physical, market and economic characteristics and factors.

CRITICAL RESORT ELEMENTS

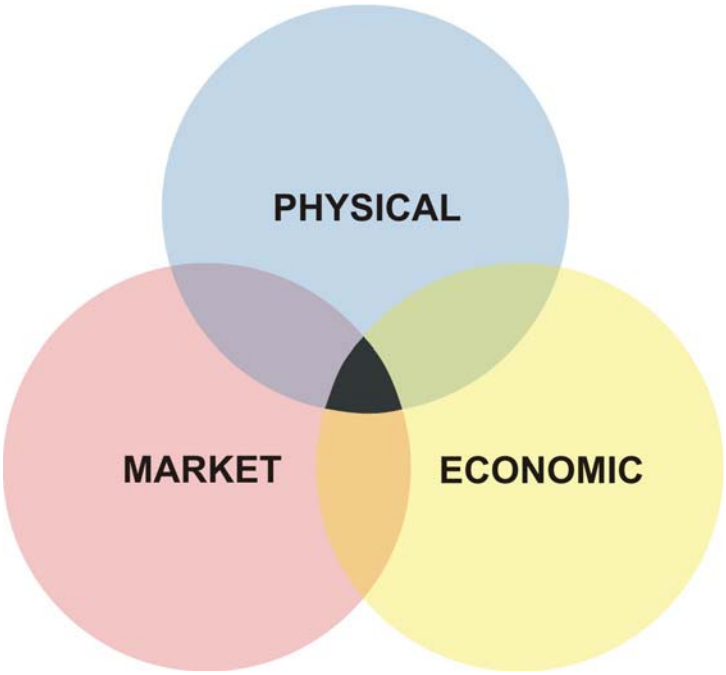


PLATE I.1

The physical site characteristics include:

- environmental resources and sensitivities including water, air, soil, vegetation, wildlife and energy conservation
- terrain
- climate
- natural hazards
- visual resources
- recreational resources

The master planning process incorporates research by scientists, ecologists and recreational planners to document the physical characteristics of each individual site with air photos, topographical maps, three-dimensional computer models, on-site field work and surveying and analytical planning technologies.

The next critical element necessary for a feasible mountain resort deals with the market characteristics including:

- access to the site
- the size and proximity of local, regional and destination markets
- population demographics, such as: age, income and education
- population dynamics, such as: growth, aging and social trends, such as fitness

Finally, there are economic factors and characteristics to be considered such as:

- resort capacity
- length of operating season (winter and summer)
- infrastructure cost and availability
- capital costs of facilities
- operating efficiency
- revenue sources and pricing
- human resources

Every resort possesses a different blend of these characteristics. It is very important to understand and document the balance between the physical, market and economic characteristics of each individual project.

A master development plan is more than a physical layout of lifts, trails, restaurants, parking and base area facilities. A master plan is a flexible responsive business plan which sets out physical and financial strategies which can respond to a variety of market scenarios including: growth, zero growth, or even declining growth. This report outlines a planning program supported by these three critical elements for Kicking Horse Resort.

.4 Goals and Objectives

The resort area master plan involves planning the installation of new facilities on the mountain and in the base area. Facilities are generally constructed over several phases of development; increasing the quality and size of the area as time progresses and the market dictates. However, it is critical to have a clear view of the complete project at build-out, so that facilities can be balanced and capital effectively invested over the life of the project.

Objectives

The objectives of the Kicking Horse Resort Master Plan are listed below:

- *Upgrade all facilities to meet and exceed current industry standards.*
- *Optimize the use and operational efficiency of the physical plant and area layout.*
- *Five to ten-year plan to renovate and expand the existing ski resort to current industry standards*
- *Provide year-round recreational activities for families and visitors of all ages.*
- *Balance lift and trail capacity to maintain quality skiing and snowboarding conditions and meet the requirements of the market*
- *Balance mountain capacity with guest services base staging areas and parking*
- *Improve and expand the intermediate and beginner offerings to appeal to a larger share of the market*
- *Install snowmaking to ensure high quality skiing, especially on the lower elevations*
- *Replace or modernize and increase size of skier service buildings*
- *Identify potential future expansion areas for parking and snow play activities*

.5 Glossary

The winter snow sliding industry has a number of terms and technical jargon specific to resort area development, hence, a glossary is provided below:

1. **Skier** - Refers to a person that slides down the hill using skis, a snowboard, mono ski, snowblades, Big Foot skis, snow runners, or other devices attached to their feet.

2. **Skier Visit (Winter)** - Sometimes referred to as “skier visit”, one person visiting a winter recreation area for all or part of a day or night for the purpose of skiing, snowboarding, snowblading, etc. This is the total number of lift tickets issued. Skier visits include a person holding a full-day, half-day, night, complimentary, adult, child, season, or any other ticket type that gives them the use of an area's lifts and trails.

3. **Rated Uphill Capacity** - The manufacturer's rated number of passengers per hour (pph) a lift can transport to the top of the lift. An area's hourly capacity is the sum of the individual lifts.

4. **VTM/Hour (000)** - (Vertical Transport Meters Per Hour) - The number of people lifted 1,000 vertical meters per hour (vertical rise of a lift, times the lift capacity per hour, divided by 1,000). An area's total VTM, is the sum of VTM for all lifts.

5. **VTM Demand/Skier/Day** - The amount of vertical consumed (demanded) each day by a skier, snowboarders, snowblader, etc.

6. **Skier (Comfortable) Carrying Capacity (SCC)** - The number of skiers that a given area can comfortably support on the slopes, lifts and in the base and mountain warming buildings, without overcrowding, or those that may be accommodated at one time and still preserve a congenial environment. An area's comfortable carrying capacity is a function of VTM demand per skier, VTM supplied per hour, difficulty of terrain, and scope of support facilities. This is some time referred to a Comfortable Carrying Capacity (CCC) or skiers At One Time (SAOT).

7. **Utilization** - Is measured as a percent of SCC. Comfortable Seasonal Capacity is the product of an area's daily carrying capacity times its days of operation. Utilization compares actual number of visits to calculated comfortable seasonal capacity.

8. **Terrain Pod** - A contiguous area of land deemed suitable for lift and trail development due to its slope gradients, exposure and fall line characteristics.

II. INVENTORY

.1 Introduction

The inventory stage includes the identification, analysis and mapping of all on-site and off-site factors which may affect the ski facility development potential of the Kicking Horse Mountain Resort study area. The inventory data includes: the land status, climatic, biophysical, and physiographic characteristics of the study area, as well as an analysis of the existing ski area. The study area identified for mountain and base analysis purposes encompasses about 5,900 hectares, including the existing permit area, covering about 1,685 hectares. Through an understanding of the site's existing conditions and natural process, environmentally sensitive areas can largely be avoided and natural development opportunities maximized.

As a prelude to discussing the mountain's characteristics, it is appropriate to familiarize the reader with the basic requirements of ski area development. Ski area development is generally considered to be a non-consumptive resource use of the land. The development of ski lifts and ski trails requires the use of approximately 50 percent of the area in small, heavily developed zones. Ski lift right-of-ways are generally 12 to 15 meters in width, while ski trails vary between 30 and 60 meters wide. Subsequent to rough grading by practices selected for each site, the ski trails require fine grooming and seeding to establish a grass cover. This grass cover prevents erosion and helps to minimize hazards and damage to the skiers' equipment during low snowpack periods and possible damage to the area's snow grooming fleet. Ski lifts are generally aerial cable systems with steel towers and concrete foundations every 45 to 75 meters.

Ski base area development generally includes a paved access road, parking lots, buildings for accommodation, a day lodge and a maintenance center. Additionally, appropriate power and water supply, and sewage disposal facilities are required to support any base area improvements.

The physical site characteristics discussed in this section all interact to aid the planning team when assessing the capability of the natural systems to support resort development.

.2 Physiography

The quality and feasibility of a winter sports site is highly dependent upon the topographic characteristics of each individual site. Physiographic features which substantially affect ski development particular include: aspect (exposure), slope gradients, fall line patterns and elevation.

Slope Aspect

Slope aspect is important for the quality of the skiing surface and retention of snowpack. Generally, northern slopes are the coldest, followed by northeast slopes. These aspects are excellent for retaining snow quality and snowpack but can be uncomfortable for skiers. Eastern and northwestern slopes are fairly good for snow retention and quality. The western slopes are warmer and snow quality can be degraded. Snowpacks do not normally last as long on western slopes as they do on the northern and eastern slopes, however western slopes are very comfortable for skiers. Southeast, south and southwest facing slopes are generally fairly hot with rapid degradation of snow quality and short lived snowpacks.

Kicking Horse ski area is located on the northeast face of a long ridge running southeast-northwest. Slopes within the existing ski area face generally northeast, with smaller slopes within the alpine bowls with aspects raging from north to east and southeast. Most of the terrain within the existing CRA also has aspects similar to the existing ski terrain; a small corner of the CRA over the ridge from the top of the gondola falls onto south and southwest aspects. The Aspect Analysis for the entire study area is illustrated on Figures 4a and Figure 4b (3-dimensional).

Elevation

The potential vertical drop available for lift serviced skiing/boarding plays an important role in site suitability, since it determines the length of potential ski trails and also the vertical transport meters that can be supplied to the skiing and snowboarding public. Essentially, the more vertical the better, as many skiers and snowboarders use vertical rise as a basic yardstick of an area's desirability.

Elevations within the study area range from over 2,505 meters at the edge of the CRA down to the bottom portion of the study area at the edge of the Columbia River (at 785 meters). The lowest elevation within the CRA is 1,160 meters, giving the CRA a potential vertical drop of approximately 1,345 meters. The existing lift serviced vertical drop is 1,186 meters, stretching from the top of the Stairway to Heaven Chair to the bottom of the gondola. Figure 5a graphically illustrates the Elevation Analysis and Figure 5b shows this in a 3-dimensional perspective. Figure 6 illustrates the Fall Line Analysis for Kicking Horse.

.3 Climate/Solar Analysis

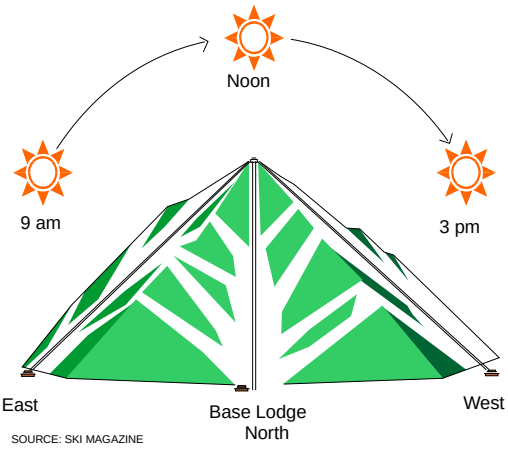
Microclimate

While regional climate patterns are primarily concerned with evaluating total resort feasibility, a thorough understanding of microclimate provides an essential input for the site-specific design process.

Microclimate is basically the climate near the ground where surface influences such as lakes, swamps, mountain slopes and valleys, and vegetation effect dramatic influence upon the local climate as experienced by humans on the earth's surface.

Most skiers are highly aware of the sun's influence on snow quality. While skiers prefer to slide in the sun, they will not do so if the snow is sticky or mushy due to intense solar radiation. As illustrated in Plate II.1, skiers will follow the sun throughout the day, sliding on eastern exposures in the morning, southern exposures at noon and western exposures in the afternoon. As a general rule, south slopes are the warmest, eastern and western slopes the next warmest and northern slopes the coolest. Snowpack retention is a critical concern for any skiing/snowboarding operation and for this reason, slopes and trails should naturally be located where the snowpack remains for the longest period.

SKI POINTER



SOURCE: SKI MAGAZINE

IN SPRING, STAY AHEAD OF THE SUN

By John Fry
Contributing Editor

The trick to enjoyable spring skiing is to catch the snow as it becomes granular corn before it gets slushy. A good strategy is to keep one eye on the slopes and the other on the sun.

In the morning, after a frosty night, look for east-facing and southeast-facing slopes that catch the early sun. They will be the first to soften up.

As the sun climbs higher and moves into the southern sky, move with it. Ski the north-facing slopes early before they become sloppy.

Finally, move to the west-facing slopes in the afternoon to search for good corn snow.

Smart scrutiny of the weather and terrain will improve your day of skiing.

PLATE II.1

Solar Analysis

The site's angular relationship with the sun is a critical design parameter, since it determines the time of day and for how long the sun's rays will bathe the parking lots, day lodge, ski trails and base areas. Within the Kicking Horse study area, the solar radiation is relatively weak due to the general northeast facing aspect and northern latitude, resulting in little snowmelt in the winter months. As described below, we have prepared a detailed solar analysis to show the solar shading on December 21, January 21 and March 21 at 9:00 a.m., noon and 3:00 p.m. These shadow analyses can be seen on Figures 7a, 7b and 7c.

In mountainous areas such as Kicking Horse, snow is first deposited at higher elevations and then melts as the temperature varies with elevation and changes in available solar radiation throughout the ski season. Predicting the potential amount of solar radiation is important to the planning of a workable ski resort.

The amount of solar radiation impacting the surface varies strongly with elevation, slope, aspect and solar shading from surrounding topographic features. Topographic shading decreases the temperature near the ground which causes the snow to last longer. Even small changes in aspect can result in substantial differences in surface warming. With this in mind, we have calculated the cumulative quantity of the potential incoming solar radiation for the winter ski season from December 1, 2007 to March 31, 2008. Utilizing software created and developed by Ivan Mészároš and Pavol Miklánek of the Institute of Hydrology of SAS in Bratislava, Slovakia, time of year, sun position (azimuth and altitude), shadows cast by surrounding terrain, terrain slope, aspect and elevation are all analyzed to simulate and calculate direct, diffuse and reflected radiation. The result is an accurate representation of potential energy income in Watt-hours per square meter. The calculation has been repeated every 15 minutes from sunrise to sunset for each day in the study period and totaled. The resulting graphic on Figures 7d and 7e illustrate, with a warm to cool color spectrum, the warm and cool zones within the study.

.4 Existing Mountain Facilities

Lifts

Kicking Horse Mountain Resort currently operates one 8-passenger gondola, two quadruple chairlifts, one double chairlift and a moving carpet conveyor lift. The layout of the existing lift system is graphically illustrated in plan view on Figure 8a and in a 3-dimensional perspective on Figure 8b.

The technical specifications for the existing lifts are listed in Table II.1. Data for these lifts, including top and bottom terminal elevations and horizontal length has been supplied by Kicking Horse management and derived from the topographic mapping.

Kicking Horse management also provided the rated hourly capacity, rope speed, drive output, hours of operation and number of carriers. Ecosign has calculated the vertical rise (based on the top and bottom terminal elevations), the estimated slope length, average slope, vertical transport meters per hour and an estimate of the lift's loading efficiency. The facility currently has a lift serviced vertical of 1,186 meters, stretching from the top of the Stairway to Heaven lift down to the base area and the bottom of the gondola. The lifts have a total rated capacity of 6,100 passengers per hour and generate a total of 3.131 million vertical transport meters (VTM) per hour.

TABLE II.1
KICKING HORSE MOUNTAIN RESORT
LIFT INVENTORY

Lift Number Lift Name Lift Type Year Constructed	A Catamount 4C 1999	B Golden Eagle D8G 1999	C Stairway to Heaven 4C 2001	D Pioneer 2C 1986	E Pony Express MC	TOTAL
Top Elevation m.	1,615	2,340	2,450	1,820	1,275	
Bottom Elevation m.	1,268	1,264	2,060	1,298	1,265	
Total Vertical m.	347	1,076	390	522	10	2,345
Horizontal Distance m.	1,463	3,215	1,346	1,263	79	
Slope Distance m.	1,504	3,390	1,401	1,367	80	7,742
Average Slope %	24%	33%	29%	41%	13%	32%
Rated Capacity	1,800	1,200	1,500	1,200	400	6,100
V.T.M./Hr.(000)	625	1,291	585	626	4	3,131
Rope Speed m/sec.	2.3	5.5	2.3	2.5	0.6	
Trip Time min.	11.14	10.27	10.38	9.11	2.22	
Operating Hr./Day	7.0	7.0	6.5	7.0	7.0	6.9

Stairway to Heaven Quadruple Chairlift

Ski/Snowboard Trail Inventory

In order to provide an accurate account of Kicking Horse' trail system, the trails have been classified in concert with the International Trail Standards (Table II.2), as well as the seven skier skill classification levels exhibited in Table II.3.

The trails are classified via an evaluation of the following parameters: slope width, average gradient and the steepest 30-meter vertical pitch. Since the average slope gradient of a trail is generally much lower than the steepest 30-meter vertical pitch, the trails are usually classified to ensure that the steepest 30-meter vertical pitch falls within five percent of the acceptable terrain gradients listed in Table II.3. Furthermore, a gentle novice trail cannot suddenly turn into an advanced trail for obvious reasons.

TABLE II.2
INTERNATIONAL TRAIL STANDARDS

TRAIL DESIGNATIONS	SLIDER ABILITY LEVELS
Easier	Beginner & Novice Sliders
More Difficult	Intermediate Sliders
Most Difficult	Advanced & Expert Sliders

TABLE II.3
SKIER SKILL CLASSIFICATIONS

Skill Classification	Acceptable Terrain Gradients	Maximum Gradient
1. Beginner	8 - 15%	20%
2. Novice	15-25%	30%
3. Low Intermediate	25-35%	40%
4. Intermediate	30-40%	45%
5. High Intermediate	35-45%	50%
6. Advanced	45-60%	65%
7. Expert	60%+	

The Kicking Horse ski area's existing trails have been plotted on the topographic mapping at a scale of 1:5,000 with 5-meter contours, as illustrated on the Existing Mountain Facilities map (Figures 8a and 8b). The presently developed ski/snowboard trail system includes 71 numbered trails and skiways covering 332 hectares. The trail specifications are listed in Table II.4. In general, the trails have been assigned to the lift that is used to return ski on that particular trail.

TABLE II.4
SKI/SNOWBOARD TRAIL INVENTORY

Trail Name		Trail No.	Skill Class	Elevation Top Meters	Elevation Bottom Meters	Total Vert. Meters	Horz. Dist. Meters	Slope Dist. Meters	Percent Slope Avg.	Percent Slope Steep.	Avg. Width Meters	Horz. Area Ha.	Slope Area Ha.
Lift A - Catamount													
Gentle Ben	70% area	2	3	1,340	1,265	75	330	338	23%	37%	78	2.56	1.84
Crowfoot	70% area	3	3	1,385	1,330	55	310	315	18%	18%	44	1.35	0.96
Snow Goose	70% area	5	3	1,395	1,265	130	680	692	19%	37%	61	4.16	2.97
Mummery	20% area	6	2	1,385	1,260	125	670	682	19%	24%	65	4.34	0.88
Mummery	50% area	6	3	1,385	1,265	120	670	681	18%	24%	65	4.34	2.21
		10C	2	1,610	1,540	70	800	803	9%	11%	10	0.80	0.80
		10D	2	1,540	1,430	110	1,090	1,096	10%	13%	13	1.47	1.48
Big Ben	50% area	12	4	1,605	1,410	195	780	804	25%	44%	41	3.22	1.66
Lower Wolverine	50% area	13B	4	1,600	1,395	205	800	826	26%	41%	54	4.33	2.24
Lower Buffalo Jump	50% area	15B	3	1,575	1,395	180	690	713	26%	38%	40	2.76	1.43
L. Stellar Jay	50% area	16B	4	1,565	1,430	135	520	537	26%	42%	41	2.11	1.09
L. Wiley Coyote	50% area	17C	4	1,555	1,390	165	680	700	24%	41%	41	2.79	1.44
Lower Grizzly Paw	50% area	18C	4	1,550	1,440	110	500	512	22%	41%	35	1.77	0.91
Total Lift A		12	(not including 17D class 3)					8,018	(not including 17D class 3)				19.89
Lift B - Golden Eagle													
Gentle Ben	30% area	2	3	1,340	1,265	75	330	338	23%	37%	78	2.56	0.53
Crowfoot	30% area	3	3	1,385	1,330	55	310	315	18%	18%	44	1.35	0.27
Snow Goose	25% area	5	3	1,395	1,260	135	680	693	20%	37%	61	4.16	0.85
Mummery	25% area	6	3	1,385	1,260	125	670	682	19%	24%	65	4.34	0.88
Got Your Goat Right	80% area	8A	4	1,630	1,447	183	560	589	33%	44%	81	4.54	3.82
Got Your Goat Left	80% area	8B	5	1,605	1,435	170	600	624	28%	51%	43	2.56	2.13
Upper Wapiti	80% area	9A	4	1,660	1,625	35	100	106	35%	42%	38	0.38	0.32
Lower Wapiti	80% area	9B	4	1,620	1,415	205	820	845	25%	42%	56	4.61	3.80
	80% area	10A	3	2,330	2,010	320	2,440	2,461	13%	20%	37	9.13	7.37
	90% area	10B	3	2,010	1,610	400	3,020	3,046	13%	21%	10	3.01	2.74
Nose Dive	80% area	11	6	1,685	1,615	70	160	175	44%	59%	84	1.35	1.18
Big Ben	40% area	12	4	1,605	1,410	195	780	804	25%	44%	41	3.22	1.66
Upper Wolverine	80% area	13A	6	1,710	1,600	110	210	237	52%	57%	43	0.90	0.82
Upper Wolverine	40% area	13B	4	1,600	1,395	205	800	826	26%	41%	54	4.33	2.24
Lynx	80% area	14	6	1,730	1,632	98	280	297	35%	54%	35	0.99	0.84
Upper Buffalo Jump	80% area	15A	6	1,770	1,575	195	450	490	43%	58%	48	2.17	1.89
Lower Buffalo Jump	40% area	15B	3	1,575	1,395	180	690	713	26%	38%	40	2.76	1.43
U. Stellar Jay	80% area	16A	6	1,780	1,570	210	530	570	40%	54%	38	2.00	1.72
L. Stellar Jay	40% area	16B	4	1,565	1,430	135	530	547	25%	42%	40	2.11	1.09
U. Wiley Coyote		17A	7	1,925	1,795	130	230	264	57%	73%	42	0.97	1.11
Mid Wiley Coyote	80% area	17B	5	1,795	1,560	235	590	635	40%	45%	49	2.89	2.49
L. Wiley Coyote	40% area	17C	4	1,555	1,390	165	680	700	24%	41%	41	2.79	1.44
Upper Grizzly Paw		18A	7	1,925	1,810	115	200	231	58%	65%	37	0.74	0.85
Mid Grizzly Paw	80% area	18B	6	1,805	1,555	250	630	678	40%	54%	46	2.90	2.50
Lower Grizzly Paw	40% area	18C	4	1,550	1,440	110	500	512	22%	41%	35	1.77	0.91
Lower Grizzly Paw	80% area	18D	7	1,445	1,352	93	270	286	34%	75%	44	1.19	1.01
Terminator		24	7	2,050	1,625	425	1,120	1,198	38%	67%	67	7.49	8.01
Double Header Right		25A	7	2,020	1,645	375	730	821	51%	68%	55	4.05	4.55
Double Header Left		25B	7	1,980	1,665	315	660	731	48%	67%	51	3.39	3.76
Upper Hail Mary		26A	6	2,045	1,845	200	340	394	59%	63%	37	1.26	1.46
Lower Hail Mary		26B	6	1,850	1,685	165	350	387	47%	65%	75	2.62	2.90
Upper Liberty		27A	6	2,100	2,005	95	630	637	15%	45%	45	2.86	2.89
Lower Liberty		27B	6	2,010	1,705	305	600	673	51%	57%	65	3.91	4.39
Blowdown		29	6	2,005	1,835	170	330	371	52%	57%	30	0.99	1.11
Upper Show-Off		30A	6	1,995	1,740	255	510	570	50%	59%	90	4.57	5.11
Lower Show-Off	80% area	30B	6	1,745	1,635	110	250	273	44%	49%	42	1.05	0.92

TABLE II.4 CONT.
SKI/SNOWBOARD TRAIL INVENTORY

Trail Name		Trail No.	Skill Class	Elevation Top Meters	Elevation Bottom Meters	Total Vert. Meters	Horz. Dist. Meters	Slope Dist. Meters	Percent Slope Avg.	Percent Slope Steep.	Avg. Width Meters	Horz. Area Ha.	Slope Area Ha.
Upper Bubbly		31A	5	2,050	1,960	90	270	285	33%	48%	40	1.08	1.14
Lower Bubbly		31B	7	1,960	1,785	175	330	374	53%	70%	84	2.78	3.15
Euphoria		32	6	2,000	1,930	70	150	166	47%	53%	46	0.69	0.76
Upper Sluiceway		33A	6	2,330	2,010	320	1,260	1,300	25%	70%	64	8.10	8.36
Lower Sluiceway		33B	6	2,090	2,007	83	350	360	24%	33%	23	0.80	0.82
Flying Dutchman		34	7	2,330	2,230	100	200	224	50%	79%	26	0.51	0.57
Think Twice		35	6	2,280	2,210	70	210	221	33%	64%	46	0.96	1.01
Northern Lights	50% area	36	3	2,265	2,065	200	1,120	1,138	18%	32%	85	9.48	4.82
Bugablue		40	4	1,640	1,385	255	1,470	1,492	17%	43%	31	4.55	4.62
		43A	6	1,890	1,850	40	70	81	57%	57%	60	0.42	0.48
Upper Blaster		43B	5	1,865	1,795	70	250	260	28%	38%	54	1.34	1.39
Lower Blaster	80% area	43C	5	1,785	1,710	75	250	261	30%	48%	65	1.63	1.36
Briggs Bragg		44	6	2,010	1,985	25	40	47	63%	63%	28	0.11	0.13
Tail Spin		45	5	2,065	1,915	150	730	745	21%	38%	16	1.18	1.20
CPR East		1/4 density	7										18.00
CPR West		1/4 density	7										22.26
Terminator		1/4 density	7										12.77
Redemption West	60% area	1/4 density	7									62.63	37.58
Total Lift B													201.36
Lift C - Stairway to Heaven													
	20% area	10A	5	2,330	2,010	320	2,440	2,461	13%	20%	37	9.13	1.84
Northern Lights	50% area	36	5	2,265	2,065	200	1,120	1,138	18%	32%	85	9.48	4.82
Cloud Nine		37	5	2,425	2,265	160	620	640	26%	54%	29	1.78	1.84
My Blue Heaven		38	7	2,425	2,265	160	360	394	44%	79%	116	4.17	4.56
Redemption East		1/2 density	7										29.00
Redemption West	40% area	1/4 density	7									62.63	25.05
Total Lift C													67.11
Lift D - Pioneer													
Snow Goose	5% area	5	3	1,395	1,260	135	680	693	20%	37%	61	4.16	0.85
Mummery	5% area	6	3	1,385	1,260	125	670	682	19%	24%	65	4.34	0.88
White Tail Right		7A	3	1,345	1,295	50	440	443	11%	13%	48	2.09	2.10
White Tail Left		7B	3	1,350	1,300	50	450	453	11%	13%	42	1.91	1.92
	20% area	8A	4	1,630	1,460	170	530	557	32%	44%	86	4.54	0.95
Got Your Goat	20% area	8B	5	1,605	1,435	170	600	624	28%	51%	43	2.56	0.53
Upper Wapiti	20% area	9A	4	1,660	1,625	35	100	106	35%	42%	38	0.38	0.08
Lower Wapiti	20% area	9B	4	1,620	1,415	205	820	845	25%	42%	56	4.61	0.95
	10% area	10B	3	2,010	1,610	400	3,020	3,046	13%	21%	10	3.01	0.61
Nose Dive	20% area	11	6	1,685	1,615	70	160	175	44%	59%	84	1.35	0.29
Big Ben	10% area	12	4	1,605	1,410	195	780	804	25%	44%	41	3.22	0.66
Upper Wolverine	20% area	13A	6	1,710	1,600	110	210	237	52%	57%	43	0.90	0.20
Upper Wolverine	10% area	13B	4	1,600	1,395	205	800	826	26%	41%	54	4.33	0.89
Lynx	20% area	14	6	1,730	1,632	98	280	297	35%	54%	35	0.99	0.21
Upper Buffalo Jump	20% area	15A	6	1,770	1,575	195	450	490	43%	58%	48	2.17	0.47
Lower Buffalo Jump	10% area	15B	3	1,575	1,395	180	690	713	26%	38%	40	2.76	0.57
U. Stellar Jay	20% area	16A	6	1,780	1,570	210	530	570	40%	54%	38	2.00	0.43
L. Stellar Jay	10% area	16B	4	1,565	1,430	135	530	547	25%	42%	40	2.11	0.44
Mid Wiley Coyote	20% area	17B	5	1,795	1,560	235	590	635	40%	45%	49	2.89	0.62
L. Wiley Coyote	10% area	17C	4	1,555	1,390	165	680	700	24%	41%	41	2.79	0.57
Mid Grizzly Paw	20% area	18B	6	1,805	1,555	250	630	678	40%	54%	46	2.90	0.62
Lower Grizzly Paw	10% area	18C	4	1,550	1,440	110	500	512	22%	41%	35	1.77	0.36
Lower Grizzly Paw	20% area	18D	7	1,445	1,352	93	270	286	34%	75%	44	1.19	0.25
Upper Porcupine		19A	6	1,820	1,540	280	700	754	40%	58%	46	3.23	3.48
Lower Porcupine		19B	5	1,535	1,300	235	710	748	33%	48%	45	3.17	3.34
Pioneer		20	7	1,815	1,300	515	1,340	1,436	38%	63%	28	3.74	4.01

TABLE II.4 CONT.
SKI/SNOWBOARD TRAIL INVENTORY

Trail Name		Trail No.	Skill Class	Elevation Top Meters	Elevation Bottom Meters	Total Vert. Meters	Horz. Dist. Meters	Slope Dist. Meters	Percent Slope Avg.	Percent Slope Steep.	Avg. Width Meters	Horz. Area Ha.	Slope Area Ha.
U. Kicking Horse		21A	6	1,820	1,420	400	1,240	1,303	32%	58%	44	5.45	5.73
L. Kicking Horse		21B	6	1,415	1,295	120	360	379	33%	59%	62	2.22	2.34
Upper Bailout		22A	6	1,420	1,335	85	330	341	26%	35%	17	0.57	0.59
Lower Bailout		22B	6	1,330	1,305	25	290	291	9%	9%	24	0.70	0.70
Race Place		23	6	1,803	1,330	473	1,570	1,640	30%	55%	39	6.19	6.46
Lower Show-Off	20% area	30B	6	1,745	1,635	110	250	273	44%	49%	42	1.05	0.23
Lower Blaster	20% area	43C	5	1,785	1,710	75	250	261	30%	48%	65	1.63	0.34
Total Lift D													42.70
Lift E - Pony Express													
		1	1	1,280	1,265	15	100	101	15%	15%	35	0.35	0.35
Total Lift E													0.35
Total All Lifts													331.4
Other Trails													
Shhh!!!		39	3	1,380	1,325	55	550	553	10%	10%	13	0.73	0.73
Total Others		1						553					0.73
TOTAL													**332.1**

Bottom terminal of the Stairway to Heaven Chair

.5 Mountain Capacity Analysis

Planning Parameters

The determination of an area's Skier Carrying Capacity (SCC) is perhaps the most critical step in ski area planning. Often referred to as the "comfortable carrying capacity" or the "skiers at one time" (SAOT), this figure represents the number of skiers that can be safely supported by an area's lift and trail system while providing a quality experience to each skier ability level. The skier carrying capacity is determined via an integration of lift capacity, acceptable slope densities, slope gradients, skier skill classifications and vertical meters of lift serviced terrain.

During the past several years, Ecosign has undertaken and reviewed substantial research dealing with skiing demand, skier skill distribution and skier densities. Each skier ability level places different demands upon an area's lift and trail system. Empirical observations have determined that each skier ability level will ski a relatively constant number of vertical meters per day.

Skier Skill Class Distribution

These reviews have also continued to support the bell curve distribution of skier skill levels, as illustrated below in Plate II.2.

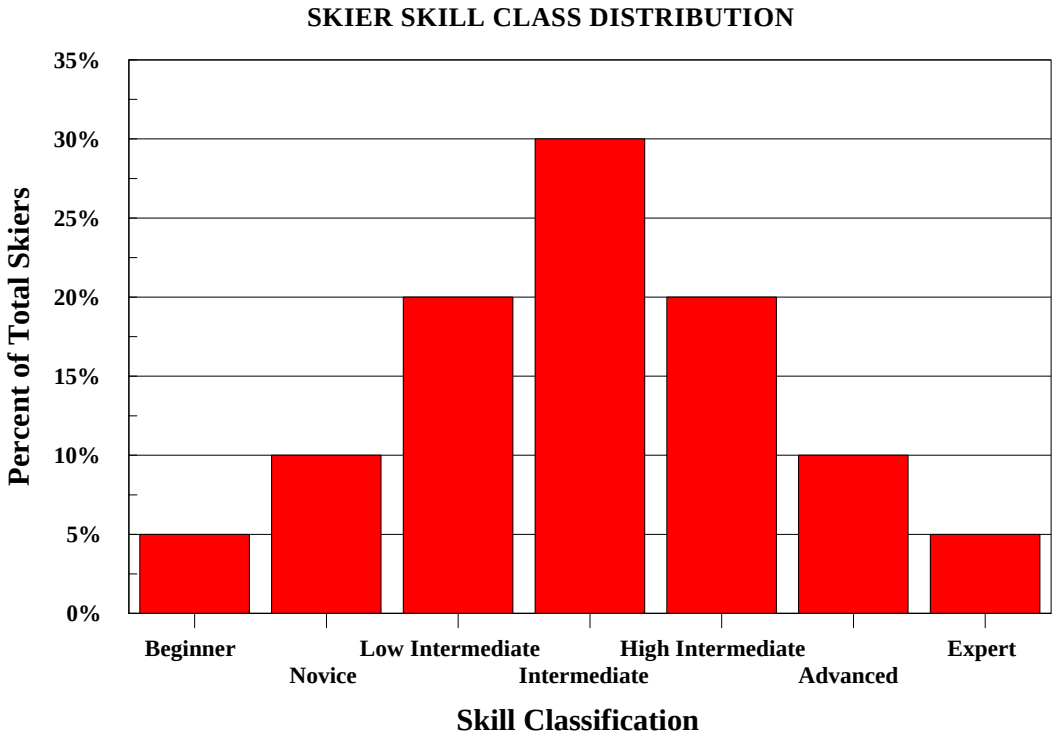


PLATE II.2

Vertical Transport Meters

As a general rule, as the proficiency of the skier increases, the demand for vertical meters increases. Table II.5 lists the low, average and high levels of VTM demand used by Ecosign for different regions of the world.

TABLE II.5
SKIING DEMAND BY SKILL CLASSIFICATION

Skill Classification	Planning Goals	Skier Demand VTM/Day		
		Low	Average	High
1 Beginner	5%	610	705	940
2 Novice	10%	1,370	1,595	2,120
3 Low Intermediate	20%	1,830	2,125	2,825
4 Intermediate	30%	2,440	2,830	3,770
5 High Intermediate	20%	3,290	3,840	5,080
6 Advanced	10%	3,840	4,460	5,935
7 Expert	5%	5,485	6,370	8,475
Weighted Average		**2,582**	**3,001**	**3,988**

Skier Densities

Based on the above mentioned review of various studies, we estimated skier densities which provide skiers with a high quality, comfortable experience, resulting in good memories and the likelihood of return visits. Densities used for planning ski areas in different parts of the world vary widely, due to the facilities the local skier has been conditioned to accept and the local land base, as illustrated in Plate II.3. In areas such as Europe, western Canada and the western United States, skier densities are relatively low compared to the densities found in ski areas in Japan or Australia, where skiers have been historically conditioned to higher densities. Densities in Japan are generally three times higher than densities in western North American destination resorts.

As shown in Table II.6, acceptable skier slope densities tend to decrease as the proficiency of the skier increases. The lower density for better skiers occurs due to their increased speed, and therefore longer stopping distances, and the general increase in space needed to avoid obstacles and other skiers. As shown, the exception to this rule is that slope densities increase slightly on expert terrain since these steep, ungroomed slopes dictate controlled, short radius turns. Under these conditions, expert skiers have slower speeds and require less space for safe skiing.

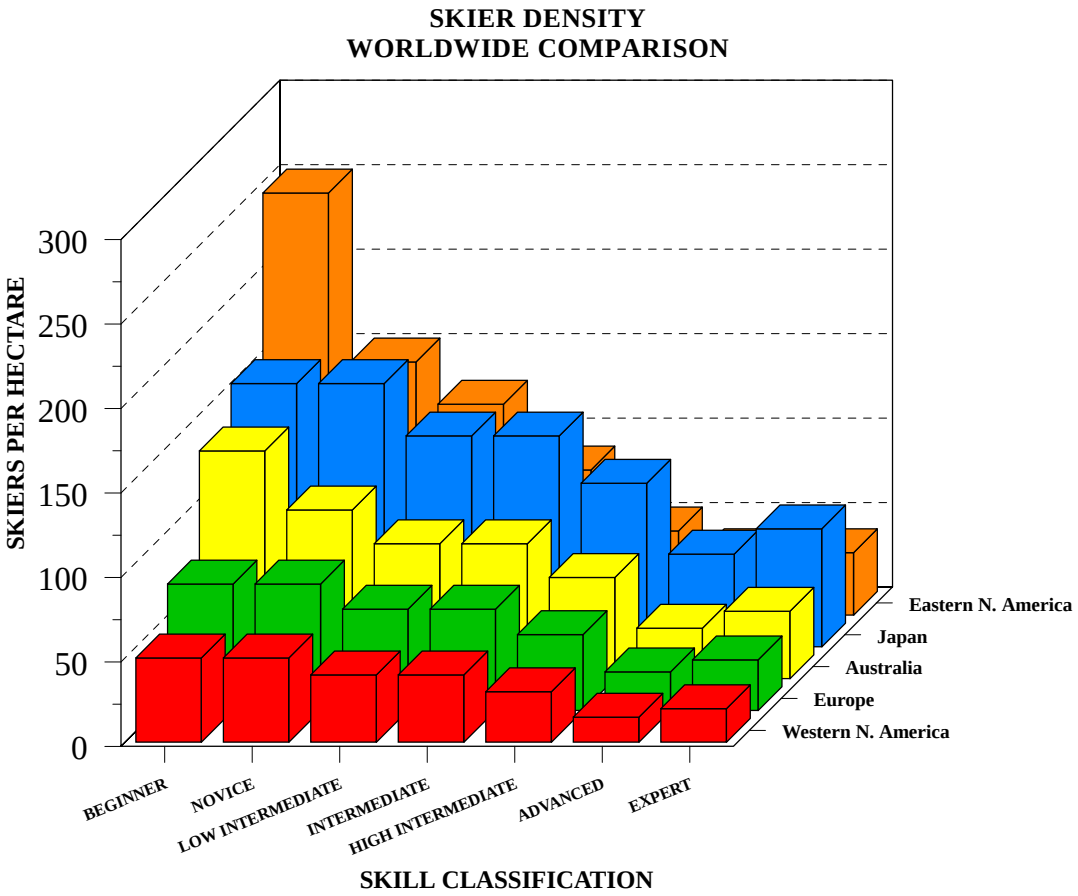


PLATE II.3

Listed in Table II.6 are the "SAOT" (Skiers At One Time) or “At Area” densities, which are based on the total number of skiers at the ski area, including skiers in lift queues, riding lifts, in restaurants and on the ski trails. "On-Slope" densities are significantly lower and take into account only those skiers actually on the ski trails at any given time.

The densities shown will be used both in the evaluation of the existing and proposed trail capacities and the potential terrain carrying capacity of the additional slopes adjacent to the presently developed area. One important point to realize here is that even though all skiers pay the same rate, it is more costly for an operator to provide an expert with adequate lifts and terrain than for a novice or intermediate skier. The planning parameters used for Kicking Horse are listed in Table II.6.

TABLE II.6
KICKING HORSE MOUNTAIN RESORT
PLANNING PARAMETERS

Skill Classification	Skill Mix	Acceptable Terrain Gradients	Skier Demand VTM / Day	Skier Densities Skiers per Ha. At Area	On Slope
1 Beginner	5%	8 - 15%	940	50	20
2 Novice	10%	15 – 25%	2,120	50	20
3 Low Intermediate	20%	25 – 35%	2,825	40	15
4 Intermediate	30%	30 – 40%	3,770	40	15
5 High Intermediate	20%	35 – 45%	5,085	30	12
6 Advanced	10%	45 – 60%	5,935	15	7
7 Expert	5%	60% +	8,475	20	10

Ski Trails Capacity Analysis

In the analysis and planning for the Kicking Horse ski area trail system, we have used the skier densities as listed in Table II.6. In order to determine the skier carrying capacity of each trail, we have multiplied the density of the skill level of skiers using a particular trail, with the slope area of the trail. Table II.7 lists the Kicking Horse trail capacities. As listed, Kicking Horse has a total trail capacity of approximately 6,000 skiers per day.

TABLE II.7
SKI/SNOWBOARD TRAIL CAPACITIES - EXISTING AREA

Trail Name		Trail No.	Skill Class	Total Vert. Meters	Slope Dist. Meters	Avg. Width Meters	Horz. Area Ha.	Slope Area Ha.	Skiers At Area Density	Total
Lift A - Catamount										
Gentle Ben	70% area	2	3	75	338	78	2.56	1.84	40	75
Crowfoot	70% area	3	3	55	315	44	1.35	0.96	40	40
Snow Goose	70% area	5	3	130	692	61	4.16	2.97	40	120
Mummery	20% area	6	2	125	682	65	4.34	0.88	50	45
Mummery	50% area	6	3	120	681	65	4.34	2.21	40	90
		10C	2	70	803	10	0.80	0.80	50	40
		10D	2	110	1,096	13	1.47	1.48	50	75
Big Ben	50% area	12	4	195	804	41	3.22	1.66	40	65
Lower Wolverine	50% area	13B	4	205	826	54	4.33	2.24	40	90
Lower Buffalo Jump	50% area	15B	3	180	713	40	2.76	1.43	40	55
L. Stellar Jay	50% area	16B	4	135	537	41	2.11	1.09	40	45
L. Wiley Coyote	50% area	17C	4	165	700	41	2.79	1.44	40	55
Lower Grizzly Paw	50% area	18C	4	110	512	35	1.77	0.91	40	35
Total Lift A		12	(not including		8,018			19.89		830
Lift B - Golden Eagle										
Gentle Ben	30% area	2	3	75	338	78	2.56	0.53	40	20
Crowfoot	30% area	3	3	55	315	44	1.35	0.27	40	10
Snow Goose	25% area	5	3	135	693	61	4.16	0.85	40	35
Mummery	25% area	6	3	125	682	65	4.34	0.88	40	35
Got Your Goat Right	80% area	8A	4	183	589	81	4.54	3.82	40	155
Got Your Goat Left	80% area	8B	5	170	624	43	2.56	2.13	30	65
Upper Wapiti	80% area	9A	4	35	106	38	0.38	0.32	40	15
Lower Wapiti	80% area	9B	4	205	845	56	4.61	3.80	40	150
	80% area	10A	3	320	2,461	37	9.13	7.37	40	295
	90% area	10B	3	400	3,046	10	3.01	2.74	40	110
Nose Dive	80% area	11	6	70	175	84	1.35	1.18	15	20
Big Ben	40% area	12	4	195	804	41	3.22	1.66	40	65
Upper Wolverine	80% area	13A	6	110	237	43	0.90	0.82	15	10
Upper Wolverine	40% area	13B	4	205	826	54	4.33	2.24	40	90
Lynx	80% area	14	6	98	297	35	0.99	0.84	15	15
Upper Buffalo Jump	80% area	15A	6	195	490	48	2.17	1.89	15	30
Lower Buffalo Jump	40% area	15B	3	180	713	40	2.76	1.43	40	55
U. Stellar Jay	80% area	16A	6	210	570	38	2.00	1.72	15	25
L. Stellar Jay	40% area	16B	4	135	547	40	2.11	1.09	40	45
U. Wiley Coyote		17A	7	130	264	42	0.97	1.11	20	20
Mid Wiley Coyote	80% area	17B	5	235	635	49	2.89	2.49	30	75
L. Wiley Coyote	40% area	17C	4	165	700	41	2.79	1.44	40	55
Upper Grizzly Paw		18A	7	115	231	37	0.74	0.85	20	15
Mid Grizzly Paw	80% area	18B	6	250	678	46	2.90	2.50	15	35
Lower Grizzly Paw	40% area	18C	4	110	512	35	1.77	0.91	40	35
Lower Grizzly Paw	80% area	18D	7	93	286	44	1.19	1.01	20	20
Terminator		24	7	425	1,198	67	7.49	8.01	20	160
Double Header Right		25A	7	375	821	55	4.05	4.55	20	90
Double Header Left		25B	7	315	731	51	3.39	3.76	20	75
Upper Hail Mary		26A	6	200	394	37	1.26	1.46	15	20
Lower Hail Mary		26B	6	165	387	75	2.62	2.90	15	45
Upper Liberty		27A	6	95	637	45	2.86	2.89	15	45
Lower Liberty		27B	6	305	673	65	3.91	4.39	15	65
Blowdown		29	6	170	371	30	0.99	1.11	15	15
Upper Show-Off		30A	6	255	570	90	4.57	5.11	15	75
Lower Show-Off	80% area	30B	6	110	273	42	1.05	0.92	15	15

TABLE II.7 CONT.
SKI/SNOWBOARD TRAIL CAPACITIES - EXISTING AREA

Trail Name		Trail No.	Skill Class	Total Vert. Meters	Slope Dist. Meters	Avg. Width Meters	Horz. Area Ha.	Slope Area Ha.	Skiers At Area Density	Total
Upper Bubbly		31A	5	90	285	40	1.08	1.14	30	35
Lower Bubbly		31B	7	175	374	84	2.78	3.15	20	65
Euphoria		32	6	70	166	46	0.69	0.76	15	10
Upper Sluiceway		33A	6	320	1,300	64	8.10	8.36	15	125
Lower Sluiceway		33B	6	83	360	23	0.80	0.82	15	10
Flying Dutchman		34	7	100	224	26	0.51	0.57	20	10
Think Twice		35	6	70	221	46	0.96	1.01	15	15
Northern Lights	50% area	36	3	200	1,138	85	9.48	4.82	40	195
Bugablue		40	4	255	1,492	31	4.55	4.62	40	185
		43A	6	40	81	60	0.42	0.48	15	5
Upper Blaster		43B	5	70	260	54	1.34	1.39	30	40
Lower Blaster	80% area	43C	5	75	261	65	1.63	1.36	30	40
Briggs Bragg		44	6	25	47	28	0.11	0.13	15	2
Tail Spin		45	5	150	745	16	1.18	1.20	30	35
CPR East		1/4 density	7					18.00	5	90
CPR West		1/4 density	7					22.26	5	110
Terminator		1/4 density	7					12.77	5	65
Redemption West	60% area	1/4 density	7				62.63	37.58	5	190
Total Lift B								201.36		3,332
Lift C - Stairway to Heaven										
	20% area	10A	5	320	2,461	37	9.13	1.84	30	55
Northern Lights	50% area	36	5	200	1,138	85	9.48	4.82	30	145
Cloud Nine		37	5	160	640	29	1.78	1.84	30	55
My Blue Heaven		38	7	160	394	116	4.17	4.56	20	90
Redemption East		1/2 density	7					29.00	10	290
Redemption West	40% area	1/4 density	7				62.63	25.05	5	125
Total Lift C								67.11		760
Lift D - Pioneer										
Snow Goose	5% area	5	3	135	693	61	4.16	0.85	40	35
Mummery	5% area	6	3	125	682	65	4.34	0.88	40	35
White Tail Right		7A	3	50	443	48	2.09	2.10	40	85
White Tail Left		7B	3	50	453	42	1.91	1.92	40	75
	20% area	8A	4	170	557	86	4.54	0.95	40	40
Got Your Goat	20% area	8B	5	170	624	43	2.56	0.53	30	15
Upper Wapiti	20% area	9A	4	35	106	38	0.38	0.08	40	5
Lower Wapiti	20% area	9B	4	205	845	56	4.61	0.95	40	40
	10% area	10B	3	400	3,046	10	3.01	0.61	40	25
Nose Dive	20% area	11	6	70	175	84	1.35	0.29	15	5
Big Ben	10% area	12	4	195	804	41	3.22	0.66	40	25
Upper Wolverine	20% area	13A	6	110	237	43	0.90	0.20	15	5
Upper Wolverine	10% area	13B	4	205	826	54	4.33	0.89	40	35
Lynx	20% area	14	6	98	297	35	0.99	0.21	15	5
Upper Buffalo Jump	20% area	15A	6	195	490	48	2.17	0.47	15	5
Lower Buffalo Jump	10% area	15B	3	180	713	40	2.76	0.57	40	25
U. Stellar Jay	20% area	16A	6	210	570	38	2.00	0.43	15	5
L. Stellar Jay	10% area	16B	4	135	547	40	2.11	0.44	40	15
Mid Wiley Coyote	20% area	17B	5	235	635	49	2.89	0.62	30	20
L. Wiley Coyote	10% area	17C	4	165	700	41	2.79	0.57	40	25
Mid Grizzly Paw	20% area	18B	6	250	678	46	2.90	0.62	15	10
Lower Grizzly Paw	10% area	18C	4	110	512	35	1.77	0.36	40	15
Lower Grizzly Paw	20% area	18D	7	93	286	44	1.19	0.25	20	5
Upper Porcupine		19A	6	280	754	46	3.23	3.48	15	50
Lower Porcupine		19B	5	235	748	45	3.17	3.34	30	100
Pioneer		20	7	515	1,436	28	3.74	4.01	20	80

TABLE II.7 CONT.
SKI/SNOWBOARD TRAIL CAPACITIES - EXISTING AREA

Trail Name		Trail No.	Skill Class	Total Vert. Meters	Slope Dist. Meters	Avg. Width Meters	Horz. Area Ha.	Slope Area Ha.	Skiers At Area Density	Total
U. Kicking Horse		21A	6	400	1,303	44	5.45	5.73	15	85
L. Kicking Horse		21B	6	120	379	62	2.22	2.34	15	35
Upper Bailout		22A	6	85	341	17	0.57	0.59	15	10
Lower Bailout		22B	6	25	291	24	0.70	0.70	15	10
Race Place		23	6	473	1,640	39	6.19	6.46	15	95
Lower Show-Off	20% area	30B	6	110	273	42	1.05	0.23	15	5
Lower Blaster	20% area	43C	5	75	261	65	1.63	0.34	30	10
Total Lift D								42.70		1,035
Lift E - Pony Express										
		1	1	15	101	35	0.35	0.35	50	20
Total Lift E								0.35		20
Total All Lifts								331.4	Ha	5,977
Other Trails										
Shhh!!!		39	3	55	553	13	0.73	0.73	40	30
Total Others		1			553			0.73		30
TOTAL								**332.1**		**6,007**

Lift Capacity Analysis

Utilizing the high industry skier vertical demand, we have calculated the skier carrying capacity (SCC) of Kicking Horse's existing lift facilities, as listed in Table II.8. Based upon this analysis, we estimate that the lift system can comfortably accommodate approximately 3,630 skiers per day. The capacity analysis assumes that the waiting time for a lift is equal to the ride time for the fixed grip lifts and the wait time is double the ride time for detachable grip lifts. Additionally, the VTM demand on each lift is determined by the terrain balance of the trails serviced by that lift.

TABLE II.8
KICKING HORSE
SKIER CARRYING CAPACITY - EXISTING AREA

Lift No.	Lift Name	Lift Type	Hourly Capacity	Vertical Meters	VTM/Hr (000)	VTM Demand	Loading Effic.	Access Reduc.	SCC
A	Catamount	4C	1,800	347	625	3,019	80%	4%	**1,120**
B	Golden Eagle	D8G	1,200	1,076	1,291	5,333	95%	17%	**1,340**
C	Stairway to Heaven	4C	1,500	390	585	7,338	80%	0%	**410**
D	Pioneer	2C	1,200	522	626	4,765	80%	0%	**740**
E	Pony Express	MC	400	10	4	940	80%	0%	**20**
Total			**6,100**		**3,131**				**3,630**

.6 Lift and Trail Balance

To accurately portray the terrain balance of the mountain complex, we computed the terrain available to each of the seven skier skill classifications and then multiplied by the skier densities exhibited in Table II.6. This exercise is often referred to as "area balancing" and provides management and the planning team with the data necessary to compare the mountain trail development with the apparent proportions of the skier market.

The Trail Balance By Lift System (Table II.9 and Plate II.4) portrays the relationship between each lift and trail system, as well as the proportionate amount of ski terrain available to each skier skill level on each lift. As previously listed, the lifts have a capacity of approximately 3,630 skiers per day, while the return cycle skiing trails have a capacity of 6,007 skiers per day, based on ideal densities. This low ratio of lift capacity compared to ski trail capacity within the existing area results in low densities on the ski slope. It would also be possible to increase the lift capacity in the Golden Eagle, Pioneer and Stairway to Heaven pods and still experience acceptable on-slope densities.

TABLE II.9
TRAIL BALANCE BY LIFT SYSTEM - EXISTING AREA

Lift No.	**A**	**C**	**B**	**D**	**E**	
Lift Name	**Catamount**	**Stairway to Heaven**	**Golden Eagle**	**Pioneer**	**Pony Express**	
Lift Type	**4C**	**4C**	**D8G**	**2C**	**MC**	
Lift Capacity	1,120	410	1,340	740	20	Skiers/Day
Trail Capacity	830	760	3,332	1,035	20	Skiers/Day
Trails:Lifts	74%	185%	249%	140%	100%	
Average Density	56.3	6.1	6.7	17.3	57.1	Skiers/Hectare
Optimum Density	41.9	23.4	29.3	29.1	50.0	Skiers/Hectare
Demand VTM	3,019	7,338	5,333	4,765	940	VTM/Skier/Day
Balance						
Beginner	0%	0%	0%	0%	100%	
Novice	19%	0%	0%	0%	0%	
Low Intermediate	46%	0%	23%	27%	0%	
Intermediate	35%	0%	24%	19%	0%	
High Intermediate	0%	34%	9%	14%	0%	
Advanced	0%	0%	17%	31%	0%	
Expert	0%	66%	27%	8%	0%	
Total	100%	100%	100%	100%	100%	

SKI TRAIL BALANCE BY LIFT SYSTEM

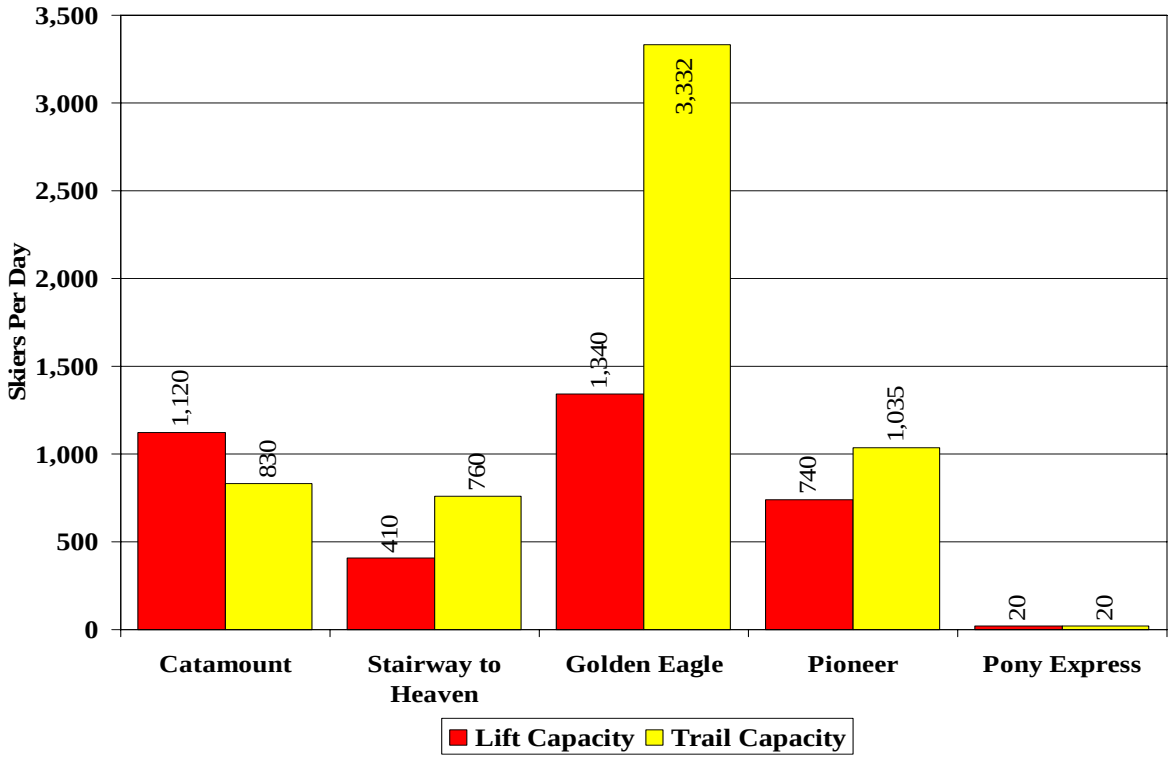


PLATE II.4

The Cumulative Ski Trail Balance Statement for the existing ski area is listed in Table II.10. Plate II.5 (Ski Trail Balance) indicates that the presently developed ski terrain at Kicking Horse, when compared to the apparent skill distribution of the skier market, is somewhat unbalanced.

TABLE II.10
KICKING HORSE MOUNTAIN RESORT
CUMULATIVE SKI TRAIL BALANCE STATEMENT

Skill Classification	Hectares	Skiers	Balance	Ideal
1 Beginner	0.4	20	0.3%	5%
2 Novice	3.2	160	2.7%	10%
3 Low Intermediate	35.9	1,445	24.1%	20%
4 Intermediate	32.1	1,285	21.4%	30%
5 High Intermediate	23.0	690	11.5%	20%
6 Advanced	61.0	907	15.1%	10%
7 Expert	176.5	1,500	25.0%	5%
TOTALS	**332.1**	**6,007**	**100%**	**100%**

Average Density =	10.9	Skiers/Hectare
Optimum Density =	30.4	Skiers/Hectare
Weighted Demand =	5,142	VTM/Skier/Day

CUMULATIVE SKI TRAIL BALANCE

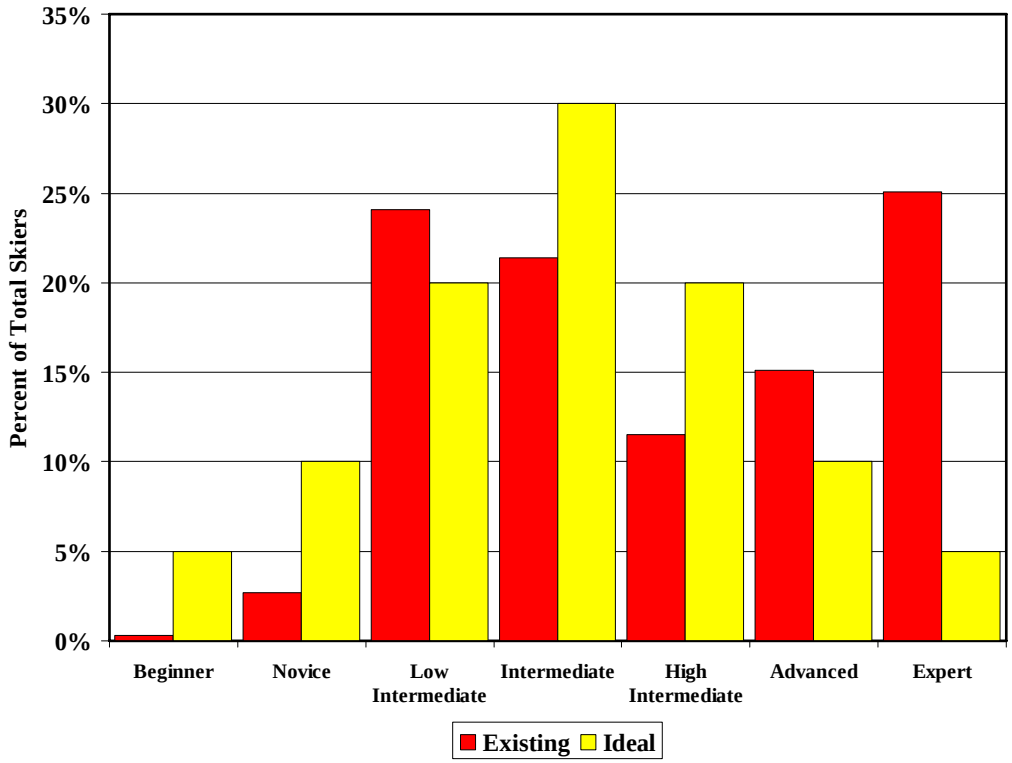


PLATE II.5

There is a lack of true beginner and novice terrain and a large surplus of advanced and expert terrain. It should be noted, that although the balance shows a significant amount of terrain in the intermediate skill classes, much of this terrain either falls on the lower mountain (where snowpack depth is an issue) or is accessible only via long skiways from the mountain top.

.7 Snow Grooming Equipment

Machine grooming (snow farming) of ski trails is an essential component of mountain operations, with new grooming techniques revolutionizing many aspects of today's ski business. Present industry guidelines recommend the regular grooming of all trails with beginner to high intermediate skill classifications, with the grooming of steeper trails on a less frequent basis using winch equipped snowcats. Swing or night shift grooming has become the rule in the industry, as it allows a longer period for groomed trails to cure (set up), while eliminating hazardous conflicts between skiers and machines. An effective summer grooming program (seeding and mulching) can save appreciable wear and tear on expensive snow grooming equipment, as well as produce earlier opening dates and lower snowmaking costs. Modern snow grooming machines come with many features and a selection of implements are available for optimizing the quality of grooming, and the time required to groom the slopes. Quick change hydraulic couplings and attachment fasteners have reduced the time and manpower required to change implements, allowing the

groomer to use the right implement for the job even in changing snow conditions during a single shift. Grooming requirements change over time due to climatic conditions and the extent of skier traffic on the trail, therefore, a good selection of grooming implements such as all-way blades, power tillers and compactor bars are necessary to increase the efficiency of the grooming fleet and to provide guests with an ideal sliding surface every day.

Kicking Horse Mountain Resort presently operates four front line grooming machines. These machines have an average of 1,604 operating hours, which is relatively young. In general, it is recommended that front line snow grooming machines be traded in as they approach the 6,000-hour mark, so that the average age of the fleet would remain just below the 3,000-hour level. Table II.11 summarizes the Kicking Horse grooming inventory.

TABLE II.11
KICKING HORSE
GROOMING INVENTORY

Machine #	Make	Model	Year	Hours	Implements
Front Line Grooming					
SC2	Pisten Bully	PB600 W	2007	467	Blade, Tiller , Winch
SC3	Pisten Bully	PB200 Edge	2007	842	Blade, Tiller
SC4	Pisten Bully	PB200 Park Bully	2005	3,484	Switch-Blade, Tiller
SC6	Prinoth (Bombardier)	BR350 Sherpa	2006	1,624	Blade, Tiller , Winch
Average Hours				**1,604**	
Other Uses					
SC1	Pisten Bully	PB200D	1991	9,800	Blade, People Transporter
SC5	Bombardier	BR275 W	2002	4,318	Blade, Tiller , Winch (Utility Use)

It is recommended that one fully operable grooming machine be available each nightly shift for every 20 hectares of groomable terrain in classes 1-5 and 5 hectares per shift for groomed class 6 terrain. Based upon these criteria, grooming trails in skill classes 1 to 5 and one shift per night, the current grooming requirements can be calculated as follows:

Groomable Terrain (acres)		/	Hectares per Machine	/	Availability	/	Grooming Frequency	=	No. of Machines Required	(Existing)
Class 1-5	93.9	/	20	/	90%	/	1 (Daily)	=	5.2	(2)
Class 6	61.0	/	5	/	90%	/	3.5 (Biweekly)	=	3.8	(2)

As shown above, Kicking Horse would be several snow cats short if it were their desire to groom every trail on the above schedule. Due to trail capacities significantly higher than lift capacity and business levels, the existing grooming fleet is likely adequate to achieve the desired quality of skiing surface for the limited number of skiers.

The calculation below lists the "skier capacity" of the existing grooming fleet when trails in skill classes 1-5 are groomed every day and winch routes are groomed twice per week (skill class 7 trails are not groomed).

No. of Machines	x Percent Availability	x ha. Machine	x Skiers / ha,	= Skiers Serviced
2	x 90%	x 20 ha.	x 38.06	= 1,370
2 Winch Cats	x 90%	x 5 ha. x 2 times/week	x 15	= 270
Class 7 Trails Not Groomed				= 1,500
Total Skiers Served				= 3,140

Kicking Horse Mountain Resort has a small maintenance shop facility that is not adequate for the vehicle maintenance purposes.

.8 Snowmaking

Kicking Horse currently has no snowmaking facilities. Although Kicking Horse typically has more than enough natural snow at the upper elevations, snowpacks are sometimes thin at the lower elevations. The lack of snowmaking and the arrangement of lifts put the Kicking Horse operation 100 percent at the mercy of the weather. Three of the four major lifts necessitate skiing to the base, through the lowest elevations with the least snowpack. The fourth lift, (the Stairway to Heaven quad chair) is located at a high elevation and therefore entirely in a different climatic zone with deeper snowpacks, however, skiers using this lift must ski the lower mountain to egress at the end of their day.

The lack of snowmaking on the lower mountain may also be limiting the attractiveness of the resort to the largest part of the skier market. The thinner natural snowpacks on the lower mountain and the fact that most of the intermediate terrain is on the lower mountain is also a deterrent to intermediate skiers when they can see vegetation poking through the snow on the ski runs which are most suitable for them.

.9 Skier Service Floorspace

Skier/snowboarder service functions are facilities specifically related to the operation and management of the resort area and can be grouped into three main categories including:

Staging Facilities: Those facilities required by skiers when first arriving at the resort

Commercial Facilities: Those facilities required by skiers once they have staged up the mountain

Operational Facilities: Those facilities required in the management and operation of the resort

Staging facilities include ticket sales, public lockers, equipment rental and repair, ski/snowboard school, nursery/daycare, and retail sales (related to the operation of the area only). Commercial facilities include food service seating (including bar seating), kitchen and food storage, and restrooms. Operational facilities include administration space, employee lockers, and first aid and patrol.

An inventory of the buildings and structures at Kicking Horse mountain resort was performed by Kicking Horse staff and given to Ecosign for analysis. The existing base area facilities are graphically illustrated on Figure 9.

The on mountain and base area skier service facilities at Kicking Horse have a total floorspace area of approximately 3,003 square meters, as listed in Table II.12. A total of 459 square meters of this skier service floorspace is situated on the mountain in the Eagle's Eye Restaurant at the top, and at mid mountain in the Heaven's Door Yurt.

Several buildings in the base area also contain a variety skier service functions. The base area skier services buildings contain a total of 2,544 square meters of skier service floorspace.

Base Area Day Lodge and Gondola

ecosign
Mountain Resort Planners Ltd.

TABLE II.12
KICKING HORSE MOUNTAIN RESORT
SKIER SERVICE INVENTORY

	BUILDING NAME:									TOTAL
	BASE AREA							ON MOUNTAIN		
Guest Service Function	Day Lodge (Sq.M.)	Glacier (Sq.M.)	Mountaineer (Sq.M.)	Admin (Sq.M.)	Patrol (Sq.M.)	Highland (Sq.M.)	Copper Horse (Sq.M.)	Eagle's Eye (Sq.M.)	Heaven's Door Yurt (Sq.M.)	
Staging Facilities										
Ticket Sales	42									**42**
Public Lockers	42									**42**
Equipment Rental & Repair		255								**255**
Guest Services / Snow Sport School	21									**21**
Children's Programs	111									**111**
Staging Subtotal (Sq. Meters)	**216**	**255**								**471**
Commercial Facilities										
Food & Beverage Seating	297	344					89	305	37	**1,072**
Kitchen & Scramble	74	74					22	76	9	**256**
Bar/Lounge		149				186				**334**
Restrooms	111							28	4	**143**
Accessory Retail	21	107	165							**293**
Commercial Subtotal (Sq. Meters)	**504**	**674**	**165**			**186**	**111**	**409**	**50**	**2,100**
Operational Facilities										
Administration				167						**167**
Employee Facilities				93						**93**
First Aid & Mountain Patrol	9					98				**107**
Operational Subtotal (Sq. Meters)	**9**			**260**		**98**				**367**
BUILDING SUBTOTAL (Sq. Meters)										
Storage										**0**
Mechanical, Circulation/Walls/Waste*	37							28		**65**
Stor./Mech./Circ./Walls/Waste Subtotal (Sq. Meters)	**37**							**28**		**65**
TOTAL GUEST SERVICE BUILDINGS (Sq. Meters)	**729**	**929**	**165**	**260**		**283**	**111**	**409**	**50**	**3,003**

Table II.13 lists the number of restaurant seats in each skier service restaurant at Kicking Horse. Ecosign calculates the capacity of the food service seats based on the following assumptions. Most people eat lunch between 11:30 hrs. and 13:30 hrs. and take approximately 30 to 40 minutes to eat their lunch, which results in three to four turns per food service seat. People normally take longer when they sit outside to eat so the outdoor seats are calculated at 2.0 turns per seat over the lunch period. By our estimates, the maximum number of people that Kicking Horse can serve during the lunch period with the existing indoor seats is 1,692 guests and an additional 476 guests from outdoor seats, for a combined total of 2,168 guests, as illustrated in Scenario 1 in Table V.13. Based on our assumptions, it appears that the total number of indoor and outdoor seats is not adequate to service the guests on a top ten design day. In order to service the guests on a top ten design day of 2,904 skiers, Kicking Horse would require an additional 245 indoor seats or would have to achieve more turns per seat indoors or 3.0 turns per seat outdoors. Assuming an average of 3.0 turns per seat outdoors, then approximately 2,406 guests could be served as shown in Scenario 2 in Table V.14.

TABLE II.13
KICKING HORSE MOUNTAIN RESORT
FOOD SERVICE SEAT INVENTORY - SCENARIO 1

	BASE AREA			MOUNTAIN		
Food Service Seating	**Daylodge**	**Glacier**	**Copper Horse**	**Eagle's Eye (Sq.M.)**	**Yurt (Sq.M.)**	**Total Served**
Number of Indoor Seats	180	149	75	130	30	**564**
Turns/Indoor Seat	3	3	3	3	3	
Guests Served Indoors	**540**	**447**	**225**	**390**	**90**	**1,692**
Number of Outdoor Seats	50	58	30	100		**238**
Turns/Outdoor Seat	2	2	2	2		
Guests Served Outdoors	**100**	**116**	**60**	**200**		**476**
Total Guests Served	**640**	**563**	**285**	**590**	**90**	**2,168**

TABLE II.14
KICKING HORSE MOUNTAIN RESORT
FOOD SERVICE SEAT INVENTORY - SCENARIO 2

	BASE AREA			MOUNTAIN		
Food Service Seating	**Daylodge**	**Glacier**	**Copper Horse**	**Eagle's Eye (Sq.M.)**	**Yurt (Sq.M.)**	**Total Served**
Number of Indoor Seats	180	149	75	130	30	**564**
Turns/Indoor Seat	3	3	3	3	3	
Guests Served Indoors	**540**	**447**	**225**	**390**	**90**	**1,692**
Number of Outdoor Seats	50	58	30	100		**238**
Turns/Outdoor Seat	3	3	3	3		
Guests Served Outdoors	**150**	**174**	**90**	**300**		**714**
Total Guests Served	**690**	**621**	**315**	**690**	**90**	**2,406**

Base Area Facilities

Space Use Analysis

In Table II.15 illustrates that amount of floor area that the Kicking Horse resort has for each of the industry accepted skier service functions at the resort.

TABLE II.15
SKIER SERVICE FLOORSPACE INVENTORY

Guest Service Function	Total Existing Floorspace
Staging Facilities	**(Sq.m.)**
Ticket Sales	**42**
Public Lockers	**42**
Equipment Rental & Repair	**255**
Guest Services/Ski School	**21**
Children's Programs	**111**
Subtotal Staging Facilities	**471**
Commercial Facilities	
Food Service Seating	**1,072**
Kitchen & Scramble	**256**
Bar/Lounge	**334**
Restrooms	**143**
Accessory/Retail Sales	**293**
Subtotal Commercial Facilities	**2,100**
Operational Facilities	
Administration	**167**
Employee Facilities	**93**
First Aid & Ski Patrol	**107**
Subtotal Operations Facilities	**367**
Subtotal all Facilities	**2,938**
Storage Circ./Walls/Waste/Mech.	**65**
Total (Sq. m.)	**3,003**

As listed in Table II.16, Ecosign has analyzed the existing skier service facilities. Ecosign used a design day of 2,904 or 80 percent of the SCC of 3,630 skiers in order to estimate the required skier services. The categories that notably exceed the recommended amount of floorspace are tickets, bar/lounge, accessory retail, and first aid and ski patrol space as graphically illustrated in Plate II.6. The food service seating areas are close to being adequate for the average weekend skier visit levels, however, this will only be enough on days when the outdoor seating can also be utilized. On peak days with inclement weather, the indoor food services are not able to seat all guests. Some services appear to have significant shortages, such as public lockers, guest services and ski school, kitchen and scramble, and restrooms. If the existing skier service floor area at the Kicking Horse resort were distributed between the 15 skier service functions based on the industry standard excluding the storage and circulation walls and waste, the existing space would be able to accommodate approximately 2,746 skiers which is below the design day capacity.

TABLE II.16
SKIER SERVICE SPACE USE ANALYSIS

Skier Carrying Capacity = 3,630
Design Day - (80% of SCC) = 2,904

Guest Service Function	Total Existing Floorspace	Ski Area Standard Recomm. Floorspace	+/- Ski Area Standard	Percentage of Standard
Staging Facilities	**(Sq.m.)**	**(Sq.m.)**	(Sq.m.)	
Ticket Sales	**42**	**27**	14.8	155%
Public Lockers	**42**	**189**	-147.0	22%
Equipment Rental & Repair	**255**	**216**	39.5	118%
Guest Services/Ski School	**21**	**67**	-46.5	31%
Children's Programs	**111**	**94**	17.1	118%
Subtotal Staging Facilities	**471**	**594**	-122.2	79%
Commercial Facilities				
Food Service Seating	**1,072**	**1,162**	-89.5	92%
Kitchen & Scramble	**256**	**581**	-324.4	44%
Bar/Lounge	**334**	**135**	199.6	248%
Restrooms	**143**	**218**	-74.4	66%
Accessory/Retail Sales	**293**	**108**	185.4	272%
Subtotal Commercial Facilities	**2,100**	**2,203**	-103.4	95%
Operational Facilities				
Administration	**167**	**162**	5.4	103%
Employee Facilities	**93**	**81**	12.0	115%
First Aid & Ski Patrol	**107**	**67**	39.4	158%
Subtotal Operations Facilities	**367**	**310**	56.7	118%
Subtotal all Facilities	**2,938**	**3,107**	-168.9	95%
Storage		**311**	-310.7	0%
Circ./Walls/Waste/Mech.	**65**	**466**	-401.0	14%
Total (Sq. m.)	**3,003**	**3,883**	-880.6	77%

KICKING HORSE MOUNTAIN RESORT
SKIER SERVICE SPACE USE ANALYSIS

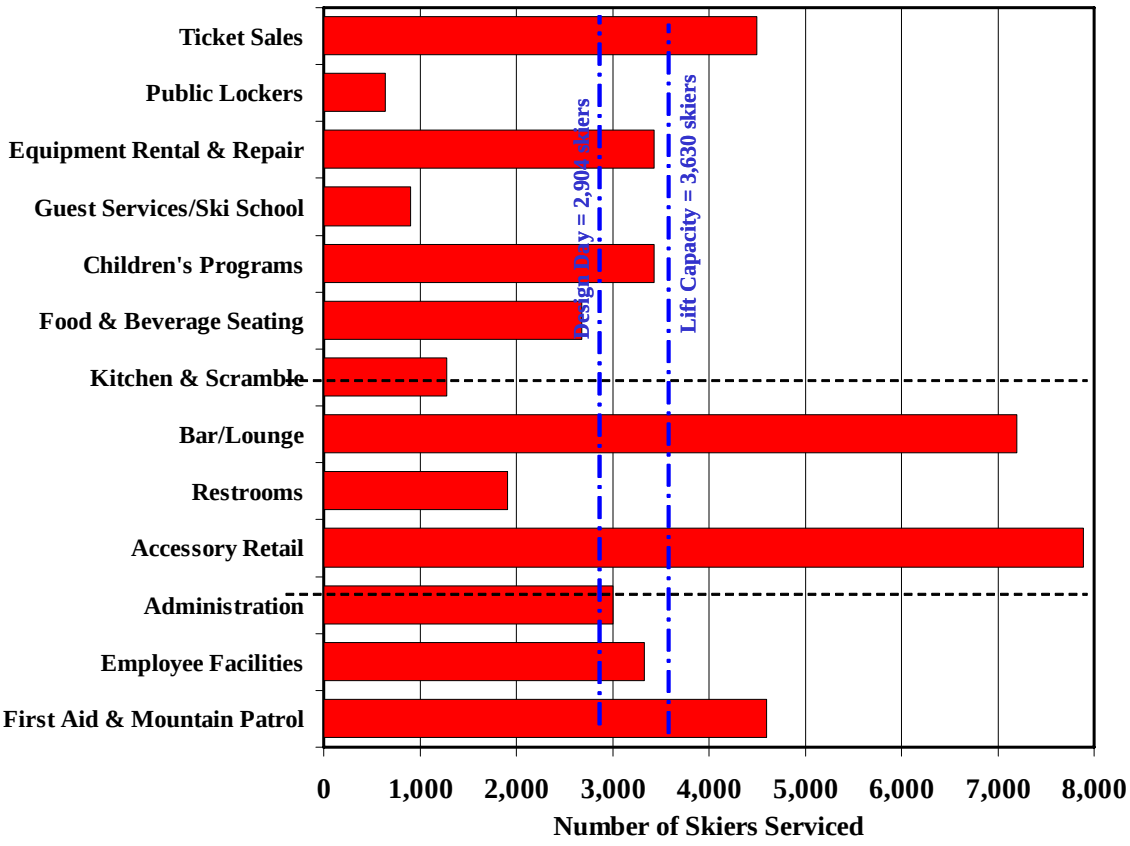


PLATE II.6

.10 Circulation and Parking

At Kicking Horse, a large number of skiers and snowboarders are delivered to the resort by way of automobile and charter bus As such, all guests must be parked in the five parking lots situated in various locations. An inventory and capacity analysis of the parking areas, based on their surface area is listed in Table II.17. The existing parking lot locations are identified on Figure 9, the Existing Base Area Facilities drawing.

It is assumed that the number of people arriving by car will average between 2.5 and 2.8 guests per car. The number of cars that can be parked in a paved, well-organized parking lot is approximately 345 cars per hectare. However, because the parking lots at Kicking Horse are not paved and are irregular in shape, we estimate that the parking lots are achieving much less per hectare. Parking counts for the 2007–2008 season were supplied to Ecosign from the Kicking Horse staff and was analyzed based on the maximum capacity of each lot achieved on peak days.

From this data, it appears that the lots are only parking about 295 cars per hectare, on average. A higher efficiency could be achieved and more cars parked by paving the parking lots or by having more staff available to help direct the cars.

Based on an average occupancy of 2.5 guests per car and 40 guests per bus, these parking lots can accommodate about 2,438 guests and based on an estimated skier participation rate of 90 percent, could generate about 2,200 skiers.

TABLE II.17
KICKING HORSE MOUNTAIN RESORT
PARKING INVENTORY

Parking Lot	Lot Area (ha.)	Number of Cars	Number of Guests By Car	Number of Skiers By Car	Number of Buses	Number of Guests By bus	Number of Skiers By Bus	Total Skiers
Lot 1 - Main Lot	0.9	253	633	569				569
Lot 2 - Bus Lot	0.3	40	100	90	10	400	360	450
Lot 3 - Daylodge Lot	0.5	146	365	329				329
Lot 4 - Upper North Lot	0.5	186	465	419				419
Lot 5 - Lower North Lot	0.6	190	475	428				428
Subtotal	**2.8**	**815**	**2,038**	**1,834**	**10**	**400**	**360**	**2,194**

.11 Overnight Accommodation

An existing accommodation inventory was prepared from data supplied by Kicking Horse staff. The existing accommodation consists of a mixture of public and private beds. The public accommodation is in the form of bed and breakfast lodges, townhomes (50 percent public) and condotels located within comfortable skier walking distance to the lifts. The private accommodation units are mainly single family chalets or townhomes (50 percent private). As shown in Table II.18, there are a total of 1,600 beds filed at the Kicking Horse base area. Of these 1,600 beds, 960 beds are constructed, 192 beds are under construction and 448 beds have not been started. All public beds are available for nightly rental by tourists and skiers/snowboarders.

TABLE II.18
KICKING HORSE MOUNTAIN RESORT
ACCOMMODATION INVENTORY
(SEPTEMBER 2007)

Building	Type	# of Units	Number of Bed Units			
			BUs Built	BUs Not Commenced	BUs Under Construction	BUs Filed
Copper Horse Lodge	B & B	1	6			6
Highland Lodge		1	6			6
Vagabond Lodge		1	6			6
Subtotal		**3**	**18**			**18**
Glacier Lodge	Condotel	56	208			208
Great Bear Lodge-Building A		49				
Great Bear Lodge-Building B		44				
Plaza - Block C		90				
Palliser Lodge		48	176			176
The Mountaineer		51	200			200
Subtotal		**338**	**584**			**584**
Cache Estates	SFU	15	40	4	30	74
Cache Residences		19	24	42	48	114
Dogtooth		16	18	72	6	96
Cabins in the Woods		17		68		68
Cedar Creek Estates		19		114		114
Founders' Chalets		10				
Purcell Woods		29	116			116
Subtotal		**125**	**198**	**300**	**84**	**582**
Selkirk Resort Homes	MFU	28	72	40		112
Founders' Townhomes		42				
Whispering Pines		22	88			88
The Aspens		60		108	108	216
Subtotal		**152**	**160**	**148**	**108**	**416**
Total		**618**	**960**	**448**	**192**	**1,600**

Figure 9 also illustrates the theoretical Skier Walking Distance "necklace" emanating from each of the main staging lift terminals. The theoretical Skier Walking Distance (SWD) has been developed as an analysis tool to evaluate the layout of ski resort base areas. Skier walking distance is defined as the distance someone walking in ski boots and carrying equipment can comfortably walk in 10 minutes. A walking speed of 2.7 kilometers per hour is assumed, which translates to a skier walking distance of 450 meters over level ground. For each meter of vertical change, a reduction factor of 4 meter is subtracted from the 450-meter length. In addition, any ski-in/ski-out accommodation or accommodation that is within SWD distance of a ski trail that will lead down to the lift is considered to be within SWD of the lift base.

Skiers from Accommodation

In order to estimate the number of skiers who come from Kicking Horse's accommodation on a peak day (the skier yield), an occupancy rate needs to be assumed for each type of accommodation, and an estimate of the percentage of guests that ski or snowboard on a given day must be made. A peak period day represents the business level on the average of the top ten days in the last season. In developing these rates, some key factors need to be considered.

- For each type of accommodation, there is a unit occupancy rate. The unit occupancy rate is the percentage of the available hotel rooms or private apartments that are occupied during peak holiday periods. Generally, from our experience at other resorts, we have found that the occupancy rates for commercial public accommodation are higher than the occupancy rate of private apartments unless, of course, these apartments are full time residences.

- Even though a hotel room is rented, or the owner of a private apartment is occupying their unit, not every pillow in it may be occupied. For example, a private apartment capable of sleeping eight may be occupied by a group of four or five, or a hotel room with four pillows may be occupied by one couple.

- Not all of the guests staying at the resort may elect to ski or snowboard on any given day. Some of the guests may be non-skiers accompanying the family, some may be pursuing other alternative winter activities around the resort and some may not ski because it is the day they are arriving at, or departing from the resort.

Utilizing the bed unit information from the Kicking Horse staff, we have assumed occupancy rates and skier participation rates for public and private accommodation for periods of peak occupancy, as shown in Table II.19.

TABLE II.19
KICKING HORSE
PEAK PERIOD OCCUPANCY AND SKIER PARTICIPATION RATES

ASSUMPTIONS	Unit Occupancy Rate	Bed Occupancy Rate	Guest Yield from Beds	Skier Participation Rate	Skier Yield Rate
Hotels/ Village	90%	90%	80%	80%	65%
Multi-Family (50% Public/ 50% Private)	80%	80%	64%	80%	51%
Private Accommodation	50%	70%	35%	70%	25%

Using the accommodation information provided and the occupancy and skier participation rates outlined in Table II.19, we are able to estimate the occupancy rates during peak periods. It should be noted that the overnight skiers were calculated using the accommodation units that have been built and the units currently under construction. The existing accommodation and units under construction at Kicking Horse Resort can generate a total of approximately 642 overnight skiers based on our assumptions, as shown in Table II.20.

TABLE II.20
KICKING HORSE
OVERNIGHT SKIERS FROM RESORT AREA ACCOMMODATION
(BUILT AND UNDER CONSTRUCTION)

	Building Type	Beds	Unit Occup-ancy Rate	Bed Occup-ancy Rate	Overnight Guests	Percent Skiing	Overnight Skiers	Within SWD Y/N
Public B & B / Condotel Accommodation								
Copper Horse Lodge	B & B	6	90%	90%	5	80%	4	Y
Highland Lodge	B & B	6	90%	90%	5	80%	4	Y
Vagabond Lodge	B & B	6	90%	90%	5	80%	4	Y
Subtotal		*18*			*15*		*12*	
Glacier Lodge	Condo	208	90%	90%	168	80%	134	Y
Palliser Lodge	Condo	176	90%	90%	143	80%	114	Y
The Mountaineer	Condo	200	90%	90%	162	80%	130	Y
Subtotal		*584*			*473*		*378*	
Sub-total Public		**602**			**488**		**390**	
Multi-Family (50% Public/ 50% Private)								
Selkirk Resort Homes	Townhomes	72	80%	80%	58	80%	46	Y
Whispering Pines	Townhomes	88	80%	80%	71	80%	57	Y
The Aspens	Townhomes	108	80%	80%	87	80%	70	Y
Subtotal Mix Use		**268**			**216**		**173**	
Private SFU Accommodation								
Cache Estates	SFU	70	50%	70%	25	70%	20	Y
Cache Residences	SFU	72	50%	70%	25	70%	20	Y
Dogtooth	SFU	24	50%	70%	8	70%	6	Y
Purcell Woods	SFU	116	50%	70%	41	70%	33	Y
Sub-total Private		*282*			*99*		*79*	
Total		**1,152**			**803**		**642**	

.12 Existing Base Area Staging Analysis

The purpose of the base area staging analysis is to estimate the number of skiers the base area can supply to the mountain during periods of peak occupancy. This analysis also looks at the circulation of guests and skiers in the base area. For this process, skiers are divided into two groups: "Day Skiers" who are skiers that originate from outside the area and are coming to ski for one day, and "Overnight Skiers" who are skiers generated from accommodation within the resort. Overnight Skiers are further divided into those staying in ski-in/ski-out accommodation close to the lift bases and those who must drive or take public transportation to get to the ski lifts. The base area capacity is the sum of the number of skiers who come from accommodation within walking distance of the lifts, plus the number of skiers that can be supplied to the resort from the available skier parking within walking distance of the lifts and from public transportation and private shuttle bus systems. If overnight skiers use their car to get to the lifts, there will be less parking available for day skiers from outside the resort.

Table II.21summarizes the theoretical capacity of Kicking Horse existing base area accommodation and parking to supply skiers to the staging lifts, based on the assumptions for parking, accommodation occupancy and skier participation rates presented in the previous sections. As outlined in Table II.21, the existing beds at Kicking Horse within skier walking distance have the capacity to supply an estimated 642 overnight skiers. The day skier car and charter bus parking can supply an additional 2,194 skiers. Therefore, the total staging capacity of the Kicking Horse base area is just over 2,836 skiers at current occupancy levels.

TABLE II.21
KICKING HORSE RESORT
STAGING ANALYSIS

Source	Beds	Skiers
Skiers from Public Accommodation within SWD	736	477
Skiers From Private Accommodation within SWD	416	166
Sub-total Skiers from Accommodation within SWD	***1,152***	***642***
Skiers from Car Parking		1,834
Skiers from Charter Buses		360
Sub-total Skiers from Parking and Drop-off		***2,194***
Total Base Area Staging Capacity		**2,836**

.13 Area Facilities Balance

Throughout the previous sections, we have prepared an inventory of all existing facilities for the winter operation of the resort. We have subsequently analyzed the Skier Carrying Capacity (Skiers At One Time) and daily capacity of the following operational elements: lifts, trails, grooming, food service seating, skier service floorspace, and parking capacity. We have prepared a graphic representation of the overall balance of these facilities for the winter season in Plate II.7. To easily compare these diverse facilities, all capacities have been calculated in terms of the number of skiers that can be accommodated in one day.

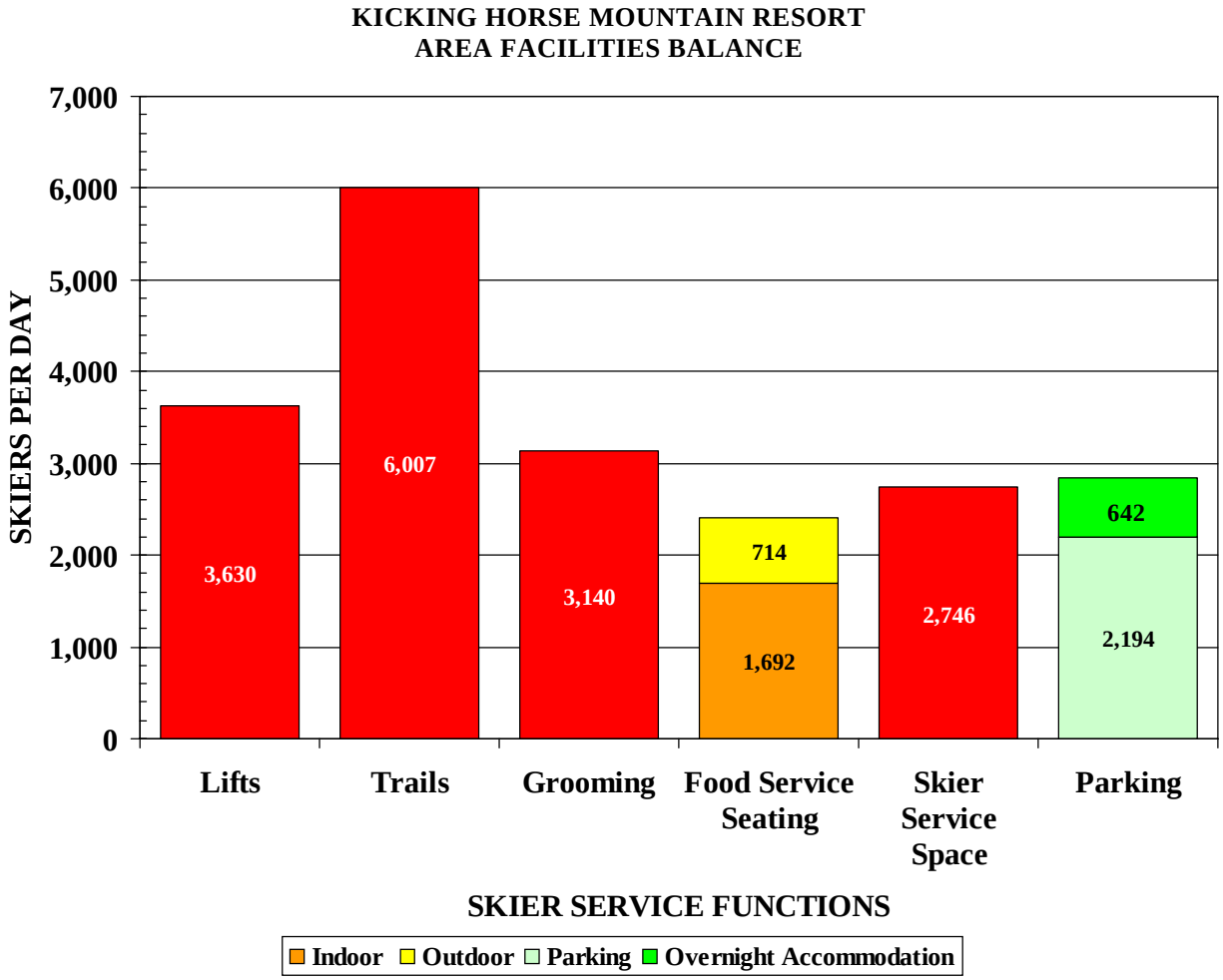


PLATE II.7

III. DEVELOPMENT ANALYSIS

The purpose of the Development Analysis section is to blend the information and/or constraints identified in the Inventory section with acceptable ski industry planning and design parameters. Specifically, the constraints imposed by climate, surficial geology, topographic features, natural hazards, forest cover, existing development and visual quality objectives "shrink" the overall size and development potential of the area.

.1 Mountain Design Analysis

Accurate topographic mapping is a prerequisite for good mountain planning. During the technical assessment phase, the planning team utilized topographic mapping with 5-meter contour intervals provided by Kicking Horse. The mapped area covers approximately 5,900 hectares, while the area selected for mountain potential analysis covers only 2,000 hectares.

Utilizing this topographic mapping, the most critical analysis map for the ski area design and evaluation process was prepared; the Mountain Slope/Terrain Capacity Analysis Map (Figure 10a). Figure 10b illustrates the Mountain Slope/Terrain Capacity Analysis map in a 3-dimensional perspective. The Mountain Slope Map delineates the areas that can be negotiated by the various skier ability levels, as well as areas that are considered too flat or too steep for skiing/snowboarding. The natural slope gradients were carefully measured and colour-coded into the following five classifications:

Slope Gradients	Colour	Type of Skiing/Snowboarding
0 - 8%	white	flats, marginal skiing
8 - 25%	green	beginner and novice skiing
25 - 45%	yellow	intermediate skiing
45 - 70%	blue	advanced and expert skiing
70% +	red	unskiable, safety zones

These maps were then utilized in the evaluation of the terrain and will play a critical role in identifying terrain suitable for further analysis, as well as developing conceptual alternatives.

.2 Mountain Terrain Capacity Analysis

We have analyzed the natural terrain within the Kicking Horse study area which exhibits characteristics suitable for skiing and snowboarding, to accurately establish the area's overall ski development potential. The Mountain Slope/Terrain Capacity Analysis Map in Figure 10a graphically illustrates major terrain "pods" within the study area which possess good potential for ski development. The pods were selected by consulting the Slope and Fall Line Analysis Maps and observing the following criteria:

- continuous fall line skiing from top to bottom
- suitable upper and lower lift terminal locations (e.g., 0.2 hectares less than 25 percent slope)
- good slope continuity to allow interesting skiing from top to bottom for one or more skier ability levels
- natural slope gradients primarily greater than eight percent and less than 70 percent

Within each terrain pod, the upper and lower points are joined to establish the total vertical rise, horizontal distance, straight line slope and average slope gradient. The total pod area was measured and calculated. The above data comprises the inputs to our terrain capacity computer program. The final program input is a judgement which identifies the "primary" skier skill classification for each terrain pod. The program outputs are as follows:

AVAILABLE SKI TERRAIN - net developable terrain within the pod. It is assumed that pods will be able to support skiing on 35 percent of the useable terrain within the pod, depending on topography, vegetation, geology, etc., as well as the shape of the pod.

TOTAL SKIERS – number of skiers and boarders possible in pod at acceptable densities.

DEMAND VTM (000) - vertical transport meters required to service the total skiers.

LIFT CAPACITY/HR. - the net hourly lift capacity necessary to maximize the development of each pod.

The Mountain Slope & Terrain Capacity Analysis Map and program printouts provide a reliable indication of the maximum development potential of each pod and zone of the study area and the lift capacity necessary to balance with the terrain.

Figure 10a illustrates a total of 29 terrain pods that have been identified within the overall Kicking Horse CRA study area which contain skiing and snowboarding terrain. These 29 pods encompass a total of 638.8 hectares, of which approximately 255 hectares could be developed into trails at full densities. At ideal densities, these 29 pods could support approximately 10,700 skiers, if fully developed. The detailed specifications and critical parameters for each of these 29 Kicking Horse pods are listed in Table III.1.

TABLE III.1
KICKING HORSE MOUNTAIN RESORT
TERRAIN CAPACITY ANALYSIS

Terrain Pod	Top Elevation m.	Bottom Elevation m.	Total Vertical m.	Horizontal Distance m.	Slope Distance m.	Average Slope %	Skill Class	Skier Density/Ha.	VTM Demand/Day	Total Area Ha.	% Ski Terrain Available	Available Ski Terrain	Total Skiers	Demand VTM (000)	Lift Capacity.Hr.
1	2,330	2,015	315	1,000	1,048	32%	7	30	8,475	27.9	40%	11.2	**330**	444	1,409
2	2,332	2,033	299	1,030	1,073	29%	7	30	8,475	26.8	40%	10.7	**320**	430	1,440
3	2,290	2,033	257	1,320	1,345	19%	3	60	2,825	23.1	40%	9.3	**560**	251	977
4	2,445	2,270	175	360	400	49%	6	23	5,935	6.1	40%	2.4	**50**	47	269
5	2,400	2,027	373	1,470	1,517	25%	7	30	8,475	24.2	40%	9.7	**290**	390	1,046
6	2,062	1,683	379	1,000	1,069	38%	7	30	8,475	26.7	40%	10.7	**320**	430	1,136
7	2,050	1,570	480	1,020	1,127	47%	6	23	5,935	46.4	40%	18.6	**420**	396	824
8	1,611	1,264	347	1,435	1,476	24%	3	60	2,825	36.0	40%	14.4	**860**	386	1,111
9	1,635	1,440	195	660	688	30%	4	60	3,770	22.2	40%	8.9	**530**	317	1,626
10	1,354	1,315	39	300	303	13%	1	75	940	2.5	40%	1.0	**80**	12	306
11	1,345	1,300	45	280	284	16%	1	75	940	2.4	40%	1.0	**70**	10	232
12	1,710	1,295	415	1,170	1,241	35%	5	45	5,085	50.5	40%	20.2	**910**	735	1,770
13	2,236	2,072	164	760	777	22%	3	60	2,825	13.7	40%	5.5	**330**	148	902
14	2,290	2,090	200	540	576	37%	6	23	5,935	12.9	40%	5.2	**120**	113	565
15	2,085	2,065	20	213	214	9%	1	75	940	1.3	40%	0.5	**40**	6	298
22	1,445	1,380	65	420	425	15%	2	75	2,120	4.4	40%	1.8	**130**	44	673
23	1,921	1,639	282	750	801	38%	5	45	5,085	29.5	40%	11.8	**530**	428	1,517
24	2,275	1,990	285	650	710	44%	6	23	5,935	21.4	40%	8.6	**190**	179	628
25	2,110	1,990	120	746	756	16%	2	75	2,120	7.7	40%	3.1	**230**	77	645
26	1,980	1,450	530	1,240	1,349	43%	5	45	5,085	59.5	40%	23.8	**1,070**	864	1,630
27	2,176	1,587	589	1,140	1,283	52%	6	23	5,935	49.5	40%	19.8	**450**	424	720
28	1,585	1,430	155	480	504	32%	4	60	3,770	15.0	40%	6.0	**360**	215	1,390
29	1,635	1,425	210	680	712	31%	4	60	3,770	26.2	40%	10.5	**630**	377	1,795
TOTAL			6,973		23,370					638.8		255.5	**10,700**		28,670

The Terrain Pod Balance Statement for the Kicking Horse study area within the CRA (Table III.2 and Plate III.1) documents that the skill level distribution of the natural terrain within the study area is concentrated even more to the higher skill levels. There is an excess of high intermediate, advanced and expert terrain and shortages of beginner, novice and low intermediate. There is a significant shortage of intermediate terrain.

TABLE III.2
TERRAIN POD BALANCE

Skill Classification	Hectares	Skiers	Balance	Ideal
1 Beginner	5.1	390	3.6%	5%
2 Novice	12.5	940	8.8%	10%
3 Low Intermediate	29.1	1,750	16.4%	20%
4 Intermediate	33.3	2,000	18.7%	30%
5 High Intermediate	60.3	2,710	25.3%	20%
6 Advanced	73.0	1,650	15.4%	10%
7 Expert	42.2	1,260	11.8%	5%
Total	**255.5**	**10,700**	**100%**	**100%**

Optimum Density =	48.8	Skiers/Hectare
Weighted Demand =	4,588	VTM/Skier/Day

TERRAIN POD BALANCE

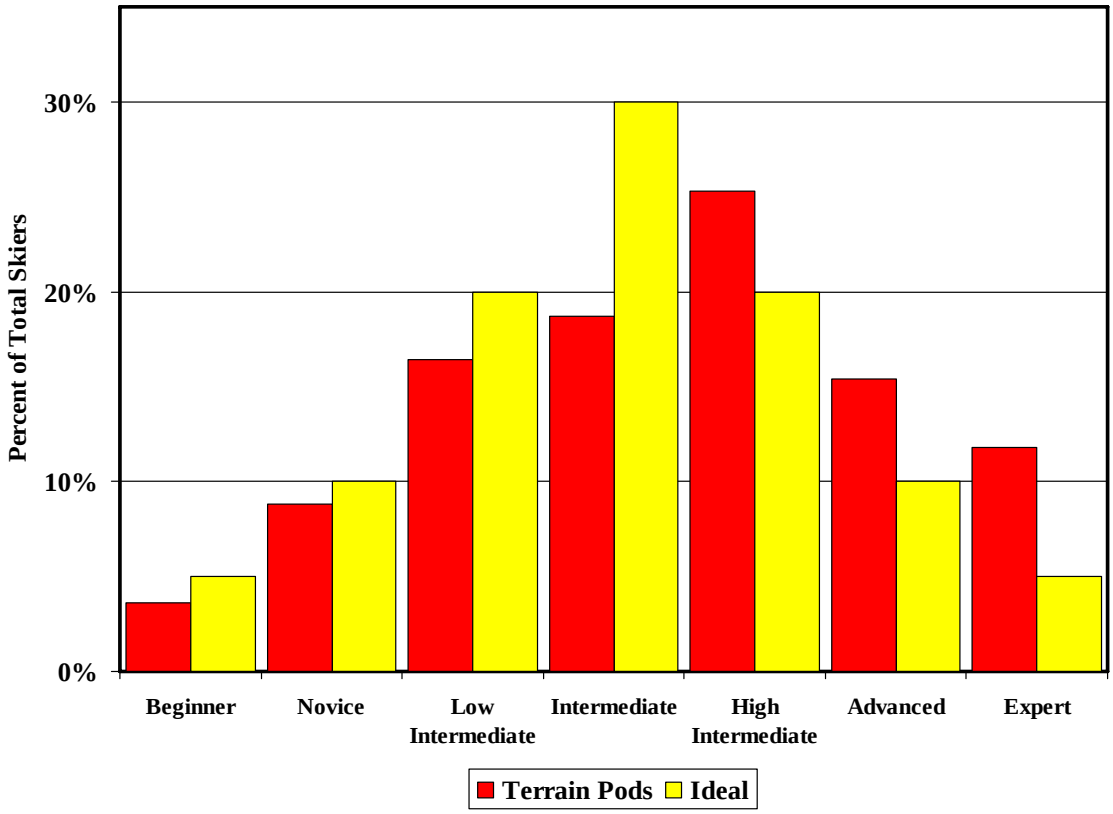


PLATE III.1

.3 Base Area Development Analysis

Introduction

The objectives of the Base Area Development Analysis are to illustrate the suitability of the Kicking Horse base lands to support ski area infrastructure, skier staging and service functions and to formulate guidelines for ski area base lands development. The first step is the preparation of a design analysis drawing that includes a base area slope analysis (Figure 11), which will help to identify potential development areas based on slope gradients and location.

Potential development areas are evaluated in terms of their slope and development suitability as required, to support skiing and snowboarding service activities and to assist in determining the ultimate development potential of the base lands. Figure 9 illustrates the existing base facilities, ski area road access and day skier parking, skier staging areas and skier service and operations buildings. The Existing Base Area Facilities map and the Base Slope Analysis map will help guide the planning and design for the Kicking Horse ski area development concept.

Base Area Goals and Objectives

The primary goal for the Kicking Horse Mountain Resort is to create a well balanced facility which offers a positive visitor experience with a range of potential year-round recreational opportunities. In order to optimize the potential of the resort, the design team has identified eight general goals which provide common guidelines for the planning and design process.

1. To create a high quality, year-round recreational environment.
2. To balance all base area and skier staging facilities with the mountain's lift and ski trail capacity.
3. To respect the site's existing and natural attributes.
4. To create a development which contributes to the local economy and provides employment opportunities.
5. To create a unique, recreational resort environment which minimizes pedestrian and vehicular conflicts.
6. To provide a diverse resort environment which is attractive to a wide spectrum of clientele.
7. To create additional mountain recreational amenities and identify real estate opportunities that compliment and enhance the guest experience in the existing resort
8. Identify expansion areas for parking and snow play activities

Base Area Slope Analysis

Slope gradients within the base area are critical in determining the size and location of suitable terrain required for base area skier service facilities, parking areas and lift staging zones. The Base Area Slope Analysis has been prepared utilizing 1-meter mapping provided by the client. The development potential for each class of slope gradient is listed below.

0 - 8%	White	Considered essentially "level" for roads, parking and larger structures such as village and tourist accommodation
8 - 15%	Green	Usable for roads, parking and larger structures but with major terrain modification
15 - 25%	Yellow	Best suited for smaller multi-family townhouse and single-family developments
25 - 40%	Blue	Marginal for single-family development with major terrain modification
40% +	Red	Too steep for development

Base Area Existing Conditions

The existing base area encompasses a total of approximately 3.0 hectares and contains existing day skier parking, maintenance area, main access roads, day lodge and skier services and staging facilities, as well as overnight accommodation. The staging areas located in the main base include the Catamount quad chair, the Golden Eye Eagle Express Gondola and the Pioneer double chair.

Comfortable Skier Walking Distance

The base area should be easily accessible from the surrounding area, and also provide easy access to the staging lifts and slopes. The distance from the day skier parking lots to the staging lifts should be such that guests in ski boots will be able to negotiate this distance comfortably, in approximately 10 minutes. Ecosign uses the standard distance of 450 meters on flat ground, which is reduced in length by 4 meters for every 1-meter in vertical change. This "Skier Walking Distance" is a determining factor for the location of the day lodge and the day skier parking in relation to the staging lifts. If the ski area is to be pedestrian oriented, all parking and skier services in the base area should be within a comfortable walking distance of the lifts.

Potential Base Development Sites

Our slope analysis indicates that the overall mountain and existing base area contain several areas with slopes ranging from 0-25 percent. There are a few large bench areas with slopes in the 0-15 percent range, which are suitable for the development of a new and larger day skier base area with guest services and parking. There are many other potential areas with slopes suitable for multi-family and single-family development but they are situated at higher elevations and many of them are vertically separated. New access roads with 8-10 percent slope gradients would be required to gain access to connect these development parcels. Many of these potential development parcels have potential for ski-in/ski-out access, as most are situated next to the ski slopes.

Ecosign has conducted an analysis of the proposed base lands, based on topographic mapping supplied by the client and using the analysis drawings from the technical assessment. As a result, we have identified several potential sites with slope gradients less than 25 percent. These areas possess the best potential for the development of skier service facilities, parking and skier staging areas, multi-family and single-family real estate development.

It should be noted that gently sloping terrain at the base of the mountain is not only suitable for resort accommodation development but also needs to be balanced with its potential as beginner ski terrain. This terrain can be serviced with lifts that are within a comfortable walking distance from accommodation and the day skier parking.

Using the developable area assumptions listed in Table III.5, we have determined potential development areas for each potential land parcel. In order to assess the number of guests and skiers, we have established development density assumptions, occupancy rates and skier yield rates. The development density assumptions listed in Table III.5 identify the type of proposed development, development units per hectare and beds per development unit. The development assumptions are based on Chapter II-Mountain Resorts, of the All Season Resort Guidelines from March 2006 and CASP.

We assume that the resort area will be a day skier and destination resort, and as such have developed the following assumptions. The development assumptions are represented with a net value in order to be as accurate as possible. The hotel/village accommodation areas have been identified assuming 100 units per hectare. Development will consist of approximately 25 units per hectare in multi-family and condo zones, and 8 units per hectare for single-family homes. Corresponding bed unit densities are also listed in Table III.3. A total of 340 cars per hectare and an average of 2.5 skiers per car have been used for day skier parking.

TABLE III.3
KICKING HORSE MOUNTAIN RESORT
DEVELOPMENT DENSITY ASSUMPTIONS

	Units/ Ha.	Beds/ Unit	Beds/Ha.
Hotel	100	2	200
Multi-Family Unit/ Condo	25	4	100
Single Family Residence	8	6	48

People per Car	2.5
People per Charter Bus	40
Cars per Hectare	340
Buses per Hectare	70
Skier Participation	90%

Assumptions regarding unit occupancy, skier participation and skier yield per bed unit are shown in Table III.4. We have estimated that hotel units will be 90 percent occupied on peak days, beds 90 percent occupied, and 80 percent of those guests skiing/snowboarding daily. Multi-family and condo development will be 50 percent private and 50 percent public, with an estimated occupancy rate of 80 percent. It is estimated that approximately 80 percent of the multi-family beds will be occupied and 80 percent will be skiers/snowboarders. Single family occupancy rates are substantially lower, at 50 percent due to the nature and more infrequent use of this type of real estate product. We are assuming 70 percent of the beds are full and 70 percent of single family visitors are skiers/snowboarders.

TABLE III.4
ACCOMMODATION OCCUPANCY ASSUMPTIONS

ASSUMPTIONS	Unit Occupancy Rate	Bed Occupancy Rate	Guest Yield from Beds	Skier Participation Rate	Skier Yield Rate
Hotels/ Village	90%	90%	80%	80%	65%
Multi-Family (50% Public/ 50% Private)	80%	80%	64%	80%	51%
Private Accommodation	50%	70%	35%	70%	25%

Ecosign has prepared a development suitability plan for the base area and mountain. The Base Area Development Suitability for Kicking Horse Mountain Resort is graphically illustrated on Figure 12 and summarized in Table III.5.

ecosign
Mountain Resort Planners Ltd.

TABLE III.5
BASE AREA DEVELOPMENT SUITABILITY

Parcel Number	Land Use Designation	Parcel Area (Ha.)	% Develop.	Net Devel. (Ha.)	Units per Ha.	Total Units	Total Beds	Skiers from Accomm.	# of Buses (Drop-Off)	# of Guests By Bus	Skiers By Bus 90%	# of Cars	# of Guests By Car	Skiers By Car 90%	Total Skiers
1	Day Skier Parking	3.0	90%	2.7	340				10	400	360	918	2,295	2,066	2,426
2	SFU	4.1	70%	2.9	8	23	138	34							34
3	MFU	2.2	80%	1.8	25	45	180	92							92
4	MFU	2.6	80%	2.1	25	53	212	109							109
5	MFU	2.6	80%	2.1	25	53	212	109							109
6	MFU	4.3	80%	3.4	25	85	340	174							174
7	SFU	8.5	70%	6.0	8	48	288	71							71
8	MFU	3.5	80%	2.8	25	70	280	143							143
9	Existing Accomm.	2.9													
10	Village/ TA	3.1	80%	2.5	100	250	500	324							324
11	Village/ TA	0.3	80%	0.2	100	20	40	26							26
12	Existing Accomm.	7.9													
13	Existing Accomm.	1.0													
14	Village/ TA	1.4	80%	1.1	100	110	220	143							143
15	SFU	2.4	70%	1.7	8	14	84	21							21
16	MFU	1.2	80%	1.0	25	25	100	51							51
17	Treatment Facility	1.5													
18	Existing Accomm.	1.1													
19	Village/ TA	1.5	80%	1.2	100	120	240	156							156
20	Village/ TA	3.9	80%	3.1	100	310	620	402							402
21	Existing Accomm.	1.9													
22	MFU	3.0	80%	2.4	25	60	240	123							123
23	MFU	2.2	80%	1.8	25	45	180	92							92
24	SFU	3.8	70%	2.7	8	22	132	32							32
25	SFU	1.6	70%	1.1	8	9	54	13							13
26	SFU	3.6	70%	2.5	8	20	120	29							29
27	SFU	2.0	70%	1.4	8	11	66	16							16
28	SFU / MFU	24.0	70%	16.8	15	252	1,512	370							370
Subtotal		**101.1**		**63.3**		**1,645**	**5,758**	**2,530**	**10**	**400**	**360**	**918**	**2,295**	**2,066**	**4,956**
Existing Built Beds and Beds Under Construction as of September 2007															**642**
Total															**5,598**

IV. MOUNTAIN FACILITIES

A ski area master plan involves planning the removal or replacement of older existing equipment, integrated with the addition of new facilities over time. Modern mountain resorts require the most efficient and user friendly lift and trail systems possible. It is therefore necessary to have a complete understanding of the total project at build-out, so that facilities can be balanced and capital invested effectively. The main purpose of the 2008 Kicking Horse Master Plan is to provide a definitive guideline for the continuing renovation and future development of the resort and to inform public agencies of those plans.

The following section proposes the phased installation of new equipment, the relocation and/or upgrading of existing equipment and removal of old or technologically obsolete equipment.

We have utilized a number and letter code to indicate the type of lift installation proposed. The coding is illustrated below:

MC	Moving Carpet conveyor lift
2C	Double fixed grip chairlift
4C	Quadruple fixed grip chairlift
D4C	Detachable grip quadruple chairlift
D8G	Detachable grip eight-passenger gondola
D8cab	Detachable eight-passenger 'cabriolet' style open gondola

.1 Summary of Mountain Master Plan Development

The Kicking Horse ski area is located on the northeast face of a ridge formed by Terminator Peak (2,408 m.) and Blue Heaven (2,450 m.), with terrain that has east and northerly aspects, and has elevations ranging from 1,160 meters up to the 2,505-meter elevation. Vegetation coverage ranges from heavily treed areas, to open avalanche chutes and alpine terrain with smaller trees or grasses.

Modern mountain resorts require the most efficient and user friendly lift and trail systems possible with a good balance of terrain type and variety. The mountain development proposed in this Master Plan is to be constructed in several phases, (each taking several years), therefore, it is necessary to have a complete understanding of the total project at build-out so that facilities can be balanced and capital invested effectively. The ski resort will ultimately include a total of 10 major ski lifts (chairlifts and gondolas), three "in-village" transportation lifts and a learning center containing two smaller beginner lifts (moving carpets).

At build-out, these lifts will accommodate a total of approximately 10,140 skiers per day. Ski terrain will cover approximately 712 hectares, including over 300 hectares of traditional trails and the balance located in treed glades or open alpine bowl skiing.

The first phase of development in this master plan will include the replacement of the Pioneer lift, the installation of an intermediate lift in Crystal Bowl and the establishment of a Learning Center between the main base and the Pioneer base. The ski area capacity of the Phase 1 development will be approximately 5,750 skiers per day. This plan is graphically illustrated on Figure 13a.

The second phase will include the replacement of the Catamount fixed grip quadruple chairlift with a detachable quad and the installation of an 8-passenger people mover. Phase 2 is illustrated on Figure 13b and will have a daily capacity of approximately 6,370 skiers per day.

In the third phase of the master plan, two fixed grip quadruple chairlifts and a detachable quadruple chairlift are installed. With the addition of these three lifts, the resort will have a daily skier carrying capacity of approximately 9,020 skiers per day. The lift and trails for Phase 3 are illustrated on Figure 13c.

The final phase of development, Phase 4, includes the installation of a detachable quadruple chairlift, a fixed grip quadruple chairlift and a detachable grip 8-passenger cabriolet people mover lift. The layout of the final phase of the Kicking Horse Master Plan development is illustrated on Figure 13d. At build-out, the resort will have a lift capacity of 10,140 skiers per day. Table IV.1 provides a summary of the development envisioned during the phased implementation of the Kicking Horse Master Plan.

TABLE IV.1
MASTER PLAN DEVELOPMENT SUMMARY

PHASE	LIFTS	LIFT SCC	CASP Capacity Calculation
EXISTING (Phase 1a)	Lift A - Catamount - 4C - 1800 pph Lift B - Golden Eagle - D8G - 1200 pph Lift C - Stairway to Heaven - 4C - 1500 pph Lift D - Pioneer - 2C - 1200 pph Lift E - Pony Express - Moving Carpet	3,630 Skiers	5,280 Skiers
PHASE 1b	Replace & Realign: Lift D - Pioneer - 2C - 1200 pph with Lift D1/D2 - 2 Stage D4C - 2400 pph Install: Lift F - Crystal Bowl - D4C - 2400 pph Lift E1 - Moving Carpet Lift E2 - Moving Carpet	5,750 Skiers	10,090 Skiers
PHASE 2	Replace: Lift A - Catamount - 4C - 1800 pph with Lift A - D4C - 2400 pph Install: Lift G - Cabriolet People Mover - D8Cab- 2800 pph	6,370 Skiers	10,520 Skiers
PHASE 3	Install: Lift H - 4C - 1600 pph Lift I - D4C - 1800 pph Lift J - 4C - 1800 pph	9,020 Skiers	15,300 Skiers
PHASE 4	Install: Lift L - D4C - 1800 pph Lift M - 4C - People Mover Lift N - D8Cab - People Mover	10,140 Skiers	18,080 Skiers

.2 Ski Area Master Plan

As described in the previous section, the mountain development is proposed to be implemented in four general phases. These phases do not have any fixed time frame, but will be implemented as the market dictates, which could either be faster or slower than anticipated. The phased Mountain Master Plan maps illustrate lift and trail systems which work both for return cycle skiing and ease of movement around the resort in each phase. It is very important to consider and blend these two uses during the design to create an efficient layout, so that every lift or trail investment is maximized. Figures 13a, 13b, 13c and 13d illustrate the Mountain Master Plan at the completion of each phase.

Mountain Phase 1

The first phase of development covered in this master plan will include the replacement of the Pioneer lift, the installation of an intermediate lift in Crystal Bowl and the establishment of a Learning Center between the main base and the Pioneer base. The ski area capacity of the Phase 1 development will be approximately 5,750 skiers per day, an increase of 2,120 over the existing 3,630 skiers per day. The Phase 1 plan is graphically illustrated on Figure 13a.

Lift D1/D2 – Pioneer Replacement

One of Kicking Horse's most significant skier circulation issues is the low capacity of the only lift which moves people to the upper half of the mountain. The gondola has a capacity of only 1,200 pph, which not only supplies skiers to the upper mountain, but is also the only way for skiers to return ski on much of the upper mountain terrain. The replacement of the Pioneer lift is proposed to provide a second route to connect the base area to the upper mountain. The bottom terminal would be located very close to the existing Pioneer base terminal and the top terminal would be located close to the bottom of the Stairway to Heaven lift.

A mid station off-load is proposed to be located at approximately the 1,680-meters elevation, as slopes above this point are generally steeper than the mostly intermediate slopes below this point. Expert skiers and skiers moving to the upper mountain will ride all the way to the top of the lift (for easy transfer to Lifts C or F), while intermediate skiers can return ski on the lower part of the mountain by unloading at the mid station unload. This is a big lift, with a total vertical rise of about 762 meters, and a total length of approximately 2,211 meters, with a ride time in excess of 10 minutes at 5m/s. The lower section has a vertical rise of approximately 382 meters and a length of about 1,122 meters.

Lift F – Crystal Bowl

Lift F, a new detachable quad chair is proposed to be installed in Crystal Bowl, just south of the Stairway to Heaven chair. This lift is located in the alpine, servicing terrain suitable for skiers in the low intermediate skill class. This lift will give intermediate skiers an opportunity to ski in the better snow conditions at the higher elevations, while skiing on terrain they are comfortable with. Because this lift is located in a bowl, it will be protected from the winds and weather on the exposed ridges. This lift will have a vertical rise of approximately 235 meters and a total length of about 1,400 meters. Access to this lift can be made by either by riding the gondola or using new Lift D (Pioneer).

Lift E1/E2 – Beginner Zone/Upper Village Connection

The Lift E1/E2 zone is a beginner area located adjacent to the daylodge in the village which consists of two moving carpets. These two lifts not only provide an area for new skiers to learn, but also provides a connection between the daylodge and the bottom of the Pioneer lift. These lifts bound a development zone adjacent to three major lifts by build-out (Pioneer, Catamount and the Gondola). The lifts and trails will need some grading to supply the appropriate grades, but this can be accomplished in conjunction with the accommodation development, creating a high quality, progressive learning center located in the base area. The area will be designed for use by children and "never-ever" (first time) skiers. The lower carpet will be approximately 170 meters in length and will have a slope gradient of 14 percent, while the upper carpet is approximately 150 meters long and has a gradient of 10 percent. The trails serviced by each carpet are about 25-30 meters wide, which will be graded to a uniform slope to match the lift.

Base Area Terminals (All Phases)

The bottom terminal of the new Pioneer lift should be installed at approximately the same elevation as the "snow apron" and plaza of the proposed base building in this area, so that skiers can easily move between the lifts and the village without negotiating sloping, slippery walking routes. Elevations should be carefully designed so that the relationship between the ski trails and lifts is ideal and so that the buildings and plaza development in this zone will relate to the skiing in the most optimal way, both in horizontal and vertical elevations. It is very important that the vertical grade changes are minimal so that people in ski boots can negotiate the base area easily. This also applies to the transition between plaza and snow surface, which should be level if possible.

Summary of Phase 1 Mountain Plan

Figure 13a illustrates the Mountain Master Plan at completion of Phase 1. At this point, there will be one high speed detachable gondola lift, two detachable quadruple chairlifts, two fixed grip quadruple chairlift and two moving carpet conveyor lifts, providing return skiing for approximately 5,750 skiers per day. These lifts will have a total rated capacity of 11,100 pph and generate 4.8 million VTM/hour, as listed in Table IV.2.

TABLE IV.2
LIFT SPECIFICATIONS
PHASE 1

Lift Number Lift Name Lift Type	A Cata-mount 4C	B Golden Eagle D8G	C Stairway to Heaven 4C	D-1 D4C	D-2 D4C	E1 Beginner MC	E2 Beginner MC	F Crystal Bowl D4C	TOTAL
Top Elevation m.	1,615	2,340	2,450	1,680	2,060	1,285	1,299	2,285	
Bottom Elevation m.	1,268	1,264	2,060	1,298	1,680	1,262	1,285	2,050	
Total Vertical m.	347	1,076	390	382	380	23	14	235	2,847
Horizontal Distance m.	1,463	3,215	1,346	1,055	1,020	170	150	1,250	
Slope Distance m.	1,504	3,390	1,401	1,122	1,088	172	151	1,272	10,100
Average Slope %	24%	33%	29%	36%	37%	14%	9%	19%	29%
Rated Capacity	1,800	1,200	1,500	2,400	2,400	1,200	1,200	1,800	11,100
V.T.M./Hr.(000)	625	1,291	585	917	912	28	17	423	4,797
Rope Speed m/sec.	2.3	5.5	2.3	5.0	5.0	0.7	0.7	5.0	
Trip Time min.	10.90	10.27	10.38	3.74	3.63	4.08	3.59	4.24	
Operating Hr./Day	7.0	7.0	6.5	7.0	7.0	7.0	7.0	6.5	6.9
V.T.M. Demand/Day	3,260	6,702	7,905	4,595	5,705	940	940	2,825	
Loading Eff. %	80%	95%	80%	95%	95%			95%	
Access Reduction	0%	4%	0%	6%	35%			0%	
SCC Skiers/Day	**1,070**	**1,230**	**380**	**1,240**	**690**	**120**	**100**	**920**	**5,750**

Figure 13a also shows the existing trails and the trails that should be developed in conjunction with the Phase 1 lift development. The Phase 1 trail system, including traditional forested trails, groomed routes above tree line, skiways, alpine open-bowl skiing and gladed tree skiing covers approximately 342 hectares of terrain, with a total over a length of 52 kilometers. The ski terrain has a capacity of approximately 6,350 skiers per day, including about 1,100 skiers in open bowl and treed areas, with the balance on groomed and forested trails and a further 710 skiers.

Table IV.3 and Plate IV.1 list and illustrate the balance of the Phase 1 trails when compared to the skier market (not including mid mountain glades). As shown, the balance is skewed to the uppermost skill levels with shortages in beginner, novice, intermediate and high intermediate when compared to the overall skier market.

TABLE IV.3
TRAIL BALANCE BY SKILL CLASS
PHASE 1

Skill Classification	Hectares	Skiers	Balance	Ideal
1 Beginner	1.4	105	1.7%	5%
2 Novice	4.5	225	3.6%	10%
3 Low Intermediate	37.4	1,500	23.8%	20%
4 Intermediate	32.1	1,290	20.5%	30%
5 High Intermediate	31.8	950	15.1%	20%
6 Advanced	54.8	811	12.9%	10%
7 Expert	172.7	1,425	22.6%	5%
TOTALS	**334.6**	**6,306**	**100%**	**100%**

Average Density =	17.2	Skiers/Hectare
Optimum Density =	31.3	Skiers/Hectare
Weighted Demand =	4,979	VTM/Skier/Day

Note: Above data includes developed trails and gladed skiing. Including all transportation skiways, coverage totals 342.2 hectares and capacity is 6,350 skiers per day.

TRAIL BALANCE - PHASE 1

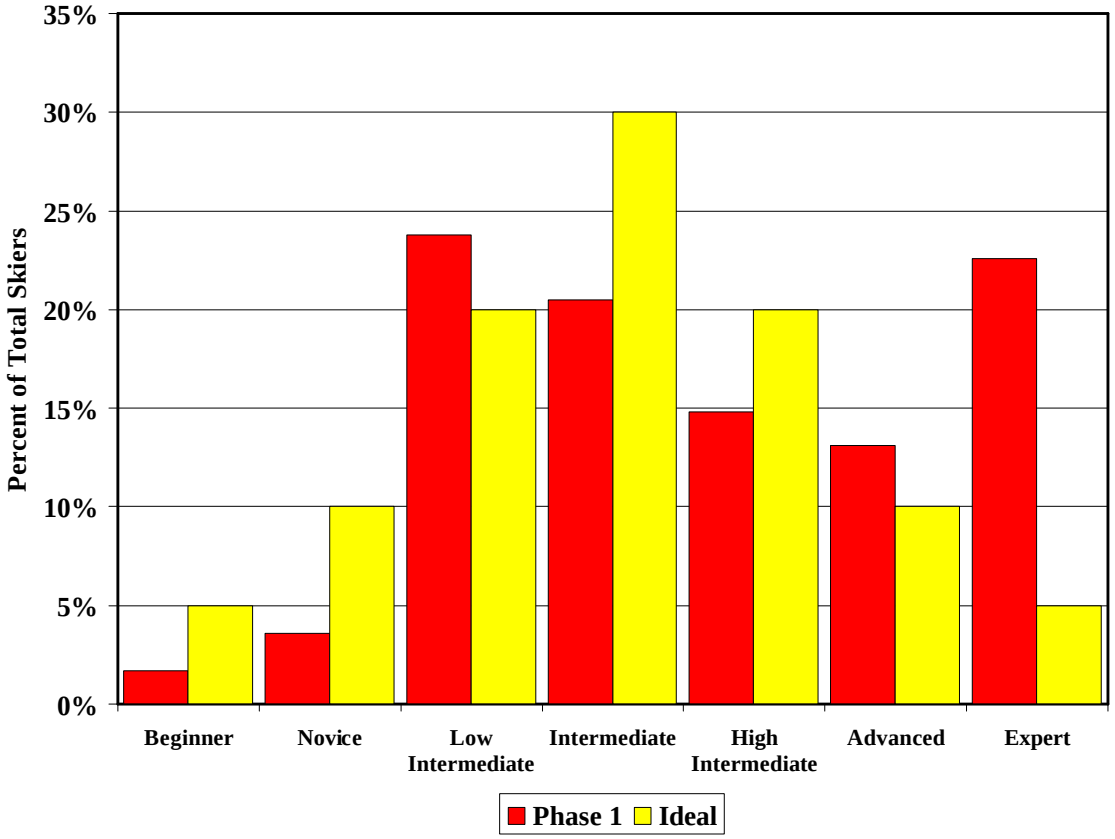


PLATE IV.1

Mountain Phase 2

The Phase 2 development completes the renovation of the existing area and adds a people mover in the base area to accommodate further base area development. Phase 2 proposes a daily ski area capacity of approximately 6,370 skiers per day, an increase of 620 skiers over the Phase 1 SCC of 5,750 skiers per day.

Lift A – Catamount Replacement

The Catamount fixed grip quad chair currently services skiing on the lower mountain that has grades perfect for skiers in the intermediate skill classes, which form about 70% of the North American market. Lift A is located on the lower mountain, which has less susceptibility to high winds and is psychologically "safer" for inexperienced skiers due to its proximity to the base area. However, this zone is not so attractive to intermediate skiers due to the lift's length (very long at 1,504 meters) resulting in a very long ride time of 11 minutes. Due to its lower elevation, the terrain can also suffer from low snowpacks in early and late season, increasing its unavailability for return skiing by the important intermediate market segment.

It is therefore proposed to replace this lift with a detachable quad in essentially the same position. This upgrade will give the intermediate skiers the high speed, comfortable lift which most skiers now expect. With the addition of snowmaking on Little Ben/Buffalo Jump, Wapiti and Wiley Coyote, this area will ensure fantastic skiing conditions on these lower elevation slopes at any time of year. This lift is proposed to be installed with a rated capacity of 1,800 pph to service return skiing on the southern part of the lower mountain (the northern part is already served by the bottom part of the Pioneer detachable quad chair). Minor trail renovations including tree removal, grading, etc., will ensure optimal skier flow and skiability in low snow conditions.

Lift G – Cabriolet People Mover

Lift G is a people mover linking the lower day skier parking lot with the existing daylodge. As time passes, more skiers will arrive by car and the central base area will expand, using the existing skier parking for accommodation buildings, necessitating a new, remote parking lot for day skiers. This new parking lot is proposed to be located about 430 meters to the east of the daylodge and 66 meters lower in elevation. This high speed, detachable grip cabriolet gondola lift will move skiers, employees and sightseers between the day parking and the daylodge/village area in winter, summer and the shoulder seasons. The bottom terminal will be located close to the center of the proposed parking lot so that no skier needs to walk more than 300 meters to the lift. The top terminal will be located about 530 meters farther west, just north of the daylodge.

Summary of Phase 2 Mountain Plan

Figure 13b illustrates the Mountain Master Plan at completion of Phase 2. The Phase 2 construction has added one new lift and replaced one lift, increasing the number of lifts to 8 and increasing the total rated capacity to 14,500 pph, as listed in Table IV.4. At completion of Phase 2, Kicking Horse will have five detachable lifts (one gondola, one cabriolet and three detachable quads, supplying 88 percent of its total VTM. The Phase 2 ski area will be able to comfortably accommodate approximately 6,370 skiers per day.

TABLE IV.4
LIFT SPECIFICATIONS
PHASE 2

Lift Number	**A**	**B**	**C**	**D-1**	**D-2**	**E1**	**E2**	**F**	**G**	
Lift Name	**Cata-mount**	**Golden Eagle**	**Stairway to Heaven**			**Beginner**	**Beginner**	**Crystal Bowl**	**Cabriolet**	
Lift Type	**D4C**	**D8G**	**4C**	**D4C**	**D4C**	**MC**	**MC**	**D4C**	**D8Cab**	**TOTAL**
Top Elevation m.	1,615	2,340	2,450	1,680	2,060	1,285	1,299	2,285	1,262	
Bottom Elevation m.	1,268	1,264	2,060	1,298	1,680	1,262	1,285	2,050	1,196	
Total Vertical m.	347	1,076	390	382	380	23	14	235	66	2,913
Horizontal Distance m.	1,463	3,215	1,346	1,055	1,020	170	150	1,250	530	
Slope Distance m.	1,504	3,390	1,401	1,122	1,088	172	151	1,272	534	10,634
Average Slope %	24%	33%	29%	36%	37%	14%	9%	19%	12%	29%
Rated Capacity	2,400	1,200	1,500	2,400	2,400	1,200	1,200	1,800	2,800	14,500
V.T.M./Hr.(000)	833	1,291	585	917	912	28	17	423	185	5,190
Rope Speed m/sec.	5.0	5.5	2.3	5.0	5.0	0.7	0.7	5.0	5.0	
Trip Time min.	5.01	10.27	10.38	3.74	3.63	4.08	3.59	4.24	1.78	
Operating Hr./Day	7.0	7.0	6.5	7.0	7.0	7.0	7.0	6.5	10.0	7.2
V.T.M. Demand/Day	3,258	6,727	7,905	4,598	5,713	940	940	2,825		
Loading Eff. %	95%	95%	80%	95%	95%			95%	95%	
Access Reduction	0%	4%	0%	6%	35%			0%	0%	
SCC Skiers/Day	**1,700**	**1,220**	**380**	**1,240**	**690**	**120**	**100**	**920**	**0**	**6,370**

Figure 13b also shows the trails that should be present at completion of Phase 2. Because the Phase 2 lift development only includes one lift replacement and the addition of an access lift, no major trail development is necessary. Minor modifications will be implemented in order to improve skier flow and trail attractiveness. The Phase 2 trail system, including transportation skiways and mid mountain tree skiing, covers approximately 341 hectares with a capacity of approximately 6,290 skiers per day at ideal densities.

Table IV.5 and Plate IV.2 list and illustrate the balance of the Phase 2 trails when compared to the skier market. As shown, the balance is the same as in Phase 1, with excesses in the uppermost skill levels and shortages in beginner, novice, intermediate and high intermediate, when compared to the overall skier market.

TABLE IV.5
TRAIL BALANCE BY SKILL CLASS
PHASE 2

Skill Classification	Hectares	Skiers	Balance	Ideal
1 Beginner	1.4	105	1.7%	5%
2 Novice	4.5	225	3.6%	10%
3 Low Intermediate	37.7	1,505	24.0%	20%
4 Intermediate	31.2	1,250	19.9%	30%
5 High Intermediate	31.9	955	15.2%	20%
6 Advanced	54.8	811	12.9%	10%
7 Expert	172.7	1,425	22.7%	5%
TOTALS	**334.2**	**6,276**	**100%**	**100%**

Average Density =	19.1	Skiers/Hectare
Optimum Density =	31.2	Skiers/Hectare
Weighted Demand =	4,985	VTM/Skier/Day

Note: Above data includes developed trails and gladed skiing. Including all transportation skiways, coverage totals 341.0 hectares and capacity is 6,290 skiers per day.

TRAIL BALANCE - PHASE 2

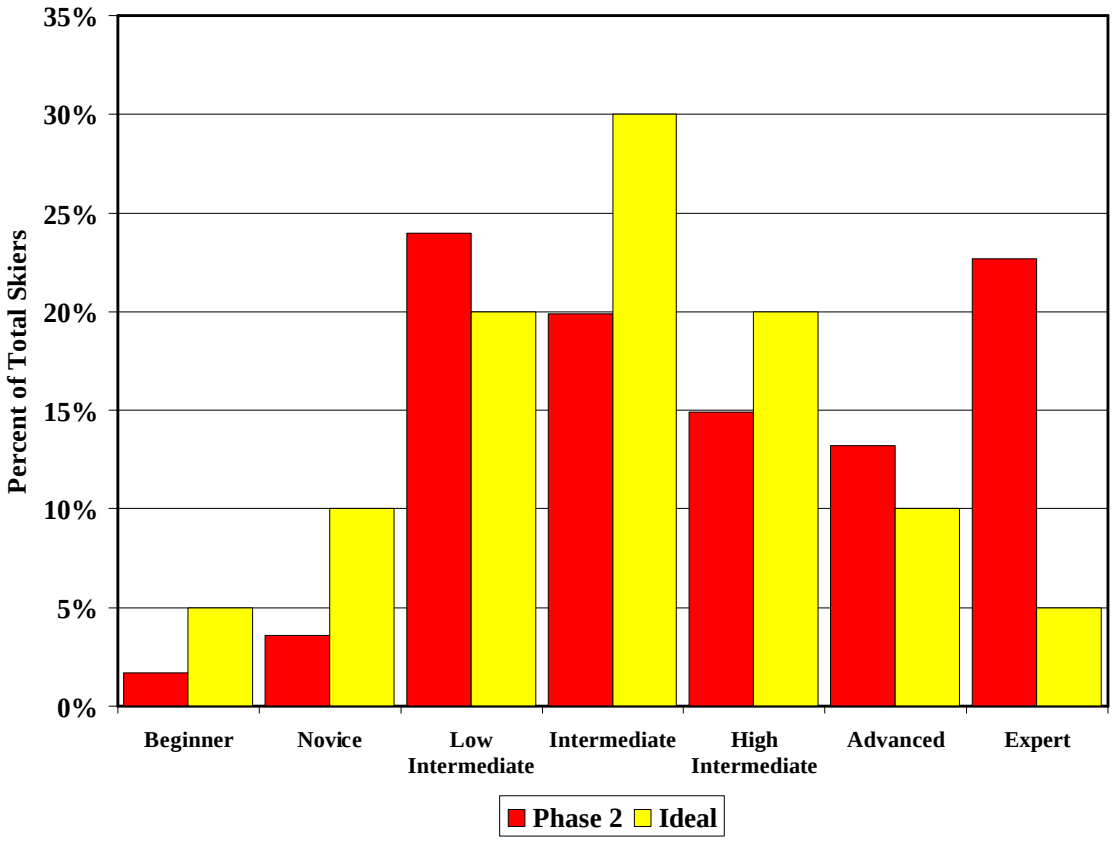


PLATE IV.2

Mountain Phase 3

The Phase 3 development consists primarily of expanding the ski area to the north. Three new lifts and 102 hectares of trails will be constructed north of the Pioneer zone and Rudi's Bowl. This area will provide significantly more low intermediate to expert skiing on elevations ranging from 1,290 to 2,276 meters. Access to this zone would be made in the lower elevations either using the Pioneer or Catamount chair, depending on where it is practical to build a skiway from south to north. Egress would be made by skiing from the top of Lift H back to the bottom of Pioneer or the gondola base. All of these lifts would be used primarily for return cycle skiing.

Lift H

Lift H is a fixed grip quad chair which serves two purposes; return cycle skiing and egress back to the main base from the bottom of Lift I. This low elevation lift serves 210 vertical meters of terrain suitable for low intermediates and intermediates and has a length of about 980 meters and a ride time of about 7.5 minutes. An installed capacity of 1,600 pph will provide enough capacity both for return skiing and its limited egress functions.

Lift I

Lift I, a detachable quad chairlift, is proposed to be installed at the northern end of the ski area, with the bottom terminal located next to the bottom of lift H, at the 1,290 meters elevation and the top located at 1,920 meters elevation. This lift services terrain that has slopes suitable for intermediate to advanced, dissected by an extremely steep band of terrain near the 1,600-1,700-meter elevation. The trails proposed for this area aim to skirt around these steep bands, allowing primarily intermediate and high intermediate skiers to use this zone. The addition of this type of terrain is a real benefit for Kicking Horse, providing more capacity and variety for the large number of intermediate skiers in the marketplace. This lift has a slope length of approximately 1,776 meters and a vertical rise of approximately 630 meters. Skiers would access this lift using the same route as accessing Lift H; they would get back to the village either by riding Lift H and going down the skiway to the village, or using the skiway halfway down I2 to ski past the top of Lift H.

Lift J

Lift J is proposed to be a fixed grip quad chair located above Lifts H and I. This lift services southeast facing terrain with slopes suitable for advanced and expert skiers. Part of this terrain is treed (the more easterly side) and part is located in open alpine terrain (more westerly area). Lift J is quite a steep lift, with a length of almost 1,100 meters and a vertical rise of about 471 meters. It is anticipated that one run may be regularly groomed in this zone (Trail J1) and the rest of the terrain will be gladed tree skiing or open bowl alpine skiing for experts.

As shown on Figure 13c, a large area of treed terrain above Lift H has been identified for gladed skiing. Access to this chair would be made via a traverse or skiway from the Lift J terrain.

Summary of Phase 3 Mountain Plan

Figure 13c illustrates the Mountain Master Plan at completion of Phase 3. At this point, there will be a total of 11 lifts at Kicking Horse, including one detachable high speed gondola lift, one people mover in the base area (a detachable cabriolet style gondola), 4 detachable quadruple chairlifts, 3 fixed grip quadruple chairlifts, and two moving carpet conveyor lifts for skiing, and an eight-passenger cabriolet people mover. The lifts at completion of Phase 3, will provide return skiing for approximately 9,020 skiers per day. These lifts will have a total rated capacity of 19,700 pph and generate 7.5 million VTM/hour, as listed in Table IV.6.

TABLE IV.6
LIFT SPECIFICATIONS
PHASE 3

Lift Number	**A**	**B**	**C**	**D-1**	**D-2**	**E1**	**E2**	**F**	**G**	**H**	**I**	**J**	
Lift Name	**Cata-mount**	**Golden Eagle**	**Stairway to Heaven**					**Crystal Bowl**	**Cabriolet**				
Lift Type	**D4C**	**D8G**	**4C**	**D4C**	**D4C**	**MC**	**MC**	**D4C**	**D8Cab**	**4C**	**D4C**	**4C**	**TOTAL**
Top Elevation m.	1,615	2,340	2,450	1,680	2,060	1,285	1,299	2,285	1,262	1,500	1,920	2,276	
Bottom Elevation m.	1,268	1,264	2,060	1,298	1,680	1,262	1,285	2,050	1,196	1,290	1,290	1,805	
Total Vertical m.	347	1,076	390	382	380	23	14	235	66	210	630	471	4,224
Horizontal Distance m.	1,463	3,215	1,346	1,055	1,020	170	150	1,250	530	960	1,660	990	
Slope Distance m.	1,504	3,390	1,401	1,122	1,088	172	151	1,272	534	983	1,776	1,096	11,730
Average Slope %	24%	33%	29%	36%	37%	14%	9%	19%	12%	22%	38%	48%	31%
Rated Capacity	2,400	1,200	1,500	2,400	2,400	1,200	1,200	1,800	2,800	1,600	1,800	1,800	19,700
V.T.M./Hr.(000)	833	1,291	585	917	912	28	17	423	185	336	1,134	848	7,508
Rope Speed m/sec.	5.0	5.5	2.3	5.0	5.0	0.7	0.7	5.0	5.0	2.2	5.0	2.3	
Trip Time min.	5.01	10.27	10.38	3.74	3.63	4.08	3.59	4.24	1.78	7.44	5.92	7.94	
Operating Hr./Day	7.0	7.0	6.5	7.0	7.0	7.0	7.0	6.5	10.0	7.0	7.0	6.8	7.1
V.T.M. Demand/Day	3,258	6,727	7,905	4,561	5,713	940	940	2,825		3,214	4,780	7,326	
Loading Eff. %	95%	95%	80%	95%	95%			95%	95%	80%	95%	80%	
Access Reduction	0%	4%	0%	6%	35%			0%	0%	13%	5%	0%	
SCC Skiers/Day	**1,700**	**1,220**	**380**	**1,260**	**690**	**120**	**100**	**920**	**0**	**510**	**1,500**	**620**	**9,020**

Figure 13c also shows the trails that should be developed by the end of Phase 3. The 569 hectares of total skiing is comprised of approximately 250 hectares of traditional trails and skiways and the balance in gladed tree skiing and open bowl alpine skiing. The trails illustrated will have a calculated capacity of approximately 9,267 skiers per day, based on ideal densities. The lift and trail system illustrated was designed to provide skiing for a wide variety of skill classes, while trying to balance the trail capacity fairly closely with the lift capacity.

Table IV.7 and Plate IV.3 list and illustrate the balance of the Phase 3 trails when compared to the skier market. As shown, the balance is still weighted towards the higher end, but with more terrain in the intermediate skill classes.

TABLE IV.7
TRAIL BALANCE BY SKILL CLASS
PHASE 3

Skill Classification	Hectares	Skiers	Balance	Ideal
1 Beginner	1.4	105	1.2%	5%
2 Novice	4.5	225	2.6%	10%
3 Low Intermediate	44.8	1,790	20.5%	20%
4 Intermediate	46.4	1,855	21.3%	30%
5 High Intermediate	46.4	1,390	16.0%	20%
6 Advanced	95.2	1,416	16.3%	10%
7 Expert	197.9	1,930	22.2%	5%
TOTALS	**436.5**	**8,711**	**100%**	**100%**

Average Density =	20.7	Skiers/Hectare
Optimum Density =	30.3	Skiers/Hectare
Weighted Demand =	5,103	VTM/Skier/Day

Note: Above data includes developed trails and gladed skiing. Including all transportation skiways and tree skiing, coverage totals 568.9 hectares and capacity is 9,267 skiers per day.

TRAIL BALANCE - PHASE 3

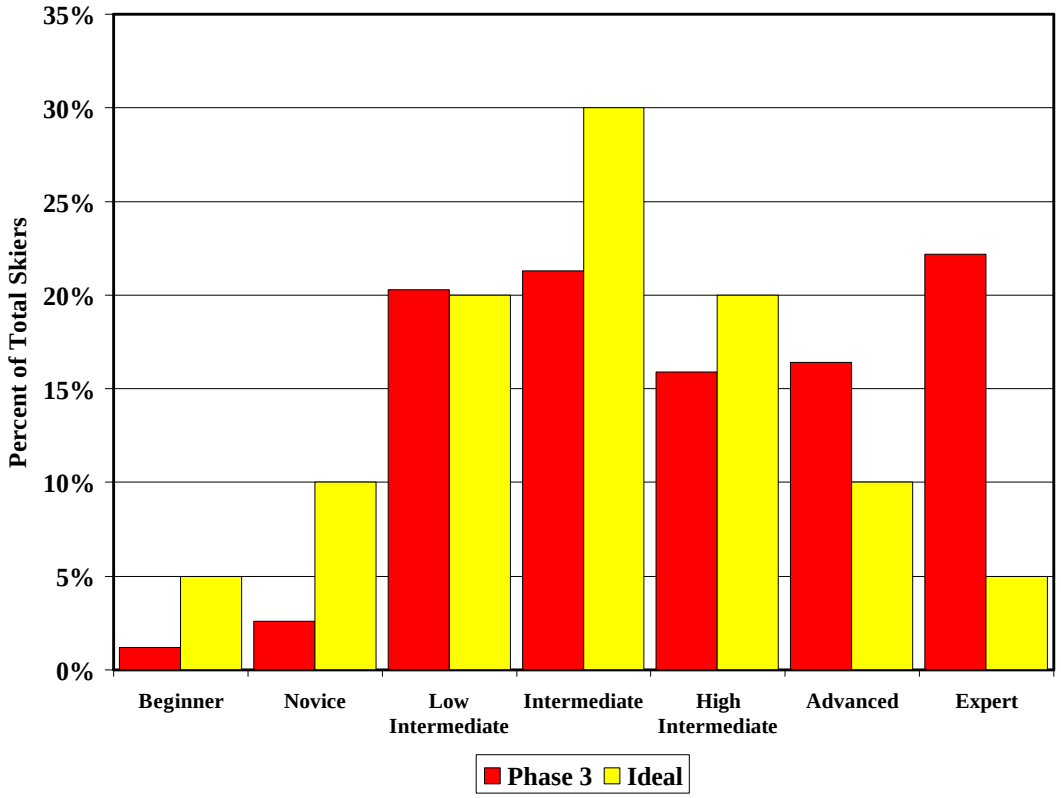


PLATE IV.3

Phase 4 - Ski Area Build-Out

Phase 4 is the final phase to be implemented under this Master Plan comprising of a large expansion of the skiing to the south. At build-out, there will be 14 ski lifts at Kicking Horse including 2 beginner moving carpets, 3 lifts used primarily for transportation and 9 lifts used for return cycle skiing. The lift system, at build-out, would be able to accommodate approximately 10,140 skiers per day. Figure 13d illustrates the layout of the various facilities at build-out.

Lift L

Lift L is a very large detachable quad chairlift installed on relatively steep terrain near the southern edge of the permit area. This lift has a vertical rise of approximately 748 meters and services a huge pod of terrain with slopes suitable for advanced and expert skiers. Trails illustrated cover approximately 65 hectares, and tree skiing covers an additional 66.5 hectares. This large lift is accessible using any of the resort's central lifts (Catamount, Pioneer or the gondola) and skiers will be able to ski to the base or much of the southern ski-in/ski-out accommodation from the bottom terminal.

Lift M

Lift M is a fixed grip quad proposed to be used as a people mover in the central northern part of the base area. The top of this lift has been located to provide direct skiing access to either the main base or the bottom of the Phase 3 skiing, located to the north. Lift M will have a vertical rise of 154 meters and a slope length of approximately 893 meters.

Lift N

Lift N is another people mover designed to move skiers from the large southern satellite parking lot up to the bottom of Lift L. From this top terminal, skiers will easily be able to slide down to the main base. Lift N has been proposed as a detachable lift in order to move the large number of people that the parking lot can accommodate.

Summary

Table IV.8 lists the specifications and capacities of the lifts proposed for build-out of the Kicking Horse ski area. As shown, the lift system at build-out includes one detachable high speed gondola lift, two 8-passenger cabriolet style people movers in the base area, 5 detachable quadruple chairlifts, 4 fixed grip quadruple chairlifts and two moving carpet conveyor lifts. The lifts installed at Kicking Horse have a total hourly capacity of approximately 25,500 passengers per hour (pph) generating a total of 9.73 million Vertical Transport Meters/hour (VTM/hr). The return cycle skiing lifts have a capacity of approximately 10,140 skiers at one time.

Table IV.8 lists the specifications and capacities of the trails proposed for build-out of the ski area. Skiable terrain identified in Figure 13d covers approximately 712 hectares and includes skiing on traditional cut trails in the forest, groomed routes through the alpine, tree skiing and alpine open bowl routes. Based on the densities detailed in the planning parameters (and reduced densities in gladed & some open-bowl terrain) the ski terrain, at build-out has a capacity of approximately 10,307 skiers per day.

TABLE IV.8
LIFT SPECIFICATIONS
PHASE 4 - BUILD-OUT

Lift Number	A	B	C	D-1	D-2	E1	E2	F
Lift Name	Cata-mount	Golden Eagle	Stairway to Heaven					Crystal Bowl
Lift Type	D4C	D8G	4C	D4C	D4C	MC	MC	D4C
Top Elevation m.	1,615	2,340	2,450	1,680	2,060	1,285	1,299	2,285
Bottom Elevation m.	1,268	1,264	2,060	1,298	1,680	1,262	1,285	2,050
Total Vertical m.	347	1,076	390	382	380	23	14	235
Horizontal Distance m.	1,463	3,215	1,346	1,055	1,020	170	150	1,250
Slope Distance m.	1,504	3,390	1,401	1,122	1,088	172	151	1,272
Average Slope %	24%	33%	29%	36%	37%	14%	9%	19%
Rated Capacity	2,400	1,200	1,500	2,400	2,400	1,200	1,200	1,800
V.T.M./Hr.(000)	833	1,291	585	917	912	28	17	423
Rope Speed m/sec.	5.0	5.5	2.3	5.0	5.0	0.7	0.7	5.0
Trip Time min.	5.01	10.27	10.38	3.74	3.63	4.08	3.59	4.24
Operating Hr./Day	7.0	7.0	6.5	7.0	7.0	7.0	7.0	6.5
V.T.M. Demand/Day	3,285	6,566	7,905	4,365	5,682	940	940	2,825
Loading Eff. %	95%	95%	80%	95%	95%			95%
Access Reduction	4%	4%	0%	6%	35%			0%
SCC Skiers/Day	**1,630**	**1,250**	**380**	**1,310**	**690**	**120**	**100**	**920**

Lift Number	G	H	I	J	L	M	N	
Lift Name	Cabriolet						People Mover	
Lift Type	D8Cab	4C	D4C	4C	D4C	4C	D8Cab	TOTAL
Top Elevation m.	1,262	1,500	1,920	2,276	2,173	1,386	1,425	
Bottom Elevation m.	1,196	1,290	1,290	1,805	1,425	1,232	1,177	
Total Vertical m.	66	210	630	471	748	154	248	5,374
Horizontal Distance m.	530	960	1,660	990	1,822	880	1,300	
Slope Distance m.	534	983	1,776	1,096	1,970	893	1,323	15,916
Average Slope %	12%	22%	38%	48%	41%	18%	19%	30%
Rated Capacity	2,800	1,600	1,800	1,800	1,800	1,200	2,800	25,500
V.T.M./Hr.(000)	185	336	1,134	848	1,346	185	694	9,733
Rope Speed m/sec.	5.0	2.2	5.0	2.3	5.0	2.0	5.0	
Trip Time min.	1.78	7.44	5.92	7.94	6.57	7.44	4.41	
Operating Hr./Day	10.0	7.0	7.0	6.8	7.0	7.0	10.0	7.3
V.T.M. Demand/Day		3,214	4,780	7,326	7,969	3,770		
Loading Eff. %	95%	80%	95%	80%	95%	80%	95%	
Access Reduction	0%	15%	5%	0%	0%	100%	0%	
SCC Skiers/Day	**0**	**500**	**1,500**	**620**	**1,120**	**0**	**0**	**10,140**

The terrain identified for development for skiing at build-out is similar to the existing balance, with large excesses of terrain in the advanced and expert skill classes and shortages in the beginner, novice, intermediate and high intermediate skill classes. Table IV.9 and Plate IV.4 illustrates the comparison between the proposed trail skill level balance and the skier market.

TABLE IV.9
TRAIL BALANCE BY SKILL CLASS
PHASE 4 - BUILD-OUT

Skill Classification	Hectares	Skiers	Balance	Ideal
1 Beginner	1.4	105	1.1%	5%
2 Novice	4.5	225	2.4%	10%
3 Low Intermediate	44.8	1,790	18.7%	20%
4 Intermediate	43.9	1,760	18.4%	30%
5 High Intermediate	46.4	1,390	14.5%	20%
6 Advanced	111.6	1,661	17.4%	10%
7 Expert	232.6	2,635	27.5%	5%
TOTALS	**485.2**	**9,566**	**100%**	**100%**

Average Density =	20.9	Skiers/Hectare
Optimum Density =	29.0	Skiers/Hectare
Weighted Demand =	5,386	VTM/Skier/Day

Note: Above data includes developed trails and gladed skiing. Including all transportation skiways and treed skiing, coverage totals 712.2 hectares and capacity is 10,307 skiers per day.

TRAIL BALANCE – BUILD-OUT

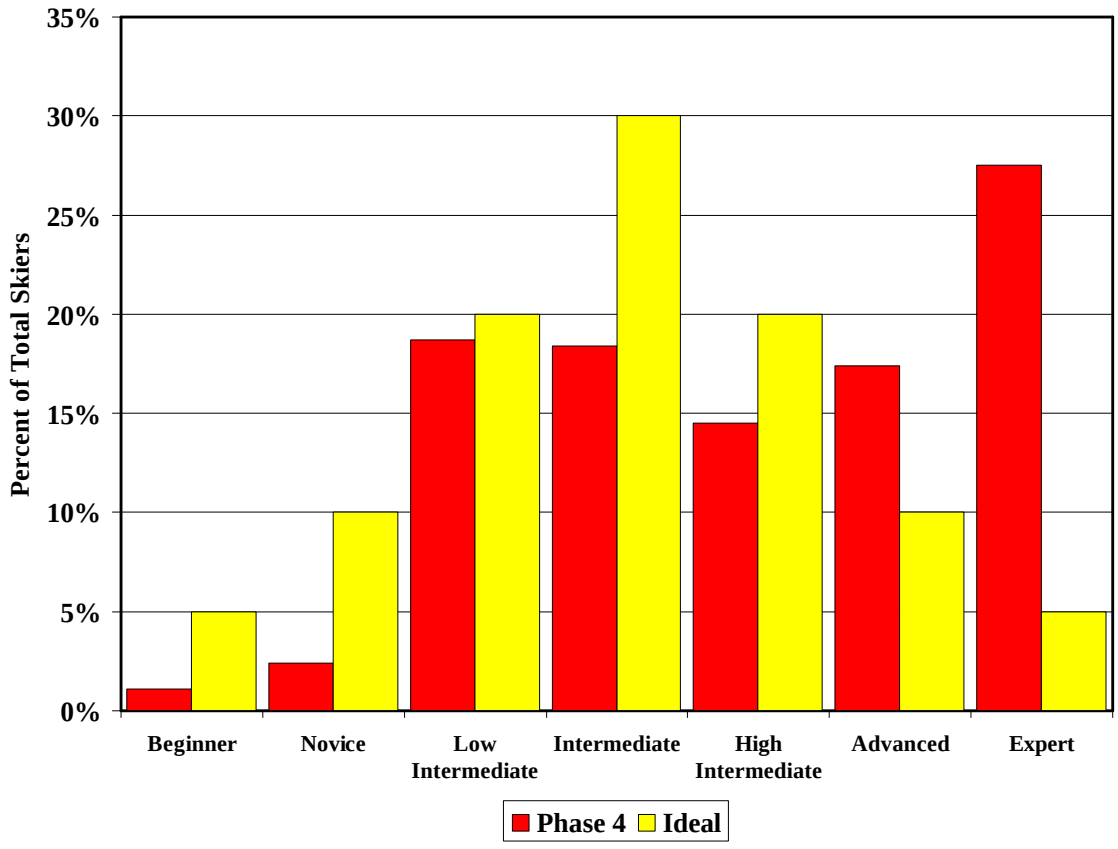


PLATE IV.4

.3 Trail Construction

The goal of the trail construction is to provide the best skiing surface at the earliest point in the season; therefore, the trail surface should be as smooth as possible with very little variation in the surface roughness. *However, it is imperative that the large "rolls" and undulations of the natural terrain be retained to provide an enjoyable ski experience.* The surface smoothness helps maximize the efficiency of, and minimizes the cost of potential snowmaking and grooming by allowing skiing with a minimal snowpack (either natural snow or machine made snow). It should be noted that a minimum of 60 cm depth of packed snow is needed to provide a sturdy skiing surface and to protect the grooming machines from churning up soil or rocks which causes damage to both the machine and the skiing surface (and also promotes faster snowmelt). Therefore, if the surface is smooth, only 60 cm of snow is needed. However, if the surface has rocks or sharp undulations which stick out of the ground 1 meter, then 1 meter of snow is needed to cover the protrusion and then another 60 cm for a skiing surface (total 160 cm of snow). Due to the capital and operational expense of snowmaking and the gradual accumulation of natural snow, it is preferable to create a surface that is as smooth as possible. In areas with large variations in the terrain of the skiing surface, high spots should be removed, and then replaced on the slope in an appropriate place to provide a relatively smooth surface.

During trail construction in treed areas, the trees and stumps should be removed (or stumps flush-cut), the soil replaced, the trail surface re-vegetated and cross-ditches constructed to redirect water off the trail and minimize erosion.

.4 Snowmaking

During periods with lower than ideal natural snowfall and areas with less than ideal snowpack, snowmaking is required to supplement the natural snowpack. This ensures operation in the early season and also ensures adequate snowpack during low snowfall years so that the ski resort can stay economically viable. Snowmaking can also be used to replenish snow when skier traffic or periods of warm weather wear down the snowpack.

Snow depth can be a significant issue at Kicking Horse on the lower elevation slopes. It is also very significant to their operations because every skier going up the mountain, with the current lift and trail configuration, must ski the lower mountain at some point during the day. Therefore, skiable snow coverage is essential for successful operation of the ski area. Due to this fact, Kicking Horse management has been working with several snowmaking manufacturers in the last couple years to create a detailed plan to implement the proposed snowmaking coverage.

Figure 14 illustrates the areas of the mountain where snowmaking is proposed to be installed. The first priority is to provide coverage on one trail from mid mountain down to the valley, as well as coverage on one trail serviced by the Catamount lift. The first snowmade trail will stretch from lower Down Shift (at the crossing with Wiley Coyote at the 1,670-meter elevation) all the way down to the base via Down Shift (Trail 41), the top terminal of the existing Catamount lift, Little Ben (Trail 97), down lower Buffalo Jump and onto Snow Goose to the bottom of the mountain. This route covers approximately 9.5 hectares, over 2,100 linear meters and will ensure skiable snow on the lower elevations of most concern, allowing all lifts to operate if natural snow is adequate above the 1,670 meter level. It is also anticipated that this measure could extend operations in a regular snow season by approximately four weeks. Additionally, it is recommended to add snowmaking to the Phase 1 beginner trails between the main base and the Pioneer base, covering a further 1.2 hectares.

The second priority for snowmaking services trails farther up the mountain (up to the 1,865 meter elevation) and provides a complete second snowmade route on the lower mountain. Snowmaking will be provided on the entire length of Wiley Coyote and extended up Down Shift and Blaster all the way up to the 1,800-meter elevation where it intersects It's a Ten. This second priority covers approximately 10.2 hectares and will stretch over approximately 2,350 meters length.

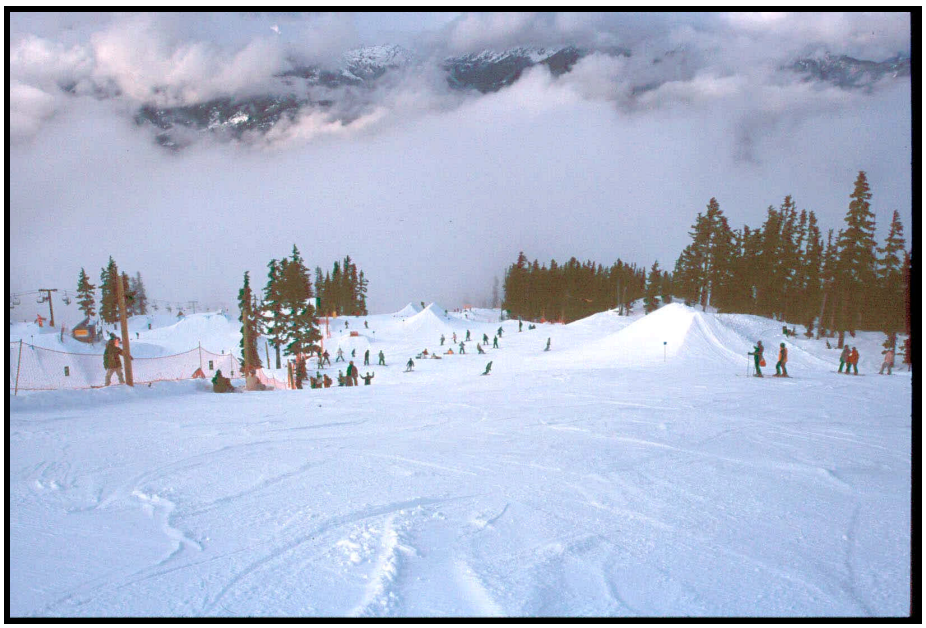
The third priority is lower Wapiti, from the top of the Catamount lift to the intersection with Snow Goose. This snowmaking will cover approximately 5.2 hectares and supplement natural snow to provide a normal skiing surface, as well as for creating terrain park features.

The snowmaking, as shown on Figure 14 will cover approximately 26.1 hectares and stretch over approximately 6.2 lineal kilometers of ski trails.

.5 Terrain Park & Halfpipe

Terrain parks are an exciting and relatively new addition to ski areas. Terrain parks and halfpipes facilitate a unique aspect of snowboarding and skiing. While snowboarders use most terrain in a way familiar to alpine skiers, freestyle snowboarding comes straight from the street. The terrain park and halfpipe is where skateboarding's influence can be either confined or showcased, depending upon your point of view. Popular with skiers and snowboarders, terrain parks are an excellent way to utilize a relatively small area of terrain.

Terrain parks generally consist of one or more "lines" of features which generally include a plethora of mounds of snow sculpted into different shapes and, often, a selection of differently shaped steel rails. The mounds of snow differ vastly in size and shape depending on the skill of the anticipated user and the amount and direction of jumping. The jump features themselves should be very carefully designed, as should be the in-runs and landing zones for these features. Careful construction, maintenance and regular adjustment of the features ensures a top quality, safe terrain park which can be an important draw for visitors.



Example of Terrain Park

A halfpipe is also an important component for ski/snowboard resorts. Halfpipes are becoming increasingly popular with skiers using "double ended" skis, as well as for snowboarders. Freestyle riding in the halfpipe is clearly a discipline that attracts the largest audience and media attention. Ski areas making the most of this take advantage of the sculptural aspects of snow, creating challenging areas that are the envy of their concrete and wood counterparts. A halfpipe is simply a channel constructed in the snow. The walls of the channel are contoured from horizontal to vertical, and the bottom of the channel is generally flat. Snowboarders and freestyle skiers use the walls as both a launch and landing ramp, and perform tricks similar to those observed in skateboarding. There are several different sizes of halfpipes, ranging from the standard halfpipe up to the "super" pipe.

Typical Halfpipe

Ecosign recommends that Kicking Horse construct at least one terrain park and a halfpipe to increase the variety of skiing experience and to be more attractive to a larger part of the skier/snowboarder market. In the first phases, it is recommended that beginner and intermediate terrain parks be constructed for use by the average skier/snowboarder. These features are smaller and more popular than the expert terrain parks with huge features. These smaller features are also easier and cheaper to build and maintain. The terrain park should be located on a trail with a suitable gradient and possibly supplied with snowmaking so that these features can be built whenever needed.

In Phase 1, we recommend that the terrain park features be constructed in Crystal Bowl, where the natural slope, topography and natural snowpack is conducive for a terrain park and the snow will remain for a fairly long period of time. A moderate sized halfpipe should also be included in this terrain park.

By build-out, the resort will be much larger and likely have more demand for terrain park facilities. At this time, it is anticipated that the market would demand one or two additional terrain parks to service a larger part of the market. It would be ideal to have one park with medium to large features and a super pipe, one or more parks with small to medium size features and one “beginner” terrain park with extremely small features. If one of these parks were to be located on the lower mountain (such as on the Wapiti trail) snowmaking would be required to provide enough snow to build the various terrain park features.

.6 Grooming

Machine grooming (snow farming) of trails is an essential component of mountain operations, with new grooming techniques revolutionizing many aspects of today's snow resort business. Present industry guidelines recommend the grooming of all trails with beginner to advanced skill classifications. Swing or night shift grooming has become the rule in the industry, as it allows a longer period for groomed trails to cure (set up) while eliminating hazardous conflicts between sliders and machines. An effective summer grooming program (seeding and mulching) can save appreciable wear and tear on expensive snow grooming equipment, as well as produce earlier opening dates and lower snowmaking costs. Modern snow grooming machines come with many features and a selection of implements are available for optimizing the quality of grooming and the time required to groom the slopes. Quick change hydraulic couplings and attachment fasteners have reduced the time and manpower required to change implements, allowing the groomer to use the right implement for the job, even in changing snow conditions during a single shift.

Grooming requirements change over time, due to climatic conditions and the extent of slider traffic on the trail, therefore, a good selection of grooming implements such as all-way blades, power tillers and compactor bars are necessary to increase the efficiency of the grooming fleet and to provide skiers and snowboarders with an ideal snow surface every day.

It is recommended that one fully operable grooming machine be available each nightly shift for every 20 hectares of groomable terrain. In order to maximize the capital investment in grooming equipment, the fleet should be double shifted as much as possible. A relatively new grooming fleet with an average of less than 6,000 hours per machine can achieve a machine availability of 90 percent or greater. The Kicking Horse grooming requirements, based on one nightly shift and grooming all available terrain on a nightly basis, are listed in Table IV.10. These recommendations envision all trails in Classes 1-5 being groomed on a daily basis and selected Class 6 trails being groomed twice per week. Although double shifting would slightly reduce the number of machines needed on a daily basis, during snowmaking and difficult snow conditions the number of machines would be slightly higher again. The number of machines needed to groom proposed terrain parks very much depends on management’s commitment to operating terrain parks; the number of terrain park groomers could be anywhere from one to four or five, depending on how many terrain parks they offer and how much they are groomed. It is likely that one machine will be required when they make a commitment to build and operate a terrain park in Phase 1.

TABLE IV.10
GROOMING REQUIREMENTS

PHASE 1			**Interval**	**Daily**
Groomable Terrain			**(Days)**	**Grooming**
Class 1 - Class 5	107.8	hectares	1	107.8 hectares
Class 6	10.9	hectares	3.5	3.1 hectares
Total	118.7	hectares		110.9 hectares
Recommended Machines	6	Standard Grooming Machines		
	1	Winch Equipped Grooming Machine		
	undetermined #	Terrain Park Grooming Machines		

PHASE 2			**Interval**	**Daily**
Groomable Terrain			**(Days)**	**Grooming**
Class 1 - Class 5	106.7	hectares	1	106.7 hectares
Class 6	10.9	hectares	3.5	3.1 hectares
Total	117.6	hectares		109.8 hectares
Recommended Machines	6	Standard Grooming Machines		
	1	Winch Equipped Grooming Machine		
	undetermined #	Terrain Park Grooming Machines		

PHASE 3			**Interval**	**Daily**
Groomable Terrain			**(Days)**	**Grooming**
Class 1 - Class 5	150.4	hectares	1	150.4 hectares
Class 6	23.5	hectares	3.5	6.7 hectares
Total	173.9	hectares		157.1 hectares
Recommended Machines	8	Standard Grooming Machines		
	2	Winch Equipped Grooming Machines		
	undetermined #	Terrain Park Grooming Machines		

PHASE 4			**Interval**	**Daily**
Groomable Terrain			**(Days)**	**Grooming**
Class 1 - Class 5	145.9	hectares	1	145.9 hectares
Class 6	33.1	hectares	3.5	9.5 hectares
Total	179.0	hectares		155.4 hectares
Recommended Machines	8	Standard Grooming Machines		
	2	Winch Equipped Grooming Machines		
	undetermined #	Terrain Park Grooming Machines		

The Pipe Magician (and other attachments made by other manufacturers) is a grooming attachment used for the shaping of a snowboard halfpipe. It is generally mounted on the front of a grooming machine in place of the blade, as illustrated in the following photograph. The grooming machine, with this attachment in the correct operating position is driven up or down a slope that has adequate snowpack and gradient to shape the halfpipe.

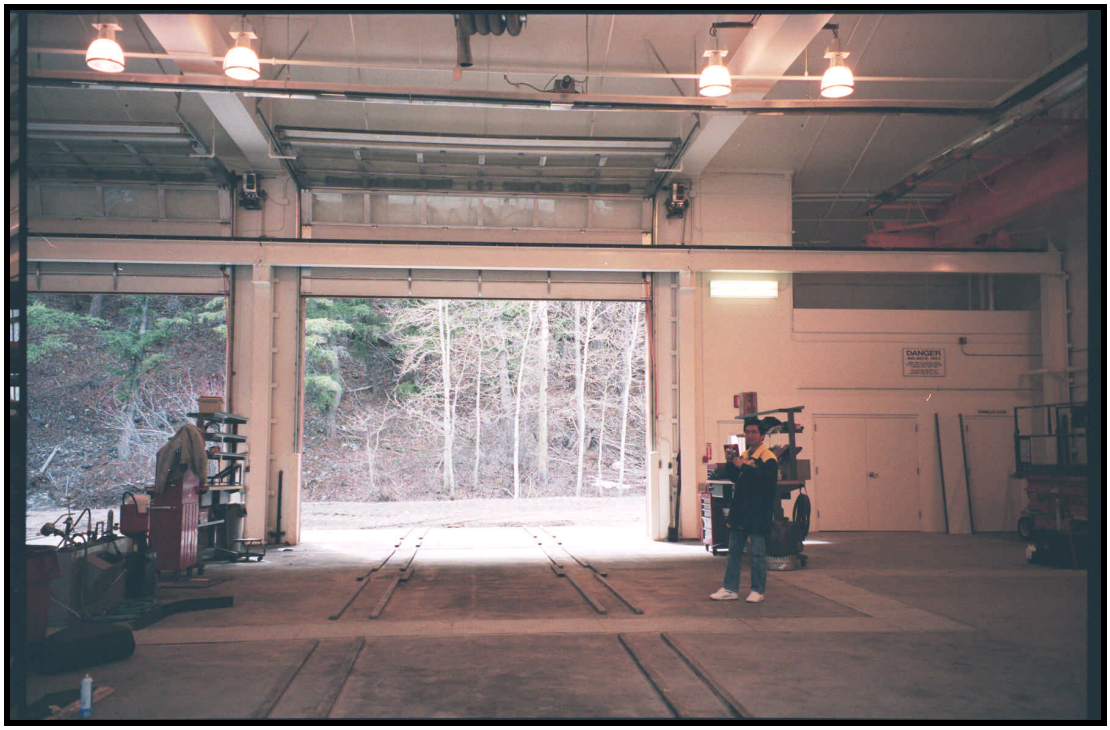
Halfpipe Grooming Implement

.7 Maintenance Facilities

Maintenance facilities will be required for the storage of grooming machines and rubber tired vehicles, lift maintenance shop, maintenance offices, etc. The maintenance facility must have easy access for rubber tire traffic and also easy access to the trails for the grooming machines. Ideally, this industrial appearing facility should be hidden from the public view, using trees or topography as a buffer.

As a rule of thumb, the maintenance shop should have one bay that is approximately 75 square meters in size (7.5 meters by 10 meters) for each front line grooming machine (at build-out; and a higher proportion in the earlier phases). In Phase 1, if Kicking Horse's business levels approach the calculated SCC, they would require a maintenance shop footprint in the order of 600 sq. m. (8 bays times 75 sq.m.). The first level floorspace would be allocated to 3 bays for grooming machines (with high ceilings to allow for a service lift for grooming machines and/or a ceiling mounted crane), 1 or 2 bays for rubber tire vehicles and snowmobiles and the other space for lift maintenance, electrical maintenance, building maintenance, sign shop, etc. In addition to the maintenance floorspace, the maintenance facility should provide a washroom and employee area, as well as parts storage, which are often located in a second floor mezzanine (covering 4 or 5 of those 8 bays or about 400 sq.m.). A fuel depot should be located adjacent to the shop for fueling all the rubber tire and on-snow vehicles. As shown on Figure 13a, the Phase 1 maintenance shop is located above and to the south of the main base, beside Gentle Ben. This location will be close to the trails and road access, yet out of site of most of the base area development and the skiers on the trails.

Due to the physical size of the ski area, the variability of snow quantity and quality and the phasing of construction, Ecosign recommends that one or two more maintenance shops be constructed by build-out, both for capacity and shortening travel time from the maintenance shop to the area to be groomed. One of these other maintenance shops may be located at the bottom of Crystal Bowl, near the top of the new Pioneer lift. A building here would provide a base for grooming the upper mountain without long drive times and would form a base for grooming during early and late season when skiing is not possible on the lower mountain. Vehicle maintenance functions here would likely be limited to minor repairs and oil changes, combined with lift maintenance functions for Crystal, Stairway to Heaven and Pioneer. A similar shop may be located near the bottom of lifts H and I for the same reasons.



Maintenance Shop Service Bay

.8 Base Area Design & Skier Service Facilities

Base area land use includes access roads, parking lots, base lodges and the lower terminals of the ski lifts. Since the function, convenience, character and aesthetics of the base facilities all contribute to the visitor experience, the base area plays a critical role in the success of a resort. Base areas require a distinct spatial organization to effectively move visitors from the parking lots, through the skier staging area, onto the ski slopes and up the hill. This spatial organization is centered in and around the base lodges and resort center with adjacent plazas and circulation corridors. The general base area hierarchy is as follows.

a. **Entry/Arrival** - The visitor should be given a definite sense of arrival with a minimum of decision points and limited pedestrian/vehicular conflict.

b. **Staging Facilities** - Generally required by most visitors, these services include ticket sales, restrooms and information. These services can be located in the base area core, as well as in a distinct "multi-purpose" daylodge.

c. **Commercial Facilities** - Required by most, but not all visitors, the secondary services include retail outlets, ski rental and repair, ski school, daycare facilities, public lockers and food and beverage facilities. Most of these services can be located within the daylodge.

d. **Skier Congregation** - Includes provision of adequate space for the placement of, and circulation around ski/snowboard racks, information kiosks and equipment donning areas.

e. **Base Area Ski Lift Terminals** - Skiers should be able to see and move easily to the lower terminals of the ski lifts. Ideally, there should be a two percent grade sloping down to the lift terminals from the skier congregation plazas.

f. **Operational/Service Facilities** - Operational and service functions include delivery, storage and waste disposal areas, ski patrol and first aid facilities, area administration and employee locker rooms.

g. **Skier Service Floorspace Overview** - The overview describes the categories and inter-relationships between the various skier services.

ENTRY/ARRIVAL ZONE

The entry/arrival zone acts as the reception area of the ski area for guests arriving by bus, or visitors who may require information services such as reservations for lodging or directions to their rental unit. It has been our experience that drop-offs and short term parking constitutes between five and twenty percent of all arriving visitors, depending on the nature and size of the resort. Day visitors will proceed directly to the parking lots and carry their equipment to the skier congregation area.

STAGING FACILITIES

Staging facilities are those which are required by almost all visitors arriving to or staying at the area and hence, must be easily accessible with generous space allowances.

Tickets

Since almost all lift tickets are purchased before noon, a southeast orientation maximizes solar exposure and hence, improves guest comfort. Lineups for lift tickets must be arranged so that distinct lines of up to 25 people can be formed. Ticket areas should have temporary ski and snowboard racks nearby to allow guests to easily set their equipment aside while purchasing tickets. As patrons approach the ticket windows, shelves are needed for guests to place goggles, gloves and hats while reaching for their wallet or credit cards. Rates should be posted for every two windows for easy reading to speed up the exchange. Many areas find it useful to heat the area overhead the last two or three spaces in line where, during inclement weather, bare hands must be used to complete the ticket purchase.

Space must be allowed for clientele to move away from the ticket windows and attractive but apparent trash receptacles should be placed adjacent to the equipment racks. Purchase of the lift ticket is a ski area's single most important contact with its clientele. The experience should be pleasant but not unduly memorable.

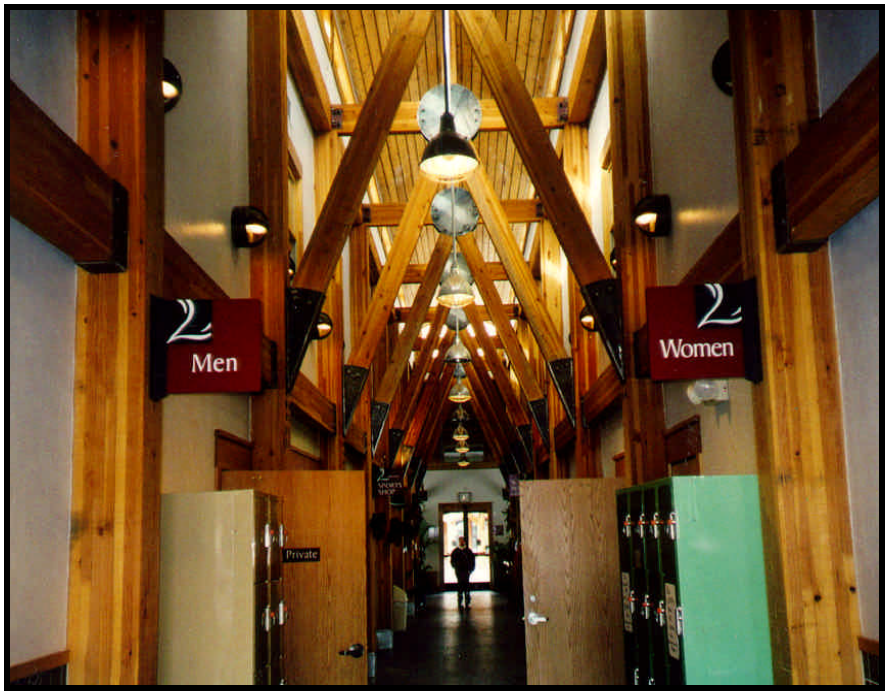
Ticket Window

Information

Information services are generally handled at an information wicket adjacent to the ticket windows or, alternatively, at a counter space which doubles as the reception for the area's administrative offices. This service disseminates information pertaining to everything from weather conditions to special ski programs and events. The information center should be staffed by polite and knowledgeable personnel.

Restrooms

Public restrooms are required by both day skiers and area visitors. Restrooms are frequently relegated to basement areas which are easily accessible from the arrival plaza, as well as the food and beverage services. Quite frequently, restrooms will have both indoor and outdoor entrances to minimize congestion within the resort center.



Restrooms/Lockers

COMMERCIAL FACILITIES

The secondary services are those which bring substantial revenues to the area but are not required by all clientele. As such, these services take a secondary place to the primary services, but must still be easily accessible from the primary pedestrian plaza and circulation area.

Retail Ski Shop

Retail shops for day skiers and snowboarders generally experience high volumes of business on accessories such as film, goggles, ski poles, gloves, hats, etc. The retail shops should have windows and a covered entrance directly accessible from the primary skier plazas, since frontage space is directly related to sales.

Ski/Snowboard and Sport Equipment Rental/Repair

Ski and snowboard rental and repair shops are also very high volume businesses which must outfit large numbers of guests with full equipment packages within a two hour period. Ideally, the ski area rental shops will have an entry corridor where clientele fill out forms and examine the rate sheets then move into an equipment fitting area which exits directly onto the skier congregation area. During the afternoon periods, the morning exit becomes the afternoon entrance as renters return equipment and pick up their identification and deposits.

Rental Shop

Rental Shop and Equipment Storage

Ski/Snowboard School

The ski school office or desk also requires access to the primary skier plazas for the purpose of maximizing use of the ski/snowboard school. Sometimes the ski school is located inside the ski shop, while other schools run from a counter in the daylodge.

Daycare/Children's Ski School

A daycare and children's ski school center is essential at ski resort areas. Experience has shown that well run, professionally staffed daycare centers can provide significant revenues to an area, while encouraging increasing participation in skiing by families. The daycare center is situated slightly away from the main activity areas, with direct access to a small, fenced snowplay or handle tow area. The nursery/daycare building should provide special food preparation and toilet facilities, as well as room for general play, crafts and nap periods.

Children's Ski School

Public Lockers

Recent ski industry experience suggests that public lockers provide good service and a potential profit center. Many areas are going towards a "country club" atmosphere with full size lockers where visitors leave their equipment throughout the week and change into ski gear upon arriving at the area. This set- up ensures a loyal clientele. Public lockers and change areas are best situated adjacent to the washrooms and can be secured separately after hours.

Food & Beverage Services

Food and beverage services are utilized throughout the day. Where possible, these facilities should have views of the mountain slopes and good sun exposure. Outdoor space and sundecks can also provide additional seating at modest expense. The layout of the food service area is paramount to the economic success of the food service operation and most areas have gone to a "scramble" and modified "fast food" system to improve sales and customer efficiency. While most ski area cafeteria facilities serve beer and wine, the bar and lounge facilities are generally separated from the main cafeteria to afford sociability to distinct social and age groups.

Mountain Restaurant with Outdoor Ski Racks

SKIER/SNOWBOARDER CONGREGATION

The skier/snowboarder congregation area is ideally separated vertically from the entry and pedestrian plazas to discourage guests on skis from entering the vehicle zone. The skier congregation area has well manicured snow surfaces with equipment racks and is used to purchase tickets, put on ski equipment and enter the lift massing areas or, alternatively, to store equipment while using the lodge facilities.

Skier/Snowboarder Congregation Area

OPERATIONAL FACILITIES

While there are no set rules for the spatial location of the area administration and other service functions, administration and staff lockers are frequently situated in the basement, or north facing sides of the buildings. The first aid and ski patrol requires direct access from the slopes to allow the patrol to bring in accident victims by toboggan. There must also be direct ambulance access to the first aid room from a vehicular terminus zone or parking lot. The first aid room should have approximately one bed for every 500 skiers for comforting accident victims while they are waiting for friends or further medical aid. Preferably, the first aid room should be situated in an area which is not highly visible to the majority of the area's clientele. A full resort also requires a complete medical facility for all guests.

Kicking Horse - Proposed Skier Service Floorspace

To assist in the planning and analysis of skier service facilities, the number of skiers that would be skiing at the resort on a “design day” needs to be determined. The design day is chosen to represent the business levels expected during the high season, but is not the “peak day” experienced in a season. If facilities were designed for the peak day, they would be under-utilized for the balance of the season. For planning Kicking Horse, 80 percent of the SCC has been selected as the number of skiers to plan for on the design day.

The base area skier service facilities are proposed to be located in the daylodge in the main base. Additional service facilities may be located in the village and buildings at the bottom of the Pioneer lift. In Phase 4, some staging services would be located at the large southern day skier lot (rentals, retail, tickets, lockers, restrooms, etc.). Locating some ancillary services in accommodation buildings will not only save construction costs but saves space in the layout of the hotel zone/village and provide some interest and activity on the ground level of the proposed base area development. If private companies operate some ski rental shops, equipment retail and restaurants within the village, it will also save operation costs and management of these facilities and provide a variety of choices for guests.

The Eagle Eye Restaurant and the Heaven's Door Yurt currently provide restaurant facilities on the mountain. On-mountain space will not only have to be expanded but new facilities will have to be constructed in various locations on the mountain to ensure the provision of food, restroom and warming facilities close to skiers in any zone. Not only is this convenient for guests, but it also ensures that lifts are used primarily for return cycle skiing and not for transportation to and from base areas and restaurants. It is anticipated that the Heaven's Door yurt will have to be replaced by a larger, permanent facility to service the larger number of skiers in this zone. A restaurant should also be located at the bottom of Lifts H and I so that skiers using the northern zone do not have to travel to the village and back to have lunch.

We have calculated the recommended floorspace for each of the skier service categories in each phase based on the design day and planning parameters detailed in the Inventory section of the master plan report.

The recommended floorspace is based on Ecosign's planning standards for regional/destination resorts of a similar type, with some modifications to suit Kicking Horse's unique characteristics. Table IV.11 lists the total amount of skier service space recommended to service Kicking Horse on a peak day in each phase based on the assumption that business levels approach the calculated SCC. A total of 6,152 sq. m. of skier service floorspace is recommended for Phase 1 (almost double the existing floorspace); 6,815 sq. m. in Phase 2; 9,650 sq. m. in Phase 3; and 10,848 sq. m. at build-out.

It should be noted that these are guidelines for skier service floorspace and the actual distribution of floorspace will vary due to architectural design of the buildings, the management's methods of operation and changes to ski area design and operation over time.

TABLE IV.11
KICKING HORSE RESORT AREA
RECOMMENDED SKIER SERVICE FLOORSPACE

Development Phase	Existing	Phase 1	Phase 2	Phase 3	Phase 4
Skier Carrying Capacity =		5,750	6,370	9,020	10,140
Design Day - (80% of SCC) =		4,600	5,096	7,216	8,112
Guest Service Function	Recommended Floorspace	Recommended Floorspace	Recommended Floorspace	Recommended Floorspace	Recommended Floorspace
Staging Facilities	(Sq.m.)	(Sq.m.)	(Sq.m.)	(Sq.m.)	(Sq.m.)
Ticket Sales	42	43	47	67	75
Public Lockers	42	299	331	469	528
Equipment Rental & Repair	255	342	379	536	603
Guest Services/Ski School	21	107	118	168	188
Children's Programs	111	150	166	235	264
Subtotal Staging Facilities	471	940	1,042	1,475	1,658
Commercial Facilities					
Food Service Seating	1,072	1,840	2,038	2,886	3,245
Kitchen & Scramble	256	920	1,019	1,443	1,622
Bar/Lounge	334	214	237	335	377
Restrooms	143	345	382	541	608
Accessory/Retail Sales	293	171	189	268	301
Subtotal Commercial Facilities	2,100	3,490	3,866	5,474	6,154
Operational Facilities					
Administration	167	256	284	402	452
Employee Facilities	93	128	142	201	226
First Aid & Ski Patrol	107	107	118	168	188
Subtotal Operations Facilities	367	491	544	771	867
Subtotal all Facilities	2,938	4,921	5,452	7,720	8,678
Storage		492	545	772	868
Circ./Walls/Waste/Mech.	65	738	818	1,158	1,302
Total (Sq. m.)	3,003	6,152	6,815	9,650	10,848