Powder King Ski Village

Resort Area Master Plan Update

prepared for:

Azu Ski Village

planning by:

Ecosign Mountain Recreation Planners Ltd.

May , 1983

Table of Contents

List of Figures

Executive Summary

This summary presents an overview of the major conclusions and findings of the Azu Ski Village Conceptual Master Plan. Detailed explanations of the methods, assumptions and calculations upon which these conclusions are based may be found in the body of the report.

Azu Ski Village is presently an operating ski area situated in the north central portion of British Columbia within the Regional District of Fraser Fort George. The existing ski area and proposed expansion areas encompass some 2,000 hectares of primarily Crown land situated on the western side of Pine Pass where the John Hart Highway (97) cuts through the northern Rocky Mountains. Elevations within the study area range from 900 meters to the summit elevation of 1,650 meters. The majority of the area is heavily forested although the summit areas contain alpine and sub-alpine vegetation above the 1,500 meter elevation. The area possesses an excellent variety of skiing terrain for all skier ability levels with predominantly eastern, northern and northwestern exposures.

Mean daily and mean daily maximum temperatures are below freezing from November through March and extreme minimum temperatures of less than -20^{o} Celsius can also be expected during these months. While the mean daily temperatures are conducive to a good long ski season, we can expect that ski operations may be limited due to extreme cold on windy or overcast days where the daytime temperatures drop to below -25^{o} Celsius. The area averages 1,258 centimeters (495 inches) of snowfall per year and with further development, Azu can be expected to gain a reputation for its abundant, dry powder snow skiing.

At the present time, no rare or endangered species of flora or fauna are known to exist or frequent the site, and hence the biophysical impacts of the ski development would appear to be limited.

There are presently two other small community ski areas within Azu's local market and an additional seven ski areas within the regional market. The population and economic forecast presented in this report reveals that Azu's local and regional markets are experiencing growth rates which are extremely high by North American standards. Mr. Ted Farwell of Boulder, Colorado has been retained to prepare a detailed financial and market analysis. His report is contained in a separate volume.

It is our opinion that Azu Ski Village has the potential to become a resort of regional significance and have recommended that the existing area be abandoned in favour of a totally new base and mountain facility constructed approximately 1 kilometer north of the existing area. The ski and base development plans contained in this study recommend the following three phases of ski lift development:

PHASE I - 1 triple chair, 1 T-Bar, 1 Beginner Tow. Daily capacity; 2,065 skiers.

PHASE II - 1 triple chair. Total daily capacity; 3,515 skiers.

PHASE III- 1 double chair. Daily capacity; 4,625 skiers.

The Phase I development will possess a vertical rise of 575 meters with 14 major ski trails covering 53 hectares of terrain. An additional 13 ski trails are slated for Phase II and cover 48 hectares while the Phase III ski development covers 38 hectares and provides an additional 7 ski trails.

We have recommended that the area will require construction of a small alpine village catering to overnight visitors. We have prepared a base area land-use plan which illustrates the location of facilities for day skiers, overnight guests and efficient ski operations. At the present time, the base area land use plan calls for 1176 overnight visitors in Phase I, 2,000 in Phase II and 2,600 in Phase III. If constructed, the total base area development will require approximately 38 hectares of land.

Paul E. Mathews, President

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1. Introduction

.1 LOCATION & REGIONAL CONTEXT

Azu Ski Village is situated in the north central portion of British Columbia within the Regional District of Fraser-Fort George. The area is a small resort and ski area located on the western side of Pine Pass where the John Hart Highway (97) cuts through the northern Rocky Mountains and enters the farm and ranch country of the Peace River area (see Figure 1, Area Location Map)..

The region surrounding Azu Ski Village has recently experienced one of North America's most rapid rates of growth due to extensive resource development in the timber, mining and hydro-electric sectors. Azu Ski Village is 200 kilometers north of the city of Prince George, B.C., which has rapidly evolved from a mill town into a bustling urban area of 73,500, serving as the manufacturing, supply and service centre for north-central B.C. With a trading area population of 175,000 Prince George is in the centre of a region where hundreds of millions of dollars of forestry, energy and transportation developments are in progress. Over $500 million in developments are being planned by the area's pulp and timber industry alone. The Greater Prince George area has consistently ranked in Canada's top ten cities in both average and disposable per capita income, with economic growth quadrupling between 1969 and 1979 (trading area income - $403 million in 1969, $1,743 million in 1979). Prince George is the largest city in B.C.'s interior and the third largest urban area in the province.

The mainstay of Prince George and the entire region is the forest industry. With three pulpmills in the city and two in Mackenzie, the region is the largest pulp producer in Canada. The Mackenzie townsite is just 75 kilometers from Azu Ski Village and lies at the southern end of Williston Lake, the largest man-made reservoir in North America, formed by the W.A.C.Bennett Dam on the Peace River. The District of Mackenzie was created in 1965 as a result of the development of large pulp and lumber manufacturing facilities, with the townsite growing to support a population of 6,500 in 1979.

The regional dominance of the forest industry, however, may soon be eclipsed by energy related activities as plans progress for development of B.C.'s northeast coal deposits, the Grizzly Valley natural gas fields and further hydro-electric developments on the Peace River. These energy developments will center on the cities of Chetwynd, Dawson Creek and Fort St. John, which are respectively 113,215 and 261 highway kilometers northeast of Azu Ski Village. The new townsite of Tumbler Ridge (estimated population (8,000-12,000) will evidently be required to service the northeast coal deposits.

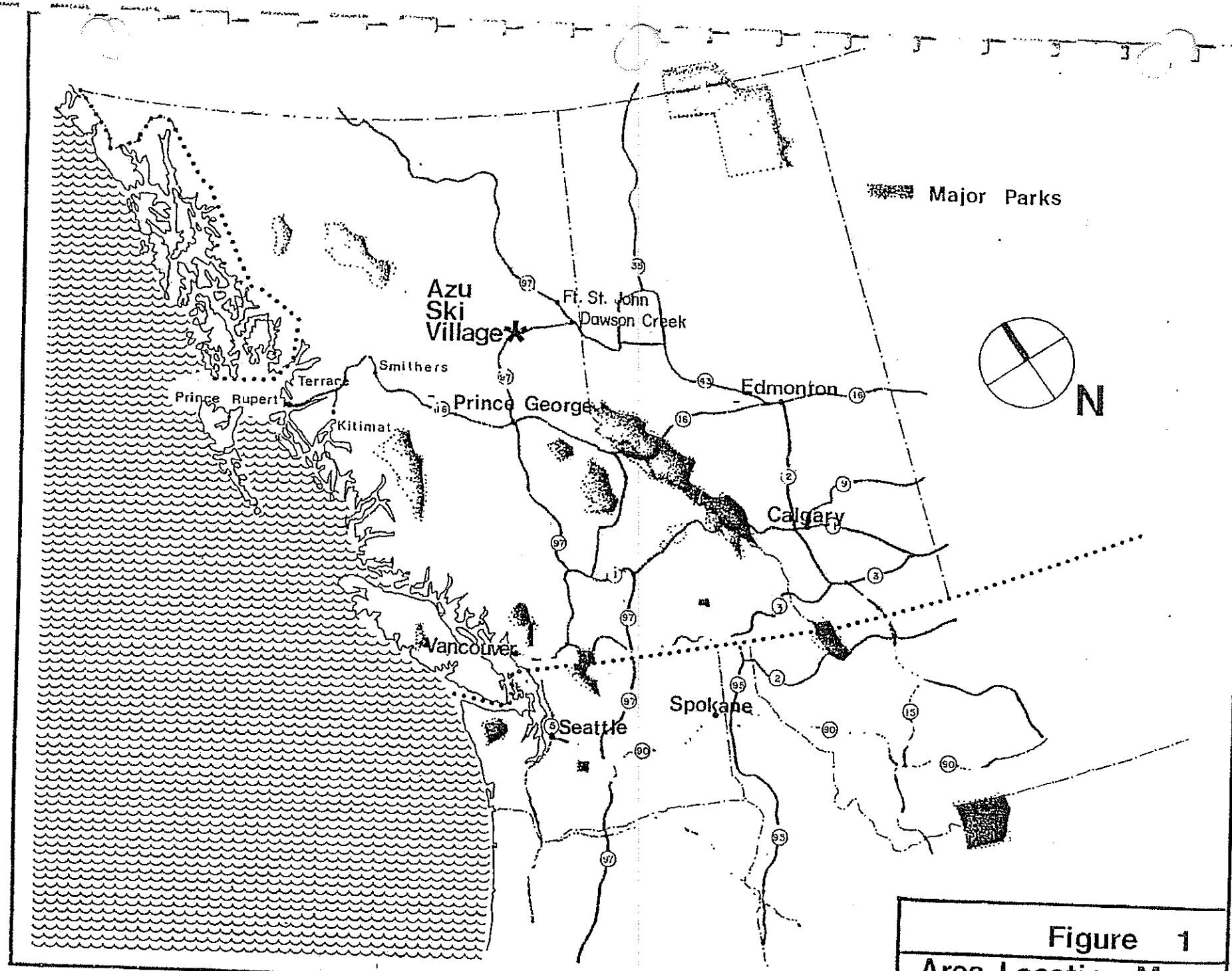


Figure 1
Area Location Map

It is evident that the region will require substantial development of health, social and recreational facilities and Azu Ski Village's central location to these developments portends a very positive opportunity to provide many of the recreational amenities for this rapidly expanding market area.

.2 SKI INDUSTRY OVERVIEW

Skiing is a relatively young sport, having a primary economic take-off point which occurred in the post World War II period. While the physical plant and participation in the sport grew moderately during the 1950's, the 1960's ushered in an explosive era of ski development in North America centered in the Northeast Corridor, the Rocky Mountains and the Pacific Northwest with participation growing in excess of 15 percent per annum.

While the North American average annual growth rate has dropped to a more modest rate of 8 percent annually, certain regions have continued to experience growth rates throughout the 1970's which equalled or exceeded those of the explosive sixties. Industry analysts have suggested that these high growth regions (ie. Colorado, California and British Columbia) have sustained their explosive growth patterns through continued resort development, thereby substantiating the tenet that in skiing, supply stimulates demand. Other identifiable growth stimulators within the sport of skiing include: population growth; the technological improvement of ski lifts, equipment and slope grooming techniques; the graduated length method of instruction; and cooperative packaging of lifts, equipment, transportation and accommodation.

Recent studies put the number of U.S. residents skiing at over 19 million with the potential to increase to 27.1 million. Participation in skiing has been growing at a rapid rate. The A.C. Neilson's 1982 survey indicated a 40 percent increase in participation in skiing over the 1979 survey on top of a 40 percent increase between 1976 and 1979.

The sport of downhill skiing must be viewed in the overall context of the population's pursuit of recreation and leisure. In the United States, downhill skiing ranked 29th overall in outdoor activities, but in 1977 was the second fastest growing activity and possessed the highest growth potential as illustrated below. Since skiing is a recreation and leisure activity closely associated with tourism and travel, the sport's future will likely mirror the general trends established by this major industry. For this reason, we have quoted directly the conclusions of a recent (1981) exhaustive study and analysis of the travel trends in the U.S. and Canada.[1]

TABLE 1

TOP OUTDOOR RECREATION ACTIVITIES RANKED BY POPULARITY AND GROWTH, 1977

Rank	Most Popular Activities[a]	Percent	Fastest Growth Activities[b]	Percent	Highest Potential Growth Activities[c]	Percent
1	Visiting zoos, acquariums, fairs, or carnivals	73%	Cross country skiing	25%	Downhill skiing	6%
2	Picknicking	72	Downhill skiing	17	Tennis	6
3	Driving for pleasure	69	Tennis	13	Waterskiing	5
4	Walking or jogging	68	Sailing	11	Horseback riding	4
5	Pool swimming	63	Snowmobiling	11	Cross-country skiing	4
6	Sightseeing	62	Waterskiing	10	Primitive area camping	3
7	Attending sports events	61	Canoeing or kayaking	9	Sailing	3
8	Other sports events	56	Golf	9	Golf	3
9	Fishing	53	Off-road vehicles	5	Snowmobiling	3
29	Downhill Skiing	7	Horseback riding	4	Canoeing or kayaking	2

[a] Percentage of total population participating in an activity at least once during a 12 month period.

[b] Percentage of participants just starting activity for the first time during previous 12 months.

[c] Percentage of nonparticipants that would like to begin participating during "next year or two"

Source: 1977 Nationwide Outdoor Recreation Survey, Heritage Conservation and Recreation Service, U.S. Deparment of the Interior, Washington, D.C.

"Recreational and leisure pasttimes are as old as mankind itself. Even the founding fathers of this country thought it necessary to identify "the pursuit of happiness" as one of our inalienable rights. The dimensions of the tourism and leisure time industry of the present age cannot even be

[1] 1977 Nationwide Outdoor Recreation Survey, Heritage Conservation Recreation Service, U.S. Department of the Interior, Washington, D.C.

compared to the dimensions of the past. They are so disproportionate, they are meaningless. The leisure industry's period of greatest growth began shortly after the end of World War II. Some of the factors that stimulated this growth were (1) accelerated curves of family formation and the rising birth rate; (2) the credit card; (3) the development of high-speed interstate highways; (4) the large high performance automobile designed for comfortable long distance travel; (5) abundant and cheap gasoline to power automobiles; (6) the use of mass media to communicate travel, recreational and leisure ideas; (7) large capactiy jet airplanes with the ability to compress time and distance; and (8) the promotion of tourism by the United States and other countries as a means of economic development.

While today some of these catalysts are diminishing in importance or even disappearing, new ones are taking their place. The future is going to be influenced by the natural resource situation - energy. But if viewed positively, that can create additional opportunities. During the last 30 years Americans have made the annual vacation trip a national institution and research shows that few Americans would be willing to give it up. They would give up other things first. Consequently, it appears that travel may be embedded in our country's behavior patterns. On the whole the future of tourism, recreation, and leisure will be driven by the following conditions:

1. Contempary socioeconomic forces are characterized by the growth of leisure, the need for psychological escapism, the youth bulge, smaller and delayed families, working wives, expanded education and the long term growth of discretionary income and are moving in a direction which indicates more tourism, leisure and recreation. The factor that is of greatest concern is income, but the increase in two wage earner families will help the income situation.

2. There will be a steady shift from large automobiles to smaller vehicles in the future.

3. There will be dramatic increase in the miles per gallon automobiles will get.

4. Smaller cars offer less comfort on long distance vacation and business travel though this will not necessarily be a substantial deterrent. It will benefit to some extent our common carrier system.

5. The vacation travel market will be increasingly pointed toward air travel. Even a small percentage of travel shifted from automobiles to air will result in a sizeable increase in air travel.

6. Even with these trends the automobile will continue to be the major method of transportation.

7. The brightest point on the travel horizon is the continued expansion of foreign visititation to this country. The United States is currently a travel bargain.

8. The U.S. tourist industry is strong and resilient, even in recessionary times.

9. Consumerism will become an even more important force in travel.

10. The dramatic increase in singles will continue to boost the tourism market.

11. Women will become more important in the travel market in the future and their impact will by dynamic.

12. Travel will continue to grow in the future until it becomes our world's largest industry. Herman Kahn has predicted it will be the world's largest industry by the year 2000.

13. The U.S. society has moved from a work ethic to a leisure ethic. The youth of the country are demanding travel, recreation and leisure as a right.

14. Time-sharing will be one of the hottest items in the tourism industry.

15. With population and income increases, and a static land supply, the demand for vacation property will continue to increase pushing prices even higher.

16. There is a trend toward multiple vacations.

17. There is a growing trend toward long lengths of stay, going to a destination resort and staying a week or two.

18. There will be a continued increase in travel closer to home - shorter distance trips.

19. The future will see more package tours.

20. Inflation will be present for some time in the future, making in-roads into consumer's discretionary buying power. In spite of this, travel will remain a high consumer priority item. However, the travel industry will have to work at retaining the consumer's favor. The future emphasis must be on value.

21. Many people are no longer finding the rewards in travel they expected. Instead, they are finding that travel is frequently becoming depersonalized, less comfortable and glamorous than anticipated, and has often created more problems than it has solved. These attitudes toward travel can be reversed only if the travel industry can introduce high levels of value, while at the same time meeting the challenge of rising costs."

SOURCE: Travel Trends in the United States and Canada, 1981 Edition, Business Research Division, University of Colorado, Boulder, Colorado; 1981.

In Canada, a 1976 STATSCAN survey indicated that 2.55 million skiers (cross country and downhill) recorded over 23 million visitor days. In 1980, 30.9 percent of all Canadian households reported owning at least one pair of downhill or cross-country skis. Household ownership of skiing equipment in Canada rose 31.5 percent between 1976 and 1978 and a further 29.5 percent between 1978 and 1980.

While the long range growth potential of the North American ski industry is difficult to accurately determine, numerous ski industry experts and government officials are predicting an extremely bright short to medium term potential for the British Columbia ski industry. This optimistic outlook is based upon the following trends:

- Continued population and economic growth in Western Canada; the 1981 Canada Census revealed a 10 year population increase of 37.5% in Alberta and 25.6% in B.C., substantially above the national average of 12.9 percent.
- Western Canada's outstanding natural attributes.
- the difficulty of new resort development and/or expansion in the United States.
- improved transportation modes and routes both to and within Western Canada.
- the relative length of the Canadian winter coupled with the comparatively young and active resident market.

To sustain this optimistic outlook, however, will require a co-ordinated effort by industry and government to: improve the quality and quantity of the industry's aging physical plant, continue access improvements, significantly upgrade and expand Western Canada's tourist accommodation base, and markedly increase the promotion of these facilities.

GLOSSARY

Skier (Comfortable) Carrying Capacity (SCC) - the number of skiers that a given ski area can comfortably support on the slopes, lifts and in base and mountain warming buildings without overcrowding or those that may be accommodated at one time and still preserve a congenial environment. A ski area's comfortable carrying capacity is a function of VTF/hour, difficulty of terrain, and scope of support facilities.

Utilization - is measured as a percent of comfortable carrying capacity. Capacity is the product of a ski area's daily capacity times its days of operation. Utilization compares actual skier visits to calculated comfortable seasonal capacity.

VTF/Hour - (Vertical Transport Feet Per Hour) - the number of people lifted 1000 vertical feet per hour (vertical rise of a lift times the lift capacity per hour divided by 1000). An area's total VTF is the sum of VTF for all lifts. VTM - Vertical Transport Meters is the metric equivalent.

Rated Uphill Capacity - the manufacturer's rated number of skiers per hour a lift can transport to the top of the lfit. An area's hourly capacity is the sum of the individual lifts.

-3 ISSUES & PLANNING PROGRAM

While visitors have been skiing in the Pine Pass area since the early fifties, the initial T-Bar was installed at Azu in the fall of 1968, and subsequently extended in 1971. The area operated on weekends only during these years for family groups from Chetwynd, Dawson Creek and Grande Prairie. The area was purchased in the fall of 1979 by an investment group headed by Mr. Peter Graham Jr. of Vancouver, B.C. and operated on a daily basis during the 1979/80 season.

On May 6, 1980, Mr. Graham Jr. owner/operator of Azu Ski Village met with Mr. Paul Mathews, President of Ecosign-Mountain Recreation Planners Ltd. to discuss the physical planning aspects of the Azu Ski Village Comprehensive Master Plan. Mssrs. Mathews and Graham reviewed a topographic map of the area and it was agreed that Ecosign would complete a preliminary slope analysis to determine which areas required mapping of a higher resolution.

A skier's experience is a product of a whole set of events, impressions and perceptions including the quality of lodging, restaurants and shops, transportation, slope grooming, the length of the lift lines and many others. The Mountain Master Plan is therefore intertwined with area-wide land-use and transportation as well as the actual skier facilities.

We have listed below the key issues, constraints and opportunities identified during discussions with the owner which influence the skier experience and the future development of skiing facilities at Azu Ski Village.

* Azu Ski Village has recently undergone a change of ownership with the new owners possessing considerable management and financial resources.

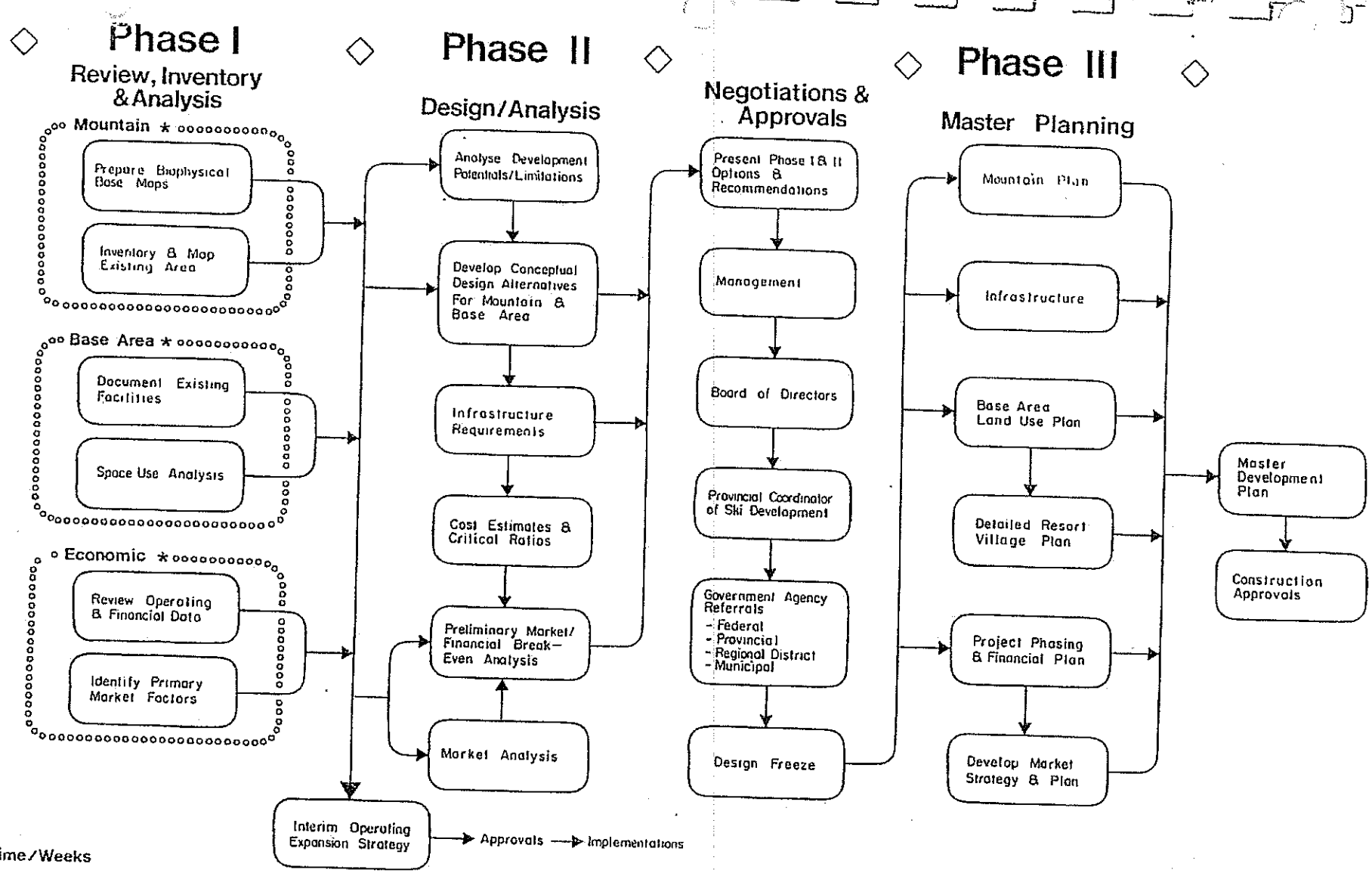
* there is an immediate need to upgrade the existing mountain and base facilities
* the area is located in a very high growth region and as such a thorough review and assessment of Azu's competitive posture within the northeastern B.C. skier market is required
* there appears to be several sites suitable for the location of a major base area
* long range planning is needed to identify the potentials of the mountain and base lands to support a regional destination resort facility with the possible incorporation of a "ski village complex".

The British Columbia Ski Area Policy clearly states the government's requirement for a conceptual master plan for both mountain and base facilities. In line with government policy and the primary issues previously identified, Ecosign recommended a three phase master planning program which would proceed on the following basis:

PHASE I	Review, Inventory & Analysis of Existing Area
PHASE II	Design/Analysis of Conceptual Expansion Plans
PHASE III	Mountain & Base Area Master Planning

This process will allow the owner of Azu Ski Village to proceed on a one-step-at-a-time approach in the evaluation of: the existing operation; the physical and market potential; design and financial alternatives; and finally the necessity of preparing detailed plans. The professional work involved in the completion of the Phases identified above is graphically illustrated in Figure 2.

Mr. Graham Jr. has also retained the services of Mr. Ted Farwell, a ski area consultant from Boulder, Colorado to prepare a market survey and feasibility study as well as assist in the financial analysis of various design alternatives.



Azu Ski Village Resort Master Planning Program

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Figure 2

2. Inventory

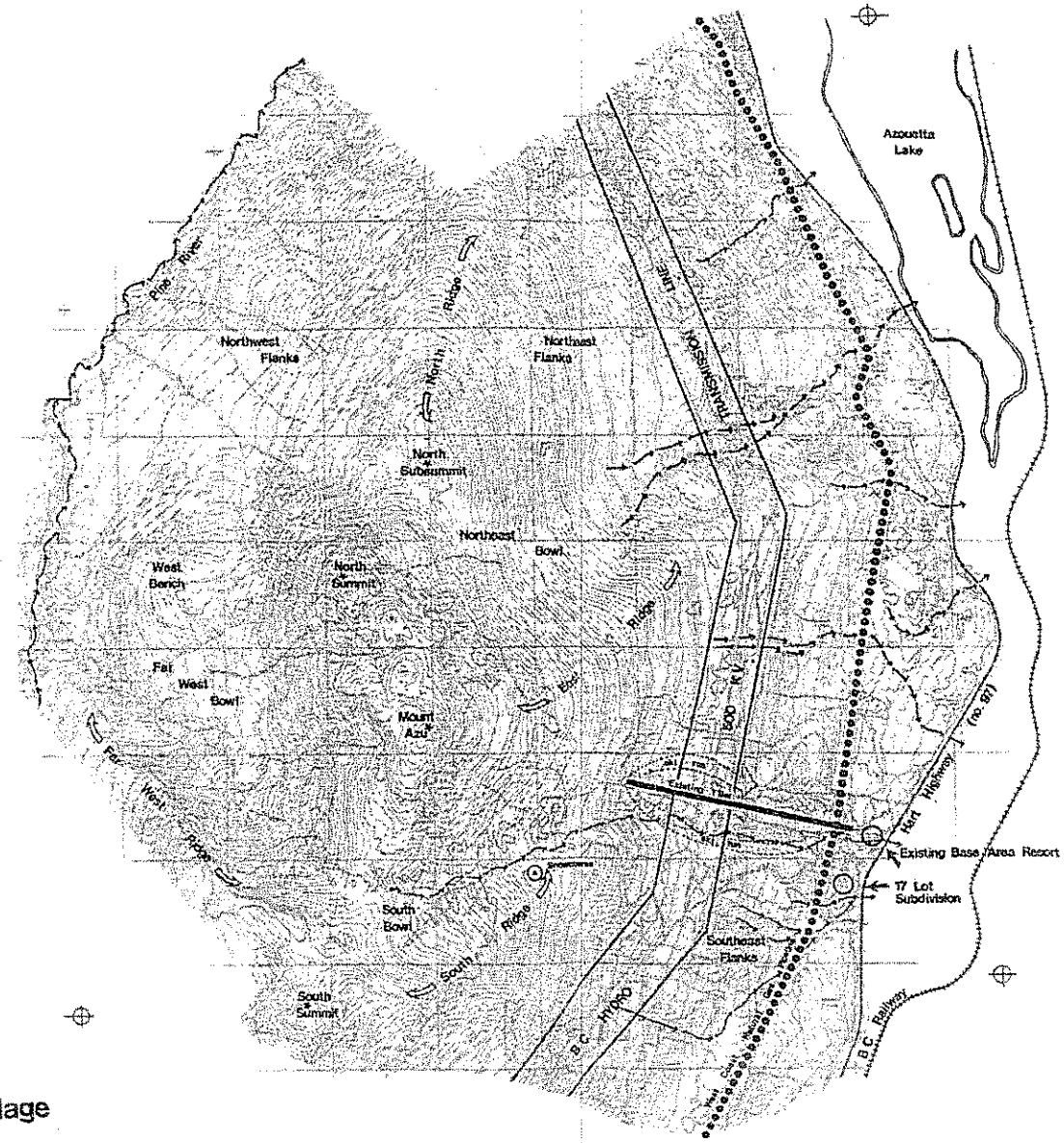
.1 PHYSIOGRAPHY

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 include: aspect (exposure), slope gradients, fall-line patterns and elevation.

The Study Area, (see Figure 3) identified for mountain planning purposes, includes an oblong shaped land mass which extends some 9 kilometers in an east/west direction and 13 kilometers in a north/south direction. This mass is presently un-named but for the purposes of this study we have termed the summit as Mount Azu, with the study area encompassing some 2,000 hectares. Elevations within the study area range from 900 meters in the Pine Pass area to a summit elevation of 1,649 meters. A majority of the area is heavily forested although the summit area contains alpine and sub-alpine vegetation above the 1,500 meter elevation.

The existing ski area has been developed on the lower eastern slopes of Mount Azu, with the existing motel and day lodge situated immediately west of and adjacent to the Hart Highway (97) at the 915 meter elevation. The existing T-Bar rises to the 1,300 meter elevation and is situated just north of a major drainage which flows through a deeply incised ravine to the present base area. The upper developed slopes fall primarily in the expert and advanced intermediate slope classifications while the lower slopes below Tower 6 include intermediate and beginner terrain. South of the ravine, there are developed slopes which are predominantly expert and advanced intermediate calibre. The southeast flanks of Mount Azu consist of predominantly advanced intermediate and expert terrain with a dominant band of terrain between the 1,075 and 1350 meter elevations possessing average slope gradients in excess of 40 percent. The southeast flanks are bisected by numerous small creeks and drainages and the general fall-line patterns flow parallel down the mountain to a prominent bench which then turns north and flows towards the existing 17 lot subdivision.

There are substantial areas of terrain which are suitable for base development ranging some three kilometers north of the present resort and generally below the 950 meter elevation. To the west and above of these baselands, lies beginner and low intermediate terrain up to the 1,025 meter elevation with advanced intermediate and advanced slopes ranging from this point up to the 1,350 meter elevation. Three B.C. Hydro 500 kv transmission lines bisect the northeast flanks, the east ridge and the southeast flanks generally between the 1,100 and 1,175 meter elevation. A major ridge line extends in a northeast direction from the Azu summit down to the



Azu Ski Village

Legend

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N

Plan Number: P801

Title: The Study Area

Scale: 0 1/2 1 2km

Date: 2/81

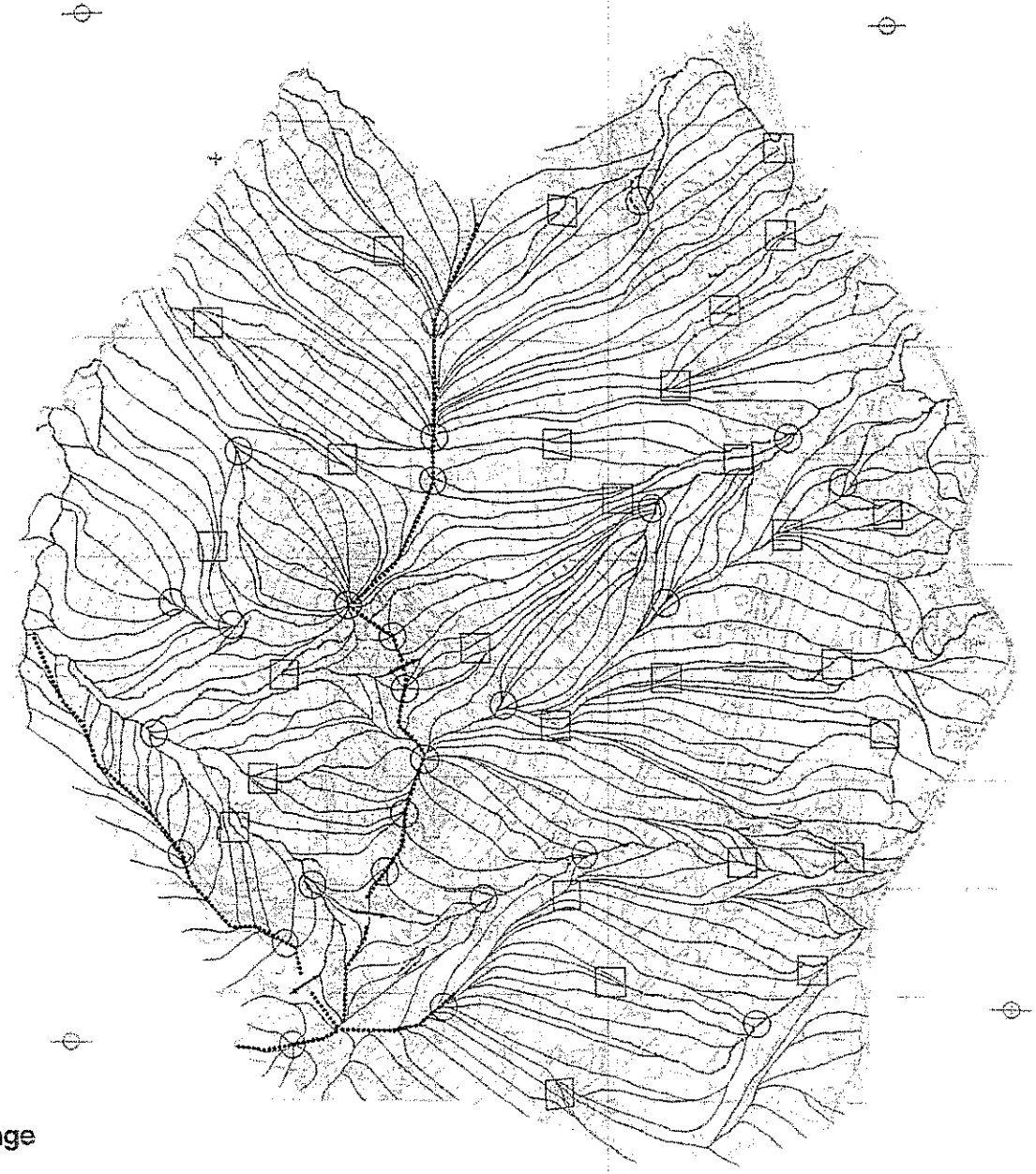
Project: Azu Ski Village

Figure 3

John Hart Highway and Azouzetta Lake. This ridge separates fall-line patterns of the southeast flanks and the northeast bowl. The east ridge is comprised of gentle terrain suitable for low intermediate and beginner skiers with a general width of 150 to 200 meters. The northeast bowl is a broad gentle bowl which averages 1 kilometer in width with a total slope distance in excess of 3 kilometers. This bowl possesses over 250 hectares of advanced intermediate, intermediate and low intermediate skiing terrain with fall-lines focussing on a broad bench at the 1,150 meter elevation, suitable for a lift staging area. From this bench, the fall-lines follow a major drainage down to the base lands adjacent to the highway at the 940 meter elevation. The terrain on these lower slopes is suitable for novice and low intermediate skiers. The northeast bowl also contains some good advanced and expert skiing in the upper elevations although there are routes for intermediates and beginners to circumnavigate these steep headwall pitches. The exposure of the northeast bowl lies in the lee of prevailing weather patterns and it is considered that this bowl will collect large quantities of snow and provide an ideal environment for sheltered skiing.

The northeast flanks of the mountain emanate from the northeast bowl and once again, contain vast amounts of pure intermediate skiing. The north ridge separates the northwest and northeast flanks of the mountain with the north ridge emanating from a sub-summit at the 1,480 meter elevation and extending northward 2 kilometers down to the Pine River at the 925 meter elevation. The north ridge has an average slope gradient of approximately 25 percent and hence is quite suitable for low intermediate and beginning skiers. The northwest flanks of the mountain possess large amounts of advanced and advanced intermediate terrain with an average slope gradient of 30 percent extending over 1.7 kilometers in length. While the fall-line patterns on the northwest flanks do not naturally converge on any single point, the area appears suitable for "over the back" skiing with access from the north summit or the north sub-summit. Slopes which emanate in a northwest direction from the north summit contain a steep band of expert and advanced terrain with average slope gradients of 56 percent ranging between the 1,250 and 1,600 meter elevation. While these slopes are excessively steep for all but the best skiers, it would appear possible that a lift in this area could service all ability levels as intermediate routes of descent appear feasible by heading from the north summit down the fall-line to the north sub-summit and then swinging west down onto the northwest flanks or, alternatively, by heading west of the north summit down to the west bench and then turning northward on a broad bench with good low intermediate terrain. Detailed on-site investigation will be necessary to confirm the viability of these routes and the weather patterns.

The far west bowl lies west of Mount Azu summit and contains large amounts of expert, advanced intermediate and intermediate terrain with fall-lines generally converging on a series of drainages. Intermediate routes of descent could be developed



Azu
Ski Village

Legend

- Fall Line Patterns
- Prominent Ridge Lines
- Water Courses
- Mountain Passes
- Concentration Areas:
  - Primary
  - Secondary

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N

Plan Number: P801

Title:
Fall Line Analysis

Scale: 0 200 400m C.I. 5m

Date: 11/80

Project:
Azu Ski Village

Figure
5

by heading southwest down the summit ridge and then turning west and northwest into the far west bowl, while advanced and expert skiers could head immediately west down the fall-line for challenging fall-line runs. As with the northwest flanks, the far west bowl could be developed in an "over the back" fashion. The northwest slopes of the far west ridge, however, have been heavily glaciated and possess steep, rocky cliffs which would appear to be suitable for avalanche start zones. The absence of the characteristic run-out patterns in the existing vegetation suggests that these cliff bands are too steep to collect substantial amounts of snow, and hence present a minimal avalanche danger.

The south bowl is accessible from the Mount Azu summit and south summit and possesses large areas of gladed beginner and low intermediate terrain. The south bowl has a northeast aspect with an average width of 450 meters and a slope length of approximately 1.5 kilometers. The slope gradients of the south bowl have a vertical drop of 275 meters with an average slope gradient of 21 percent. Fall-line patterns in the south bowl focus on the drainage which is just south of the existing T-Bar.

In summary, the entire site possesses a wealth of terrain suitable for commercial ski development with generally favourable fall-line, aspect and slope gradients. The maximum potential vertical rise is 745 meters which, if fully developed, would allow the site to be classified as a regional/destination facility. The physiographic features of the northeast bowl are, without question, most suitable for immediate development on the site and if developed would provide a very competitive skiing experience with other B.C. and Alberta ski areas.

.2 CLIMATE

Northeastern B.C. is dominated by Polar Continental and Arctic air masses which are much less humid than the Maritime air masses which affect the majority of coastal and southern B.C. Intensely cold winters and mild to warm summers are generally associated with these arctic and polar air masses. Azu Ski Village is situated in Pine Pass, which at 915 m. elevation is the lowest pass through the Rocky Mountains. Because of its location, Pine Pass is frequently spared the extreme low temperatures and high winds found at lower elevations in the Rocky Moutnain Trench and the Peace River Plateau.

In Table 1, we have summarized the weather records collected by the Atmospheric Environment Service of Canada between 1962 and 1975. The temperature data has been normalized over a much longer period by comparison with the Germansen Landing (#1183090) recording station. Mean daily and mean daily maximum temperatures are below freezing from November through March and extreme minimum temperatures of less than -20° Celsius can also be expected during these months. December and

January are the coldest months while July and August are the warmest. While the mean daily temperatures are conducive to a good long ski season, we can expect that ski operations may be limited due to extreme cold on windy or overcast days where the daytime temperatures drop below -25°C.

The Pine Pass area receives approximately 2,068 millimeters (81.5 inches) of precipitation annually, with peak precipitation occuring in the months of November, Deeember, January and February. Over 60 percent of the total average annual precipitation occurs in the form of snowfall while rainfall amounts to an average of 810 mm. (32 in.) per year. June and July are the heaviest rainfall months with averages of 111 mm. and 125 mm. respectively. The area averages 1,258 cm. (495 in.) of snowfall per year which is more than double the big snow areas such as Big White (635 cm), Silver Star (635 cm) and Whistler (590 cm). Due to the generally cooler temperatures, we can expect Azu to gain a reputation for its abundant dry powder skiing.

TABLE 1

AZU SKI VILLAGE CLIMATE

AES Station #118617; Pine Pass

	Jan.	Feb.	Mar.	Apr.	May	June	Jul.	Aug.	Sept	Oct.	Nov.	Dec.	
Mean Daily Maximum Temp °C	-11.6	- 3.9	- .9	5.6	12.2	17.3	19.9	17.8	12.8	6.0	- 2.9	- 6.6	
Mean Daily Temp °C	-14.0	- 6.6	- 5.8	.3	6.2	11.0	13.3	13.3	8.6	3.1	- 6.5	-11.2	
Mean Daily Minimum Temp °C	-18.4	-12.7	-10.8	-3.9	1.1	4.9	7.2	7.1	3.6	- .8	- 8.7	-12.6	
Total Precipitation mm.	289	266	184	141	92	111	125	85	86	152	282	288	(2,068)
# of Days with Measurable precip.	19	16.5	14	11	13	9	14	13	15	22.5	21	18	(186)
Snowfall cm.	246	234	152	91	15	-	-	-	tr	58	217	244	(1,258)
# of Days with Measurable sf.	18.5	16	11	8.5	2.5	-	-	-	-	6.5	19	17.5	(99.5)
Extreme Minimum Temp. °C	-35.1	-24.8	-23.9	-15.6	-4.4	-.2	2.9	1.2	-2.3	-7.1	-27.2	-31	
Extreme Maximum Temp. °C.	3.2	7.0	9.3	13.5	21.4	25.9	27.8	27.9	22.4	15.5	6.1	1.8	

Microclimate

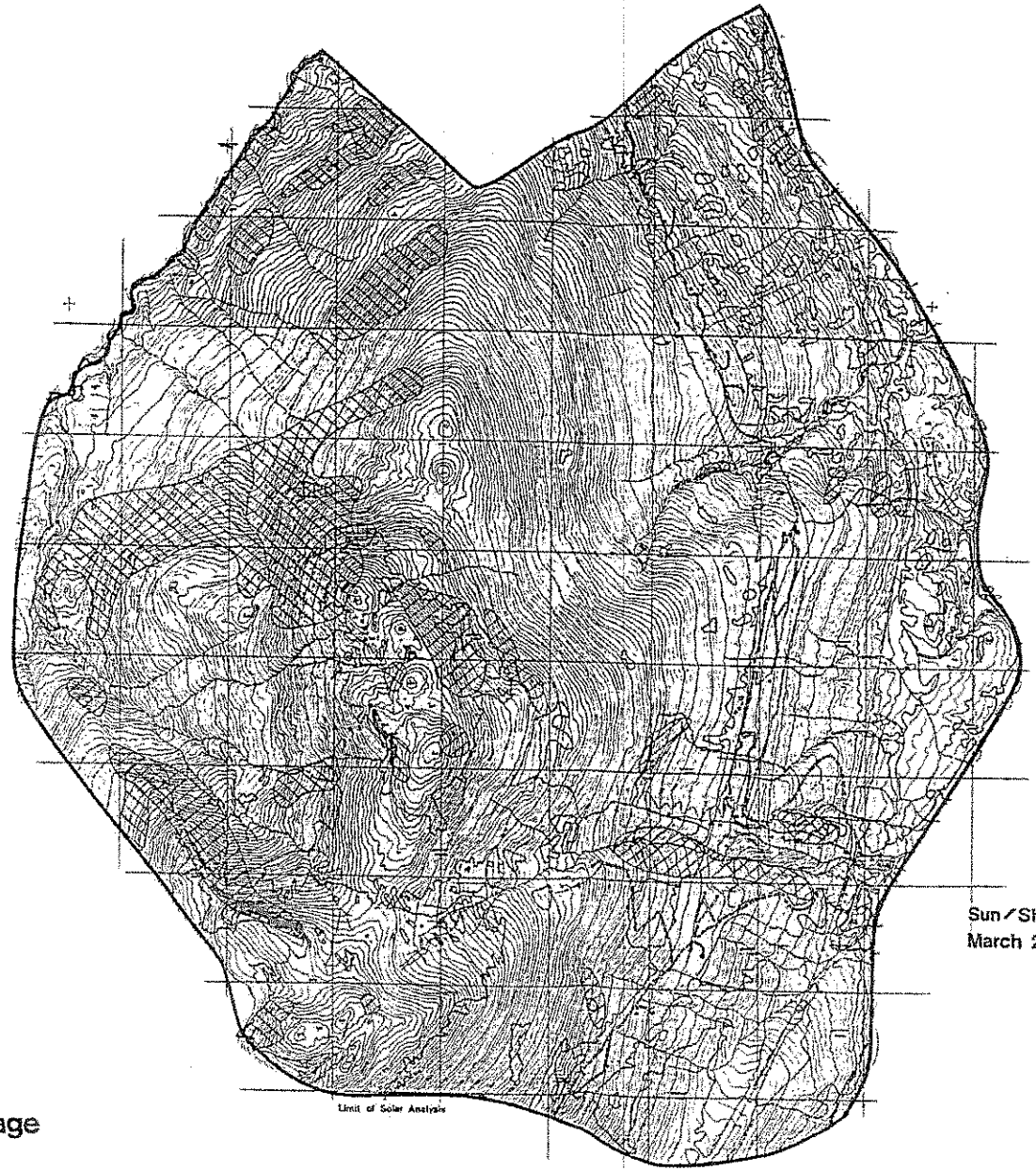
While regional climatic patterns are primarily concerned with evaluating total resort feasibility, a thorough understanding of the microclimate provides an essential input for the site specific design process. Microclimate is basically the climate near the ground where surface influences such as lakes, swamps, mountain slopes and valleys, and vegetation effect dramatic influences 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 ski in the sun, they will not do so if the snow is sticky or mushy due to intense solar radiation. Given the opportunity, skiers will follow the sun throughout the day, skiing eastern exposures in the morning, southern exposures at noon and western exposures during 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 operation and for this reason, slopes and trails should naturally be located where the snowpack remains for the longest portion of the season.

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, village centre or ski slopes. For this reason, we have prepared a detailed solar analysis to determine the areas of local shading at 9 am, 12 noon and 3 pm. on seven selected skiing season days. Figures 6A to 6D illustrate the sun/shadow relationship throughout the study on these selected days. A composite overlay of these maps (Figure 7) illustrates hot, warm, cool and cold zones throughout the critical winter season. As a general rule, ski trails should be located in the moderate solar regimes, warm and cool, since the hot zones may lack adequate snow cover while the cold zones may create skier discomfort.

.3 AVALANCHE

Our analysis of the site has not revealed the presence of any major avalanche run-out zones. The mean incline of avalanche starting zones is approximately 40 degrees (84%). Large avalanches are not common on slopes down to 30 degrees (58%), but given the right conditions, minor activity may be initiated by skiers on slopes as slight as 22 degrees (40%). Under certain conditions, threrefore, we may expect a low, intermittent hazard on advanced and expert ski terrain on the headwall of the northeast bowl and the eastern flanks. All of these areas are easily accessible from proposed lift locations and hence can be quickly stabilized by ski patrol personnel. Actual operating experience will dictate the frequency and method of control measures.



Azu
Ski Village

Legend

9:00 am

Noon

3:00 pm

Sun / Shadow :
March 21 & September 23

ecosign
mountain recreation planners ltd
Box 69 Whistler, B.C. V0N 1B0 (604) 932 5976

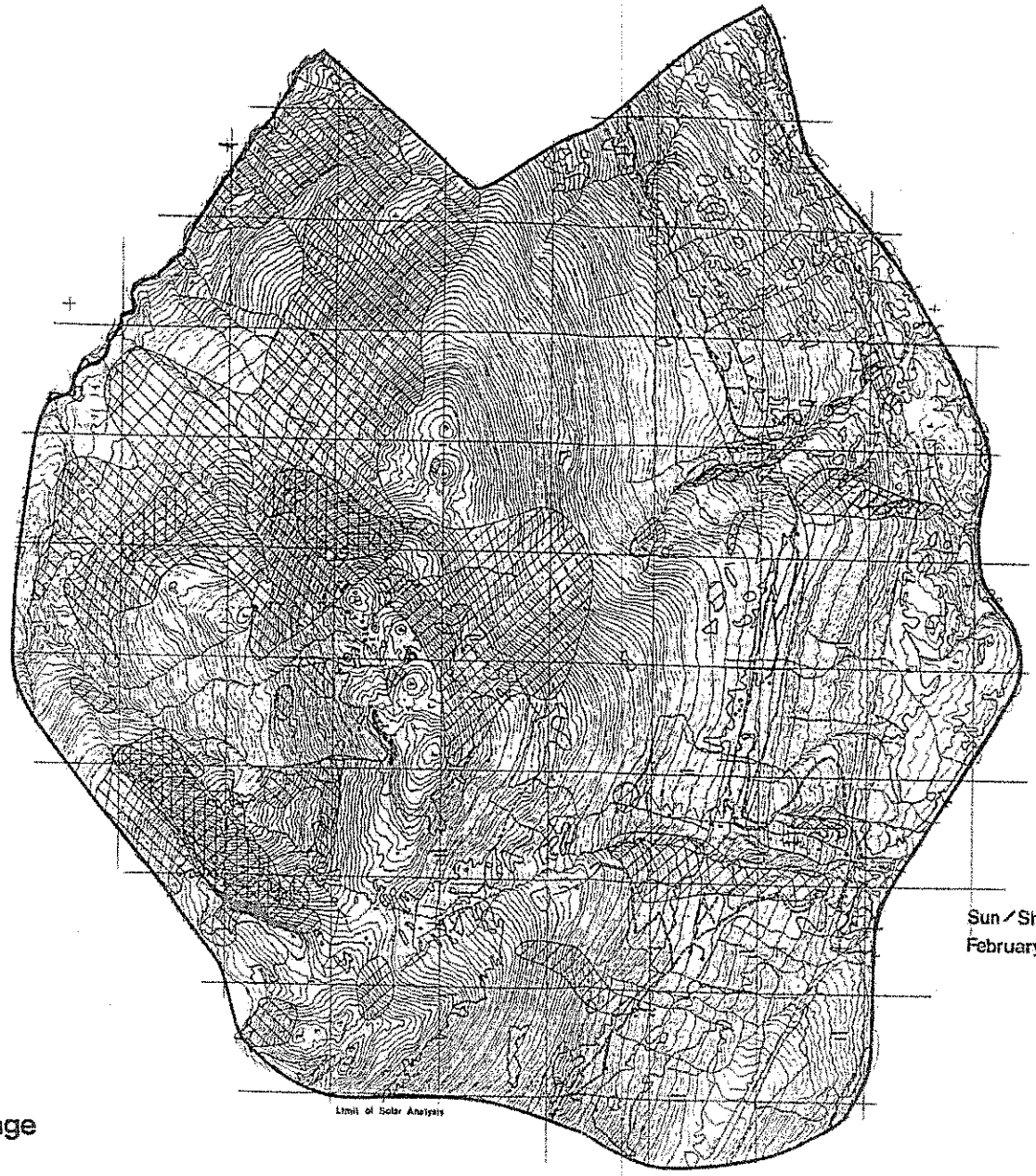
N

Plan No. P801

Title
Solar Analysis
Mar 21 • Sep 23

Scale: 0 50 100m
Date 11/80
Project
Azu Ski Village

Figure
6D



Azu
Ski Village

Legend

9:00 am

Noon

3:00 pm

Sun / Shadow :
February 23 @ October 20

ecosign
mountain recreation planners ltd
Box 63 Whistler BC V0N 1B0 (604) 932 5276

N

Plan Number: P801

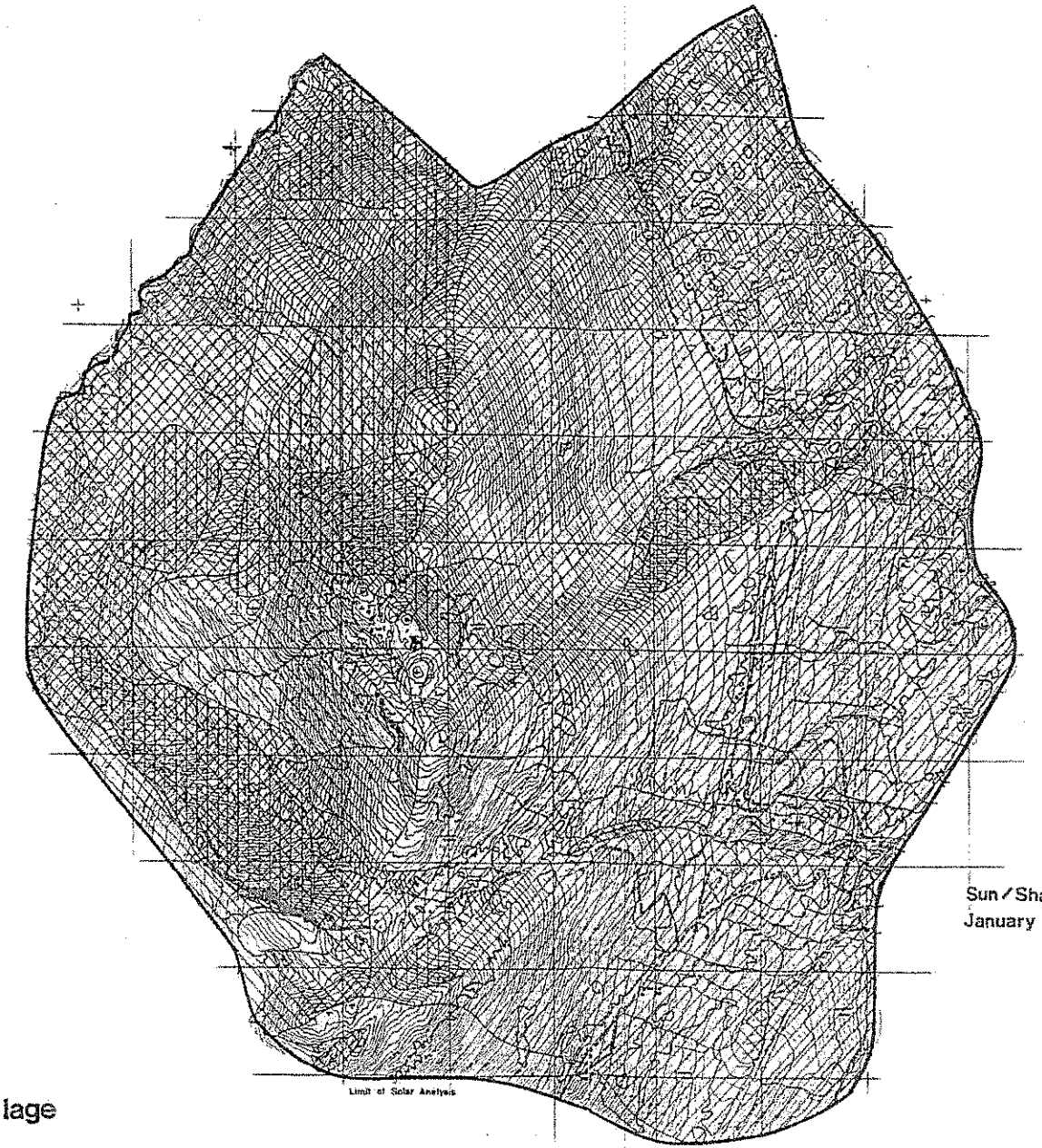
Title:
Solar Analysis
Feb 23 • Oct 20

Scale: 0m 100 200m 0.1 Km

Date: 11/80

Project:
Azu Ski Village

Figure
6C



Legend

- 9:00 am
- Noon
- 3:00 pm

Sun / Shadow :
January 21 e November 22

Azu
Ski Village

ecosign
mountain recreation planners ltd.
Box 62 Whistler, B.C. V0N 1B0 (604) 932 5076

N

Plan Number: P801

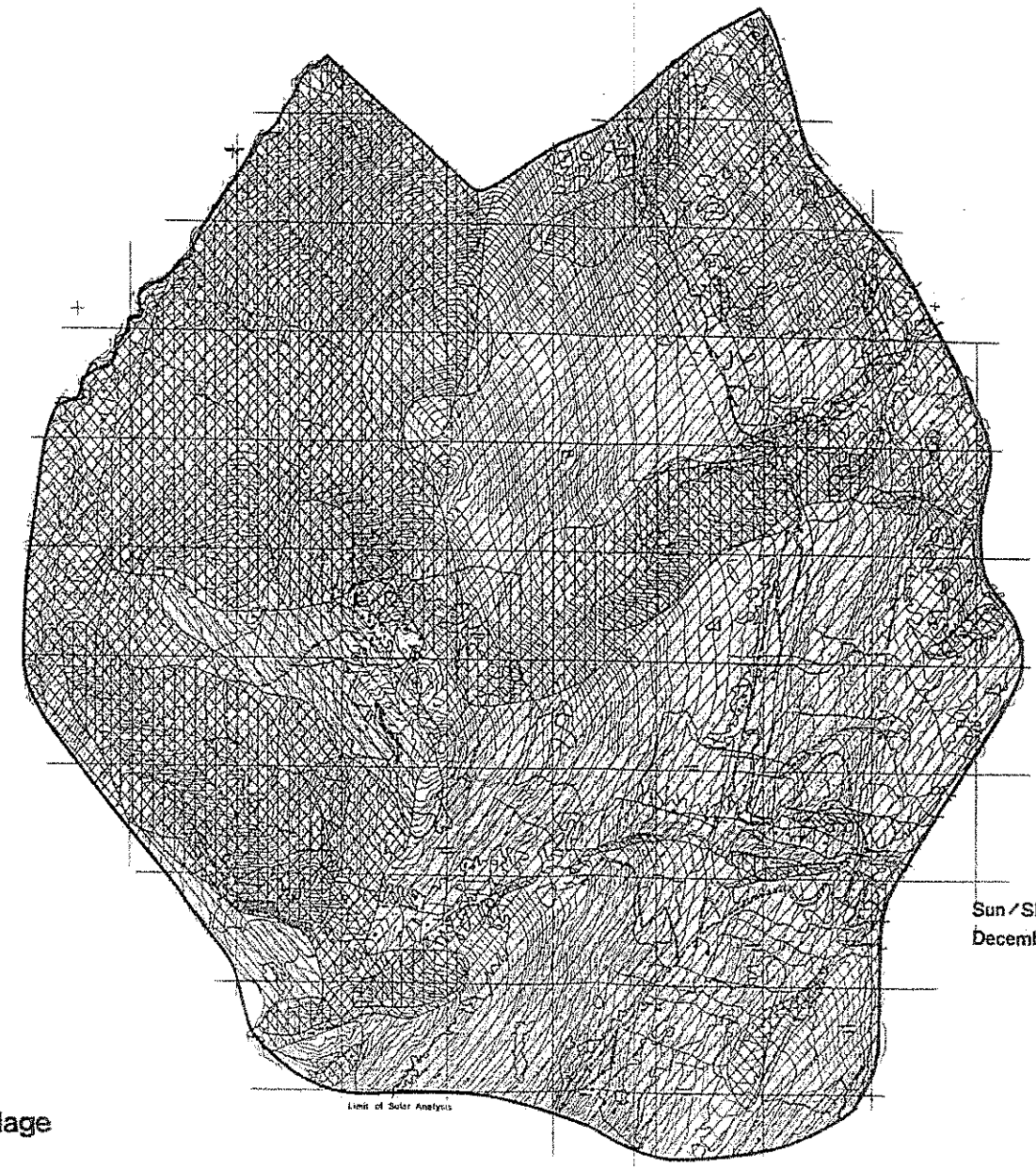
Title:
Solar Analysis
Jan.21+Nov.22

Scale: 0 100 200 C.I. 5m

Date: 11/80

Project:
Azu Ski Village

Figure
6B



Azu
Ski Village

Sun / Shadow
December 22

Legend

9:00 am

Noon

3:00 pm

ecosign
mountain recreation planners ltd.
Box 63 Whistler B.C. V0N 1B0 (604) 932 5976

N

Plan Number: P801

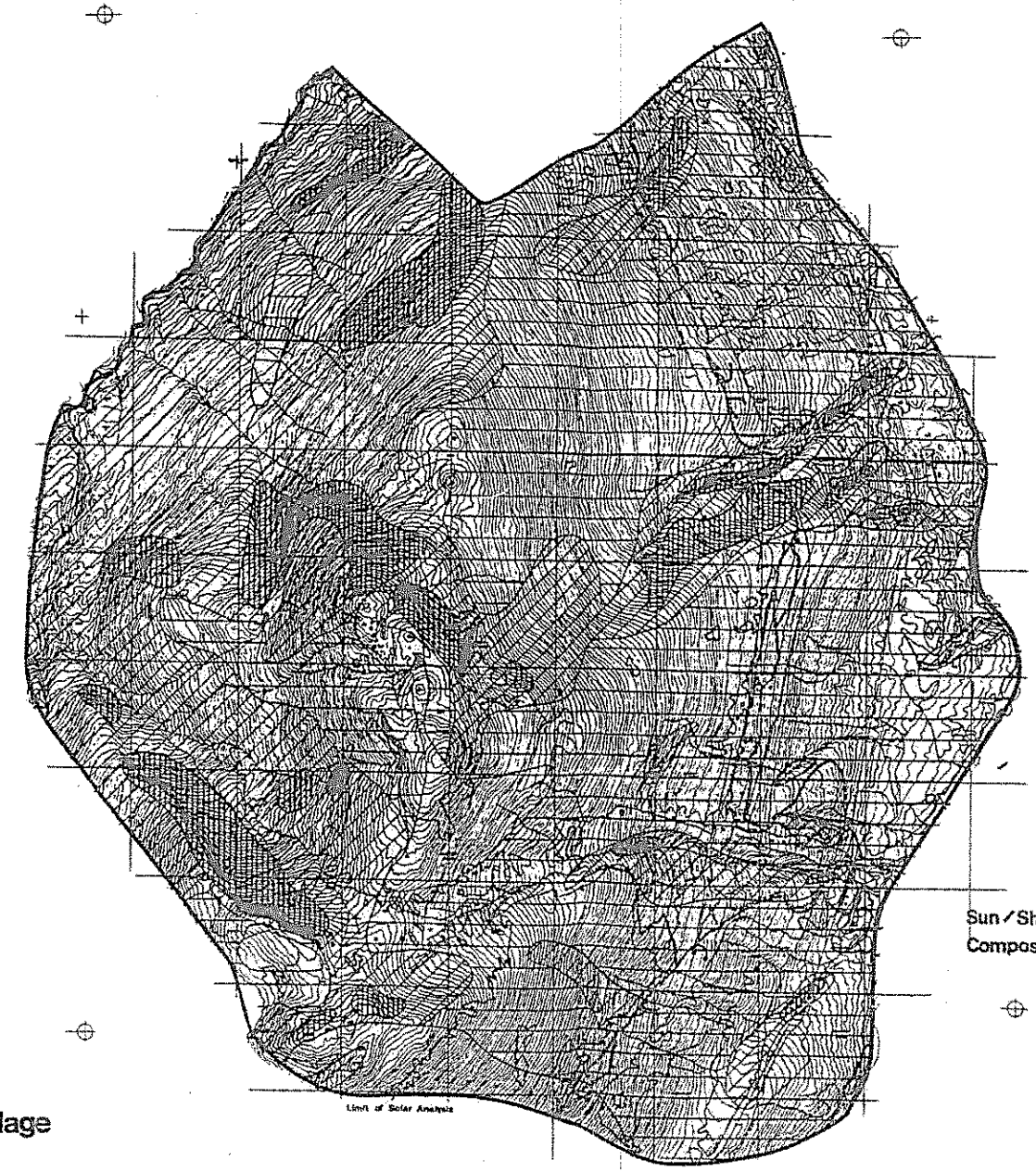
Title:
Solar Analysis
December 22

Scale: 0 100 200 m 2.5 3m

Date: 11/80

Project:
Azu Ski Village

Figure
6A



Azu
Ski Village

Sun / Shadow :
Composite

Legend

- Hot Zones
- Warm Zones
- Cool Zones
- Cold Zones

ecosign
mountain recreation planners ltd.
Box 63 Whistler, B.C. V0N 1B0 (604) 932 5976

N

Plan Number: P801

Title:
Solar Analysis
Composite

Scale: 0m 100 200m C.I. 5m

Date: 11/80

Project:
Azu Ski Village

Figure
7

.4 BIOPHYSICAL

Azu Ski Village lies in the Rocky Mountain physiographic region of B.C., just east of the Rocky Mountain Trench. The bedrock geology is mainly sedimentary rocks dating back to the Paleozoic era of 230 to 570 millions of years ago. Pine Pass lies on a major thrust fault of the Rockies and was subsequently covered by up to a kilometer of ice during the Pleistocene glaciation. These geomorphological processes have resulted in dominantly Podzolic soils which are imperfectly drained soils that have developed under coniferous and mixed forest vegetation, mostly in cold to temperate climates and on acid parent materials. Substantial sand and gravel deposits are also in evidence due to glaciation.

The study area lies within the subalpine Engelmann spruce - subalpine fir biogeoclimatic zone as defined by Vladimir Krajina. The Forest Type Map (Figure 5) illustrates that balsam fir predominates on the mountain slopes while spruce dominates the forest type on the gentle lower slopes. Additionally, non-commercial species dominate a sub-alpine zone generally between the 1,475 m. and 1,575 m. elevations while alpine tundra species lie above the 1,575 m. elevation.

The forests above the 1,225 m. elevation consist primarily of mature amabilis fir (*Abies amabilis*) 140 - 250 years old, densely stocked, ranging up to 20 meters in height. The forest site quality is poor, and the commerical value is minimal due to the stunted, overmature nature of the stand. It is estimated at this time that timber removed during ski trail construction will be piled and burned on site. The fir stands with commerical value (between the 950 and 1,225 meter elevation) were substantially (76%+) logged and burned in 1946. These areas were not resocked and the logging disturbance has stimulated a vigoruous undergrowth of sitka alder (*Alnus sinuata*) in association with fir and spruce veterans. Much of these areas appear naturally gladed and are ideal for skiing with the exception of the alder. We recommend that ski trails on these lower and middle elevations will require bulldozing and grass seeding to eradicate the woody shrubs.

While moose and black bear have been spotted in the area, their visits are limited to the high summer season due to the deep, persistent snow pack in the area.

At the present time, no rare or endangered species of flora or fauna are known to exist or frequent the site, and hence the biophysical impacts of ski development would appear to be limited.

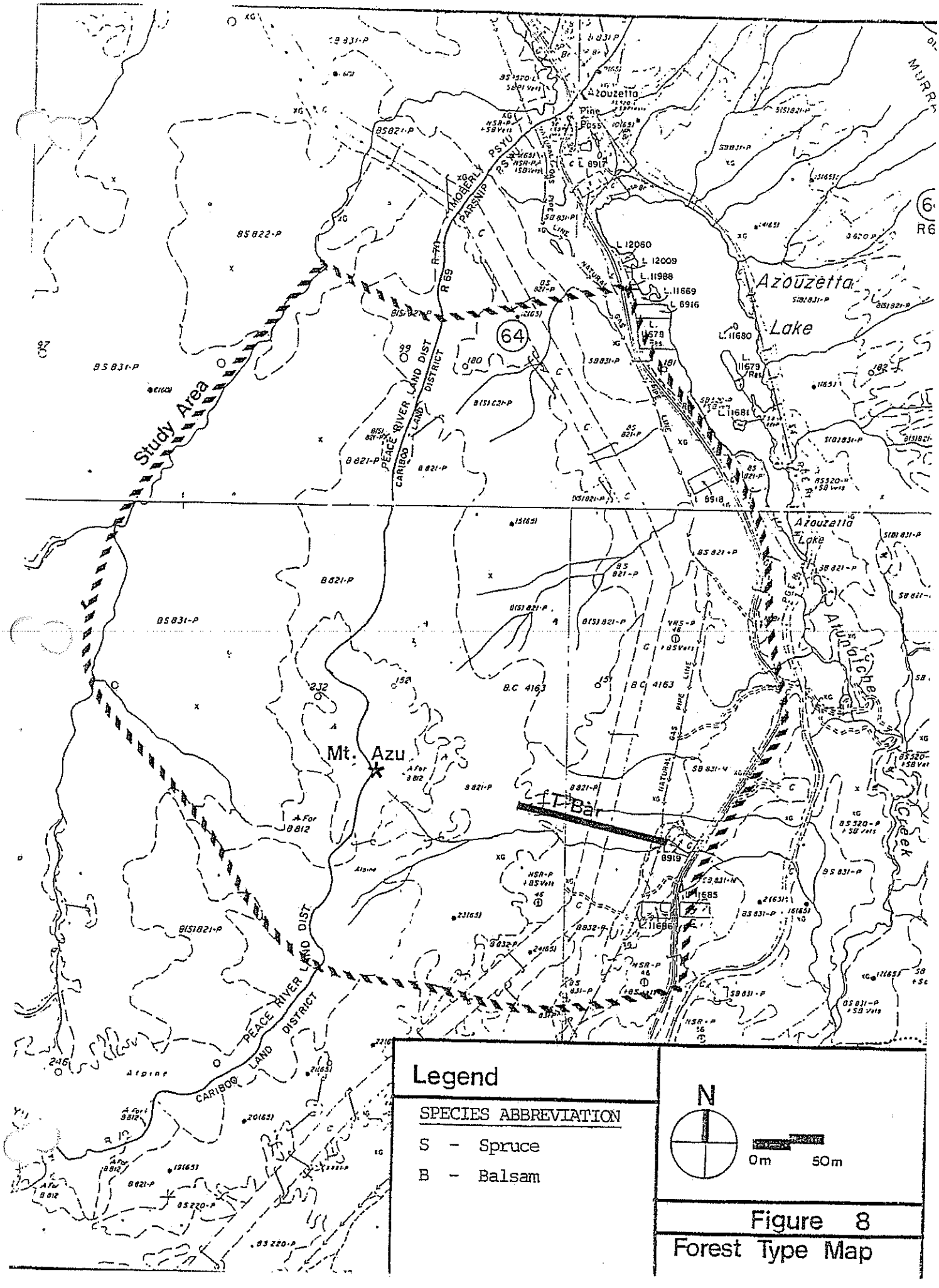


Figure 8
Forest Type Map

.5 SKI LIFTS & TRAILS

Azu Ski Village presently owns and operates a Mueller T-Bar which was originally installed for the 1968/69 skiing season. The lift was extended 514 meters in 1971 to increase the length of runs as well as service an additional vertical rise of 150 meters. The extension however, decreased the lift's rated capacity from 350 to 230 skiers per hour.

The layout of the present lift and trail system is graphically illustrated in plan view on the Existing Area Map (Figure 9) while the lift's technical operating specifications are listed in Table 2 .

TABLE 2

T-BAR ONE

Elevations:	top terminal	1,295 meters
	bottom terminal	945 "
	total vertical	350 "
Horizontal Length:		1,120 "
Slope Length:		1,173 "
Straight Line Slope:		31%
Vertical Transport Meters:		80.5 VTM/hr. (000)
Rated Capacity:		230 skiers/hr.
Rope Speed:		2.82 M/sec
Ride Time:		6.65 minutes

Comments: 37.5 hp

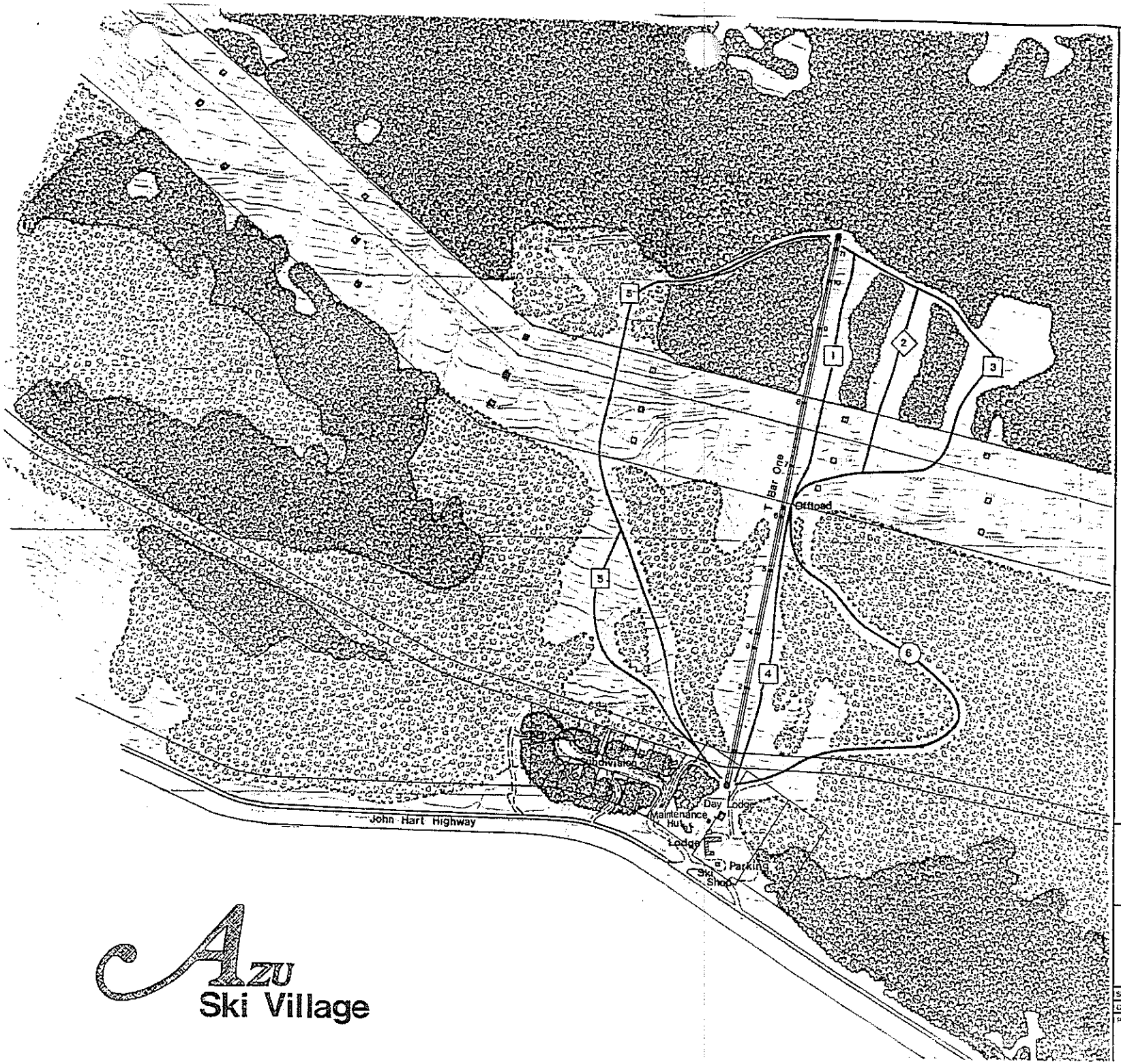
Azu's present ski trail system consists of some 16 hectares of developed terrain plus an additional 10 hectares of gladed skiing areas. The existing trail system has been accurately plotted on the topographic base maps and is illustrated in Figure 9.

In order to provide an accurate account of the existing trail system, we have classified each trail in concert with the international trail standards as well as the seven skier skill classification levels exhibited in Tables 3 and 4 .

TABLE 3

INTERNATIONAL SKI TRAIL STANDARDS

Trail Designation	Skier Ability Level
easier	beginner & novice skiers
more difficult	intermediate skiers
most difficult	advanced & expert skiers



Legend

Ski Trails

Run	Skill	Name	Vertical	Length	Width
1	□	Road Run	190 m	558m	50m
2	◇	First Meadow	140	400	70
3	□	Big Bunny	190	969	50
4	□	The Face	160	592	40
5	□	Powder Meadow	350	1540	100 G
6	○	Little Bunny	160	1062	30

Ski Lifts

Lift	Vertical	Length	Hourly Capacity
T Bar One	345 m	1124 m	230

Ability Levels

○ easier

□ more difficult

◇ most difficult

Dense Forest

Scrub

Lift Towers

Azu Ski Village

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Box 63 Whistler, B.C. V0N 1B0 (604) 932 5976

N

Scale: 0m 50m 1: 5m.

Date: 10/80

Project: Azu Ski Village

Plan Number: P801

Title: Existing Area

Figure 9

TABLE 4

SKIER SKILL CLASSIFICATIONS

Skill	Classification	Acceptable Terrain Gradients	Acceptable Skier Densities	
1	Beginner	10% - 15%	75/ha.	30/ac.
2	Novice	15% - 25%	62/ha.	25/ac.
3	Low Intermediate	25% - 35%	50/ha.	20/ac.
4	Intermediate	30% - 40%	37/ha.	15/ac.
5	Advanced Intermediate	35% - 45%	30/ha.	12/ac.
6	Advanced	45% - 60%	20/ha.	8/ac.
7	Expert	60% +	12/ha.	5/ac.

The classification, carrying capacity and critical data of Azu Ski Village's existing ski trail inventory have been summarized in Table 5 .

TABLE 5

AZU SKI VILLAGE SKI TRAIL INVENTORY

Trail Number	International Skier Skill Designation	Classification	Vertical	Distance		Percent Slope				
				Horizontal	Slope	Average	Steepest 25 m.	Average Width	Area	Skiers
1	more difficult	adv. inter.	190 m.	525 m.	558 m.	36%	42%	50 m.	2.79 ha.	85
2	most difficult	advanced	140	375	400	37	50	70	2.80	56
3	more difficult	low inter.	190	950	969	20	38	50	4.85	240
4	more difficult	intermediate	160	570	592	28	39	40	2.37	88
5	more difficult	adv. inter.	350	1,500	1,540	23	56	100 gl.	3.85	16
6	easier	novice	160	1,050	1,062	15	33	30	3.19	198

.6 MOUNTAIN CAPACITY ANALYSIS

Skier Carrying Capacity

The determination of a ski 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 "Sociological Capacity", this figure represents the number of skiers that can be safely supported by an area's lift and trail systems while providing a quality experience to each skier ability level. Skier Carrying Capacity is determined via an integration of lift capacity, acceptable slope densities, slope gradients, skier skill classifications and vertical meters of available terrain.

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. As the proficiency of the skier increases, the demand for vertical meters increases and the acceptable slope densities (skiers per hectare) decrease. The 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 a novice or intermediate skier. Table 6 illustrates current ski industry norms for vertical skiing demand.

TABLE 6

SKIING DEMAND BY SKILL CLASSIFICATION

Skill Classification	Skiing Demand Vertical Meters/Day		Skiing Demand - 5-Hour Day	VIM/Hour 6-Hour Day
1. Beginner	750 VM/Day	=	150 VIM/Hr.	
2. Novice	1,500 VM/Day	=	300 VIM/Hr.	
3. Low Intermediate	2,400 VM/Day	=	480 VIM/Hr.	
4. Intermediate	3,600 VM/Day	=	720 VIM/Hr.	
5. Advanced Intermediate	4,500 VM/Day	=		
6. Advanced	5,400 VM/Day	=		750 VIM/Hr.
7. Expert	7,500 VM/Day	=		900 VIM/Hr.
				1,250 VIM/Hr.

Based upon our opinion as to the relative skier vertical demands placed upon each lift system, our Skier Carrying Capacity analysis for the existing ski operation has been summarized in Table 7.

TABLE 7

SKIER CARRYING CAPACITY ANALYSIS

Lift	Slope Length	Vertical	Hourly Capacity	VIM/hr.[2.] (000)	SCC[1.]
T-Bar One	1,173 m.	350 m.	230	80.5	155

1. Skier Carrying Capacity (skiers/day)
2. Vertical Transport Meters per hour

Ski Trail Balance Statement

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 4 to illustrate the distribution of Azu skiing terrain available to each skier skill level. 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, which are illustrated in Table 8 .

TABLE 8

SKIER MARKET DISTRIBUTION BY SKILL LEVEL

Skill Classification	Apparent Skier Market Distribution			
Beginner	5 %			
Novice	10 %	15 %	20 %	
Low Intermediate	20 %			
Intermediate	30 %	70 %	60 %	Range of Ideal Ski Area Design
Advanced Intermediate	20 %			
Advanced	10 %	15 %	20 %	
Expert	5 %			

The Ski Trails Balance Statement (Table 9) indicates that a reasonable balance of terrain is available to Azu skiers, a fact which is somewhat surprising for a single lift area. This fact is due in part to the great wealth of terrain available from the two offload points. The balance statement can be further consolidated to reveal an overall balance of 30 percent easiest, 61 percent more difficult and 9 percent most difficult. The existing trail system has a major bottleneck at the Tower 6 offload point and it appears that the runs have utilized man-made (roads) or natural clearings such that it is obvious that little effort has been expended to date on the design and construction of quality ski runs that are in balance with the capacity of the lift system. Azu is primarily known as a "powder hound" area and as such the skiers probably utilize the existing terrain at very low skier densities and that the uphill lift capacity provides the primary constraint.

TABLE 9

SKI TRAILS BALANCE STATEMENT

PHASE: Existing LIFT: T-Bar SCC: 155

Skill Classification	Hectares	Skiers	Balance	Ideal
1. Beginner	-	-	-	5 %
2. Novice	3.19	198	30 %	10 %
3. Low Intermediate	4.85	240	37 %	20 %
4. Intermediate	2.37	88	13 %	30 %
5. Advanced Intermediate	6.64	72	11 %	20 %
6. Advanced	2.80	56	9 %	10 %
7. Expert	-	-	- %	5 %
	19.85	654	100 %	100 %

SNOW GROOMING EQUIPMENT

Azu Ski Village presently owns the following grooming and maintenance equipment:

- 3 bay wooden frame maintenance garage
- 1976 Bombardier 301 ski dozer (with blade & compacter bar)
- 1969 Bombardier SV250 (with blade)
- 1 10 foot roller

Machine grooming (snow farming) of ski trails is an essential component of mountain operations with new grooming equipment and techniques revolutionizing many aspects of today's ski business. The fact that heavily mogulled or ungroomed powder slopes negotiable only by advanced or expert skiers can be safely skied by the lower ability levels assumes great importance to the Azu operation.

New hydro-static grooming machines can effectively operate on slope gradients up to 60 to 70 percent while powder-makers can turn an icy "terror trail" into a "packed powder cruiser". Present industry guidelines recommend the grooming of all trails with an advanced intermediate or lower skier skill classification. Swing or night shift grooming has become the rule in the industry as it allows a longer period for the 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.

We recommend that one, fully operable grooming machine be available during each daily (or nightly) shift for every 20 hectares of groomable terrain. Azu's grooming requirements therefore, can be calculated as follows:

Groomable Terrain	÷ 20 ÷	Availability	=	Machines Required
13.20	÷ 20 ÷	.50	=	1.32
13.20	÷ 20 ÷	.65	=	1.02

Since most areas experience an availability rate between 50 and 65 percent, it would appear that the present area could get by with one, well maintained grooming machine. At a remote area, however, it is obviously desirable to own a back-up grooming vehicle and if both machines are "up", then the grooming program can utilize shorter shifts to provide a good skiable surface.

.7 BUILDING INVENTORY & ANALYSIS

We have performed a detailed onsite inventory of the buildings and structures presently in use at Azu Ski Village and subsequently broken down the square footage by service function to allow a comparison with competing resorts.

In 1977, the United States Forest Service performed a detailed inventory of skier service facilities at western U.S. resorts. This inventory was tabulated and broken down into 15 service functions illustrating a range of low, average and high level of service facilities for U.S.F.S. permittees. Based upon this data, we have calculated the low and average levels of skier services (utilizing a SCC of 155 skiers/day) and compared these with Azu's present facilities. Table 10 illustrates this comparison.

TABLE 10

AZU SKI VILLAGE SPACE-USE ANALYSIS

SCC = 155 skiers/day

Service Function	U.S.F.S. Low	U.S.F.S. Average	Azu Village Existing	Azu Village Difference From Average	Azu Village Percent of Average
1. Food Service Seating	372	465	1,625	+ 1,160	349 %
2. Kitchen & Scramble	90	153	336	+ 183	220 %
3. Rest Rooms	53	84	201	+ 117	239 %
4. First Aid & Ski Patrol	30	101	160	+ 59	158 %
5. Ski School	-	43	-		
6. Retail Sales	-	45	182	- 8	96 %
7. Equipment Rental	-	102	-		
8. Public Lockers	-	126	-	- 126	n/a
9. Administration	42	84	146	+ 62	174 %
10. Ticket Sales	12	23	See# 1&5		
11. Employee Lockers/Housing	-	-	1,162	n/a	n/a
12. Bar/Lounge	-	158	See# 1		
13. Nursery	-	53		- 53	n/a
14. Storage/Mechanical	11	42	782	+ 740	1,862 %
15. Circulation/Walls/Waste	23	76	64		
Total	632	1,572	4,658	+ 2,134	135 %
16. 6 Motel Units			1,350		
17. Public Dorms (14m/16w)			1,981		
Total Built Floor Space			7,989 sq.ft.		

3. Market

.1 CLASSIFICATION OF WINTER SPORTS AREAS

The prominent factors that play a role in establishing user demand for winter recreation facilities are: proximity to local, regional and destination population centres; the number, type and location of existing competing areas; and access to the development from the various destination origins of the identifiable market segments.

The British Columbia government has realized the necessity of providing a variety of sites to accommodate an equal variety of winter sports activities and participants and has subsequently developed a rough classification system for winter sports areas. The recent Ski Area Policy Paper, published by the Ministry of Lands, Parks & Housing, specifically outlines four distinct classifications of winter sports facilities. It is anticipated that in the long run, each winter sports facility within the province will fall within one of the following classifications:

a. Community Facilities
b. Regional Facilities
c. Regional/Destination Facilities
d. Destination Facilities

The following section is a list of site development characteristics for each of the above classifications:

a. Community Facilities

150 meter or less vertical drop, ski trails predominantly beginner and low intermediate and less than 40 hectares, rope tow, handle lift or T-Bar, servicing primarily the local population and school groups

b. Regional Facilities

approximately 450 meter vertical drop, ski trail acreage predominantly beginner and intermediate with some advanced, rope tow, T-Bars, chairlift; located where competitive areas have less facilities thereby making this facility attractive to communities within a two-hour drive

c. Regional/Destination Facilities

more than 450 meter vertical drop, three or more chairlifts, ski trail acreage balanced for all skier ability levels; Regional/Destination areas would have sufficient facilities both on and off the mountain to make the area attractive to the vacation or mid-week skier, the majority of which would arrive by automobile from a market within a five-hour drive

d. Destination Facilities

more than 915 vertical meter drop, more than five chairlifts or aerial lifts as well as a good selection of restaurants, bars and entertainment facilities; ski trail acreage in excess of 160 hectares balanced toward the intermediate, advanced intermediate and advanced skill levels. Destination resorts generally have such unique skiing, accommodation and entertainment features that skiers from distant markets will choose the area for major vacation periods during both the summer and winter months; air travel provides access for a sizeable portion of ski vacation visitors.

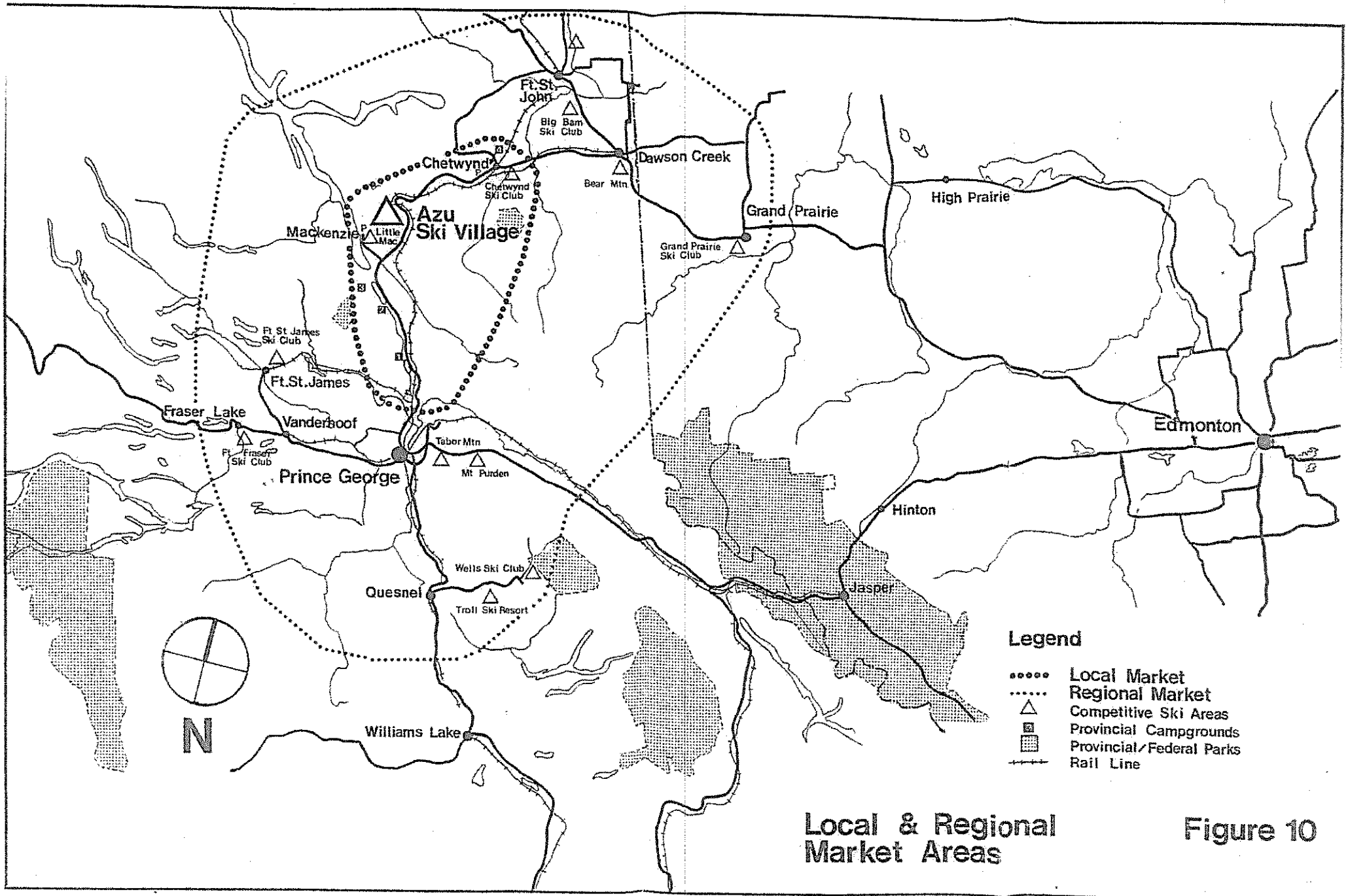
It is evident from the above listed resort profiles that the Azu Ski Area is presently somewhere between a Community and Regional winter sports facility.

.2 EXISTING COMPETITION

Azu Ski Village is situated on the boundary of the Peace River/Alaska Highway and Yellowhead 16 tourism administration regions as identified in the recently completed B.C. Tourism Development Strategy prepared by the B.C. Ministry of Tourism.

Azu's local skier market (within 150 kilometers) lies wholly within the Peace River/Alaska and Yellowhead 16 tourist regions. The regional skier market (within 350 kilometers) however, overlaps into the Cariboo/Chilcotin tourism region as well as northwestern Alberta (see Figure 10).

In order to adequately analyse the relative demand for winter sports facilities in these regions, it is useful to evaluate the existing use and supply. For this purpose, data has been assembled on two ski areas which lie within Azu's local market and an additional eight ski areas within Azu's regional market as illustrated by the Local & Regional Market Areas Map (Figure 10). Data on competing areas has been summarized in Table 11.



Local & Regional Market Areas

Figure 10

TABLE 11

COMPETITIVE SKI AREAS WITHIN LOCAL/REGIONAL MARKET

	LOCAL			REGIONAL						
Nearest City	75 km	1.6 km	2 km	44 km.	13.km.	64 km.	3.2 km.	22 km.	14 km.	21 km.
Base Elevation	940 m.			915 m.	975 m.	1,030 m.	727 m.		530 m.	1,707 m.
Vertical Drop	345 m.		21 m.	460 m.	244 m.	336 m.	125 m.	213 m.	140 m.	701 m.
Longest Run	1.5 km.				3.2 km.	3.2 km.	1.6 km.	822 m.	1.9 km.	5.6 km.
No. of Chairlifts	-	-	-	-	-	1d	-	-	-	2d,1t
Other lifts	1T	1H	2H	2T	1t	1t	1T	1T,1H	1H,1T	2T
No. of Runs	6		2		1T.2H	10	10	6		25
Lift Capacity/hr.	230		500		9	875	600	300	800	4,900
% Beginner Terrain	16		100			30				30
% Intermediate Terrain	68		-			40				50
% Advanced Terrain	16		-			30				20
Night Skiing	no	yes	yes	yes	yes	no	yes	yes	no	no
On-Mtn. Restaurants	2	1	-	1	1	1	1	-	1	3
	AZU SKI VILLAGE MACKENZIE,B.C.	Chetwynd Ski Club Chetwynd, B.C.	Little Mac Ski Area Mackenzie, B.C.	Troll Resort Quesnel, B.C.	Tabor Mountain Prince George, B.C.	Purden Ski Village, Prince George, B.C.	Bear Mountain Dawson Creek, B.C.	Big Bam Ski Club Fort St. John, B.C.	Grande Prairie Grande Prairie, Alta.	Marmot Basin Jasper Alta. (comparison only)

Notes: *the regional areas of Hart Highlands & Murray Ridge are not listed here due to lack of information
*Marmot Basin is listed as a comparison only

Source: White Book of Ski Areas, Inter Ski Services, 1980

.3 POPULATION CENTRES

The existing and potential market base for commercial skiing facilities is heavily dependent upon the size and proximity of local, regional and national population centres.

The number of times that an active skier will visit a particular area is heavily dependent upon the distance and/or travel time to that area as well as the relative cost of travel. Given this factor, we have established three potential market levels for the Azu project: local, regional and destination. The local market has been defined as those day skiers whose residence is within 150 kilometers (less than two hours driving time) of Azu Ski Village. The regional market has been established as the population within 350 kilometers, which is a maximum drive of five hours. The destination market consists of skiers throughout North America and indeed the world, with destination skiers having travel and accommodation needs significantly different that those of the local and regional skiers.

For the local and regional market areas, we have listed the 1971 and 1981 Canadian census data to establish recent population trends. Tables 12 to 14 exhibit the local and regional population figures. The local market population grew 61% percent (4.9 per annum) during the 1971 and 1981 period while the population within Azu's regional market grew 37 percent (3.2 per annum).

TABLE 12

POPULATION: LOCAL MARKET

Population: LOCAL MARKET (150 Highway km)

British Columbia	1971	1981	% Change
Fraser/Fort George			
Subdivision A (50%)	4,564	5,844	
Mackenzie	2,332	5,890	
	6,896	11,734	+ 70%
Peace River/Liard			
Subdivision B (33%)	2,425	2,823	
Chetwynd	1,260	2,553	
	3,685	5,376	+ 45%
TOTALS:	10,581	17,110	+ 61%

TABLE 13

POPULATION: REGIONAL MARKET

Population: REGIONAL MARKET (350 Highway km)

British Columbia	1971	1981	% Change
Fraser/Fort George			
Subdivision A (50%)	4,564	5,884	
Prince George	49,365	67,559	
	53,929	73,403	+ 36%
Peace River/Liard			
Subdivision A (75%)	6,800	8,574	
Subdivision B (67%)	4,850	5,732	
Dawson Creek	11,885	11,373	
Fort St. John	8,303	13,891	
Hudson's Hope	1,741	1,365	
Pouce Coupe	684	821	
Taylor	658	966	
	34,921	42,722	+ 22%
Bulkley/Nechako			
Subdivision A	5,352	7,841	
Fort St. James	1,484	2,284	
Fraser Lake	1,292	1,543	
	8,128	11,668	+ 44%
Cariboo			
Subdivision A (33%)	7,168	10,859	
Quesnel	6,314	8,240	
	13,482	19,099	+ 42%
Alberta			
Division #15			
Beaverlodge	1,172	1,937	
Grande Prairie	13,233	24,263	
Grande Prairie County	8,496	12,078	
Hythe	487	639	
Rycroft	461	649	
Sexsmith	593	1,180	
Spirit River	1,121	1,104	
Wembly	372	1,169	
Wanham	268	266	
019 ID	2,155	1,757	
020 ID	2,730	3,000	
133 Spirit River	1,022	897	
	32,110	48,939	+ 52%
TOTALS	142,570	195,831	+ 37%

TABLE 14

POPULATION SUMMARY

Population Summary

	LOCAL MARKET 1971	LOCAL MARKET 1981	%	REGIONAL MARKET 1971	REGIONAL MARKET 1981	%
B.C.						
Fraser Fort George	6,896	11,734		53,929	73,403	
Peace River/Liard	3,685	5,376		34,921	42,722	
Bulkley/Nechako				8,128	11,668	
Cariboo				13,482	19,099	
Alberta						
Division #15				32,110	48,939	
	10,581	17,110	+ 67%	142,570	195,831	+ 37%

TOTAL COMBINED MARKETS:

1971	1981	% Change
153,151	212,941 (total market)	39%

The population statistics presented in this analysis reveal that Azu's local and regional markets are experiencing growth rates which are extremely high by North American standards. Members of our study team interviewed Ms. Anne Hogan of the Fraser/Fort George Regional Development Commission and Mr. Peter Ostergaard of the Prince Geroge City Planning Department to discuss regional growth patterns which may be favourable for facility expansion at Azu.

Ms. Hogan provided the 1979 population and demographic information which reveals an average annual Regional District population growth of 3.6 percent (Table 15) with age profiles considerably skewed towards the lower age cohorts when compared to the rest of B.C. (Table 16). According to the 1976 census, some 57 percent of the Fraser Fort George Regional District population was in the 15 to 49 age cohorts, with an additional 32 percent in the 14 and under age category. This comparatively young population has above average income with the average wage in Prince George ($12,487) being the seventh highest in Canada in 1978. These demographic factors are very favourable for the Azu project in that they contain the key elements (age &

TABLE 15

REGIONAL DISTRICT OF FRASER/FORT GEORGE

POPULATION INCREASES

	June 1976	Dec. 1979	%Change in 3.5yrs.	Average Annual % Change
Prince George	62,473	70,000	12	3.4
Mackenzie	5,338	6,250	17	4.5
Valemount	878	1,043	18.8	5.1
McBride	619	696	12.4	3.4
Subtotal: Incorporated Communities	69,308	77,989	12.5%	3.4%
Electoral Area				
A	1,445	1,953	35	
C	1,742	2,348	35	
D	3,851	4,691	22	
E	714	763	6.9	
F	1,750	1,987	13.0	
G	1,003	1,119	11.6	
H	2,347	2,431	3.6	
Subtotal: Electoral Areas	12,852	15,283	18.9%	5.0%
TOTAL	82,160	93,272	13.5%	3.6%

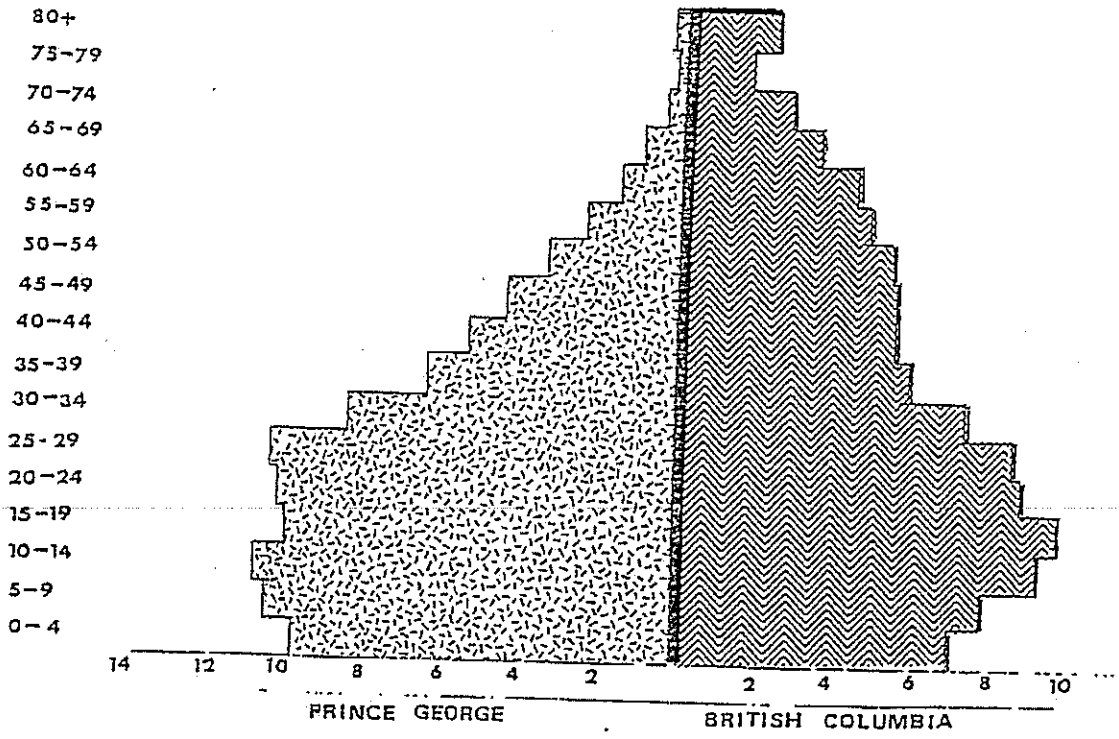
*Source: Regional District of Fraser/Fort George

TABLE 16

POPULATION BY FIVE-YEAR AGE GROUPS

1976

(in percent figures)



income) which are found in the skier market. The future of this region looks bright as evidenced by the following committed and potential developments in the region:

Committed Projects

Company	Project	Permanent Jobs Created	Capital Investment ($ millions)
B.C. Railway	New offices & car repair plant	n/a	$ 4.6
Regional Hospital	500 bed expansion	n/a	$ 22.0
Northwood Pulp & Timber	Pulp mill expansion	200	$246.0
Findaly Forest Industries	Pulp & saw mill	400	$ 32.0
Lakeland Mills	Sawmill upgrade	n/a	$ 15.0
Holiday Inn	148 room hotel	n/a	$ 8.0
Imar Developments	62 room motel	n/a	$ 2.0
C.N.R.	Track & facility improvements	n/a	$ 65.0

Potential Projects

B.C. Chemicals	Plant expansion	n/a	$ 6.0
Norco Resources Ltd.	Bowron Coal	600	n/a
B.P. Explorations	Sukunka Coal	1,200	$ 50.0
Teck Corp	Bullmoose Coal	500	n/a
Dennison Mines	Quintette & Saxon Coal	1,400	n/a
B.C. Railway	Anzac line construction & operations to North-east Coal	600	n/a
B.C. Hydro	Site"c" Peace River Dam	600	n/a

n/a: Not available

We also contacted Mr. William Anderson, Commissioner of the Peace-Liard Region Economic Development Commission for a regional overview document prepared in July, 1980. Mr. Anderson provided the planning team with the regional district population projections through 1999, as illustrated in Table 17. Table 17 also includes the Economic Development Commission's estimates of the impact of two major construction programs and the development of the northeast coal deposits on the region's population.

TABLE 17

PEACE - LIARD REGION POPULATION PROJECTIONS

	Census 1976	Est. July 1980	Projections 1983	1985	1990	1999
Village of Chetwynd	1,487	2,400				
Chetwynd - Rural	1,740	2,200	6,207	8,135	11,670	17,454
City of Dawson Creek	10,528	14,855				
Dawson Creek - Rural	5,900	6,861				
Village of Pouce Coupe	776	860	21,809	22,185	23,494	25,636
Village of Fort Nelson	2,916	4,601				
Fort Nelson - Rural	1,100	1,169	6,711	7,179	7,250	7,350
City of Fort St. John	8,947	16,105				
Fort St. John - Rural	8,675	9,088				
Village of Taylor	649	1,166	28,514	27,039	27,655	28,664
District of Hudson Hope	1,330	2,383	3,639	4,403	6,623	9,928
Total	44,048	61,688	66,880	68,941	76,692	89,032
Major Probable population influences/impact						
- B.C. Hydro Site C start-up in 1980			3,380	425		
- Alaska Highway Natural Gas Pipeline 1981-1984			1,882	2,818		
- Northeast Coal development			3,400	7,480	14,960	16,320
TOTAL			75,542	79,664	91,652	105,352
(Annual Growth for Period)			(6.5%)	(2.6%)	(2.8%)	(2.8%)

Note: Anticipated population increases resulting from forestry expansion, etc. and agriculture projects are included and generally offset population reductions from pipeline and B.C. Hydro project completions.

.4 ACCESS

Access is a primary consideration in the overall attractiveness of a year-round resort development. Both private and public modes of transportation have been assessed to identify market constraints and/or potentials or gaps in existing public delivery systems.

Personal or Rental Auto

The private auto has been and will likely continue to be, the primary mode of travel for skiers within the local and regional markets. Interviews undertaken by Tourism B.C. indicate that over 80 percent of all B.C. skiers arrive in their private vehicle, with scheduled buses (7.6 percent) and rental cars (1.5 percent) making up the bulk of the alternative transportation modes. Destination skiers, however, exhibit significantly different modes of transportation characteristics with fly/drive or fly/bus being the most popular combinations.

Safe and efficient highway access is, therefore, an important pre-requisite for local, regional and destination skiers. Azu Ski Village is situated immediately adjacent to the John Hart Highway (Highway 97) which connects Prince George and Dawson Creek. Azu Ski Village is 197 highway kilometers north of Prince George and 215 highway kilometers southwest of Dawson Creek. Due to the recent and planned developments in this region, a major expansion and upgrading of the John Hart Highway has occurred during the past two years, and the majority of the highway is a newly paved two and three lane all-weather highway.

In establishing the local and regional market base, it is necessary to consider the distance and estimated travel times from major population centres to Azu Ski Village. The following table illustrates the highway distance and approximate winter driving times from major cities.

TABLE 18

APPROXIMATE DRIVING TIMES FROM MAJOR CITIES

City/Town	Population	Distance	Approximate [1] Driving Time
Calgary	508,000	988	13.2
Chetwynd	2,500	113	1.5
Edmonton	500,000	790	10.5
Fort St. James	2,200	360	4.8
Fort. St. John	12,500	261	3.5
Grande Prairie	20,000	347	4.6
Kamloops	60,000	726	9.7
Mackenzie	7,000	75	1.0
Prince George	68,700	197	2.6
Quesnel	8,000	314	4.2
Smithers	4,500	571	7.6
Vanderhoof	2,600	294	3.9

Car rental firms are available at airport and downtown locations for skiers utilizing the gateway cities of Prince George and Dawson Creek

Air Access

The nearest local airport to Azu Ski Village is in Mackenzie, a distance of 75 kilometers. Azu is situated almost half-way between Prince George and Dawson Creek, which are both gateway cities to B.C.'s north. Pacific Western Airlines services both cities and Canadian Pacific Air has daily scheduled flights to Prince George and Fort St. John, which is 288 kilometers northeast of Azu. The following table is a summary of daily direct (1 stop or less) scheduled flights to and from Prince George, Dawson Creek and Fort St. John.

TABLE 19

DAILY DIRECT SCHEDULED FLIGHTS

(1 stop or less)

Station (to/from)	Major Commercial Carriers		
	Pacific Western	CPAir	Total
Prince George			
Vancouver	2	4	6
Dawson Creek	1	3	4
Edmonton	1		1
Kamloops	2		2
Seattle	1		1
Victoria	1		1
Williams Lake	2		2
Quesnel	1		1
Grande Prairie		2	2
	11	9	20
Dawson Creek			
Calgary	1		1
Edmonton	1		1
Kamloops	1		1
Prince George	1		1
	4		4
Fort St. John			
Calgary		1	1
Edmonton		3	3
Prince George		3	3
Fort Nelson		1	1
Grande Prairie		3	3
Vancouver		4	4
Watson Lake		1	1
Whitehorse		1	1
		17	17

Train Access

Prince George is the gateway city to northern B.C. and the Peace River District. At Prince George, the British Columbia Railway connects with the Canadian National Railway affording through service to Prince Rupert (westbound), to Edmonton and points east, and to Vancouver (south) via Quesnel and Williams Lake. Passenger service to the north is provided by Greyhound Bus. There is the possiblity of direct rail service northbound from Prince George to Azu Ski Village via the B.C. Rail "Budd Car" on a main line which exists between Prince George and Dawson Creek.

Bus Transit

At present, bus service is the only mode of public transportation between Prince George and Dawson Creek and as such there are two Greyhound Bus Line daily scheduled round trips which connect with the B.C. Railway scheduled arrival time.

Accommodation

At present, Azu Ski Village provides the only accommodation along the John Hart Highway between Mackenzie and Chetwynd. The lodge contains dormitories that can accommodate 40 persons and six motel units. Accommodation in Mackenzie consists of two motels (48 units) and a hotel (132 units) while Chetwynd offers four motels (98 units) and 2 hotels (102 units).

The following table is a summary of campgrounds with the local market of Azu Ski Village:

TABLE 20

CAMPGROUNDS WITHIN LOCAL MARKET AREA

Campgrounds

Provincial Campgrounds within Local Market Area

1 -	Crooked River Park	On Bear Lake, 72 km north of Prince George 98 campsites, 50 picnic tables
2 -	Whiskers Point Park	On MacLeod Lake, 127 km north of Prince George 74 campsites, 23 picnic tables, boat launch
3 -	Carp Lake Park	Access from MacLeod Lake 68 campsites, boat launch
4 -	Moberley Lake Park	24 km. north of Chetwynd 59 campsites, 30 picnic tables, boat launch

Private Campgrounds

Mackenzie Municipal Campground, Mackenzie

Wildmare Grove - 6.4 km west of Chetwynd

4. Development

1. THE MOUNTAIN

Accurate topographic mapping is an essential requirement for modern resort planning and therefore the planning team had a topographic base map covering 2,000 hectares prepared at a scale of 1:5,000 with a 5 meter contour interval. Utilizing this newly prepared topographic mapping, the two most critical base maps for the ski area design and evaluation process were prepared. Natural routes of descent were analysed by use of the Fall-Line Analysis Map (Figure 5) which delineates major drainages, fall-line patterns and primary and secondary fall-line concentration areas. The primary concentration areas suggest potential lift terminals and hence, suitable base facility locations while the secondary concentration areas suggest trail intertie points. The Ski Area Slope Analysis Map (Figure 4) delineates the areas that can be negotiated by the various skier ability levels as well as areas that are considered to be too flat or too steep for the skiing public.
The natural slope gradients were carefully measured and coloured into the following five classifications:

Slope Gradient	Color	Type of Skiing
0 - 8%	white	flats, marginal skiing
8 - 25%	green	beginner & novice skiing
26 - 45%	yellow	intermediate skiing
46 - 70%	blue	advanced & expert skiing
70% +	red	unskiable, safety zones

Careful examination of the slope analysis map revealed that a vast area of slopes ranging from low to advanced intermediate are present in the northeast bowl. Realizing that good intermediate skiing terrain is frequently the limiting factor for ski development, the planning team considered the early development of this bowl essential to attract a broad market base. Furthermore, an "easy" route down the mountain is very desirable for novice and intermediate skiers as well as efficient mountain operations. The east ridge provides an ideal "easy" route with slope gradients ranging from 15 to 30 percent. The eastern flanks are directly accessible from the east ridge thus providing excellent access to a wealth of commercial ski terrain ranging from intermediate to expert in difficulty. While it was evident that the south bowl, far west bowl and northwest flanks also possess good development potential, the planning team considered that the superior ski development opportunities were available in the northeast bowl and the eastern facing slopes below the east ridge. All areas were surveyed on foot, on skis and from the air.

.2 THE BASE AREA

Given the natural fall-line patterns of the mountain, it became evident that a totally new base area was required which related well to the superior ski slopes. The following potential base areas were initially considered:

- a natural bench located between the 1,125 and 1,150 meter elevations above the hydro lines at the base of both the northeast bowl and the northeast flanks
- a knoll situated adjacent to the creek which drains the northeast bowl and the main highway at the 935 meter elevation, 2 kilometers north of the existing base area
- a major bench with several prominent knolls at the 950 meter elevation 1.1 kilometers north of the existing base area.

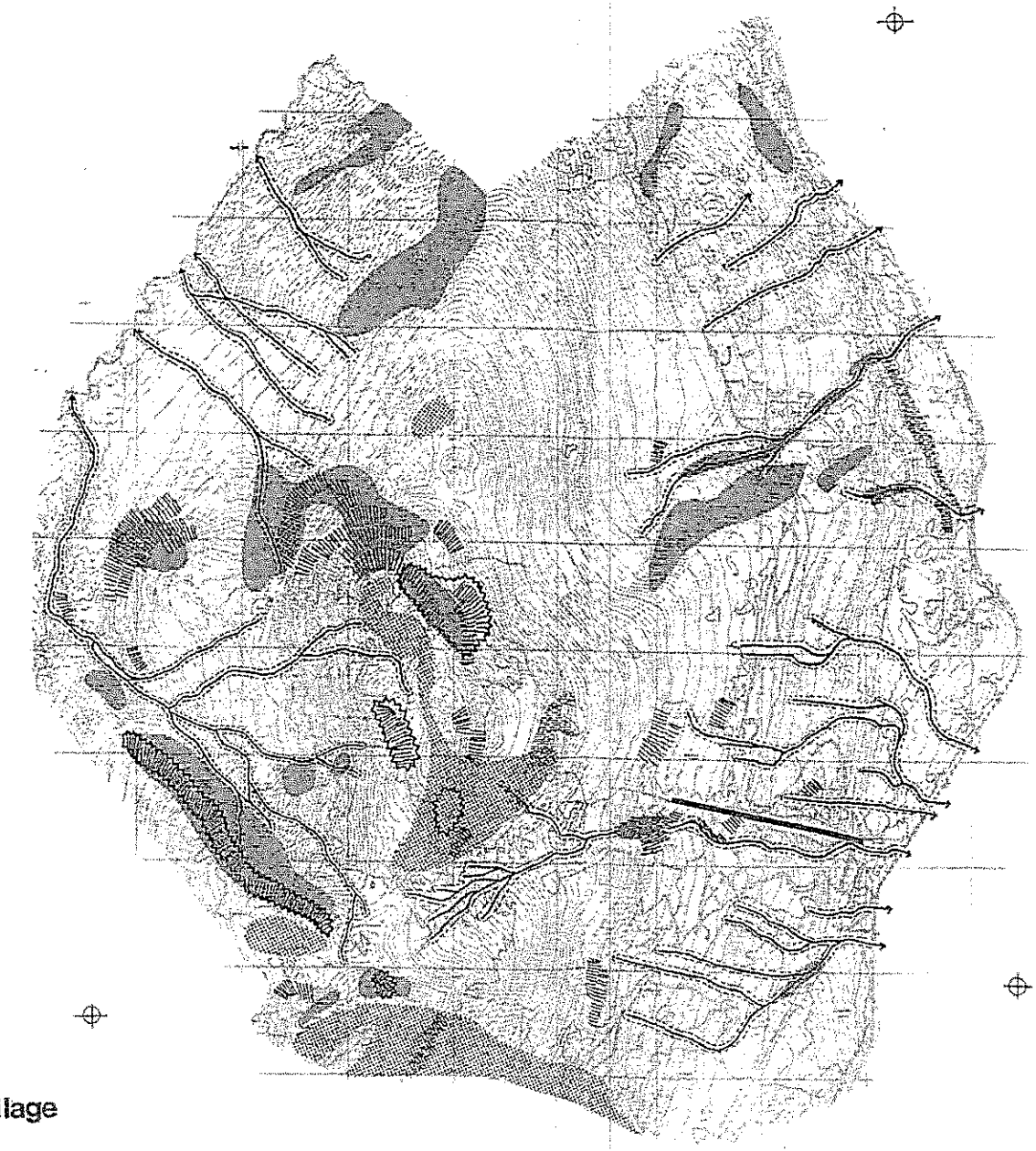
Examination of these areas on foot and from the air revealed that the first two of the aforementioned sites were very wet, required major access road construction from the highway, were of limited size and did not relate well to advanced skiing terrain. The third site however, possessed: slopes conducive to base area development (less than 20%), good soils and natural drainage, knolls with outstanding views in all directions, maximum sunlight and close proximity to the main highway. While the third site relates very well to the intermediate and advanced terrain on the eastern flanks, this site was selected with the realization that it would be necessary to construct a 0.8 kilometer "catwalk" to bring novice and low intermediate skiers back to the base area from the east ridge.

.3 DESIGN ANALYSIS

To document the findings of the bio-physical inventory, the planning team has prepared the Overall Design Analysis Map (Fibure 11) which maps those areas on Mount Azu where ski development may be constrained due to the climatic and/or natural attributes of the mountain. Included in these "natural constraints" are:

* Primary Watercourses (including 15 meter setbacks)
* Rock Outcrops
* Solar Hot Zones
* Wet Areas
* Slopes over 70%
* Solar Cold Zones

Utilizing overlay methodology during the design process, the Design Analysis Map graphically portrays "red flag" situations to the planning team where future development may require special consideration and/or extraordinary mitigative measures.



Legend

- Creeks & Buffer Areas
- Rock Outcrops
- Wet Areas
- Solar Hot Zones
- Solar Cold Zones
- Slopes over 70%
- Existing Lifts

Azu
Ski Village

ecosign
mountain recreation planners ltd.
Box 83 Whistler, B.C. V0N 1B0 (604) 932 5976

N

Plan Number: P801

Title: Overall Design Analysis

Scale: 0 1/2 1 Km C.I. 5m

Date: 2/81

Project: Azu Ski Village

Figure 11

5. Facility Expansion

.1 SKI LIFTS

Subsequent to completing our inventory and analysis programs, the planning team recommended that if Azu Ski Village were to become a resort of regional significance, then the existing area should be abandoned and a totally new base and mountain facility constructed approximately 1.5 kilometers north of the existing area. The ski and base development plans contained in this study recommend the following three phases of lift development:

PHASE I - 1 Triple Chair, 1 T-Bar, 1 Beginner Tow

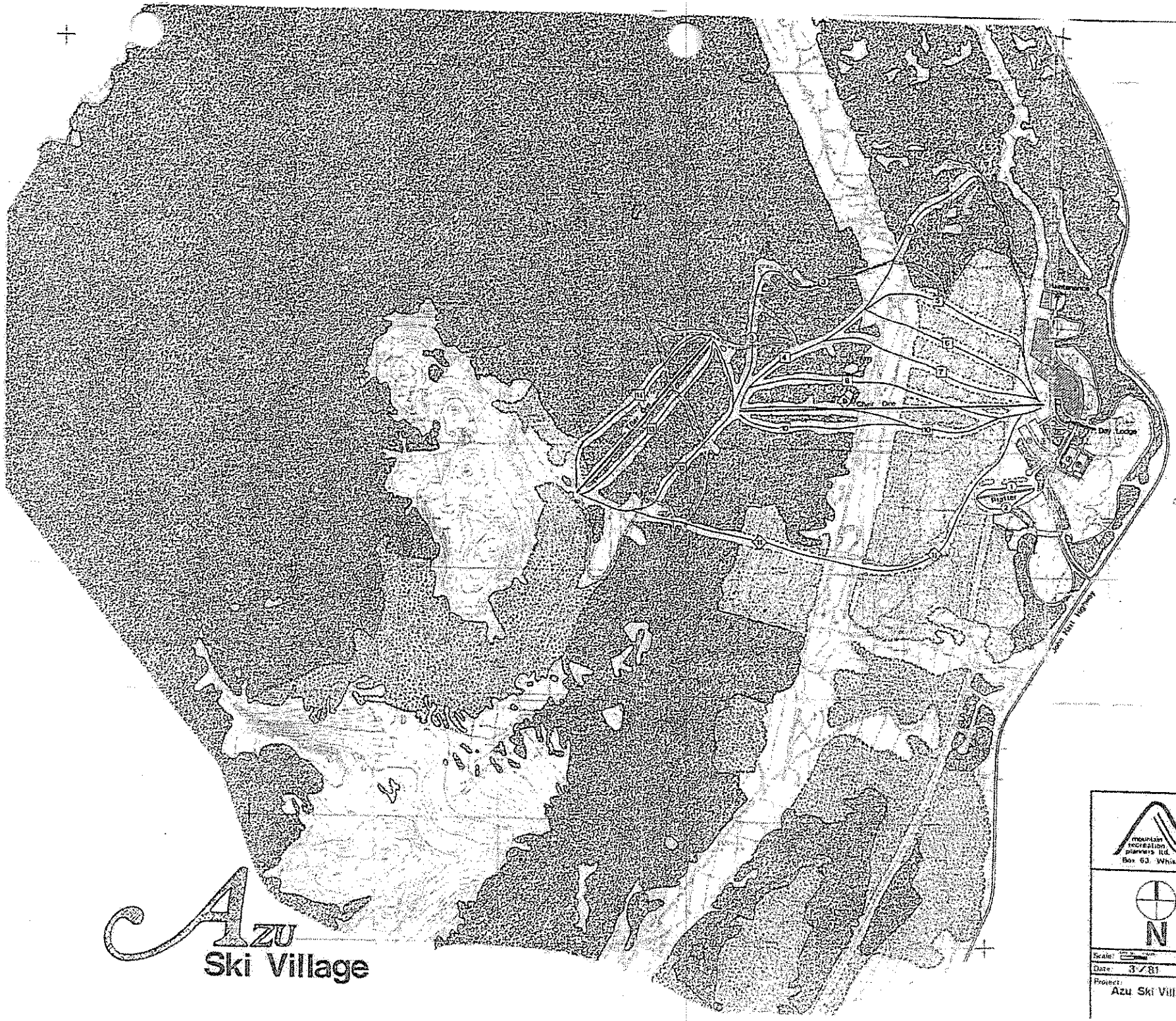
Chair One rises from the new base village 360 vertical meters to the 1,310 meter elevation on the east ridge. This triple chairlift will transport 1,800 skiers per hour over 1.3 kilometers and provide access to T-Bar One in the northeast bowl and large amounts of intermediate and advanced terrain on the eastern facing slopes above the new village. We have recommended the construction of a T-Bar in the southeastern portions of the northeast bowl as the most cost effective method of providing an increased vertical rise and maximizing the terrain available in the rtheast bowl. T-Bar One is accessible from the top of Chair One, can transport 0 skiers per hour and possesses a vertical rise of 255 meters. The aspect and elevation of T-Bar One will allow early and late season skiing, abundant powder snow and maximum protection from southwesterly air flows. Phase One also includes a small surface lift in the base village for children and beginner skiers.

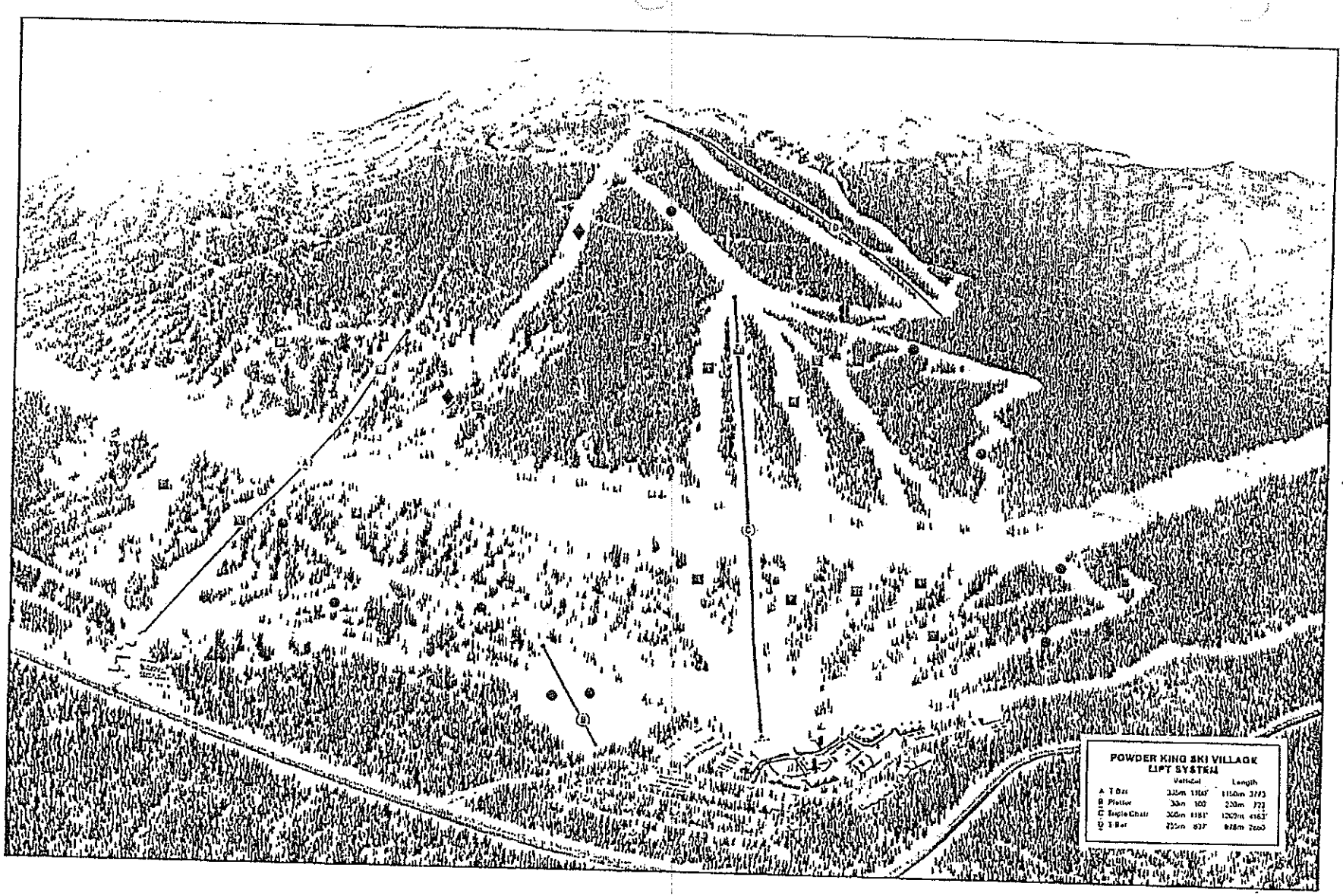
PHASE II - 1 Triple Chair

Chair Two is a large (400 hp) high capacity triple chair which will allow maximum ski trail development in the northeast bowl. This lift rises 450 vertical meters to the 1,605 meter elevation thereby raising Azu Ski Village's total skiable vertical to 660 meters (2,165 ft.).

PHASE III - 1 Double Chair

Chair Three is a long (1,942 m.) double chair which rises from the south staging area of the village to the 1,530 meter elevation of the east ridge for a total vertical rise of 575 meters. The lift provides additional access capacity to the northeast bowl as well as servicing advanced and expert terrain on the eastern slopes.


Legend
Ski Trails
Run Ability Level Vertical Length Width
1 30 m 232m 40m
2 30 225 33
3 360 2674 25
4 190 909 40
5 185 725 45
6 200 838 40
7 240 946 40
8 340 1266 35
9 245 740 30
10 350 1427 40
11 420 1356 35
12 255 1196 40
13 235 800 45
14 253 956 40
Ability Levels
easier more difficult most difficult
Ski Lifts
Lift Lift Type Vertical Length Capacity
Chair 1 Triple 360m 1296m 1800p/h
T-Bar 1 T-Bar 255 878 1500
Platter Platter 30 220 500
Day Lodge
Dense Forest
Gladed Areas
Proposed mountain access road (maximum 12% grade)
Village Centre
Potential Residential Areas
Public Parking
Sea to Sky Highway
Azu
Ski Village
Phase 1
ecosign
mountain recreation planners ltd.
Box 63 Whistler, B.C. V0N 1B0 (604) 932 5976
N
Plan Number: P801
Title:
Ski Area Master Plan
Phase 1
Scale: 1:5m
Date: 3/81
Project:
Azu Ski Village
Figure
12



PROPOSED MOUNTAIN FACILITIES

The lift systems have been designed such that Azu will offer a balanced ski facility at any stage of development. The actual timing of the previous development phases will obviously be dependent upon the financial position of Azu Ski Village's owners.

Design specifications for the Phase I, II and III lift installations follow while the plan view layout of these lifts is illustrated in the Ski Area Master Plan (Figure 13).

PHASE ONE

T-BAR ONE

Elevations:	top terminal:	1,520 m.
	bottom terminal:	1,265 m.
	total vertical:	255 m.
Horizontal Length:		840 m.
Slope Length:		878 m.
Straight Line Slope:		30%
Rated Capacity:		1,300 skiers/hr.
Vertical Transport Meters:		331.5VTM/hr. (000)
Estimated Rope Speed:		2.95 M/sec
Estimated Ride Time:		4.58minutes

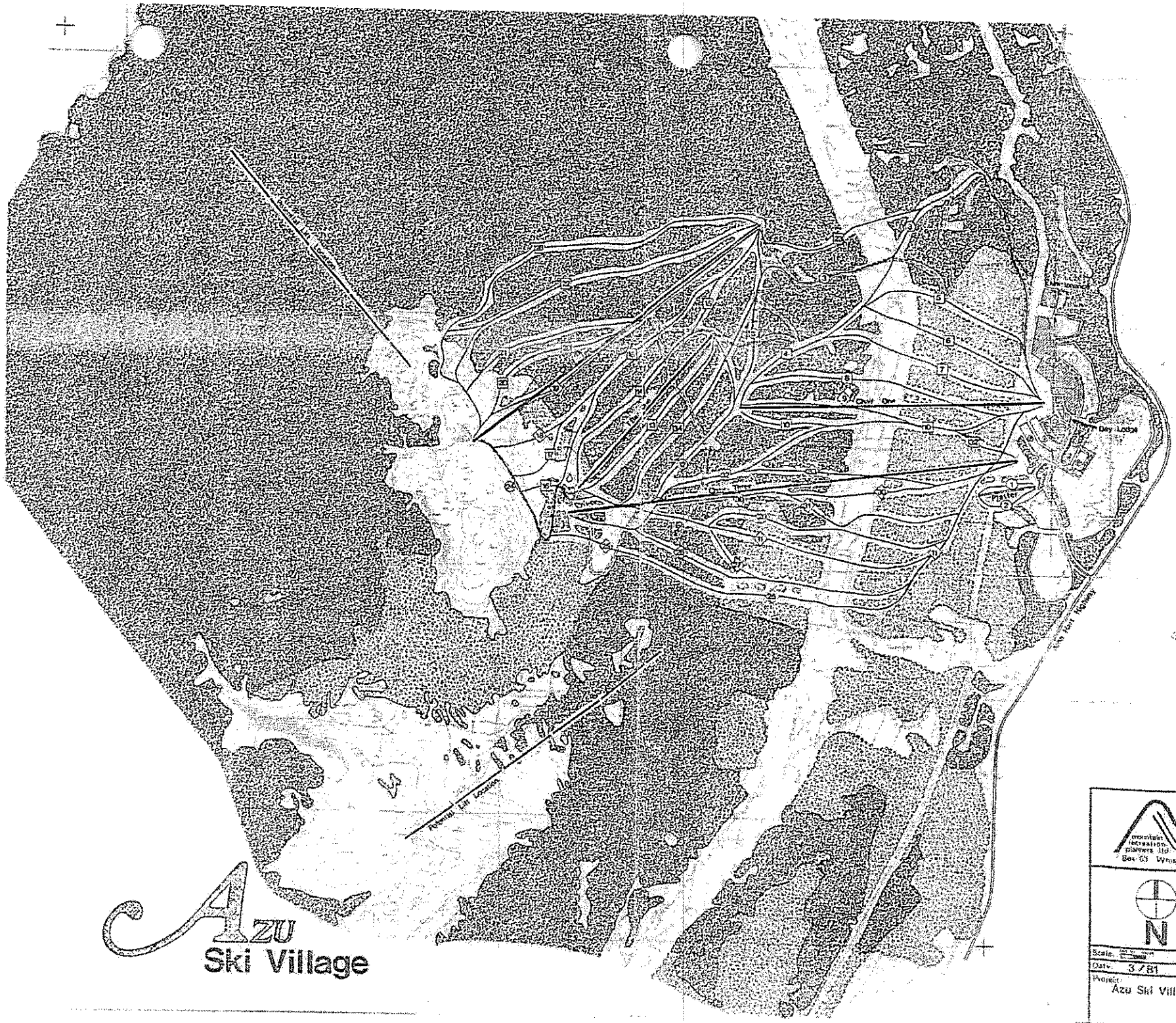
Download Capacity: n/a
Lift Line Skiing: n/a
Estimated Cost: $1981 Doppelmayr quote $258,200
$80 - $103,800 installation $362,000 tl.
Comments: top or bottom drive (self loading)
120 hp.

CHAIR ONE - Triple Chair

Elevations:	top terminal:	1,310 m.
	bottom terminal:	950 m.
	total vertical:	360 m.
Horizontal Length:		1,245 m.
Slope Length:		1,296 m.
Straight Line Slope:		29%
Rated Capacity:		1,800 skiers/hr.
Vertical Transport Meters:		648 VTM/hr. (000)
Estimated Rope Speed:		2.5 M/sec
Estimated Ride Time:		8.7 minutes

Download Capacity:
Lift Line Skiing: Yes
Estimated Cost: $1,063,000 @ $250/lin. m.

Comments: 300 hp. top drive preferred


Legend
Ski Trails
Run Ability Level Vertical Length Width
Ability Levels
easiest
more difficult
most difficult
Ski Lifts
Lift Lift Type Vertical Length Capacity
Chair 1 Triple 580m 1296m 1800p/h
Tbar 1 T-bar 253 878 1500
Platter Pomo 30 220 1000
Chair 2 Triple 456 1490 1800
Chair 3 Double 375 1242 1200
Dense Forest
Gladed Areas
Proposed mountain access road (maximum 12 st grade)
Village Centre
Potential Residential Areas
Public Parking
Phase 3
Azu
Ski Village
Potential Lift Location
Ecosign
mountain recreation planners ltd
Box 63 Whistler, B.C. V0N 1B0 (604) 932 5876
N
Plan Number: P801
Title:
Ski Area Master Plan
Phase 3
Scale: 1:5m
Date: 3/81
Project:
Azu Ski Village
Figure
13

Phase I Cont'd

HANDLE PLATTER TOW

Elevations:	top terminal:	975 m.
	bottom terminal:	945 m.
	total vertical:	30 m.
Horizontal Length:		220 m.
Slope Length		222 m.
Straight Line Slope:		14%
Rated Capacity:		500 skiers/hr.
Vertical Transport Meters:		15 VIM/hr. (000)
Estimated Rope Speed:		2.0 M/sec.
Estimated Ride Time:		1.9 minutes

Download Capacity: n/a
Lift Line Skiing: n/a
Estimated Cost: Equipment/installation , $17,500

Comments: adjustable height, Model 900 Harusch

PHASE TWO

CHAIR TWO - Triple Chair

Elevations:	top terminal:	1,605 m.
	bottom terminal:	1,155 m.
	total vertical:	450 m.
Horizontal Length:		1,490 m.
Slope Length:		1,556 m.
Straight Line Slope:		30%
Rated Capacity:		1,800 skiers/hr.
Vertical Transport Meters:		810 VIM/hr. (000)
Estimated Rope Speed:		2.5 M/sec
Estimated Ride Time:		10.4 minutes

Download Capacity: n/a
Lift Line Skiing:
Estimated Cost: $1,352,825 @ $265/lin. m.

Comments: Big triple(400hp.) would require top drive
250 hp. double probably could be bottom driven

PHASE THREE

CHAIR THREE - Double Chair

Elevations:	top terminal:	1,530 m.
	bottom terminal:	955 m.
	total vertical:	575 m.
Horizontal Length:		1,855 m.
Slope Length:		1,942 m.
Straight Line Slope:		31%
Rated Capacity:		1,200 skiers/hr.
Vertical Transport Meters:		690 VIM/hr. (000)
Estimated Rope Speed:		2.54 M/sec.
Estimated Ride Time:		12.8 minutes

Download Capacity: 1/3
Lift Line Skiing: partial
Estimated Cost: Equipment/installation, $1,529,192
$240.lin.ft.

Comments: 300 hp. top drive electric

.2 SKI TRAILS

We have proposed that an extensive ski trail system of 140 hectares will be required to provide adequate, quality skiing terrain to each of the 4,625 skiers we envision in the Phase 3 resort development. The number of skiers that a particular trail can comfortably accommodate is a somewhat linear function of its width and slope gradient. We have designed the trail system to be in concert with the type of skier and terrain to be serviced as well as the capacity of the lift(s) providing access to that trail. The Phase 1 ski trails will be accessible from Chair One and T-Bar One and have a combined length of 13.7 kilometers with the longest trail being 3.8 kilometers. The Phase 2 ski trails cover 48 hectares of skiing terrain accessible from Chair Two in the northeast bowl. The Phase 2 trail development will provide an additional 11.4 kilometers of ski trails and extend the longest run from 3.8 kilometers to 4.6 kilometers. The Phase 3 ski trail development focusses on the eastern slopes which will be accessible both from Chair One, T-Bar One and Chair Three. These seven ski trails have a combined length of 8.2 kilometers covering some 38 hectares.

The Ski Area Master Plan (Figure 13) illustrates in plan view the location of the 34 major ski trails which have been designed in concert with the proposed lift system. For convenience, we have used a numerical index system for each trail with critical trail data for the Phase 1,2 and 3 expansion program being presented in Table 21.

.3 SKIER CARRYING CAPACITY ANALYSIS

Utilizing an integration of the proposed uphill capacity of the ski lifts and the downhill capacity of the ski trails, the Azu Village Ski Area Master Plan exhibits a total skier carrying capacity of 4,625 skiers per day. The Phase 1 development has a daily comfortable capacity in excess of 2,000 skiers a day and will allow Azu Ski Village to open as the largest ski facility in northern B.C. in terms of both skiable vertical rise and daily capacity although Hudson Bay Mountain in Smithers in very near both of these figures. The Skier Carrying Capacity analysis for each expansion phase is presented in Tables 22, 23 and 24.

TABLE 21

AZU SKI VILLAGE PHASE I,II & III SKI TRAILS

	TRAIL NUMBER	INTERNATIONAL DESIGNATION	SKIER SKILL CLASSIFICATION	VERTICAL	SLOPE DISTANCE	AVERAGE WIDTH	— % Slope — AVERAGE	Steepest 25 meters	AREA HECTARES	CAPACITY SKIERS/HR	DENSITY SKIERS/HA.	SKIERS
	1	Beginner	easier	30 m.	232 m.	40 m.	13 %	-	0.93 ha.	710	75	70
	2	Beginner	easier	30	255	35	12	-	0.90	700	75	65
	3	Novice	easier	360	2,642	25	14	30	6.59	400	56	370
	4	Low Intermediate	more difficult	190	889	40	21	38	3.64	530	50	182
	5	Intermediate	more difficult	195	698	45	28	42	3.26	325	37	120
PHASE I	6	Adv. Inter.	more difficult	205	812	40	25	47	3.35	250	30	100
	7	Intermediate	more difficult	240	915	40	26	45	3.78	340	37	140
	8	Adv. Inter.	more difficult	340	1,220	38	28	48	4.81	250	30	144
	9	Advanced	most difficult	245	698	50	35	50	3.70	260	20	74
	10	Adv. Inter.	more difficult	350	1,066	40	33	47	4.49	235	30	135
	11	Advanced	most difficult	450	1,320	38	34	63	5.30	180	20	106
	12	Novice	easier	255	1,168	40	22	34	4.78	500	56	268
	13	Intermediate	more difficult	255	864	45	30	42	4.05	350	37	150
	14	Intermediate	more difficult	255	927	40	28	38	3.84	375	37	141
	15	Low Intermediate	more difficult	120	508	45	24	34	2.35	410	50	117
	16	Intermediate	more difficult	365	1,245	45	29	42	5.84	375	37	216
	17	Adv. Inter.	more difficult	170	533	38	32	47	2.12	250	30	64
	18	Expert	most difficult	125	305	40	41	70	1.32	75	12	16
	19	Expert	most difficult	235	648	40	36	66	2.76	125	12	34
	20	Intermediate	more difficult	450	1,524	48	30	44	7.62	300	37	282
PHASE 2	21	Adv. Inter.	more difficult	265	788	38	34	48	3.16	260	30	95
	22	Adv. Inter.	more difficult	370	1,245	45	30	50	5.84	185	30	175
	23	Low Intermediate	more difficult	100	673	35	15	36	2.38	475	50	119
	24	Novice	easier	85	762	15	11	25	1.15	380	56	64
	25	Advanced	most difficult	510	1,550	20	33	60	6.53	275	20	131
	26	Advanced	most difficult	420	1,270	42	33	60	5.62	300	20	112
	27	Expert	most difficult	110	305	38	36	71	1.23	190	12	15
	28	Intermediate	more difficult	450	1,981	50	23	42	10.16	425	37	375
	29	Advanced	most difficult	355	1,016	40	35	57	4.30	210	20	86
PHASE 3	30	Advanced	most difficult	455	1,308	45	35	52	6.23	280	20	125
	31	Expert	most difficult	255	724	40	35	66	3.07	185	12	37
	32	Adv. Inter.	more difficult	385	1,473	45	26	47	6.85	360	30	205
	33	Advanced	most difficult	305	787	35	39	52	2.95	150	20	58
	34	Low Intermediate	more difficult	255	965	47	26	36	4.69	475	50	234

TABLE 22

AZU SCC ANALYSIS - PHASE ONE

Lift	Length	Vertical	Hourly Capacity	VIM/hr. (000)	SCC
Chair One	1,296 m.	360 m.	1,800	648.0	1,270[1.]
T-Bar One	878	255	1,300	331.5	660
Platter	220	30	500	15.0	135
	2,394 m.	575 m.[2.]	3,600	994.5	2,065

1. reduced 5% for access purposes
2. total vertical minus lift overlap

TABLE 23

AZU SCC ANALYSIS - PHASE TWO

Lift	Length	Vertical	Hourly Capacity	VIM/hr. (000)	SCC
Chair One	1,296 m.	360 m.	1,800	648.0	1,100[1.]
T-Bar One	878	255	1,300	331.5	660
Platter	220	30	500	18.0	135
Chair Two	1,556	450	1,800	810.0	1,610
	3,950 m.	660 m.[2.]	5,400	1,804.5	3,505

1. reduced 18% for access purposes
2. total vertical minus lift overlap

TABLE 24

AZU SCC ANALYSIS - PHASE THREE

Lift	Length	Vertical	Hourly Capacity	VIM/hr. (000)	SCC
Chair One	1,296 m.	360 m.	1,800	648.0	1,190[1.]
T-Bar One	878	255	1,300	331.5	660
Platter	220	30	500	18.0	135
Chair Two	1,556	450	1,800	810.0	1,610
Chair Three	1,942	575	1,200	690.0	1,030[1.]
	5,892 m.	660 m.[2.]	6,600	2,494.5	4,625

1. reduced 11% for access purposes
2. total vertical minus lift overlap

.4 AREA BALANCING

The planning team closely categorized each proposed ski trail into one of seven skier skill classifications and tabulated the cumulative balance statement for each phase of expansion. The necessity of providing a safe and efficient route from the top to the bottom for low and intermediate skiers has resulted in the Phase 1 ski trails being slightly balanced in favour of these skier skill levels. It is noteworthy however, that Phase 2 and 3 trail systems will be perfectly in line with the relative proportions of eaeh ability level in the skier market. In a similar vein, the Phase 1 trail systems will have a slightly higher density than the industry norm of 37 skiers per hectare while Phases 2 and 3 will be well below this median level. The Phase 1, 2 and 3 ski trails cumulative balance statements are presented in Tables 25, 26 and 27 respectively.

TABLE 25

SKI TRAILS CUMULATIVE BALANCE STATEMENT

PHASE ONE SCC = 2,065 skiers/day

Skill Classification	Hectares	Skiers	Balance	Ideal
1. Beginner	1.83	135	6	5 %
2. Novice	5.21	293	14 %	10 %
3. Low Intermediate	9.80	527	25 %	20 %
4. Intermediate	14.93	551	27 %	30 %
5. Advanced Intermediate	12.65	379	18 %	20 %
6. Advanced	9.00	180	10 %	10 %
7. Expert	-	-	- %	5 %
	53.42	2,065	100 %	100 %

Density: 38.66 skiers/hectare

TABLE 26

SKI TRAILS CUMULATIVE BALANCE STATEMENT

PHASE TWO SCC = 3,505 skiers/day

Skill Classification	Hectares	Skiers	Balance	Ideal
1. Beginner	1.83	135	4 %	5 %
2. Novice	6.36	357	10 %	10 %
3. Low Intermediate	14.53	763	22 %	20 %
4. Intermediate	28.39	1,049	30 %	30 %
5. Advanced Intermediate	23.82	713	20 %	20 %
6. Advanced	21.15	423	12 %	10 %
7. Expert	5.31	65	2 %	5 %
	101.39	3,505	100 %	100 %

Density: 34.57 skiers/hectare

TABLE 27

SKI TRAILS CUMULATIVE BALANCE STATEMENT

PHASE THREE SCC = 4,625 skiers/day

Skill Classification	Hectares	Skiers	Balance	Ideal
1. Beginner	1.83	135	3 %	5 %
2. Novice	7.97	446	10 %	10 %
3. Low Intermediate	17.61	908	20 %	20 %
4. Intermediate	38.55	1,424	30 %	30 %
5. Advanced Intermediate	30.67	918	20 %	20 %
6. Advanced	34.63	692	15 %	10 %
7. Expert	8.38	102	2 %	5 %
	139.64	4,625	100 %	100 %

Density: 33.12 skiers/hectare

.5 SKIER STAGING & CIRCULATION

An important consideration in the design of large mountains such as Mount Azu is to insure that there is sufficient up-mountain capacity to fill all lifts and trails within a two hour staging period. Due to the large capacity of the northeast bowl, it was the planning team's consideration that at least two lifts be available from the proposed Azu Village. If and when the Phase 3 Master Plan is constructed, the design allows the operation of Chair One and Chair Three during peak use periods while suitable access to the northeast bowl and ski trails on the eastern flanks would be provided by either lift during periods of more moderate use. Table 28 illustrates the mountain staging periods for each phase of development and it can be seen that all phases have acceptable maximum staging periods.

TABLE 28

MOUNTAIN STAGING PERIODS

	Phase 1	Phase 2	Phase 3
Fill Upper Mountain	.55 hrs.	1.26 hrs.	.76 hrs.
Fill Lower Mountain	1.07	1.83	1.62

6. Powder King Village

.1 OVERNIGHT ACCOMMODATION POTENTIAL

Having now identified the proposed lift and trail systems, presented the daily skier capacity and balancing of the skiing facilities, we can determine the space requirements for day-use facilities such as parking, restrooms, day lodge, etc. To accurately determine how many visitors will require overnight accommodation at the area, however, is a much more difficult task. At large destination resorts up to 90 percent of the visitors may require overnight accommodation while at small community areas no overnight facilities are needed. The British Columbia government has recognized the legitimate need of many of its permittees to provide lodges, condominiums or chalet sites on Crown land adjacent to major skiing centers. It has become quite evident that the majority of British Columbia resorts suffer a competitive disadvantage with similar U.S. resorts due to the inadequacey of on-hill accommodation and tourist facilities.

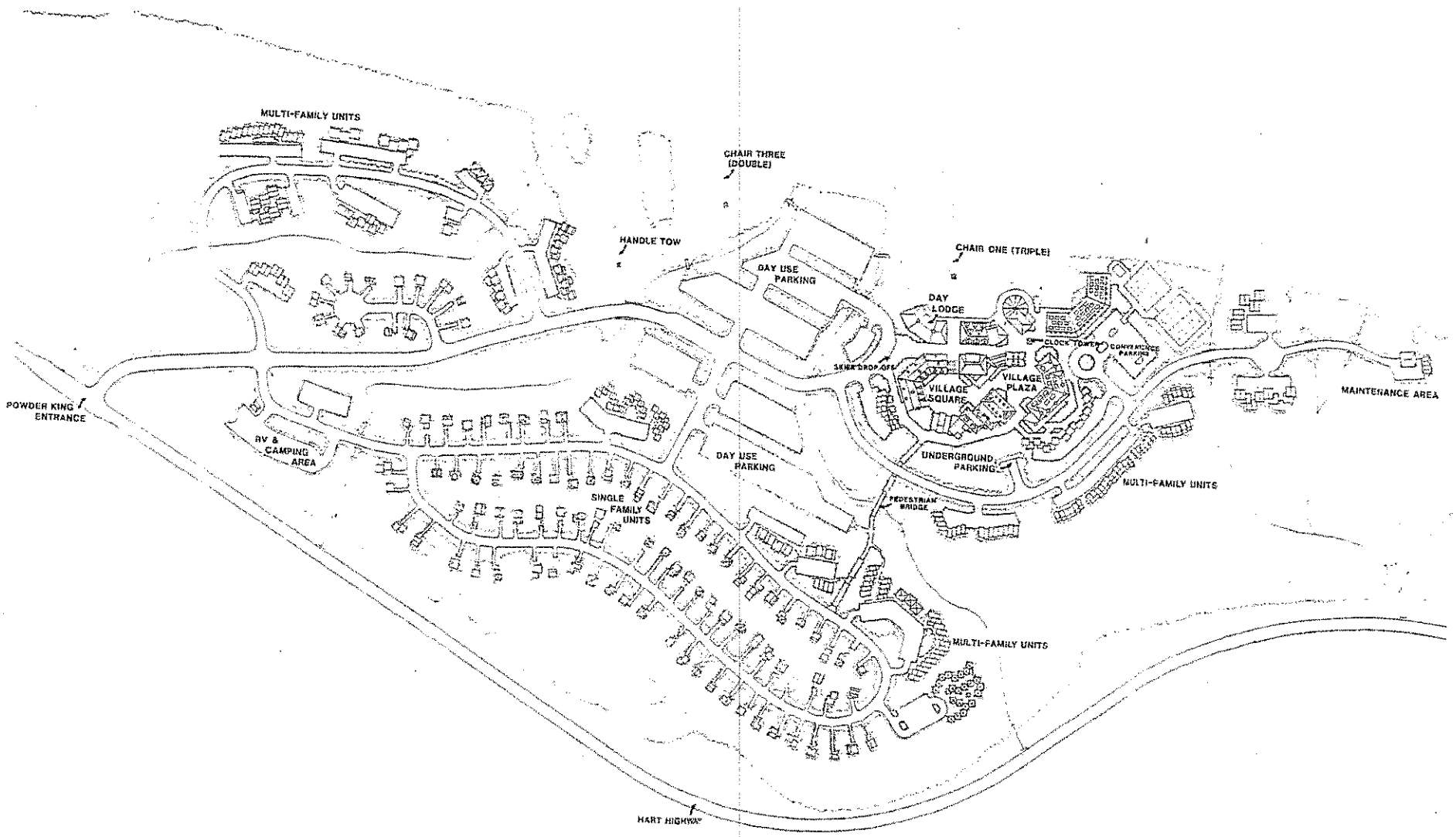
In order to more accurately determine the quantity of those facilities required by different types of skiing sites, the B.C. Ski Development Coordinator has prepared a set of policy guidelines to calculate the overnight accommodation potential for any given area. The nomenclature of this policy is to establish the resort status of proposed or existing resorts and then complete an analysis of various ski area evaluation factors whose totals can then be cross referenced to indicate what percentage of the site capacity is likely to require overnight accommodation at the ski area. The following table summarizes our analysis for each of the three phases proposed at Azu Ski Village

TABLE 29

POWDER KING VILLAGE ACCOMMODATION DEMAND[1]

Ski Area Evaluation Factors	Azu Village Ratings (Phase)		
Determinant	One	Two	Three
Area Type	B	C	C
A. Developed Skiing Terrain			
Terrain Balance	4	5	5
Skier Densities	-	5	5
B. Accessibility			
Travel Time	4	4	4
Mountain Road	1	1	1
C. Popn. within 322 km.	3	3	3
D. Unique Qualities other than skiing[2].	1	1	1
E. Year-Round Experience[3].	1	2	2
F. Site Quality			
Climate	3	3	3
Length of Season	3	3	3
Snow Condition	4	4	4
Ratings from Analysis	24	31	31
Accommodation Demand (% of site capacity)	57%	57%	57%

1. based ucpn B.C. Provincial Ski Policy
2. Pine Pass, Azouzetta Lake, and ski village are believed sufficient to constitute a regional attraction
3. based upon facilities proposed on site



POWDER KING SKI VILLAGE

Ecosign

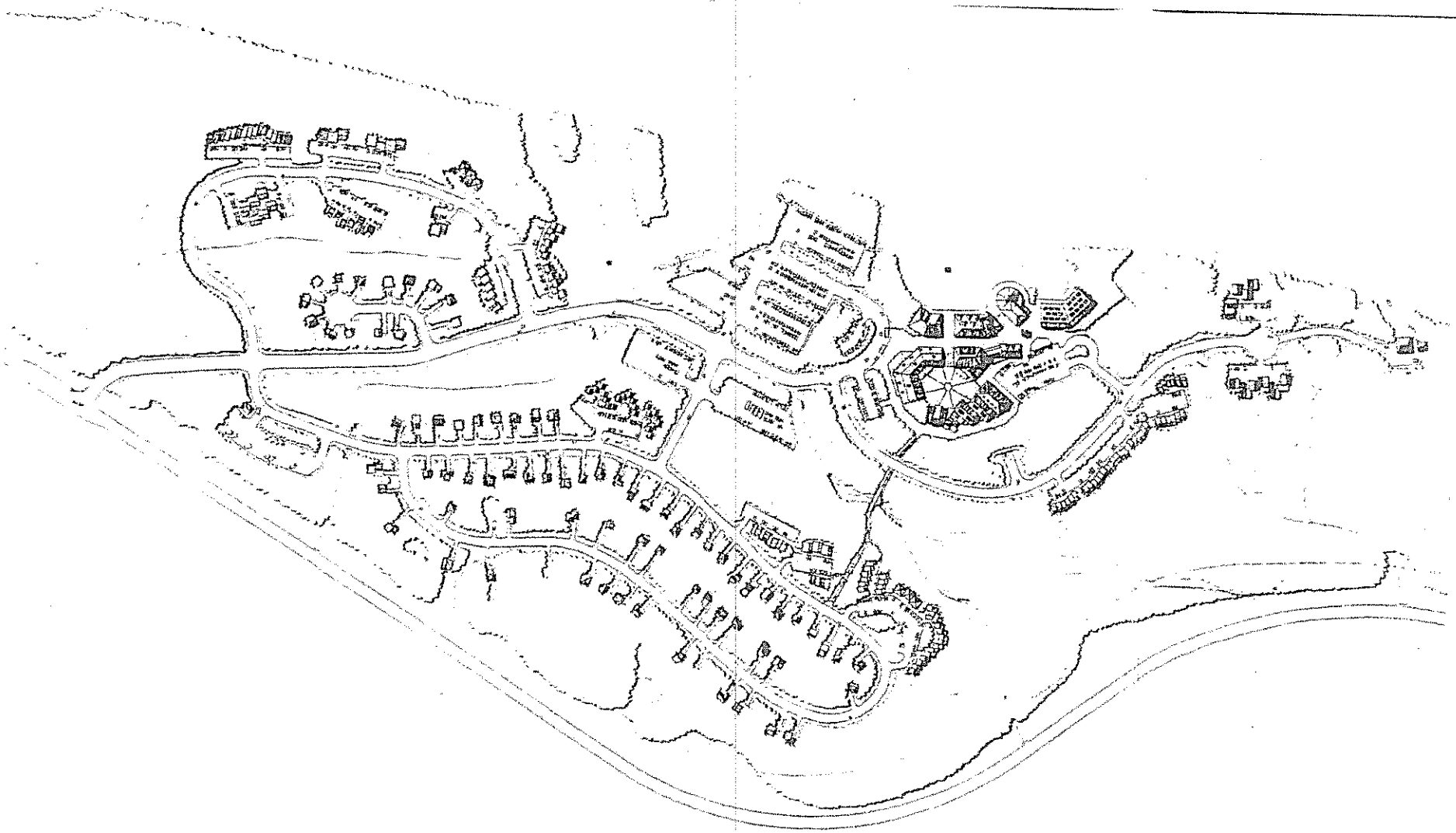
CLIENT: MR. PETER GRAHAM JR.

PLAN PRO
DATE JANUARY 1993
SCALE

NORTH →

BASE AREA COMPONENTS

FIGURE 14



POWDER KING SKI VILLAGE

PLANNERS: Ecosign

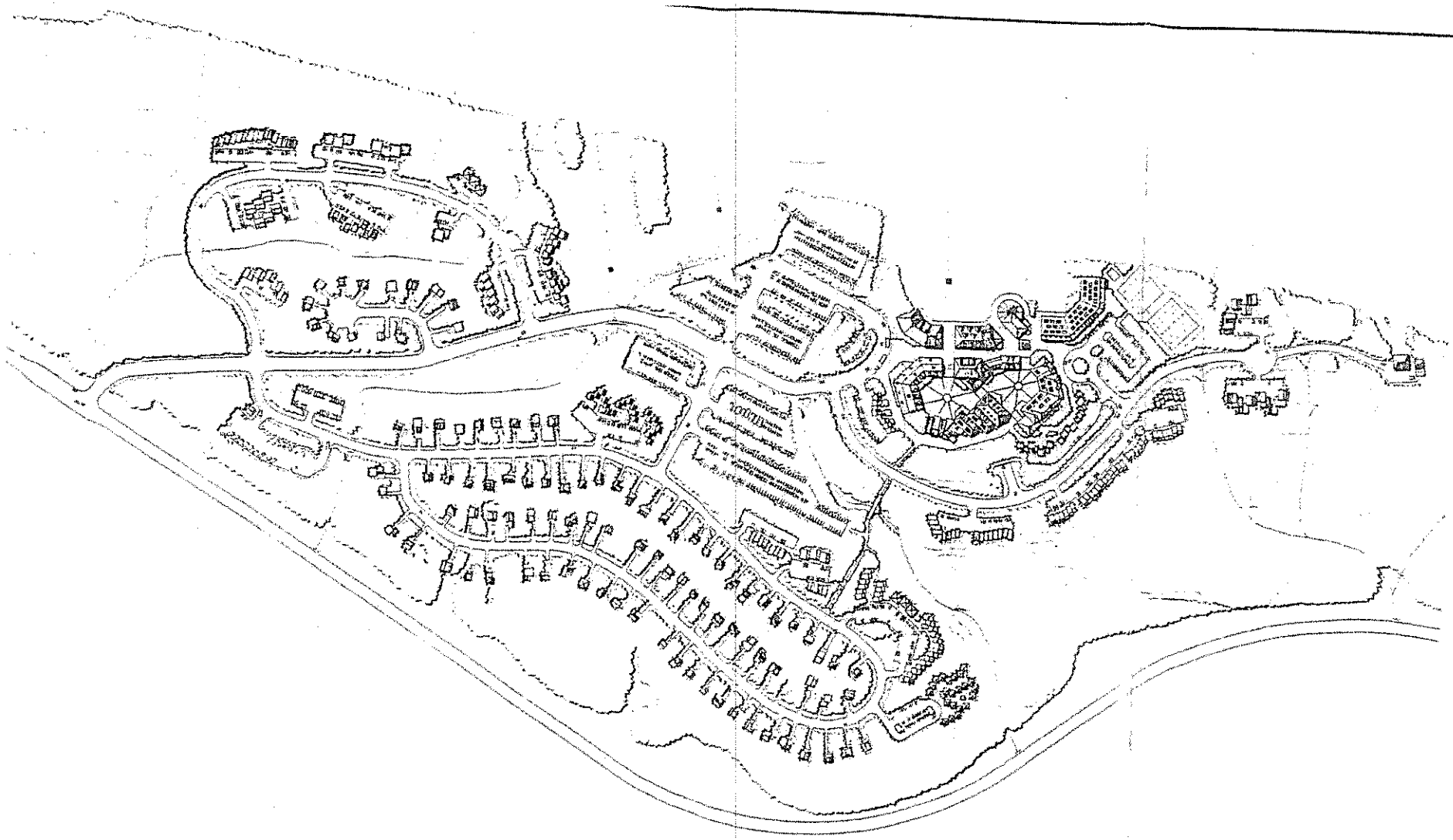
CLIENT: DR. PETER GRAHAM JR.

DRAN: MSD
DATE: JANUARY 1993
SCALE:

NORTH →

BASE AREA PHASE TWO

FIGURE 16



POWDER KING SKI VILLAGE

PLANNERS: ecosign

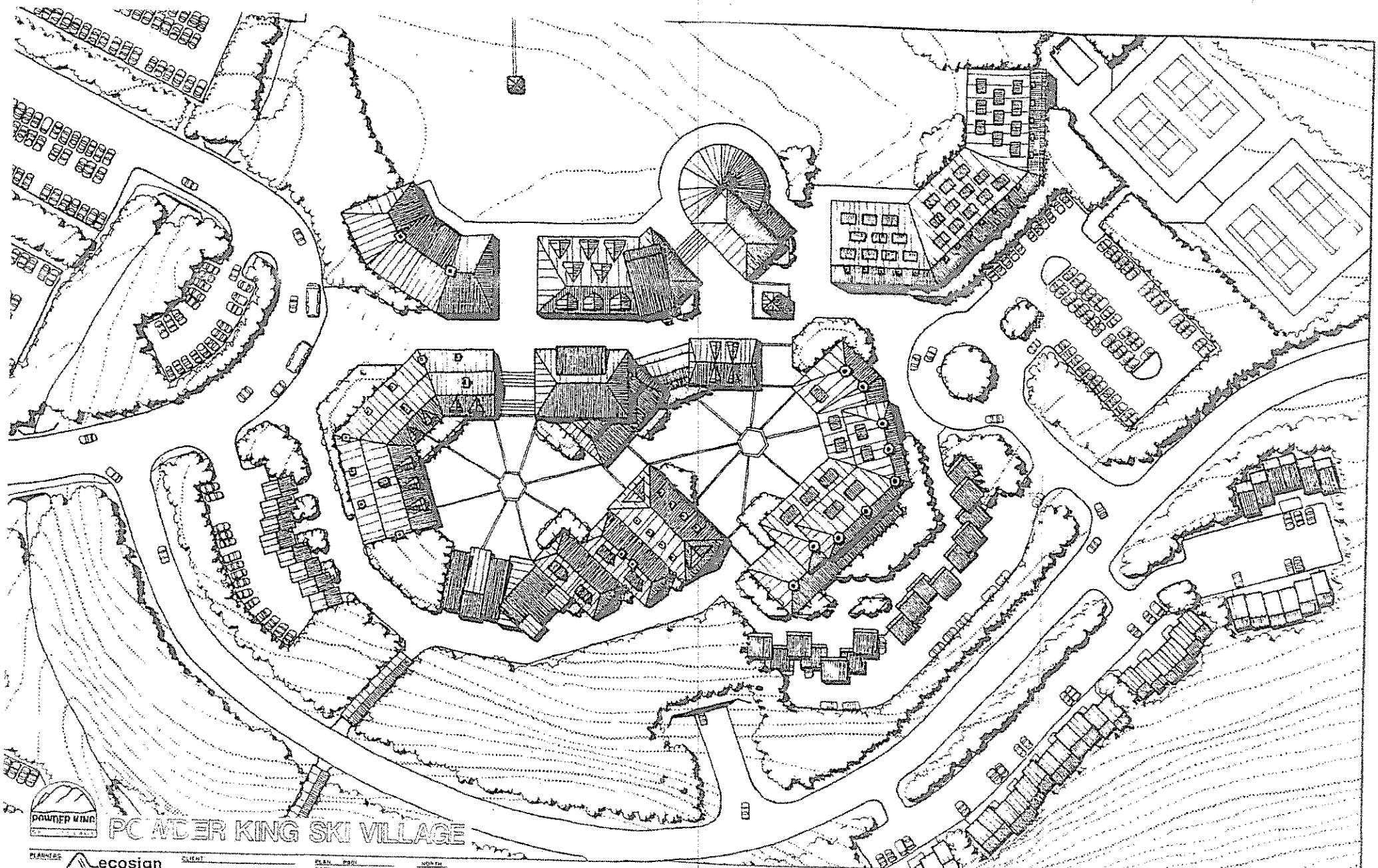
CLIENT: MR. PETER GRAHAM JR.

PLAN: PRO
DATE: JANUARY 1989
SCALE:

NORTH →

BASE AREA PHASE THREE

FIGURE 17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DATE JANUARY 1980
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NORTH
BASE AREA VILLAGE

FIGURE 18

The previous figures will be utilized during the space-use analysis and base area design stages to calculate land and service requirements for the various accommodation zones.

.2 PUBLIC DAY-USE FACILITIES

The planning team has prepared a Space Use Analysis of fifteen skier service functions which require enclosed space for the skiing public. While it may be desirable to locate some of these services in the village core area, Table 30 lists our recommended built space required to provide an adequate level of service for each phase of development.

TABLE 30

POWDER KING SPACE USE ANALYSIS

		Expansion Phase/U.S.F.S. Average Level of Service					
PHASE:	I	II			III		
SCC:	2,065	3,505			4,625		
Service Function							
1. Food Service Seating[1]	3,572	2,491	6,064		1,938	8,001	
2. Kitchen & Scramble[1]	1,177	821	1,998		638	2,636	
3. Rest Rooms	702	490	1,192		381	1,573	
4. First Aid & Ski Patrol	599	418	1,016		325	1,341	
5. Ski School	165	115	280		90	370	
6. Retail Sales	330	230	561		179	740	
7. Equipment Rental	1,033	720	1,753		560	2,313	
8. Public Lockers	640	446	1,087		347	1,439	
9. Administration	558	389	946		302	1,249	
10. Ticket Sales	83	58	140		45	185	
11. Employee Lockers	888	619	1,507		482	1,989	
12. Bar/Lounge	785	547	1,332		426	1,758	
13. Nursery	124	86	210		67	278	
14. Storage/Mechanical	1,156	806	1,963		627	2,590	
15. Circulation/Walls/Waste	1,549	1,080	2,629		840	3,469	
Total Day-Use Lodges SF.	13,361	9,317	22,677		7,246	29,924	
Total Land Area (Acres)	0.61	0.43	1.04		0.33	1.37	
Maintenance Building SF.	2,664	1,858	4,521		1,445	5,966	
Maintenance Area (Acres)	0.49	0.34	0.83		0.27	1.10	

[1] It is probable that portions of the dining and entertainment services will be provided in restaurants and lounges situated in public accommodation developments, thus reducing the recommended space for these service functions.

.3 ACCOMMODATION MIX & ZONING

In Section VI.1, we discussed the overnight accommodation demand as established by the Provincial Ski Area Policy. Based upon this analysis and the approval of Provincial authorities, it is our opinion that Powder King Village should be permitted to commence construction of the village units during the Phase 1 expansion program. We have recommended a variety of types of both public and private overnight accommodation in order to encourage diversity and individuality on the site as well as to appeal to a broad market base.

Ecosign envisions that during the intial phase of development, the majority of day-use and apres ski facilities will be situated in a large day lodge complex adjacent to Chair One and the village core. A 66 room hotel/lodge complex is proposed during Phase 1 to anchor the core area adjacent to the day lodge complex. It is likely that further public overnight accommodation will be provided in individual condo-tel units situated within the village core. A condo-tel unit is basically a fully equipped condominium where reservations and maintenance are performed by a central management agency. This type of accommodation has proved to be quiet popular with large family groups for weekends, holidays and vacations due to the self-contained food preparation facilities. In many resorts throughout the west these condo-tel units are being built and purchased by private investors for tax shelter purposes. We envision that the existing day lodge and motel may be transformed at a later phase into a hostel. A hostel offers low cost berthing facilities similar to a European pension and may or may not provide family-style meals.

Private accommodation will be encouraged through the sale or lease of individual or strata title lots. Multi-family units (MFU) are medium density residential housing such as condominiums, duplexes or town houses. Single family units (SFU) are low density detached residential housing or chalets owned and maintained by individual owners. During the base area design process we have designated various land areas in concert with our recommended zoning guidelines. We have also made generous allowances for open space between the various activities and accommodation types to preserve the intimate character of the site.

The recommended net densities for the above facilities are as follows:

	Units per Hectare
Hotel, Lodge Units	160/hectare
Public Condo-Tel Units	54/ "
Private Multi-Family Units	35/ "
Private Single Family Units	14/ "
Camper Pads	250/ "

Zoning

During the inital planning program in early 1981, the planning team carefully reviewed the Fraser-Fort George Regional District Zoning Bylaw No. 430 and noted that Azu Ski Village was in unorganized territory with no zoning restrictions. At that time Ecosign considered that the proposed expansion of Azu Ski Village had the potential to create land use conflicts and parasitic strip development adjacent to the area. Since resort centres in mountainous snow country possess infrastructural and operational requirements quiete unlike most B.C. Communities, Ecosign prepared a draft zone designation which would allow the efficient development and operation of a year-round resort facility. The Regional District considered our recommendations and drew up By-Law No. 497 to ammend the Regional District of Fraser-Fort George Zoning By-Law No. 430 by increasing the definitions in Part II and adding an RC4 - RECREATION COMMERCIAL IV zone to Section 26. By-Law No. 497 was given first reading on September 10, 1981; a public hearing was held on October 20, 1981 and adopted March 18, 1982. A description of the Recreation Commercial Zone (RC4) follows and reflects the current zoning of the Powder King Village base lands.

RECREATIONAL COMMERCIAL IV ZONE (RC4)

The Recreation Commercial IV Zone is used for multiple use recreational resort areas, which may or may not be identified in an Official Settlement Plan.

Permitted Uses of Land, Buildings and Structures

26.1 In the Recreation Commercial IV Zone, the use of land, buildings and structures is restricted to:

(a) Recreation Dwelling - Single Family
(b) Recreation Dwelling - Multiple Family
(c) Condotel
(d) Hotel
(e) Campground
(f) Restaurant
(g) Convenience Store
(h) Craft/Gift Store
(i) Lodge - Day Use
(j) Gasoline Service Station
(k) Recreation Facilities

Setbacks

26.5 (1) No building or structure shall be located less than:

(a) 7.5 m from a front or rear lot line; or

(b) 3 m from a side lot line;

except that there is no requirement for a front, rear or side setback for a principal building containing one or more of the commercial uses (f), (g), (h), (i), whether in a separate building or in combination with a Condotel or Hotel; provided that where 2 or more principal buildings are located on a site there shall be a minimum of 4.5 m separating such buildings.

(2) No drainage field, lagoon, drainage pit or other surface or sub surface disposal of effluent shall be closer to the natural boundary of a lake than 75m.

Height

25.6 No building shall exceed a height of 2½ storeys or 9m, whichever is lesser, except that the following uses shall not exceed a height of 3½ of 3½ storeys or 12m, whichever is lesser:

(a) Recreational Dwelling - Multiple Family

(b) Condotel

(c) Hotel

(d) Lodge - Day Use

Living Quarters

26.2 Dwelling Units for the accommodation of owner/operator/manager/employee of commercial uses are permitted, in Single Family, Multiple Family, or Condotel units.

Site Area

26.3 The minimum Site Area for the Permitted Uses shall be:

(1) Recreation Dwelling - Single Family - 700 sq.m.

(2) Recreation Dwelling - Multiple Family - 300 sq.m.

(3) Condotel - 150 sq.m. per unit

(4) Hotel - 60 sq.m. per unit

(5) Campground - 0.4 ha

(6) Commercial uses (f), (g), (h), (i), above, shall not have a minimum site area where within a building containing Hotel or Condotel.

(7) Commercial uses (f), (g), (h), (i), where contained in a separate building, individually or in combination - 500 sq. m.

(8) Gasoline Service Station - 0.1 ha

Site Coverage

24.4 The maximum Site Coverage for the Permitted Uses shall be:

(1) Recreation Dwelling - Single Family - 33%

(2) Recreation Dwelling - Multiple Family, Campground - 50%

(3) Condotel, Hotel, including commercial uses in the same building - 100%

(4) Commercial Uses (f), (g), (h), (i), where contained in a separate building - 100%

Relationship to Subdivision Control By-law

The minimum parcel size for subdivision of lots created in the RC4 zone is 400 sq.m., with community water and sewer systems.

Additional Definitions

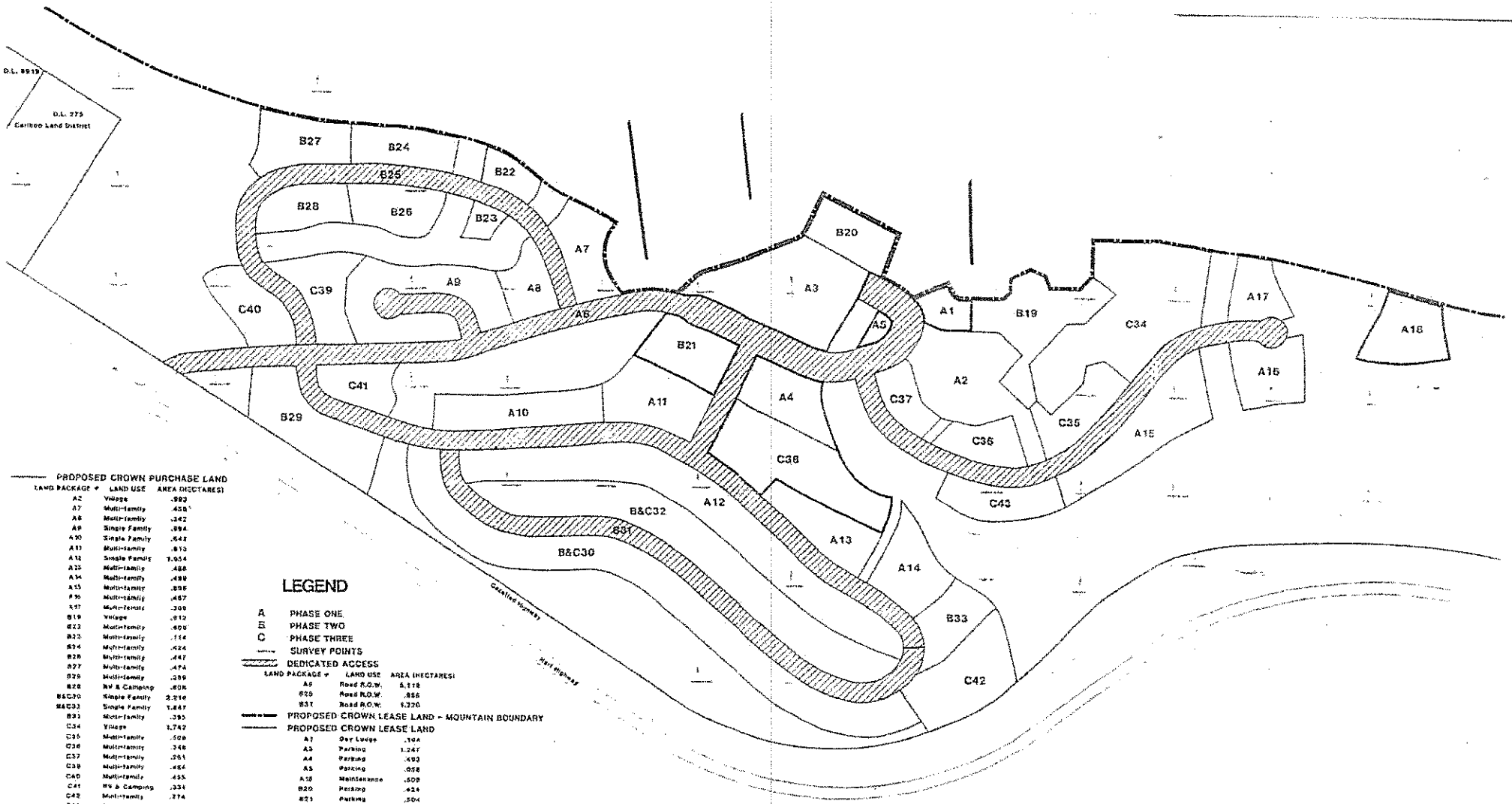
"condotel" means a building containing units of self-contained accommodations for tourist rental use, associated with a ski resort area.

"lodge - day use" means a building containing various day use facilities associated with ski resort development, and includes such facilities as equipment rental, cafeteria, offices, nursery, indoor recreation areas and licensed premises.

"recreation dwelling - single family" means a residential building, not including a mobile home, designed for occupancy by not more than one family, and used on a seasonal and temporary basis by persons for whom the Recreation Dwelling is not a principal residence.
(Note exception permitted by Section 26.2)

"recreation dwelling - multiple family" means a building containing 2 or more residential units which are structurally joined, including duplex, townhouse, condominium; with each unit designed for occupancy by not more than one family, and used on a seasonal and temporary basis by persons for whom the Recreation Dwelling is not a principal residence.
(Note exception permitted by Sections 26.2)

"storey" means that portion of a building, excluding a cellar or underground parking area, between the surface of any floor and the surface of the floor next above or the ceiling above in the case of the uppermost storey; and habitable rooms in an attic or loft space above the top storey shall be considered a ½ storey.



PROPOSED CROWN PURCHASE LAND

LAND PACKAGE #	LAND USE	AREA (HECTARES)
A2	Village	.992
A7	Multi-family	.458
A8	Multi-family	.342
A9	Single Family	.894
A10	Single Family	.642
A11	Multi-family	.813
A12	Single Family	1.054
A13	Multi-family	.488
A14	Multi-family	.498
A15	Multi-family	.898
A16	Multi-family	.467
A17	Multi-family	.300
B19	Village	.912
B22	Multi-family	.609
B23	Multi-family	.114
B24	Multi-family	.424
B25	Multi-family	.447
B27	Multi-family	.474
B29	Multi-family	.389
B28	RV & Camping	.606
B&C30	Single Family	3.216
B&C32	Single Family	1.847
B33	Multi-family	.395
C34	Village	1.742
C35	Multi-family	.509
C36	Multi-family	.348
C37	Multi-family	.261
C38	Multi-family	.464
C40	Multi-family	.495
C41	RV & Camping	.334
C42	Multi-family	.374
C43	Multi-family	.448

LEGEND

- A PHASE ONE
- B PHASE TWO
- C PHASE THREE
- SURVEY POINTS
- DEDICATED ACCESS

LAND PACKAGE #	LAND USE	AREA (HECTARES)
A9	Road R.O.W.	5.118
B29	Road R.O.W.	.886
B31	Road R.O.W.	1.330

- PROPOSED CROWN LEASE LAND - MOUNTAIN BOUNDARY
- PROPOSED CROWN LEASE LAND

A1	Day Lodge	.194
A3	Parking	1.247
A4	Parking	.493
A5	Parking	.058
A18	Maintenance	.509
B20	Parking	.424
B21	Parking	.504
C39	Parking	1.097

POWDER KING SKI VILLAGE

PLANNERS: ecosign

CLIENT: MR. PETER GRAHAM JR.

PLAN: PRELIMINARY
DATE: JANUARY 1989
SCALE: 1" = 200'

NORTH →

BASE AREA LAND PACKAGES

FIGURE 19

TABLE 32

POWDER KING BASE AREA DESIGN ANALYSIS

Land Package	Land Use	Parcel Size	Units	Beds
A1	Day Lodge	0.194 Ha		
A2	Village	0.993	47 Condotel	188
			94 Hotel	188
A3	Parking	1.247	218	
A4	Parking	0.493	94	
A5	Parking	0.058	22	
A6	Road R.O.W.	5.118		
A7	Multi-Family	0.458	16	64
A8	Multi-Family	0.342	10	40
A9	Single Family	0.994	11	66
A10	Single Family	0.644	9	34
A11	Multi-Family	0.613	21	84
A12	Single Family	1.954	27	162
A13	Multi-Family	0.488	17	68
A14	Multi-Family	0.499	16	64
A15	Multi-Family	0.898	30	120
A16	Multi-Family	0.467	10	40
A17	Multi-Family	0.309	16	64
A18	Maintenance	0.508		
B19	Village	0.812	33 Condotel	211
			66 Hotel	105
B20	Parking	0.424	92	
B21	Parking	0.504	72	
B22	Multi-Family	0.195	6	24
B23	Multi-Family	0.114	3	12
B24	Multi-Family	0.424	14	56
B25	Road R.O.W	0.925		
B26	Multi-Family	0.447	14	56
B27	Multi-Family	0.474	14	56
B28	Multi-Family	0.389	11	44
B29	RV & Camping	0.806	40	80
B30	Single Family	2.216	16	96
B31	Road R.O.W.	1.220		
B32	Single Family	1.847	17	102
B33	Multi-Family	0.395	12	48
C34	Village	1.742	26 Condotel	52
			51 Hotel	102
C35	Multi-Family	0.509	16	64
C36	Multi-Family	0.348	12	36
C37	Multi-Family	0.261	9	36
C38	Parking	1.097	170	
C39	Multi-Family	0.484	10	40
C40	Multi-Family	0.455	15	60
C41	RV & Camping	0.334	13	26
C42	Multi-Family	0.774	26	104
C43	Multi-Family	0.448	15	60
C30	Single Family	2.216	12	72
C32	Single Family	1.847	13	78

7. Infrastructure

This section discusses the technical aspects and associated costs of the water, sewage, power and road service requirements for the proposed phased development of Powder King Village. The servicing of each phase is designed to be technically and economically independent of subsequent phases. Designs and costs are conceptual and subject to further investigation.

The proposed village site is located on the upper part of a bench at the eastern foot of Azu Mountain. The topography is gently rolling with an average cross slope of 10 percent. The site is relatively well drained with some wet and marshy areas. Two small creeks flow across the village site. Rock, except for some possible local outcrops, is not expected to be encountered.

The granular bench will likely provide low cost water supply and sewage disposal. The natural gas pipeline which could be tapped, runs right past the site.

.1 WATER

The Azu Ski Area is located on the western foothills of the Rocky Mountains. The mountain drainage basin receives an annual precipitation of approximately 2,000 millimeters of which about 60 percent falls as snow. The typical creek flow is expected to be minimal during the time of high demand; namely during the winter months. Most of the flow will be carried during the freshet with a small base flow during the summer. It is assumed that the ground water recharge is about 10 to 20 percent of the annual precipitation.

Water Demand

The water requirements for each phase is based on the before mentioned population estimate or a water use of 20 liters per day per visitor, 200 liters per day for overnight visitors and employees, and 700 liters per square meter of commercial and retail area.

A 65 percent average occupancy rate was assumed for the five month season, which gave the total season water demand shown in Table 33.

TABLE 33

WATER DEMAND FOR AZU SKI VILLAGE

PHASE:	I	II	III
Water Demand			
Maximum Daily			
x 10^3 l/day	340	700	930
x 10^3 gal/day	75	154	205
Season Total			
x 10^6 l/day	33.2	60.3	90.7
x 10^6 gal/day	7.3	15.0	19.9

A water supply of 10,000 liters/minute sustained for two hours (1.2 million liters) will probably provide sufficient fire protection for the village, However, the actual fire demand will depend on building type, material and density, and whether automatic sprinkler systems will be installed.

Water Sources

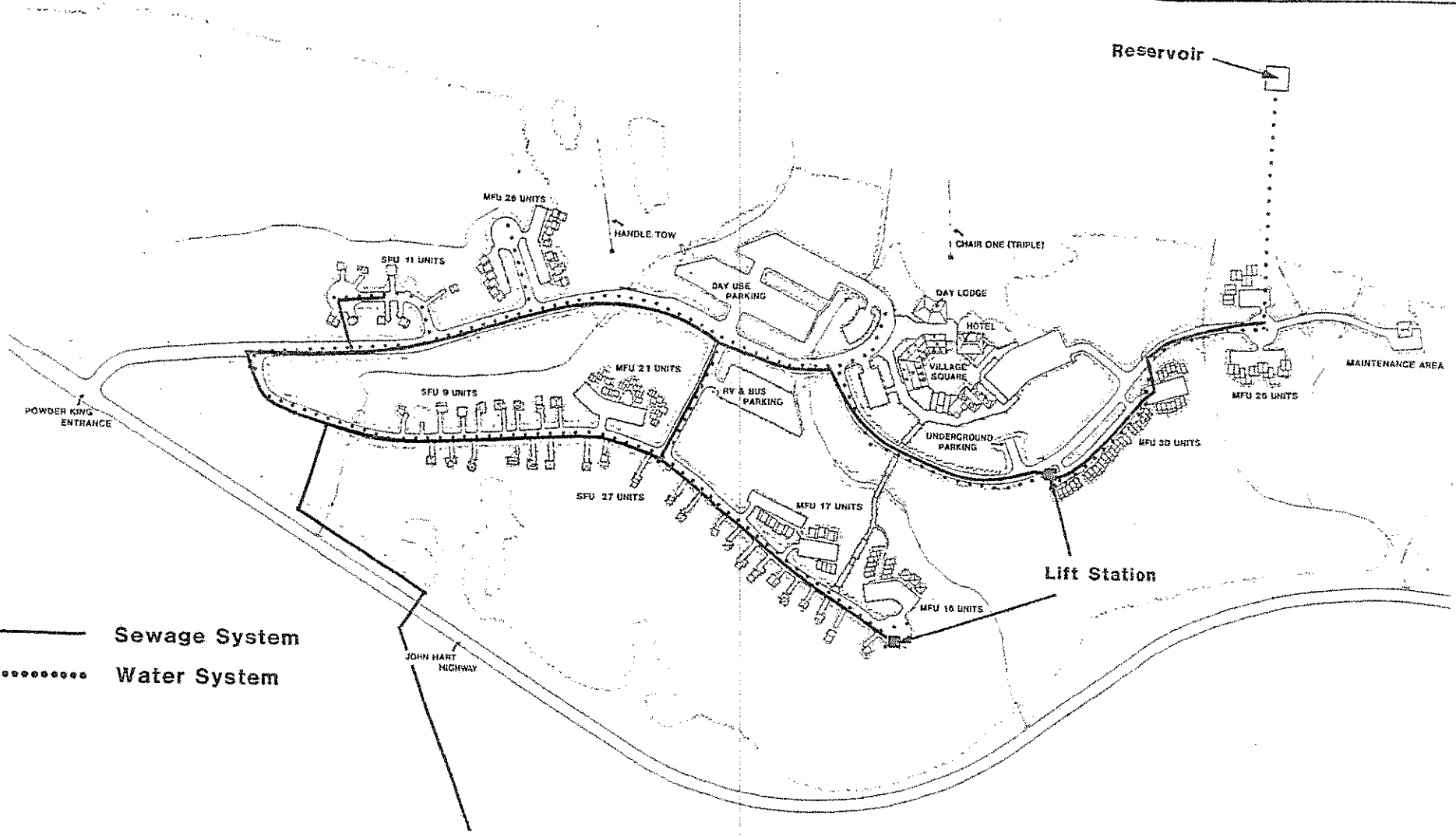
There are three major water sources in the area, namely; local mountain streams, ground water and Azouzetta Lake.

Wells will most likely provide sufficient water of consistent quality at the lowest cost. The streams will not yield enough water during winter flow when demand is high and flow is low. Reservior for storage of creek water is only practical as an additional water source for domestic and fire flows. In case the ground water yield is substantially less than suspected, the Azouetta Lake may be an attractive source of water. The cost of pipeline and pumping to the village from the lake will be high. There may also be a water-use conflict since the lake is presently being used for recreational purposes.

Fire protection can be provided by means of a tank located at 975 meters close to the village or by a reservoir constructed on Creek A at the 1,000 meter elevation (See Figure 20). Based on limited information, the cost of the reservoir is estimated to be somewhat higher than the tank alternative. However, the reservoir does have the advantage of effectively making use of the 2 kilometer^2 drainage basin for additional water supply.

Distribution System

Water distribution will be extended to service each lot. The cost of the distribution is based on a minimum of 6 feet burial. Fire hydrants have been allowed every 150 meters.



POWDER KING SKI VILLAGE

PLANNERS: Ecosign

CLIENT: MR. PETER GRAHAM JR.

PLAN REF:

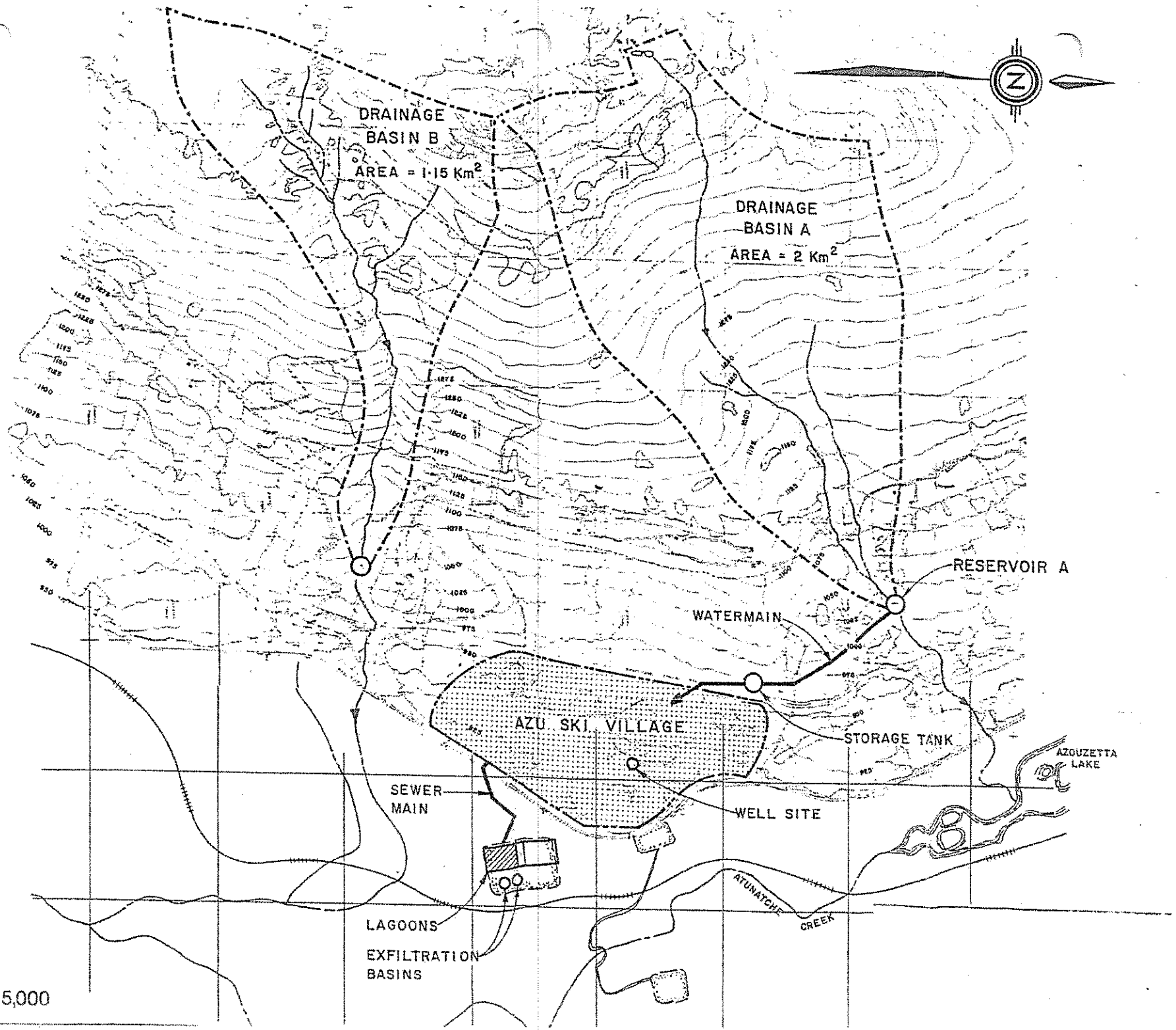
DATE: JANUARY 1993

SCALE:

NORTH →

PROPOSED WATER & SEWER SYSTEMS

FIGURE 20


DRAINAGE
BASIN B
AREA = 1·15 Km²
DRAINAGE
BASIN A
AREA = 2 Km²
N
RESERVOIR A
WATERMAIN
AZU SKI VILLAGE
STORAGE TANK
AZOUZETTA
LAKE
SEWER
MAIN
WELL SITE
ATUNATCHE
CREEK
LAGOONS
EXFILTRATION
BASINS
SCALE 1:15,000

.2 SEWER

Developments in mountain regions are often limited by the lack of large surface water or suitable ground conditions for disposal of sewage effluent. Powder King Village is fortunate in this respect to be located in the upper part of a large granular bench which appears well suited for disposal of treated sewage. The abandoned 15 acre borrow pit shown in Figure 20 which is located about 400 meters downhill of the village can easily accommodate conventional lagoon treatment and exfiltration basins.

It is conservatively assumed that the sewage generation is equal to the total water consumption (See Table 33). For a maximum daily flow of 42,000 liters per day during Phase I , the conventional septic tank-tile field disposal system may be more practical and less costly. However, this system is not suitable for the later phases.

Two primary settling and exfiltration lagoons will allow for storage of all the waste water generated over one winter season plus one month treatment prior to discharge to ground by means of exfiltration basins. The lagoon system lends itself to phased construction (one lagoon per phase). It is also flexible in terms of operation. The plan is to utilize facultrative lagoons which will store and treat the sewage under ice cover during the winter. If necessary, aeration may be applied during the spring until the required effluent quality has been obtained.

.3 POWER

Negotiations to date suggest that B.C. Hydro will bring single-phase power to the site to service the domestic electrictiy requirements of the proposed development. Natural gas will be utilized to satisify the majority of the heating requirements by tapping into the Inland Gas Ltd. pipeline which flows through the site. Powder King Village will generate the three-phase power necessary to operate the ski lifts onsite.

.4 ROADS & PARKING

The village site is gently rolling with a cross slope of about 10 percent. The existing ground appears to be suitable for subgrade, based on limited soil information. The roads and parking lots will cross some wet areas, and further soil investigation is required to determine the depth and extent of the unsuitable materials. Rock, except for local outcrops, is not likely to be encountered. Bottom material may be excavated from the granular bench within haul distance of a few kilometers.

The roads will be constructed to the Department of Highways specifications. The paving may preferrably be performed during the later phases to reduce capital expenditure during the early phases and to minimize pavement damage.

Once the Village Master Plan has been approved, the Department of Highways should be contacted regarding highway access requirements. It is likely that a left turn lane plus an acceleration and deceleration lane will be required.