

Glacier / Winner Creek Resort Development Terrain Suitability Study

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Heritage Land Bank and Real Estate Services
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Part I: Introduction

Section A: Project Background

In 1992, SE GROUP was retained by Alaska Department of Natural Resources (ADNR) to assist with the planning process for a new ski and year-round resort development in the Glacier/Winner Creek Area as part of the planning process for the Turnagain Arm Management Plan (TAMP). This process involved identifying and evaluating possible land use alternatives to enable land agencies and the public to participate in discussions and to make informed decisions regarding resort development appropriate for the area. Following the adoption of the Girdwood Area Plan (GAP) in February 1995 and the first Glacier Summit in October 2003 (facilitated by Girdwood 2020), the Heritage Land Bank (HLB) identified the need to redefine the recreation and resort land use concepts outlined in the TAMP and the GAP. The goal was to further define and understand the opportunities concerning the extent of ski and year-round resort development that would be appropriate for the Girdwood Valley. The resulting information would then be utilized to create a final development plan for the study area.

Section B: Scope and Process

In February 2004, SE GROUP was asked by HLB to assist in this effort and to work collaboratively with the Steering Committee, comprised of representatives of the National Development Council (NDC), HLB, Girdwood 2020, the municipality and the development team, who would oversee the process and provide direction as necessary. The overall goal was to produce a conceptual resort development plan that would provide a basis for a final development plan.

The project proceedings were initiated by the Glacier Summit III meetings in May 2004. As part of the scope, SE GROUP was asked to compile and produce an existing conditions base map to use in preparing site analysis evaluations. This site analysis information helped to shape the preliminary development program and a subsequent land use concept. With direction from the Steering Committee, combined with public input, the preliminary development concept then moved toward a revised, Terrain Suitability Study.

This report serves as an overview, outlining the findings and recommendations from the above planning and analysis process.

Part II: Project Overview

Section A: Study Area Description

The study area comprises 3,300 acres of undeveloped land northeast of the Girdwood New Townsite and Alyeska Resort, currently Alaska's premier ski destination. Girdwood is located near the Municipality of Anchorage, only a few miles from Turnagain Arm (Figure 1). The detailed study area (Figures 2 and 3) is bounded on three sides by the Chugach National Forest with the site itself heavily forested with a dense evergreen cover rising in elevation to approximately 1,500 feet. Areas above treeline extend to approximately 6,000 feet. The study area is on the northern edge of the Pacific Coastal Rainforest Zone where western hemlock, spruce and black cottonwood dominate the forests. Glacier Creek flows southwest to the tidewater and converges with two other streams while making its way down to the lower valley. This point of convergence is called the "four corners area" and involves Glacier Creek, Winner Creek, flowing from the southeast, and Crow Creek, flowing from the northwest.

The study area is situated within the upper and lower regions of the Girdwood Valley with gorgeous views from multiple vantage points to the Chugach Mountains. The Girdwood Valley was formed by glacial scouring, as evidenced by the exposed bedrock valley hillsides, and meltwater stream erosion from Glacier Creek. This mountainous area offers unparalleled beauty providing the optimal physical landscape for outdoor recreation.

Occupying the lower valley, the Girdwood New Townsite and the surrounding area is an ideal setting for the outdoor enthusiast, as evidenced by its rugged alpine slopes

reaching an elevation of 3,500' in the lower valley and more than 6,000' in the upper valley. The physical features and soils have shaped the development patterns over time, resulting in a populated lower valley.

Access to the Girdwood New Townsite and surrounding region is granted via the Seward Highway (Route One) which follows the scenic Turnagain Arm.

Girdwood is a gateway to Portage Glacier, the Kenai Peninsula, Whittier and Prince William Sound, all of which offer an abundance of scenic, recreational and cultural outlets. The Girdwood lifestyle is outdoors oriented given its remote location and the wild qualities of Alaska as a state.

Neighboring Alyeska Resort, with its 1,000 acres of skiable terrain and the 300 room Prince Hotel, serves the Anchorage market and other visitors to the area. The Glacier/Winner Creek Resort development has the potential to share some resort services with Alyeska, skiing excluded, providing current residents and future owners and guests an alternative skiing opportunity. The only motorized use occurring within the study area at this time is a sno-cat/ heli-ski operation that provides a much needed service when it comes to identifying recreational resources and amenities. Non-motorized uses such as Nordic skiing, hiking, fishing and backpacking occur throughout the site.

Winner Creek flows southwest through the study area raising environmental issues concerning bridge crossings and subsequent impacts to the stream corridor. The Crow Creek Development, located west of the study area, enables the potential for 1,000 acres of single and multi-family housing to the Girdwood community.

Section B: General Ski Resort **Design Criteria**

SE GROUP, through its nearly 50 years of mountain planning and design, has identified key physical and design factors that provide for a quality skier experience. In preparing this land use plan, some of these criteria have not been completely evaluated. However, the process described in this section discusses our approach of how these criteria are incorporated into the ski area planning process.

Ski Trail Design

Fall-Line:

The Fall-Line Analysis evaluates the natural fall-lines of mountainous terrain, with the fall-line representing the path an object would take as it descends a slope under the influence of gravity. Fall-line paths indicate the natural flow of potential ski trail routes, from the top of mountain ridges to the valleys and base areas below. Consistency of fall-line provides for the best recreational skiing experience and results in the least amount of environmental disruption due to the minimal amount of terrain modification required for ski trail construction.

Slope Aspect or Solar Exposure:

Slope aspect or solar exposure plays an important role in snow quality and retention. The attributes of the various angles of exposure are discussed in the above section. In general, slopes with northerly aspects provide the best natural cover against solar snow degradation. It typically is beneficial to have a significant portion of terrain facing more northerly. However, a variety of exposures will present opportunities to provide a range of slope aspects that can respond to the changes in sun angle. The placement and

location of snow features, such as half pipes and terrain parks, needs to consider the effects of late season sun on elements of the feature due to varying snow softening, melting and freezing depending on sun exposure.

Slope Gradients and Terrain Breakdown:

Terrain ability level designations are based on the maximum sustained gradient of each ski trail. Short sections of the trail can exceed the maximum slope without effecting the run designation. For example, novice skiers typically aren't intimidated by short pitches of slope over 25%, but a sustained pitch exceeding that grade would force the trail to be classified as low intermediate. The following gradients are used to determine the skier ability level of the mountain terrain:

Table: Acceptable Terrain Gradients

<u>Skier Ability</u>	<u>Slope Gradient</u>
Beginner	8 to 12%
Novice	to 25%
Low Intermediate	to 35%
Intermediate	to 45%
Advanced Intermediate	to 55%
Expert	over 50%

Source: SE Group



The distribution of terrain by skier ability level and slope gradient is then compared with the market demand for each ability level. The available ski terrain should be capable of accommodating the full range of ability levels consistent with market demand. The ideal breakdown of terrain for the North American skier market is shown below, illustrating that intermediate skiers comprise the bulk of market demand.

Table: Skier Ability Breakdown

Skier Ability	% of Skier Market
Beginner	5%
Novice	15%
Low Intermediate	25%
Intermediate	35%
Advanced Intermediate	15%
Expert	5%

Source SE Group

Skier Trail Density

The calculation of capacity for a ski area is based in part on the acceptable number of skiers that can be accommodated on each acre of ski terrain at any one given time. The widely accepted criteria for the range of trail densities for North America's ski areas are listed below.

Table: Skier Density per Acre

Skier Ability	Trail Density
Beginner	25-35 skiers/acre
Novice	12-25 skiers/acre
Low Intermediate	8-20 skiers/acre
Intermediate	6-15 skiers/acre
Advanced Intermediate	4-10 skiers/acre
Expert	2-5 skiers/acre

Source SE Group.

These density figures account for the skiers that are actually populating the ski trails and do not account for other guests, who are either waiting in lift lines, riding the lifts, or

using the milling areas or other support facilities. These criteria assume that on an average day approximately 33 percent of the total number of skiers in the area will be on the trails at any one time.

A current trend in trail density design criteria is to provide for less crowded skiing experiences. There is a market preference for more natural, unstructured, semi-backcountry types of terrain. Open bowls, glades, and other similar types of terrain are increasing in popularity as skiers seek more diverse skiing experiences. Skier density per acre numbers are not necessarily applicable to these types of terrain, particularly as there often is not a defined edge to these areas, as there is on a traditional ski run. However, skiers are attracted to these areas for the uncrowded feel, and the experience and challenge that it affords. These areas should be provided if possible. Examples range from glading between existing runs to providing guided out-of-bounds tours.

Skier Trail System

A primary goal of ski trail system design is to provide a wide variety of ski terrain. Each trail must have generally consistent grades to provide an interesting and challenging experience for skiers with the ability level the trail is designed for. Optimum trail widths should vary depending upon topographic conditions and the caliber of the skier being served. The trail network must minimize cross-traffic and should provide the full range of ability levels consistent with market demand. The trails must be designed and constructed to minimize off fall-line conditions and to avoid bottlenecks and convergence zones that might produce skier congestion.

In terms of a resort's ability to retain guests at that resort, both for longer durations of visitation and for repeat business, one of the more important factors has proven to be variation in terrain. This means having developed runs for all ability levels, some groomed on a regular basis and some not, mogul runs, bowl skiing, tree skiing, back-country style skiing, and terrain parks and pipes.

A current trend in trail design is to increase the width of the developed trails. There are several reasons for this. First, with wider runs, the terrain density decreases and, as stated above, the market preference is increasingly for lower densities. Second are changes in ski types and technology. With the advent of snowboards, shaped skis, and telemark skis, skiers and boarders take wider, carved turns. These wider turns take up more space than a traditional slalom-style parallel turn, which increases the required space per skier. Further, these advancements in ski technology have enhanced overall skiing ability, which means increased demand for intermediate and advanced terrain. The resulting need for expanded terrain is compounded by the lower acceptable densities of the higher level terrain.

In summary, a broad range of skiing terrain must be provided in order to satisfy skiers from beginner through expert ability levels within the natural topographic characteristics of the site.

Terrain Parks

Providing a progression in terrain parks, from beginner through expert, is a primary goal. Teaching parks should be provided. Cross traffic should be minimized with good visibility provided in merge zones. Park features should flow easily from one to another and avoid creating bottle necks

and traffic jams. Novice parks and features should be separated from the more advanced parks, and should be geared toward a learning environment. A low pressure venue should be provided for beginners, to allow them to be comfortable as they practice tricks and get used to transitions and jumps. Signage should clearly and simply delineate the difficulty of the various parks and features. This will help ensure that users will be directed to the feature size most appropriate to their ability. Maintenance of the park is critical to ensure quality and the reputation of the park with the youth market. Quality and diversity of features over quantity should be a goal. As the locations of features, particularly pipes, become fixed, constructing them out of earth can greatly reduce the amount of snow coverage required.

Lift Design

Ski lifts should be placed to serve the available ski terrain in the most efficient manner. A myriad of factors should be considered including wind conditions, round-trip skiing and access needs, interconnectability between other lifts and trails, and the need for circulatory space at the lower and upper terminal sites. The vertical rise and length of ski lifts for a particular mountain are the primary measures of overall attractiveness and marketability of a ski area.

Capacity Analysis and Design

Comfortable Carrying Capacity (CCC) is defined as an optimal level of utilization for the ski area (the number of visitors that can be accommodated at any given time) that guarantees a pleasant recreational experience, without overburdening the resort infrastructure. It is typical for resorts to experience peak day visitations of up to

25% over their CCC. The accurate estimation of the CCC of a mountain is a complex issue and is the single most important planning criterion for the resort. Related skier service facilities can be planned, including base lodge seating, mountain restaurant requirements, sanitary facilities, parking, and other skier services with proper identification of the mountain's true capacity. The CCC figure is based on a combination of the uphill hourly capacity of the lift system, the downhill capacity of the trail system, and the total amount of time spent in the lift waiting line, on the lift itself, and in the downhill descent.

Base Area Design

Particular consideration should be given to the relationship between the base area and the mountain facilities. Upon arrival at the ski area, skiers should be able to move directly from parking, through ticketing or rentals and other essential ski services, to the base of the lifts. Walking distance and vertical differential between the base area facilities and lifts should be minimized in an effort to move skiers directly onto the mountain. Vehicle, pedestrian, and skier circulation should be coordinated to create an organized and pleasant base area environment.

A current trend being experienced in mountain resort parking, particularly at those areas in close proximity to a drive market, is a decrease in the number of skiers per car. This is partly a result of the lack of leisure time among many skiers, as well as affordable season passes, which creates the flexibility for skiers to arrive by themselves and then only stay for a few runs or a few hours. These trends lead to an increase in demand for parking, even if total skier visitation doesn't rise, and a need at many resorts to increase available parking space.

Balance of Facilities

The mountain master planning process emphasizes the importance of balancing recreational facility development. The size of the skier service functions are designed to match the CCC of the mountain. The future development of a ski area should be designed and coordinated to maintain a balance between accommodating skier needs, ski area capacity (lifts and trails), and the supporting equipment and facilities (e.g., grooming machines, day lodge services and facilities, utility infrastructure, access, and parking).

Current Industry Trends

Several trends have emerged in the ski industry in response to a changing and maturing market. The ski industry has been relatively flat, the primary reason for which is thought to be demographic trends that are not favorable to the sport, i.e. a decrease in available leisure time, increased alternative leisure activities, and a less active population. Additionally, the industry has always been heavily subject to the vagaries of the weather, which has gone through drought periods and extreme fluctuations in some regions of the country. Despite these factors, the U.S. ski industry has had very strong seasons from 2000 through the 2005 season. This industry revitalization can be attributed to resorts responding to the changing market. Several challenges were known to exist, and the industry has proven successful and resilient in addressing them. Various methods are being employed to address these issues, with the general goal being to provide the best overall experience and value for guests new to the sport or new to the resort.

One area of focus that needed to be addressed was a relatively low number of new participants to the sport. The industry

was not attracting first-timers, or retaining its core market. Resorts responded by developing a variety of methods to generally make the sport more accepting of new participants, to increase first-timer trial of the sport, and, as importantly, encourage conversion of people skiing for the first time into long-term participants. The general goal of these methods is to provide the best overall experience for guests new to the sport, and seeking pricing structures to retain its core business and provide additional repeat business. State-of-the-art learning centers and increased attention to new ski technology, particularly for beginner and rental equipment, have helped to make ski schools more accommodating; helping to attract new skiers and provide a better initial experience, which leads to more return skiers. Physical improvements, such as well designed, attractive drop-off areas, and more informative and flexible signage programs, have helped to improve the initial impression of resorts as well. Marketing incentives in the form of ticket, lesson, and equipment deals have also helped to attract both new guests and repeat business. Related to this issue was another problem, which was that the sport was perceived as being too expensive for local skiers and families. The primary response by the industry to this issue has been providing an affordable season pass, which has not only greatly increased the numbers of season passes sold throughout the industry, but has increased enthusiasm for the sport, brought many skiers back to the sport, and reinforced customer loyalty. In addition, many other marketing incentives have been put in place, such as coupon books, alternative pricing schemes, and family incentives such as allowing kids to ski and stay free.

In terms of demographics, the most significant issues facing the ski industry in recent times have been the dual challenges

of broadening the appeal of skiing beyond the upper-income baby boomers while retaining this core market. A primary reason that mountain resorts have been able to broaden their appeal has been the advent of snowboarding and the resultant change in attitude and culture throughout the ski industry. These changes, particularly, have helped to attract and accommodate the needs of the youth market. Resort visitation data has shown that snowboarder visits have been responsible for most of the industry growth shown in recent years, i.e. skier visits have remained relatively constant while snowboarder visits have increased dramatically. Snowboarding has re-energized the sport and has greatly increased its appeal to younger generations and more ethnically diverse markets. Skiing itself has also benefited from and adapted to this change in attitude and culture, as the rapid rise in popularity of shaped skis, twin-tipped skis, use of terrain parks, free-skiing, and even telemark skiing can at least partly be attributed to influences from snowboarding.

The ski industry also realized it had to broaden its appeal while at the same time retaining the core baby boomer market. The industry has long been reliant on the baby boomer generation as its core market, but this market had been dwindling as that generation aged. The reason for this is that the baby boomers, and actually the population in general, had diminished athletic ambitions, decreased leisure time, and increased alternatives for leisure activities, particularly as household incomes have raised, allowing for other vacation/recreation opportunities. The ski industry's response to this challenge has been to offer a higher quality and more diverse product and experience. The higher quality experience has come in the form of investments in skier facilities, diverse on-mountain food choices, high-speed

comfortable lifts, improved and expanded grooming, seasonal lockers, and improved customer service. Improvements and new technology in ski equipment have helped make skiing less difficult in general, and in particular has allowed the baby boomers to ski more easily. Taken as a whole, these adaptations have greatly contributed to the stabilization and increase in skier visits throughout the industry.

One benefit of this broader appeal across generations is that skiing has always been accessible and appealing to all members of families, each being able to participate together at their own individual level. This component of the ski experience has proven especially valuable to the aging population, who see skiing as a way to spend quality recreation time in the mountains while reconnecting with their families. The ski industry has been able to capitalize on these feelings by stressing this important aspect of the sport.

Today, the most significant challenge facing the ski industry is to provide these improved services, facilities, lifts, a wider variety of terrain, new types of terrain, and all the other improvements discussed, while at the same time focusing on making the sport more affordable, more fun, and more approachable, particularly to beginners and other new guests. A key of this strategy is that resorts as a whole have looked to cost-efficient techniques to provide this higher quality experience while keeping overall costs down. One example in this respect is the use of modern building materials and techniques, products such as Sprung structures, to provide skier services, rather than traditional construction techniques. These structures have been proven to be cost-effective while providing a quality guest experience. Outdoor seating and plaza areas have also proven to be a cost-effective way to create desirable skier

meeting and congregating space. Other techniques are being used to reduce energy and maintenance costs, such as new-generation drives in lifts and the use of biodiesel for buses and snow grooming machines. Improved shuttle services have helped make skiing more accessible while at the same time reducing pollution and parking needs. Automation of certain functions has helped keep labor costs down and increase efficiency; some examples of these are computerized ticketing, more efficient rental facilities with improved and new ski and snowboard equipment, automatically scanning Smart Card lift passes, automated snowmaking systems, and direct access to the marketplace through the internet.

Section C: Site Characteristics

The outstanding scenic beauty and extensive wilderness areas clearly make the Glacier/Winner Creek Area a highly attractive and valued site. With USFS boundaries occupying three sides of the site, the Chugach National Forest provides much in the way of abundant wildlife and recreational opportunities. The Chugach National Forest totals 5.8 million acres, the second largest National Forest in the Nation, with one third of the rugged land consisting of rock and moving ice. This gives some indication of the environmental constraints inherent with the proposed project site. Much of the land comprising the study area is unsuitable for development due to steep alpine topography, ice and avalanche hazards, wetlands, dense forest and an abundance of surface waters in the form of streams and their tributaries. The site characteristics play a defining role in understanding the opportunities and constraints concerning the extent of the Glacier/Winner Creek Resort development. These environmental factors ultimately provide a framework in which to evaluate potential impacts.

Slope distribution: The majority of the site, over 58%, is unsuitable for real estate development though most of this area can be classified as suitable for ski development (Figure 4). The major slope class comprises 28% of the area (927 acres) and has a slope distribution of 25-45%. The green colored slope class designates suitable land for real estate development and makes up a total of 26% of the study area (863 acres). In general, this indicates why most of the population and subsequent development is located in the lower elevations of the valley.

East of Winner Creek, the topography steepens considerably, turning potential real estate land into optimal ski terrain.

Approximately 87% (2,881 acres) of the study area is suitable for ski development versus the 42% (1,407 acres) that is “potentially suitable to suitable” for real estate development. Out of the 2,881 acres of suitable ski terrain, 973 acres has a slope distribution classified from 45% to over 80% making this area especially prone to high avalanche risk.

Slope Aspect: Local climate and vegetation density are greatly influenced by slope aspect. Dense evergreen growth dominates the northern slopes of the study area due to microclimates afforded by slope distribution and sun angle. Terrain stability and form combined with limited direct sun exposure contribute to the area’s sustainable and dense wilderness forests.

Slope aspect plays an important role in snow quality and retention at this latitude. The study area has an overall northwesterly aspect meaning that in mid-winter, the slopes receive little heat from the sun making for better snow conditions. The west facing slopes are exposed to the afternoon sun, which is warmer than the colder morning sun caught by the east facing slopes. This is an advantage given the significant climate challenges inherent with Alaska’s limited winter daylight.

Direction of slope in respect to sun and wind exposure has an impact on snow pack and the risk of avalanches. As previously stated, the north receives little heat from the sun in mid-winter while the south facing slopes receive more direct sun. This results in a difference in snow pack. The southern slopes tend to develop a thin ice crust, and with the warmer temperatures, weaker layers form around the snowpack edges, near the surface. Colder snowpack is less stable because it tends to develop “sheets” of weak layers similar to stratified rock.

Approximately 58% of the study area (1,925 acres) has north to north-west slope aspect (Figure 5). These slopes have the highest risk of avalanche potential as cited in the data provided by the Municipality of Anchorage. The correlation between aspect and avalanche risk is shown on Figures 5 and 6.

Avalanche hazard: Evidence of avalanche activity in the region demonstrates the need for understanding and assessing the various hazards associated with mountain slopes. The relationship of slope distribution, slope aspect and avalanche risk are important considerations when evaluating land for potential ski and/or real estate development. Topographic attributes are a critical variable in avalanche risk assessment as most avalanches occur on slopes between 25-40% (Figures 4 and 6). In terms of slope aspect, more avalanches occur on north and east facing slopes since cold snowpack tends to produce weaker layers than warmer snowpack. Approximately 37% of the study area is considered to be at risk for avalanche hazards. Approximately 33% (1095 acres) is deemed high risk while about 4% (138 acres) is considered moderate risk.



Section D: Planning Context

The Glacier/Winner Creek Resort development land use plan has been created within the context of long-term and on-going land planning efforts within the Girdwood community. In addition to the recently adopted Title 21 Update (November 2005) for the Girdwood area, the adjacent Crow Creek Neighborhood Land Use Plan (April 2006) was also recently finalized.

The following summarizes the important regulatory and planning guidance documents and studies that were reviewed and considered as part of the development of this land use plan

- Girdwood Community Impact Study (August 1993): This study, herein referred to as the GCIS, was prepared for the Department of Planning and Development of the Municipality of Anchorage by a group lead by Kevin Waring Associates. The study stemmed from an initial Sno.engineering, Inc (now known as SE Group) evaluation of resort development alternatives in the Glacier-Winner Creek area (Department of Natural Resources study completed in April 1993). The GCIS study team evaluated the socioeconomic, demographic and market implications of these alternatives and created four plausible development land development scenarios ranging from no new alpine resort to development of a resort roughly 2-3 times the size of the Alyeska Resort.

In all four scenarios, the study identified potential impacts and mitigation approaches. Some of the common impacts for all scenarios included:

Traffic

- Even under the limited development alternatives, Arlberg Road would see a tripling of volume for the design year of 2013. Congestion is also predicted to occur along Alyeska Highway and Timberline Drive. Under higher density development Crow Creek Road would experience increasing impacts.
- The study recommends development of a shuttle system to support the resort concepts. Linking the two resorts with shuttle service and adding additional road capacity are considered essential mitigations.

Infrastructure:

- Extension of water and sewer would be needed along Arlberg Road and Crow Creek Road.

Turnagain Arm Management Plan (October 1994): The TAMP was prepared by the Alaska Department of Natural Resource (ADNR), Division of Land, Resource Assessment and Development Section with the mandate to “determine management intent, land-use designations, and management guidelines” for the state-owned lands with the Turnagain Arm area. These lands include those within the study area for the Glacier/Winner Creek Resort Development.

The management policies set forth in this plan address a range of objectives including habitat protection, heritage resources, recreational uses, water and shoreline protection and forest resources.

Specific guidelines were identified relative to Resort and Mountain design:

Resort Design:

- a. Clustering of buildings in integrated and cohesive “village” forms is a primary objective.
- b. Style and form of architecture should respond to the natural or historic character of the area.
- c. Pedestrian circulation is encouraged and design should minimize need for mechanized transport.

Mountain Design:

- a. Slopes should “take advantage” of natural terrain and minimize grading.
- b. Open space is to be maximized to preserve the “natural, tranquil” setting.
- c. Roads and service trails should minimize visual intrusions and terrain impacts. Transit alternative should be encouraged to reduce traffic impacts.
- d. Parking should respond to site constraints, minimize visual impact, address proper vehicular and pedestrian circulation and minimize land utilization. The plan also requests consideration of underground or covered parking.

In addition to these policies, the TAMP also “highly recommends” development of a cross-country ski network as part of an overall approach towards trail implementation of a four season trail system.

The Glacier/Winner Creek area is designated as Management Unit 3 in the TAMP. The majority of the study area for the Glacier/Winner Creek Mountain Resort is designated as Management Subunit 3a with a small portion within Subunit 3c. An

even smaller portion of the study area (near Alyeska Resort) is in Subunit 4a.

Specific uses anticipated in Subunit 3a included:

- Ski lifts
- Day Lodge
- Hotel
- Resort Housing
- Conference Center
- On-mountain Restaurant

The management guidelines specifically state that “no action will be taken to preclude resort development in Subunit 3a”.

As outlined within TAMP, portions of the management units have been selected for conveyance to the Municipality of Anchorage pursuant to the 1978 Municipal Entitlement Act to be managed by the Heritage Land Bank (HLB) created by ordinance of the Anchorage Assembly in 1983. According to HLB policies (December 1996), the management of this land is “designed to benefit the present and future citizens of Anchorage, promote orderly development, and achieve the goals of the Comprehensive Plan”.

Girdwood Area Plan (February 1995): The GAP is considered a revision of the TAMP in regards to the Girdwood Valley. The study sought to expand on TAMP by addressing specific land uses and densities that are consistent with the continued goal of developing the region as a winter destination resort. GAP is also clear, in this intent, to do so while maintain high environmental qualities, preserving significant open spaces and ensuring public access and use.

GAP also outlined housing densities and residential development guidelines as part of the overall land use plan. Under these guidelines density ranges were:

Single-Family	2-4 dwelling units/acre
Multi-Family	5-20 dwelling units/acre
Resort	no maximum density

The ranges varied based on the proposed land use classifications within the Girdwood Valley. The majority of the study area for the Glacier/Winner Creek Mountain Resort is classified as “Resort Reserve”, “Park”, “Open Space” and “Commercial Recreation”. Based on these classifications, substantial potential density was planned.

Glacier/Winner Creek Access Corridor Study, Final Routing Report (December 1996). Prepared by DOWL Engineers, this study examined the feasibility of “single joint use corridor for potential future transportation and utility extensions to the Glacier/Winner Creek Area”. This comprehensive study evaluated the topographic, geologic, wetland, drainage, vegetative, aesthetic and trail implications of alternative routes. The recommendation from this effort, which included six field visits, five days of GPS ground proofing, two public meetings and numerous meetings with potentially impacted parties, was an “Eastern” route alignment extending Arlberg Road from Alyeska Resort to a point on the northern side of the Winner Creek, east of Glacier Creek. DOWL Engineers recommended a 100 foot buffer in the southern portion of this route with a 200 foot buffer along the northern portion where terrain is more challenging.

Girdwood Golf Course, Trail and Open Space Project: Site Specific Land Use Study, Generalized Site Plan (September 2001):

Prepared by Christopher Beck and Associates and Land Design North, this study, evaluated the development of golf, housing and trail recreational amenities in areas identified for such uses in the 1995 Girdwood Area Plan. This area, located down valley from the Glacier/Winner Creek Resort Development Study Area continues to be identified in the Title 21.09 as GMP-1 (Golf Course/Nordic Ski Course Master Plan).

Approximately 330 acres of golf with integrated Nordic skiing were suggested. This plan contemplated residential development on roughly 40 acres including single and multi-family uses. The study also recommends that uses be concentrated in “discrete” areas to reduce environmental impacts and encouraged designs which enhance the character of the area.

The study also highlighted the need within Girdwood for community facilities, including trails, schools and municipal offices. The study reiterated the importance of the trail network in Girdwood as an important cultural resource.

Title 21, Chapter 9 Update (November 2005): The Municipality of Anchorage has recently completed a rewrite of its zoning and land use code. As part of this effort, Title 21, Chapter 9 was revised to reflect new thinking and strategy with regards to development within the Girdwood Valley. Perhaps the most fundamental change to the code was the decision to designate the areas within the upper Girdwood Valley, including the study area for the Glacier/Winner Creek Resort, as Master Planned. This designation, while keeping in

place the underlying zoning that included residential and recreational uses, also provides substantial flexibility in the final form that the area will take. This study, in part, serves as an initial step towards this master planning.

Title 21.09, as it is commonly known, is consistent with prior planning efforts in its commitment to developing the area as a recreationally-focused resort. In sum and substance, uses and densities previously contemplated by TAMP and GAP are preserved in Title 21.09. The lands within the study area include the following districts identified within Title 21.09 (See overlay on Figure 15):

- GCR-2: Commercial Recreation (Glacier-Winner Creek)
- GIP-p: Girdwood Institutions and Parks
- GDR: Girdwood Development Reserve
- GRR: Girdwood Recreational Reserve
- GOS: Girdwood Open Space

Crow Creek Neighborhood Land Use Plan (April 2006):

Prepared for the HLB by Agnew-Beck Consulting, LLC, this study was completed to fulfill the requirements of Title 21 for an Area Master Plan. The plan provides broad guidance for the Title 21 process on appropriate densities, uses, development forms and locations of open spaces within the Crow Creek Neighborhood with which the Glacier/Winner Creek area abuts. In fact, two areas within the Crow Creek Plan (“Matrix” and “Lower Forest” are adjacent to the Study Area.

The Crow Creek Plan suggested densities in the valley ranging from 1.2 dwelling units/acre (dua) to 4.6 dua. These densities, representing 465-710 dwelling

units within the roughly 1,000 acre study area. It also provided development design standards and guidelines that demand environmental sensitivity; promote quality and durability in construction, encourage the use of height verses footprint, integration of trails and paths and address the need to extend services in sensitive ways.

A Market Analysis Evaluating Potential for Real Estate Sales Within a New Destination Resort in Girdwood, Alaska (May 2006):

Prepared by Peterson Economics, this market study, commissioned by the NDC, included the market implications of developing real estate and associated alpine and golf amenities within the study area for the Glacier/Winner Creek Mountain Resort.

The study used existing visitation and real estate sales data, coupled with demographic, economic and market intelligence to evaluate demand for residential product.

The two primary buyer markets identified and studied included: second homebuyers from Anchorage and the U.S. (Lower 48) and permanent homebuyers from the Anchorage market. The Peterson study estimates the current demand to be in the range of 25-30 units per year. The Anchorage market is small comparatively (10 units per year) and price sensitive. Presently, real estate sales in the Girdwood area from the Anchorage market reflect approximately \$15 million per year.

The outdoor oriented Girdwood lifestyle is the driving component attracting buyers into this destination market given the remote site location and the rugged qualities of Alaska as a state. The unparalleled wilderness and outstanding scenic beauty clearly separate the state, geography aside, from the Lower 48 and Canada.

The Peterson study identifies positive attributes of the site including proximity and access to Anchorage and it's airport, scenic qualities of the valley, proximity to Alyeska and potential for more intermediate and diverse terrain, quality of snow and orientation of terrain (northern) and presence of existing resort operations from which to draw design guidance and sales prospects.

The study also identifies challenges for the site including climate, distance to the Lower 48 market, need to build substantial high-cost infrastructure in a high snowload area, limited golfing season, lack of schools and other civic amenities for primary home market and modest quality of the existing real estate market.

The study also notes that the existing second-home market is largely dominated by whole-ownership units verses fractionals. The primary home market is also small within the Anchorage region and, according to the Peterson Study about 67% were valued at more than \$400,000. Most homes were valued less than \$1,000,000.

While the Peterson Study recognizes the opportunity to create a resort development from a market perspective, the report suggests that in the initial phase of development, some form of subsidizing would likely be required by outside sources due to the high capital outlay required to develop project infrastructure. According to the study, a traditional non-subsidized approach to the development would require real estate market absorption of 6 times that which is projected.

Feasibility Study for a Proposed Golf Course in Girdwood, Alaska (August 2006):

National Golf Foundation Consulting, Inc. (NGF Consulting) was recently retained by the National Development Council to assist

the Heritage Land Bank (HLB) in assessing the market potential and financial feasibility of developing and operating a new 18-hole golf course as part of Glacier/Winner Creek Resort study. The purpose of this feasibility study was to determine economic viability and to provide guidance regarding positioning of the golf product in the Anchorage market. Research has indicated the potential opportunity for a high quality golf course for the growing Anchorage population and visitor markets as well as guests of the Alyeska Resort.

In the NGF Consulting study, two main challenges were identified regarding overall project feasibility: capital (with the high costs associated with infrastructure) and climate (golf season would be 25% shorter than Anchorage courses). Other central evaluating factors included:

- Status of the local public golf market;
- Demographic and economic profile of market area;
- Recent historical performance of competing courses in the local market;
- Projected expenses to operate and maintain the facility; and
- Expected financial operating performance of the proposed facility.

The NGF predictive demand model supports the following conclusions regarding the public golf market within Anchorage (which is the projected primary source of play for the Glacier/Winner Creek Golf Course):

- Growing population trends and local economy (dependent on oil sector);
- Inactive golf market (high proportion of households to courses but with lack of variety in golf opportunities);
- Popularity of tournament play (limiting tee times for daily fee golfers);

- Unpredictability in revenues (climate variations);
- Willingness to travel to play golf (based upon survey research);
- Consistency of green fees among courses;
- Competing courses operating close to maximum capacity; and
- Currently, minimal visitor play.

Given the unmet demand in the Anchorage golf market, NGF Consulting suggests that a high quality, well designed course that accentuates the spectacular scenery and offers excellent customer service will provide incentive and draw consistent play from the Anchorage population. NGF research indicates golf course supply can stimulate demand and availability is one of the top predictive factors of golf demand in a given market. Demand from the visitor market will also be a key to the success of the golf facility, given the premium non-resident green fees. Aggressive advertising from Alyeska Resort will also be key to the success of the visitor market.

The NGF Consulting cash flow model projection shows Glacier/Winner Creek Golf Course can expect to generate approximately \$1.075 million in total operating revenues during the first year of operation growing to approximately \$1.837 million by the fifth year of operation. Cumulative operating losses are expected to total more than \$483,000 in the first three years, while total annual operations profit available for capital investment reduction will be about \$95,000 in year four.

With minimal surplus cash flow from operations, subsidies from other sources will be required. However, a high quality golf course in the upper valley will likely draw much attention in the local, regional and destination market, as no other high caliber course presently exists in the

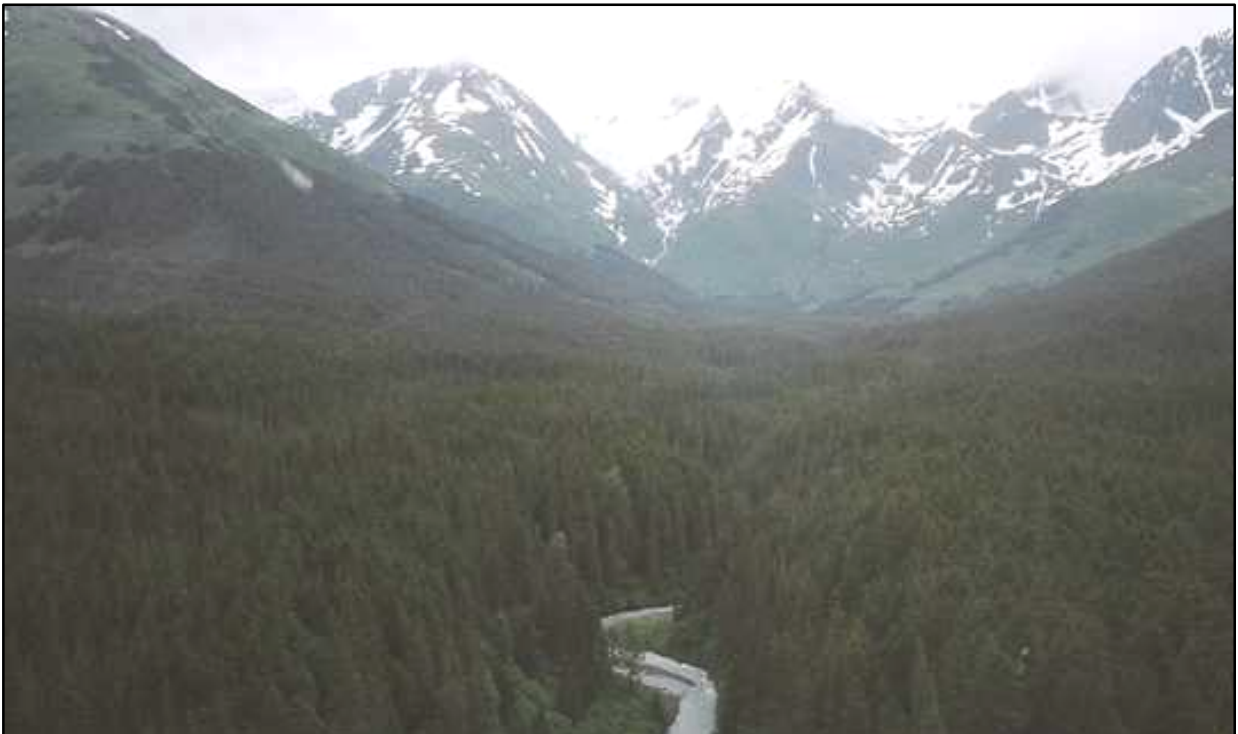
marketplace or the entire state of Alaska. As a result, the presence of such a course would create secondary economic benefits in terms of lodging, retail sales, and general acceptance of the area as a desirable destination.

Essential elements to achieve the market projections made by NGF Consulting include good management, high quality maintenance and aggressive and well targeted marketing. Elements that would contribute to outperforming market projections would include favorable weather conditions, strong support and high participation from the adjacent Alyeska Resort and other Anchorage area visitors and greater than expected residential play.

Key Planning Factors:

The considerable planning history of the Girdwood Valley and the lands within this study provide direction to, as well as challenges for, establishing a forward looking land use plan. It was apparent from the review of these documents that the planning has evolved as new realities were determined and assimilated. For example, GAP and other studies anticipated golf in the down-valley setting, new work indicates an up valley setting as potentially more appealing.

The next step in the process of creating the land use plan was to balance the constraints of the site with the goal of development a destination resort while recognizing the importance of the area from a public policy perspective.



Section E: Land Use Development **Program Goals**

In order to explore market opportunities, a project vision was established for the Glacier/Winner Creek Resort development. The initial impression was to create an eco-based development (building upon the existing town of Girdwood and Alyeska Resort facilities and infrastructure) that would serve as a “base camp” for adventure based activities. The focus would be to potentially become the premier ski and golf resort in Alaska, featuring a rugged, wilderness setting, an expansive ski mountain and a signature 18-hole course. Other amenities would include wildlife guided trips, snow machines, dog sledding, bird watching and fishing. Emphasis was placed on a sustainable design approach that would create efficiency in land utilization and minimize impacts to important natural and cultural resources. Such an approach included the set aside of large tracts of land for preservation.

The project vision evolved from early interactions during the initial Glacier Summit Meetings hosted by Girdwood 2020, leading to a “project” Memorandum of Understanding which was executed by numerous public agencies, politicians and other entities in support of such development. Through this process the Steering Committee, Girdwood 2020, the NDC and members of the municipality and design teams focused on certain key areas.

These key areas included:

- ? Site Selection & Access
- ? Topography
- ? Wetlands
- ? Surface Waters
- ? Real Estate Development
- ? Ski & Golf Course Development

- ? Infrastructure

For each of these areas, project attributes and objectives were identified that further refined the project vision.

Site Selection & Access:

- ? Site location is in a remote scenic valley north of the Girdwood New Townsite and Alyeska Resort; already an established resort community.
- ? Unparalleled views and access to the Chugach Mountains make this rugged wilderness area extremely attractive to the outdoor adventurer.
- ? Built environment should not be the visual focus; create eco-based development.
- ? Seward Highway (Highway One) provides easy accessibility from Anchorage.
- ? Air transportation is available from numerous metropolitan areas to Ted Stevens Anchorage International Airport.
- ? Resort road standards should be developed to minimize impact, independent of urban Anchorage standards.

Topography:

- ? Design should conform to existing topography to the extent possible in order to reduce environmental and construction disturbance.

Wetlands:

- ? Where wetland impacts are deemed necessary, great care in design should be exercised to minimize and mitigate disturbances.

- ? Every effort should be made to span associated wetlands and buffers, minimizing disturbances within these areas.
- ? Inflow to wetland areas should not be significantly diminished or increased.

Surface Water:

- ? Recreational fishing ponds can be created to contain surface runoff in developed areas.
- ? Where bridge crossings over Winner Creek and associated tributaries are necessary, every effort should be made to minimize impact to stream corridors.

Real Estate Development:

- ? Integration of the natural and built environments is paramount.
- ? Residential density should be focused in the lower valley where there is existing development as well as adjacent to existing and future recreational activity hubs.
- ? Single and multi-family development should reflect regional attributes (i.e.: topographic conditions, slope aspect, views, natural landscape features and function).

Ski Development:

- ? Make resort unique; do not focus on competing with other ski resort destinations in the Lower 48 or Canada.
- ? Attention should be concentrated on the winter wilderness experience.
- ? Produce a high quality recreational experience that is appealing to guests of all ages and ability levels.

- ? Lift layout should complement existing sno-cat/ heli-skiing services.
- ? Provide necessary ski infrastructure commensurate with anticipated skier capacity in the form of guest service facilities and other critical mountain operations (i.e., ski patrol, first aid, snowmaking, grooming, maintenance, etc.).
- ? Incorporate a mixed terrain alternative to complement what is offered at Alyeska Resort.

Golf Course Development:

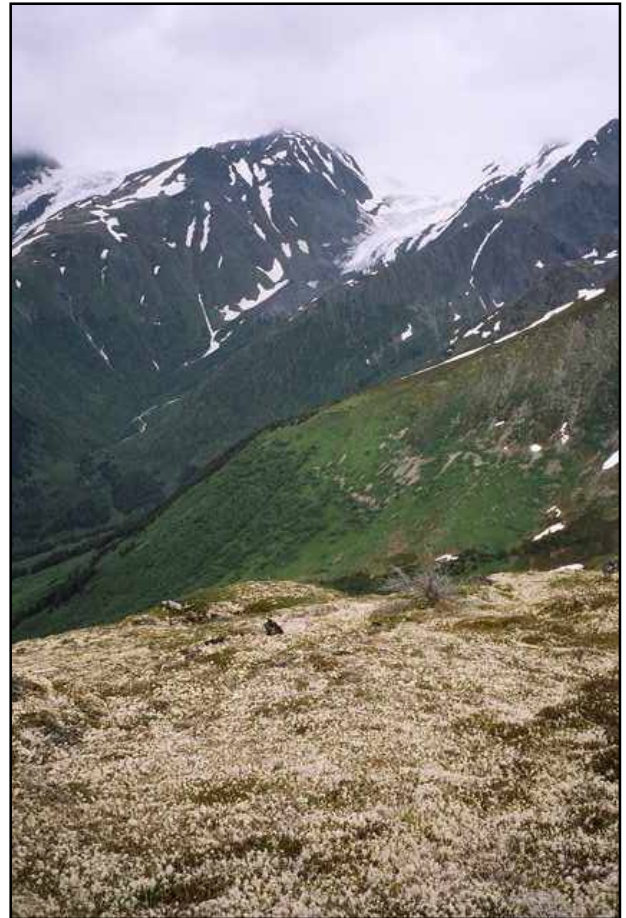
- ? Preserve central meadows area in course layout.
- ? Create unique signature course through integration of natural features and landforms.
- ? Residences should not be built directly on golf course.
- ? Development should not encroach into four corners area.
- ? Advantage should be taken of views and (summer) sun exposure and duration.
- ? Integrate Nordic trails into the golf layout.

Infrastructure:

- ? Increase Girdwood's appeal through the addition of base services (grocery store, hospital, high school).
- ? Incorporate development wide four-season pedestrian plan with trail network.

With a vision clearly defined, the following steps were identified as a means to shape the design process. These steps included:

- 1.) Compile pertinent site analysis information in order to develop a baseline of existing conditions to be used for subsequent tasks;
- 2.) Produce a conceptual resort development plan;
- 3.) Gain input and forward direction from the Steering Committee and public;
- 4.) Refine conceptual plan to create a final development and infrastructure plan.



Part III: Land Use Plan

Section A: Plan Goals

The essential goals for the Glacier/Winner Creek Resort Development Land Use Plan are to:

1. Define the boundary of the Glacier/Winner Creek Resort Development;
2. Establish residential, commercial and recreational uses that are consistent with the environmental, social and market potential of the area;
3. Define residential and commercial densities within the area that balance market realities with environmental sensitivity and maintenance of quality of life;
4. Define areas of open space and resource protection;
5. Provide recommendations for changes to the Girdwood Area Plan and/or the Title 21.09 (Girdwood) to ensure compatibility with the proposed resort development concept and the underlying planning context.



Section B: Plan Summary

Working with the site analysis data for the study area, several alpine skiing, other recreational and real estate development zones were identified. The result was a Real Estate Development Concept that included proposed ski lifts and terrain and the layout for a championship 18-hole golf course, and a Nordic trail system.

Ski Area Development:

The ski development zone makes up 1,555 acres of the study area with a total proposed uphill capacity of 13,800 (PPH), based upon the installation of seven new lifts. The conceptual configuration of these lifts and appropriate types are depicted on Figure 7. Based on conceptual trails and lift capacities, SE Group estimates that the comfortable resort alpine capacity is approximately 4,200 guests. Additional

details regarding this recreation zone can be found in the next section.

Real Estate Development:

Based upon overall site attributes and environmental constraints, as well as the identified location for ski trails and lifts and vehicular access, SE Group has identified two areas for potential real estate development (Figure 8). Figure 9 overlays major environmental constraints factors (wetlands, slopes and avalanche areas) within each zone. Figure 10 breaks down these larger zones into smaller development pods within which specific uses and densities have been suggested.

Zone 1:

The most concentrated zone, Zone 1, is planned to occur at the base area of the Glacier/Winner Creek Resort. Zone 1 is located in and around the confluence of Glacier and Winner Creeks and has a total of approximately 915 acres. It is bordered by Crow Creek Development on the west, the Town of Girdwood and Alyeska Resort to the south and the Chugach National Forest to the north. Winner Creek travels through the north-east portion raising issues concerning bridge crossings and potential impacts to the stream corridor.

Wetlands and buffers occupy 122 acres and unsuitable slopes (over 25%) make up 147 acres. Avalanche hazards cover 8 acres, 7 acres high risk and 1 acre moderate (See Figure 9). The potential net developable area within Zone 1 is 727 acres.

Zone 2 is located in the extreme upper valley and has 55 acres of potential ski-in/ski-out real estate. No wetland data is available, and slopes over 25% occupy 6 acres. Less than 1% of Zone 2 is at risk for avalanches (Figure 9). Net developable

area for this zone is approximately 54.4 acres.

These two broad real estate development zones reflect the areas best suited for a variety of residential and commercial uses. Factoring in environmental constraints reduces the roughly 970 acres of *potential* development area to 406 acres within 18 development “pods” (See Figure 10). Development pods can best be described as land areas within which residential and commercial uses consistent with resort development could:

- 1) Be built with minimized land development costs and disturbance,
- 2) Be connected together with road and utility services without excessive grades and with minimized infrastructure, and
- 3) Have maximum connection to scenic or recreational amenities.

The development pods shown on Figure 10 range in size from 2 to 125 acres. SE Group, in delineating and evaluating these development pods has designated each for a specific use type. Uses include single-family, multi-family, alpine village, golf and Nordic.

Moving into a more refined design, these development pods have been incorporated into the Overall Land Use Plan (Figure 12). More details of this plan can be found on Figures 13-14.

Section C: Plan Details

The proposed land use plan proposes, in “development bubble” form, a specific approach relative to key planning criteria. These areas are depicted on Figures 12-14.

Uses and Density:

- Single-Family Residential: 205 dwelling units on 166 acres of single-family areas. This equates to a density of 1.25 du/acre, significantly lower than previously contemplated for the Girdwood area but is very consistent with the low density residential areas approved for the Crow-Creek neighborhood within the “Lower Forest”. The plan anticipates a nominal lot size of 30,000 square feet with 15% loss for infrastructure, right-of-way, etc. Single-family areas are concentrated on hillsides with primarily southern orientations, down valley views and without direct ski-to/ski-from access. Some single-family areas are adjacent to, but not directly on golf/Nordic amenity zones. A total of six areas are shown ranging in size from 7 acres to 95 acres. The following table summarizes these areas:

Single Family Residential		
Pod	Acres	Dwelling Units (du)
A-SF	16	20
B-SF	12	15
C-SF	7	9
D-SF	95	117
E-SF	13	17
F-SF	22	27
Total	166	205

- Multi-Family Attached: 133 units on approximately 31 acres for a density of 4.3 dwelling units/acre. Multi-family units may include attached townhouse or stacked flats (2 story), hotels, fractional condominiums or hotels, apartments, zero lot line cottages, duplex and triplex units. These may be organized in clustered residential forms or integrated with recreational amenities either in village compositions or slopeside.

Multi-Family Residential		
Pod	Acres	Dwelling Units
A-MF	3	12
B-MF	1	3
C-MF	3	14
D-MF	1	3
E-MF	2	7
F-MF	6	27
G-MF	8	32
H-MF	7	30
I-MF	1	3
Total	31	133

- Alpine Services and Guest Oriented Commercial: The plan anticipates allowing up to 5% (based on square footage) of the Multi-family development areas to be used for guest oriented commercial. This is a total of 68,000 square feet for such uses. Uses may include: Skier services (rental, ski school, food and beverage), restaurant, visitor centers, sales centers, conference or meeting spaces, office and ancillary uses.
- Alpine Heli-Ski Area: New Heli-Ski Base area with 7 detached luxury cottages.
- Golf Course: An 18-hole championship golf course of 7,181

yards (Par 74) has been shown within an area of approximately 330 acres located within the center of the valley, below the confluence of Glacier/Winner Creeks and between Arlberg Road and Crow Creek Drive. Based on the findings from NGF, this course will need to be of stunning beauty and quality, reflecting the unique character of the region and the need to provide a supreme golf experience.

- The Boutet Company, Inc. (TBC) has created a conceptual layout for 49,798 lineal feet (9.5 miles) of Class A Nordic trails designed to both integrate various residential and resort development zones and to connect to existing trail networks.
- Ski Development Zone (See entire extents on Figure 7) of over 1,555 acres of varying terrain located primarily on the east side of Glacier-Creek. Approximately 450 acres of this area is anticipated as lift-served, with approximately 1100 acres as guided. A second, more limited Alpine Resort area (approximately 20 acres) on the west side of Glacier-Creek is also shown for use as beginning skier terrain and real estate amenity space.
- Within these zones we anticipate seven new lifts servicing 22,200 feet of terrain with an uphill capacity of 13,800 people per hour (pph). Anticipated daily lift capacity is 4,200 skiers based on the lift and trail configuration. See Figure 17 for details on projected skier capacity.

Lift-Served Ski Terrain Distribution		
Skier/Rider Ability Level	Trail Area (acres)	Skier/Rider Distribution (%)
Beginner	12.8	9%
Novice	17.4	7%
Low Intermediate	125.4	41%
Intermediate	99.3	23%
Adv. Intermediate	66.9	11%
Expert	128.6	9%
Total:	450.4	100%

- Open Space and Protected (including wetlands) areas encompassing 1,216 acres reserved for public parks and protected open spaces. This includes 491 acres of Riparian corridors.

Infrastructure:

Development within the zones identified in this land use plan will require extensive expansion of municipal infrastructure. Much of the required infrastructure has been studied in various forms previously. Infrastructure required will include:

- Arlberg Road provides primary access to Alyeska Resort and would be extended along the “Eastern” route identified by DOWL Engineers. This extension (about 12,000 lineal feet or 2.3 miles) would provide access to the alpine village base lands of the Glacier/Winner Creek Resort.
- New surface parking area totaling 460 spaces for ski area use on the west side of Glacier Creek. In addition, approximately 115 spaces have been located at the golf-nordic clubhouse area off Crow Creek Road. Expanded parking near Alyeska Resort (1,000 spaces) is also shown off Arlberg Road.

- Four new vehicular bridges connecting Crow Creek and Arlberg Roads with development areas. These bridges range in length from 120 feet to 210 feet.
- Three new pedestrian bridges for Nordic/golf use.
- Water, sewer and power to the development zones.

Development Forms:

Previous land analyses have suggested various development forms and architectural styles that promote visual and contextual connections with the area. Certainly the architectural character and form suggested in the Crow Creek Neighborhood Plan are reasonable for consideration within the single-family residential areas within the Glacier/Winner Creek Resort Development Plan. Examples of these forms can be found on Figure 16.

In high density slopeside and resort village settings, additional development forms may be desired. Architectural and development forms should:

1. Embrace the general vernacular of the rustic and rugged Alaskan wilderness.
2. Relate to grade changes rather than relying on extensive grading or terrain modification.
3. Incorporate structured parking either below or within attached structures to reduce site impact and promote visual integrity.



Section D: Development Costs

In a conceptual land use plan such as this, assessing and determining exact construction costs is difficult. However, SE GROUP has developed some preliminary “order of magnitude” estimates for infrastructure capital costs associated with the various elements of the land use plan.

The following assumptions are made for this analysis:

- Road costs are \$1M per mile based on discussions with local engineers and previously prepared reports (SGM, DOWL engineers). This is for standard 24 foot wide paved roads.
- Bridges are \$20K/foot plus 30% contingency.
- Sewer/Water costs are \$200 per foot
- Power Costs are \$400/foot based on buried conditions.
- Lift and Trail costs are based on SE Group databases of actual installations.
- Nordic costs are per The Boutet Company estimates
- Golf Costs are per the NGF golf study.

Alpine Resort:

These cost estimates reflect the project capital expenditures necessary for on-mountain (lifts, trails, and infrastructure) improvement as well as development of alpine-associated residential development

adjacent to slopes or within the upper valley. Included in these estimates is the extension of Arlberg Road and associated infrastructure, the extension of Crow Creek Road (to serve the western side of Glacier Creek), and bridges over Crow Creek, Winner Creek and Glacier Creek.

These costs, based on SE Group historic data and local engineering contacts, do not reflect site specific costs that may require more detailed design. They also do not include real estate development costs, only general infrastructure. They should be regarded only as a guide.

Alpine Resort – On Mountain	
Element	Estimated Cost
Lifts	\$30M
Trail Improvements	\$6.75M
Snowmaking	\$11M
Power/ Access	\$5M
Equipment	\$1.5M
Total	\$55M +/-
Alpine Village (Development Pods A-G, MF) plus 68,000 s.f. of Commercial	
Element	Estimated Cost
Roads and Bridge (Arlberg Road plus interior roadways, Winner Creek Bridge)	\$12M (Arlberg) \$5M (other) \$8M Bridge
Sewer/Water	\$5.5M
Power	\$5M
Base Lodge 12000 SF	\$5M
Total	\$40.5M
Upper Valley Residential (Development Pods F-SF, B-SF)	
Element	Estimated Cost
Roads	\$6M
Sewer/Water	\$8M
Power	\$5M
Total	\$19M
ALPINE TOTAL	\$115M +/-

Alyeska Expansion:

SE Group, in the development of this land use plan, identified two area (H-MF and I-MF), adjacent to Alyeska, where multi-family development is possible. Costs associated with these areas are likely much lower, given their proximity to the existing Alyeska Resort.

Alyeska-Associated Residential (Development Pods H-MF and I-MF)	
Element	Estimated Cost
Roads & Bridge	\$1M
Sewer/Water	\$1.5M
Power	\$1M
TOTAL	\$3.5M +/-



Crow Creek Residential:

The development proposed along Crow Creek Road is associated with the Golf/Nordic amenities in the central valley. These estimates include costs for interior roads and infrastructure as well as for a road and bridge between Arlberg Road and Crow Creek Road.

Crow Creek Residential (Development Pod C-SF, D-SF, E-SF)	
Element	Estimated Cost
Roads and Bridge over Glacier Creek to Arlberg	\$5M (roads) \$6M
Sewer/Water	\$9M
Power	\$6M
TOTAL	\$26M +/-

Recreational Components:

Working with information provided by The Boutet Company (TBC) for its Nordic Trail network concept, estimates prepared by National Golf Federation (NGF) for the proposed Glacier/Winner Creek Golf Course and other sources, these rough estimates include development of trails, associated structures and support buildings and necessary pedestrian bridges. They do not include operating costs.

Golf Course	
Element	Estimated Cost
Clubhouse	\$4M
Course	\$7M - \$15M
Total	\$11M - \$19M
Nordic Trails ¹	
Element	Estimated Cost
Buildings	PENDING
Trails	PENDING
Power	PENDING
Total	

Other Considerations:

In total, less any residential construction costs, we would estimate that the infrastructure costs for the development of the Glacier/Winner Creek Land Use Plan could be \pm \$160M.²

These costs do not, however, include necessary offsite costs for infrastructure including water and sewer improvements needed. The planned upgrade of the municipal wastewater and water plant may be sufficient to support the Glacier/Winner Creek area, but additional study is needed.

¹ Costing Note: SE Group has not received the Nordic Trails cost estimates from The Boutet Company.

² Costing Notes: SE Group, working with information from DOWL Engineers and SGM Inc. (Joe McElroy, Anchorage AK), as well as with proprietary databases of on-mountain improvement costs, has developed this capital cost summary. This is by no means inclusive of all development costs, but reflects a broad range of potential costs needed to fulfill the general buildout as described in this report. Our assumptions are as follows:

Road Costs: \$1M per mile (standard 24' width with shoulders)

Power Costs: \$200 per foot

Bridge Costs: \$20,000 per foot plus 30% for bank improvements

Water/Sewer: \$300 per foot.

Section E: Recommendations

While the long-term planning for the Glacier/Winner Creek Resort area has been focused on developing a four-season, recreational focused resort, we believe that the short-term approach towards this goal should be to create some “developmental inertia”.

Key recommendations for moving forward with the development of the Glacier/Winner Creek Resort include:

1. Clarify local planning and zoning regulations to identify the preferred location for the golf course. The location presented in this study is recommended over other previous sites because it enables multi-season synergy with Alyeska Resort and the future Glacier/Winner Creek Resort, provides an opportunity to develop Nordic



concurrently so as to reduce environmental impacts and disturbance, and helps provide market differentiation of the area over other competing areas.

2. Redefine Title 21.09 boundaries for development of alpine, resort, open space and residential uses to be consistent with the general “bubble” diagram prepared in this study. See Figure 15 for an overlay of the current zoning with the proposed development areas.
3. Redefine the density projections within these areas to be consistent with the recommendations within this study.
4. Modify the GAP Land Use Plan in accordance with the Glacier/Winner Creek Resort Development Land Use Plan.
5. Work to integrate the planning efforts for Crow Creek Neighborhood and Glacier/Winner Creek. These two areas have common boundaries, are both proximal to proposed recreational amenities and should be coordinated to promote efficiency in development of crucial infrastructure.
6. Seek strategic capitalization for implementation of the development program. Work with local, state and federal organizations and private-sector interests to identify financing mechanisms that leverage public interests with the development program. Good examples of this may include the implementation of the Nordic trail system and golf course. These facilities can have broad public use and enable extension of critical infrastructure into the study area in an incremental manner.

7. Study impacts of Glacier/Winner Creek area on critical municipal infrastructure including sewer and water to ensure sufficient long-term capacity.
8. Phase and implement the plan by leveraging existing infrastructure to the degree possible. Relate plan implementation in part to market absorption, and need. Focus on taking advantage of the unique terrain and recreational opportunities that these areas provide through less intensive access (i.e. heli-ski, snow-cat skiing, backcountry guided, hiking).
9. Avoid scattered development within the residential core areas that results in inefficient utilization of land and inefficient extension of infrastructure.
10. Continue efforts to define the Girdwood brand through marketing within Alaska and the Lower 48.
11. Working with the conclusions of the Petersen Study, evaluate the potential impacts of new resident populations within the Girdwood Valley.
12. Ensure that all development is done in an environmentally safe and sustainable manner. The incredible natural beauty of the region is the most commonly cited factor for its attractiveness.
13. Build facilities complementary to the existing Alyeska Resort operation.
14. Develop multi-seasonal recreational programs to encourage use of the site and many recreational opportunities.



15. Encourage increased snow-cat and heli-skiing as a means to attract more visitors to the area. Provide for infrastructure to allow development of heli-ski and hiking lodging units, as identified in the land use plan.

