



# Memorandum

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Subject | **Beitostølen S5/A6 Study Areas Summary**

At the request of Øystre Slidre Kommune, International Alpine Design (IAD) has recently conducted a study to examine the feasibility of lift and trail expansion into two areas west of the existing resort - S5 (Størrtjednliheisen) and A6 (Størrtjednlie). The primary purpose of this study was to analyze whether the proposed S5 ski lift and associated trail(s) are feasible, marketable, and economical considering the current situation and future direction. In order to effectively address these questions, IAD analyzed the existing conditions at the resort, visited the site, assessed alternatives previously considered for the area, and identified potential alternatives and recommendations for the project. The following summarizes the key findings of this process.

## Existing Conditions

Beitostølen Skiområde consists of two separate alpine ski areas. The primary alpine ski area (Beitostølen Skisenter) is located at the village and accounts for approximately 90% of overall alpine skier visits at Beitostølen. This area provides an exceptional alpine skiing experience for families, children, and seniors due to its predominately beginner, novice, and low intermediate skier profile. An additional area called Rauddalen Alpinksenteret is located approximately 5km to the southwest and provides intermediate and advanced level alpine skiing. With its history as a premier cross country skiing destination, its unique and attractive village, and high quality accommodations, the overall resort complex has positioned itself well in the Norwegian market.

The focus of IAD's study is the S5 (Størrtjednliheisen) and A6 (Størrtjednlie) areas located west of the existing Beitostølen Skisenter, as referenced on the attached Figure 1 (Existing Conditions Plan). At Beitostølen Skisenter there are currently 7 lifts in operation – (1) high speed detachable 6 place chairlift, (2) fixed grip triple chairlifts, and (4) surface lifts. There is also approximately 35-40 hectares of conventional alpine skiing terrain spread out over 16 named pistes, with a total length of approximately 12km. A detailed capacity analysis, referenced below, shows that the existing lift system has the potential to support around 2,600 skiers per day. Empirical observations, however, indicate that there is an average of approximately 800 skiers per day. Beitostølen and Rauddalen combined see approximately 100,000 skier visits per year.

## Existing Lift Capacity - Beitostølen Skisenter

#	Lift Name	Slope Length	Vert. Rise	Rope Speed	Actual Hourly Capacity	Lift Loading Efficiency	Effective Hourly Capacity	Skiers in Maze	Skiers on Lift	Skiers on Trail	Daily Lift Capacity
		(m)	(m)	(mps)	(pers./hr.)	(%)	(pers./hr.)	(pers.)	(pers.)	(pers.)	(skiers)
A	Carlheisen	587	111	100	800	85%	680	136	67	17	219
B	Støtheisen	781	129	150	1,200	90%	1,080	216	94	35	345
C	Interskiheisen	295	62	100	800	85%	680	136	33	22	192
D	Barneheisen	401	66	100	800	85%	680	136	45	45	227
E	Ola-Expressen	683	118	300	2,800	95%	2,660	532	101	303	936
F	Kjelkeheisen	542	75	100	800	85%	680	136	61	61	259
G	Knauseheisen	727	126	150	1,200	90%	1,080	216	87	131	434
<b>Total 'Design Day' Lift Capacity</b>											<b>2,611</b>



With a total trail capacity at Beitostølen Skisenter calculated around 2,000 skiers per day, the resort's current infrastructure could support an additional growth (20-30%) in skier days. The primary limitation of the ski resort is vehicle access to limited parking facilities in the village core. Additional parking development is crucial to future growth in skier visits. Additionally, there is lack of high quality beginner training near the village. In all cases, however, IAD recommends that every effort should be made to better utilize and increase attendance at existing alpine facilities prior to considering expansion.

## Site Analysis

In order to better understand the current resort profile, as well as the potential of the S5 lift area, several ski area specific analyses were performed. Physiographic features such as slope gradients, elevations and directional aspects all influence decision-making about the site. The following discusses Beitostølen Skisenter's primary landform and physiography:

### *Slope Analysis*

The slope analysis (Figure 2) shows that Beitostølen consists almost entirely of novice (green) and low intermediate (blue) ability level terrain. This terrain profile corresponds well with the target alpine skiing market of mainly beginner, novice and low intermediate skiers. It is observed, however, that pure beginner training areas (8-12% slopes) are lacking at Beitostølen, especially near the central village area. Identifying future areas to be used for beginner training for "never before" skiers should be a critical component of the potential future village upgrade. Specific to the S5 area, the slope analysis indicates that it is nearly too flat for skiing for several meters in the upper and middle section, followed by a short 100 meter section of novice terrain, then transitioning into steeper intermediate slopes for 100 meters above the Rv 51. Below Rv 51 in the A6 area, there is again a flat section, followed by approximately 200 of novice terrain, and then pockets of very flat terrain for several hundred meters on the approach down towards Bjødnestølshøvda. In general, this overall profile is not consistent and would generally not be recommended for a conventional ski product.

### *Elevation Analysis*

The elevation analysis (Figure 3) provides insight on snow retention characteristics, which can directly affect length of operating season and quality of experience. Typically, snow retention is better at higher elevations where temperatures tend to be lower. Elevations at the resort are favorable with an existing base elevation of approximately 900 meters and a top elevation of 1,100 meters. In this region, IAD has observed this to be an adequate base elevation for snow retention throughout a typical winter season.

### *Solar (Directional) Aspect Analysis*

The solar (directional) aspect analysis (Figure 4) aides in determining the time of day and extent in which the sun will impact ski slopes, facilities, lodges and base areas. Defining the solar aspects and sun/shade relationships to surrounding landscapes, mountain and base lands, allows for functional planning and design of the site. The existing terrain at Beitostølen predominately faces south and southwest. Due to its geographic location, the resort typically has good snow retention with its high elevation, and the generally southern aspect provides nice solar gain for skier facilities.

## Historic Considerations

Considering the information gained through the resort assessment and site visit, IAD assessed the lift and skiing access options of S5 (Størrtjednliheisen) and A6 (Størrtjednlie). The Kommune regulation plan has approved 50,000 square meters of accommodation development (300-500 cabins/second homes) and additional alpine resort infrastructure (including a 350 car parking lot) within the S6 area. Access to this S6 area has been historically based on lift and trail access through the S5 area. As identified above, the S5 area is characterized by mostly flat terrain up high in the zone with constrained and relatively steep terrain in the narrow corridor between the existing cabin areas. The flat grades up high in the zone limit potential for high-quality commercial skiing. The upper areas of A6 contain terrain for additional novice and intermediate skiing (the target market). Below elevation 845m in A6, there exists large flat areas that do not suit fall-line alpine skiing.

IAD reviewed and considered historic lift options provided by Kommune, as shown on Figure 5. As we understand, the angled KL-4 (or alternative KL-3) was planned to provide access back to the skisenter from A5/A6. It would be assumed that if a surface lift was installed, 1-2 bridges to support downhill ski traffic and uphill lift riders would be



required. A second surface lift (KL-6) was shown to provide access from the skisenter back into the S5/S6 area above the Bjødnebakkadn cabin area. It appears that there is also a third surface lift option (KL-1 or KL-2) proposed to provide access for cabins into the lowest and westernmost reaches of the A6 area. KL-7 and KL-8 present alternatives to the other scenarios. Overall, it is assumed that the conventional skiing will come through the S5 corridor between the cabin areas.

## Development Assessment

Assessment of the historic lift and trail options highlight a variety of challenges:

- The terrain profile through S5 / S6 is inconsistent, ranging from extremely flat at the top and bottom to steeper near Rv 51.
- Due to the steep terrain above Rv 51, the grading of the skier bridge crossing require even steeper slopes in order to get a suitable road crossing. These steep grades would be considered generally unacceptable for approximately half of the resort's target market.
- All conventional skiing, as well as the lift, is forced through the narrow corridor between the existing cabin areas and does not leave much opportunity for a mix of conventional downhill terrain and beginner bypasses.
- It has been expressed that a number of cabin owners along this middle / upper S5 / S6 corridor have expressed their concern over the potential visual impacts of a lift through this historic cabin area. It would appear that these owners could present social and legal challenges to the project.
- To reach the lower reaches of the A6 zone and fully access the potential of the cabin development, a third "owners" lift would be required. While this remains an option, it does not seem financially viable for either the ski area or land developer to purchase 3 lifts, as well as 1-2 bridge crossings to solve the greater issue.
- Without a fully integrated ski in/ski out solution, most new cabin owners in A6 would still be required to drive to the existing or newly developed parking lots.
- While there are plenty of land areas available in A6 for newly developed skisenter parking, most would be considered remote and hard to locate within the A6 area.

Overall, we believe that the skiing is not consistent enough, nor suited to the target market, for development of conventional, round-trip style skiing in the S5 / S6 zone. Considering this lack of conventional style skiing, a 3 lift scenario as proposed, would not be recommended due to the "cost-benefit" economics of the project. While there is plenty of potential for cabin / accommodation development and secondary parking within A6, it does not appear any of the current lift scenarios would most effectively provide for a truly integrated ski in / ski out development. Unless a detailed site design for a completely integrated roadway, cabin, parking, trail and lifts scenario is completed to address all of these issues, IAD would not recommend this 2-3 lift solution in S5 and A6 zones.

### *Recommended Alternative*

In order to most effectively and economically meet the goals of the Kommune and the ski area, we reviewed and considered potential alternatives for this area. To solve parking expansion issues, IAD believes that the current cross country parking area along Beitostølvegen presents a high quality opportunity. As shown on Figure 6, this area is highly visible along the road and easy to find and provides ample opportunity for expansion to 150 + parking spaces. Under this scenario, a fixed-grip chairlift similar to the historic KL-7 (but in slightly different alignment not to impact lift A) could be installed to deliver skiers directly into the skisenter. As a chairlift, no bridge over the road would be required. It would appear that there may be opportunities to work with the skisenter to re-use a lift that may be replaced in the future (e.g. Stolheisen or Rauddalen triple). This would provide a very economical option for this installation. It should be noted that IAD believes this lift could be access from the village area as part of a future redesign scenario.

Given that it does not appear the S5 corridor works effectively for conventional skiing, IAD would assume that it would most effectively be utilized for return to the proposed parking area and as future A6 cabin owner access. We do believe that an effective ski in / ski out cabin development, consistent with the Kommune approvals, would be feasible for this area. With the placement of short (~90m), relatively inexpensive moving carpet near the top of lifts A and B, skiers could access the S5 corridor on a beginner skiway. This beginner skiway could be developed through



the S5 corridor with minimal visual impacts to the cabin owners. To avoid the steep bridge crossing previously proposed as Rv 51, IAD would recommend a lower slope gradient 8-10% crossing. At a lower slope gradient, the width of the bridge can be minimized and overall creates a much safer crossing for lower ability level skiers.

Below the crossing, the skiway, as well as a variety of new cabin owner skiways, would be well suited to access future cabin development throughout A6. As previously mentioned, a very thoughtful and careful ski in / ski out design for A6 should be completed to ensure the highest quality and value development. On Figure 6, IAD has identified (in blue outline) an area that could be effectively designed to be ski in / ski out. This design would likely require 1 additional "owner" surface platter or T-lift to provide access to the IAD proposed parking lift. An important note is that IAD believes that the previously planned and design Markahøvda accommodation development should be redesigned to ensure complete ski in / ski out development and full integration into the A6 cabin development. Overall, however, the parking and lift scenario proposed is not dependent on the A6 development but works in complete coordination in the future.

Additionally, IAD has looked at opportunities for a new beginner training site and identified solutions for better access to parking and vehicular circulation in the village core. We believe that we could provide the highest value in the future planning efforts at Beitostølen by preparing a detailed design of the A6 area and village area. We are confident that our integrated solutions for these areas would further the resorts position as a high quality resort.

We hope this provides you with a good understanding of our process and design approach in the resort assessment and concept plan. Prior to implementation, the concepts identified herein will require additional study at a more detailed level. We look forward to discussing our concepts and ideas with you.

Thank you,  
**International Alpine Design, Inc.**