Porters Ski Area Ltd

Proposed Private Plan Change: Proposed Porters Ski Area Expansion

Transportation Assessment Report

Traffic Design Group

July 2010

PO Box 13 835, Armagh
Christchurch 8141
P: +64 3 379 2404
www.tdg.co.nz
New Zealand

10635 080710 ta final.doc

Porters Ski Area Ltd

Proposed Private Plan Change: Proposed Porters Ski Area Expansion

Transportation Assessment Report Quality Assurance Statement

Prepared by:

Andrew Metherell
Principal Transportation Engineer

Reviewed by:

Andy Carr
Senior Associate

Approved for Issue by:

Andy Carr
Senior Associate

Status: Final

Date: 8 July 2010

Table of Contents

1. Introduction

Porters Ski Area Ltd is applying for a private plan change to the Selwyn District Council District Plan (District Plan). The proposal would result in land adjacent to the existing Porters Ski Area access road, inland from State Highway 73 (SH73) and northwest of Porters Pass, being rezoned from High Country to Ski Area Sub-Zone. This will facilitate the development of an expanded ski terrain and a mountain village.

This Transportation Assessment Report evaluates the potential transportation-related effects of the proposed rezoning on the existing and future transport networks, and includes a consideration of relevant strategic transportation strategies and policies.

2. Existing Transport Infrastructure

2.1 Site Location

Figure 1 shows the location of the proposed plan change site ("the site") within the context of the wider area. The site is located approximately 90km west of Christchurch, just off SH73 and is located at the base of the existing Porters Ski Area.

SH73 near the site is an alpine highway and forms the primary roading route between Christchurch on the eastern coast and the West Coast townships, passing through mountainous terrain at Porters Pass and Arthurs Pass. While SH73 links the east and west coast, in the vicinity of the site it runs with a generally north-south alignment. Through this area there is a low population density and the nearest township to the southeast along SH73 is Springfield, some 25km away. To the northwest the nearest township is Arthurs Pass at approximately 55km distant, although the small Castle Hill Village is 8km away.

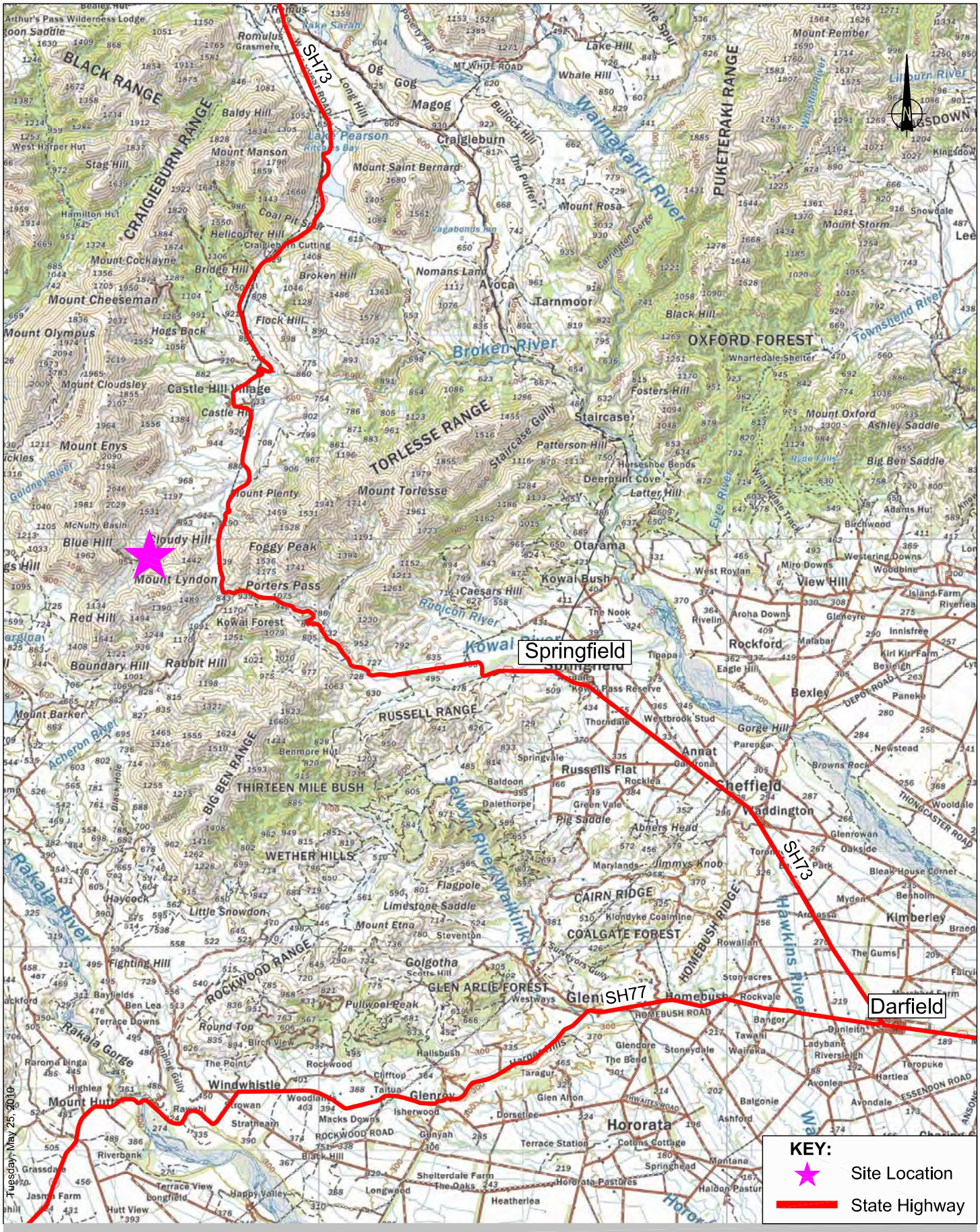
The Porters Ski Area access road is formed largely within a legal road reserve although it is maintained by the Porters Ski Area in accordance with an agreement with Selwyn District Council. As such, public access is restricted out of the ski season.

An alternative route into the site from the southwest is via SH77 at Windwhistle, via Lake Coleridge and Lyndon Road to SH73 at Lake Lyndon. Coleridge Road is an arterial road and Lyndon Road is a local road in the District Plan.

2.2 Transport Network

Figure 2 shows the location of the site. The Porters Ski Area access road is formed largely within legal road reserve, and has a 6m wide gravel surface, as shown in Photograph 1. The access road has a posted 50km/h speed limit.

Photograph 1: Porters Ski Area Access Road west of SH73



Porters Ski Area Expansion

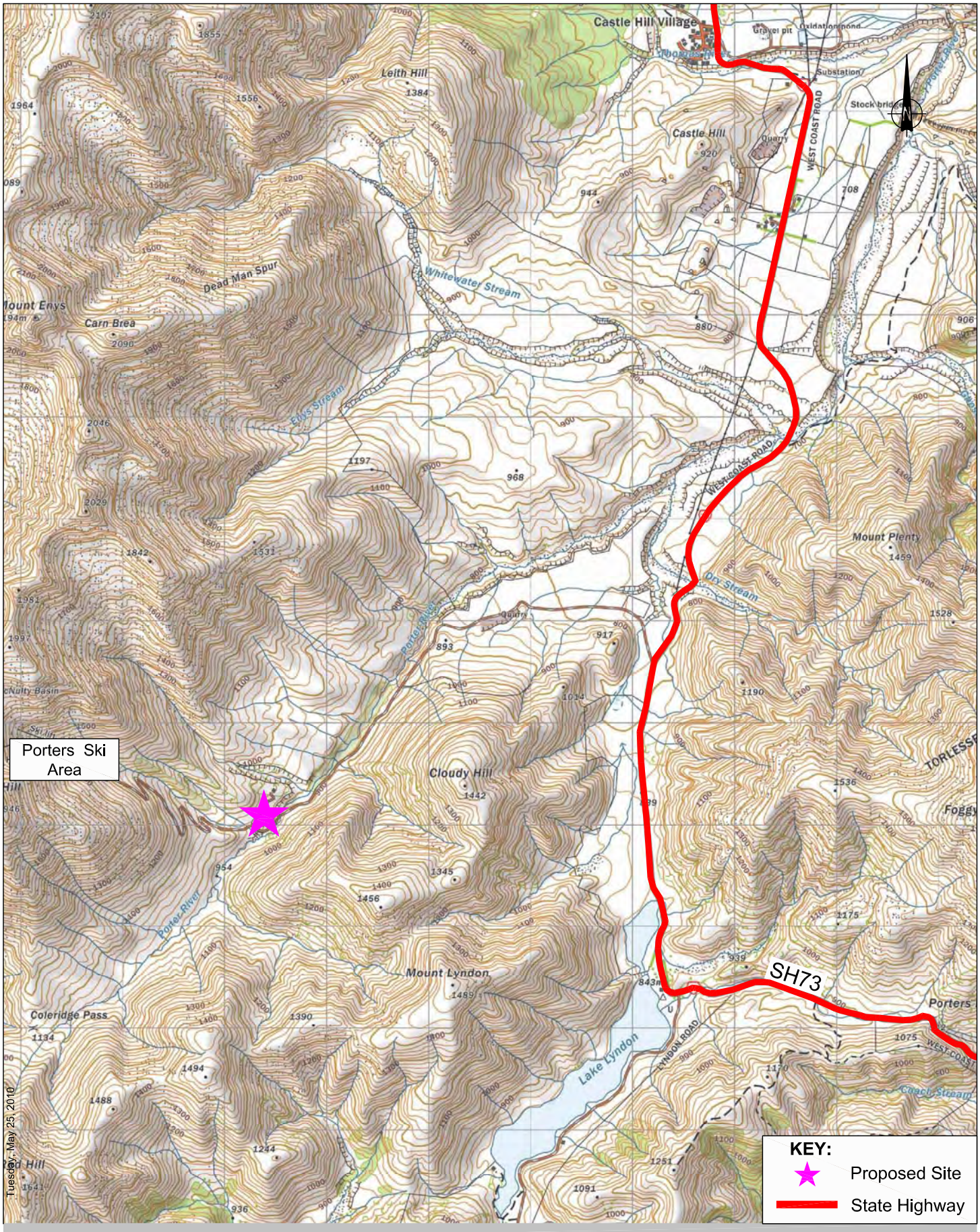
Strategic Location

Traffic Design Group

1

SCALE: 1:250,000

G:\10000-10999\10600-10699\10635 Porters Skifield\ACAD\10635-C1A.dwg



Tuesday, May 25 2010

Porters Ski Area Expansion

Transportation Network

Traffic Design Group

2

SCALE: 1:50,000

G:\10000-10999\10600-10699\10635 Porters Skifield\ACAD\10635-C2A.dwg

The Ski Area Access Road has a 3m wide cattle-stop and gate located 24m from the western edge of carriageway of SH73. The gate is able to be locked to restrict access as required. The section of access road between the intersection with SH73 and the cattle stop is sealed and has a painted centreline over a length of approximately 12m. The gate and cattle-stop are shown in Photograph 2.

Photograph 2: Porters Ski Area Access Road approach to SH73

The Access Road forms a give way controlled "T" type intersection with SH73. Although the Access Road approaches the State Highway at an acute angle, there is a curve on its approach such that it meets at an angle of approximately 90 degrees. The intersection layout is shown in Photograph 3.

Photograph 3: SH73 / Ski Area Access Road Intersection

There is advance warning signage (black text on yellow backing) on the approaches to the intersection denoting “Porters Ski Area, Turn Left (Right) 300m”. There are also a permanent warning approach sign and a directional sign at the intersection.

Photograph 4: Advance warning signage on SH73 north approach to Porters Ski Area Access Road

The northern and southern approaches to the intersection are shown in Photographs 5 and 6 below.

Photograph 5: SH73 northern approach to Porters Ski Area Access Road

Photograph 6: SH73 southern approach to Porters Ski Area Access Road

Sight distance towards the north is excellent, with visibility of approximately 800m available as shown in Photograph 7.

Photograph 7: Porters Ski Area Access Road – SH73 Sight Distance to north

The sight distance to the south is approximately 230m, constrained by a vertical curve in the highway. This is shown in Photograph 8.

Photograph 8: Porters Ski Area Access Road – SH73 Sight Distance to south

SH73 near the site is of a mountainous nature, and generally has a road gradient of approximately 10%. It is typically formed with two 3.5m wide lanes and sealed traffic shoulders varying between 0.5m and 1.5m wide. In the vicinity of the SH73 / Access Road intersection, there is localised widening of the sealed shoulders to 2.5m width on the western side of SH73 and 2.7m width on the eastern side.

Although the section of highway near the Porters Ski Area access road undulates in both the horizontal and vertical plane, there is only one curve signposted with a speed advisory sign. This is located approximately 800m north of the access, and has a 65km/h advisory sign.

Some 3.5km to the south of the Porters access is Lyndon Road, which provides an unsealed alternative route via Lake Coleridge from SH77 near the Rakaia Gorge. As illustrated in Photograph 9, Lyndon Road is unsealed over a distance of approximately 30km, with a carriageway width of approximately 5m and a winding alignment. It links to the sealed two lane Coleridge Road before connecting to SH77. At both the intersection with SH73 and on Lyndon Road itself, warning signage (black text on yellow backing) is provided noting “Fine Weather Road Only”.

Photograph 9: Lyndon Road west of SH73

3. Transport Patterns

3.1 Daily Traffic Volumes

The New Zealand Transport Agency (NZTA) undertakes a regular traffic counting programme on SH73. The most recent Annual Average Daily Traffic (AADT) counts (in vehicles per day (vpd)) at the traffic counting sites within the immediate area have been collated for the most recently published year of 2008. Traffic growth has also been calculated for the most recent 10 year period (or part thereof if 10 years of data is not available), as well as the percentage of heavy vehicles as a total of all traffic. These are shown in the Table 1 below.

Count Location	2008 AADT	% Growth p.a.	Heavy Vehicle %
SH73 Castle Hill Straight	1,404 vpd	2%	13%
SH73 west of Springfield	1,629 vpd	2%	12%
SH73 north of Darfield	1,805 vpd	4%	10%

Table 1: State Highway Daily Traffic Volumes

The traffic volumes show that SH73 carries fewer vehicles further towards the west, and in general the highway carries traffic volumes that are relatively low for a regional State Highway. There has been moderate traffic growth recorded over the most recent ten year period, typically in the order of 2% per annum, and it can be seen that approximately 10-13% of traffic passing the site on SH73 is classified as heavy vehicles.

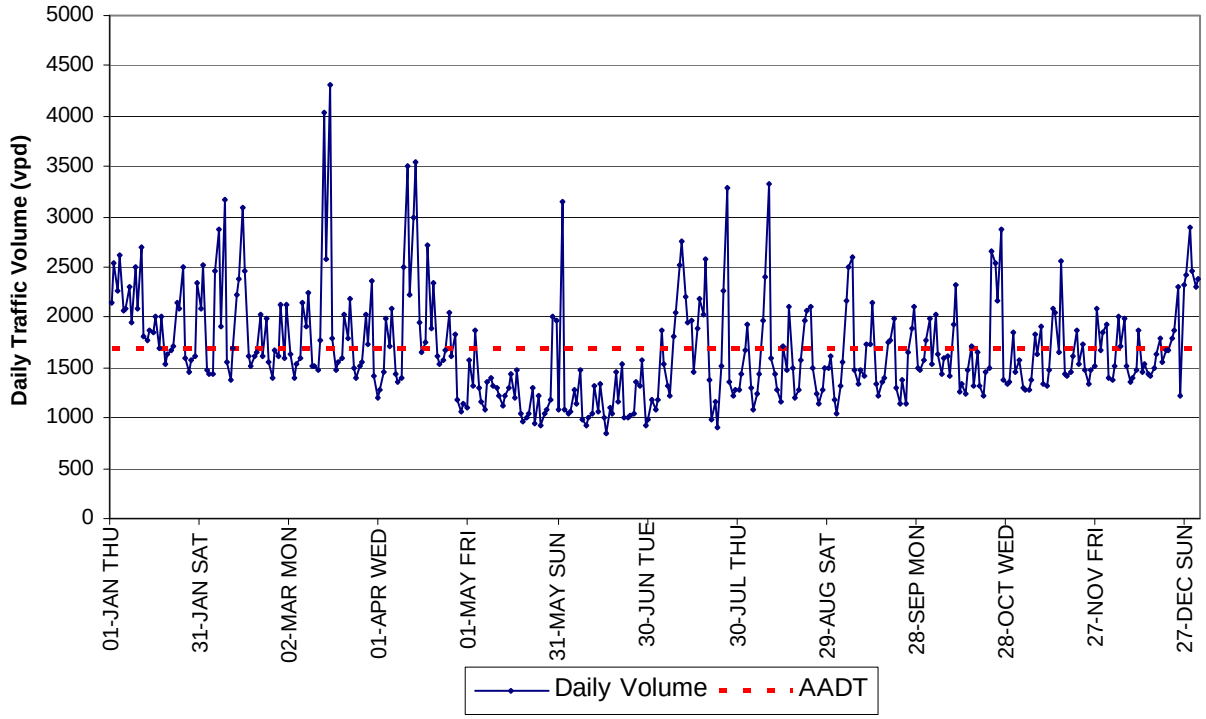
Figure 3 shows an analysis of the year-round traffic counts recorded at the SH73 Springfield telemetry traffic counting site. The seasonal traffic variations are shown on both a daily basis and on a weekly basis for the average of the full week (7 days). The patterns show the seasonal fluctuations varying between average daily traffic volumes of 1,000vpd to 2,500vpd, representing 36% less than the AADT, and 49% more than the AADT (which is 1,684vpd). Such fluctuation is typically representative of the recreational nature of trips on a route during the summer and winter seasons, and of higher use during holiday periods. Further, in this case, the busiest day has a recorded traffic volume of approximately 4,300vpd.

A comparison with available seasonal data from the Castle Hill count site shows that surveys recorded in February, April and October have a close correlation with the pattern of daily traffic volumes recorded at Springfield, albeit with slightly lower values. However, the week recorded during July shows the Springfield site carries higher volumes than the Castle Hill site on the weekends, which it is considered will most likely be associated with the peak traffic to Porters Ski Area.

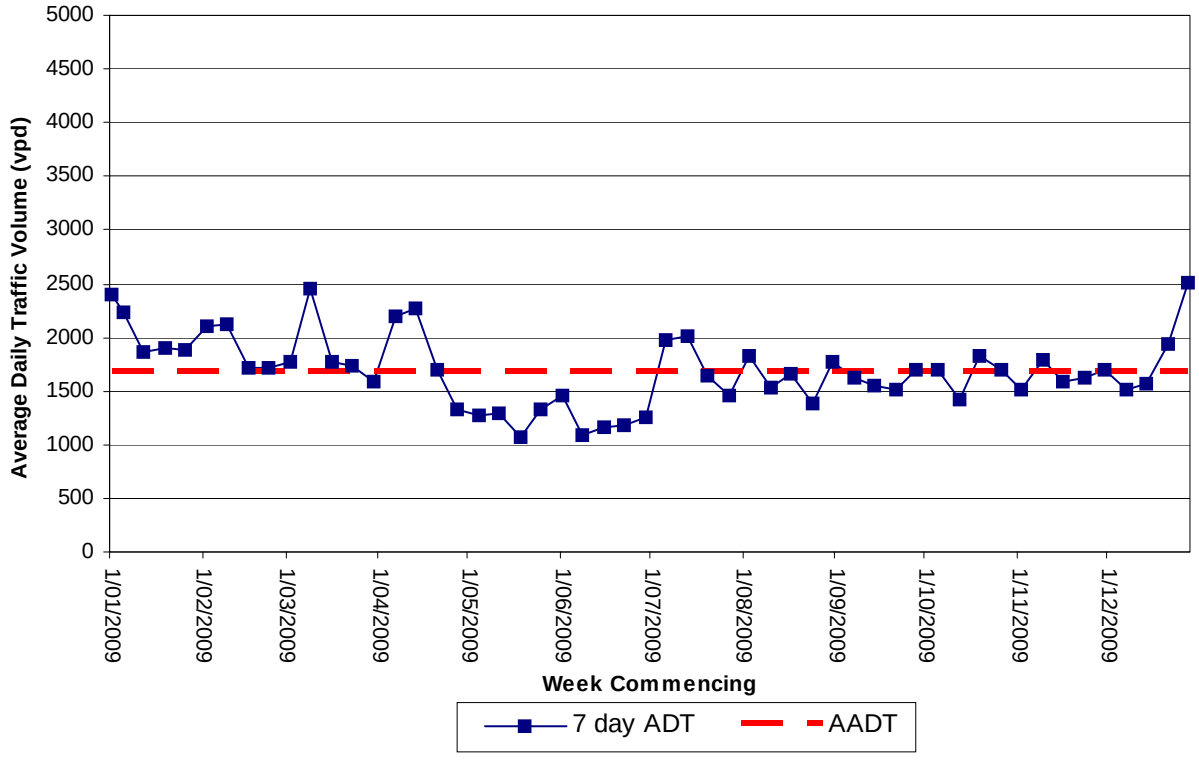
The Porters Pass area is subject to occasional road snowfall and NZTA applies travel restrictions as required based on snow conditions. Advance warning is included at Springfield where a large variable message electronic sign is located. It is understood that the road is typically passable with chains, although it can occasionally be temporarily closed to towing or to all vehicles. For example in 2009 official restrictions of “chains essential, closed to towing vehicles” were applied at the Springfield sign on approximately 11 occasions, being a total of approximately 200 hours (2.2% of the year).

Selwyn District Council records show that the Lyndon Road – Coleridge Road route between SH77 and SH73 also carries low traffic volumes. The most recent recorded count for Lyndon Road west of SH73 was 90vpd (January 2006), with the Coleridge Road carrying 430vpd (March 2009).

Daily Patterns



Weekly Patterns



Tuesday, May 25, 2010

Porters Ski Area Expansion

SH73 West of Springfield - Seasonal Patterns

Traffic Design Group

3

SCALE: NTS

G:\10000-10999\10600-10699\10635 Porters Skifield\ACAD\10635-C3A.dwg

3.2 Hourly Travel Patterns

Figure 4 shows the pattern of hourly traffic volumes on SH73 at Castle Hill, recorded by NZTA over a typical seven day period in February 2009. The main characteristics of the weekday hourly traffic patterns can be summarised as follows:

- Weekday directional flows of approximately 50-80 vehicles per hour (vph) throughout the day from 8am to 6pm.
- A gradual building up to an early afternoon weekday peak two-way traffic volume of approximately 150vph in the hour ending 1pm, followed by a gradual decrease.
- A slightly higher two-way volume on Fridays with up to 200vph recorded in the early afternoon.
- Saturday volumes being similar to a weekday but extending over a longer duration from 8am onwards. Sunday volumes are the highest volumes within the seven day period, with two-way volumes peaking at approximately 220vph in the mid afternoon.

A review of the winter patterns shows that peak weekday volumes are lower than those recorded in summer, although the weekend volumes are rather higher which would be consistent with travel associated with the ski fields in the area. The peak recorded winter traffic volume was 280vph on a Sunday during the hour ending 5pm.

Overall, the patterns are considered to be reflective of the road's function as an alpine highway linking regions and providing for weekend recreational travel.

3.3 Porters Ski Area

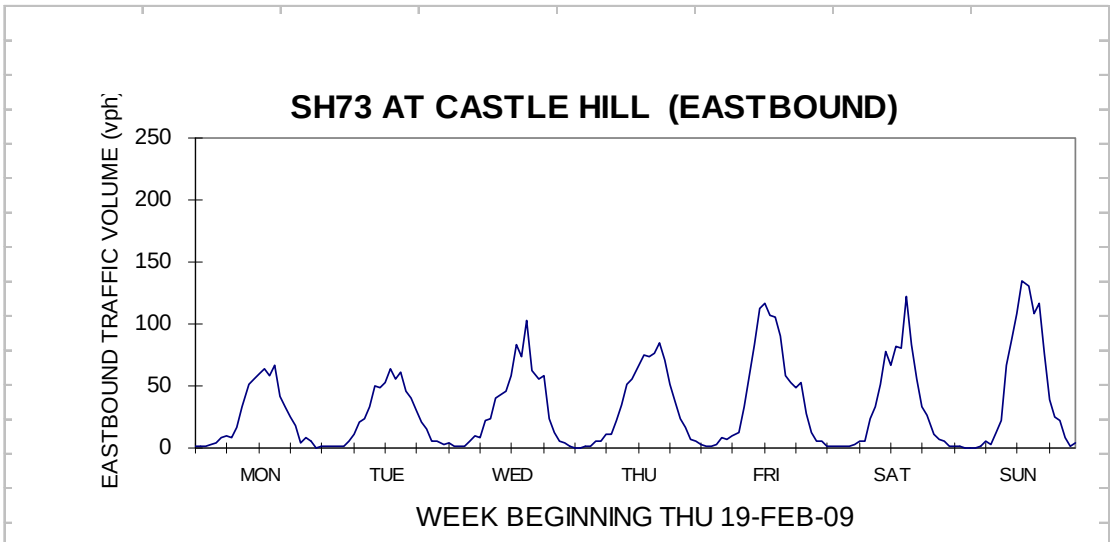
It is understood that the Porters Ski Area typically has a season lasting from late June to late September, with season extensions or reductions occurring depending on snow conditions. Ski Area statistics show that peak periods currently occur during the July school holidays, at which time there are approximately 850 to 1,000 visitors. Based on a vehicle occupancy of 3.35 people per vehicle (as measured at other ski fields), this equates to approximately 600 vehicle movements per day (two-way).

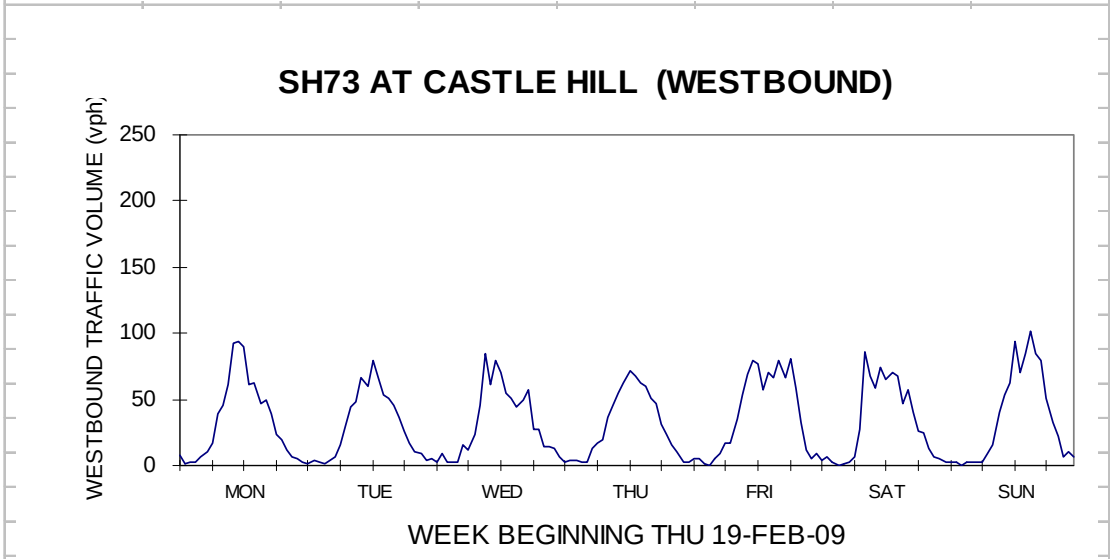
The existing Ski Area caters for day visitors arriving by private car, camper van, shuttle bus, and coach. Patterns at other ski areas that ride sharing and hitch hiking is common for this type of land use, and there are several commercial operators that provide shuttle bus transport from Christchurch, Springfield and the West Coast. Cost of travel for an adult is in the order of $50 for a return journey.

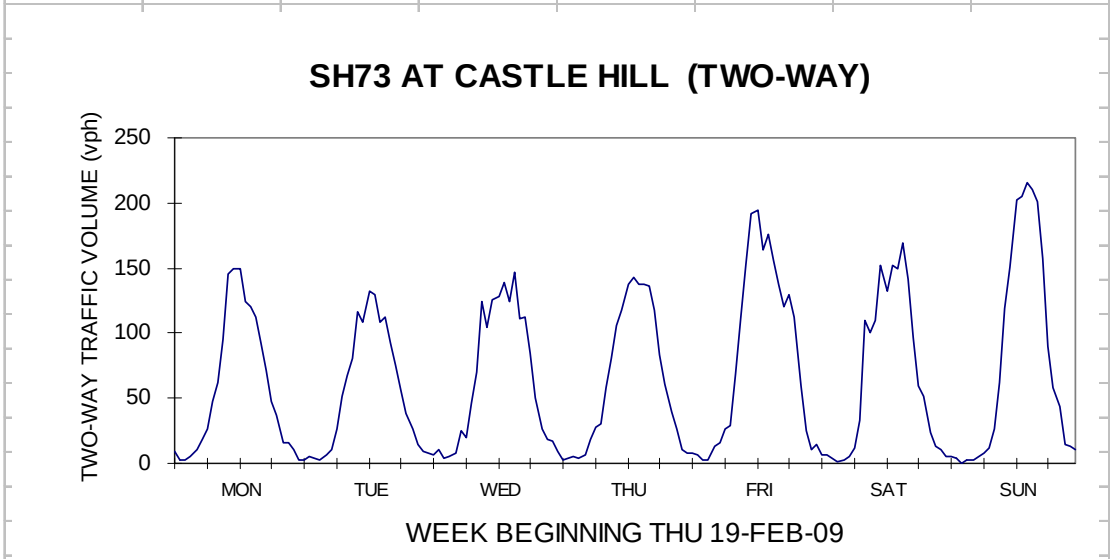
3.4 Speed Survey

A speed survey was carried out on 13 May 2010 to determine the speed of vehicles travelling north along SH73 on their approach to the existing Ski Area access road intersection.

The speed survey was undertaken from 11:40am to 12:25pm, during which time 20 vehicles were recorded. The vehicle speeds ranged between 79km/h and 107km/h. In accordance with Austroads Guide to Traffic Management Part 3, the 85th percentile speed of the survey was calculated as 104km/h with a 95% confidence interval of +/- 4km/h (ie an 85th percentile speed between 100km/h and 108km/h).







Tuesday, May 25, 2010

Porters Ski Area Expansion

SH73 Hourly Traffic Patterns

Traffic Design Group

4

SCALE: NTS

G:\10000-10999\10600-10699\10635 Porters Skifield\ACAD\10635-C4A.dwg

4. Road Safety

The NZTA Crash Analysis System (CAS) database has been reviewed to determine the occurrence of crashes within a 1km radius of the SH73 / Porters Ski Area access road intersection. Due to the relatively low traffic volume on SH73, the crash search has been extended from a five year analysis period to cover a full ten year period of 2000 to 2009.

Over this period, there have been four reported crashes, all occurring in fine and dry weather conditions. Two of the crashes resulted in minor injuries, both of which involved drivers losing control of their vehicle and leaving the road. One of these occurred during an overtaking manoeuvre, and the other occurred when the driver travelled too quickly when entering a corner.

One of the non-injury crashes involved a truck driver losing control at a bend, with a contributing factor being the driver's unfamiliarity with the vehicle. The other crash involved an overtaking vehicle hitting another car head on as a result of the driver overtaking where there was insufficient visibility.

All of these crashes occurred at different sections of the highway, and there have been no reported crashes at the SH73 / Porters Ski Area access road intersection. The type of crashes reported are consistent with those typically reported for rural roads.

A wider area analysis of SH73 has been undertaken which encompasses the section of highway from the Kowai No 2 Bridge to the Porter River, and including Porters Pass and the portion of the highway past the site access. The observed injury crash history has been compared with national averages for similar sections of highway (adopting the methods set out in the NZTA Economic Evaluation Manual).

Over the 25km length of highway, there have been 16 reported injury crashes in the last ten year period, as shown in Table 2 below.

Section	Length	Terrain	Traffic Volume (Vpd)	Reported Injury Crashes (2000-09)	Predicted Injury Crashes (2000-09)
Kowai Bridge 2 – Porters Pass	6km	Mountainous	1,500 vpd	9	7.3
Porters Pass – Porter River	8km	Mountainous	1,385vpd	7	9.3
Total	**25km**			**16**	**16.6**

Table 2: SH73 Injury Crash Analysis

As can be seen, the highway has an observed rate within 5% of the calculated expected accident rate. It is noted that there have been two injury crashes reported associated with the one-lane bridge at the Kowai River Bridge 2, and these would contribute to the slightly higher rate observed for that section of highway when compared with the typical mid-block rate.

5. Levels of Service

5.1 Definitions

Service flow rate is defined as the maximum hourly flow at which a designated Level of Service (LOS) can be maintained under specific conditions, taking account of factors such as road carriageway standard, the level of heavy vehicles and the directional split of traffic over a given time period. The following LOS definitions are given in "Basic Level of Service Criteria for Two-Lane Two-Way Rural Roads" of Austroads Guide to Traffic Engineering Practice Part 2: Roadway Capacity (AUSTROADS Capacity):

> *LOS A is a condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent*
>
> *LOS B is in the zone of stable flow and drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream, although the general level of comfort and convenience is a little less than with level of service A (excellent).*
>
> *LOSC is also in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level.*
>
> *LOS D is close to the limit of stable flow and is approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speeds or to manoeuvre within the traffic stream. The general level of comfort and convenience is poor, and small increases in traffic flow will generally cause operational problems*
>
> *LOS E occurs when traffic volumes are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream will cause breakdown*

5.2 State Highway 73

SH73 through the Porters Pass area currently provides typical peak period levels of service of LOS C, when assessed in accordance with the AUSTROADS guidelines. During these busy periods vehicles are likely to follow other vehicles at some stage through the mountainous terrain. In this regard, there are currently no formal passing lanes although the highway does provide several convenient locations for slower vehicles to pull over and let following vehicles pass.

5.3 SH73 / Porters Ski Area Access Road Intersection

Traffic volumes at the SH73 / Porters Ski Area access Road intersection are generally restricted to the ski season. The peaks of the through traffic volumes do not coincide with the peak arrival time to the Ski Area, and as such there is negligible delay imposed upon traffic on the highway. Further, localised widening at the intersection will minimise the effect on vehicles that are following turning vehicles. It is possible that there is localised queuing on the access road when the Ski Area closes, associated with a short-term peak in skier departures. However any vehicle queuing will take place entirely on the access road and thus overall, it is considered that there are no existing capacity issues at the intersection.

The available Safe Intersection Sight Distance (SISD) at the existing access after allowing for grade correction (measured in accordance with Austroads Guide to Road Design Part 4A "Unsignalised and Signalised Intersections") is 216m. The Approach Sight Distance (ASD) is measured as 126m. Given the mountainous driving conditions and advanced warning signage on the intersection approach, this is consistent with a design speed of 90km/h where drivers are alert. However, as discussed earlier, the speed survey indicated that the design speed of the intersection is in the order of 100-108km/h. Adopting a slightly more conservative design speed of 110km/h, the Austroads requirement is for some 305m of SISD and 215m of ASD, indicating an existing shortfall at the intersection.

Nevertheless, the sight distance deficiency has not resulted in any adverse safety issues as no crashes have been reported at this location within the last ten years. A contributing factor is that traffic emerging onto the highway is confined to a short time of day and only for part of the year.

6. Proposed Development

6.1 Project Overview

Porters Ski Area Ltd proposes to expand the existing Porters Ski Area. As indicated in **Figure 5**, the development will comprise:

- Expanded terrain at the Crystal Basin, and provision of gondolas from a Village Centre to the Crystal Basin and existing Porters Ski Area
- A Village Centre with retail and service facilities,
- Visitor accommodation ranging from backpacker type accommodation, through to apartments, and hotels. There will also be chalet type visitor and permanent accommodation.
- A large basement car parking area under the Village Centre, surface car parking areas to cater for peak times, and car parking associated with the buildings outside of the Village Centre;
- An upgraded access road from SH73 to the Village, generally along the existing access road alignment.

It can be expected that the Village, Ski Area and accommodation facilities will be a significant attraction for both overseas and domestic visitors, as it will be an on-mountain full service alpine village. In the skiing off-season the Village will continue to operate and provide facilities and activities as a year-round destination, albeit with a likely lower level of activity than during the ski season.

The proposed road network in the Village is shown on the Outline Development Plan in the proposed Plan Change.

6.2 On Site Traffic Circulation

Figure 6 shows the concept plan for the Village with the vehicle and pedestrian routes and linkages highlighted. As can be seen, the main access road leads directly into the primary basement parking area under the Village Centre which will include coach and car drop off areas. It is proposed that one-way entry and egress to the basement will be provided to minimise vehicle and vehicle / pedestrian conflicts in this high turnover area.

An outside drop-off area will also be provided at the same level as the Village Centre which it is understood will predominantly be used for off-season visitors.

Secondary circulation routes will be provided to link to the Porters Chalets and Slopeside Accommodation in the southern part of the site, and the Crystal Chalets and visitor accommodation areas in the northern part of the site. The existing access road will continue to the existing Porters Ski Area for use by staff and operations vehicles only.

The routes proposed to be utilised for coach access and egress are specifically highlighted in order to ensure that such vehicles can be accommodated when the detailed designs are developed.

G:\10000-10999\10600-10699\10635 Porters Skifield\ACAD\10635-C5A.dwg

Boffa Miskell
www.boffamiskell.co.nz

0 150m
1:2,500 @ A1
1:5,000 @ A3

Data Sources:
Aerial photo supplied by NZ Aerial Mapping.

Legend

- Proposed buildings
- Existing buildings
- Hot pools
- Waterways
- Plaza space
- Bridge
- Ski area Short tussock + browntop mix
- Roads/Carparking
- Existing species mix
- Mountain beech
- Toetoe + Dracophyllum mix
- Mountain beech + tussock mix

PORTERS MOUNTAIN RESORT

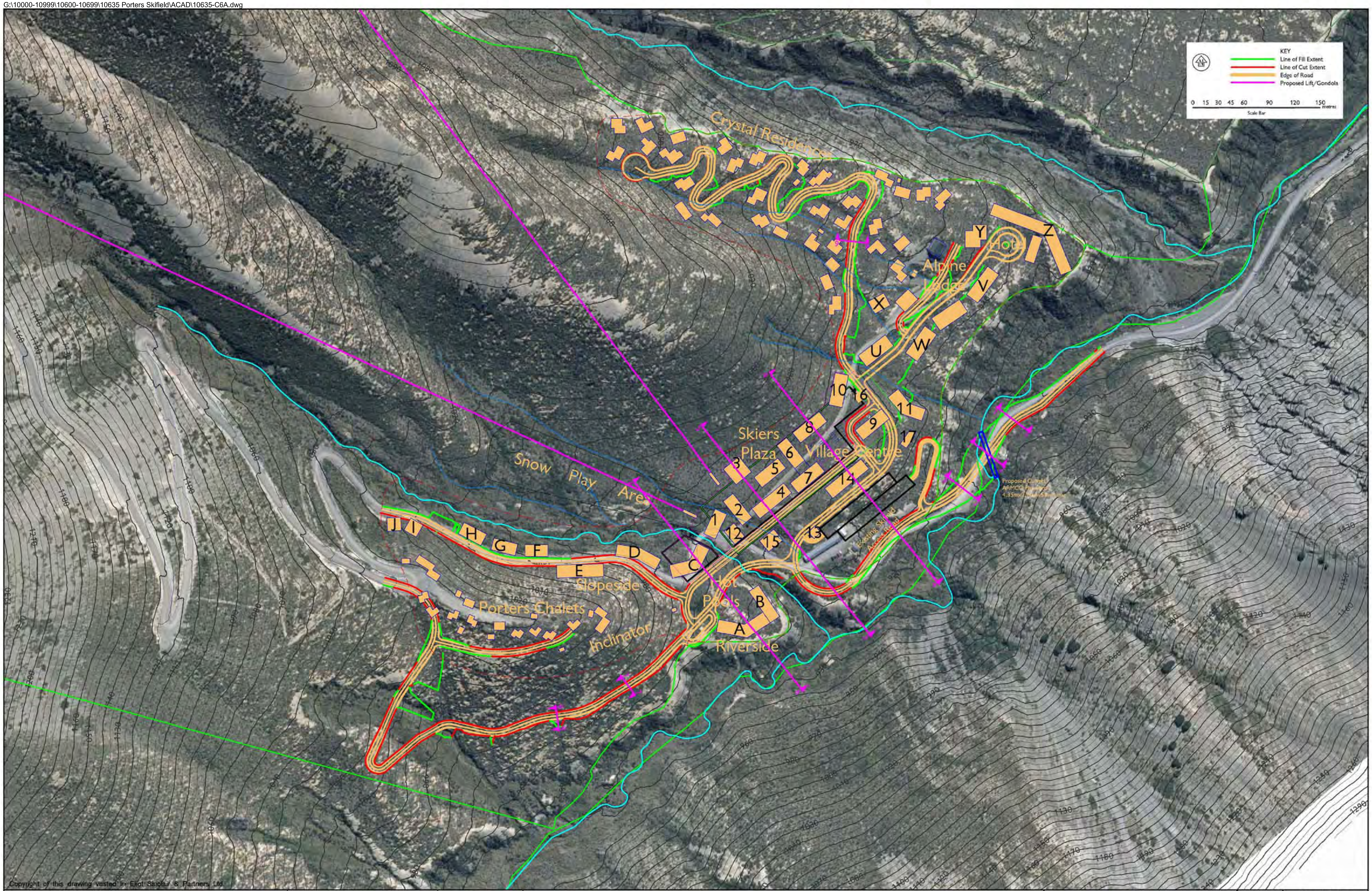
5 Masterplan

Date: 17 June 2010

Plan prepared for Blackfish by Boffa Miskell Limited

Author: gary.white@boffamiskell.co.nz | *Checked:*

G:\10000-10999\10600-10699\10635 Porters Skifield\ACAD\10635-C6A.dwg



Scale: 1:2000 (A1) 1:4000 (A3)				Date: 29/06/2010				origin of levels
no.	amendment	initial	date	checked				UF66 (B85L)
				drawn	N. Burrowes			0.3km North of Dry Stream (SH73)
				designed	M. Sinclair	surveyed	RCP	R.L. 771.3479
				manager	M. Sinclair	surv.date	Jan 10	datum Lyttelton 1937

PROPOSED VILLAGE
VILLAGE ROADING LAYOUT
PROPOSED PORTERS SKI AREA EXPANSION

Eliot Sinclair & Partners Limited
Surveyors • Engineers • Planners
151 Kilmore Street, PO Box 4597, Christchurch 8140, N.Z.
Telephone: (03) 379-4014 Fax: (03) 365-2449

6

Drawing Set
298875 E3
PLOT E3 CITY PLAN
rev.
Sheet 1 of 3

The Village Centre itself will be a pedestrian precinct, linked to the basement car park via lifts and travelators. At one end of the Village Centre will be the gondolas providing Ski Area access, and these will be within nominal walking distance of the central development area. Whilst walking movements between the Crystal Chalets / Porters Chalets and the Village Centre can be made, it is likely that practical walking distances will be diminished where equipment is being carried and so it is also expected that the chalets will also be served by an on-site shuttle service to minimise the need for visitors to use private vehicles.

6.3 Car Parking

The Village will provide a large basement car park to cater for the expected parking demands associated with the Village Centre and central accommodation activities. The basement car parking will also accommodate coach and car drop off areas.

Additional car parking will be provided near to the Village Centre to accommodate the majority of the day visitor parking at times of peak activity during the ski season. Additional areas further from the Village Centre will be allocated to provide for overflow parking.

Each of the accommodation and residential facilities outside of the Village Centre will have parking allocated in the immediate vicinity of the buildings.

6.4 Bus Parking

As noted above, buses will utilise an internal area in the Village Centre basement for pick up and drop off, with the final site layout being subject to detailed design at a later stage. It is anticipated that site management plans could be produced to enable the pick-up and drop-off area to accommodate some level of longer stay coach and bus parking on less busy days, although there would be no reason why buses or coaches could not be accommodated off site if desired.

6.5 Service Vehicles

The Village roads will also be designed to accommodate service vehicles such as those required for rubbish and utility servicing.

7. Traffic Generation and Distribution

7.1 Existing Ski Area Activity

As noted above, the traffic generation of the present Ski Area is in the order of 600 vehicle movements per day.

Based on the traffic surveys undertaken at other Ski Areas, it is understood that approximately 60% of the vehicles arrive during the morning peak hour of activity, and 40% leave in the evening peak hour of activity. The existing peak hour travel patterns are therefore approximately 180 vph in the morning peak, and 120 vph in the afternoon peak.

7.2 Proposed Plan Change

It is expected that buses and coaches will form an important mode of transport for visitors to the Ski Area and Village. Several small operators already service the Ski Area, and it is expected that this would expand to accommodate the upgraded ski area activities. Coaches servicing the visitor accommodation will be in close range of Christchurch, ensuring that there will be opportunity to provide for transport at rates that are competitive with rental cars. Given the resort facilities and easy ski area access, it is therefore anticipated that coach transport to the resort would be well utilised and there will not be a heavy reliance on private motor vehicles, and this has been factored into the traffic generation calculations accordingly.

7.2.1 Permanent Residents

The Village provides for approximately 45 permanent residential dwellings. Surveys of household traffic generation patterns have been undertaken in rural parts of Canterbury that are in close proximity to major service towns, and these have shown a daily household traffic generation rate in the order of 6 vpd/household. Given the remote location of the site (being 50km from the nearest major service town of Darfield), it is expected that the traffic generation rate of the Village's permanent residences would be somewhat lower as residents will link trips for activities. Further, it is expected that a portion of the permanent residences will not be occupied at all times throughout the year due to their use as holiday homes. In this regard, the use of a slightly lower traffic generation rate of 4 vpd/household is considered to be appropriate for assessment of traffic generation for this land use activity.

In addition to the permanent residents living in the residential dwellings, it is expected that there will be approximately 200 people permanently staying within the various visitor accommodation buildings elsewhere in the site. Assuming an equivalent household size of 3 people, this is the equivalent of a further 66 households for the purpose of traffic generation calculations.

The calculated traffic generation associated with the permanent residents is therefore 450vpd throughout the year.

7.2.2 Overnight Visitors

Generally, there is an absence of data available in the literature regarding traffic generation of accommodation facilities within a remote mountain resort. The typical method of applying a traffic generation rate per accommodation unit for hotels and visitor accommodation is likely to over-predict the extent of traffic generation for a development of this scale as the nature of the development will result in visitors primarily staying within the site, and without significant external travel (other than arrivals and departures).

For the purposes of assessing the likely traffic generation of the site, Porters visitor projections which take account of the attractiveness of the site during the different seasons have been adopted.

The pattern of arrivals and departures to the site will be subject to some variability and dependent on how the Village and Ski Area operate and are promoted. If an allowance is made for an average duration of stay of 2 to 4 days (and given the large number of flights into Christchurch International Airport from both domestic and international origins throughout the week), it is considered unlikely that there will be significant peak periods of visitor arrival and departure to the Village on any particular days when the resort is operating at or near capacity.

Traffic generation calculations for overnight visitors have allowed for the following:

- The estimated average duration of stay (based on Statistics NZ data for Queenstown)
- The visitation on any night will be spread across the accommodation types, based on a pro rata of the various capacities
- A transport mode split between private car and bus
- An assumed occupancy per vehicle (taking into account the Statistics NZ guests per stay unit data for Queenstown)
- Allowance for a proportion of visitors staying multiple nights to undertake day visits into the surrounding area.

The trip generation associated with the overnight visitors is shown in Table 3 below.

Period	SUMMER		WINTER	
	Average	**Peak**	**Average**	**Peak**
Number of Visitors (People)	800	1500	1400	2600
Arrivals and Departures				
Duration of Stay	2.5	2.5	3.5	3.5
Daily arrivals (people)	320	600	400	743
Daily departures (people)	320	600	400	743
Total (people)	640	1200	800	1486
Private car Assume 80% travel by car and each car has occupancy of 2.2 people				
Visitors arriving by car per day	512	960	640	1190
Car movements per day	232	436	291	541
Buses / coaches Assume 20% travel by car and each vehicle has occupancy of 25 people				
Visitors arriving by coach per day	128	240	160	296
Coach movements per day	6	10	7	12
Day Trips				
Allow for 15% of visitors to make one day trip during their stay in summer and 5% in winter				
Private car movements per day	88	164	51	95
Coach movements per day	2	4	2	2
Total (in+out)	**328**	**614**	**351**	**650**

Table 3: Overnight Visitors – Traffic Generation

It can be seen the busiest period of activity will be during the winter when the daily traffic generation associated with the overnight visitors will be approximately 350vpd on average, with a peak of up to 650vpd.

7.2.3 Ski Area Day Visitors

Data from South Island ski areas shows a strong linear relationship between the car traffic generation and the daily visitors to the ski areas. Based on observed (confidential) data, around 85% of day visitors to a ski area can be expected to arrive by private car with 15% arriving by bus or coach. Based on the same data, the following calculated rates have been adopted:

- An occupancy of 3.8 people per car on weekdays
- An occupancy of 3.4 people per car at weekends

The following traffic generation has then been calculated, based on a season average day visitation of 1,400 visitors per day, and a design level season peak of 2,900 visitors per day representing a typical busy weekend. It is noted that there may be approximately 4-5 higher days, but it is not considered appropriate to assess the absolute maximum level of activity:

Period	**WINTER**	
	Average	**Peak**
Number of Visitors (People)	1400	2900
Private car		
Visitors arriving by car per day	1190	2465
Car movements per day	626	1450
Buses / coaches		
Visitors arriving by coach per day	210	435
Coach movements per day	17	35
Total (in+out)	**643**	**1485**

Table 4: Ski Area Daily Traffic Generation

It can be seen that the weekend peak will result in daily traffic volumes of over two times the average.

7.2.4 Servicing

There will be ancillary traffic generation associated with servicing and maintaining the Village. However, it is expected that such movements will be relatively small (that is, less than 5% of the total) in comparison to the overall traffic generation, and the timing can easily be managed to avoid peak patterns associated with the Ski Area activity. As such, no further consideration has been given within this analysis to any additional servicing traffic generation.

7.3 Net Traffic Generation

Based on the figures above, the net traffic generation is as follows:

Trip Source	SUMMER		WINTER	
	Average	Peak	Average	Peak
Permanent residents	450	450	450	450
Overnight visitors	328	614	351	650
Ski area day visitors	-	-	643	1485
Minus existing ski area operation	-	-	300	600
Total (in+out)	**778**	**1064**	**1144**	**1985**

Table 4: Net Traffic Generation of Site

It can be seen that the winter activities at the site represent the busiest period, when the average daily traffic volume is approximately 2,600vpd, of which 1,985 vehicle movements per day will be newly-generated. Over the course of the year, on average around 1,100 vehicle movements per day can be expected.

The three main components of traffic generation of the resort (being permanent residents, day skiers, and overnight visitors) are expected to have distinct peaks in both time and direction of movement when considered at an hourly level. For example, typical patterns could be expected to be as follows:

- residents will leave early morning and arrive back early evening
- skiers will arrive early-mid morning, and depart mid-late afternoon
- overnight visitors will arrive mid-late afternoon, and leave mid-late morning

In this regard, the peak hourly periods and patterns of traffic associated with the resort are not likely to overlap in the same direction at the same time of day, and thus the table above represents an extreme scenario. Given the relative numbers of vehicles involved, the performance assessment of the SH73 / Access Road intersection and the level of service of SH73 has been undertaken primarily based on the patterns associated with the ski area day visitors.

For this analysis, an allowance has been made for 70% of the incoming trips to arrive and depart within a single hour period at the site. This means that in the morning peak hour, around 560 vehicles will enter the site. The departures from the site in the evening peak hour will be more dispersed as the capacity of the ski lifts and gondolas serve to limit the number of people who will be able to exit the site. An allowance has been made for 50% of the total number of departures to occur within a one hour period.

7.4 Traffic Distribution

The majority of traffic is expected to be associated with locations towards the east, with Christchurch and the International Airport being a major trip origin / destination point. It is likely that only a small proportion of traffic will be coming from or going to the west, although it is possible in due course that the Village could form a stop on longer coach tours through Arthurs Pass and the West Coast. The expected traffic distribution is therefore 90% to/from the east and 10% to / from the west.

8. Effects on the Transport Network

8.1 Porters Ski Area Access Road

Following the full expansion of the Ski Area and the establishment of the Village, the Ski Area Access Road will accommodate on average approximately 1,100vpd. During the seasonal peak in the winter, this would increase to approximately 2,600vpd with the potential for occasional peak traffic volumes exceeding this level.

Such a volume will be readily accommodated on the upgraded Ski Area Access Road, which will be widened and sealed in accordance with Selwyn District Council standards to provide for full two way traffic. It is anticipated that existing arrangements with Selwyn District Council for maintenance of the road will be continued.

As noted earlier, SH73 currently carries 1,500vpd, with annual growth at approximately 2% per annum. Allowing for a nominal ten year development period and continuing growth at the historic growth rate, the through traffic volume on SH73 in ten years would be approximately 1,800vpd.

The design level (maximum) peak morning hour in the ski season will involve approximately 470vph entering from the south, and 50vph entering from the north. Other traffic on the highway at the peak time of the resort generation is unlikely to exceed 100vph, and the traffic leaving the resort will be relatively small. The volume will require the provision of a full left turn deceleration lane from the south to accommodate the turning traffic at peak times. A right turn from the north would not be required under the current turn priority rules, although it would fit the warrant based on AUSTROADS criteria adopting the potential future right turn rule (this change was recently signalled as a likelihood by the NZ Government).

During the evening peak, the Ski Area Access Road will have approximately 330vph turning right, and 40vph turning left associated with Ski Area departures. Through traffic volumes on SH73 may be up to approximately 150vph.

These peak traffic scenarios at full development have been modelled within the SIDRA Intersection software, and show that the critical turning movements will be able to be undertaken with an acceptable level of service, with spare capacity still being available. The left turn into the site will effectively operate as a continuous movement with the low opposing movement, even under current NZ turning priority rules. The afternoon right turn out will operate close to its capacity, as vehicles are required to give way at the intersection. However these queues will be retained entirely on the access road and given the nature of the facility, would not be unexpected.

Given the very unbalanced flows at the intersection, it may be possible to implement a temporary traffic management plan with manual traffic controllers on the very busiest days each season where the peak conditions exist to manage the possible traffic queuing. Such an activity would be a minor inconvenience to through traffic but would be over a very short period, and is unlikely to be required more than a few times a year.

8.2 SH73 / Access Road intersection

The existing SH73 access to Porters Ski Area will be upgraded to accommodate the additional traffic that will be generated by the proposal. Based on the anticipated visitation, it is proposed that ultimately a right turn lane and left turn deceleration lane will be required in order to safely and efficiently accommodate the increased levels of traffic. Following discussions with NZTA, it is

understood that the Agency wishes to implement such turning lanes at a time which it considers them to be necessary, in order to better take account of the high seasonal flow through the intersection. Porters will however provide seal widening in order to allow for the future marking of the turning lanes. This requirement should be reflected in the proposed plan change rules.

As noted above, the sight distance for emerging drivers is limited in one direction. It is therefore recommended that the proposed plan change requires this sight distance to be improved prior to the commencement of construction of the site.

8.3 SH73 Route

A level of service analysis has been undertaken to determine the change in level of service during peak conditions. The level of service during the busiest hour will be level of service LOS D/E in the peak hour of activity, when day skier traffic is travelling to the Ski Area. This level of service represents relatively heavy traffic flows for a mountainous region. However this would occur for only several hours each year, and as most of the traffic on the highway is related to the expanded Ski Area, effects on other road users will be minimal.

The increase in traffic will result in increased crash exposure on the highway and potentially additional road crashes, particularly over the mountainous Porters Pass section of the road. Applying the average traffic volume to the route crash analysis rates reported earlier in this report, there is the potential for an additional 1.5 injury crashes per year over the 21km section of highway (calculated from approximately 2.8 million veh-km of exposure generated from Springfield to the Ski Area access road). However, and by way of comparison, there were 107 reported injury crashes on the State Highway network within Selwyn District in 2008 and the increase is therefore comparatively small. Further, the net increase overall may in practice be considerably less than this, as some crashes will be simply displaced from other locations as skiers choose to visit Porters Ski Area rather than other alternatives elsewhere.

8.4 Emergency Access

The Plan Change site has only one formed road access to the site from SH73, and is subject to road closures due to weather conditions as well as accidents on SH73 to both the east and west. Emergency services may therefore have difficulty reaching the site from nearby townships, and it will be necessary to consider the provision of on-site emergency response personnel.

Lyndon Road provides an alternative route to the site if SH73 is closed between Porters Pass and Springfield due to a road crash, although it is likely to also be susceptible to snow conditions. Similarly, SH73 via Arthurs Pass also provides alternative lifeline access if there is major closure of roads from the east. Furthermore, the site itself will have a helipad.

9. Parking Demand

9.1 Current District Plan Provisions

The development to be facilitated by the proposed Plan Change is considered to be unique within Selwyn District and consequently the activity types are not realistically addressed within the parking provisions of the District Plan. For example, the parking requirement in the District Plan which is closest in nature to the activity at the existing Ski Area is that for 'sports grounds and playing fields' where 15 parking spaces per hectare of playing fields is required. With an (existing) skiable area of 230ha, this would equate to a requirement of 3,450 car parking spaces, yet the current peak demand at the Ski Area is only around 10% of this figure.

As a result, it is envisaged that the proposed Plan Change will include additional zone-specific parking Rules, as described below.

9.2 Proposed Provisions

9.2.1 Parking Demand for Day Visitors

As noted above, the season average day visitation is expected to be some 1,400 visitors per day, with a design level season peak of 2,900 visitors per day representing a typical busy weekend. There is a significant cost in providing fully formed parking to accommodate peak demands, and so it is common practice for any major parking generator to provide formed spaces for a "design level" which will comfortably address the majority of peak parking demands, with occasional peaks accommodated in less formal overflow parking areas. Consequently, the latter figure of 2,900 visitors has been allowed for within the calculation of parking demand.

The first principles assessment has been undertaken based on the maximum person capacity of the Ski Area, using traffic count data, including vehicle occupancy information, recorded at another Ski Area in New Zealand. Based upon this data, a breakdown of parking spaces required can be calculated.

Scenario	Number of Visitors	Car Spaces	Coach Spaces
Design level (95%ile)	2,900	870	13
Maximum capacity	4,700	1410	21
Required overflow provision (for maximum)	1,800	540	8

Table 2: Day Visitor Parking Requirements

Given that this is a plan change, the detailed provision of the car parking plus overflow provision is not addressed further. However, as the projected parking demands are reliant on achieving the comfortable lift carrying capacity of 6,000 people per day it would be appropriate to stagger the required parking provision as the Ski Area develops. Similarly, from a traffic effects perspective, the precise location of parking is not a significant issue as all effects can be contained within the site.

Depending on the location of the overflow parking areas, it is expected that they could be serviced by shuttle bus (as occurs at most ski fields and indeed currently occurs at Porters Ski Area).

9.2.2 Parking Provision for Accommodation

There are very few comparable developments from which a robust parking rate can be developed. However, a recent proposed Plan Change (PC18) to the Queenstown Lakes District Plan, which has now been approved by the Environment Court, considered the parking demand at a similar development to that proposed at Porters Ski Area. When complete, the Mount Cardrona Station development will include both residential and visitor (hotel type units) accommodation and will be sited along the existing ski area access road and proximate to the Cardrona Ski Area.

The following parking rates were applied to that proposed Plan Change, and were considered to be appropriate through the Hearings process:

- **Residential Accommodation:** 2 car parking spaces per unit
- **Visitor Accommodation (hotel type):** 1 space per 3 guest rooms up to 60 rooms, thereafter 1 per 5 guest rooms. In addition 1 coach park per 50 guest rooms and 1 staff space per 20 beds.

In addition to the above accommodation types, the development facilitated by the proposed Plan Change at Porters Ski Area will include backpacker/lodge accommodation and visitor accommodation where cooking facilities are provided. Given that the Queenstown District provides a substantial amount of similar visitor accommodation, it is considered appropriate to adopt the parking requirements in the Queenstown Lakes District Plan. Moreover, these parking rates have recently (through Plan Change 8) been subject to some scrutiny and assessment from first principles and a comprehensive survey of visitor accommodation.

- **Backpacker / Lodge:** 1 space per 5 guest beds. In addition 1 coach park per 50 guest rooms and 1 staff space per 20 beds.
- **Visitor Accommodation (apartment type):** 1 space per 15 units; thereafter 1 space per 2 units. In addition 1 coach park per 30 units and 1 staff space per 10 units.

It should be noted that Mount Cardrona Station is relatively close to both Wanaka and Queenstown, and can therefore be expected to have slightly different parking characteristics to the expanded Porters Ski Area. In particular, it is considered that there will be more travel associated with Mount Cardrona Station both for employment purposes but also because that plan change did not include retail development as is proposed at Porters Ski Area.

Also, it is likely that the coaches travelling to and from the development will serve multiple destinations within the Village, thereby requiring significantly fewer coach parking spaces. Furthermore, many of the coaches are also likely to utilise Christchurch or other off-site locations as a base, and potentially timetable trips to provide a morning skier drop-off / overnight visitor pick-up and an afternoon visitor drop-off / skier pick up. As such there will be significant opportunities for efficiency gains in coach use and parking.

In summary, the following parking rates are considered to be appropriate for the proposed plan change:

- **Residential Accommodation:** 2 car parking spaces per unit;
- **Visitor Accommodation (hotel type):** 1 space per 3 guest rooms up to 60 rooms, thereafter 1 per 5 guest rooms. In addition 1 coach park per 50 guest rooms and 1 staff space per 20 beds.
- **Backpacker / Lodge:** 1 space per 5 guest beds. In addition 1 coach park per 50 guest rooms and 1 staff space per 20 beds.
- **Visitor Accommodation (apartment type):** 1 space per 15 units; thereafter 1 space per 2 units. In addition 1 coach park per 50 units and 1 staff space per 10 units.

10. Construction Effects

Given that this is a plan change request, details of the anticipated construction traffic, workforce numbers and duration of the works are not available.

Consequently, it is not considered appropriate to address any construction-related traffic effects within this assessment. Rather, it is envisaged that a Construction Traffic Management Plan will be required as a condition of consent as and when the site develops. This will address matters such as the effects of the additional traffic movements on the SH73 / Access Road intersection and on the highway.

11. Planning Policy Framework

11.1 Canterbury Regional Policy Statement

The Canterbury Regional Policy Statement (RPS) has been prepared to meet the requirements of the Resource Management Act 1991, and aims to promote sustainable management of natural and physical resources.

Chapter 15 of the RPS outlines four policies directly relevant to transport. These policies are:

> Policy 1: *"Protect Canterbury's existing transport infrastructure and land transport corridors necessary for future strategic transport requirements by avoiding, remedying, or mitigating the adverse effects of the use, development or protection of land and associated natural and physical resources on transport infrastructure."*
>
> Policy 2: *"Promote the use of transport modes which have low adverse environmental effects."*
>
> Policy 3: *"Promote changes in movement patterns, travel habits and the location of activities, which achieve a safe, efficient and cost-effective use of the transport infrastructure and reduce the demand for transport."*
>
> Policy 4: *"Ensure that in the provision, realignment or maintenance of transport infrastructure, adverse effects on natural resources that meet the criteria of sub-chapter 20.4 are avoided, remedied, or mitigated."*

Chapter 12 of the RPS outlines policies relating to Settlement and The Built Environment. The relevant transport policies within this section of the RPS are:

> Policy 1: *Promote settlement and transport patterns and built environments that will:*
>
> *(a) result in increasingly effective and efficient use of resources, particularly energy.*
>
> *(b) reduce the rate of use of non-renewable energy sources.*
>
> *(c) minimise the adverse effects of emissions into the atmosphere resulting from the use of motor vehicles and building heating.*
>
> *(d) incorporate energy efficient approaches to building orientation, form and design.*
>
> Policy 3: *Encourage settlement patterns that will make efficient use of the regional transport network.*

The Plan Change site is in accordance with the above policies by efficiently gaining access to the strategic transport network via an existing road and an existing intersection. The proposed Plan Change will facilitate the improvement of the existing access off SH73, which will provide for safe and efficient access to SH73.

The use of public transport will be promoted and accommodated as a method of travelling to the Plan Change site with the aim of reducing reliance on the private car. In addition, the Plan Change will facilitate the provision of on-site accommodation which will minimise the demand by guests for transport external to the site for the duration of their stay.

Based on surveys at other Ski Areas, the development that will be facilitated by the Plan Change is likely to have a high rate of car sharing, helping reduce the number of vehicles visiting the site.

The Plan Change area is connected to surrounding population centres such as Springfield, Darfield, and onwards to Christchurch by an efficient transport network which will help minimise any stop-start occurrences during vehicle trips to the site.

11.2 Canterbury Regional Land Transport Strategy

The Canterbury Regional Land Transport Strategy (RLTS) 2008-2018 describes a series of key result areas for achieving the vision of "the best possible quality of life".

The RLTS takes into account the priorities, needs and aspirations contained in the New Zealand Land Transport Strategy and the Land Transport Management Act as well other national policy documents specifically addressing vehicle emissions, road safety, walking and cycling and climate change.

The RLTS states that quality of life is supported by a land transport system that:

- provides equitable access for all sectors of the community
- supports a thriving economy
- promotes a social environment that is safe and supportive
- promotes public health outcomes, is pleasant and environmentally sustainable
- is safe
- involves community participation in land transport decision-making
- is part of an integrated planning framework
- is innovative and responsive to change

The RLTS identifies five key result areas that represent a balanced approach to achieving this vision, and provides policy under each category. These areas are:

- alternative modes
- roads: safety, public health, environmental sustainability and infrastructure
- demand management
- land use
- freight

The site can provide safe and direct access to the existing arterial transport network through an existing intersection, and will not adversely impact on the effectiveness of the strategic transport network. The proposed Plan Change will facilitate the improvement of the existing access intersection with SH73 which will be beneficial in terms of road safety and efficiency.

The Village is intended to have a compact form with a centrally located commercial and service centre specifically tailored for the needs of pedestrians with consideration given to the reduced walking speed and distances associated with carrying or wearing ski equipment. The facilities for ski area access will be unique within the New Zealand but will provide for a high level of convenience and ease of access.

The development of the Plan Change site will not impact on the programming of provision for transport infrastructure in the wider network as outlined in the RLTS, or require other regionally significant transport infrastructure provision not already programmed.

11.3 Council's 2009 Walking and Cycling Strategy

The Council's strategy has four main goals, of:

- Goal 1: improving safety for pedestrians and cyclists;
- Goal 2: more people choosing to walk and cycle more often;
- Goal 3: convenient and safe community environments and transport systems that encourage and support walking and cycling; and
- Goal 4: a transport system that is more sustainable in the long term.

The development that will be facilitated by the proposed Plan Change will be designed specifically to provide a safe and convenient environment for pedestrians within the site. While it is unlikely that people will travel to the Ski Area by bicycle or foot given its remote location, once on site there will be little or no demand for vehicular transport, with the vast majority of trips capable of being made by foot.

11.4 Greater Christchurch Travel Demand Management Strategy

The Greater Christchurch Travel Demand Management (TDM) Strategy sets four goals, of:

- a reduction in the current number of motor vehicle trips made by private car;
- an increase in the proportion of trips made using sustainable travel options;
- a reduction in the distance travelled for regular and local trips; and
- a change in the time of travel.

The TDM Strategy sets out that in order to achieve these outcomes, six policies need to be incorporated into the Council's strategic and operational planning. As a result, the outcomes are of limited relevance to proposed Plan Change. This includes, for example, increasing the awareness of sustainable travel choices, providing information to travellers as to how and when to travel using sustainable transport options, and undertaking education and marketing activities in conjunction with transport pricing.

However, by providing adequate parking provision for buses and coaches within the Plan Change site, the proposal is consistent with the aims of this Strategy. Furthermore, the provision of on-site accommodation within the Plan Change site will help minimise travel times for some of the visitors to the site and allow the guests to make use of the facilities on consecutive days without having to leave the site.

11.5 District Plan Issues and Objectives

The Selwyn District Plan summarises a number of issues related to transport in rural areas. Those of which relate to this plan change are paraphrased below:

- Safe and efficient use of the transport network
- Effects of transport network on surrounding environment
- Effects of transport on energy use and the environment

Section 2.1 of the District Plan outlines the transportation related objectives and policies of the Plan, along with the environmental outcomes expected as a result of their implementation. Each environmental outcome which relates to this proposal is discussed below:

- All roads are formed and maintained to the standards necessary to carry the type and volume of traffic using them, safely and efficiently.
- Strategic Roads are the most efficient roads for carrying "through" traffic
- Visibility is maintained for motorists and pedestrians at vehicle crossings and intersections, and for motorists, pedestrians and train drivers at road / rail crossings.
- Roadside signs are easy and quick for motorists to read, with large letters and symbols.
- Roadside stalls and vehicular accessways are located along straight stretches of road, with plenty of room to manoeuvre safely on and off the road.
- Areas along roadsides and railway lines are not damaged or are replanted when roads or railway lines are constructed, repaired or realigned.

The Plan Change proposal is consistent with the above mentioned outcomes. The through movement function of SH73 will not be compromised as no new connections to SH73 are proposed. The proposed Plan Change will facilitate the improvement of the existing intersection, thereby maintaining (and enhancing) the safety and efficiency of the road.

The improvements to the intersection that will be facilitated by the proposed Plan Change will ensure sufficient sight distances are available and adequate room to manoeuvre is provided for all road users.

The existing advance warning signs have large letters and symbols and are quick and easy for drivers to read.

Suitable roadside treatments will be provided after any changes to the existing intersection that will be facilitated by the proposed Plan Change.

11.6 District Plan Rules

The proposed Plan Change site will be developed in accordance with the ODP. The roads within the development will be potentially a mix of public and private ownership. However, it is also anticipated that the development facilitated by the proposed Plan Change will be designed in accordance with the District Plan rules for car parking dimensions and manoeuvring areas.

Zone specific rules relating to parking provision will be required that address the particular parking characteristics of the site. Similarly, the improvements to the SH73 / Porters Ski Area access road intersection will be subject to a zone-specific rule or upgrading as a condition of either subdivision or prior to construction commencing to ensure that the intersection can safely and efficiently accommodate the projected traffic demands.

Given the unique nature of the development, and reliance within the transport assessment on projected visitation patterns, there is a need to maintain some flexibility to ensure the transport provisions of the site satisfy the final form of development undertaken. Development of appropriate assessment matters is therefore recommended.

12. Conclusions

The expanded Porters Ski Area is proposed to expand the Ski Area terrain and enable the establishment of a village attracting a large number of overseas and domestic visitors for a year round alpine experience. From a transportation perspective, the key matters relate to providing safe access to SH73, ensuring the ODP provides for efficient travel within the site, and setting appropriate mechanisms within the District Plan in terms of parking requirements.

Based on the preceding analyses, it is considered that the traffic-related effects of the proposed plan change can be accommodated by the adjacent transportation networks, subject to the measures outlined above. Because of the somewhat unique nature of the site, it is difficult to evaluate the degree of compliance with overarching strategic documents, but overall it is considered that the proposed plan change is not contrary to the relevant transport-related strategic and policy documents.

Accordingly, from a traffic and transportation perspective, there is no reason why this proposed plan change could not be adopted.

Traffic Design Group Ltd
July 2010