Henley Downs Plan Change

RCL Queenstown Ltd

Transportation Assessment Report

December 2012

Traffic Design Group

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Henley Downs Plan Change

RCL Queenstown Ltd

Transportation Assessment Report Quality Assurance Statement

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Status: Final report

Date: 21 December 2012

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1. Introduction

Traffic Design Group was commissioned by RCL Queenstown Ltd to prepare a Transportation Assessment for a proposed Private Plan Change at Henley Downs, located adjacent to Jacks Point, approximately 5km south of Frankton on SH6. The intention of the Plan Change is to alter the existing internal neighbourhood boundaries of the QLDC Structure Plan covering the Jacks Point and Henley Downs area and increase the residential densities permitted within the Henley Downs development area.

The current zoning at Henley Downs allows for a mix of residential and commercial development and an educational facility. The development at Henley Downs that would be facilitated by this Plan Change would include:

- a reduction in the level of commercial activity; and
- an increase in the number of residential dwellings.

The development at Henley Downs would be served by an additional access onto SH6, which would be provided in the location of the existing SH6 / Woolshed Road intersection. The internal road network for Henley Downs will be integrated with the road network for the permitted development at Jack's Point.

This Transportation Assessment Report identifies the potential traffic effects of the proposed Plan Change and connections to the roading network, including reference to relevant transportation policies and objectives within local and regional planning documents.

This assessment also considers the implications of travel to and from the proposed development on the adjacent transport network, and demonstrates how any potential adverse effects can be mitigated or minimised. Whilst this Transportation Assessment includes coverage of travel by private motor vehicle, it also recognises the importance of other forms of transport. Consequently consideration has also been given to public transport, walking and cycling.

2. Existing Transport Environment

2.1 Site Location

The Henley Downs Plan Change site is located on the western side of State Highway 6 (SH6) approximately 5km south of Frankton and 35km north of Kingston. The site extends between SH6 and the eastern edge of Lake Wakatipu and is situated adjacent to the existing Jacks Point development. The location of the Plan Change site is shown in **Figure 1.**

2.2 Land Use

Based on the existing zoning for Jacks Point and Henley Downs, the permitted baseline is estimated to allow for the following land uses.

Jacks Point

- Golf course
- 800 houses in residential neighbourhoods
- 18 houses on rural residential preserve sites
- 700 houses in village
- 150 visitor accommodation units
- 6,000sqm office area
- 12,000sqm retail area (max 200sqm per retail unit)

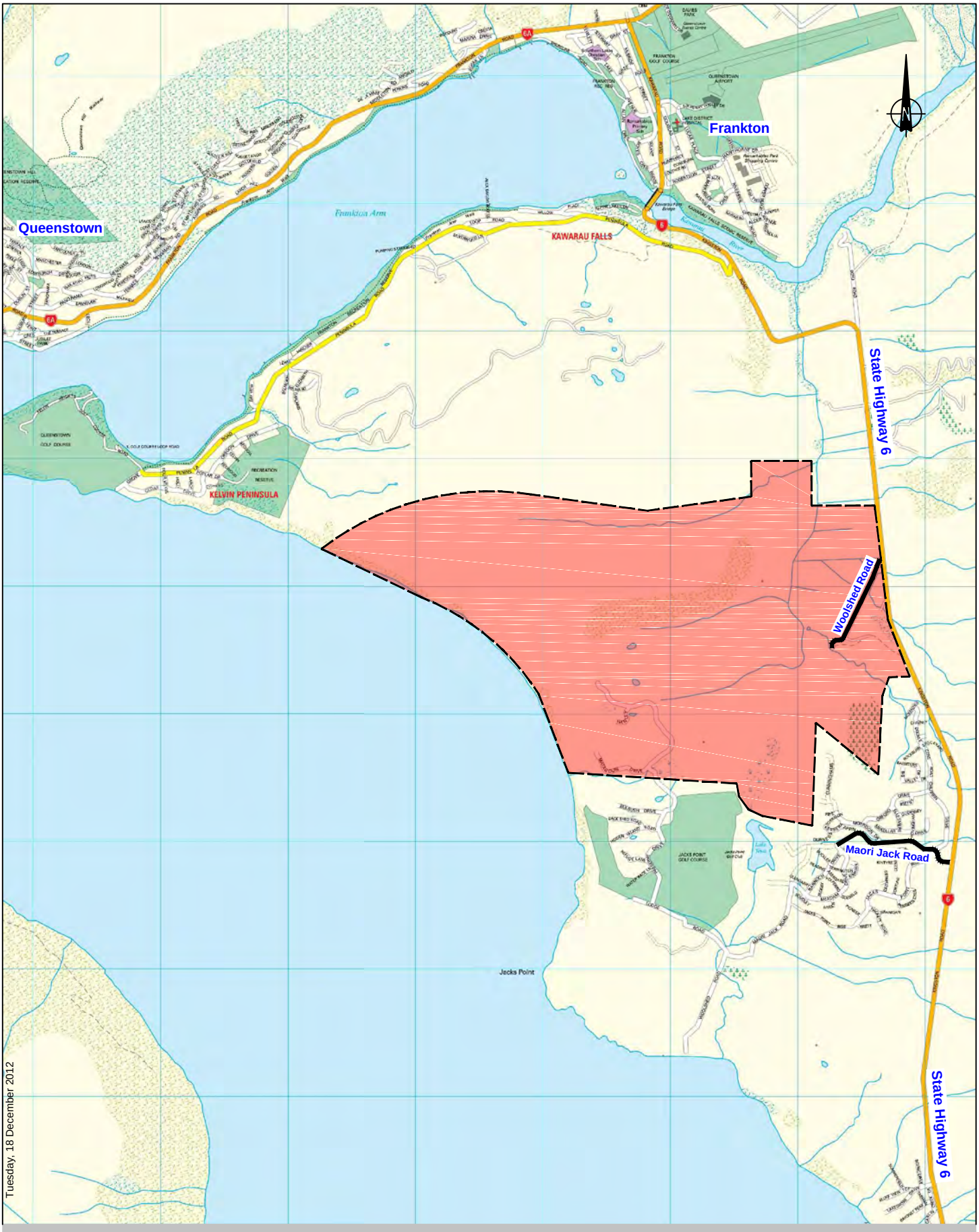
Henley Downs

- 1,280 houses in residential neighbourhoods
- 16 houses on rural residential preserve sites
- 4,600sqm office area
- 9,400sqm retail area (max 200sqm per retail unit)
- Primary School to cater for 600 pupils

2.3 Road Network

2.3.1 State Highway 6

In the immediate vicinity of Henley Downs, SH6 provides the only formed and sealed two-lane roading connection serving the various activities in the area and allowing movement of other vehicles through the area. As illustrated in Photograph 1, SH6 in the vicinity of the site has a straight alignment. The speed limit along SH6 in the immediate vicinity of the Henley Downs is 100kph. Under the District Plan for Queenstown Lakes District, SH6 is classified as a Major Arterial route. Arterial roads are the dominant elements of the road network, connecting major settlements with other areas in the District.



Henley Downs Plan Change

Site Location

Traffic Design Group

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Photograph 1: SH6 (Kingston Road) looking south towards Woolshed Road

In its District-wide function, SH6 provides the connection between Cromwell, Frankton, Kingston and as far as Invercargill some 170km to the south.

Figure 1 shows road network in the vicinity of the site.

2.3.2 Woolshed Road

Woolshed Road is an unmarked two-lane road which leads from SH6 to the eastern shoreline of Lake Wakatipu, servicing a small number of residential units, agricultural land and a road maintenance yard. The road is sealed for a distance of 40m on the approach to the intersection with SH6, but is otherwise an unsealed road, as shown in Photograph 2. Woolshed Road meets with SH6 at a give-way controlled T-intersection. The Woolshed Road approach to the intersection provides for a shared left and right turn lane. There are no dedicated turning lanes on SH6 for vehicles turning onto Woolshed Road. The speed limit on Woolshed Road is 60kph.

Photograph 2: Woolshed Road looking southwest from SH6 intersection

2.3.3 Maori Jack Road

Maori Jack Road is a sealed, two lane, two way road which serves as the access into the Jacks Point development. Maori Jack Road forms the minor arm of a T-intersection with SH6, located approximately 2.5km south of the existing SH6 / Woolshed Road intersection.

The intersection has a 95m long deceleration and left turn lane and a 25m long right turn lane for vehicles turning onto Maori Jack Road from SH6, as shown in Photograph 3.

Photograph 3: SH6 looking south towards Maori Jack Road intersection

2.4 Public Transport

There are currently no existing bus routes servicing SH6 in the immediate vicinity of the proposed development. The closest bus routes to the proposed development are operated by Connectabus and service Kelvin Heights, Frankton and Queenstown Hubs.

Queenstown International Airport is located within 6km of the proposed development. The airport accommodates frequent domestic and international flights.

2.5 Walking and Cycling

There are no footpaths or bicycle trails along SH6 or Woolshed Road in the vicinity of the proposed development. A shared use pedestrian and mountain bike recreational trail is located along the eastern shoreline of Lake Wakatipu from Jacks Point to Kelvin Heights Peninsula.

3. Future Transport Improvements

3.1 Programmed Improvements

3.1.1 Kawarau Bridge Upgrade

A Notice of Requirement has been issued for a designation for the location of the proposed replacement Kawarau Bridge. The proposed bridge will be located downstream from the existing bridge and with provision for two-way traffic will remove the capacity constraint caused by the existing one-lane bridge.

3.1.2 SH6 Realignment

There are two low-speed bends in the road on SH6 approximately 2km southeast of the existing Kawarau Bridge. Consent has been granted for NZTA to realign this section of SH6 to remove these two bends and provide a straighter alignment for the state highway.

3.2 Proposed Improvements

3.2.1 SH6 Southbound Passing Lane

NZTA has identified the need for a southbound passing lane on SH6 to the south of the access road to Remarkables Ski Area. Although the exact location for this passing lane is yet to be determined, there are several potential locations where it could be provided.

The 1.4km long section of SH6 between the Remarkables Ski Area and Woolshed Road offers a straight alignment with gentle vertical undulations which would be suitable for a southbound passing lane. However, there are numerous development accesses along this section of road, including an access to “Four Acres” quarry, which generates frequent heavy vehicle movements to and from the state highway. In addition, the proposed SH6 / Woolshed Road intersection that would be facilitated by this proposed Plan Change would require a right turn lane on SH6 for southbound vehicles turning right into Henley Downs. In order to avoid any potential confusion for drivers, a clear separation would need to be provided between the end of the passing lane and the start of the right turn lane. This could reduce the length of road available for the passing lane by 500 – 600 meters, leaving approximately 800m for the passing lane, including the diverge and merge sections at either end.

The 2.5km long section of SH6 between Woolshed Road and Maori Jack Road has two horizontal curves in the road and pronounced vertical undulations. There is a straight section of approximately 1km between the horizontal curves, starting immediately south of a residential property, which would be suitable for a southbound passing lane. It has an uphill gradient that could help reduce the required length of the passing lane as cars could overtake slow moving heavy vehicles over a shorter distance. There are no accesses along this length of road other than some gated field accesses. This potential passing lane area ends approximately 400m before the start of the right turn lane into Jacks Point. This would provide clear separation between the passing lane and the right turn lane and avoid any potential confusion for drivers on the approach to the right turn lane.

There is also a 1.3km long section of SH6 between Maori Jack Road and the access road to the skydiving airstrip. This section of road has a downhill gradient initially for southbound traffic before sloping upwards again. Immediately following the crest of the uphill section is a right turn into the skydiving airstrip. Although there is no right turn bay provided, there are regular right turn movements undertaken by vehicles accessing the skydiving area. This could cause conflict with vehicles travelling at high speed at the end of a passing lane.

Of these three potential locations for a southbound passing lane, the option located between Woolshed Road and Maori Jack Road is considered by Traffic Design Group to be the most suitable.

4. Current Traffic Conditions

4.1 Daily Traffic Volumes

State Highway traffic counts recorded by NZTA in May 2012 on SH6 at a site just south of the Remarkables Ski Field access have been used to analyse the typical daily and hourly traffic volumes in the vicinity of the proposed development. The 2012 traffic count for this location gives an average seven-day traffic count of some 2,500 vehicles per day (vpd) two-way. A diagram showing the pattern of typical daily traffic volumes in this area is provided in **Figure 2**. Traffic volumes such as the volumes recorded on SH6 south of Remarkables Ski Field even at their peak levels, represent only around 10-20% of the practical traffic carrying capacity of a high-standard rural State Highway of this type.

Towards Frankton and south of Peninsula Road the daily volumes reach approximately 3,000 vpd and at the SH6/6A junction SH6 is carrying up to almost 15,600 vpd two-way representing the additional traffic joining from mixed land uses from Peninsula Road northwards, which includes Queenstown International Airport and other commercial facilities.

A traffic survey undertaken in May 2010 at the intersection of Woolshed Road and SH6 showed that the average two-way weekday flow on Woolshed Road was 140 vehicles.

4.2 Hourly Traffic Patterns

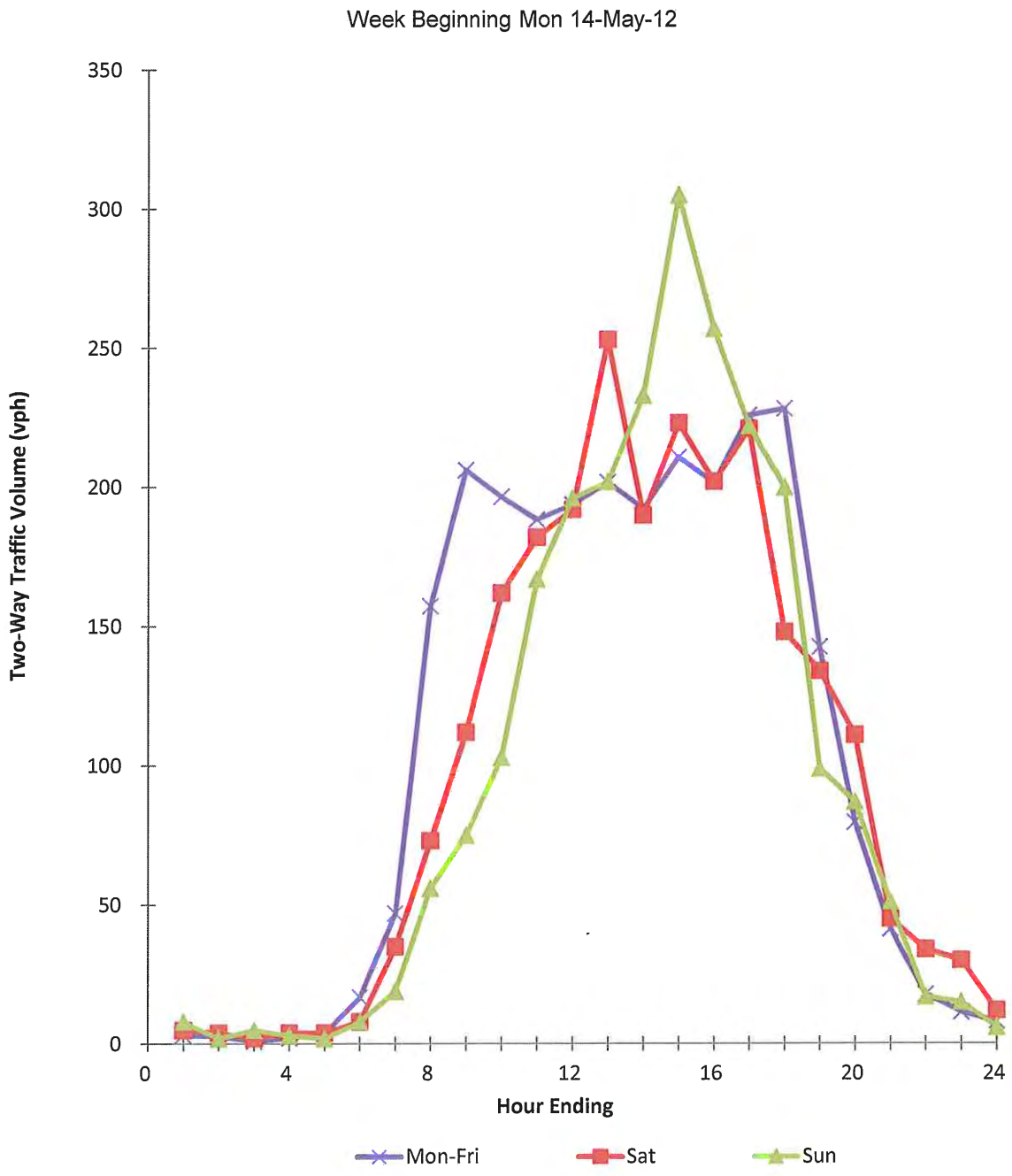
The details of hour-by-hour volumes from the SH6 count south of Remarkables Ski Field indicates that the busiest hour for traffic movements within the seven-day period surveyed comprised of a two-way volume of some 305 vehicles per hour (vph) in the hour ending 3pm on Sunday. The Sunday peak in two-way traffic volumes is most likely attributable to tourist traffic in the area, which can vary considerably during the year. During the course of a typical weekday (Monday to Friday), the busiest two-way hourly volume is approximately 228 vph between 5pm and 6pm.

From the survey on Woolshed Road in May 2010, the busiest hours were the hours starting 7:30am and 3:30pm when the recorded two-way vehicular movements were 27 vph and 17 vph respectively.

4.3 Traffic Growth

The annual average daily traffic on the State Highway network around Queenstown rose rapidly between 2000 and 2006. During this period the traffic growth on SH6 south of the Remarkables Ski Field increased 6% per year. The AADT since 2007 has been rising more slowly, with traffic data indicating a traffic growth of 2% per year, which is consistent with general growth in the area. The AADT data used to establish the annual growth rate between 2007 and 2011 is shown in Table 1.

SH6 TMS Counter south of Remarkables Ski Field (Two-Way)



Wednesday, 19 December 2012

Typical Daily Traffic Volumes

SH6 TMS Counter south of Remarkables Ski Field

Traffic Design Group

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Year	SH6 – South Remarkables Ski Field Access
2007	2752 vpd
2008	2541 vpd
2009	2413 vpd
2010	2874 vpd
2011	2855 vpd
Growth/Annum	1.9%

Table 1: SH6 south of Remarkables Ski Field Access - AADT

4.4 Road Safety

A review of the reported road safety record was undertaken for the section of SH6 from approximately 1km north of Woolshed Road to 1km south of Jacks Point Main Access. Reported injury and non-injury crashes were obtained from the New Zealand Transport Agency's Crash Analysis System (CAS) for the five year period between 2007 and 2011 inclusive, as well as all available data for the partial 2012 record.

In total 13 crashes occurred within the search area over the study period. The records show there have been seven injury crashes within the search area. Four of these injury crashes resulted in serious injuries while the remaining three crashes resulted in minor injuries. The main factors attributed to the injury crashes involved loss of vehicle control due to fatigue, alcohol consumption or diverted attention. The other injury crash factors included insufficient following distance, collision with a stray animal and a tourist failing to adapt to NZ road rules.

Of the six non-injury crashes, four involved a vehicle colliding with a stray animal. The remaining two non-injury crashes involved driver fatigue and a tourist driver failing to adapt to NZ road rules.

Of the 13 recorded crashes, three occurred within a 50m radius of the intersection of SH6 and Woolshed Road, a further three crashes occurred within a 500m radius of the same intersection. Of these 6 crashes recorded within 500m of Woolshed Road, two resulted in injury. Four out of the six crashes involved the collision of a vehicle and a stray animal. All of the four collisions occurred during night-time hours. Three of the collisions with stray animals involved the vehicle hitting a farm animal, while the fourth stray animal collision was with a wild animal. The remaining crashes that occurred within a 500m radius of Woolshed Road involved driver fatigue and a tourist failing to adapt to NZ road rules.

The typical injury crash rate for a two-lane rural road of this nature has been calculated using the accident rate prediction formula in the Economic Evaluation Manual (EEM). The analysis indicates that the typical injury crash rate for the assessed area is 0.77 injury accidents per year. Over a five year period this amounts to 3.8 injury crashes. The 7 reported injury crashes on the 4.5km section of road in the vicinity of the site is almost double the anticipated crash rate for this type of rural road. This indicates the presence of an existing road safety issue.

As half of the combined injury and non-injury crashes that occurred within 500m of the intersection of SH6 and Woolshed Road were the result of stray farm animals on the road, some initiatives aimed at preventing livestock from gaining access onto the State Highway should

investigated. In addition, it would be advisable to erect signs warning drivers about the presence of animals on the road.

5. Permitted Baseline Traffic

5.1 Traffic Generation

Under the Council's Development Standards, each residential property is required to be assessed as generating 8 vehicle movements per day (two-way). This traffic generation rate has been used for both residential and visitor accommodation dwellings.

The trip rates for the office and retail land uses have been taken from the New Zealand Trips and Parking Database and the primary school trip rates have been based on Transportation Assessments undertaken previously for primary schools by Traffic Design Group. A first principles assessment was used to calculate the traffic generation for the golf course based on 4 golfers every 5 minutes from 6am – noon and 2 golfers every 5 minutes for the remainder of the day.

Given the mix of residential and commercial activity in the permitted baseline scenario, there will be a proportion of traffic generated within Henley Downs and Jacks Point that stays internal to that zone. This internal traffic will not affect the capacity or operation of the access onto SH6. The total external traffic generated by the permitted baseline scenario is shown in Table 2.

	MORNING PEAK HOUR (vph)			EVENING PEAK HOUR (vph)		
	In	Out	Total	In	Out	Total
Permitted Baseline	413	1,653	2,067	893	481	1,374

Table 2: Peak Hour External Traffic Generation of Permitted Baseline

5.2 Trip Distribution

Based on the location of Jacks Point and Henley Downs in relation to local employment and recreational activities, it is likely that the majority of the peak hour traffic generated under the permitted baseline scenario will be travelling to or coming from the Frankton and Queenstown areas. Consequently a distribution of 80% of traffic being associated with the north and 20% being associated with the south has been adopted.

5.3 Traffic Effects

Traffic capacity analysis was undertaken using SIDRA Intersection for the existing SH6 / Maori Jack Road intersection to determine the level of operation under the fully developed permitted baseline scenario. It is anticipated that the full development of the permitted baseline scenario could take up to 15 years to complete. Therefore, an analysis year of 2027 has been use in this report.

It is possible that the development would take considerably longer than 15 years to complete. However, given the low volume of existing traffic on SH6, combined with a low rate of traffic growth, a longer construction timeframe to full development would not have any noticeable effect on the results of the analysis undertaken as part of this report.

The passing traffic on SH6 has been factored to a 2027 volume using the growth factor calculated in Section 4.3.

The results of the intersection analysis for the permitted baseline scenario are shown in Table 3.

		TRAFFIC VOLUMES (vph)		AVERAGE DELAY(secs)		LEVEL OF SERVICE	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
SH6 South	Left	83	179	15	15	LOS C	LOS C
	Through	133	157	0	0	LOS A	LOS A
SH6 North	Through	140	124	0	0	LOS A	LOS A
	Right	331	715	16	19	LOS C	LOS C
Maori Jack Road	Left	1323	385	650	16	LOS F	LOS C
	Right	331	96	650	16	LOS F	LOS C

Table 3: SH6 / Maori Jack Road Intersection – 2027 Permitted Baseline

The results in the above table clearly show that the existing intersection would not have sufficient capacity to cater for the anticipated volumes of traffic associated with the maximum development of both Jacks Point and Henley Downs under the current zoning.

6. Private Plan Change Proposal

6.1 Overview

Other reports provided with the proposed Plan Change request outline in more detail the development that would be permitted at Henley Downs. From a traffic effects perspective the proposed zone is likely to include the following key features:

- 1,750 houses in residential neighbourhoods
- 16 houses on rural residential preserve sites
- 600sqm office area
- 1,400sqm retail area (max 200sqm per retail unit)
- Primary school to cater for 600 pupils
- Preschools: 2 with 30-40 pupils each

The existing land uses permitted for Jacks Point would not be affected by the proposed Plan Change.

It is proposed that the primary access to Henley Downs will be via an upgraded SH6 / Woolshed Road intersection. The upgrade of the intersection would include the provision of turning lanes on SH6 and the realignment of the Woolshed Road approach to the intersection so that it is perpendicular to SH6. A preliminary intersection design as shown in **Figure 3.**

The internal road network for Henley Downs will be integrated with the Jacks Point road network.

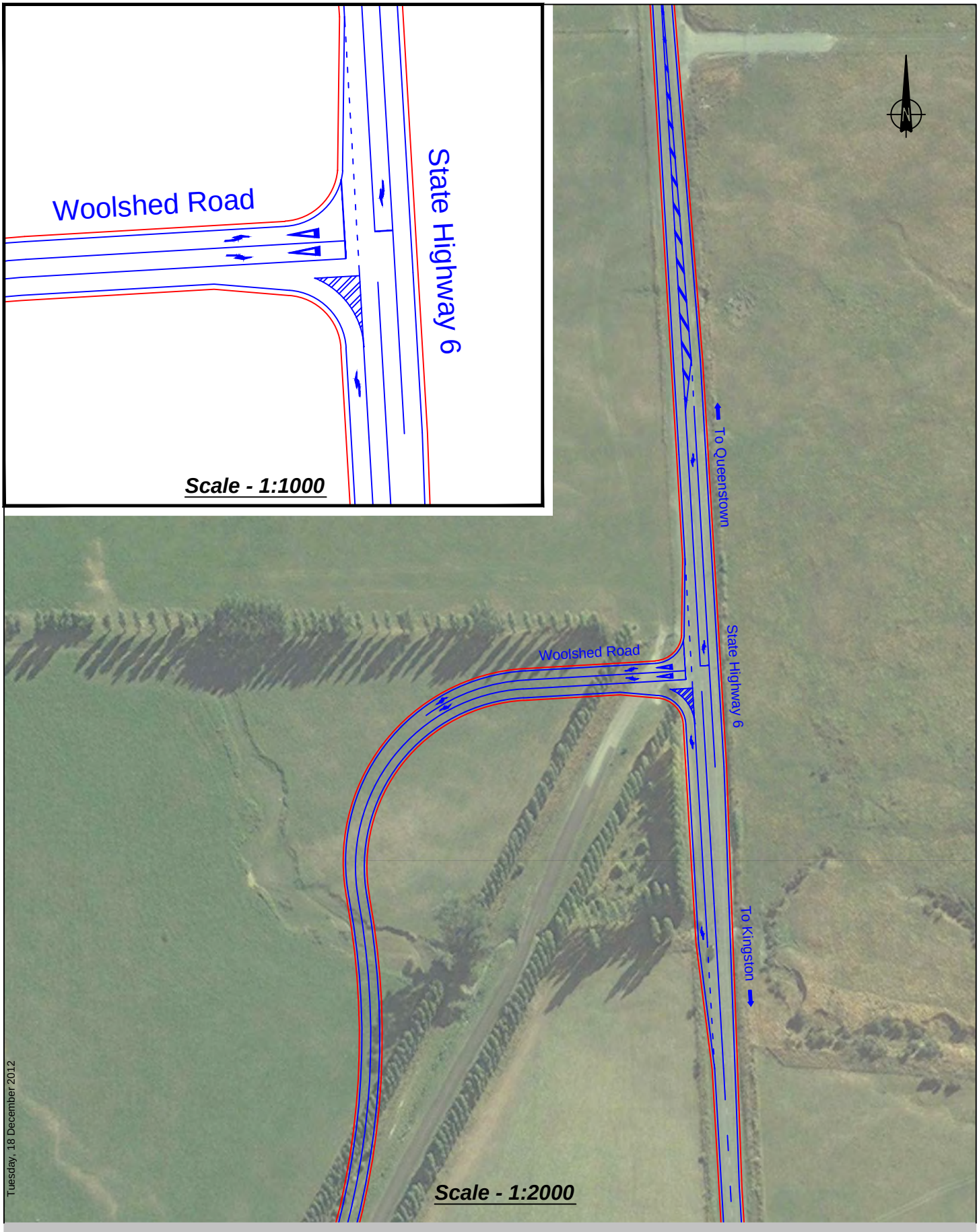
It is expected that Henley Downs would be progressively developed over a significant period of time. For consistency with the analysis of the permitted baseline scenario, a 15 year timeframe has been used, giving an assessment year of 2027.

6.2 Traffic Generation

The same traffic generation rates and distribution have been used to calculate the future traffic patterns as were used for the permitted baseline scenario, with the exception of the preschools which were not included in the permitted baseline scenario. The traffic generation rate for the preschool was based on other Transportation Assessments undertaken for preschools by Traffic Design Group. As with the permitted baseline scenario, an allowance has also been made for the internal trips, which will use the internal local roads and therefore do not interact with the state highway.

Due to the reduced level of commercial development in the assessed Plan Change scenario, compared with the permitted baseline, there would be fewer employment opportunities available within the Plan Change area, which would result in a higher proportion of external trips occurring.

The external traffic volumes calculated for the Plan Change proposal, including the permitted Jacks Point traffic is shown in Table 4. For the purposes of comparison, the permitted baseline volumes are also shown.



Tuesday, 18 December 2012

Henley Downs Plan Change

Proposed Woolshed Road / SH6 Intersection

Traffic Design Group

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SCALE: As Shown

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	MORNING PEAK HOUR (vph)			EVENING PEAK HOUR (vph)		
	In	**Out**	**Total**	**In**	**Out**	**Total**
Permitted Baseline	413	1,653	2,067	893	481	1,374
Plan Change Scenario	466	1,863	2,329	1,493	640	2,133

Table 4: Peak Hour External Traffic Generation of Proposed Plan Change and Permitted Jacks Point

As can be seen in the above table, the Plan Change scenario has a slightly higher external traffic generation due to the additional residential units in Henley Downs and a reduced quantity of commercial land use within the zone.

6.3 Trip Distribution

The same trip distribution of 80% to/from the north and 20% to/from the south is anticipated for the Plan Change scenario as was used for the permitted baseline scenario.

With the addition of the SH6 / Woolshed Road intersection, drivers will have a choice of which access to use for entering Jacks Point (and Henley Downs). While the Woolshed Road intersection will be located closer to Queenstown and Frankton, the existing intersection at Maori Jack Road will continue to serve large parts of Jacks Point as there will be a shorter journey time by travelling along SH6 at a higher speed limit than travelling through Henley Downs.

It is anticipated that the residents will become familiar with any delays that occur at the two intersections and will distribute in such a manner as to minimise the delay encountered at either intersection. Therefore, the external traffic generation has been assigned almost evenly between the two accesses, with a slightly higher proportion using Woolshed Road.

7. Transportation Effects of Plan Change

7.1 Single Vehicle Access

Traffic capacity analysis was initially undertaken for the existing SH6 / Maori Jack Road intersection to determine the level of service under the fully developed Plan Change scenario, with only a single access provided. As with the permitted baseline scenario, the capacity analysis was undertaken for a 2027 assessment year, with the passing traffic on SH6 factored accordingly. The results of the analysis are shown in Table 5.

		TRAFFIC VOLUMES (vph)		AVERAGE DELAY(secs)		LEVEL OF SERVICE	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
SH6 South	Left	93	299	15	15	LOS C	LOS C
	Through	133	157	0	0	LOS A	LOS A
SH6 North	Through	140	124	0	0	LOS A	LOS A
	Right	373	1124	16	20	LOS C	LOS C
Maori Jack Road	Left	1491	512	893	530	LOS F	LOS F
	Right	373	128	893	530	LOS F	LOS F

Table 5: SH6 / Maori Jack Road Intersection – 2027 Plan Change Scenario

The results in the above table clearly show that the existing intersection would not have sufficient capacity to cater for the anticipated volumes of traffic associated with the permitted development of Jacks Point and the proposed development of Henley Downs under the Plan Change scenario. Therefore, a second access onto SH6 would be required to cater for the traffic associated with these developments.

7.2 Additional Vehicle Access

It is proposed that the second access will be provided at the existing SH6 / Woolshed Road intersection. This intersection will be upgraded by changing the approach angle of Woolshed Road and widening SH6 to allow for right and left turn lanes.

Analyses were undertaken to assess the performance of the existing Jacks Point access and the proposed Woolshed Road access with both accesses in operation and internal road network connections provided between Jacks Point and Henley Downs. The results of the analyses are shown in Table 6 and Table 7

		TRAFFIC VOLUMES (vph)		AVERAGE DELAY(secs)		LEVEL OF SERVICE	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
SH6 South	Left	50	162	15	15	LOS C	LOS C
	Through	815	392	0	0	LOS A	LOS A
SH6 North	Through	311	670	0	0	LOS A	LOS A
	Right	202	647	20	21	LOS C	LOS C
Woolshed Road	Left	808	277	419	8	LOS F	LOS A
	Right	202	69	216	154	LOS F	LOS F

Table 6: SH6 / Woolshed Road Intersection – 2027 Plan Change Scenario

		TRAFFIC VOLUMES (vph)		AVERAGE DELAY(secs)		LEVEL OF SERVICE	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
SH6 South	Left	43	137	15	15	LOS C	LOS C
	Through	182	319	0	0	LOS A	LOS A
SH6 North	Through	342	192	0	0	LOS A	LOS A
	Right	171	547	16	19	LOS C	LOS C
Maori Jack Road	Left	683	235	28	13	LOS D	LOS B
	Right	171	59	28	13	LOS D	LOS B

Table 7: SH6 / Maori Jack Road Intersection – 2027 Plan Change Scenario

The analyses showed that with the combination of the traffic associated with the permitted Jacks Point development and the proposed Henley Downs Plan Change scenario, the Woolshed Road access would operate at LOS F during the AM and PM peak hour, with delays of up to 419 seconds. Delays for vehicles at the Woolshed Road access are primarily caused by the number of vehicles that turn left from Maori Jack Road onto SH6 and subsequently oppose the vehicles that turn left from Woolshed Road.

7.3 Discussion

The above analyses presents a worst case scenario with no allowance was made for a reduction in the volume of traffic generated due to the presence of a public transport system or travel demand management initiatives.

When the permitted development at Jacks Point and the Henley Downs Plan Change development are constructed, there would be sufficient density of housing to make a bus route to and from Frankton or Queenstown viable. The presence of such a service could see a considerable reduction in the traffic volumes entering and exiting Jacks Point and Henley Downs.

Travel demand management initiatives such as a car sharing system or a park and ride facility could lead to additional reductions in traffic generated by the zone. In this case, additional access capacity may not be required to cater for the full development of the Henley Downs Plan Change development.

If a public transport system and travel demand management initiatives are not implemented, or if the resulting reduction in traffic generation does not sufficiently improve the level of service of the SH6 intersections, then the most likely long term outcome would be the provision of a roundabout at the Woolshed Road intersection. Analysis indicates that a roundabout could provide a good level of service with full development of the Plan Change scenario at Henley Downs.

In addition to the capacity benefits that would be obtained through the provision of an intersection at Woolshed Road, there are also benefits to be gained in terms of network resilience. The current zoning for Jacks Point and Henley Downs permits almost 2,000 houses as well as commercial and educational land uses. If there was a crash at the SH6 / Maori Jack Road intersection, or any other event occurred to stop people from using the access, there would be an urgent need for an alternative access. The existing unsealed sections of Woolshed Road and the existing low capacity SH6/Woolshed Road intersection would not be able to cope with the volume of traffic that would need to use this access.

By providing a second high quality intersection as part of the proposed Plan Change there would be significant increase in network resilience.

7.4 Sensitivity Analysis of Worst Case Predictions

Sensitivity testing was undertaken to determine the level of development that could be catered for without consideration of the reduced traffic volumes that could result from the provision of a public transport system and travel demand management initiatives. The sensitivity testing was undertaken by varying the number of houses within the Henley Downs Plan Change scenario, while keeping the rest of the development unchanged. It was determined that in this worst case scenario, up to 1250 houses could be developed at Henley Downs, in addition to the rest of the Plan Change scenario and all of the permitted Jacks Point development without reaching LOS F on the Woolshed Road arm of the intersection. The results of the analyses using 1250 houses in Henley Downs are shown in Table 8 and Table 9.

		TRAFFIC VOLUMES (vph)		AVERAGE DELAY(sec)		LEVEL OF SERVICE	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
SH6 South	Left	36	113	15	15	LOS C	LOS C
	Through	782	376	0	0	LOS A	LOS A
SH6 North	Through	303	633	0	0	LOS A	LOS A
	Right	144	453	19	18	LOS C	LOS C
Woolshed Road	Left	577	194	45	8	LOS E	LOS A
	Right	144	49	39	42	LOS E	LOS E

Table 8: SH6 / Woolshed Road Intersection – 2027 Plan Change Scenario 1250 Households

		TRAFFIC VOLUMES (vph)		AVERAGE DELAY(sec)		LEVEL OF SERVICE	
Approach	**Movement**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
SH6 South	Left	41	128	15	15	LOS C	LOS C
	Through	168	271	0	0	LOS A	LOS A
SH6 North	Through	285	171	0	0	LOS A	LOS A
	Right	162	510	16	18	LOS C	LOS C
Maori Jack Road	Left	650	219	17	11	LOS C	LOS B
	Right	162	55	17	11	LOS C	LOS B

Table 9: SH6 / Maori Jack Road Intersection – 2027 Plan Change Scenario 1250 Households

The results of the analyses undertaken demonstrate that with a conservative assessment of a steady increase in traffic growth on SH6 for the next 15 years, there would be sufficient capacity available between the two accesses to cater for the permitted baseline scenario at Jacks Point and the majority of the Plan Change development scenario at Henley Downs.

7.5 Road Safety

The proposed Plan Change would lead to a significant increase in the amount of traffic using the SH6 / Maori Jack Road intersection if it was the only access to Henley Downs and Jacks Point. This carries the possibility of adverse consequences to road safety, especially through the potential for road rage due to long delays during peak periods and southbound through traffic on SH6 being blocked by right turning traffic queuing in the turning lane. However, these adverse effects could be mitigated by the provision of a second access at Woolshed Road through a reduction in the length of delays experienced and additional vehicle storage in the right turn lanes on SH6 for vehicles turning into Henley Downs. This additional access would be designed to meet the District Council and NZTA intersection design standards.

In the event of the intersections with SH6 reaching capacity, the provision of a roundabout at Woolshed Road would mitigate any potential road safety issues associated with intersection capacity and delays.

Based on analysis of historic crash information in the vicinity of Woolshed Road, it is considered worthwhile to locate permanent warning signs indicating the presence of livestock or stray animals at a minimum of 500m in advance of Woolshed Road, for both directions of travel. Drivers should have a 120m uninterrupted view of these signs.

8. District Plan Provisions

8.1 Policies and Objectives

The general Transport Objectives and Policies are contained within Section 14.1.3 of the District Plan. The relevant transportation objectives relate to efficiency, safety and accessibility, the environmental effects of transportation, parking and loading, pedestrian and cycle transport, and to public and visitor transport.

8.1.1 Efficiency

> *"Efficient use of the District's existing and future transportation resource and of fossil fuel usage associated with transportation."*

With the site being located along SH6 and within a 10 minute drive of Frankton, it is considered that the site is well located with regard to major traffic routes which will contribute to efficient use of the road network. In addition, the increased density of residential dwellings would help make a public transport system a viable option.

8.1.2 Safety and Accessibility

> *"Maintenance and improvement of access, ease and safety of pedestrian and vehicle movement through the District."*

The analysis of road traffic effects described earlier in this report indicated that the existing access at Maori Jack Road would have insufficient capacity to cater for the traffic associated with both the Henley Downs and Jacks Point development traffic under the Plan Change scenario. As such an additional access located at the intersection of SH6 / Woolshed Road is proposed to operate as the primary access for Henley Downs. Due to the type and scale of activities proposed to be located within the site, pedestrian and cycle linkages to the internal and external road networks are an anticipated feature of the proposed development.

8.1.3 Environment Effects of Transportation

> "*Minimal adverse effects on the surrounding environment as a result of road construction and road traffic."*

The analysis of road traffic effects described earlier in this report indicates that a second access would be required for the proposed development to operate efficiently. The second access would be located at the existing intersection of SH6 / Woolshed Road, minimising the effects of adding a new intersection onto the existing road network.

8.1.4 Further Objectives of Queenstown-Lakes Transportation Objective and Polices

Whilst sufficient information has been provided to TDG to comment on the efficiency, safety and accessibility and environment effects of Transportation, additional detail would be required in order to comment on the following objectives:

- Town Centre Accessibility and Car Parking;
- Parking and Loading;

- Pedestrian and Cycle Transport; and
- Public and Visitor Transport.

However, these objectives will be addressed when greater detail regarding the development concept has been outlined when resource consent applications are submitted.

8.2 Special Zone – Jacks Point

Jacks Point Zone is part of Resort Zone rules within section 12 of the District Plan. The purpose of the Jacks Point Zone is to provide for residential and visitor accommodation in a high quality sustainable environment. The preparation and development controls associated with Jacks Point Zone in conjunction with the provisions of the District Plan ensure that the zoned village and residential activities provide for the social, economic and cultural wellbeing of the wider community. The transportation rules which are specific to Jacks Point will accordingly be adopted or betterment made of the rules by the proposed development. Jacks Point rules regarding controlled transportation activities are as follows:

- Parking, Loading and Access:
  - As identified in Resort Zone rules, access to the Jacks Point Zone will be from SH6. This access is currently in operation and has been constructed in line with the intersection layout design included as part of the Jacks Point Zone rules. Intersection capacity analysis undertaken indicates this access has insufficient capacity to cater for the traffic generated by the proposed development. A second access is proposed at the existing intersection of SH6 / Woolshed Road. The intersection will be upgraded to the standards adopted for the Jacks Point Zone access or enhanced based on the intersection capacity requirements.
- Residential and Village Activity Areas, the outline development plan of these activity areas require council approval in respect of:
  - Roading Patterns
  - Pedestrian links through the Activity Area to connect with surrounding or adjoin Activity Areas
  - The identification of areas for visitor parking which have regard to the amenity values of the zone

8.3 District Plan Rules

While RCL Queenstown Ltd have provided TDG with an indicative proposed development scenario to enable a realistic estimate of traffic generation, it does not include a level of detail that would allow a compliance check of the proposed layout that would be facilitated by the Plan Change against the rules of the District Plan. However, it is not considered appropriate or necessary to address such details as part of a Plan Change request because the development concept may change and specific compliance assessments will be undertaken when resource consent applications are submitted.

9. Summary and Conclusion

The current zoning at Henley Downs allows for a mix of residential and commercial development and an educational facility. The development at Henley Downs that would be facilitated by this Plan Change would include:

- a reduction in the level of commercial activity; and
- an increase in the number of residential dwellings.

The development at Henley Downs would be served by a new access onto SH6, which would be provided in the location of the existing SH6 / Woolshed Road intersection. The internal road network for Henley Downs will be integrated with the road network for the permitted development at Jacks Point.

An assessment of the traffic generation for the existing zoning of Henley Downs and Jacks Point showed that the SH6 / Maori Jack Road intersection would have insufficient capacity to cater for the full extent of the permitted development.

Through the provision of an additional access at Woolshed Road and an integrated road network connecting Henley Downs and Jacks Point, the proposed Plan Change would result in a significant improvement to the access arrangements to this area when compared against the permitted baseline.

With the second access onto SH6 formed as a high capacity T-intersection there would be sufficient capacity to cater for the majority of the development that would be facilitated by the proposed Plan Change. The worst case analyses showed that 1250 houses could be constructed in Henley Downs, in addition to the non-residential elements of the Plan Change scenario and the permitted Jacks Point development, before access at the Woolshed Road or Maori Jack Road intersections becomes restricted.

At this point, additional intersection capacity may be required to maintain good access to the Plan Change area. This could potentially be in the form of a roundabout at the Woolshed Road intersection with SH6. Analysis indicates that a roundabout at Woolshed Road would provide a good level of service with the full development of Henley Downs and improve road safety.

However, the worst case analyses undertaken did not allow for any reduction in traffic generation due to the presence of a public transport system or any travel demand management initiatives. Given the proposed density of residential dwellings, a bus route to and from Frankton or Queenstown would be a viable option. There would also be potential for car sharing and a park and ride facility. The provision of these facilities could reduce the traffic loading on the Maori Jack Road and Woolshed Road intersections, in which case additional access capacity may not be required.

Either way, it will be possible to accommodate the traffic generated by the development that would be facilitated by the Plan Change without any significant adverse traffic effects. Furthermore, the proposed Plan Change has been assessed against the relevant transportation policies and objectives in the District Plan and it has been shown to be more consistent with these policies and objectives than the existing zoning.

Accordingly, the proposed Plan Change can be supported from a transportation perspective.

Traffic Design Group Ltd
21 December 2012