

Appendix J:

*Transportation Assessment*

*Carriageway Consulting*





# Proposed Private Plan Change Shannon Farm Cromwell

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## Transportation Assessment

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**CARRIAGEWAY**  
CONSULTING

traffic engineering | transport planning



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## 1. Introduction

- 1.1. New Zealand Cherry Corp (Leyser) LP Limited proposes to lodge a private plan change to rezone an area of Rural-zoned land to facilitate the future development of up to 160 rural residential properties, at a location to the west of Cromwell (*“the site”*).
- 1.2. This Transportation Assessment sets out a detailed analysis of the transportation issues associated with the proposed plan change including changes in travel patterns that are likely to arise from development of the site. Where potential adverse effects are identified, ways in which these can be addressed are set out.
- 1.3. This report is cognisant of the guidance specified in the New Zealand Transport Agency’s *‘Integrated Transport Assessment Guidelines’* and although travel by private motor vehicle is addressed within this report, in accordance with best practice the importance of other transport modes is also recognised. Consequently, travel by walking, cycling and public transport is also considered.







## 2. Site Overview

### 2.1. Location

- 2.1.1. The plan change site is located to the west of the State Highway 6 / Ripponvale Road intersection, just west of Cromwell. The site is currently zoned as Rural Resource Area in the Central Otago District Plan ('District Plan') and is currently used for rural activities.
- 2.1.2. The location of the site in the context of the local area is shown in Figure 1 and in more detail in Figure 2.

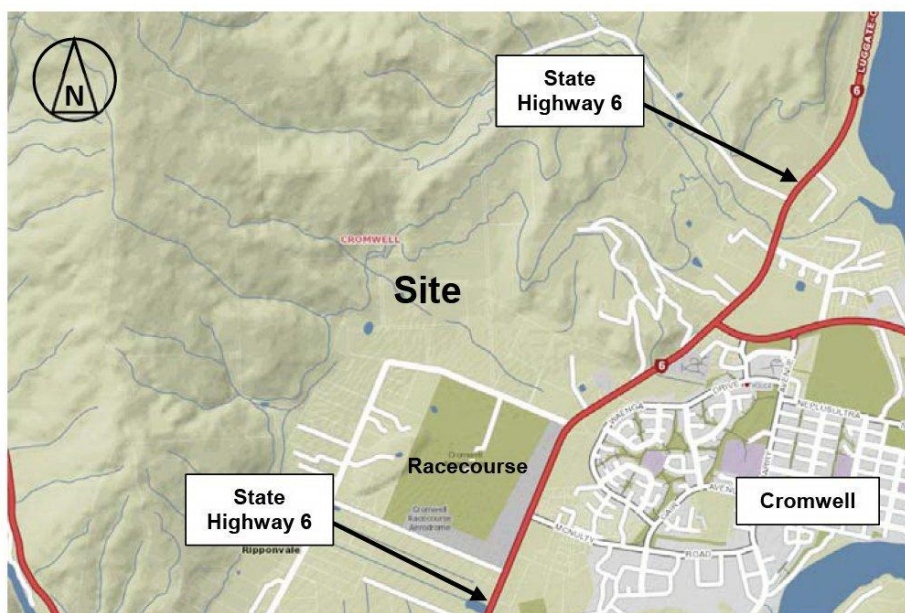


Figure 1: General Location of Development Site

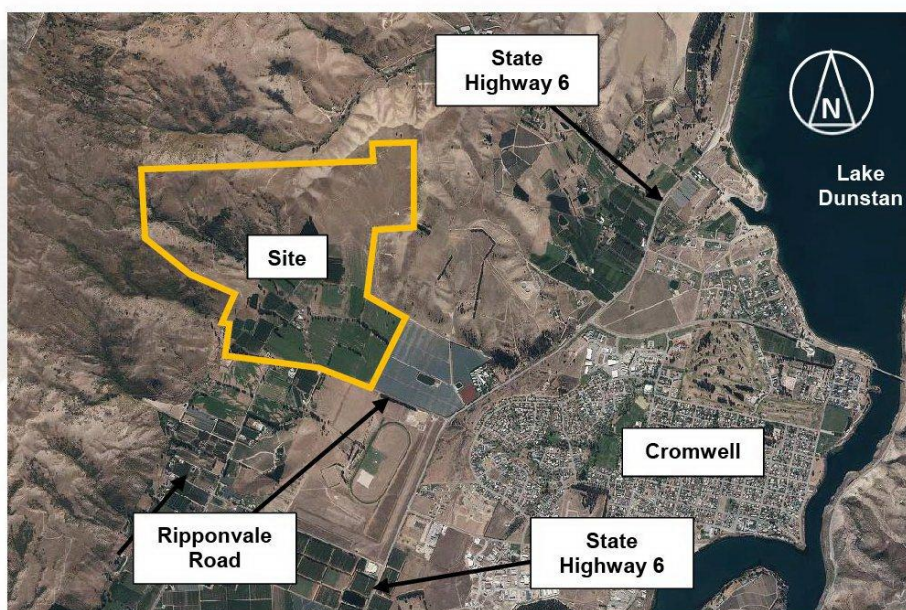


Figure 2: Aerial Photograph of Development Site and Environs



## **2.2.    *Roading Classification***

- 2.2.1. The District Plan classifies State Highway 6 towards the east of the site as a Rural State Highway. Ripponvale Road is classified as a Rural Collector Road.
- 2.2.2. On this basis, it is reasonable to conclude that the primary role of the highway is to carry through traffic, with Ripponvale Road providing for local journeys and property access.







### 3. Current Transportation Networks

#### 3.1. *Roading Network*

- 3.1.1. In the vicinity of the site, Ripponvale Road is characterised by having two very straight sections of carriageway connected by a sharp, 90-degree curve which has a chevron board to direct drivers. One section of road has a broadly north-south orientation and serves a number of rural residential properties and agricultural uses. The other section of road has a broadly east-west orientation, and leads to State Highway 6.
- 3.1.2. Ripponvale Road is subject to a speed limit of 100km/h and has swales on both sides within wide grassed verges. On the east-west section of road, the carriageway seal width is 5.8m, with a centreline but no edgeline markings. The legal width is 20m.



**Photograph 1: Ripponvale Road Looking West, Towards Site**

- 3.1.3. At its eastern extremity, Ripponvale Road meets State Highway 6 at a priority ('give-way') controlled intersection. The intersection has an auxiliary left-turn lane which is around 75m long and 3.5m wide. It also has an auxiliary right-turn lane of 3.5m width, which is 20m long with an extended taper. Sight distances at the intersection are excellent, and in excess of 350m in each direction.





**Photograph 2: Aerial Photograph of State Highway 6 / Ripponvale Road Intersection**



**Photographs 3 and 4: Sight Distances to the Left and Right at State Highway 6 / Ripponvale Road Intersection**

- 3.1.4. Towards the south, the highway provide access to Frankton, Queenstown and further south to settlements at the bottom of the South Island. Towards the north, the highway provides access into Cromwell via a network of district roads, and also to State Highway 8B which provides a connection to State Highway 8 and locations throughout the South Island. State Highway 6 also passes close to Wanaka before turning westwards towards the West Coast.

### **3.2. Non-Car Infrastructure**

- 3.2.1. There is no infrastructure provided for walking and cycling in the immediate area although the low traffic flows on the road means that cyclists can safely share the carriageway with motorised vehicles and there are wide grassed berms that can be used by pedestrians.
- 3.2.2. There is a walkway provided between the highway and Waenga Drive, and this meets the highway around 400m north of Ripponvale Road. At its eastern end, Waenga Drive forms the southern boundary to Cromwell town centre around

### **3.3. Future Changes**

- 3.3.1. There are no known changes to the roading environment in the immediate area that are set out in any overarching strategies or guides.



## 4. Current Transportation Patterns

### 4.1. Traffic Flows

4.1.1. The New Zealand Transport Agency (“NZTA”) carries out regular traffic counts on the state highway network. The closest count site on the state highway is site 00600947 which is located to the south of the State Highway 6 / State Highway 8B intersection, and around 1.3km northeast of Ripponvale Road. In 2017, the highway had an Annual Average Daily Traffic of 4,887 vehicles (two-way). By way of a check on this, the traffic counter in the Gibbston Valley further south carried an almost-identical traffic flow (to within 1.5%), which is as would be expected due to the lack of development and roading connections for vehicles to leave or join the highway between the two locations. It can therefore be concluded that the recorded data represents the traffic flows past the site.

4.1.2. The survey station counts data continuously, and the following graph shows a breakdown of the daily flows for the past 12 months:

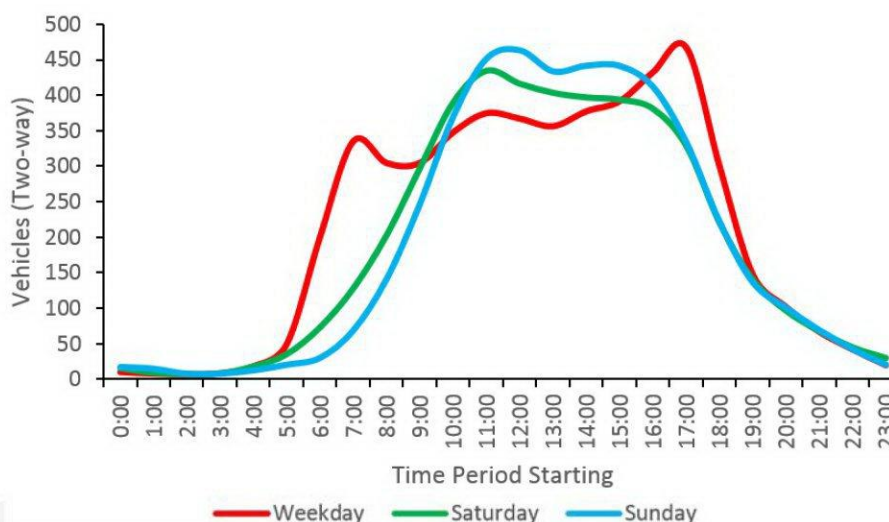


Figure 3: Traffic Flows on State Highway 6

4.1.3. As shown above, the weekday traffic flows display a morning and evening peak hour. The average recorded traffic flows were:

- Morning peak hour, 7am to 8am: 254 vehicles southbound, 77 vehicles northbound; and
- Evening peak hour, 5pm to 6pm: 171 vehicles southbound, 290 vehicles northbound

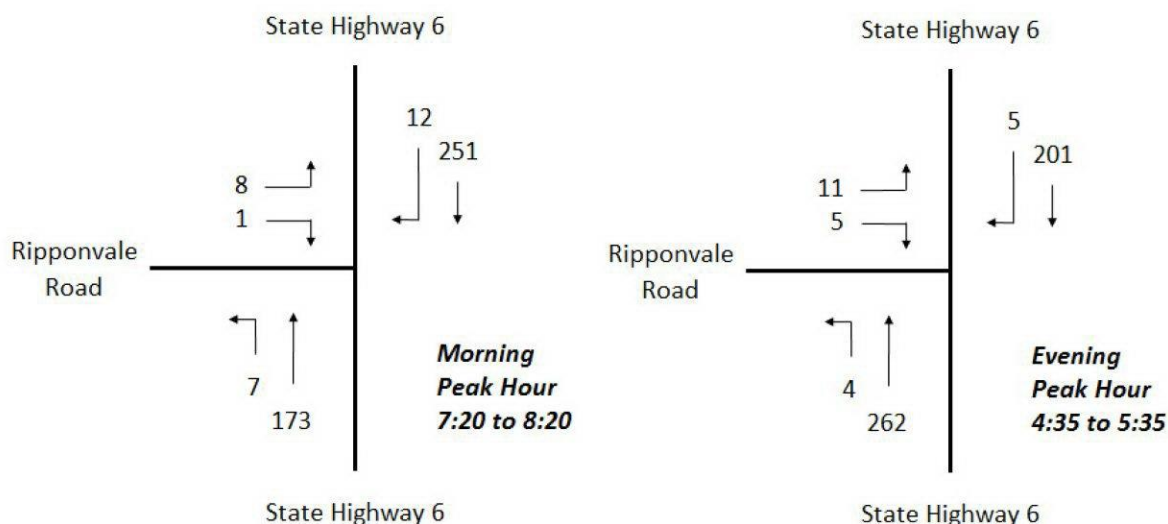
4.1.4. This indicates a tidal flow on the highway, towards the direction of Queenstown in the morning and away from Queenstown in the evening. Other surveys in the area have indicated a similar direction of travel.

4.1.5. The data also shows that the traffic flows during the weekend are relatively high, and approach that of the weekday evening peak. This pattern of traffic flows is typical of a highway carrying recreational traffic. Further evidence of recreational traffic is shown in the seasonality of the highway. The average daily traffic volume during the summer months (December, January and February) was 5,910 vehicles (two-way), compared to 4,190 vehicles (two-way) during June, July and August, some 29% lower.





- 4.1.6. Over the past five years, volumes on the highway have increased from 3,130 vehicles per day to 4,887 vehicles per day (that is, a growth of 351 vehicles per day in each year). This equates to an annual growth of 7.2%, expressed as a percentage of the 2017 volumes.
- 4.1.7. As part of this commission, a traffic survey was carried out at the State Highway 6 / Ripponvale Road intersection during July 2018. The results are summarised below.



**Figure 4: Existing Peak Hour Traffic Flows at the State Highway 6 / Ripponvale Road Intersection**

- 4.1.8. The surveys support the NZTA data with a predominant southbound flow on the highway in the morning (towards Queenstown), and the direction of flows being reversed in the evening.
- 4.1.9. The total volume observed on the highway is 479 vehicles in the morning peak hour and 444 vehicles in the evening peak hour. This compares to 331 and 461 vehicles respectively as recorded by the NZTA traffic counter. Although there are some differences in the data, the surveyed volumes are considered to be robust.
- 4.1.10. It can be seen that Ripponvale Road is lightly trafficked with peak hour volumes of less than 30 vehicles (two-way). This suggests daily volumes of no more than 300 vehicle movements. The NZTA Crash Analysis System (“CAS”) includes details of traffic flows on district roads obtained from council RAMM databases, and this confirms that traffic volumes are low with CAS recording 200 vehicles per day.
- 4.1.11. The Austroads Guide to Traffic Management Part 3 (‘Traffic Studies and Analysis’) sets out thresholds regarding the need for detailed traffic analyses at intersections, and the traffic flows below which detailed analyses of unsignalised intersections are unnecessary since the intersection operates under ‘free-flow’ conditions. An extract from this is replicated below.

Major Road Type	Traffic Volumes (Vehicles Per Hour)	
	Major Road	Minor Road
Two lane road	400	250
	500	200
	600	100

**Table 1: Extract from Table 6.1 of Austroads Guide to Traffic Management Part 3 (Intersection Volumes below which Capacity Analysis is Unnecessary)**



4.1.12. It can be seen that the volumes at the State Highway 6 / Ripponvale Road intersection fall below these thresholds, and accordingly, no analysis has been carried out at the intersection. In essence, at present it will operate under 'free-flow' conditions, and this was confirmed during the traffic surveys will negligible delays to turning traffic being observed.

#### **4.2. Non-Car Modes of Travel**

4.2.1. Given that the area is predominantly rural, it can reasonably be expected that it will be relatively lightly used by pedestrians and cyclists. During site visits (a total of six hours) no pedestrians or cyclists were observed. It is considered that the absence of infrastructure for these road users is therefore not unreasonable.

4.2.2. There are no regular bus services that pass the site. Although several longer-distance services pass nearby on the highway, there are no bus stops provided within walking distance.

#### **4.3. Road Safety**

4.3.1. The NZTA Crash Analysis System has been used to establish the location and nature of the recorded traffic crashes in the vicinity of the plan change area. All reported crashes between 2008 and 2017 were identified, plus the partial record for 2018, for Ripponvale Road between State Highway 6 and 100m south of the 90-degree bend (a ten-year period is used due to the low traffic flows). All reported crashes between 2013 and 2017 were identified, plus the partial record for 2018, for State Highway 6 for 200m on either side of the intersection with Ripponvale Road (a five-year period is used due to the higher traffic flows).

4.3.2. This showed that there were three reported crashes in the area. None resulted in any injuries.

- One crash occurred in Ripponvale Road around 1km west of the highway, when an eastbound driver stopped suddenly in the carriageway for no apparent reason, and was struck by a following eastbound vehicle;
- One crash occurred on State Highway 6, 130m north of Ripponvale Road, when a northbound driver left the road (no reason for this was given); and
- One crash occurred on State Highway 6, 180m north of Ripponvale Road, when a northbound driver turned left into the cherry orchard but in so doing, firstly pulled to the right-hand-side of the highway. A following driver thought that the first driver was turning right (not left) and overtook the first vehicle on the left. The vehicles then collided.

4.3.3. No crashes have been reported at the State Highway 6 / Ripponvale Road intersection.

4.3.4. The historic pattern of crashes does not indicate any particular safety-related deficiencies on either this section of highway or Ripponvale Road.



## 5. Proposal

- 5.1. The proposed plan change will facilitate the development of up to 160 rural residential dwellings.
- 5.2. Since the proposal is for a plan change, there are no confirmed scheme plans for the area. However a Structure Plan has been produced. This shows that access onto the roading network is proposed to be gained onto Ripponvale Road around 1.14km west of the state highway, in a location which was previously an unformed legal road (for clarity, this legal road has been closed and stopped) and the land is now privately owned.
- 5.3. The access road will serve a loop road located approximately centrally within the plan change area.

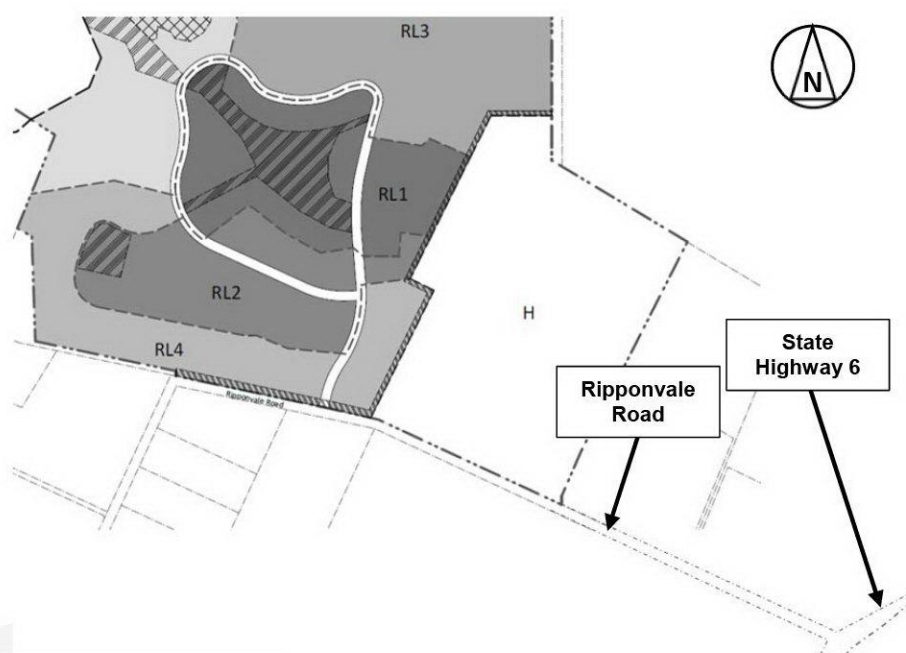


Figure 5: Annotated Proposed Structure Plan (Extract from Rough and Milne Drawing 'Structure Plan' Numbered L1.1 Rev 0)



## 6. Traffic Generation and Distribution

### 6.1. Traffic Generation

- 6.1.1. Traffic generated by residential developments is known to vary for a variety of reasons, with one such reason being the proximity (or otherwise) to employment and community facilities. Where a dwelling is some distance from these types of facilities, the traffic generation rates tend to be lower than for residences that are closer due to 'trip chaining', that is, the tendency of a resident to carry out multiple visits to different destinations during the same trip away from the dwelling.
- 6.1.2. In this case, it is likely that some traffic will be associated with employment locations in Queenstown but there is also likely to be travel to/from local destinations also. Accordingly, for this analysis a rate of 6 vehicle movements per day per residence has been used, with 1 vehicle movement per residence occurring in each of the peak hours.
- 6.1.3. In the morning peak hour, 90% of these vehicles are likely to be exiting the site, with 65% of the generated vehicle movements entering the plan change site in the evening peak hour.

### 6.2. Trip Distribution

- 6.2.1. With regard to the distribution of these vehicles, it is anticipated that all drivers travelling to/from the site would pass through the State Highway 6 / Ripponvale Road intersection because this provides the most direct route to education, employment and community facilities.
- 6.2.2. However once at the intersection, the direct is less certain because some drivers will travel towards the facilities within Cromwell and others will travel towards destinations further afield such as Queenstown, Wanaka and Alexandra. For this assessment, it is anticipated that:
- 25% of generated travel will travel towards Cromwell and local facilities; and
  - 80% of the remaining traffic will travel towards the south and the direction of Queenstown, with the remainder travelling north towards Wanaka and Alexandra.
- 6.2.3. This gives rise to the following traffic generation:

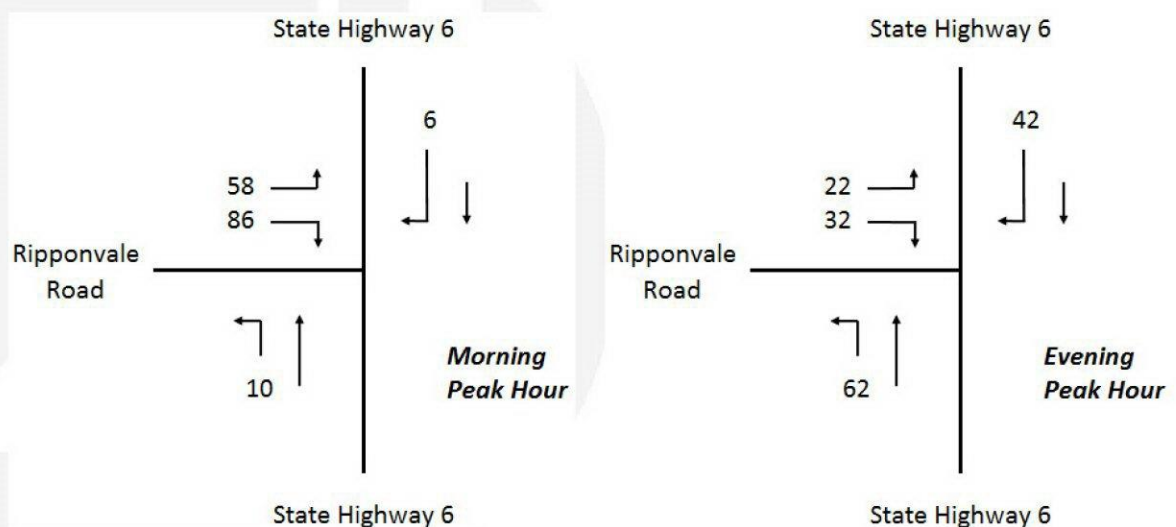


Figure 6: Traffic Generation Due to Development of Plan Change Site at the State Highway 6 / Ripponvale Road Intersection



## 7. Effects on the Transportation Networks

### 7.1. Intersection Capacity

7.1.1. The Figures above show that the overall traffic flows continue to fall below that where a formal assessment of the State Highway 6 / Ripponvale Road intersection is required. Nevertheless, for completeness, an assessment has been carried out and the results are summarised below.

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
State Highway 6	L	8.5	0	A	8.6	0	A
State Highway 6	R	8.1	0	A	8.5	0	A
Ripponvale Road	L	9.1	1	A	9.6	0	A
	R	11.2	1	B	11.8	0	B

**Table 2: Performance of State Highway 6 / Ripponvale Road with Full Development of Plan Change Site**

7.1.2. It can be seen that queues and delays are negligible.

7.1.3. As set out above, the traffic flows on the highway are seasonal. Although the observed volumes compare favourably with the summer volumes, the flows on the highway have been increased by 30% to reflect the seasonality. At the same time, ten years of background traffic growth on the highway has been applied, as is best practice when considering a plan change request. This results in the through-traffic on the highway being factored by 2.23. The results are summarised below:

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
State Highway 6	L	8.5	0	A	8.6	0	A
State Highway 6	R	9.0	0	A	10.5	0	B
Ripponvale Road	L	13.0	2	B	14.0	1	B
	R	23.0	2	C	24.3	1	C

**Table 3: Performance of State Highway 6 / Ripponvale Road with Full Development of Plan Change Site, Highway Traffic Factored**

7.1.4. As would be expected, the delays on Ripponvale Road increase under this scenario but the increase is minor. The queue increases by just one vehicle compared to the unfactored data and delays increase by around 12 seconds. The resultant levels of service (typically B and C) are not unreasonable for a rural intersection under peak traffic loadings.

7.1.5. No modelling has been undertaken for the access between the plan change site and Ripponvale Road. Given that the volumes on both roads will be low, the thresholds set out in the Austroads Guide will not be met and the intersection(s) will operate under free-flow conditions.

7.1.6. Overall then, the traffic generated by full development of the plan change site can easily be accommodated on the road network.



## 7.2. *Non-Car Modes of Travel*

- 7.2.1. The subdivision is likely to result in increased levels of walking and cycling in the immediate area. However these will only be moderate because of the lack of destinations within a viable walking/cycling distance, meaning that most walking/cycling will occur for recreational use. The traffic flows on Ripponvale Road will remain low, even with the plan change site fully developed, and consequently it is not considered that any additional infrastructure is required for pedestrians or cyclists.
- 7.2.2. The size of the subdivision is not sufficient that it will give rise to the need for a public transport service.

## 7.3. *Road Safety*

- 7.3.1. Based on a review of the road safety records, the proposal is unlikely to result in adverse road safety effects arising as a result of the increase in traffic flows on the road network.
- 7.3.2. The location of the access into the site (as shown on the Structure Plan) means that a sight distance towards the east of 350m is achieved (limited by the road boundary) with 320m achieved towards the west (limited by the curve of the formed road). For clarity, both of these sight distances are measured at a distance of 5.5m back from the edge of the traffic lane of Ripponvale Road, and both considerably exceed the requirements for sight distances for the prevailing 100km/h speed limit.



**Figure 7: Sight Distance Towards the East at the Proposed Site Access**



**Figure 8: Sight Distance Towards the West at the Proposed Site Access**





#### **7.4. Ripponvale Road Upgrading**

- 7.4.1. Development of the site will inevitably increase traffic flows on Ripponvale Road. As noted above, the legal width is 20m and the carriageway is presently 5.8m wide. Given the extent of traffic flows presently using the road (200-300 vehicle movements per day, as noted above), the Council's Engineering Code of Practice requires a 6.0m width with 0.25m metalled shoulders. The existing road is therefore of a lesser standard than required under the Code of Practice.
- 7.4.2. The proposal will result in traffic flows increasing by around 960 vehicles per day. Under the Code of Practice this requires a 7.0m wide carriageway with 0.25m metalled shoulders.
- 7.4.3. In view of the 20m road reserve width and the favourable topography, it is considered that this widening can easily be accomplished.
- 7.4.4. Finally, the proposal will create a priority intersection on Ripponvale Road. The traffic flows on Ripponvale Road will not justify the provision of auxiliary turning lanes at these, and the wide road reserve means that an appropriate design can be constructed.





## 8. Statutory Framework

### 8.1. Introduction

8.1.1. There are a number of statutory documents that are relevant to plan change requests. These are discussed in detail below, together with an assessment of whether the plan change request aligns with the strategic guidance given.

### 8.2. Otago Regional Land Transport Plans 2015-2021

8.2.1. The purpose of the RLTP is to “*set our vision of transport in the future and how intend to achieve this by funding and providing transport services and infrastructure*”. The June 2018 update of the document also adds “*...and by concentrating over the next few years on achieving a safer and more sustainable transport system that supports and enhances regional development*”.

8.2.2. The key long-term strategic objectives are:

- A transport system that is safe;
- A transport system that delivers appropriate levels of service;
- A transport system that supports economic activity and productivity;
- A transport system that provides appropriate transport choices;
- A transport system based on effective coordination; and.
- Mitigating the effects of the transport system on the environment

8.2.3. The traffic generated by development of the plan change area can be accommodated on the roading network with appropriate levels of service, and there are no reasons to anticipate that adverse road safety effects would arise. The location of the plan change area is around 2.8km from Cromwell town centre meaning that it is within a practical cycling distance. This route would be on lightly trafficked roads (Ripponvale Road, an off-road walkway and Waenga Drive, other than a 0.4km section which would be alongside the highway).

8.2.4. If there was to be a local bus network within Cromwell in future, or if longer-distance services were to stop nearby, then one location would be in the vicinity of the State Highway 6 / Ripponvale Road intersection. This would therefore result in the site being accessible by public transport.

### 8.3. Otago Regional Public Transport Plan 2014

8.3.1. This Plan focusses on areas with higher numbers of residents, specifically the Wakatipu Basin and Dunedin. As such, there is little mention made of Cromwell or surrounding areas. However the plan change request does not preclude the ability to implement public transport in future.

### 8.4. Central Otago District Plan

8.4.1. The District Plan sets out a number of transportation-related rules with which any development is expected to comply. Although the proposal is for a plan change, consideration of these rules is important at this stage in order to identify whether the plan change provisions should seek to exempt development from any rules, or conversely, to introduce new rules specific to the zone.



8.4.2. Consequently an assessment of the plan change provisions against these rules has been undertaken and the results are summarised below

*8.4.3. District Plan Part 12.7.1: Access Standards from Roads: Part (ii): Sight Distances*

8.4.3.1. Under the District Plan, assuming that roads within the plan change are subject to a speed limit of 100km/h then each lot requires a sight distance of 160m at its access. This can be achieved through careful site layout design.

8.4.3.2. However it is possible that there will be a number of lots which do not achieve the appropriate sight distance because the lot is adjacent to an intersection and the intersection geometry means that the sightline passes across land outside the lots and the road reserve, or because the access is on the inside of a curve and the curve restricts the sight distance.

8.4.3.3. The sight distance of 160m is based upon a vehicle speed of 100km/h. However as a vehicle approaches an intersection it must slow down in order to be able to give-way to other vehicles and/or to negotiate the intersection geometry. Since there is a direct relationship between vehicle speeds and sight distances, it follows that where speeds are physically reduced, sight distances can also be reduced while still allowing a driver to see and react to a potential hazard ahead.

8.4.3.4. Where a sightline passes across land which is within the same or an adjacent lot, it is possible to place a consent notice on the lot title such that no obstruction of more than 1m in height is permitted to be placed within the sightline.

8.4.3.5. Taking these matters into account, it is considered that the sightlines at each lot access will be appropriate for the prevailing speeds or can be suitably addressed through consent notices.

*8.4.4. District Plan Part 12.7.1: Access Standards from Roads: Part (vii): Access to Rural Collector Roads*

8.4.4.1. This part of the District Plan requires accesses to be constructed to particular layouts. In the event that there are any direct accesses onto Ripponvale Road, these layouts can be achieved.

*8.4.5. District Plan Part 12.7.2: Parking: Part (i): Number of Spaces*

8.4.5.1. At this stage, no detailed layout has been produced for the individual lots. However their likely size means that each will be able to provide several car parking spaces, meeting Plan requirements.

*8.4.6. District Plan Part 12.7.2: Parking: Part (ii): Parking in Excess of Three Spaces*

8.4.6.1. It is not expected that any lots will provide more than three parking spaces.

*8.4.7. District Plan Part 12.7.3: Loading and Manoeuvring: Part (i): Servicing Activities*

8.4.7.1. The proposal is for residential activities and therefore the loading and unloading of goods is not expected to occur frequently.





## **8.5. Council's Engineering Code of Practice**

8.5.1. The Council has a Code of Practice which sets out appropriate widths for the internal roads within the plan change site. It is not considered that there are any reasons why these could not be met.

## **8.6. Summary**

8.6.1. It is considered that the plan change request is aligned with the strategic objectives of the Otago Regional Land Transport Plans 2015-2021, as relevant to this particular area. The Otago Regional Public Transport Plan is not particularly relevant due to the focus on other areas, but the plan change request is not contrary to it.

8.6.2. The site layout is likely to be able to comply with all the transportation requirements of the District Plan, other than potentially in respect of Part 12.7.1(ii) Sight Distances. However any non-compliances with the sight distances are likely to arise due to the proximity of the lot access to curves or intersections, with those geometric features also meaning that vehicle speeds will be reduced in the immediate area, which in turn means that shorter sight distances will be adequate.

8.6.3. In view of the situation, it is not considered that the plan change proposal needs to include any specific transportation-related Rules. Rather, the existing Rules of the District Plan are appropriate, and resource consent applications can be made in the event that the detailed site layout design introduces non-compliance with these.





## 9. Conclusions

- 9.1. This report has identified, evaluated and assessed the various transport and access elements of a plan change request for rural residential activities (facilitating up to 160 lots) at Cromwell.
- 9.2. Overall it is considered that the traffic generated by the development of the plan change site can be accommodated on the adjacent roading network without capacity or efficiency issues arising. In practice, the traffic generated by the development results in minimal queues and delays, even when allowing for season traffic flows on the highway and for ten years of prevailing ambient traffic growth.
- 9.3. The crash history in the vicinity of the plan change site does not indicate that there would be any adverse safety effects from the proposal.
- 9.4. The internal roads within the site are likely to be able to comply with the Council's standards, but minor upgrading of Ripponvale Road will be required. In view of the 20m legal width, this can easily be accomplished.
- 9.5. Although there is presently only a Structure Plan proposed, it is likely that there will be a high degree of compliance with the transportation requirements of the District Plan. The most likely source of any non-compliance will be due to restricted sightlines where lots gain access close to curves or intersections but these features also mean that vehicle speeds will be reduced in the immediate area, which in turn means that shorter sight distances will be adequate.
- 9.6. The plan change is also aligned with overarching Otago Regional Land Transport Plans, as relevant to the area.
- 9.7. Overall, and subject to the preceding comments, the plan change request can be supported from a traffic and transportation perspective and it is considered that there are no traffic and transportation reasons why the plan change could not be approved.

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