

Annexure A: Transportation Assessment

Request for Rezoning 308 Cones Road / 90 Dixons Road

Transportation Assessment



**CARRIAGEWAY
CONSULTING**

traffic engineering | transport planning



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1. Introduction

- 1.1. Waimakariri District Council is presently reviewing its District Plan, as part of which it is also considering the rezoning of land. Land at 308 Cones Road and 90 Dixons Road (**the site**) is proposed by the Council to be zoned as Rural Lifestyle Zone but with a Large Lot Residential Zone Overlay. The difference between the two zonings relates to the minimum lot sizes, and hence the number of lots which could be formed.
- 1.2. From discussions with the Council, it is understood that the intent of the 'overlay' is to ensure that a detailed assessment is carried out of the larger number of lots which would be permitted under a Large Lot Residential Zone compared to a Rural Lifestyle Zone to ensure that any adverse effects of the increased yield are identified.
- 1.3. This Transportation Assessment sets out a detailed analysis of the transportation issues associated with the proposed zoning of the site as a Large Lot Residential Zone, including changes in travel patterns that are likely to arise. Where potential adverse effects are identified, ways in which these can be addressed are set out.
- 1.4. 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 site is located approximately 4km to the north of Rangiora town centre (and 3km north of the existing urban edge of Rangiora), to the immediate north of Dixons Road and east of Cones Road (and the site has frontage onto both). It is proposed to be zoned as Rural Lifestyle Zone (**RLZ**) but with a Large Lot Residential Zone (**LLRZ**) Overlay under the notified proposed District Plan. The site is 25.1ha in size.

2.1.2. An existing residential area lies to the immediate west of the site. Known as Loburn Lea, this has 38 residential properties. It is zoned as Residential 4B in the operative District Plan but this land use classification was eliminated through the National Planning Standards and consequently it is proposed to be zoned as LLRZ in the proposed District Plan (the minimum lot sizes in Residential 4B and LLRZ are the same).

2.1.3. The location of the site in the context of the local area is shown in Figure 1 and in more detail in Figure 2.

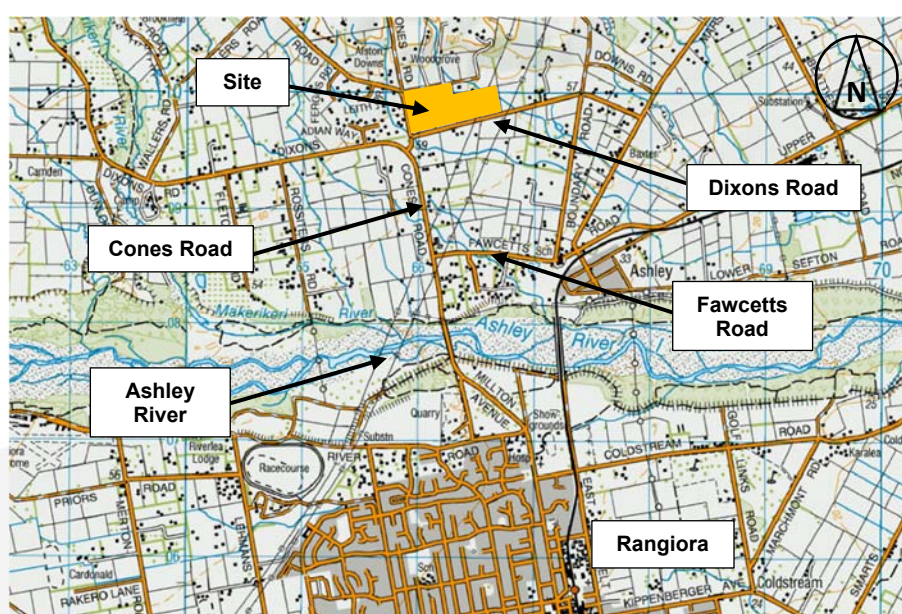


Figure 1: General Location of Site

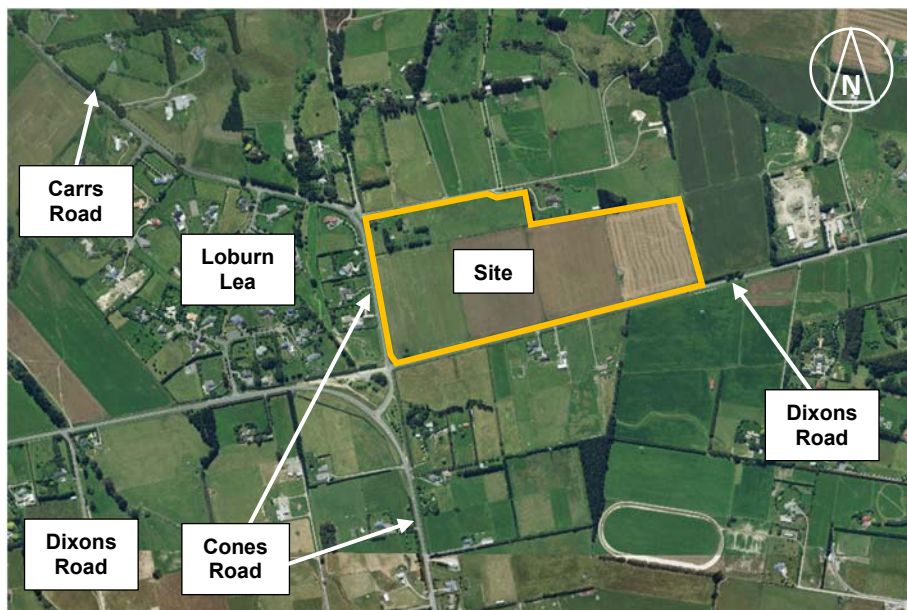


Figure 2: Aerial Photograph of Site and Environs

2.2. *Roading Classification*

- 2.2.1. The District Plan classifies Cones Road and Carrs Road at the site as Collector Roads, meaning that they carry a mix of local traffic and through traffic.
- 2.2.2. All other roads in the vicinity of the site are Local Roads, meaning that they provide for local journeys and property access.
- 2.2.3. There is a sealed roadway located along the northern boundary of the site. This is known as Harris Lane, and is a private lane which the site has no right of access.
- 2.2.4. Further south, Cones Road becomes an Arterial Road at its southernmost intersection with Dixons Road, and then becomes a Strategic Road to the south of Fawcetts Road.
- 2.2.5. Fawcetts Road and Cones Road (south of Fawcetts Road), and the continuation of Cones Road to Rangiora (Milton Avenue and Ashley Street) form part of Inland Scenic Route 72, a tourism route.



3. Current Transportation Networks

3.1. *Roading Network*

- 3.1.1. In the vicinity of the site, Cones Road has a largely flat and straight alignment, with one traffic lane in each direction and a roadway width in the order of 6.5m. There is a series of private driveways on the western side of the road associated with residential properties within the Loburn Lea residential subdivision that lies on the western side of the road. There are presently no direct accesses onto this part of Cones Road from the site.



Photograph 1: Cones Road Looking North (Site on Right)

- 3.1.2. At the northwestern corner of the site, the main road curves through 70 degrees, and changes name to Carrs Road. Although Cones Road (legally) continues northwards, this part of the road provides property access only (including a driveway to a residential property that is located at 308 Cones Road), and the formation changes to a metalled road surface. It is marked with a PW-31 'children' sign and plate stating "no exit".
- 3.1.3. Council reconstructed the Cones Road / Carrs Road intersection in 2018. This scheme included providing localised widening on the through route in order to provide a flush median for traffic turning to/from Cones Road (north), Harris Lane, and an existing dwelling within the northwestern corner of the site. The point at which traffic was able to turn was moved northwards in order to improve sight distances, and a bund was constructed to provide a clear visual indication to approaching drivers of the curve in the road. Advisory speed limit signage of 55km/h was also put in place plus chevrons at the intersection and PW-18 'curve' advance signage (under the previous arrangement, the advisory limit was 45km/h and there were no chevrons).



Figure 3: Aerial View of Cones Road / Carrs Road Intersection



Photograph 2: Cones Road Looking North, Curving into Carrs Road (Site on Right)

- 3.1.4. There is also a private laneway (known as Harris Lane) which joins Cones Road from the east which serves a number of rural residential properties. Although the lane runs along the northern boundary of the site, the site does not have any legal right to gain access onto it. Harris Lane connects to the Cones Road / Carrs Road intersection as shown on Figure 3 above.
- 3.1.5. Dixons Road runs along the southern boundary of the site. This has a flat and straight alignment, with one traffic lane in each direction and a roadway width in the order of 6.0m to 6.5m. There is a small number of accesses to the site on Dixons Road, used for movement of agricultural vehicles and machinery, and three private residential driveways on the southern side of the road.



Photograph 3: Dixons Road Looking East (Site on Left)

- 3.1.6. Towards the east of the site, Dixons Road connects to other local roads which typically serve other rural residential development. However these local roads also serve the Daiken MDF plant, located 3km east of the site, which is a local centre of employment.
- 3.1.7. Dixons Road meets Cones Road at a priority ('stop') intersection where traffic on Cones Road retains priority. Dixons Road notionally extends to the west of Cones Road (as it is legal road) but this serves no development, only an informal yard for the temporary storage of aggregate by contractors. The intersection therefore effectively operates as a tee arrangement.



Photograph 4: Cones Road / Dixons Road Intersection Looking South

- 3.1.8. Although the intersection is 'stop' controlled, sight distances at the limit line are excellent with a distance of at least 7m between the edge of the nearest traffic lane on Cones Road and the property boundaries.

3.1.9. South of this intersection, Cones Road widens to provide an 8m seal width. Approximately 135m south of the intersection with Dixons Road, Cones Road deviates slightly to the west, and join with roads somewhat confusingly also named Cones Road and Dixons Road. In essence, at some point in the past (at least 20 years ago), it appears that a crossroads intersection was removed in favour of forming two tee-intersections (as this type of arrangement is safer).

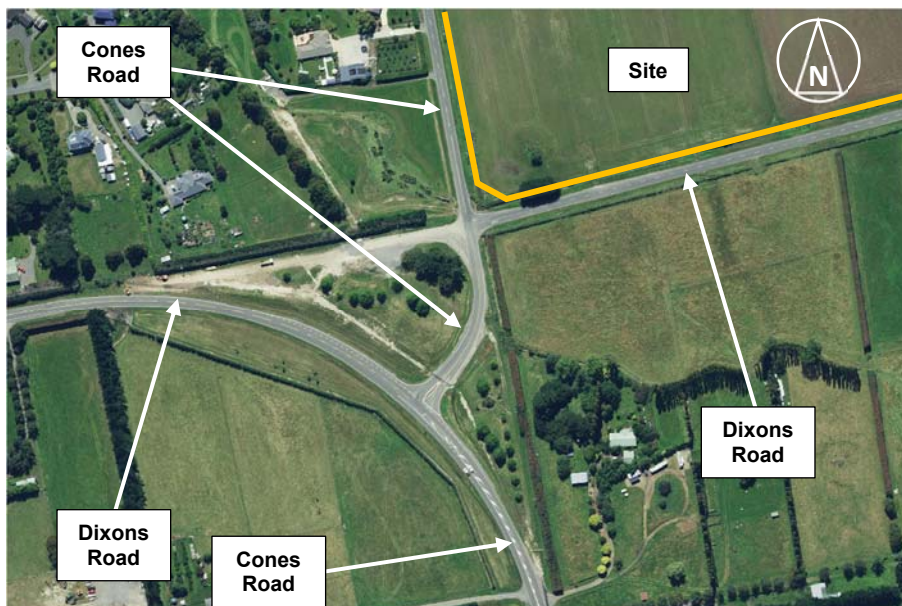


Figure 4: Aerial Photograph of Southernmost Cones Road / Dixons Road Intersection



Photograph 5: Southernmost Cones Road / Dixons Road Intersection Looking North

3.1.10. The intersection is priority ('give-way') controlled with the southern and western legs having priority. There are also auxiliary lanes for vehicles turning right and left into the minor leg, and a raised island on the minor leg to prevent drivers from 'cutting the corner'.

3.1.11. Cones Road continues southwards, to cross the Ashley River via a recently-constructed bridge (after the previous bridge was damaged in the 2013 floods). It changes name to Milton Avenue and then to Ashley Street to the south of the bridge and this in turn leads into Rangiora town centre.



3.2. Vehicle Speeds

- 3.2.1. Cones Road and Dixons Road adjacent to the site are both subject to a 100km/h speed limit. The flat and straight alignment of Dixons Road means that this speed is likely to be achieved by vehicles, other than in the vicinity of its intersection with Cones Road at the southwestern corner of the site where drivers must slow to negotiate the intersection geometry.
- 3.2.2. However the geometry of Cones Road means that traffic speeds are reduced at the site. The curve towards the northwestern corner of the site is marked with a 55km/h advisory speed limit and chevrons. A speed survey was carried out in this location during November 2022 as part of a resource consent application in the area, which showed a mean speed of 59.4km/h and an 85th percentile speed of 68.0km/h at the location of the existing lot boundary between 90 Dixons Road and 308 Cones Road.
- 3.2.3. Waka Kotahi Research Report 226 ('Curve Advisory Speeds in New Zealand') includes a relationship between observed 85th percentile speeds and posted advisory speeds, based on comprehensive surveys and 18,700 speed observations. This shows that for a posted 55km/h advisory speed limit, an 85th percentile speed of 70km/h could be expected. The observed 85th percentile speed at Cones Road is within 3% of this value. An operating speed of 68km/h was accepted by the Council's traffic engineers as being the appropriate speed environment in the vicinity of the northwestern part of the site (as discussed subsequently).
- 3.2.4. Cones Road has an 80km/h speed limit between Fawcetts Road and Rangiora Showgrounds, and is then posted with a 50km/h speed limit into the town centre.

3.3. Non-Car Infrastructure

- 3.3.1. As the site is located in a rural / rural residential area, there are no footpaths provided in the immediate vicinity. However there are wide grassed berms and the low traffic flows (discussed subsequently) mean that pedestrians and other non-car road users are able to walk along the side of the seal.
- 3.3.2. It is noted that the existing LLRZ development at Loburn Lea to the immediate west also has no specific measures provided for walking and cycling. Pedestrians use the verges to walk within the development (and adjacent to it, on Carrs and Cones Road), with cyclists sharing the roadways.
- 3.3.3. This is a shared walking and cycling path on Cones Road, which joins from Fawcetts Road, approximately 1km south of the site. This runs along the eastern side of Cones Road to the Ashley Bridge. The signage is unclear with regard to the formal start/end of the shared path and whether this runs across the bridge. However the bridge itself has a 1.5m wide footpath on the eastern side, plus 1.8m wide shoulders on each side of the movement lanes, which can be used for walking and cycling.



Photograph 6: Wide Shoulders and Separated Footpath on Ashley Bridge (Looking South)

- 3.3.4. On the southern side of the bridge is an off-road shared route which extends to the Rangiora Showgrounds, approximately 2.7km south of the site. From there, there is a pedestrian refuge which enables pedestrians to cross to the western side of the road and onto a footpath which extends south into the town centre. Cyclists are accommodated by way of wide shoulders on the road, and an intermittently marked cycle lane on each side of the road.
- 3.3.5. It is expected that this higher level of provision for walking and cycling is as a result of these roads forming part of Inland Scenic Route 72, and therefore potentially attracting tourists/visitors, rather than serving any particular local needs or demand.
- 3.3.6. The closest bus route is Service 1 (Cashmere – Rangiora) which stops at the Rangiora Showgrounds, approximately 2.8km south of the site. The bus stop has a flag and pole but no other infrastructure.

3.4. Future Changes

- 3.4.1. 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. According to the MobileRoad website, Cones Road adjacent to the site carries 1,600 vehicles per day (two-way) with Dixons Road adjacent to the site carrying 340 vehicles per day.
- 4.1.2. The Council has previously provided details of a traffic count on Cones Road carried out in 2022 which shows that the peak hours on Cones Road occurred between 8am to 9am (139 vehicles (two-way)) and 5pm to 6pm (159 vehicles (two-way)). These indicate that the peak hour volumes on the road are in the order of 10% of the daily flow, as would be expected.
- 4.1.3. On this basis, the peak hour traffic volume on Dixons Road past the site would be in the order of 30-35 vehicles (two-way)
- 4.1.4. Cones Road towards the south is shown by the MobileRoad website as carrying 5,600 vehicles per day (two-way), which would equate to 560 vehicle movements (two-way) in the peak hours.
- 4.1.5. A specific traffic survey was carried out at the southern Cones Road / Dixons Road intersection in September 2023. The results of this are summarised below.

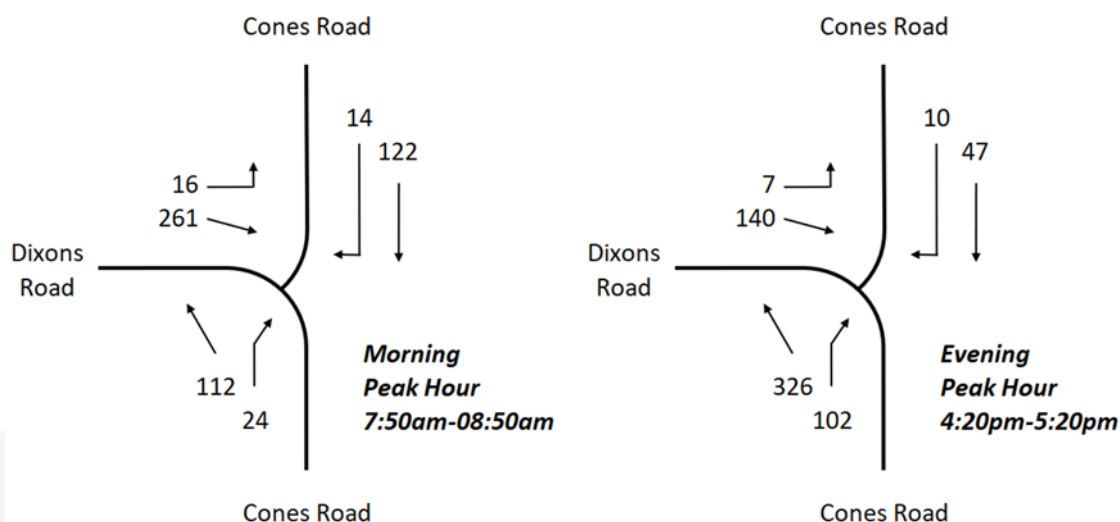


Figure 5: Weekday Morning and Evening Peak Hour Traffic Flows, Southernmost Cones Road / Dixons Road Intersection

- 4.1.6. It can be seen that the observed peak hour flow on Cones Road (south) of 519-615 vehicles (two-way) aligns well with the estimate of 560 vehicle movements (two-way). However for the purposes of analysis, the observed traffic flows have been used.
- 4.1.7. No specific traffic survey has been undertaken at the northern Cones Road / Dixons Road intersection. However the total traffic flow passing through that intersection must be the same as observed on the northern leg of the southern Cones Road / Dixons Road intersection. That is, in total, 176 vehicles (two-way) will have passed through the northern Cones Road / Dixons Road intersection in the morning peak hour with a total of 166 vehicles passing through the intersection in the evening peak hour.
- 4.1.8. 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)

4.1.9. It can be seen that in total least 650 vehicles need to pass through an intersection for a formal analysis to be justified. The traffic flows at the northernmost Cones Road / Dixons Road intersection fall well below these thresholds and accordingly, no analysis has been carried out. In essence, at present the Cones Road / Dixons Road intersection will operate under 'free-flow' conditions, where the ability to turn and manoeuvre is largely unrelated to the presence of other vehicles.

4.1.10. It can be seen that the observed traffic flows at the southern Cones Road / Dixons Road intersection lie slightly above these thresholds in the evening peak hour and therefore for a robust assessment, this intersection has been assessed. The computer software package Sidra Intersection has been used for this, 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
Cones Road (south)	R	9.2	0.1	A	8.6	0.4	A
Cones Road (north)	L	9.5	0.5	A	8.8	0.2	A
	R	11.5	0.1	B	13.7	0.1	B
Dixons Road	L	8.2	0.0	A	8.2	0.0	A

Table 2: Existing Peak Hour Levels of Service at the Southernmost Cones Road / Dixons Road Intersection

4.1.11. It can be seen that queues and delays are very low, with a good level of service provided.

4.2. Non-Car Modes of Travel

4.2.1. Given that the area is predominantly rural / rural residential, it can reasonably be expected that it will be relatively lightly used by pedestrians and cyclists. However while this outcome is supported by informal observations for utility travel on weekdays, it is also noted that the southernmost section of Cones Road and Dixons Road (west) are regularly used by groups of cyclists at weekends for recreational riding.

4.2.2. In view of demand, the current level of infrastructure for walking and cycling is considered appropriate.



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 site. All reported crashes between 2016 and 2022 were identified, plus the partial record for 2023, for Cones Road and Dixons Road, for a distance of 200m around the site. This therefore includes the southernmost Cones Road / Dixons Road intersection. Due to the low traffic flows on Dixons Road, a further five years (2011 to 2015) were assessed for this road.
- 4.3.2. This showed that there were six crashes recorded, and of these four were recorded in the vicinity of the southernmost Cones Road / Dixons Road intersection. Only two crashes was recorded elsewhere.
- 4.3.3. Two crashes occurred at the curve towards the northwest of the site (one is a miscode within CAS). In one case, a driver travelling towards Rangiora and under the influence of alcohol failed to slow down for the curve and left the road. The crash did not result in any injuries. In the other instance, a driver travelling towards Rangiora struck a patch of loose gravel while turning at the curve, lost control and left the road. The crash did not result in any injuries.
- 4.3.4. Of the four crashes at the southernmost Cones Road / Dixons Road intersection:
- One crash occurred just north of the intersection, when a driver travelling towards Rangiora failed to slow down sufficiently, lost control and left the road. The police report describes a vehicle fault as contributing to the crash (there was no bodywork, and hence no weight, above the rear wheels). The crash did not result in any injuries;
 - One crash occurred just south of the intersection, when a driver travelling towards Rangiora negotiated the intersection but the vehicle steering then jammed with the wheels turned and the vehicle then left the road. The crash did not result in any injuries;
 - One crash occurred at the intersection, when a driver travelling towards Rangiora briefly ran over wet grass on the verge, lost control and the vehicle then left the road. The crash did not result in any injuries;
 - One crash occurred just south of the intersection, when a driver travelling towards Rangiora failed to see the road markings due to heavy rain, rang over the verge, lost control and the vehicle then left the road. The crash resulted in minor injuries.
- 4.3.5. No crashes were recorded at the northern Cones Road / Dixons Road intersection, or on Cones Road or Dixons Road directly adjacent to the site.
- 4.3.6. The historic pattern of crashes indicates all crashes involved drivers that were travelling from the west and towards Rangiora. This is a movement that is unlikely to be increased by the proposed rezoning, as discussed subsequently.

5. Proposal

- 5.1. The proposal is for the rezoning of the land under the proposed District Plan from GRZ with LLRZ overlay, to LLRZ. Under the provisions of LLRZ, lot sizes across a site must be an average of at least 5,000sqm, and given the size of the site (25.1ha), this means that it could notionally be developed into 50 lots. However in view of the need to provide for internal roading and stormwater management, this yield is expected to reduce to 45 lots. This represents an increase of 44 residential lots over and above the current use (as there is one occupied residential property located towards the northwest of the site).
- 5.2. As the proposal is for a rezoning, there is no specific subdivision plan at this stage. However the District Plan requires an Outline Development Plan (**ODP**) for sites such as this, and this is shown below.



Figure 6: Proposed Outline Development Plan

- 5.3. From a transportation perspective, the key feature of the ODP is a small internal transportation network, which is intended to provide for vehicular access to the site. There is one point of access proposed onto Cones Road, towards the northwest of the site. This is positioned at the boundary between the two existing lots and is located to enable development to commence either from the north or from the south. This roadway then turns southwards and in turn, connects to Dixons Road. The ODP notes this as the primary route.
- 5.4. A second roadway runs east-west through the site. At its eastern end, this turns southwards to connect to Dixons Road close to existing powerlines. To the west, it intersects with the primary road and extends further west before becoming a route for walking and cycling only, to enable access to the Open Space Zone in Loburn Lea.

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 traffic will be associated with employment locations in Rangiora or further afield in Christchurch, and there is also likely to be travel to schools in Rangiora. Consequently, for this analysis a rate of 8 vehicle movements per day per residence has been used, with 1 vehicle movement per residence occurring in each of the peak hours. Thus at full development of 44 additional lots, the site will generate peak hour traffic volumes of 44 vehicle movements (two-way).
- 6.1.3. In the morning peak hour, 85% of these vehicles are likely to be exiting the site, with 65% of the generated vehicle movements entering the 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 the vast majority will be associated with travel to/from Rangiora or Christchurch. For the purposes of this analysis then, all traffic has been allowed to travel through both the northern and the southern Cones Road / Dixons Road intersections. At the southern Cones Road / Dixons Road intersection, the traffic has been apportioned according to the observed patterns.
- 6.2.2. While there may be a small amount of traffic that travel eastwards on Dixons Road (such as towards the Daiken plant), these volumes will be low and easily accommodated on the road network. Furthermore, assessing a scenario where all traffic uses the Cones Road route means that the assessment of changes in queues and delays at the Cones Road / Dixons Road intersections will be highly robust.
- 6.2.3. The traffic generation of the site when developed is therefore as follows:

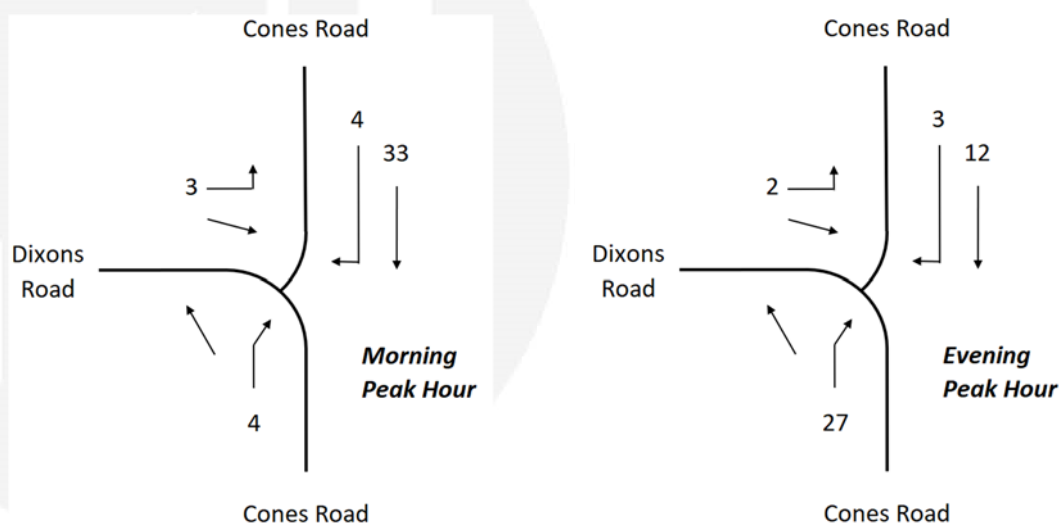


Figure 7: Weekday Morning and Evening Peak Hour Traffic Generation at Full Site Development



7. Effects on the Transportation Networks

7.1. Rooding Capacity

- 7.1.1. With full development of the site, the total traffic passing through the northernmost Cones Road / Dixons Road intersection remains well below the thresholds at which a formal intersection assessment is required. Accordingly, it will continue to operate under 'free-flow' conditions.
- 7.1.2. The southernmost Cones Road / Dixons Road intersection has been reassessed using the Sidra Intersection software package 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
Cones Road (south)	R	9.3	0.1	A	8.7	0.5	A
Cones Road (north)	L	9.6	0.6	A	8.8	0.2	A
	R	11.6	0.1	B	14.2	0.1	B
Dixons Road	L	8.2	0.0	A	8.2	0.0	A

Table 3: Peak Hour Levels of Service at the Southernmost Cones Road / Dixons Road Intersection with Full Site Development

- 7.1.3. It can be seen that queue lengths increase by a maximum of only 0.1 vehicle lengths, and the increase in delay on any turning movement is just 0.5 seconds per vehicle. This extent of change is unlikely to be perceptible.
- 7.1.4. There is no detail on the extent of traffic growth on this part of the rooding network, but typically general traffic growth is assumed to be in the order of 4% per annum. Accordingly, a sensitivity test has been carried out with a further 40% (that is, 10 years of ambient traffic growth) added to the observed 2023 volumes, and the intersection remodelled. The changes in delay, queue length and levels of service results are summarised below (a '-' represents no change).

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	
		No dev	With dev	No dev	With dev	No dev	With dev	No dev	With dev	No dev	With dev	No dev	With dev
Cones Road (south)	R	10.0	-	0.2	-	A	-	9.0	-	0.6	-	A	-
Cones Road (north)	L	10.4	+0.1	0.8	+0.2	B	-	9.1	-	0.2	+0.1	A	-
	R	13.9	+0.2	0.2	-	B	-	18.6	+0.6	0.2	-	C	-
Dixons Road	L	8.2	-	0.0	-	A	-	8.2	-	0.0	-	A	-

Table 4: Change in Peak Hour Levels of Service at the Southernmost Cones Road / Dixons Road Intersection, Sensitivity Test of Background Volumes Increased by 40%

- 7.1.5. It can be seen that development of the site would not significantly affect intersection performance. Even the greatest change, of an increase of 0.6 seconds for the right-turn movement in the evening peak hour is unlikely to be perceptible.



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

7.2. Non-Car Modes of Travel

7.2.1. The development of the site may result in increased levels of walking and cycling in the immediate area. However, these will only be small because of the small scale of development.

7.2.2. As set out above, there is no specific provision for walking and cycling on the roads in the vicinity of the site, including within the existing Loburn Lea LLRZ development to the west. There is however a shared walking and cycling route which runs along the southern part of Cones Road and Fawcetts Road, and therefore is just 1km from the site. Between the site and shared path, the easternmost verge of Cones Road is a minimum of 4m wide¹ and therefore easily able to be used by those walking or cycling.

7.2.3. It is typically accepted that people will walk a maximum of 1km to reach a particular destination, and will cycle a maximum distance of 3km. In this regard, it is unlikely that many people will walk to/from the site, and the site also lies outside the 3km cycling distance with regard to travel to Rangiora town centre (which is around 4km away). That said, the nature of LLRZ zoning means that it necessarily cannot be located close to town centres due to the average lot sizes required. Further, the maximum 3km cycling distance was surveyed prior to the advent of e-bikes. It is reasonable that the travel distance is related to the amount of energy required to be expended by the rider, and thus with battery-assist, the journey length will be greater.

7.2.4. By way of comparison, the Austroads Guide to Road Design Part 6A (Paths for Walking and Cycling) sets out that “most” cyclists travel at 20km/h to 30km/h. A cyclist could therefore travel from the southern edge of the site to the northern edge of the town centre in only 9 to 13 minutes (and faster, if an e-bike is used). It is considered that this not an unreasonable travel time.

7.2.5. The legal width of Cones Road permits the construction of an off-road route in future to connect into the existing route at Fawcetts Road. However as noted above, the provision for walking and cycling to the south of Fawcetts Road is likely to be related to these roads forming part of Inland Scenic Route 72 rather than meeting local demand. As such, it is not anticipated that demand would be sufficiently high from development of the site to justify the formation of a new shared path.

7.2.6. In addition to the facilities within the town centre, the recently-constructed Mainpower Stadium is located just 3.8km from the site (an 8 to 11 minute cycle ride). This includes a fitness centre, sports courts and running turf.

7.2.7. The ODP shows a link proposed at the western end of the secondary road intended for walking and cycling. The purpose of this is to provide a direct connection to the Open Space Zone at Loburn Lea, which is opposite the proposed connection and means that those living within the site will be able to travel to the Open Space Zone without using a car.

7.2.8. The size of the site is not sufficient that it will give rise to the need for a public transport service. If a service was to be developed in future, it is considered that it is most likely to use Cones

¹ For clarity, vegetation in adjacent lots has intruded into this and therefore the width as seen on-site is somewhat less than this. However Council is able to remove vegetation within the road reserve as of right.



Road and serve Loburn Lea and other rural residential development. Development of the site does not preclude or otherwise affect this route.

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. Of the recorded crashes, all involved traffic travelling from the west and in the direction of Rangiora. Development of the site is unlikely to significantly increase the number of vehicles undertaking these movements.
- 7.3.3. The matter of sightlines available at the proposed new intersections formed onto Cones Road and Dixons Road is discussed below. In short though, the sightlines available are appropriate for the prevailing speed environments.
- 7.3.4. The site is relatively flat and there are no reasons why the internal roading network could not meet appropriate designs guides and standards.

7.4. Site Access

- 7.4.1. The proposal will create three priority intersections, one onto Cones Road and two on Dixons Road. Under the warrants set out in the Austroads Guide to Traffic Management Part 6 ('Intersections, Interchanges and Crossings'), and taking into account the through traffic on Dunstan Road, auxiliary turning lanes are not warranted at any location. The legal width of both Cones Road and Dixons Road is 20m meaning that any localised widening of the seal to accommodate turning movements can be easily achieved.



8. District Plan

8.1. Introduction

8.1.1. 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 rezoning, consideration of these rules is important at this stage in order to identify whether there are any likely non-compliances within the ODP or impediments to achieving a complying subdivision layout in future. Consequently an assessment of the transportation rules has been undertaken and the outcomes are summarised below.

8.2. Operative District Plan Chapter 30, Utilities and Traffic Management: Condition 30.6

8.2.1. Conditions 30.6.1.1 to 30.6.1.11 – Access to Roads

8.2.1.1. Cones Road and Dixons Road have already been constructed and evidently carry current traffic flows without any difficulty. However Cones Road adjacent to the site has a shortfall in respect of Condition 30.6.1.1 and Table 30.1 in that the seal width is 0.5m less than expected and the road does not provide cycleways.

8.2.1.2. The extent of traffic increase associated with development of the site is small. Many of the vehicles associated with the site will not use Cones Road adjacent to the site (as Dixons Road will form the more direct route) but even if they did, the peak hour volume of 44 vehicle movements equates to an average of one additional vehicle movement every 82 seconds. This level of increase is not sufficient to justify changes to the current road layout.

8.2.1.3. The internal roads can be constructed to meet the requirements of Table 30.1 (Condition 30.6.1.2).

8.2.1.4. Conditions 30.6.1.3 to 11 relate to activities or locations which are not relevant to this site.

8.2.2. Conditions 30.6.1.12 to 30.6.1.18 – Accessways

8.2.2.1. Under Condition 30.6.1.13, accessways must achieve certain minimum widths. Accessways might occur within the site, but there are no reasons why the required dimensions could not be achieved. They can be formed to an all-weather standard (Condition 30.6.1.15a)

8.2.2.2. Conditions 30.6.1.12, 14, and 16 to 18 relate to activities or locations which are not relevant to this site.

8.2.3. Conditions 30.6.1.19 to 30.6.1.31 – Vehicle Crossings

8.2.3.1. Under Condition 30.6.1.19 there is a maximum number of vehicle crossings per site. At this stage the proposal is for a rezoning, but there are no reasons why the provisions of this Condition could not be met in future.

8.2.3.2. Condition 30.6.1.24 specifies the sight distances required from vehicle crossings. No vehicle crossings are proposed at this stage, but in the event that the site was to be developed in stages, each of the roads could potentially be constructed initially as an access.

8.2.3.3. The flat and straight alignment of Dixons Road means that the anticipated 250m sight distance at the roads/accesses can be easily achieved.

8.2.3.4. With regard to the potential access on Cones Road, although the speed limit is 100km/h, the prevailing speed is 68km/h. The District Plan sets out sight distances for roads subject to a 100km/h, 70km/h and 50km/h speed limit (250m, 140m and 80m respectively) but this is on the assumption that traffic is travelling at the speed limit, which is clearly not the case here. According to the Austroads Guide (in all iterations), sight distance is a function of driver reaction time and vehicle speed, meaning that as traffic speeds reduce, a reduced sight distance is appropriate.

8.2.3.5. In order to identify the appropriate sight distance for a speed of 68km/h, the values of the District Plan have been plotted on a graph and the best-fit equation found:

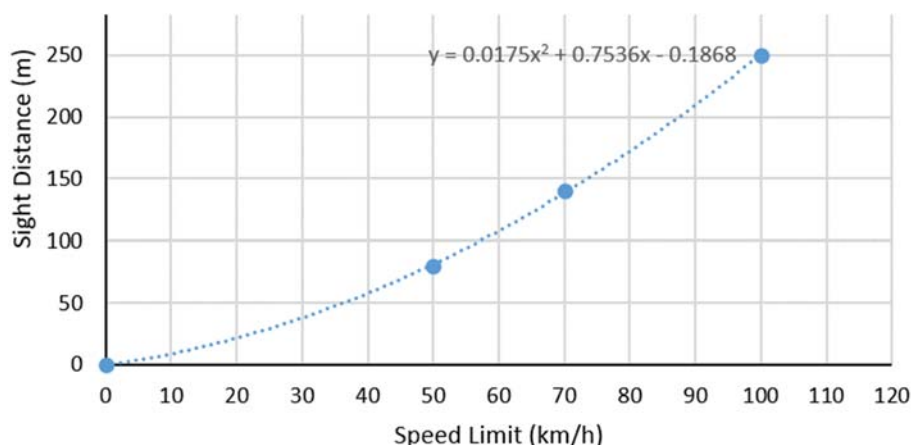


Figure 8: Best-fit Line for District Plan Sight Distances and Speeds

8.2.3.6. Applying this shows that for a vehicle speed of 68km/h, a sight distance of 133m is appropriate.

8.2.3.7. A site measurement at 3.5m back from the edge of the traffic lane at the location of the potential access shows a sight distance of 129m. The constraint to the measurement is the road boundary adjacent to 303 Cones Road (on the inside of the curve). Measuring at 5.0m back from the edgeline, the distance increases to 134m, again being constrained by the road boundary adjacent to 303 Cones Road.



Photograph 7: Sightline Looking Towards South and Proposed Location for Primary Road Access



8.2.3.11. Overall then, it is considered that the sight distance provided towards the north is appropriate, taking into account the reduced speeds associated with the curve². This matter has already been considered and accepted by the Council.

8.2.3.12. Conditions 30.6.1.26 and 27 specify the minimum distance between new vehicle crossings and intersections. Although no new vehicle crossings are proposed, the provision of new intersections means that existing vehicle crossings require assessment. In this case, a separation of 60m would be required between vehicle crossings on Cones Road and the proposed new primary road intersection, and a separation of 60m is also required on Dixons Road.

8.2.3.13. This is achieved for the proposed intersections on Dixons Road, but separation distances are 10m and 29m for the primary road onto Cones Road due to vehicle crossings on the western side of Cones Road.

8.2.3.14. Assessment Matters for this are not specific, but refer generally to the “*operation of the transportation network*” and “*traffic and pedestrian safety*”. In this case, the other vehicle crossings are located on the opposite side of the road to the site meaning that there would be no confusion about where a vehicle is turning. The vehicle crossings on the western side of Cones Road are lightly trafficked as they serve just one residential property each, and the sight distances available to road users are appropriate for the prevailing speeds. Additionally, drivers exiting the vehicle crossings will be travelling in a forwards gear (rather than having to reverse) which further supports good intervisibility between road users.

8.2.3.15. Accordingly, the reduced separation distance can be supported.

8.2.3.16. Conditions 30.6.1.20 to 23, 25, and 28 to 31 relate to activities or locations which are not relevant to this site.

8.2.4. Conditions 30.6.1.32 to 30.6.1.33 – Road Intersection Spacing

8.2.4.1. The proposal involves the formation of Local Roads onto existing roads, and hence new intersections. Given that both frontage roads are subject to a 100km/h speed limit, there is a requirement for a separation of 800m between intersections.

8.2.4.2. By way of background, there is a separation of 120m between the northern and southern Cones Road / Dixons Road intersections to the immediate south of the site, and 300m between the Carrs Road / Fergus Road and Carrs Road / Leith Drive intersections to the immediate north of the site. There is also no discussion in the District Plan as to why this separation is proposed. For example, the Austroads Guide to Road Design Part 4 (‘Intersections and Crossings – General’) sets out that intersections should be “*desirably*” separated by at least five seconds of travel time at the design speed, as this provides sufficient time for drivers to process information related to traffic, the road layout, and traffic signs. At a design speed of 110km/h (the speed limit plus 10%), this suggests that a separation of 150m is appropriate. It is noted that this same 150m separation distance is also set out in Standard NZS4404:2010 (‘Land Development and Subdivision Infrastructure’).

² The proposed District Plan is discussed subsequently, but it should be noted that sight distance requirements are different and the sight distances for an access in this location would comply with the new provisions.



- 8.2.4.3. By way of another example, under the Austroads Guide the distance needed for an unalert driver approaching an intersection, to see a vehicle ahead moving out from a side road and stopping directly in front of them, is 300m.
- 8.2.4.4. In both cases, this suggests that the 800m separation is excessive, since it represents more than 26 seconds of travel time at the design speed.
- 8.2.4.5. As noted above, the curve on Cones Road means that the operating speed of the road is less than 100km/h. There is a separation of 270m between the proposed primary road intersection and the northernmost Cones Road / Dixons Road intersection, and interpolating Table 30.7 under Condition 30.6.1.32, this is appropriate for a speed environment of slightly more than 70km/h. However as noted previously, the operating speed is lower than 70km/h due to the presence of the curve. Accordingly, the reduced separation can be supported.
- 8.2.4.6. The two proposed intersections onto Dixons Road are located approximately 300m and 600m east of the northern Cones Road / Dixons Road intersection. This distance is appropriate to provide full sight distances for turning traffic at the intersections, and ample to achieve 5 seconds of travel time separation (in fact, around 10 seconds of travel time is available between the intersections).
- 8.2.4.7. Accordingly, the reduced separation distance between intersections can be supported.

8.2.5. *Conditions 30.6.1.34 to 30.6.1.45 – Parking, Loading and Manoeuvring*

- 8.2.5.1. Conditions 30.6.1.34 to 36 set out the requirements for parking at the site. At this stage the proposal is for a rezoning, but there are no reasons why the provisions of these Conditions could not be met in future.
- 8.2.5.2. Condition 30.6.1.37 requires that vehicles do not reverse onto Cones Road, and the layout shows that this will not be necessary due to the continuous route provided.
- 8.2.5.3. Conditions 30.6.1.38 to 44 relate to activities or locations which are not relevant to this site.

8.2.6. *Conditions 30.6.1.46 – Traffic Sight Lines at Railway Level Crossings*

- 8.2.6.1. The site is not near to any railway lines and this rule therefore is not applicable.

8.3. *Operative District Plan Chapter 30, Utilities and Traffic Management: Condition 30.8*

- 8.3.1. Under Condition 30.8.2, where a site includes 20 or more new car parking spaces, a development is a discretionary activity (restricted). At this stage the proposal is for a rezoning and accompanying ODP and therefore this Condition is not applicable.

8.4. *Summary of Operative District Plan Assessment*

- 8.4.1. Based on the review above, the proposal (and ODP) has the following non-compliances with the operative District Plan:
- Condition 30.6.1.1: Access to Roads
 - Cones Road is presently constructed to a slightly lesser standard than the District Plan requires, but carries current traffic flows without any difficulty, and the extent of traffic increase associated with development of the site is small.



- Condition 30.6.1.24: Vehicle Crossings
 - In the event that the site was to be developed in stages and the roads were constructed as accesses, then the required 250m sight distance would not be achieved. For the 68km/h operating speed, a sight distance of 133m is required and a sight distance of 129m to 134m is available, depending on where the sightline is measured to. The distance is considered to be appropriate.
- Conditions 30.6.1.32: Road Intersection Spacing
 - There is a requirement for a separation of 800m between intersections but this is not achieved. The separation distance of 270m for the proposed new primary road on Cones Road is appropriate for the prevailing operating speed. The 300m separation for the proposed intersections onto Dixons Road easily achieves the appropriate separation distance under the Austroads Guide to Road Design and Standard NZS4404:2010.

8.4.2. It is not considered that these non-compliances will give rise to any adverse roading efficiency or road safety effects.

8.4.3. One potential further non-compliance would be in respect of the minimum distance between new vehicle crossings and intersections, although the District Plan limits this to “new” vehicle crossings whereas in this case a new intersection is proposed. Irrespective, an assessment of the effects of the reduced separation distances between the proposed new intersection on Cones Road and the existing vehicle crossings on the opposite side shows that the low traffic volumes and good intervisibility means that there will be no driver confusion and accordingly, a reduced separation distance can be supported.

8.5. Proposed District Plan: Transport Rules

8.5.1. TRAN-R3: Formation of a New Road

8.5.1.1. Under this Rule, new roads are to meet Standard TRAN-S1 (design standards for new roads). There are no reasons why the roads within the site could not comply with the expected cross-sections.

8.5.2. TRAN-R4: Formation of a New Road Intersection

8.5.2.1. Under this Rule, new roads are to meet Standard TRAN-S2 (minimum road intersection separation distances). For roads with a 100km/h speed limit, a separation distance of 800m is required, which is the same as the operative District Plan.

8.5.2.2. As discussed in detail above, the locations for the intersections of the ODP do not meet this separation distance. Assessment Matters (MD-1 and MD20) are not specific for non-compliance with this Rule, as they mention “safe and efficient access and use” but also “Any other relevant assessment matters”. However for the reasons set out above, it is considered that the proposed separations are located with adequate separation.

8.5.3. TRAN-R5: Formation of a New Vehicle Crossing

8.5.3.1. Under this Rule, new vehicle crossings are to meet Standard TRAN-S3 (design standards for new vehicle crossings). No vehicle crossings are proposed at this stage, but in the event that the site was to be developed in stages, each of the roads could potentially be constructed initially as an access and hence a vehicle crossing.



- 8.5.3.2. This Standard has several parts. The site has frontage of 380m onto Cones Road and 800m onto Dixons Road, meaning that 3 vehicle crossings could be constructed onto both (Table TRAN-15). The ODP shows 1 vehicle crossing / road onto Cones Road and 2 vehicle crossings / roads onto Dixons Road, meeting this.
- 8.5.3.3. Under Table TRAN-16, there is an expected separation distance of 105m to any other vehicle crossing on Cones Road for the posted 100km/h speed limit, but as noted above, the operating speed in the vicinity of the proposed access/road is slightly below 70km/h. This therefore suggests a separation distance of 40m is appropriate. This is not achieved, with a separation of 10m and 29m to existing vehicle crossings on the western side of the road.
- 8.5.3.4. Assessment Matters are set out in TRAN-MD3. However the size of the lots means that there is no on-street parking on Cones Road, and thus in practice there are only two of relevance, *“the extent to which safety will be adversely affected by conflict between manoeuvring vehicles at vehicle crossings”* and *“the extent to which pedestrian and cycle safety may be adversely affected by a lack of complying separation distance between vehicle crossings”*.
- 8.5.3.5. In this case, the other vehicle crossings are located on the opposite side of the road to the site, and they will be very lightly trafficked since they serve only a small amount of residential development. Pedestrian and cyclists numbers will be low due to the location of the site, with further minimises the potential for conflict. Sight distances are appropriate for the prevailing speeds, and additionally, drivers exiting the vehicle crossings will be travelling in a forwards gear (rather than having to reverse) which further supports good intervisibility between road users. Accordingly, the reduced separation distances can be supported.
- 8.5.3.6. Also under Table TRAN-16, a 40m separation distance is required for any vehicle crossings onto Dixons Road. This separation distance can be achieved.
- 8.5.3.7. Under Table TRAN-17, there is an expected separation distance of 60m between new vehicle crossings and intersections, In this case, although no new vehicle crossings are proposed, the provision of new intersections means that existing vehicle crossings require assessment. The separation distance of 60m is the same as required under the operative District Plan, and this is achieved for the proposed intersections on Dixons Road, but separation distances are 10m and 29m for the proposed primary access onto Cones Road as noted above.
- 8.5.3.8. Assessment Matters are set out in TRAN-MD4. However the size of the lots and the low traffic volumes they carry means that in practice, the relevant matters are *“the extent to which any potential confusion between vehicles turning at the crossing or the intersection may adversely affect safety”* and *“the extent of effects on the safety of users of all transport modes”*.
- 8.5.3.9. In this case, the other vehicle crossings are located on the opposite side of the road to the site meaning that there would be no confusion about where a vehicle is turning. The vehicles crossings on the western side of Cones Road are lightly trafficked as they serve just one residential property each, and the sight distances available to road users are appropriate for the prevailing speeds. Additionally, drivers exiting the vehicle crossings will be travelling in a forwards gear (rather than having to reverse) which further supports good intervisibility between road users. Accordingly, the reduced separation distance can be supported.
- 8.5.3.10. The appropriate vehicle crossing widths can be provided.
- 8.5.3.11. The matter of sight distances is discussed in detail above. However the proposed District Plan provides slightly more detail than the operative District Plan. As set out previously, this part of Cones Road has an operating speed of 68km/h, and the proposed District Plan



specifies that a distance of slightly less than 120m is appropriate. However, the access provides at least 129m. The sight distance therefore meets (and exceeds) the proposed District Plan requirements.

8.5.4. TRAN-R6: Formation of a New Vehicle Accessway

8.5.4.1. Under this Rule, new vehicle crossings are to meet Standard TRAN-S4 (design standards for new vehicle accessways). The proposal is for a rezoning, but there are no reasons why compliance with these provisions could not be achieved.

8.5.5. TRAN-R7: Formation of a New Vehicle Accessway on a sealed road where the posted speed limit is 60km/hr or above

8.5.5.1. Under this Rule, new vehicle crossings are to meet Standard TRAN-S5 (design standard for a new vehicle crossing on a sealed road where the posted speed limit is 60km/hr or above). The legal width of Cones Road and Dixons Road means that there are no reasons why a complying vehicle crossing layout could not be provided. Pedestrians splay can be provided

8.5.6. TRAN-R8: Formation of a new vehicle crossing on a site with frontage to more than one road

8.5.6.1. The proposal is for a rezoning, and at this stage there are no vehicle crossings proposed.

8.5.7. TRAN-R9: Provision of accessible car parking space

8.5.7.1. The proposal is for a rezoning, and at this stage this Rule is therefore not applicable.

8.5.8. TRAN-S7: Minimum car parking space and associated manoeuvring area dimensions

8.5.8.1. The proposal is for a rezoning, and at this stage this Rule is therefore not applicable. However there are no reasons why compliance with the Rule could not be achieved in future.

8.5.9. TRAN-R10: Provision of car parking space and associated manoeuvring area

8.5.9.1. The proposal is for a rezoning, and at this stage this Rule is therefore not applicable. However there are no reasons why compliance with the Rule could not be achieved in future.

8.5.10. TRAN-R11: Provision of loading space and associated manoeuvring area

8.5.10.1. The proposal is for a rezoning, and at this stage this Rule is therefore not applicable. However there are no reasons why compliance with the Rule could not be achieved in future.

8.5.11. TRAN-R12: Formation of parking area, loading area, manoeuvring area, vehicle crossing or accessway

8.5.11.1. The proposal is for a rezoning, and at this stage this Rule is therefore not applicable. However there are no reasons why compliance with the Rule could not be achieved in future.

8.5.12. TRAN-R13: Landscaping of a new car parking area

8.5.12.1. The proposal is for a residential zoning and therefore this Rule is not applicable.

8.5.13. TRAN-R14: Provision of New Footpaths

8.5.13.1. The proposal is for a residential zoning, and there are no reasons why the provision of footpaths could not be achieved as required under this Rule.



8.5.14. TRAN-R15: Provision of New Cycle Parking

8.5.14.1. Cycle parking is not required at residential activity and therefore this Rule is not applicable.

8.5.15. TRAN-R16: Provision of Cycling End-of-Trip Facilities for Staff

8.5.15.1. Cycle parking is not required at residential activity and therefore this Rule is not applicable.

8.5.16. TRAN-R17: Installation of new charging facilities for electric vehicles

8.5.16.1. The proposal is for a zoning of land and therefore this Rule is not applicable.

8.5.17. TRAN-R18: Provision of a parking area or loading area and associated manoeuvring area on a site with frontage to a Principal Shopping Street in Oxford

8.5.17.1. The site does not have frontage onto a Principal Shopping Street.

8.5.18. TRAN-R19: Provision of a parking area or loading area and associated manoeuvring area on a site with frontage to a Principal Shopping Street in Rangiora or Kaiapoi

8.5.18.1. The site does not have frontage onto a Principal Shopping Street.

8.5.19. TRAN-R20: High Traffic Generators

8.5.19.1. Under this Rule, any activity that generates more than 200 vehicle movements per day is a High Traffic Generator, for which a Transportation Assessment is required. This report responds to this issue.

8.5.20. TRAN-R21: Activities Adjacent to a Road/Rail Level Crossing

8.5.20.1. The site is not proximate to a level crossing.

8.5.21. TRAN-R22: Installation of a new stock underpass beneath a road corridor or rail corridor

8.5.21.1. The proposal does not involve a stock underpass.

8.5.22. TRAN-R23: Rangiora Airfield

8.5.22.1. The site is not proximate to the airfield.

8.6. Summary of Proposed District Plan Assessment

8.6.1. Based on the review above, the proposal (and ODP) has the following non-compliances with the proposed District Plan:

- TRAN-R4: Formation of a New Road Intersection
 - There is a requirement for a separation of 800m between intersections but this is not achieved. The separation distance of 270m for the proposed new primary road on Cones Road is appropriate for the prevailing operating speed. The 300m separation for the proposed intersections onto Dixons Road easily achieves the appropriate separation distance under the Austroads Guide to Road Design and Standard NZS4404:2010.



- TRAN-R5: Formation of a New Vehicle Crossing
 - In the event that the site was to be developed in stages and the roads were constructed as accesses, then the expected separation between vehicle crossings on Cones Road would not be achieved. However because the new vehicle crossing would be on the opposite side of Cones Road to the existing crossings, and road user intervisibilities are good, the reduced separation distances can be supported

8.6.2. One potential further non-compliance would be in respect of the minimum distance between new vehicle crossings and intersections, although the wording of the proposed District Plan limits this to “new” vehicle crossings whereas in this case a new intersection is proposed. Irrespective, an assessment of the effects of the reduced separation distances between the proposed new intersection on Cones Road and the existing vehicle crossings on the opposite side shows that the low traffic volumes and good intervisibility means that there will be no driver confusion and accordingly, a reduced separation distance can be supported.

8.6.3. It is not considered that these non-compliances will give rise to any adverse roading efficiency or road safety effects.





9. Conclusions

- 9.1. This report has identified, evaluated and assessed the various transport and access elements of a proposed rezoning of land to a Large Lot Residential Zone, able to accommodate 45 residences, an increase of 44 residences over and above what is presently there.
- 9.2. Overall it is considered that the traffic generated by the development of the site can be accommodated on the adjacent roading network without capacity or efficiency issues arising. In practice, the traffic flows on the adjacent roading network are very low at present, and development of the site generates comparatively little traffic, meaning that even the busiest intersection will operate with low queues and delays, and a good level of service.
- 9.3. The crash history in the vicinity of the site does not indicate that there would be any adverse safety effects from the proposal. In practice, all recorded crashes have involved movements which would only be increased by a very small amount due to development of the site.
- 9.4. The nature of Large Lot Residential Zones means that they are located outside urban areas. In this case though, the site is just 4km from Rangiora town centre (a 9 to 13 minute cycle ride), with specific infrastructure provided for walking and cycling over 75% of this distance. Sports facilities lie even closer, at an 8 to 11 minute cycle ride from the site.
- 9.5. Although the proposal is for a rezoning, it is likely that there will be a high degree of compliance with the transportation requirements of the operative and proposed District Plans. There are likely to be non-compliances with the following:
- Road Intersection Spacing: There is a requirement for a separation of 800m between intersections but this is not achieved. However the separations proposed easily achieves the appropriate separation distance under the Austroads Guide to Road Design and Standard NZS4404:2010.
 - Separation of Vehicle Crossings and Intersections: There are existing driveways on Cones Road and the formation of a new intersection would result in a lesser separation than expected. However the vehicle crossings are on the opposite side of Cones Road, and road user intervisibilities are good, plus the vehicles crossings serve only one residence each where drivers will be travelling forwards onto Cones Road (rather than reversing). Consequently, the reduced separation distances can be supported
- 9.6. The internal roads within the site are able to comply with the Council's standards.
- 9.7. Overall, and subject to the preceding comments, the rezoning can be supported from a traffic and transportation perspective and it is considered that there are no traffic and transportation reasons why rezoning to Large Lot Residential Zone is inappropriate in this location.

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September 2023



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Annexure B: Peer Review of Transportation Assessment

Memo

To: Waimakariri District Council
From: Antoni Facey
CC: Andy Carr
Date: 18 September 2023
Re: **Plan Change-308 Cones Road and 90 Dixons Road**

I have been asked to carry out a peer review of the ITA prepared for the proposed zoning change for 308 Cones Road and 90 Dixons Road to enable those lots to be rezoned as Large Lot Residential Zone, rather than Rural Lifestyle Zone with a Large Lot Residential Zone overlay. I have reviewed the report and set out my findings in the following sections as they are presented in the ITA.

I have not undertaken a site visit due to my familiarity with area based on a number of previous site visits for projects in the area as well the comprehensive use of photographs in the ITA showing the current state of the network and environs.

1.0 Introduction

The assessment will be conservatively based on the Large Lot Residential Zone which allows the greatest number of Lots to be developed. While focused on motorised vehicles, it will also consider non motorised and alternative forms of transport.

This is an appropriate approach, particularly given the rural location.

2.0 Site overview

The site has been correctly identified. It is noted that there is similarly zoned land on the southern side of Dixons Road but it is understood this has been excluded from the assessment due to planning and urban design reasons which are beyond the scope of traffic engineering.

The roading hierarchy has been correctly identified.

3.0 Current transport network

This identifies the current roading layout including an analysis of the speed environment for Cones Road between Carrs Road and Dixons Road which is a short block between two horizontal curves. Previous speed surveys have indicated a speed environment of about 70 km/hr is achieved in this section. It is stated that this was agreed by the WDC in a previous resource consent application. With a block length between the two curves/intersections of about 410 metres, it is unlikely that the speed environment would be considerably higher than 70 km/hr and is agreed.

The speed limit on Dixons Road is 100 km/hr and given the geometry it is likely that the speed environment would be about 100 km/hr and reducing to the west where Dixons Road is the side road to a priority controlled intersection. A speed environment of 100 km/hr has been assumed for Dixons Road.

The only infrastructure in the area for non motorized traffic is a shared path on Cones Road between Fawcett Road and the Ashley River Bridge and through to Rangiora. Cones Road between Fawcett Road and Dixons Road has wide flat shoulders that are suitable for use by pedestrians but not cyclists. The ITA argues that the distances to any likely destination are greater than are typical for pedestrians and cyclists so demand will be limited.

When considering a rezoning, it is important that there is the potential for a need to be met rather than to meet the need at rezoning. It appears that there is sufficient space on the berms for a separate path to be constructed between the site and Fawcetts Road and the need for such a path would be examined at the subdivision/engineering approval stage. For the purposes of rezoning, this is all that is required.

Public transport is not provided currently and it is unlikely that the density of development would create a demand for public transport to service the site.

4.0 Current transportation patterns

MobileRoads traffic volumes were identified in the report. However, a recent peak hour traffic survey was carried out at the curve on arterial Cones Road/Dixons Road intersection and this was used for analysis purposes. The peak hour survey was consistent with the peak hour traffic volumes for Cones Road and was therefore considered reasonable and appropriate to use for analysis.

The AUSTRROADS Guide to Traffic Management Part 3 2009 has been superseded and the Table 6.1 referred to was not carried into the 2018 version. However, the advice contained in Table 6.1 was not suggested to be wrong and is available to use. The guidance provides a useful threshold for when an analysis is unnecessary. In this case, the northern Cones Road/Dixons Road intersection does not exceed the threshold so does not require further analysis.

The southern Cones Road/Dixons Road intersection slightly exceeds the threshold so was analysed using SIDRA. The results indicate that there are currently no capacity issues at the intersection.

The ITA notes low current demand for cyclists and pedestrians on Cones Road from casual observations with groups of cyclists on weekend group rides. This is typical of many rural roads in Canterbury and was discussed earlier in the ITA. Current provision of infrastructure is considered appropriate to meet the current needs.

The CAS data indicated that crashes were due to loss of control while negotiating the curve and/or vehicle faults. No crashes were identified for vehicles turning to or from the arterial Cones Road/Dixons Road. The crash record did not indicate any safety concerns with the intersection itself and the development of the rezoned site is unlikely to exacerbate the existing crash record.

5.0 Proposal

The proposal is for about 45 Lots to be created. An appropriate ODP to service the sites has been produced.

The design of the ODP suggests that most of the traffic will be focused on Dixons Road with less focus on Cones Road. Two intersections will be constructed on Dixons Road with one intersection on Cones Road.

Connectivity is provided with only a short cul-de-sac internally which connects to Cones Road through a pedestrian/cycle linkage. This is an appropriate level of connectivity for a development of this size.

6.0 Traffic generation

For this analysis, a traffic generation rate of 8 vehicle movements per day per residence has been used. There are a range of published traffic generation rates available and few are focused on rural residential sites.

The Proposed District Plan provides traffic generation rates in TRAN-APP6 based on Research Report 453. For a rural residential unit the PDP recommends that a daily rate of 10.1 vpd/unit should be used and 1.4 vph/unit in the peak hour.

A recent update to the values produced by TRIPS Database has not yet been published but has the following extract:

2. → Trip-Generation-Rates-Update¶

The daily and peak hour trip rates proposed for inclusion in the PPM are shown in Table 2.1. Blank fields indicate a lack of available data.¶

Table 2.1 Average trip rate table for inclusion in PPM¶

Land-Use¶	Sub-Land-Use¶	Trip-Rate-Daily-(vpd)¶	Trip-Rate-Peak-hour-(vph)¶
Residential¶	Low Density e.g. Single Dwellings¶	8.2/dwelling¶	0.9/dwelling¶
	Medium Density e.g. Attached Housing¶	3.1/dwelling¶	0.5/dwelling¶
	High Density e.g. Apartment Blocks¶	2.5/dwelling¶	0.4/dwelling¶

These are more up to date based on recent surveys than RR453 and could be used. It is noted that they are consistent with the application traffic generation. Given the small size of the development, the difference in traffic generation rates is unlikely to have a significant effect on the calculations but a sensitivity analysis using the PDP rates should also be presented for comparison.

The analysis has assumed a trip distribution that is heavily focused on movement between the site and Rangiora. Given that most of the employment, commercial and recreation opportunities will be in Rangiora or beyond, this is considered appropriate.

85% of the morning peak hour traffic is assumed to leave the site and 65% enter the site in the evening peak hour. This is typical of other similar residential developments.

7.0 Effects on the transportation networks

The modelled trip distribution was applied to the earlier SIDRA model. The effects on the intersection performance were negligible with the intersection performing well with free flowing traffic conditions in both peak hours.

Given the minor changes, it is unlikely that a higher traffic generation of 10.1 vpd/unit as noted in the PDP would have any noticeable effect.

Traffic growth rates were assumed to be 4% per annum. While no evidence was provided to support the assumption, this is higher than is typically experienced in rural areas which are normally 2-2.5%. Therefore, 4% is likely to be a conservative estimate.

By applying 4% annual traffic growth for 10 years, the difference between the intersection performance with and without development of the site is negligible.

The conclusion that the traffic generated by development of the site can be accommodated on the road network is acceptable.

Non car modes of travel are considered. The small size of the development will restrict the likely demand for non car travel and the distance from Rangiora and speed environment could be impediments to cycling. However, there is no reason that the few cyclists cannot safely use the road which is straight and flat with good forward visibility for drivers and pedestrians can use the berm until they can access the shared path from Fawcetts Road. Knowing that a solution is available is required at plan change stage, with details of a facility (if required) to be determined at the time of subdivision/engineering acceptance.

Road safety is unlikely to be impacted by development of the site. The crash record does not indicate any underlying problems with the immediate road network that would be exacerbated by the additional traffic generated by the development.

The site has 3 proposed access points for vehicles and one for cyclists/pedestrians only. It would appear that each access can be located and constructed consistent with District Plan rules noting that the speed environment on Cones Road is accepted to be about 70 km/hr. The details of the locations and detailed designs will be confirmed at subdivision stage, but appropriate solutions are available for plan change stage.

8.0 District Plan

Compliance with the Transport sections of the Operative District Plan is considered. While compliance with most of the clauses can be achieved at the time of subdivision application, specific attention has been given to the new intersections which may not be compliant with the District Plan provisions.

The new intersections may have reduced sight distance and separation from other intersections and existing vehicle crossings.

Sight distances on Cones Road are impacted by vegetation on the inside of the curve at Carrs Road. The sight distances are almost consistent with the requirements for a 70 km/hr speed environment and could be further increased by trimming vegetation. I consider that the sight distance is likely to be approved at subdivision stage.

Separation distance between the new intersections and vehicle crossings are considered. Cones Road is unlikely to achieve separation between vehicle crossings and the new intersection. The assessment has considered this and concludes that the breach can be supported. Given that similar breaches have been approved recently by WDC, it is expected that this will be adequately dealt with at subdivision stage.

The intersections on Dixons Road are required to be closer than the District Plan requires but they are required for connectivity for the development which is considered important. Justification for the reduced separation is based on AUSTROADS guidelines and is considered robust. The reduced separation is considered acceptable and can be supported.

Overall, the assessment considers that development of the site will not give rise to any adverse roading efficiency or road safety effects and can be generally supported under the Operative District Plan and I concur with this.

Under the Proposed District Plan, development of the site will generally be consistent with the Rules of the plan.

Intersection spacing will again be breached as discussed above.

Vehicle crossing spacing from an intersection will not be achieved on Cones Road. As discussed previously the effects of the breach of separation distances is unlikely to create any safety or efficiency concerns and can be supported.

Sight distances from the Cones Road intersection will be compliant with those required from a vehicle crossing. Interestingly, there is no requirement for a minimum sight distance to be provided from a new vested public road so sight distance from a vehicle crossing has been used as a proxy. This is considered appropriate in this case since all traffic using the development will be local to the area and familiar with the intersections.

Similar non compliances have been noted for the Operative District Plan and robust assessments provided that indicate the development can operate safely and efficiently with negligible impacts on the existing road network.

Other criteria in the Transport section Rules can be complied with or evaluated at subdivision/engineering approval stage. It would appear that generally compliant solutions can be provided.

9.0 Conclusions

The assessment concludes that development of the site for 45 residential Lots can be accommodated without capacity, efficiency or safety issues arising on the transportation network. The assessment supports these conclusions.

It is my opinion that the site can be rezoned to Large Lot Residential Zone with the Rules of the Operative and/or Proposed District Plan controlling the details to create a generally compliant subdivision.



Antoni Facey

BE (Civil), CMEngNZ, IntPE(NZ), APEC Engineer

Annexure C: Additional Information Requested by Peer Review

MEMORANDUM



CARRIAGEWAY
CONSULTING

project Submission to Waimakariri District Plan Review
to Antoni Facey, Avanzar
from Andy Carr, Carriageway Consulting Ltd
date 10 February 2024
subject Response to Requested Sensitivity Test

A. PO Box 29623, Christchurch, 8540
P. 03 377 7010
E. office@carriageway.co.nz

Introduction

In the peer review of the Transportation Assessment, it was suggested that a sensitivity test should be carried out using a peak hour traffic generation rate of 1.4 vehicle movements per lot for the requested rezoning of 308 Cones Road and the adjacent site of 90 Dixons Road. This memorandum responds to this request, and should be read in conjunction with the Transportation Assessment.

Updated Traffic Generation

The Transportation adopted a figure of 1 vehicle movement per lot in the peak hours. The requested sensitivity test therefore represents a 40% increase in this. Accordingly, we have increased the traffic generation shown on Figure 7 of the Transportation Assessment by 40%, and the revised volumes are shown below.

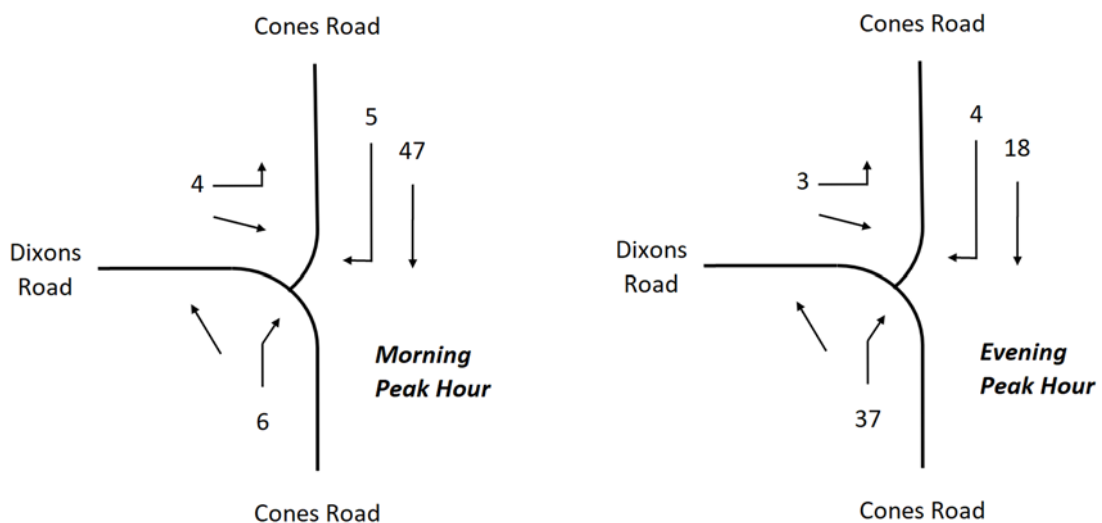


Figure 1: Revised Weekday Morning and Evening Peak Hour Traffic Generation at Full Site Development

In the Transportation Assessment, we included a sensitivity test allowing for 4% annual growth on the adjacent transportation network for a period of 10 years. We have retained this, for the purposes of this assessment.

Results

The intersection has been remodelled using the Sidra Intersection computer software program.

Table 4 of the Transportation Assessment set out a comparison of the queues and delays at the intersection without any development of the sites occurring and with full development of the sites, allowing for the 4% per annum ambient traffic growth. We have copied these results below, for ease of reference. Following this, we show the results of the modelling with the ambient traffic growth plus the higher traffic generation associated with the site.

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	
		No dev	With dev	No dev	With dev	No dev	With dev	No dev	With dev	No dev	With dev	No dev	With dev
Cones Road (south)	R	10.0	-	0.2	-	A	-	9.0	-	0.6	-	A	-
Cones Road (north)	L	10.4	+0.1	0.8	+0.2	B	-	9.1	-	0.2	+0.1	A	-
	R	13.9	+0.2	0.2	-	B	-	18.6	+0.6	0.2	-	C	-
Dixons Road	L	8.2	-	0.0	-	A	-	8.2	-	0.0	-	A	-

Table 1: Change in Peak Hour Levels of Service at the Southernmost Cones Road / Dixons Road Intersection, Sensitivity Test of Background Volumes Increased by 40% (Copy of Table 1 from Transportation Assessment)

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	
		No dev	With dev	No dev	With dev	No dev	With dev	No dev	With dev	No dev	With dev	No dev	With dev
Cones Road (south)	R	10.0	-	0.2	-	A	-	9.0	-	0.6	+0.1	A	-
Cones Road (north)	L	10.4	+0.1	0.8	+0.3	B	-	9.1	-	0.2	+0.1	A	-
	R	13.9	+0.2	0.2	-	B	-	18.6	+0.9	0.2	-	C	-
Dixons Road	L	8.2	-	0.0	-	A	-	8.2	-	0.0	-	A	-

Table 2: Change in Peak Hour Levels of Service at the Southernmost Cones Road / Dixons Road Intersection, Sensitivity Test of Background Volumes Increased by 40% AND Increased Traffic Generation from Site

We highlight the differences between the two scenarios in the shaded cells above.

In summary there are few differences between the sensitivity test carried out previously, and the revised testing using the increased trip rate. The greatest change arises in the evening peak hour for the right-turn movement from Cones Road (north), but even this is a change of less than one second compared to the situation with no site development, and with no consequential change in queue length or level of service.

Summary

The analysis continues to show that the traffic associated with the requested rezoning can be accommodated on the roading network without capacity or efficiency issues arising.