

Southeast Woodend Rezoning Integrated Transport Assessment



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Southeast Woodend Rezoning Integrated Transport Assessment

Quality Assurance Information

Prepared for Urban Estates Limited
Job Number OJL-J001
Prepared by Lizzie Garside, Graduate Transportation Engineer
Logan Copland, Senior Transportation Planner
Reviewed by Dave Smith, Technical Director, Transportation Planning

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1. Introduction

Abley Limited (Abley) was engaged by Urban Estates Ltd to prepare an Integrated Transport Assessment (ITA) report in respect of a proposal to rezone approximately 32ha of land from Rural Lifestyle to Residential (the development) located southeast of Woodend adjacent to Judsons Road (the site). This ITA report has been prepared to support a submission by Woodwater Limited on the proposed Waimakariri District Plan (pWDP) and provides an assessment of the potential transport-related effects of the proposal. This Integrated Transport Assessment (ITA) has been developed in accordance with NZTA Research Report 422 ITA guidelines.

1.1 Report Structure

This ITA report is divided into the following sections:

- A description of the site.
- A description of the surrounding transport environment, including
 - A review of the adjacent roads
 - A review of the key intersections
 - Consideration of existing public transport services
 - A review of active transport facilities (walking and cycling)
 - An assessment of road safety
- A review of the future receiving environment, including relevant programmed transport upgrades.
- A description of the proposed rezoning.
- An assessment of planning provisions proposed to manage transport effects arising from the plan change.
- A review of the relevant national, regional and local planning and policy framework.
- Conclusions

2. Site Description

2.1 Site Locality

The location of the site is shown in Figure 2.1. It is located southeast of the existing Woodend urban area and adjoins existing residential activity directly to the west and north, within 1km from the Woodend Town Centre (northwest), and approximately 22km from Christchurch City Centre (south). Rangiora is approximately 7km northwest of the site and Kaiapoi is approximately 6km south.

The site has frontage to Petries Road, Judsons Road, Woodend Beach Road and Copper Beach Road. Judsons Road bisects the site on an east-west alignment. Judsons Road then connects to a paper road corridor that bisects the site on a north-south alignment. This corridor does not connect through to Petries Road. There are two reserve lots adjacent to the site which are understood to be used for stormwater management but also provide an opportunity for additional walking / cycling connections and enhanced amenity.



Figure 2.1 Site location. (Source: Canterbury Maps).

2.2 Current Zoning and Land Use

The site is currently predominantly rural in nature and is proposed to be zoned Rural Lifestyle in the pWDP. It is bounded by Large Lot Residential Zoning to the south and east. The land directly west and north is zoned Medium Density Residential as shown in Figure 3.92.2.

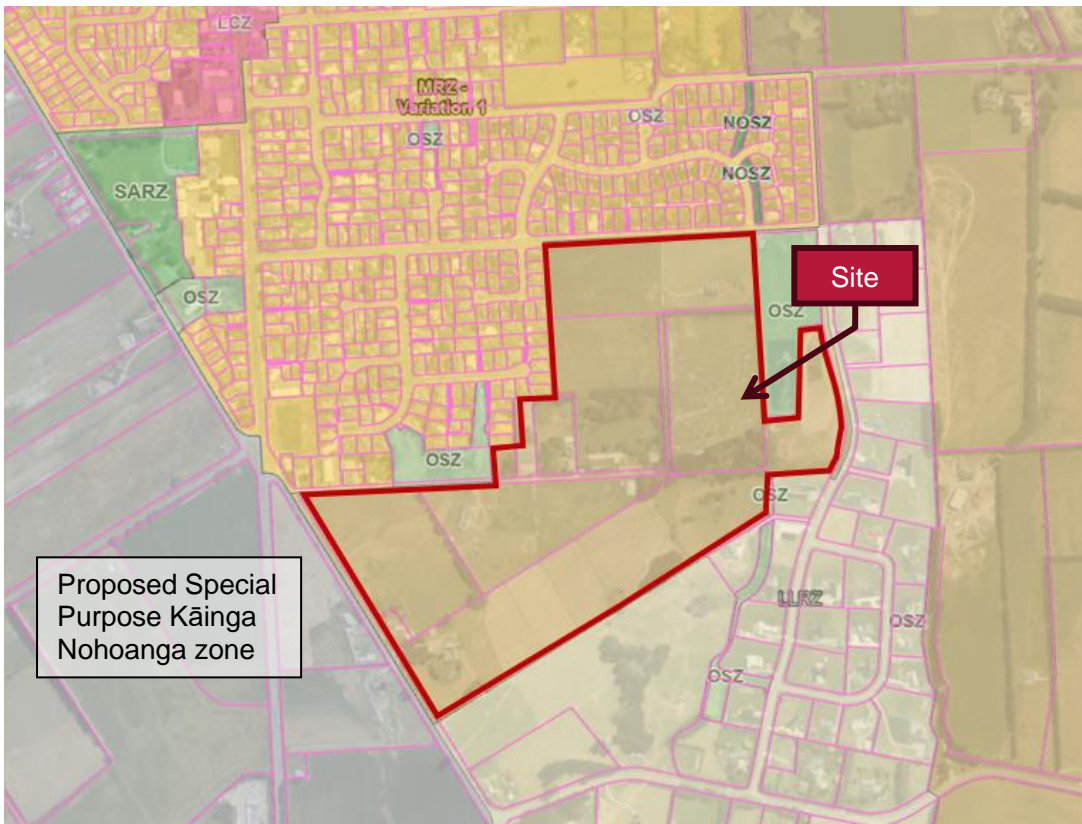


Figure 2.2 Proposed zoning in pWDP. (Source: pWDP).

The site is currently undeveloped farmland with some supporting dwellings and associated farm buildings.

A site visit was undertaken on Thursday 1st February 2024 to inform this assessment.

3. Surrounding Road Network

Surrounding network is shown in Figure 3.1.

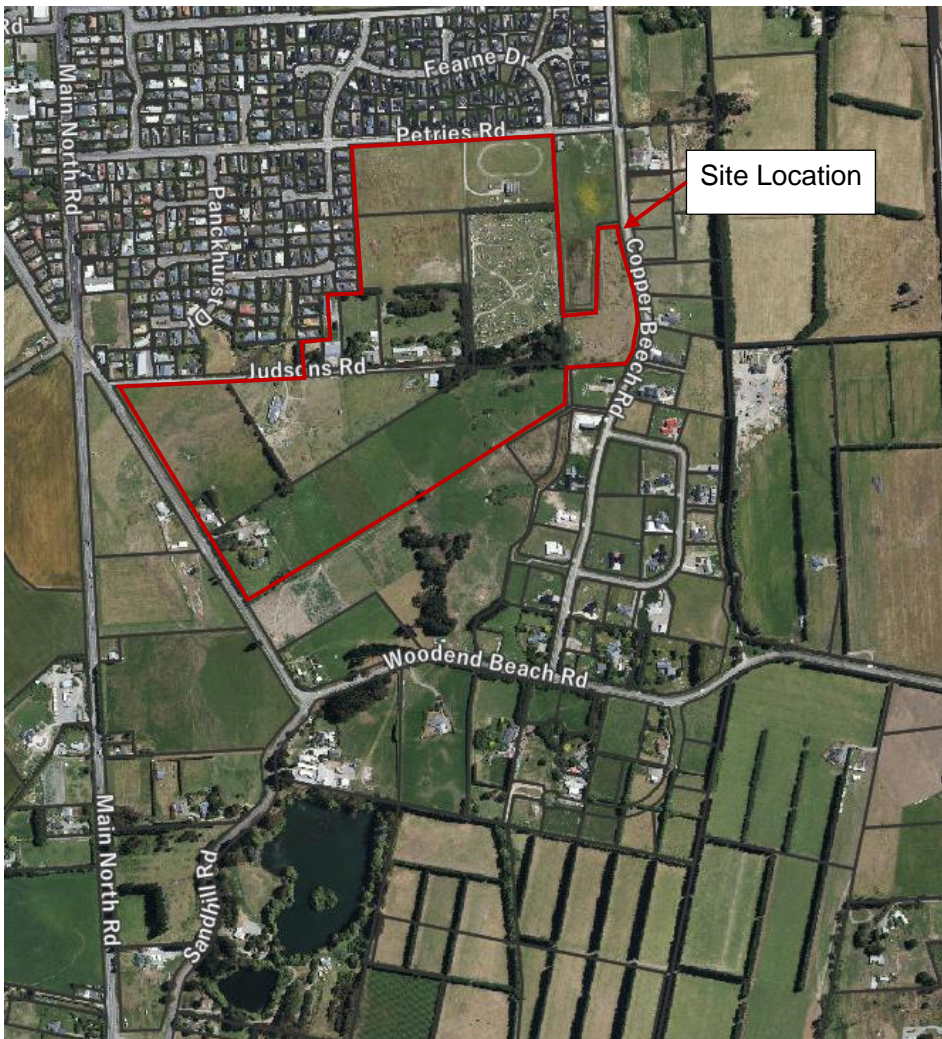


Figure 3.1 Site with surrounding roads

Petries Road

The site fronts Petries Road along its northern boundary. Petries Road is classified as a Local Road in the pWDP, and a Local Street in the One Network Framework (ONF).

Petries Road has a legal width of 20m, with two-way carriageway in the order of 13.0m wide at the western end of the site. The legal width of Petries Road reduces to 15m with a carriageway width of 7.5m as it passes the site. The southern side of Petries Road as it passes the site has no footpath or kerb and channel.

The speed limit is 50km/h. Petries Road has an estimated AADT of 1641vpd with 4.4% of vehicles classified as heavy vehicles¹. The west section of Petries Road has an estimated AADT of 137vpd with 10.7% of vehicles classified as heavy vehicles². Petries Road has an unformed future connection to Copper Beech Road that is currently fenced off.

¹ Source: Mobile Roads

² Source: Mobile Roads

Judsons Road

The site has frontage onto Judsons Road in the west. Judsons Road is categorised as a Local Road in the pWDP, and a Rural Road in the ONF. The speed limit is 50km/h. Judsons Road has an estimated AADT of 30vpd with 12.8% of vehicles classified as heavy vehicles³. The first 80m of Judsons Road (from Woodend Beach Road) is sealed and has a legal width of 10m and a carriageway width of 5-6m. There is also marked kerbside parking on the northern side of the road. The unsealed length of Judsons Road also has a legal width of 10m, but the carriageway reduces to a single 3.5m lane.

Woodend Beach Road

Woodend Beach Road provides a connection from the site to Main North Road (SH1). Woodend Beach Road is categorised as a Collector Road in the pWDP, and a Rural Connector in the ONF. The speed limit is 80km/hr except for the last 140m on the approach to Main North Road where the speed limit is 50km/hr. Woodend Beach Road has an estimated AADT of 1052vpd with 5.2% of vehicles classified as heavy vehicles⁴. The legal width of the road is 20m, with two-way carriageway in the order of 7m wide. There is a recreational path on the southern side of the road which connects from SH1 to Woodend Beach.

Copper Beech Road

Copper Beech Road is directly east of the site. Copper Beech Road is categorised as a collector road in the pWDP, and a Rural Road in the ONF. The speed limit is 50km/hr. It provides access to the adjacent Large Lot Residential land. North of 38 Copper Beech Road, the road has been blocked and does not physically connect to Petries Road. Copper Beech Road has an estimated AADT of 269vpd with 8.4% of vehicles classified as heavy vehicles⁵. The legal width of the road is 20m, with a two-way carriageway in the order of 8m wide. There is a shared path on the western side of the road from Woodend Beach Road up to Evergreen Drive. There are no dedicated pedestrian facilities north of Evergreen Drive.

Main North Road (SH1)

Main North Road (SH1) is classified as a Strategic Road in the pWDP, and an Urban Connector in the ONF. Main North Road has a legal width of 20m and a sealed carriageway width of 10m. The speed limit is 50km/h south of the Woodend Beach Road intersection and 80km/h to the south. Main North Road south of Woodend Beach Road has an estimated AADT of 20,200vpd with 8.5% of vehicles classified as heavy vehicles⁶.

It has narrow parking lanes and footpaths on both sides through the Woodend urban area. North of Petries Road there is a flush median and cycle lanes.

3.1 Key Intersections

Petries Road and Main North Road (SH1)

The intersection of Petries Road and Main North Road is a priority T junction where Petries Road is the minor leg with STOP control. The intersection allows all turning movements into and out of Petries Road. There is no left or right turn bay on Main North Road. Petries Road has sufficient width at the intersection for two lanes of queuing traffic.

³ Source: Mobile Roads

⁴ Source: Mobile Roads

⁵ Source: Mobile Roads

⁶ Source: Mobile Roads



Figure 3.2 Intersection of Main North and Petries Roads. (Source: Canterbury Maps).

Woodend Beach Road and Main North Road (SH1)

The intersection of Woodend Beach Road with State Highway 1 is a priority T intersection, where Woodend Beach Road is the minor leg. Woodend Beach Road leg has an island separating the lanes; vehicles turning left and right into Woodend Beach Road are also separated by road markings and merge upon entry. There is no right turn bay on SH1. The intersection is close to the Rangiora Woodend / SH1 intersection. There is a left-turn deceleration lane opposite Woodend Beach Road on SH1 for southbound vehicles turning left into Rangiora Woodend Road.



Figure 3.3 Intersection of Main North and Woodend Beach Road. (Source: Canterbury Maps)

Woodend Beach Road and Judsons Road

The intersection of Woodend Beach Road and Judsons Road is a priority T junction where Judsons Road is the minor leg and has give way control. The intersection is located approximately 50m from the SH1 / Woodend Beach Road intersection. The intersection does not have limit lines on the Judsons Road leg. Woodend Beach Road has markings for no passing at this location in the northbound direction. The intersection has built kerbs on Judsons Road and a shared path crossing location.

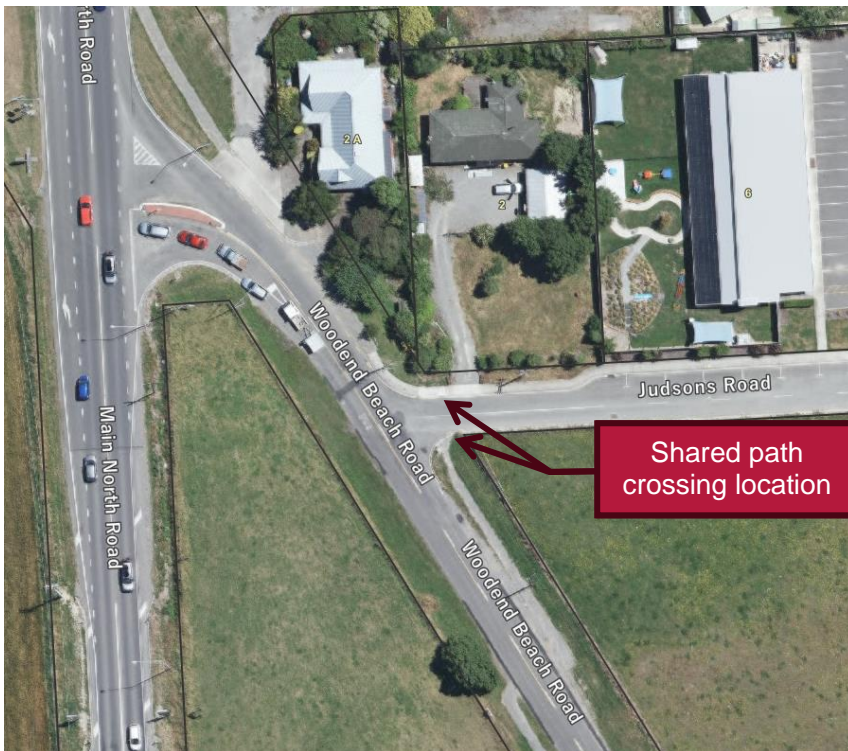


Figure 3.4 Intersection of Woodend Beach and Judsons Roads. (Source: Canterbury Maps).

Woodend Beach Road and Sandhill Road

The intersection of Woodend Beach Road and Sandhill Road is a T intersection with Sandhill Road as the minor leg with give way control. Sight lines for vehicles travelling east on Woodend Beach Road are limited by the vegetation to the north of the intersection, on the inside of the horizontal curve.



Figure 3.5 Intersection of Woodend Beach Road and Sandhill Road. (Source: Google Maps Streetview).



Figure 3.6 Intersection of Woodend Beach Road and Sandhill Road. (Source: Canterbury Maps).

Main North Road (SH1) and Sandhill Road

The Main North Road (SH1) and Sandhill Road intersection is a priority T junction where Sandhill Road is the minor leg and has give way control. All movements are allowed and no turning bays are provided on Main North Road although there is holding space in the shoulder.



Figure 3.7 Intersection of Main North Road (Source: Canterbury Maps)

Woodend Beach Road and Copper Beech Road

The intersection of Woodend Beach Road and Copper Beech Road is a T intersection. Copper Beech Road is the minor leg with give way control.



Figure 3.8 Intersection of Woodend Beach Road and Copper Beech Road (Source: Canterbury Maps)

3.2 Public transport

There are a range of public transport options that connect Woodend to Rangiora, Christchurch, Kaiapoi, Pegasus and Waikuku. The bus routes vary in frequency and are operated by Environment Canterbury.

The two key bus routes (97 and 95) are shown relative to the site in Figure 3.9.

There are five locations for Park and Ride facilities. Three are located in Rangiora and two in Kaiapoi. These services provide accessibility to direct peak hour services into Christchurch City.



Figure 3.9 Public transport routes, showing the closest stop locations to the site. (Source: Metro Info⁷).

The nearest bus stops to the site are located on Main North Road, approximately 200m from the north-western corner of the site at Judsons Road (Stop IDs 26170 & 15077). The 95 bus connects the city through Woodend to Pegasus and Waikuku. The service runs hourly in both directions.

The 97 bus connects through the Woodend town centre to Pegasus and Rangiora. The service runs hourly in both directions. The nearest bus stops to the site to connect to the 97 bus route are located on the corner of Woodend Road / Main North Road, which is approximately 1.1km from the site, a 15 minute walk (46048 & 26087).

Overall, it is considered that the site is highly accessible by public transport.

3.3 Active transport

There are existing connections for pedestrians and cyclists to safely travel from the site into the Woodend town centre.

Petries Road has a footpath on each side of the road from Main North Road to Catchpole Place. The southern footpath will be extended along the site frontage at the time of subdivision.

Judsons Road has a footpath on the north side for the first 80m where the road becomes unsealed with grass verge. Beyond this (aside from the existing dwellings at 12 and 16 Judsons Road), the adjacent land use is currently rural and so there are currently no footpaths nor is there any notable demand for walking. Footpaths will be constructed on the Judsons Road extension and will be extended to connect with existing footpath infrastructure.

There are existing footpaths along both sides of Main North Road, north of Woodend Beach Road, which connect into the Woodend town centre. There is a relatively new signalised pedestrian crossing south of School Road.

Woodend Beach Road also connects Main North Road to the beach along the Jill Creamer Trail, which runs directly past the site.

⁷ Public transport map, published by Metro Go, available online at <https://go.metroinfo.co.nz/mtbp/en-gb/arrivals/content/routes>

WDC is proposing to construct a cycle way that will connect Kaiapoi through to Woodend and Ravenswood. This project is referred to as the Kaiapoi Ravenswood Cycleway and was identified as a priority by the public through the Walking and Cycling Network Plan which was adopted by Council in 2022⁸. It is understood that the new coalition government has stopped funding this project, although it is understood that Council is considering completing the work without government assistance.

An overview of existing and future cycling infrastructure in Waimakariri District is shown in Figure 3.10



Figure 3.10 Map showing existing and future Waimakariri cycle network. (Source: Walking and Cycling Strategy 2017-2022⁹).

3.4 Road safety

A search of the NZTA Crash Analysis System (CAS) database of surrounding roads has been undertaken to understand the reported accident record in the vicinity of the site. The analysis reveals

⁸ <https://letstalk.waimakariri.govt.nz/kaiapoi-ravenswood-cycleway/>

⁹ https://www.waimakariri.govt.nz/_data/assets/pdf_file/0020/127244/Walking-and-Cycling-Strategy-2017-2022.pdf

that a total of 34 crashes have been reported over the period between 2018 and 2024 inclusive. The search area and crash locations is shown in Figure 3.11. The following is noted:

- There have been no fatal crashes in the study area.
- Three serious injury crashes were reported at intersections with Main North Road (SH1). Two of these were at the intersection with Sandhill Road and the third at the intersection with Petries Road.
- 17 non-injury crashes occurred.
- Seven minor crashes occurred and two involved pedestrians.

The most common causal factors included failure to give way (4), speed (4), loss of control (10), rear end/obstruction (11). The crash severity and locations are shown in Figure 3.11. Crash details are summarised in Appendix A.

There were three crashes on Woodend Beach Road. All of these were the result of a driver lost control on the bend. The two crashes at the intersection with Sandhill Road were serious crashes. The other crash was at the intersection with Copper Beech Road which was a non-injury crash.

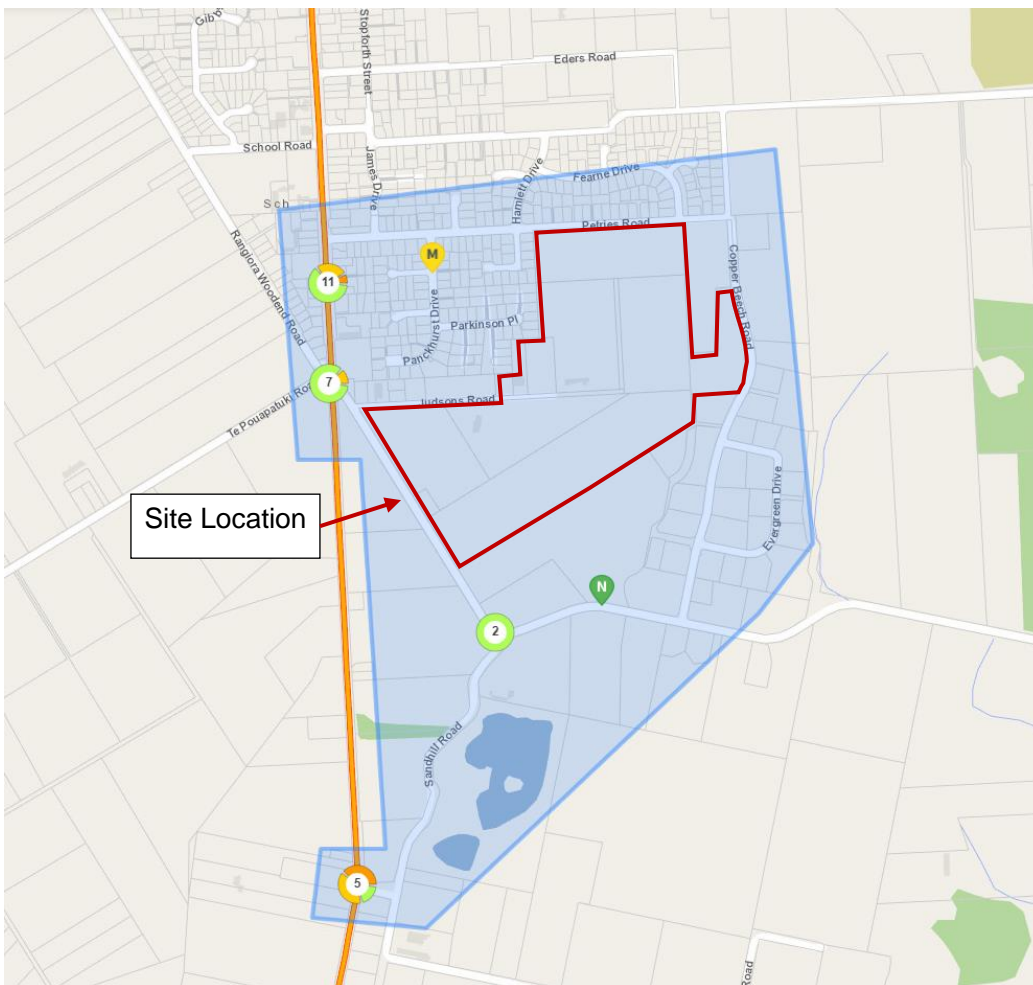


Figure 3.11 Crash locations and severity, 2018 to 2024. (Source: NZTA CAS).

On the basis of the historical crash records, it is evident that there are existing safety issues at Main North Road / Woodend Beach Road and Main North Road / Sandhill Road. The crash clusters are explained more below, however it is noted that these intersections of the State Highway are to be

improved with the proposed transport upgrades of the Saltwater Creek Cam River project. These upgrades will reduce the safety risk at those intersections. It is noted that the speed limit on Main North Road reduced recently and a double centreline was also installed.

SH1/Woodend Beach Road/Rangiora-Woodend Road

A total of 11 crashes occurred at the intersection of Main North Road (SH1), Woodend Beach Road and Rangiora-Woodend Road. These crashes were all non-injury (7) or minor (4) crashes. As above, the safety record at this intersection is expected to improve once it has been upgraded.

SH1/Petries Road

A total of four crashes occurred at the intersection of Main North Road (SH1) and Petries Road with one being serious and the remainder non-injury crashes. The serious crash occurred when a driver was waiting to turn right into Petries Road and was struck from behind by a truck. Four of the crashes at the intersection were a result of loss of control. Only one was the result of a driver failed to complete their right turn, hitting a parked vehicle. The remaining were vehicles leaving the road to the left, colliding with street furniture or parked cars.

Although there was one serious crash resulting from right turning into Petries Road, this was an isolated incident and there are no ongoing crash trends associated with this movement. It is also noted that there is approximately 7m of space between the road centre line and the kerb with no stopping lines painted. This allows sufficient space for a through vehicle to undertake a right turning vehicle into Petries Road. If required in the future an auxiliary right turn lane could be installed on SH1 to reduce the potential for rear end crashes.

SH1/Sandhill Road

There were four crashes at the intersection of Main North Road (SH1) and Sandhill Road. Three of these were due to loss of control while turning, one was due to loss of control on the straight and the final crash a rear end. Of the three loss of control while turning crashes, one was serious where a driver had a medical event and collided head on. The other two were vehicles turning from Main North Road (SH1) to Sandhill and losing control. The straight loss of control crash was serious where a driver fell asleep. The rear end crash was caused by a driver hitting a truck when the truck was waiting off the road to the left to turn right. This resulted in a minor injury.

This intersection is to be changed to only allow left in / left out movements as part of the Saltwater Creek to Cam River safety improvements project, which will simplify its operation by reducing the number of conflict points. This will reduce the safety risk at the intersection.

4. Future Receiving Environment

4.1 Programmed Transport Upgrades

Saltwater Creek to Cam River project

NZ Transport Agency Waka Kotahi (NZTA) are proposing changes to road infrastructure at the Main North Road (SH1) / Woodend Beach Road and Main North Road (SH1) / Rangiora Woodend Road intersections as part of the Saltwater Creek to Cam River road safety improvements¹⁰. A concept showing these changes is shown in Figure 4.1.

The NZTA website states that construction is to commence in 2024, following completion of design, consenting and property processes. A roundabout is proposed to the south of the Main North Road (SH1) / Woodend Beach Road intersection. As above, the SH1 / Rangiora Woodend Road intersection is proposed to be restricted to left in / left out movements only as is the SH1 / Sandhill Road

¹⁰ <https://www.nzta.govt.nz/projects/sh1-north-canterbury-corridor/saltwater-to-cam/>

intersection. This is part of a wider road safety improvement programme along the corridor which is proposed to include the installation of further safety infrastructure and traffic management measures. These programmed safety improvements will enhance safe access to the site.



Figure 4.1 Waka Kotahi Woodend Beach Road to Cam River concept. (Source: NZTA).

The Woodend bypass project

The Woodend Bypass project has been designated. it has been included in the pWDP and the project is outlined in the National Transport for the Future Plan¹¹. The coalition government has made a commitment to building the bypass, but it is not currently included in the Regional Land Transport Plan. The Draft Government Policy Statement (draft GPS) on Land Transport was released for consultation on 4th March 2024 and includes the Woodend Bypass as a committed infrastructure project to be delivered over the 2024-34 period of the GPS (refer Appendix B of GPS).

The draft consultation plan is shown in Figure 4.2.

¹¹ <https://www.national.org.nz/transportforthefuture>

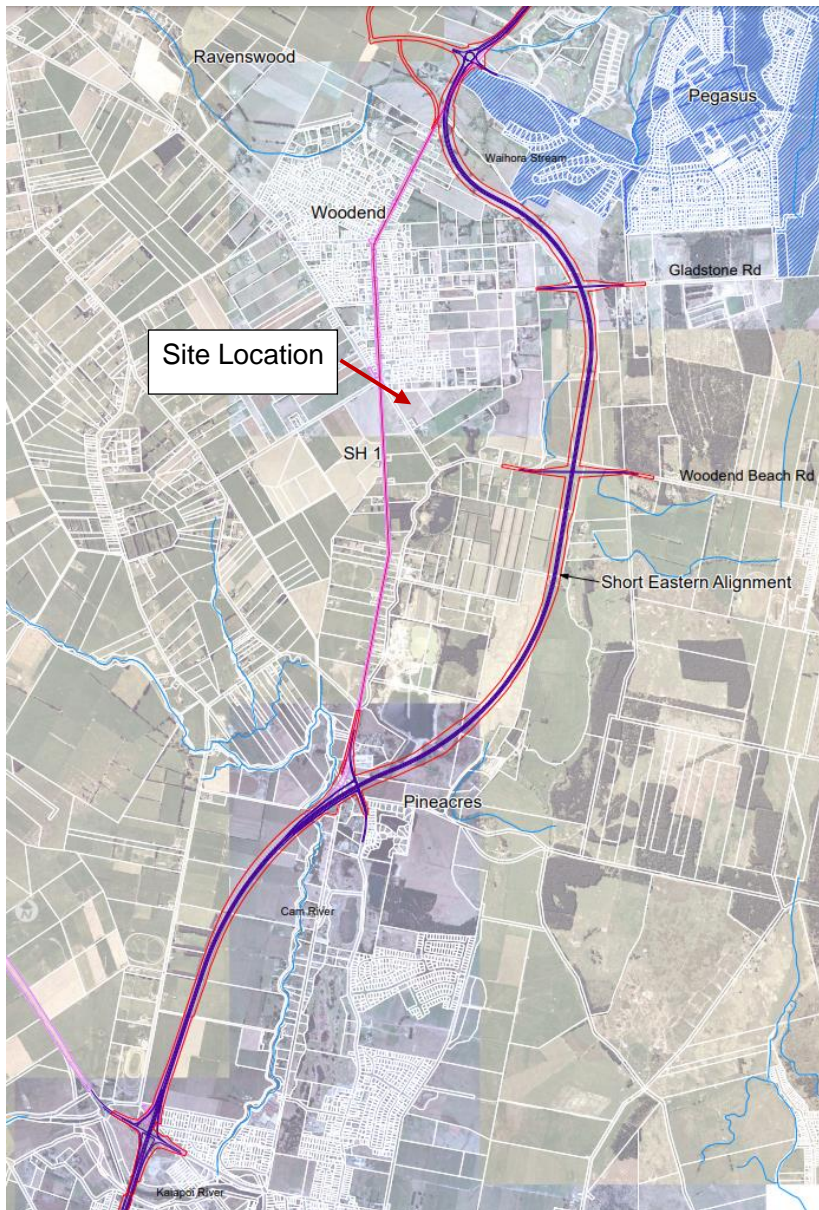


Figure 4.2 NZTA Woodend Bypass consultation draft plan. (Source: NZTA).

The Woodend Bypass would be advantageous for the site and the existing Woodend township as a whole as it will enhance access to the state highway network and will have the positive effect of reducing traffic flows on Main North Road. This will in turn reduce the through volumes on Main North Road which will in turn create more gaps to turn onto Main North Road from the side roads and therefore improve safety.

Engagement with Waka Kotahi

Abley have been engaging directly with Waka Kotahi with respect to both projects. The inclusion of the Woodend Bypass in the draft GPS provides certainty with respect to the delivery of this project over the 2024-34 period of the GPS. We will continue to engage with Waka Kotahi up to the rezoning hearing with respect to the delivery of the Woodend Bypass and timing of the SH1 Saltwater Creek to Cam River safety improvements project.

The Waimakariri Walking and Cycling Network Plan

The Waimakariri Walking and Cycling Network Plan proposes a shared path connection on Sandhill Road, connecting from Williams Street in Kaiapoi to Woodend Beach Road. The shared path is a priority 2. The proposed shared path would connect Woodend to Kaiapoi by a separated path. The plan is shown in Figure 4.3.

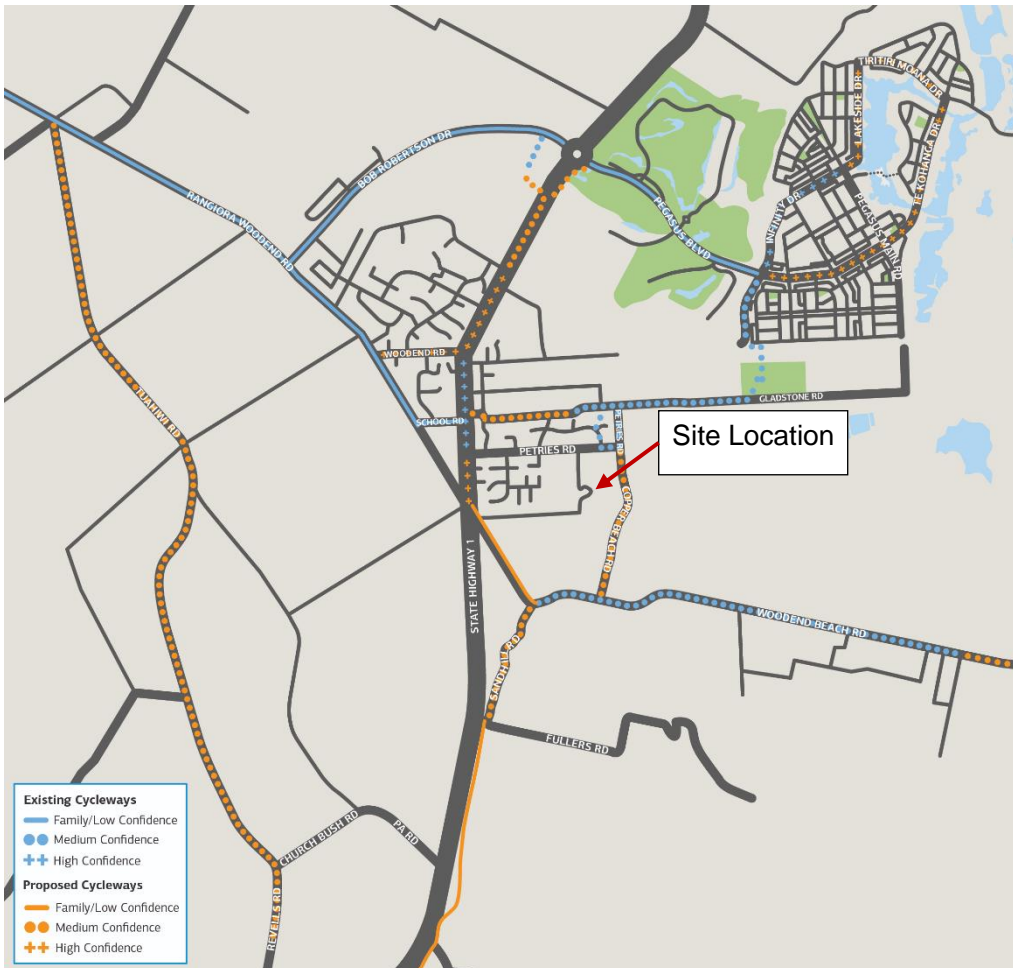


Figure 4.3 Proposed and existing walking and cycling network map. (Source: Waimakariri District Council).

Greater Christchurch Mass Rapid Transit (GCMRT)

The GCMRT will provide more frequent and reliable, high-capacity public transport to core routes. The proposed routes will connect the greater Christchurch area and link into the improved public transport networks. A core route of a street running service would connect Hornby to Belfast via the Christchurch City centre. Standard or express bus service improvements would be included to connect from Woodend to Rangiora, Christchurch or into Selwyn area.

The MRT has been proposed and supported as a business case as of May 2023. The MRT is expected to be operational by 2033 with expansion continuing after as future phases. Phase 1 development is shown in Figure 4.4.

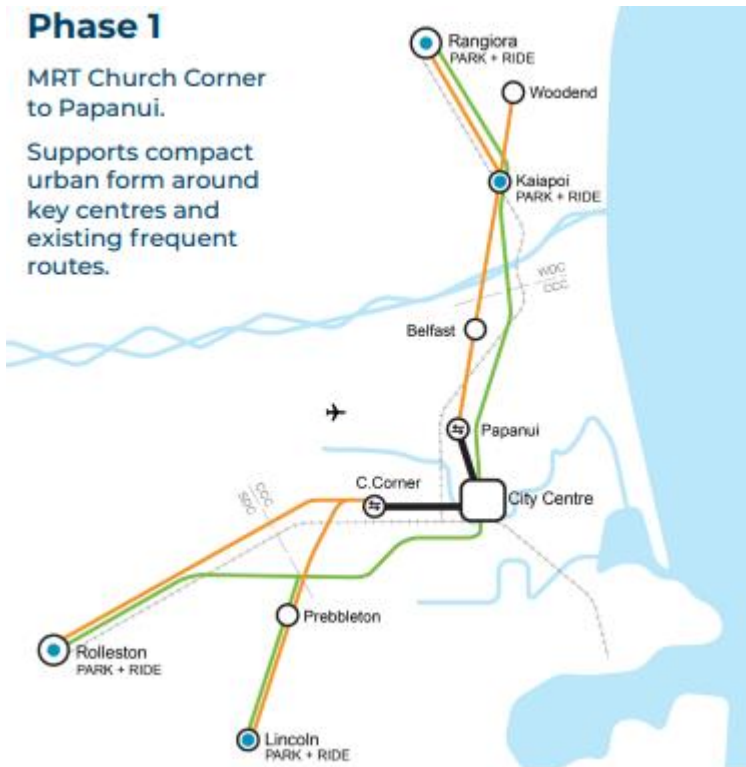


Figure 4.4 Phase 1 plan for the MRT system (Source: [Greater Christchurch Partnership](#))

5. Description of the Proposed Rezoning

The site is proposed to be rezoned from rural lifestyle to residential. The submission is broad in nature, but principally it includes General Residential zoning. However, a subsequent submission on the Variation to the Proposed District Plan seeks a higher density of development in accordance with a Medium Density Residential Zone. It is envisaged that the site will be broadly developed at a General Residential density with pockets of Medium Density Residential.

The total site area is 32.9ha. It is understood that broadly the average yield when applied across the site would be based on a ratio of 15 dwellings per hectare. For assessment purposes, a total yield of up to 500 dwellings is assumed.

5.1 Outline Development Plan

An Outline Development Plan (ODP) has been prepared which shows the internal road network and how the site will connect to the existing transport network. Refer Figure 5.1.

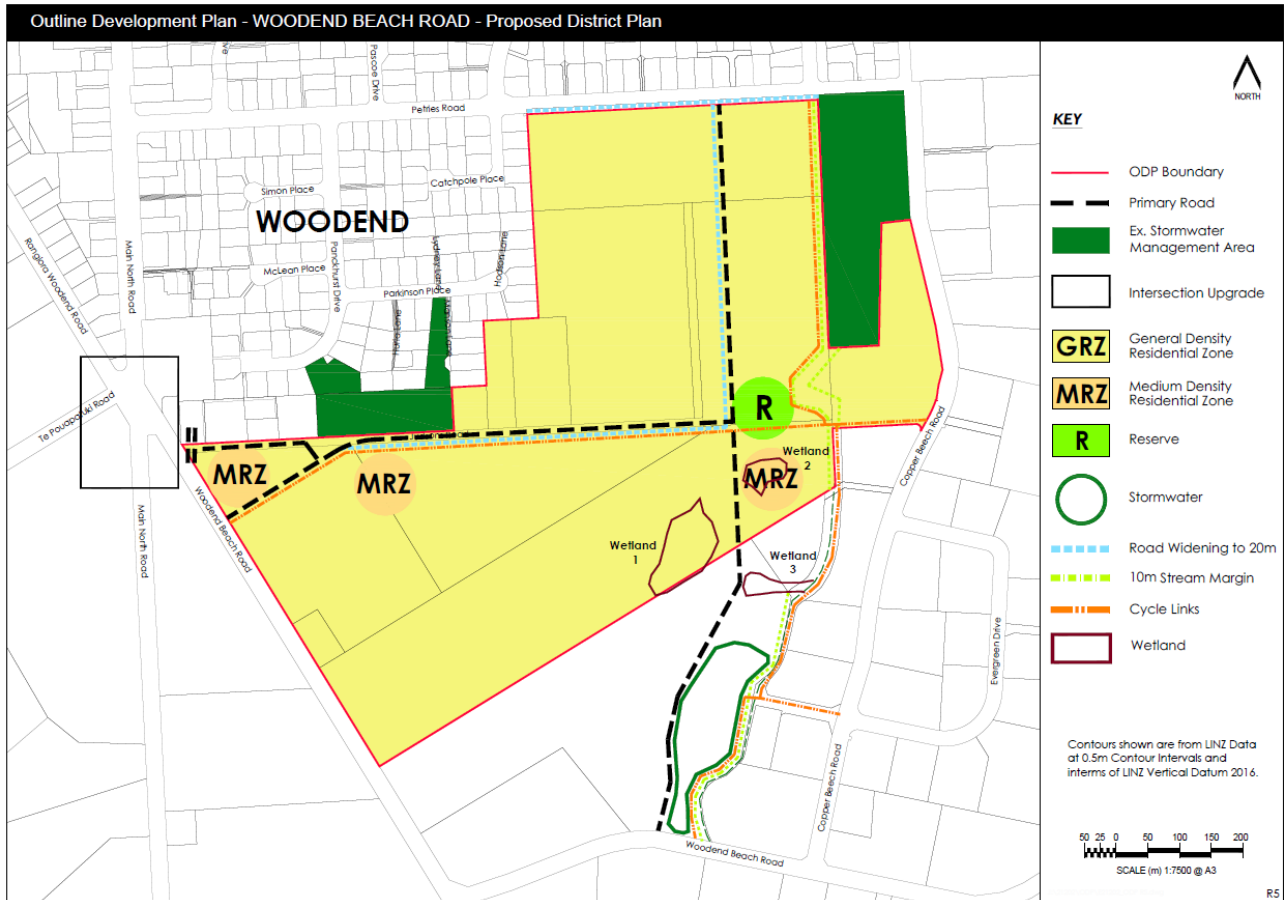


Figure 5.1 Proposed Outline Development Plan. (Source: Davie Lovell Smith).

The key aspects of the ODP are:

Transport Layout

- A north-south primary road connecting with Woodend Beach Road at the southern end and Petries Road at the northern end.
- An east-west primary road generally following the alignment of Judsons Road, intersecting with the north-south primary road at the eastern end.
- Cycle connections between Woodend Beach Road, Copper Beech Road and Petries Road.

New External Intersections

- The existing Judsons Road / Woodend Beach Road intersection will be shifted further south. This will increase the separation between the SH1 / Woodend Beach Road intersection. The sight distances in both directions are acceptable. The current T-intersection of Judsons Road / Woodend Beach Road will be closed and replaced with a turning facility. This will reduce the potential for conflict between vehicles turning at Judsons Road / Woodend Beach Road and vehicles turning at SH1 / Woodend Beach Road.
- A new intersection will be constructed onto Woodend Beach Road. This will be located approximately 180m west of Copper Beech Road and approximately 230m east of Sandhill

Road¹². Clear visibility is available to the Sandhill Road intersection and is unobstructed to the east.

- Another new intersection will be constructed onto Petries Road. This will be located approximately 200m east of Catchpole Place and Hamlett Drive and approximately 160m west of Fearne Drive. The sight distances are excellent in both directions.

Road Upgrades & Widening

- Petries Road will be widened along the site frontage to achieve a 20m legal width. Physical works will be undertaken so that the formation matches the existing formation directly west of the site.
- Judsons Road, including the paper road portion, will be widened to achieve a 20m legal width.
- A planning provision is proposed that requires an assessment of the safe and efficient operation of the Petries Road / SH1 intersection prior to subdivision. The assessment would need to consider how many lots could be developed before the safety or capacity of the intersection is compromised. If required, the intersection can be upgraded. There is sufficient space available to undertake a variety of upgrade treatment types. The type of upgrade would be determined as part of that assessment and in consultation with NZTA / WDC as road controlling authorities.
- Development accessing Woodend Beach Road would be delayed until such time as one of the pending SH1 projects is completed, that is the Saltwater Creek to Cam River safety improvements or the Woodend Bypass. The delivery of at least one of these projects is anticipated to improve safety and enhance the efficient operation of the Main North Road corridor.

5.2 Proposed Roding Standards

Based on the number of dwellings proposed, and corresponding number of daily traffic movements, it is likely that the primary internal roads shown on the ODP will operate as collector roads. Table TRAN-3 in the pWDP suggests that roads with a speed limit of 50km/h or less serving 1500 or more vpd are collector roads and are required to have a legal width of 23m.

In this instance, it is proposed that the primary roads have a legal width of 20m. This width will provide sufficient space for the required infrastructure which is likely to include:

- A two-way / two-lane carriageway with parking lanes on both sides (or indented parking)
- A shared path on one side and a footpath on the other side, or cycle lanes and footpaths.
- Berm space

Although this width does not comply with the pWDP, it is consistent with NZS 4404:2010 *Land Development and Subdivision Infrastructure* for a road serving up to 800 households or 8000vpd. Refer to Figure 5.2.

¹² Note that the southern-most intersection onto Woodend Beach Road is located outside of the proposed submission area.

PLACE CONTEXT			DESIGN ENVIRONMENT				LINK CONTEXT				TYPICAL PLAN AND CROSS SECTION	
Area	Land use	Local attributes	Locality served	Target operating speed (km/h)	Min. road width (m)	Max. grade	Pedestrians	Passing, parking, loading and shoulder	Cyclists	Movement lane (excluding shoulder)	Classification	
Notes	See 3.2.4, table 3.1 & 3.3.1.6	See table 3.1	See table 3.1	See 3.3.5	See 1.2.2, 3.3.1.9, & 3.4.16		See 3.3.11	See 3.3.6 & 3.3.1.4	See 3.3.1.5, 3.3.7, & 3.3.11.2	See 1.2.2, 3.3.1.1, 3.3.1.2, 3.3.1.3, 3.3.1.10, 3.3.11.3	See 3.2.4.2 & 3.3.1.6 (Typical max. volumes)	See Appendix E for larger versions of figures
	Live and play	Primary access to housing	Up to 800 du	50	20	10%	2.0 m each side	Parking is separate and recessed. See 3.3.6. Public transport is likely (see clause 3.3.1.4, 3.3.1.5)	Separate provision where local authority defined cycle route.	2 x 4.2	Connector/collector (~ 8,000 vpd)	

Figure 5.2 NZS4404:2010 road standard. (Source: NZS 4404:2010).

Moreover, this width is consistent with the existing width of local connecting roads including Petries Road and Woodend Beach Road.

6. Proposed Planning Provisions

It is proposed that a number of planning provisions are implemented to manage the transportation effects of the rezoning. These are based on the following principles:

1. There should be no roading connection from the site onto Woodend Beach Road prior to the upgrading of Woodend Beach Road / SH1 intersection (as is currently programmed by NZTA as part of the Saltwater Creek to Cam River safety improvements project) OR the construction of the Woodend Bypass. It is considered that only one of these projects needs to have been completed (not both), as the Woodend Bypass will significantly reduce traffic flows on Main North Road. Therefore, if the Woodend Bypass is constructed, there will be additional spare capacity at the Woodend Beach Road / SH1 intersection compared with the current situation.
2. Any subdivision application that involves a roading connection from the site onto Petries Road requires widening of the Petries Road corridor to 20m and urbanising Petries Road across the site frontage.
3. No more than 170 lots can be established connecting to Petries Road until such time as the Woodend Bypass is constructed OR the SH1 / Petries Road intersection is upgraded to the satisfaction of NZTA.
4. Any subdivision application that involves a roading connection onto the northern-most section of Woodend Beach Road requires:
 - a. Urbanising Woodend Beach Road across the site frontage.
5. Any subdivision application that involves a connection to Judsons Road requires:
 - a. The Judsons Road / Woodend Beach Road intersection to be relocated south, in general accordance with the ODP.
 - b. Widening the Judsons Road corridor to 20m and upgrading/constructing to an urban standard where it fronts any part of the site that is subject to subdivision.

7. Wider Network Assessment

7.1 Traffic Generation

Traffic generation rates for residential developments can vary for many reasons. This includes proximity to employment, services and amenities, development typology, the increased incidence of people working from home, and level of access to alternative modes of transport.

The RTA Guide to Traffic Generating Developments has been referred to for the traffic generation assessment. The peak hour trip generation rate used is 0.85 trips per dwelling. The daily trip generation rate used is 9.0 trips per dwelling.

Table 7.1 Projected number of vehicle trips generated by development

Yield (HH)	Peak Hour trips (0.85 trips per dwelling)	Daily Trips (9.0 trips per dwelling)
500	425	4,500

In terms of arrivals and departures, the following is assumed in line with best practice:

- AM Peak – 80% departures (340 movements) / 20% arrivals (85 movements)
- PM Peak – 60% arrivals (255 movements) / 40% departures (170 movements)

7.2 Traffic Distribution

The distribution of development traffic onto the transport network has been based on workplace and education departures from the Commuter Waka website¹³. The data has been analysed and broken down based on departure destination, and then separated out by direction of travel. The distribution of traffic by direction is shown in Table 7.2.

Table 7.2 Current Departures to / from Woodend Statistical Area

Direction	Percentage
North (towards Woodend Town Centre and Pegasus)	3%
South (towards Christchurch)	43%
West (towards Rangiora)	20%
Stays Local	34%
Total	100%

This is illustrated diagrammatically for both the morning and evening commuter peak periods in Figure 7.1 and Figure 7.2 respectively.

¹³ <https://commuter.waka.app/>

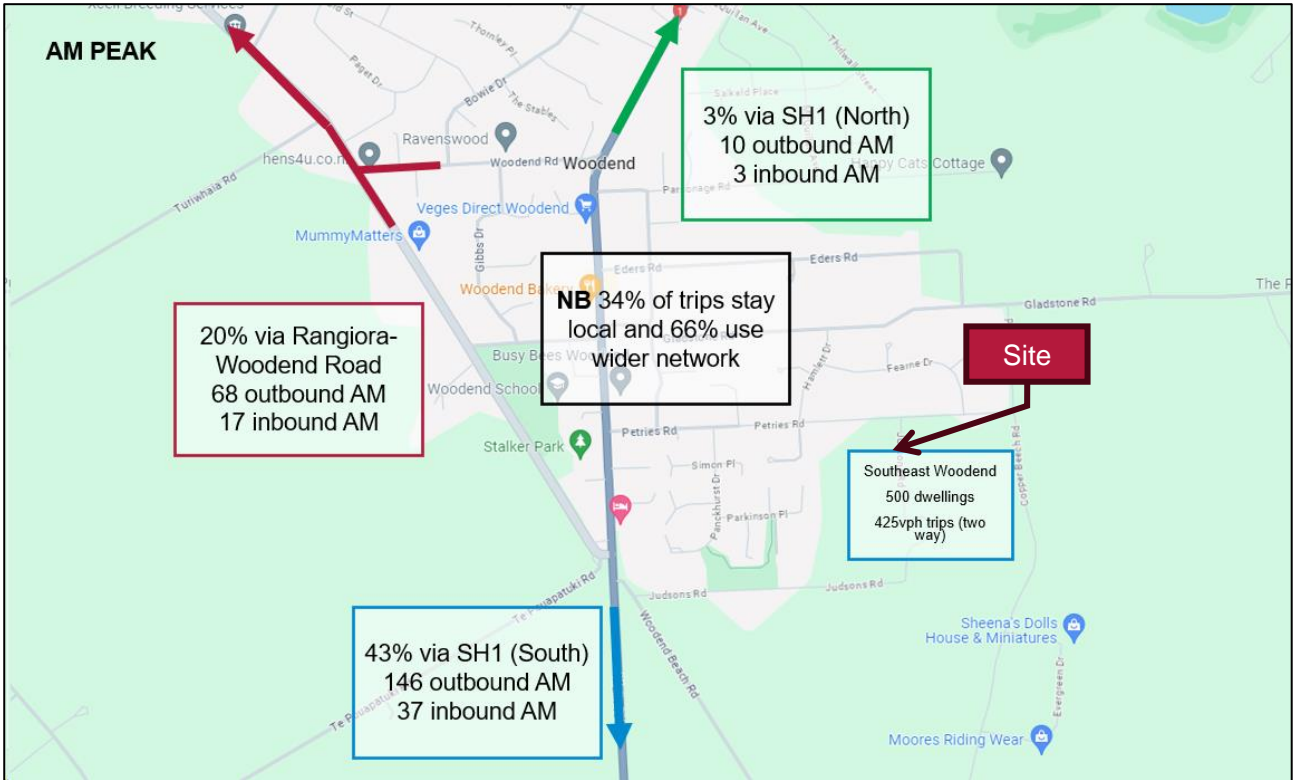


Figure 7.1 Trip distribution in Morning Peak Hour (Basemap source: Google Maps)

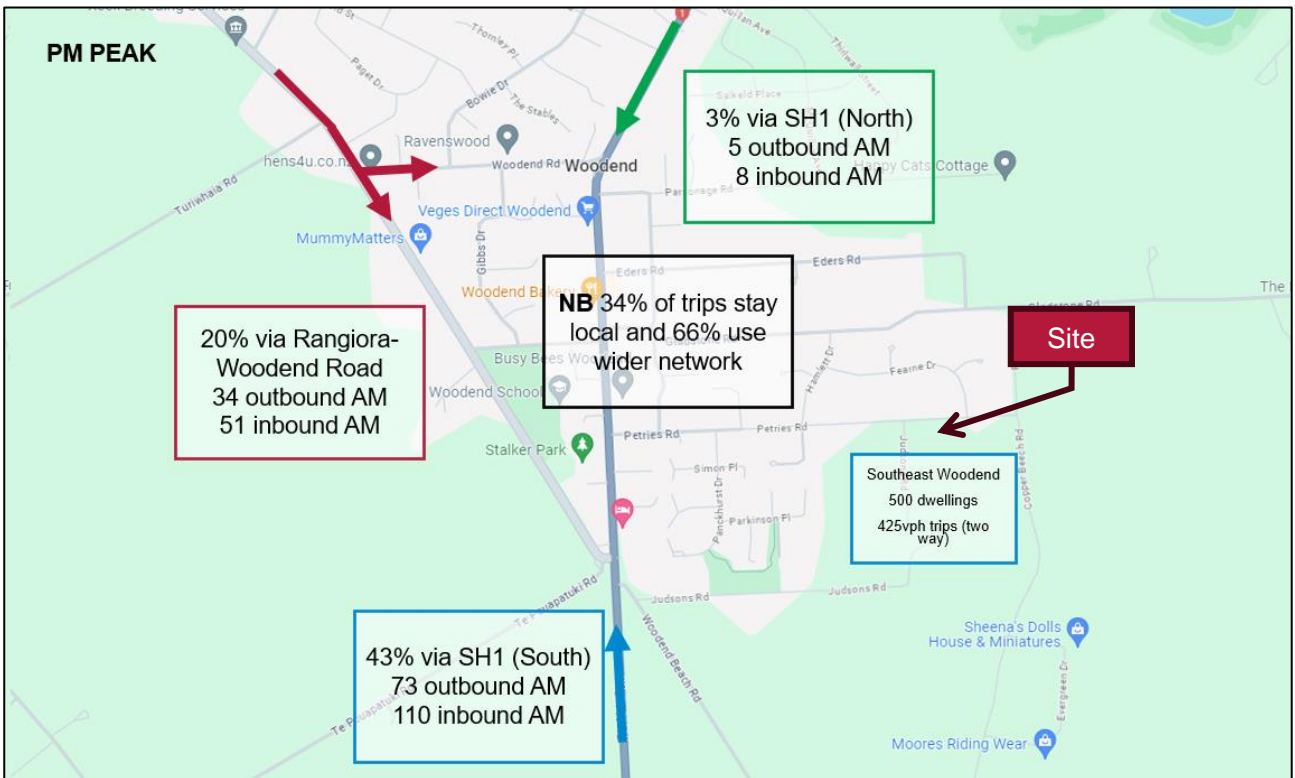


Figure 7.2 Trip distribution in Evening Peak Hour (Basemap source: Google Maps)

The change in peak hour flows on the adjacent roads is shown in Table 7.3.

Table 7.3 Peak hour flows (two-way) before and after development

Road Name	Current Peak Hour Flows (two-way)	Peak Hour Flows with development (two-way)	% increase
Rangiora Woodend Road (north of Woodend Road)	556	641	15.3%
Main North Road (directly south of Woodend Beach Rd)	2,023	2,206	9.0%
Main North Road (directly north of Woodend Beach Rd)	1,863	1,876	0.70%

This shows that the increase in traffic flows on the connecting road network will be relatively modest. An assessment of the lane capacity of Main North Road and Rangiora Woodend Road has been undertaken using Austroads Guide to Traffic Management Part 3 – Section 5.1.1. This indicates that Main North Road has a capacity in the order of 1,650vph per lane and Rangiora Woodend Road has a capacity in the order of 1,200vph per lane.

Broadly assuming that the flows are evenly split by direction, there remains sufficient spare capacity on each of these roads to accommodate the projected increase in traffic flows without creating any new capacity problems.

7.3 SH1 / Petries Road Intersection Assessment

A detailed modelling assessment of the intersection of SH1 / Petries Road has been undertaken to understand how much development can be supported if accessing the network via Petries Road prior to the establishment of connections to Woodend Beach Road and Judsons Road. Note that this is on the basis that any connections from the development to Woodend Beach Road and/or Judsons Road can only be supported once one of the Woodend Bypass or SH1 / Woodend Beach Road roundabout is constructed and operational.

Abley organised a video traffic survey to be undertaken on Thursday 22nd February 2024 from 6am to 6pm to calculate peak hourly turning movements and observe queues and delays at the intersection. The observed peak hours were 7-8am (morning) and 4:30-5:30pm (evening).

Sidra Intersection models were then developed and calibrated for the morning and evening peak period based on the observed 2024 traffic volumes and delays for left and right turning vehicles. Key features of the model include:

- The observed split of light and heavy vehicles by intersection turning movement;
- The bunching factor to represent the platooning impact of traffic from the upstream signalised pedestrian crossing (20% bunching in morning and 10% in evening);
- Critical gaps and move up times were calibrated based on observed delays for right turn in, left turn out and right turn out movements.

Three model scenarios were run as follows:

- Scenario A – 2024 calibrated base model – this represents the current situation.
- Scenario B – 2024 base model with 170 lots of development – this estimates the levels of delay and queuing that would be expected including traffic generated from 170 lots on the rezoning site if all accessed from Petries Road.

- Scenario C – 2030 future model with 170 lots of development – it is noted that it would take several years for the development to roll out and to deliver the Woodend Bypass. This model tests the impact of the development allowing for six years of background traffic growth at 1.65% per annum on SH1 (calibrated from observed 2019-2023 traffic growth on the corridor at the Waka Kotahi TMS SH1 count station by Woodend School).

It is anticipated that by 2030 (or potentially earlier) at least one of the Waka Kotahi projects referred to above will be operational, and wider connections to the transport network can be achieved.

Local Context

Woodend is located approximately 20km or a 30 minute commute from Christchurch, with 43% of travel to work and education (See section 7.2) travelling south towards Christchurch. Much of this traffic is likely to leave earlier to 'beat the traffic' and find parking in Christchurch City. For this reason morning peak traffic generation in outlying towns is generally split into two distinct peaks being the 7-8am traffic for longer commutes to the south towards Christchurch and the 8-9am traffic for shorter commutes within the Waimakariri District and within Woodend itself.

Analysis of the traffic count at SH1 / Petries Road shows that:

- Between 7-8am there are 1736 two-way through vehicles on SH1, and 113 vehicles turning in/out of Petries Road – it is observed that the 'longer commuting trips' peak hour in/out of Petries Road is much lower than the traditional evening peak hour (68% of evening peak);
- Between 8-9am there are 1427 two-way through vehicles on SH1, and 157 vehicles turning in/out of Petries Road – it is observed that the 'shorter commuting trips' peak hour in/out of Petries Road is much lower than the traditional evening peak hour (87% of evening peak); and
- Between 4:30-5:30pm there are 1941 two-way through vehicles on SH1, and 181 vehicles turning in/out of Petries Road.

It is noted that the evening peak traffic turning into/out of Petries Road corresponding to trips by households currently fronting and accessing the wider transport network by Petries Road is much higher in the evening peak than the morning peak hours.

The estimated traffic generation rate for the proposed rezoning site based on a typical traffic profile taken from section 7.3 is 0.85 trips per household in each peak hour. This peak hour trip rate has been assumed in the modelled evening peak models. When 170 households of development are added, the modelling includes an additional 92 movements. This is made up of (92 movements = 170 hh * 0.85 trips / hh * (43% south + 20% turning left out of Petries Rd intersection to travel west – see section 7.2)). The remaining traffic generated by the development is anticipated to travel locally within Woodend using local roads or access SH1 further north via local roads.

In the morning peak the situation is more complex. The observed traffic counts demonstrate that the traffic generated by development fronting Petries Road is much lower in the 7-8am morning peak hour which is when the SH1 corridor is busiest, compared to the 8-9am hour when the State Highway flows are reduced (by 18% from 1736 to 1427 through vehicles per hour). As discussed above, the effective trip generation rate is much lower in each individual morning hour than it is in the evening peak. The trip generation of the 170 lots has been carefully calibrated based on the relative number of vehicles turning into/out of Petries Road in each hour compared to the evening peak.

The effective trip rate for morning peak hour is 0.55 trips/hh in the 7-8am hour and 0.73 trips/hh in the 8-9am hour and represents the local context whereby the morning peak is effectively split across the two hours. As SH1 flows are more than 20% higher in the 7-8am hour it is observed that there are fewer gaps in the traffic stream, therefore this is the critical hour for the purposes of testing the intersection operation and capacity. The modelling for the 7-8am hour with 170 households includes 58 two-way movements = 170 hh * 0.55 trips / hh * (43% south + 20% turning left out of Petries Rd intersection to travel west – see section 7.2).

Modelling Results

The modelling results are presented in Table 7.4 below. Full Sidra Intersection summarise are included in Appendix B.

Table 7.4 SH1 / Petries Road Modelling Summary

Scenario	Total Volume	Petries Rd Approach Delay	Petries Rd Approach Level of Service
<i>Morning Peak Hour (7-8am)</i>			
A – 2024 Base Model	1848	25.0	C
B – 2024 with 170 lots	1903	28.9	D
C – 2030 with 170 lots	2081	49.2	E
<i>Evening Peak Hour (4:30-5:30pm)</i>			
A – 2024 Base Model	2122	14.4	B
B – 2024 with 170 lots	2214	14.9	B
C – 2030 with 170 lots	2408	17.4	C

Discussion and Conclusions

Scenario A - Petries Road is the critical approach at the SH1 / Petries Road intersection. There is currently ample capacity at the intersection in both peak periods with delays in the order of 25 and 15 seconds in the morning and evening peak respectively.

Scenario B - The introduction of 170 lots of traffic generation marginally increases delays by up to four seconds in the morning peak hour and has minimal impact on the intersection performance in the evening peak hour.

Scenario C – Acknowledging that the rezoning site will take several years to develop (should rezoning be approved) and the Woodend Bypass or SH1 / Woodend Beach Road may also be several years away, a futureproofed scenario allowing for six years of background growth demonstrates that the Petries Road is approaching and near capacity. The threshold of 50 seconds delay corresponds to Level of Service F which is the point at which the intersection is considered operating at capacity. The inclusion of traffic corresponding to 170 lots of development can be supported on this basis.

Should more than 170 lots be developed on the rezoning site prior to the Woodend Bypass or establishment of other connections onto SH1 via Woodend Beach Road or Judsons Road, it is recommended that a further assessment be undertaken to determine a suitable intersection upgrade at SH1 / Petries Road. Any such upgrade would need to be approved by Waka Kotahi and could potentially include the installation of dedicated turning bays and/or traffic signals.

8. Strategic Planning Framework

The proposed rezoning has been assessed against the transport related policies of the following relevant national, regional and district planning instruments:

- National Policy Statement on Urban Development (NPS-UD)
- Canterbury Regional Policy Statement

- Canterbury Regional Land Transport Plan
- Canterbury Regional Public Transport Plan
- Proposed Waimakariri District Plan

The proposed rezoning of the site is not anticipated to give rise to adverse effects on the strategic transport network. In summary, it is considered that the rezoning is consistent with and/or not contrary to the transportation-related provisions of the NPS-UD Canterbury Regional Policy Statement, Canterbury Regional Land Transport Plan 2021-31, Canterbury Regional Public Transport Plan 2018-28, and the objectives and policies of the pWDP. This is assessed for each document in the following subsections.

8.1 National Policy Statement on Urban Development 2020 (NPS-UD)

Objective 3 of the NPS-UD requires regional policy statements and district plans to enable more people to live in, and more businesses and community services to be located in, areas of urban environment in which one or more of the following apply:

- the area is in or near a centre zone or other area with many employment opportunities,
- the area is well-serviced by existing or planned public transport.

Policy 1(c) of the NPS-UD requires planning decisions to contribute to well-functioning urban environments, which are urban environments that, as a minimum, have good accessibility for all people between housing, jobs, community services, natural spaces, and open spaces, including by way of public or active transport.

The site is accessible by public transport with services operating within walking distance to the site. This provides access to Kaiapoi, Rangiora, and Christchurch City. Existing Park and Ride sites in Rangiora and Kaiapoi further the connection to fast services into Christchurch City. Furthermore, the layout of the site demonstrates an excellent level of connectivity to the existing transport network and wider residential area for all modes of transport.

Future plans from the Greater Christchurch Partnership are included in the draft Greater Christchurch Spatial Plan¹⁴ (the Plan). At the time of preparing this report the Plan has been endorsed by the Greater Christchurch Partnership with final endorsement from Councils being imminent. The spatial strategy in the Plan includes a core public transport route running past the rezoning Site connecting Woodend to Kaiapoi and Christchurch. Bus service improvements are signalled in the Plan between Woodend and Belfast with the proposed introduction of Mass Rapid Transit connecting Belfast to Christchurch. These improvements will further support the attractiveness and uptake of public transport for commuters travelling between the rezoning Site and destinations to the south.

The site is also located on the edge of the existing urban area, close to the Woodend township, with amenities, education and employment opportunities. Rangiora is located 7km, and Kaiapoi 6km from the site. Both offer further employment opportunities and amenities.

8.2 Canterbury Regional Policy Statement

Policy 5.3.7 of the Canterbury Regional Policy Statement relates to the “strategic land transport network and arterial roads (entire region). It seeks to avoid development that:

- adversely effects the safe, efficient, and effective functioning of the strategic land transport network and arterial roads, including the ability of infrastructure to support freight and passenger transport services, and
- forecloses the opportunity for the development of the network to meet future strategic transport requirements.

¹⁴ <https://greaterchristchurch.org.nz/assets/Documents/greaterchristchurch-/Draft-GCSP/Greater-Christchurch-Spatial-Plan.pdf>

The proposed planning provisions discussed in Section 6 of this report will ensure that traffic generated by the future development of the site does not adversely affect the safe and efficient operation of the strategic land transport network. The modelling assessment has demonstrated that up to 170 lots of development accessing the network via Petries Road can be supported. The provisions ensure that the appropriate assessments are undertaken at key intersections with SH1 beyond the establishment of 170 lots (in scenarios where that development is likely to have effects at key intersections). Those scenarios are explained in Section 6.

The planned upgrades of the section from Saltwater Creek to Cam River provide the required improvements to safely integrate the planned residential area with the existing strategic transportation network. Moreover, the future construction of the Woodend Bypass will further improve the accessibility of the site to the strategic transport network, and it is noted that development of the site will not preclude the Woodend Bypass from being constructed.

A high level capacity assessment of Main North Road and Rangiora Woodend Road confirms that there will remain sufficient midblock lane capacity on those roads once the development traffic is added.

8.3 Canterbury Regional Land Transport Plan 2021-2031

The Canterbury Regional Land Transport Plan 2021-2031 is periodically reviewed and updated to reflect the current state of the region's transport network, and the focus for future investment. The objectives of the plan are:

- Shared prosperity (environmental, social, economic and cultural);
- better freight options;
- reduced harm;
- improved advocacy;
- reliable and consistent journeys;
- mode shift;
- resilience.

As above, the proposed rezoning is not anticipated to give rise to adverse effects on the strategic transport network and does not require any new external roading links or upgrades outside of the planned works mentioned above. The site is surrounded by existing and future planned development including Large Lot Residential zoning to the east and south, and proposed Special Purpose Kāinga Nohoanga zone to the west. Connections will be made to the external road network are proposed to safely integrate the Site with the wider transport network.

Provision will be made for walking and cycling within the site and adjacent to the site on the existing bounding roads as included in the proposed ODP.

8.4 The Canterbury Regional Public Transport Plan 2018-28

The Canterbury Regional Public Transport Plan 2018-28 has four key policies. These are as follows:

- The network: service, infrastructure, and supporting measures.
- Customers.
- Funding and fares.
- Standards, procurement, monitoring and review.

Environment Canterbury regularly evaluates the public transport requirements of the wider network. The bus services from Woodend may increase to provide further public transport accessibility, as the district population continues to grow and as signalled in the draft Greater Christchurch Spatial Plan. It is understood from media reports that bus patronage in the Waimakariri District has increased 21% compared to pre-Covid patronage levels.

The site adjoins an existing residential area, and as such the existing bus facilities in Woodend and park and ride services elsewhere in Waimakariri District are easily accessible from the site. Hence, the site will benefit from any future public transport service improvements that are targeted at the existing Woodend Settlement.

8.5 Proposed Waimakariri District Plan

Our review of the relevant objectives and policies contained within the proposed Waimakariri District Plan (TRAN-01-TRAN-05, TRAN-P1-P16) concludes that the proposed rezoning is either consistent or can be consistent with those policies. It is considered that the resource consent process will provide the appropriate platform for assessment of the internal road design and site layout.

9. Conclusion

This Integrated Transport Assessment (ITA) has been developed in accordance with Waka Kotahi ITA guidelines to support a rezoning submission on the Waimakariri proposed District Plan (pDP). The rezoning site is:

- located in southeastern Woodend;
- presently zoned as Rural Lifestyle under the pDP;
- is proposed to be rezoned to General Residential with some pockets of Medium Density Residential and under this zoning could accommodate up to 500 dwellings.

The location has good accessibility by all modes to key destinations in the Greater Christchurch area and future planned infrastructure upgrades by NZTA. These upgrades will deliver important safety and efficiency improvements in the vicinity of the site including the installation of a new roundabout at SH1 / Woodend Beach Road, changing the Sandhill Road / SH1 intersection to left in left out only, and delivery of the Woodend Bypass within the next ten years (refer draft GPS which has a timeframe of 2024-34).

The wider networks assessment has demonstrated that traffic generated by the rezoning will result in a modest increase in traffic flows relative to the existing flows on the major connecting roads, with these broadly being Main North Road (for traffic heading north toward Pegasus and traffic heading south toward Kaiapoi and Christchurch) and Rangiora Woodend Road (for traffic heading west toward Rangiora). This has been confirmed by a high-level capacity assessment which shows that there will remain sufficient capacity on those roads to accommodate the development traffic. A modelling assessment has demonstrated that up to 170 lots of development accessing the network via Petries Road can be supported prior to these network upgrades. It is proposed that planning provisions are put in place to ensure that localised effects of development beyond this 170 lot threshold are appropriately assessed and addressed at the time of subdivision.

An ODP has been developed which demonstrates a high degree of connectivity and accessibility to the existing transport network for all modes of transport. This includes provision for walking and cycling within the site and ensuring that extensions to the pedestrian network are made that connect the site to existing infrastructure.

Overall, the proposed rezoning can be supported from a traffic and transportation perspective, subject to the inclusion of the following planning provisions as recommended in this assessment:

- There should be no roading connection from the site onto Woodend Beach Road prior to the upgrading of one of the Woodend Beach Road / SH1 intersection (as is currently programmed by NZTA as part of the Saltwater Creek to Cam River safety improvements project) OR the construction

of the Woodend Bypass OR any similar project that may provide additional capacity and safety improvements along the Main North Road corridor.

- Any subdivision application that involves a roading connection from the site onto Petries Road requires widening of the Petries Road corridor to 20m and urbanising Petries Road across the site frontage.
- No more than 170 lots can be established connecting to Petries Road until such time as the Woodend Bypass is constructed OR the SH1 / Petries Road intersection is upgraded to the satisfaction of NZTA.
- Any subdivision application that involves a roading connection onto the northern-most section of Woodend Beach Road requires:
 - Urbanising Woodend Beach Road across the site frontage.
- Any subdivision application that involves a connection to Judsons Road requires:
 - The Judsons Road / Woodend Beach Road intersection to be relocated south, in general accordance with the ODP.
 - Widening the Judsons Road corridor to 20m and upgrading/constructing to an urban standard where it fronts any part of the site that is subject to subdivision.

Appendix A.
CAS Data Summary



A1. Summary of crashes

[Enter text here]

Location	Crash year	Crash severity	Fatal injury count	Serious injury count	Minor injury count	Non-injury count	What happened
Main North Road at Rangiora Woodend Road	2021	Minor Crash	0	0	1	1	Car 1 travelling north on Main North Road. Car 2 was stationary and parked outside 9 Main North Road, Woodend, facing north. Car 1 failed to remain in its lane and collided with the rear right side of Car 2. The impact caused Car 1 to roll onto its side.
Main North Road at Sandhill Road	2018	Minor Crash	0	0	1	0	A driver left the road and crashed into the ditch. Suspected driver fatigue.
Main North Road at Rangiora Woodend Road	2019	Minor Crash	0	0	1	2	A pedestrian intentionally walked into traffic.
Main North Road at Sandhill Road	2021	Minor Crash	0	0	1	1	A truck and car heading north on Main North Road, just north of Pa Road. The car was following behind the truck and failed to notice the truck stopping to turn right onto Sandhill Road. The truck was off the left side of the road. The car rear ended the truck as the driver was not paying attention.
Panckhurst Drive at Simon Place	2021	Minor Crash	0	0	2	0	A driver of Car 1, turning right from Panckhurst Drive onto Simon Place failed to give way to Car 2 who was heading north on Panckhurst Drive.

Location	Crash year	Crash severity	Fatal injury count	Serious injury count	Minor injury count	Non-injury count	What happened
Main North Road at Rangiora Woodend Road	2021	Minor Crash	0	0	1	1	Car 1 was heading south on Main North Road and towing a trailer with boat. Car 2 was also travelling south. Car 1 has stopped to turn right into Rangiora Woodend Road. Car 2 has rear ended the trailer, causing the boat to fall off.
Main North Road at Rangiora Woodend Road	2021	Minor Crash	0	0	1	2	A pedestrian intentionally walked into the carriageway in front of a vehicle travelling north along Main North Road.
Main North Road at Petries Road	2018	Non-Injury Crash	0	0	0	3	A vehicle has left the road and struck a power and lighting pole. The vehicle continued and came to a stop 40m away at the intersection of Main North Road and Petries Road.
Woodend Beach Road at Copper Beech Road	2022	Non-Injury Crash	0	0	0	1	A car travelling east on Woodend Beach Road was travelling too fast and slid out at the right-hand bend.
Main North Road at Petries Road	2021	Non-Injury Crash	0	0	0	1	A vehicle travelling north on Main North Road turned left off the road, into a power pole.
Main North Road at Woodend Beach Road	2018	Non-Injury Crash	0	0	0	2	Two vehicles heading north on Main North Road. The leading car stopped due to traffic. The second car didn't stop in time and collided with the rear left side of the front vehicle.
Main North Road at Woodend Beach Road	2020	Non-Injury Crash	0	0	0	2	Vehicle heading north on Main North Road failed to give way to oncoming vehicles when turning right onto Woodend Beach Road.
Main North Road at Rangiora Woodend Road	2021	Non-Injury Crash	0	0	0	2	A vehicle failed to give way.

Location	Crash year	Crash severity	Fatal injury count	Serious injury count	Minor injury count	Non-injury count	What happened
Main North Road at Petries Road	2019	Non-Injury Crash	0	0	0	1	Driver has veered left off the road and collided with a power pole.
Petries Road at Main North Road	2022	Non-Injury Crash	0	0	0	2	Driver came out of intersection and failed to make right hand turn and crashed into a parked vehicle.
Main North Road at Sandhill Road	2022	Non-Injury Crash	0	0	0	1	Driver turning left onto Sandhill Road cur the corner, striking the kerb and power pole stay.
Main North Road at Rangiora Woodend Road	2020	Non-Injury Crash	0	0	0	3	Car 1 waiting in lane to turn right into Rangiora Woodend Road. Car 2 failed to see the stopped vehicle and hit the rear of Car 1. Car 1 has ended up in the road on the wrong side of the road. Car 3 has then hit Car 1 head on.
Main North Road at Woodend Beach Road	2021	Non-Injury Crash	0	0	0	2	Car 1 was stationary on the far left of the road, waiting to perform a U-turn. Car 2 was travelling north. Car 1 pulled out in front of Car 2 and collided.
Main North Road at Rangiora Woodend Road	2019	Non-Injury Crash	0	0	0	2	In heavy traffic, Car 1 was waiting to turn right. Car 2 failed to go around and rear-ended Car 1.
Woodend Beach Road at Sandhill Road	2018	Non-Injury Crash	0	0	0	1	Driver failed to navigate the bend and drove off the road, into a farm fence.
Rangiora Woodend Road at Te Pouapatiki Road	2018	Non-Injury Crash	0	0	0	2	Car 1 has turned left onto Rangiora Woodend Road from state highway one. Car 2 has been behind it. Car 1 has applied breaks and Car 2 failed to stop in time and has collided with it.
Woodend Beach Road at Sandhill Road	2023	Non-Injury Crash	0	0	0	1	A vehicle was driving west on Woodend Beach Road too fast. At the bend at Sandhill Road the vehicle left the road.

Location	Crash year	Crash severity	Fatal injury count	Serious injury count	Minor injury count	Non-injury count	What happened
Main North Road at Rangiora Woodend Road	2020	Non-Injury Crash	0	0	0	2	Two vehicles heading on Main North Road. Car 1 braked heavily at the 50km/h zone. Car 2 also braked but hit the back of Car 1.
Main North Road at Petries Road	2018	Non-Injury Crash	0	0	0	2	Driver veered off road to the left and crashed into a parked vehicle.
Main North Road at Sandhill Road	2021	Serious Crash	0	1	3	0	Driver had a medical event and veered into the oncoming lane and into another car.
Main North Road at Petries Road	2022	Serious Crash	0	1	0	2	A vehicle waiting to turn right into Petries Road was rear ended by a truck continuing north.
Main North Road at Sandhill Road	2023	Serious Crash	0	1	1	0	Driver lost control and crashed into a power pole on the verge.

Appendix B.
Sidra Intersection Modelling Outputs



Auckland

Level 1/70 Shortland Street
Auckland 1010
Aotearoa New Zealand

Wellington

Level 1/119-123 Featherston Street
Wellington 6011
Aotearoa New Zealand

Christchurch

Level 1/137 Victoria Street
PO Box 36446, Merivale
Christchurch 8146
Aotearoa New Zealand

hello@abley.com

+64 3 377 4703

abley.com