# Rolleston FUDA Plan Change

Integrated Transport Assessment

August 2022

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TRANSPORTATION SPECIALISTS

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# EXECUTIVE SUMMARY

Flow Transportation Specialists Ltd (Flow) has been engaged by Selwyn District Council (Council) to assist with preparing a variation to the Proposed Selwyn District Plan (PDP) to respond to the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act (2021).

Council is proposing to include within the scope of its Variation, land subject to a Future Urban Development Area (FUDA) classification under the Canterbury Regional Policy Statement (CRPS) that has not, to date, been subject to a private plan change request. The Plan Change proposes to rezone this land to a medium density residential zoning, consistent with the intended zoning for the surrounding land.

Our assessment has found that the transport safety and efficiency effects of the Plan Change can be adequately managed by

- Implementing Outline Development Plans, as discussed in Section 1.2, to guide the provision of a connecting street network that caters for all users
- Requiring the SH1/Dunns Crossing Road intersection to be upgraded to a roundabout before any development occurs within Sites 1 and 3 (refer to Section 3.2)
- Requiring the Dunns Crossing Road/Selwyn Road/Goulds Road to be upgraded to a roundabout before any development occurs within Sites 1, 2 and 3 (refer to Section 3.1)
- Requiring the Selwyn Road/Springston-Rolleston Road intersection to be upgraded to a roundabout, with a separate short left turn lane on the Springston Rolleston Road south approach, before any development occurs within Sites 1 – 6 (refer to Section 3.1 and Section 5.3.5). However, we note that site constraints may preclude a left turn lane. We recommend that Council further investigate effects at this intersection, as part of a wider reassessment of network performance as a result of land use changes within Rolleston that may eventuate as a result of the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act (2021)
- Requiring the upgrade of the Selwyn Road/Lincoln Rolleston Road and Selwyn Road/Weedons Road intersections to roundabouts before any development occurs within Sites 1 – 6, to mitigate potential safety effects (refer to Section 5.5).

The 2033 Rolleston Paramics model identifies that the following intersections will be operating near to or over capacity by 2033 if all Private Plan Changes within Rolleston proceed

- SH1/Weedons Interchange South roundabout
- Lowes Road/Broadlands Drive priority intersection
- Levi Road/Ruby Drive priority intersection
- Levi Road/Strauss Drive priority intersection
- Levi Road/Weedons Road priority intersection
- Selwyn Road/Lincoln Rolleston Road priority intersection with seagull treatments (however, Council intends to construct this as a roundabout, which will improve performance)

- Jones Road/Weedons Road roundabout.

Consistent with our recommendations when acting as Council's transport expert for these multiple Private Plan Changes, we consider that any upgrades to these intersections should be led by Council, and that that Development Contributions should be leveraged from Plan Change sites on a proportional basis relative to the level of traffic that each respective Plan Change sites contributes during peak hours.

As such, we consider that further assessment of the wider traffic effects of this Plan Change is not needed from an effects assessment perspective. We recommend that, separate to this Plan Change process, Council progress further assessment of these intersections in terms of improvements and funding mechanisms.

Finally, we conclude that the Plan Change is consistent with the transport related objectives and policies of relevant regional and district plans.

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## APPENDICES

# 1 A SUMMARY OF THE PROPOSED PLAN CHANGE

Flow Transportation Specialists Ltd (Flow) has been engaged by Selwyn District Council (Council) to assist with preparing a variation to the Proposed Selwyn District Plan (PDP) to respond to the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act (2021).

Council is proposing to include within the scope of its Variation, land subject to a Future Urban Development Area (FUDA) classification under the Canterbury Regional Policy Statement (CRPS) that has not, to date, been subject to a private plan change request. The Plan Change proposes to rezone this land to a medium density residential zoning, consistent with the intended zoning for the surrounding land.

The purpose of this Integrated Transport Assessment (ITA) is to assess the transport effects related to the rezoning of the Sites, to provide input into the draft Outline Development Plans, and support the Section 32 Evaluation.

## 1.1 Sites

The areas being considered are shown in and include the following 6 parcels (Sites):

1. 130 Dunns Crossing Road (Site 1) – 4ha
2. 545 East Maddisons Road (Site 2) – 4ha
3. 890 Selwyn Road (Site 3) – 4ha
4. LOT 2 DP 61162 Springston Rolleston Road (Site 4) – 16ha
5. 435 Springston Rolleston Road (Site 5) – 11.5ha
6. LOT 1 DP 82966 Springston Rolleston Road (Site 6) – 10.7ha.

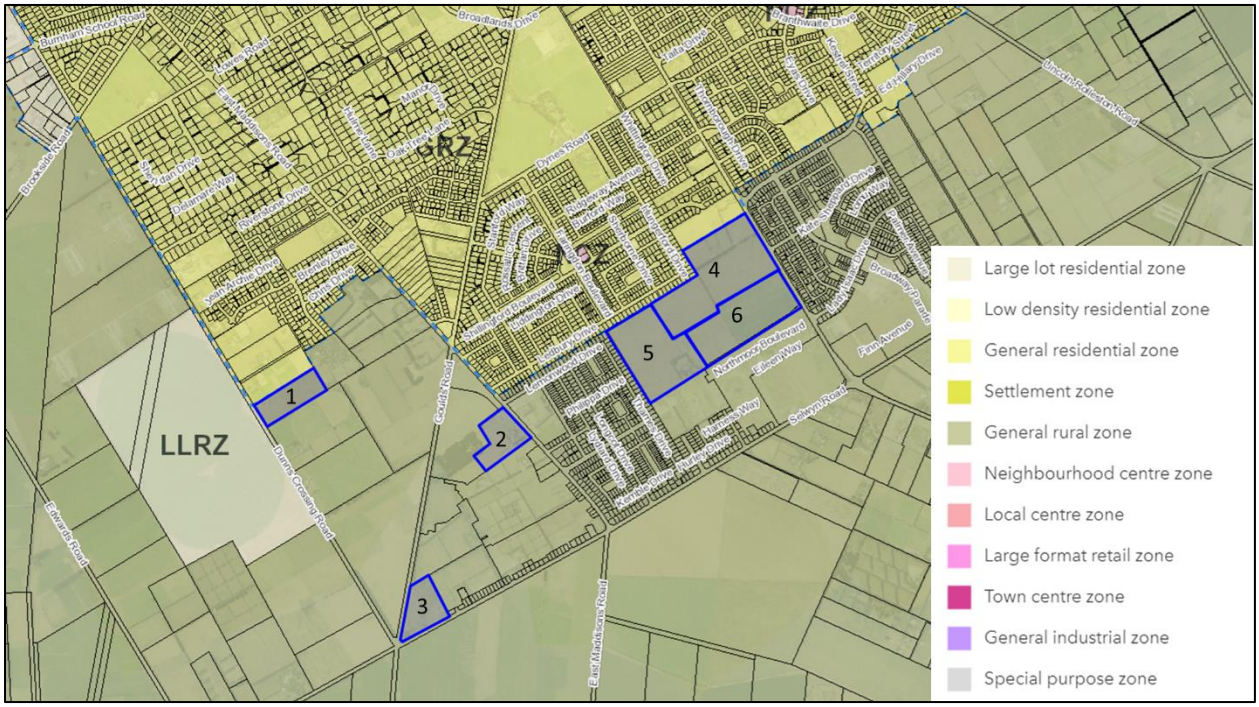
As shown in Figure 1 the Sites are zoned General Rural Zone (GRZ) in the PDP.

We note that subsequent to the completion of our assessment of effects, Council has advised us that

- 130 Dunns Crossing Road (4ha site) into this Plan Change will be withdrawn from this Plan Change and included within PPC70
- 606 Selwyn Road (1ha site) has been incorporated into this Plan Change.

We consider that the conclusions of our assessment are sufficiently robust to remain relevant in light of these changes.

**Figure 1: Proposed District Plan zoning for the Plan Change sites**




## 1.2 Proposed Outline Development Plans

Council proposes to establish two Outline Development Plans (ODP), which include the Sites as well as incorporating operative and proposed ODPs from adjacent parcels of land. The ODPs shown in Figure 2 and Figure 3 both anticipate an average yield of 12 dwellings per hectare for the Sites. Approximately 600 dwellings are anticipated across the 6 Sites.

ODP DEV-R013, shown in Figure 2, covers Sites 1 – 3 and includes the following key aspects

- Site 1
  - Road connections to proposed and consented development to the north, east and south, and a new intersection with Dunns Crossing Road
  - Frontage upgrades to Dunns Crossing Road
- Site 2
  - A road connection to proposed development to the north, and a new intersection with East Maddisons Road
  - A future pedestrian/cycle link is proposed to the west
  - Frontage upgrades to East Maddisons Road
- Site 3
  - A road connection to proposed development to the east, and a new intersection with Goulds Road

- The new intersection with Goulds Road is indicative, with the alignment and location to be confirmed at subdivision consent
- The closure of the Goulds Road arm of the Dunns Crossing Road/Goulds Road/Selwyn Road intersection
- Frontage upgrades to Selwyn Road and Goulds Road.

ODP DEV-R014, shown in Figure 3, covers Sites 4 – 6 and includes the following key aspects

- Extension of the following proposed and consented roads
  - Faringdon Boulevard (Primary Road with Shared Use Path)
  - Hungerford Drive (Primary Road with Shared Use Path)
  - Kate Sheppard Drive (Primary Road with Shared Use Path)
  - Shannon Drive (Secondary Road with Shared Use Path)
  - Philippa Drive (Secondary Road)
  - Lemonwood Drive (Secondary Road)
  - Adamite Drive (Secondary Road).
- A new intersection with Springston Rolleston Road (extension of Kate Sheppard Drive), as a future roundabout
- A new T-intersection with Springston Rolleston Road (extension of Phillipa Drive)
- Two future pedestrian/cycle links are proposed to the north
- Frontage upgrades to Springston Rolleston Road.

**Figure 2: ODP DEV-R013, including Sites 1 - 3**

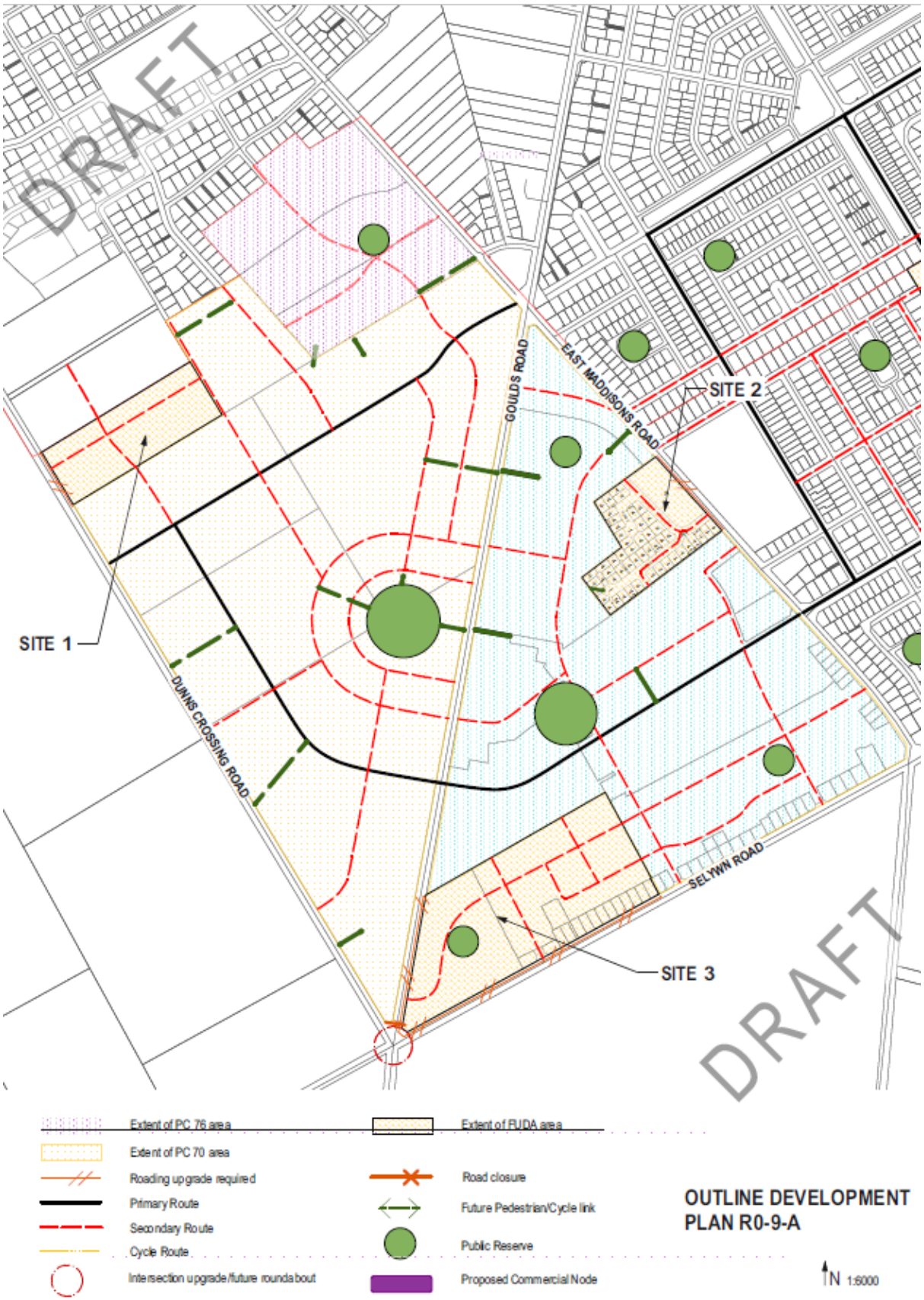
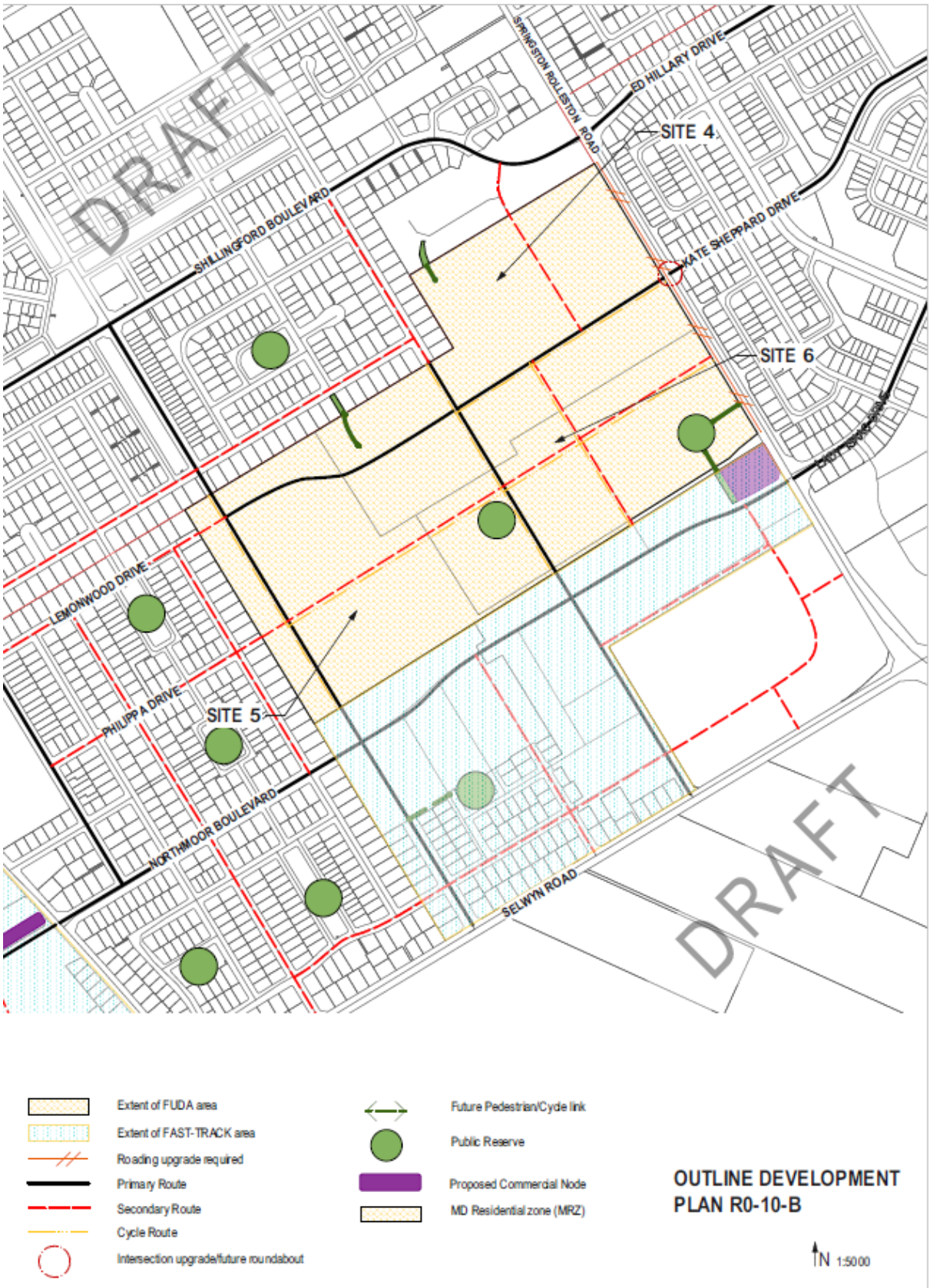


**Figure 3: ODP REV-R014, including Sites 4 - 6**



# 2 OUR DISCUSSION OF THE EXISTING TRANSPORT ENVIRONMENT

The following subsections describe the existing transport environment in the vicinity of the Sites in terms of:

- Adjacent roads
- Adjacent intersections
- Public transport accessibility
- Walking and cycling accessibility
- Private vehicle accessibility
- Safety of the transport network.

Overall, we consider the level of access to the Sites vary between travel modes. The existing roading network currently provides good access, there are several lower frequency public transport services providing moderate access, and active travel modes currently have limited provision of infrastructure. The following sections provide further detail.

## 2.1 Adjacent Roads

The following subsection describes the roads adjacent to the Sites, including

- Dunns Crossing Road
- East Maddisons Road
- Goulds Road
- Selwyn Road
- Springston Rolleston Road.

### 2.1.1 Dunns Crossing Road

Dunns Crossing Road is classified as an arterial road in the operative District Plan and the Proposed Selwyn District Plan. The speed limit to the south of the proposed Plan Change site at 130 Dunns Crossing Road is 80 km/h and the speed limit to the north of this Site is 60km/h.

The carriageway has a width of approximately 6.2m in the vicinity of Site 1 and Site 3 and accommodates two-way traffic (one lane in each direction) as shown in Figure 4. Existing traffic volumes on Dunns Crossing Road varies between 1,600 to 5,100 vehicles per day between the southern and northern ends respectively.

**Figure 4: Dunns Crossing Road site photo (looking north)[1]**


### 2.1.2 East Maddisons Road

East Maddisons Road is classified as a collector road in the operative District Plan and the Proposed Selwyn District Plan. The speed limit in the vicinity of Site 2 is 60 km/h but it is expected that this speed limit will reduce to 50 km/h as the urbanisation of the corridor continues.

The carriageway has a width of approximately 6 m and accommodates two-way traffic (one lane in each direction) as shown in Figure 5. Footpaths are provided on the eastern side of the road, separated from the carriageway by a grassed berm. No formal cycling infrastructure or protected pedestrian and cycling crossing locations are provided. Existing traffic volumes on East Maddisons Road is approximately 1,300 vehicles per day.

[1] All streetview photos credited to Google Maps, accessed 10/05/22

**Figure 5: East Maddisons Road site photo (looking south)**

### 2.1.3 Goulds Road

Goulds Road is classified as a collector road in the operative District Plan and the Proposed Selwyn District Plan. The speed limit in the vicinity of the proposed plan change area is 80 km/h between Selwyn Road and East Maddisons Road.

The carriageway has a width of approximately 6.8 m in the vicinity of the proposed plan change area and accommodates two-way traffic (one lane in each direction) as shown in Figure 6. Existing traffic volumes on Gould Road are approximately 1,000 vehicles per day.

**Figure 6: Gould Road site photo (looking south)**

### 2.1.4 Selwyn Road

Selwyn Road is classified as an arterial road in the operative District Plan and the Proposed Selwyn District Plan. The speed limit in the vicinity of the proposed plan change area is 80 km/h.

The carriageway has a width of approximately 6.6 m in the vicinity of the proposed plan change area and accommodates two-way traffic (one lane in each direction) as shown in Figure 7. Existing traffic volumes on Selwyn Road are approximately 3,000 vehicles per day.

**Figure 7: Selwyn Road site photo (looking west)**


### 2.1.5 Springston Rolleston Road

Springston Rolleston Road is classified as an arterial road in the operative District Plan and the Proposed Selwyn District Plan. The speed limit in the vicinity of the proposed plan change area is 80 km/h.

The carriageway has a width of approximately 6.5 m in the vicinity of the proposed plan change area and accommodates two-way traffic (one lane in each direction) as shown in Figure 8.

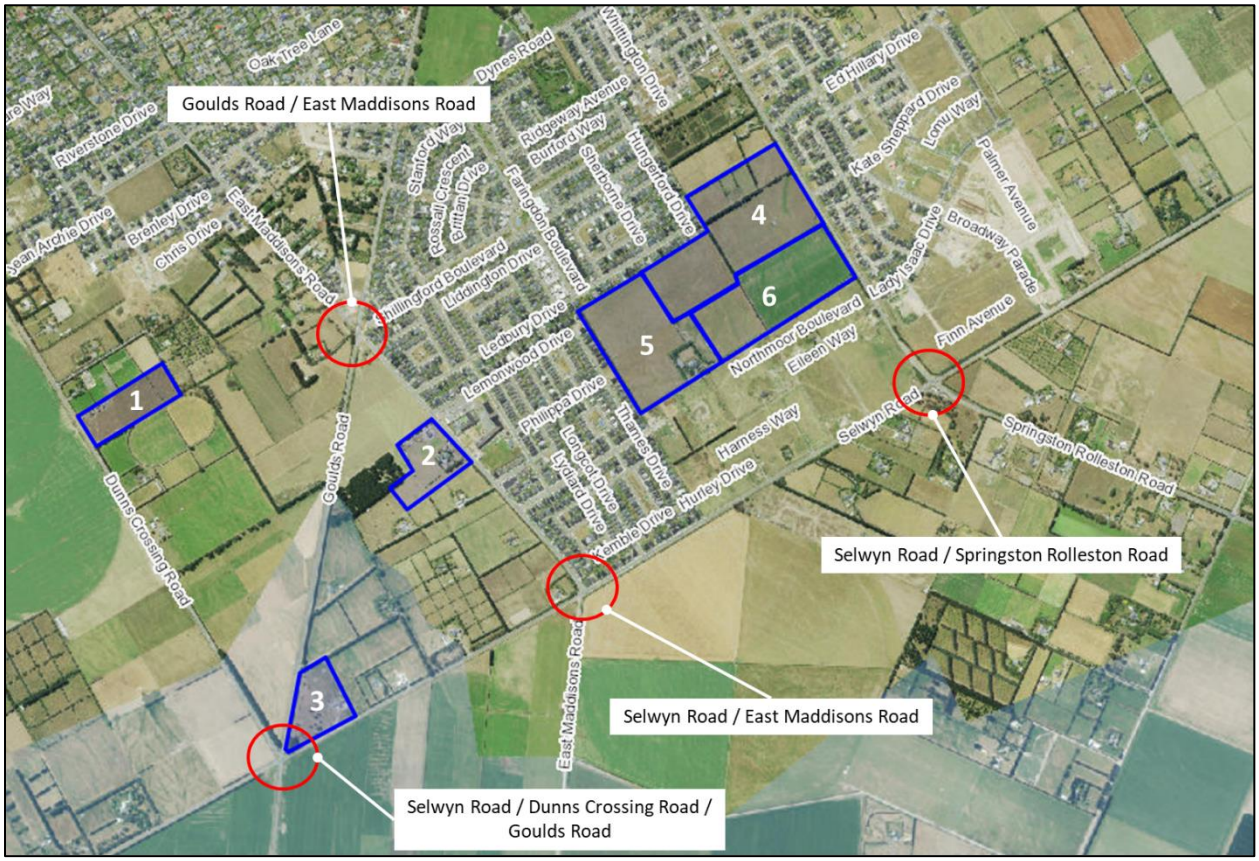
**Figure 8: Springston Rolleston Road site photo (looking south)**


## 2.2 Adjacent intersections

The following subsection describes the road intersections near the Sites as shown in Figure 8, including

- Selwyn Road / Dunns Crossing Road / Goulds Road
- Selwyn Road / East Maddisons Road
- Goulds Road / East Maddisons Road
- Selwyn Road / Springston Rolleston Road.

**Figure 9: Intersections near the Sites**




### 2.2.1 Selwyn Road / Dunns Crossing Road / Goulds Road

The intersection of Selwyn Road, Dunns Crossing Road and Goulds Road is located immediately adjacent to Site 3 and approximately 1.1 km south of Site 1. The existing layout of the intersection is shown in Figure 10.

**Figure 10: Selwyn Road, Dunns Crossing Road and Goulds Road intersection layout**


Dunns Crossing Road currently forms a yield-controlled T-junction with Goulds Road, immediately north of the intersection of Selwyn Road and Goulds Road. The existing intersection of Goulds Road and Selwyn Road is a stop-controlled priority crossroads with priority given to Selwyn Road. No pedestrian or cycling facilities are provided at this intersection.

Given the level terrain and vegetation offset from the carriageway, all approaches have clear lines of sight.

We understand that, in conjunction with Plan Change 70 and Plan Change 81[2], it is expected that this intersection will be upgraded to a roundabout and that the northern Goulds Road arm will be removed from the intersection. Traffic from the northern arm of Goulds Road will be able to access Dunns Crossing Road to the north of the intersection from new roads connecting to Dunns Crossing Road, as shown indicatively in Figure 11.

[2] PPC81: 423 Selwyn Road Rolleston Integrated Transport Assessment, Novo Group, October 2021, accessed online at https://www.selwyn.govt.nz/__data/assets/pdf_file/0006/571245/Appendix-D-Integrated-Transport-Assessment-Including-Appendix-1,2-and-3.pdf

**Figure 11: Indicative design for the upgrade of the Selwyn Road / Dunns Crossing Road / Goulds Road intersection**

### 2.2.2 Selwyn Road / East Maddisons Road

The intersection of Selwyn Road and East Maddisons Road is located approximately 550 m to the south of Site 2 and 850 m to the east of Site 3. The layout of the intersection is shown in Figure 12.

**Figure 12: Selwyn Road and East Maddison Road intersection layout**


The intersection is a stop-controlled priority crossroads with priority given to Selwyn Road. The East Maddison Road arms are slightly offset. Through traffic along East Maddisons Road is expected to be low since the southern arm of East Maddisons Road is an unsealed road.

Footpaths are located to the northeast of the intersection, however, no pedestrian or cycling crossing points are provided at the intersection.

Given the level terrain, straight approach arms and vegetation offset from the carriageway, all intersection approaches have clear lines of sight.

### 2.2.3 Goulds Road / East Maddisons Road

The intersection of Gould Road and East Maddisons Road is located approximately 350 m to the north of Site 2. The layout of the existing intersection is shown in Figure 12.

**Figure 13: Existing Goulds Road / East Maddison Road intersection layout**


East Maddisons Road (south) currently forms a stop-controlled T-junction with Goulds Road. Visibility from East Maddisons Road is good, given the flat and straight terrain of Goulds Road in the vicinity of the intersection. The northern arm of East Maddisons Road has been closed, and the road realigned to intersect with Goulds Road approximately 140 m north of this intersection.

Footpaths are located on the eastern side of East Maddisons Road, however, no pedestrian or cycling crossing points are provided at the intersection.

This intersection is planned to be upgraded to a roundabout as part of the Councils' 10-year projects. The upgrade will include the extension of Shillingford Boulevard to form the fourth arm of the intersection, with East Maddisons Road being removed from the upgraded intersection. The upgrade works is currently planned for 2029/2030. An indicative layout of the upgraded roundabout-controlled intersection is shown in Figure 14.

**Figure 14: Indicative Goulds Road / Shillingford Boulevard roundabout upgrade**

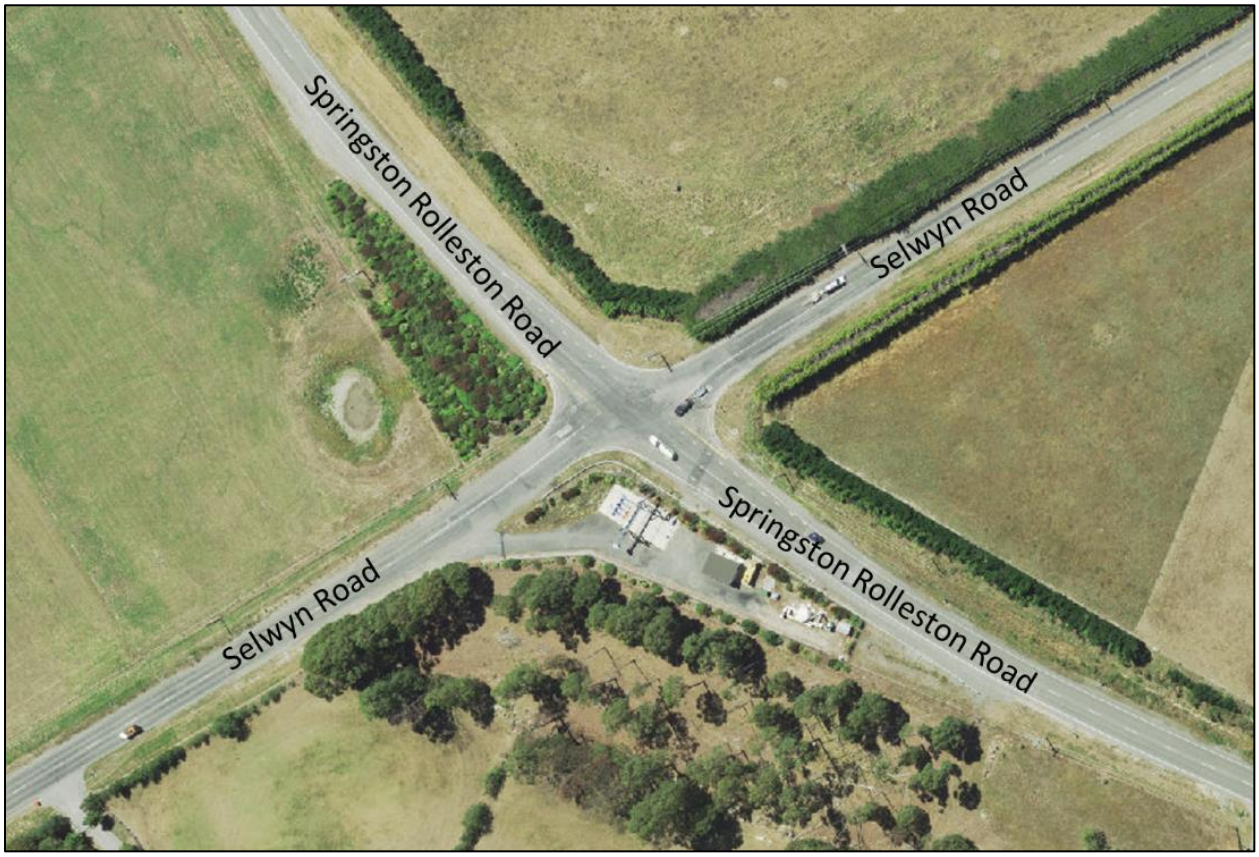

### 2.2.4 Selwyn Road / Springston Rolleston Road

The intersection of Selwyn Road and Springston Rolleston Road is located approximately 420 m to the south of Site 6. The layout of the existing intersection is shown in Figure 15.

The intersection is currently a stop-controlled priority crossroads with priority given to Springston Rolleston Road. The Selwyn Road arms are slightly offset, resulting in the through traffic on Selwyn Road being slightly misaligned. No pedestrian or cycling facilities are provided at the intersection.

Due to safety concerns associated with this intersection, a safety upgrade is funded under the National Land Transport Programme (NLTP), and is planned to be constructed by Council and Waka Kotahi between 2024 and 2027. This upgrade will include converting the intersection to a single lane roundabout.

**Figure 15: Existing Selwyn Road / Springston Rolleston Road intersection layout**




## 2.3 Safety assessment

A review of Waka Kotahi NZTA's Crash Analysis System (CAS) was completed to determine the number and types of crashes that occurred in the vicinity of the Sites during the period of 2017 to 2022 (inclusive). The review area included all intersections near the Sites (as noted in the previous section), as well as the mid-blocks linking these intersections together. The assessment area is shown in Figure 16.

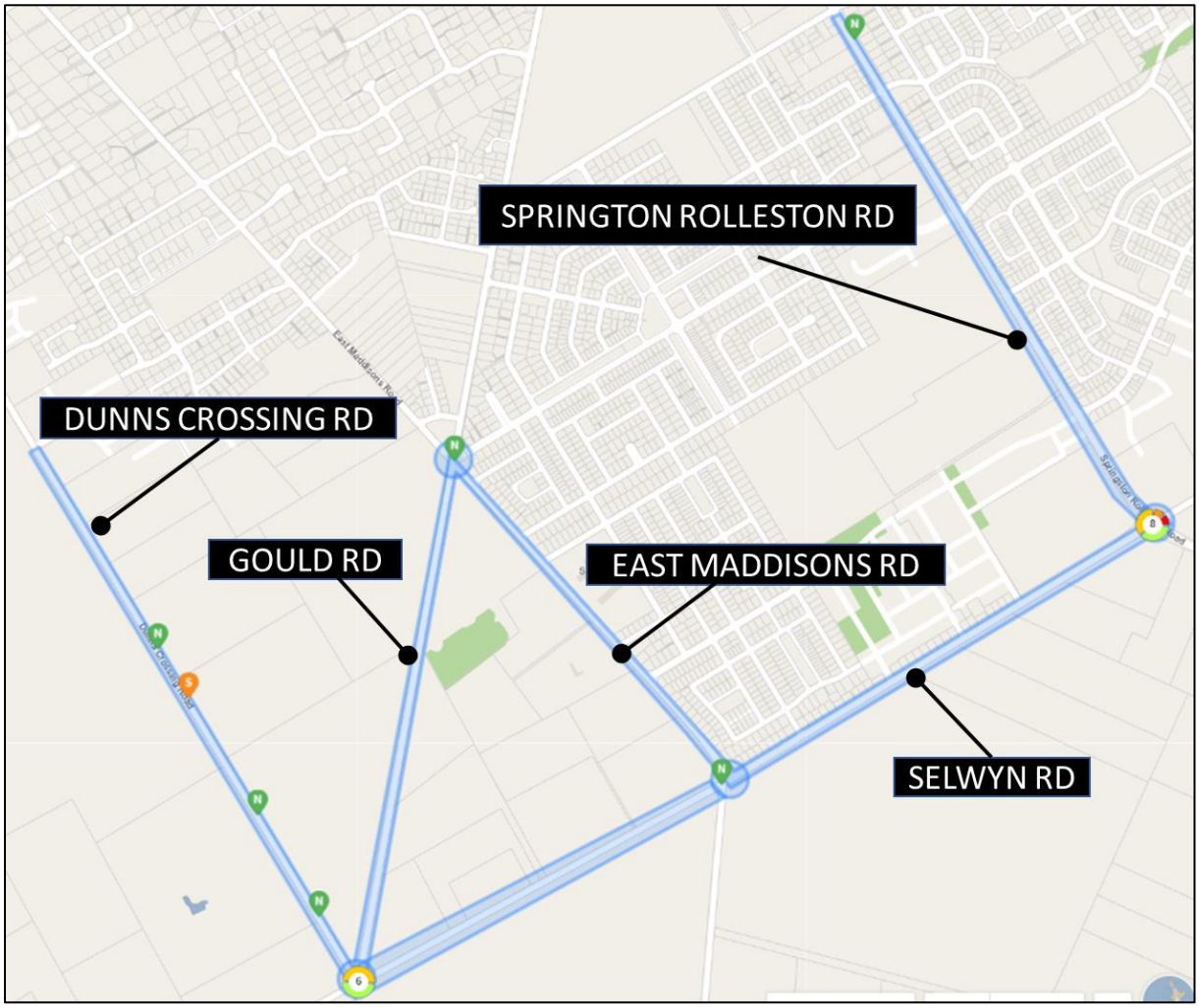
In total, 21 crash events were reported within the searched area. Most of the reported crashes occurred at intersections, with 5 incidents occurring at midblock sections.

Analysis of the data identified a crash trend at two of the intersections (Selwyn Rd/Springston Rolleston Rd and Selwyn Rd/Goulds Rd), where the drivers failed to adhere to stop signs and give-way to priority traffic. Half of these incidents have resulted in an injury of some kind and one instance resulted in a death.

The trends identified at the two intersections along Selwyn Road highlight existing safety concerns. Both intersections have upgrades planned in the near future, as noted in Section 2.2, which will likely address the safety of these intersections.

Reference can be made to Appendix A for a full breakdown of the CAS results and further analysis.

**Figure 16: Crash search area 2019-2022**




## 2.4 Public transport accessibility

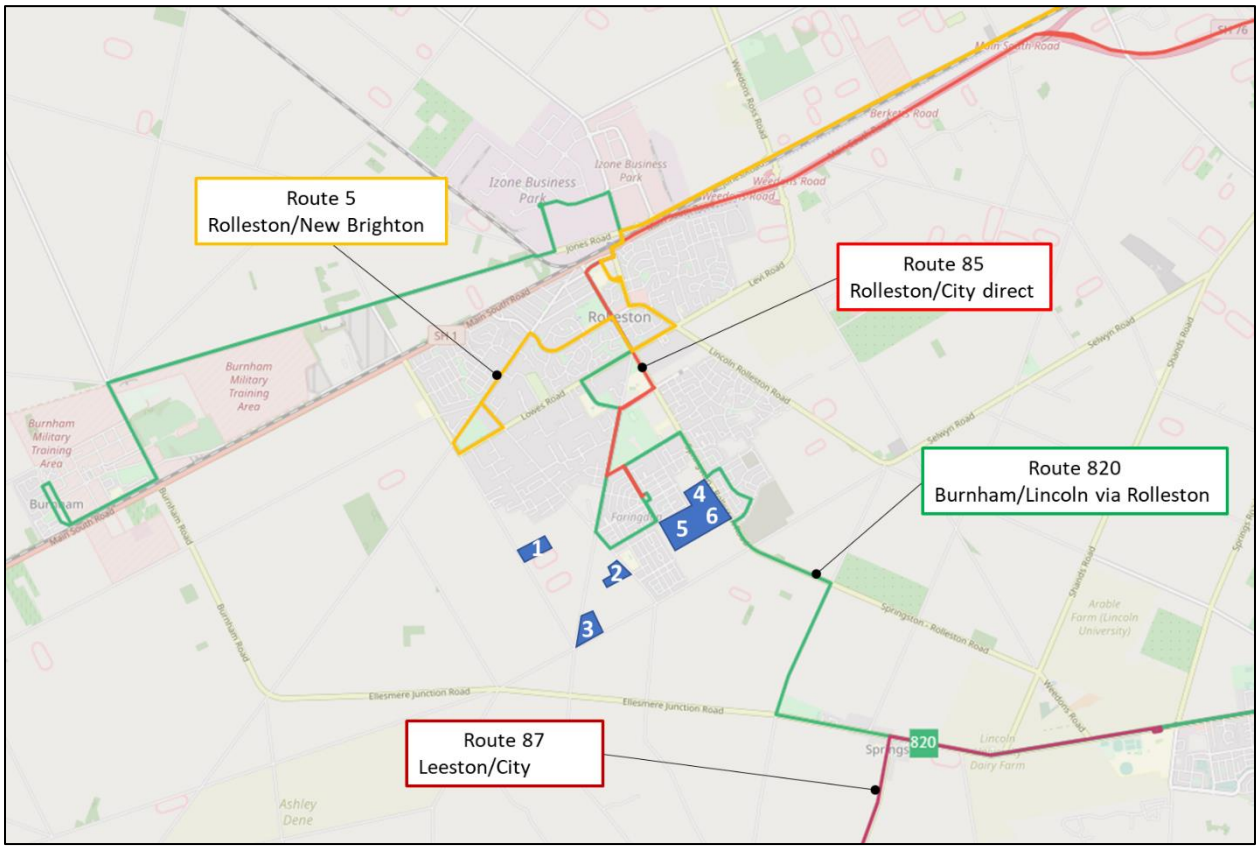
Rolleston is served by three regional bus routes (5, 85, 820) as shown in Figure 17. The existing bus routes provide connections from Rolleston to the following locations:

- New Brighton
- Christchurch City
- Burnham
- Lincoln
- Leeston.

The Route 5 service runs approximately twice an hour outside of peak periods, with frequent and express services during peak commuter periods. The 85 service runs at commuter times only, while the 820 service runs hourly.

Sites 2, 4, 5 and 6 are located in close proximity to existing bus stops for Route 820 and Route 85. Given the low existing development in the vicinity of the other Sites, it is expected that bus service operations will expand as development increases.

**Figure 17: Rolleston Regional Bus routes[3]**




## 2.5 Walking and cycling accessibility

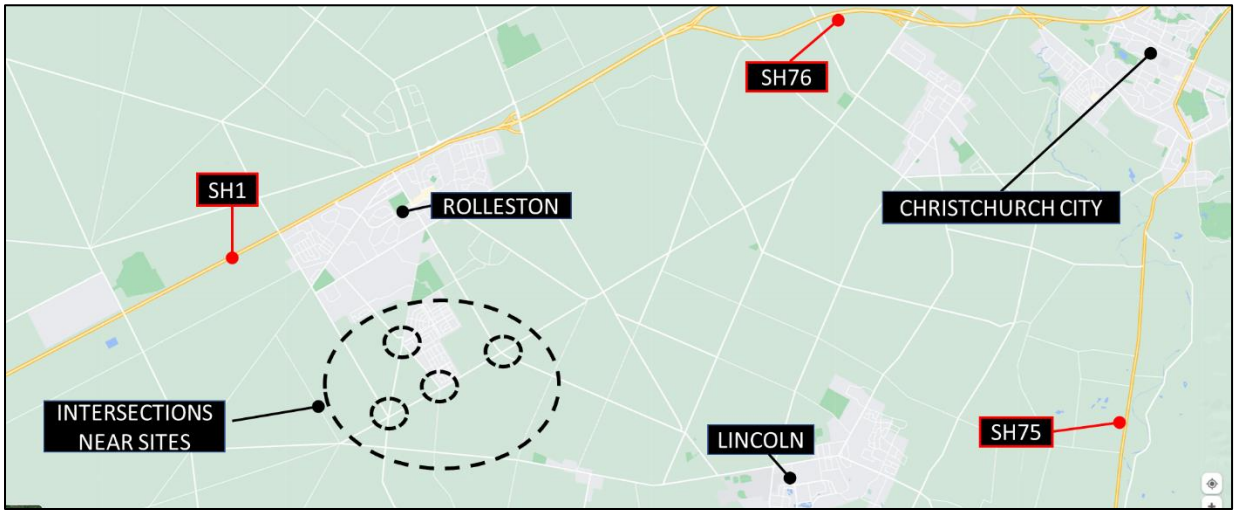
The existing walking and cycling facilities in the vicinity of the Sites are limited. Shared paths are however proposed as part of other proposed and approved Private Plan Changes in the area.

## 2.6 Private vehicle accessibility

Figure 18 shows the location of the proposed intersections in relation to the wider transport network. All sites are located within 5 km from several key collector roads and State Highway 1 and have good access to the wider transport network.

[3] Metro Go Website Network Map, accessed on 21 April2022 at https://go.metroinfo.co.nz/mtbp/en-gb/arrivals/content/routes

**Figure 18: Sites in relation to transport network**



# 3 OUR DISCUSSION OF THE FUTURE TRANSPORT ENVIRONMENT

This section discusses various funded and planned transport projects in Rolleston that have relevance to the Plan Change, along with other recent Private Plan Changes in Rolleston.

## 3.1 Transport projects in the Long Term Plan 2021 - 2031

Council has provided a list of transport projects within their Long Term Plan (LTP) that is considered relevant to this Plan Change, as shown in Table 1.

**Table 1: LTP transport projects relevant to this Plan Change**

| Project | Scheduled year | Description | Relevance to this Plan Change |
|---|---|---|---|
| Traffic Signals at Rolleston Drive/Tennyson Street | 2021/22 | Safety upgrade, including safer pedestrian crossing | Traffic generated by the Plan Change is expected to be less than 1% of the total flow through this intersection. The impacts are therefore unlikely to be significant from a traffic perspective.<br>The pedestrian crossing improvements will provide safer accessibility for pedestrians to the town centre, however, due to the distance of this project from the Sites, is unlikely to influence local pedestrian safety. |
| Foster Park - Park N Ride | 2023/24 | improved parking to access express bus services | The improved park and ride facilities will provide the Sites that currently do not have good linkages to public transport access to bus services operating from the Park N Ride. |
| Brookside Road/Rolleston Drive Roundabout | 2024/25 | Safety upgrade | Traffic generated by the Plan Change is expected to be less than 1% of the total flow through this intersection.<br>The impacts are therefore unlikely to be significant to this Plan Change from a traffic perspective but will improve the general road safety of the wider network. |

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|---|---|---|---|
| Springston Rolleston Road/Selwyn Road intersection | 2024/27 | Safety upgrade under National Land Transport Programme (Waka Kotahi) | The Plan Change is predicted to contribute some 12% of peak hour traffic movements in 2033, which we consider to be a significant proportion. |
| Lowes Road/Levi Drive/Masefield Drive Intersection Upgrade | 2025/26 | Upgrade to traffic signals | Traffic generated by the Plan Change is expected to be less than 1% of the total flow through these intersections and impacts are therefore unlikely to be significant to this Plan Change beyond the safety improvements to the wider network. |
| Tennyson/Moore Street Roundabout | 2026/27 | Safety upgrade as part of Moore Street extension | |
| Selwyn/Weedons Road Roundabout | 2027/28 | Safety upgrade - Rolleston southern arterial link | |
| Jones Road Cycleway | 2027/28 | Between Jones Road and Weedons Road - links to Rolleston to Templeton Cycleway | This will improve cycling connections from Rolleston to Templeton and will have a significant impact on this Plan Change, given that it is located within 10km of the Sites, which is considered a cyclable distance. |
| Lincoln Rolleston Road/Selwyn Road Intersection Upgrade | 2028/29 | Safety upgrade - Rolleston southern arterial link | The Plan Change is predicted to contribute some 3% of peak hour traffic movements in 2033, which we consider to be a minor proportion. This upgrade will help to address safety effects that would otherwise occur from the Plan Change. |
| Walkers Road/Two Chain Road Roundabout | 2028/29 | Safety upgrade - Rolleston Industrial Zone southern link | Traffic generated by the Plan Change is expected to be less than 1% of the total flow through this intersection. |
| Goulds/East Maddisons Road Roundabout | 2029/30 | Connects Farrington and new subdivisions to Goulds Road | The Plan Change is predicted to contribute some 10% of peak hour traffic movements in 2033, which we consider to be a significant proportion. |

| | | | |
|---|---|---|---|
| Rolleston to Burnham Cycleway | 2029/30 | From Elizabeth St to Aylesbury Road along the northside of SH1 and along Runners Road | This will provide better cycling accessibility to Burnham from Rolleston and is considered relevant to this plan change given that the cycleway is within 10km from the Sites which is considered a cyclable distance. |
| Rolleston 'Park N Ride' | 2030/31 | New facilities for parking to provide access to express bus services | Supports improved Public Transport access between Rolleston and Christchurch |
| Burnham School Road/Dunns Crossing Road Traffic Signals | 2032/33 | Project funded beyond the 2021-31 LTP | The Plan Change is predicted to contribute some 4% of peak hour traffic movements in 2033 |
| Rolleston South to Rolleston Industrial Zone Cycleway | 2033/34 | | Some relevance to this Plan Change, this is within 5km, which is cyclable distance |
| West Melton to Rolleston Cycleway | 2034/35 | | |
| Lowes Road/Dunns Crossing Road Roundabout | 2035/36 | | The Plan Change is predicted to contribute some 3% of peak hour traffic movements in 2033 |
| Burnham School Road Widening | 2042/43 | | Some relevance, however the Plan Change generates only 3% of peak hour traffic movements at the Burnham School Road/Dunns Crossing Road intersection in 2033 |

## 3.2 Transport projects in the New Zealand Upgrade Programme

The New Zealand Upgrade Programme (NZUP) projects in Canterbury are intended to manage growth effects by providing residents with safer and better travel choices, as well as improving freight links to support economic growth and the opening of the Christchurch Southern Motorway through to Rolleston. The NZ Upgrade Programme includes $300 million for six projects to support growth in the south-west sector of Christchurch and neighbouring Selwyn District. Projects relevant to this Plan Change are discussed in Table 2.

**Table 2: NZUP[4] transport projects relevant to this Plan Change**

| Project | Scheduled year | Description | Relevance to this Plan Change |
|---|---|---|---|
| SH1 Rolleston and Rolleston Flyover[5] | 2024/2026 | $125 million has been provided to create safer and better access from the residential area across State Highway 1 (SH1) and the Main South Line (railway) to the industrial zone. A new two-lane overbridge will be built to connect the two areas and provide improved walking and cycling facilities. It will cross SH1 from Rolleston Drive to Hoskyns Road. Four intersections along SH1 between Burnham and Rolleston will also be upgraded, with a range of safety improvements to reduce deaths and serious injuries and better manage the forecast future growth in traffic volumes along this section of the highway | Includes upgrade of SH1/Dunns Crossing Road, and potential changes to SH1/Rolleston Drive. There are identified safety issues with the SH1/Dunns Crossing Road intersection, and we therefore recommend that this upgrade be implemented before any development within Site 1 and 3 (refer to Table 6 for predicted traffic distribution). All other Sites are likely to generate minimal traffic movements through this intersection.<br>The 2033 Rolleston Paramics model assumes that the NZUP projects in Rolleston have been implemented, however the version of the model used for this report does not include the potential conversion of the SH1/Rolleston Drive intersection to a left in/left out. |

## 3.3 Other Plan Changes in Rolleston

There are several Private Plan Changes within Rolleston, which are shown in Figure 19 and summarised in Table 3. We have considered the cumulative effects of these Plan Changes in Section 6 of this ITA.

We note that subsequent to the completion of our assessment of effects, Council has advised us that

- 130 Dunns Crossing Road (4ha site) into this Plan Change will be withdrawn from this Plan Change and included within PPC70
- 606 Selwyn Road (1ha site) has been incorporated into this Plan Change.

We consider that the conclusions of our assessment are sufficiently robust to remain relevant in light of these changes.

**Figure 19: Rolleston Plan Changes, including the Sites for this Plan Change**


[4] NZUP Canterbury Package, available online https://www.nzta.govt.nz/planning-and-investment/nz-upgrade/canterbury-package/

[5] Rolleston flyover and transport improvements feedback form, July 2021, available online https://www.nzta.govt.nz/assets/projects/sh1-rolleston/SH1-Rolleston-flyover-and-transport-improvements-brochure.pdf

**Table 3: Summary of Rolleston Private Plan Changes**

| Plan Change number | Description | Status |
|---|---|---|
| PC64 | 969 residential lots | The plan change request was withdrawn at the request of the proponent on 5 November 2021. The requestor was successful in gaining consent to subdivide and develop the proposed land for housing under the COVID-19 Recovery (Fast-track Consenting) Referred Projects Order 2020. |
| PC70 | 800 residential lots plus commercial | Awaiting response to Council's request for further information issued 24 December 2020. |
| PC71 | 660 residential lots | Hearing held 9 - 10 February 2022. Interim recommendation of the Commissioner is that this plan change is approved in part |
| PC73 | 2100 residential lots plus commercial | Declined. Opportunity to appeal decision to Environment Court by 23 May 2022. |
| PC75 | 280 residential lots | No appeals received. Plan change to be included in Variation. |
| PC76 | 150 residential lots | No appeals received. Plan change to be included in Variation. |
| PC78 | 750 residential lots | No appeals received. Plan change to be included in Variation. |
| PC80 | Industrial lots | Publicly notified on 6 April 2022. Submissions close Monday 9 May 2022. |
| PC81 | 350 residential lots | Publicly notified on 6 April 2022. Submissions close Monday 9 May 2022. |
| PC82 | 1320 residential lots | Publicly notified on 6 April 2022. Submissions close Monday 9 May 2022. |

# 4 ACCESSIBILITY ASSESSMENT OF THE PLAN CHANGE

This section discusses the accessibility of the Plan Change, considering the existing and future transport environment.

## 4.1 Active modes accessibility

While pedestrian and cycling facilities are presently very limited near the sites as a developing urban area, it is expected that walking and cycling accessibility will improve as urbanisation occurs. This will include:

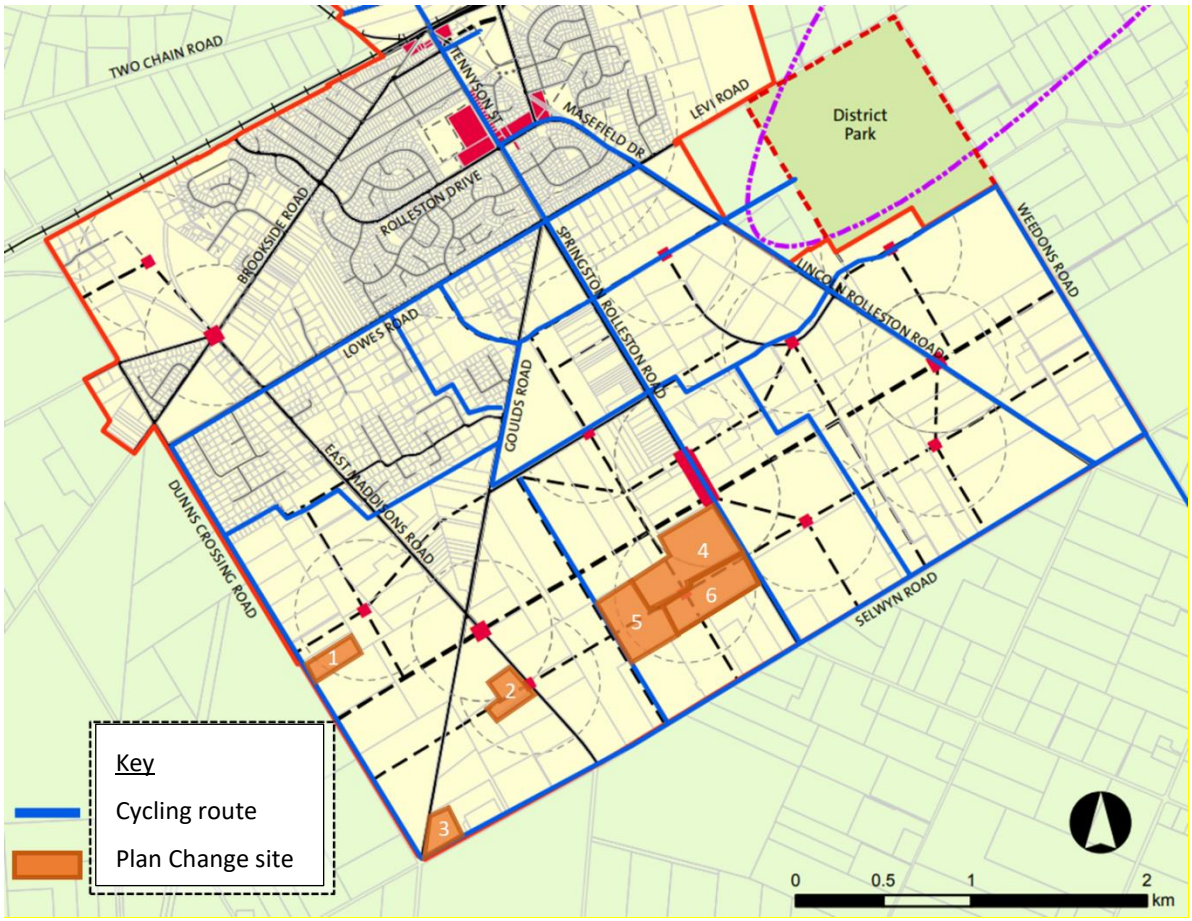
- Footpaths on roads internal to the sites, including connections to the existing road network and adjacent future urban developments
- Cycle facilities provided within Sites 4 to 6, as discussed in Section 1.2
- Walking and cycling facilities planned as part of Plan Change 70, and consented as part of Faringdon Southwest and Faringdon Southeast (formerly Plan Change 64)
- Road frontage upgrades to Dunns Crossing Road, Selwyn Road and Springston Rolleston Road, which will include cycle facilities.

The Selwyn District Walking and Cycling Strategy[6] places further emphasis on providing multi-modal options for the growing residential developments. The Rolleston Structure Plan: Movement Network[7] provides an indication of the long-term intent for cycling routes in Rolleston, as shown in Figure 20. This indicates that most sites will have good accessibility to cycling networks.

[6] https://www.selwyn.govt.nz/__data/assets/pdf_file/0016/14371/090923-08-MovementNetwork.pdf - accessed 02/05/2022

[7] Rolleston Structure Plan: Movement Network, accessed 03/05/22, available online at https://www.selwyn.govt.nz/__data/assets/pdf_file/0016/14371/090923-08-MovementNetwork.pdf

**Figure 20: Rolleston Structure Plan: Movement Network – cycleway routes, showing Plan Change Sites**




## 4.2 Public transport accessibility

As noted in Section 2.4, 4 of the 6 Sites are already connected to the existing public transport network. Through the implementation of the two planned Park N Ride upgrade projects within Rolleston, it is considered that all Sites will have good linkages to public transport in the long term. The Regional Public Transport Plan 2018 – 2028 also sets out a strategy to provide more public transport linkages between Rolleston and the Christchurch CBD through the cross-town public transport link with Lincoln.

## 4.3 Private vehicle accessibility

As noted in Section 2.6, the existing road network provides good access to the wider transport network for private vehicles. This access will be further improved with the planned intersection upgrades, which will improve the safety of the networks in close proximity to the Sites.

# 5 ASSESSMENT OF TRAFFIC EFFECTS

We have undertaken an assessment of the traffic effects to determine the impact of the Plan Change on the surrounding traffic environment. The base traffic volumes and trip distribution were estimated from the existing Rolleston Paramics model. SIDRA models were developed to assess the operation of key intersections near the Sites, with and without the proposed plan change.

## 5.1 Trip generation

The anticipated traffic generation associated with each plan change site is summarised in Table 4 below. We have assumed that the Sites will have a density of 12 dwellings per hectare and each household will generate 0.9 private vehicle trips in both the morning and evening peak hours. We note that these assumptions are consistent with other plan changes in Rolleston. This yield reflects existing development within the area, and exceeds the minimum yield of 10 dwellings per hectare adopted in Change 1 to Chapter 6 of the CRPS.

**Table 4: Traffic Generation Assumptions - Morning and Evening Peak hour**

| Site | Area (Ha) | Dwellings | Trip Rate (vehicle trips per dwelling) | Predicted Traffic Demands (vph) |
|---|---|---|---|---|
| 1 | 4 | 48 | 0.9 | 43 |
| 2 | 4 | 48 | 0.9 | 43 |
| 3 | 4 | 48 | 0.9 | 43 |
| 4 | 16 | 192 | 0.9 | 173 |
| 5 | 11.5 | 138 | 0.9 | 124 |
| 6 | 10.7 | 128 | 0.9 | 116 |
| Total Demands | | | | 542 |

The following inbound/outbound split assumptions have been applied to the predicted traffic demands above, based on the directional distribution of single-family detached housing trips reported in the Institute of Transport Engineers (ITE) Trip Generation Guide.

**Table 5: Directional distribution of traffic demands**

| Peak | AM Peak | | PM Peak | |
|---|---|---|---|---|
| Direction | Arrivals | Departures | Arrivals | Departures |
| Split | 25% | 75% | 63% | 37% |

## 5.2 Trip distribution

The predicted distribution of the traffic demands for each site have been based on select link analysis obtained from the Rolleston Paramics model. The model was originally developed by

Abley and it has been used to inform various plan changes proposed in the Rolleston area. The select link results have been obtained from the model that includes the proposed plan changes listed in Table 3 above.

The Sites have been grouped into 4 'blocks' based on their locations/access points to the network and a nearby existing zone has been selected for each block to understand their likely traffic distribution. Three separate select link plots have been provided for Sites 1, 2 and 3 while another select link plot has been used for Sites 4, 5 and 6 collectively, due to their proximity to each other. Table 6 provides a summary of the predicted traffic distribution for each block.

**Table 6: Predicted traffic distribution based on select link analysis**

| **Sites** | Dunns Crossing Rd North | Selwyn Road East | Selwyn Road West | CRETS Collector Rd East | Goulds Road North | Springston Rolleston Road South | Total |
|---|---|---|---|---|---|---|---|
| 1 | 55% | 9% | <1% | 12% | 17% | 6% | 100% |
| 2 | 7% | 8% | <1% | 41% | 38% | 6% | 100% |
| 3 | 24% | 25% | 10% | 0% | 41% | <1% | 100% |
| 4, 5 and 6 | 13% | 30% | 11% | 19% | 12% | 15% | 100% |

## 5.3 Intersection assessments

We have assessed the following intersections using SIDRA traffic modelling software

- Dunns Crossing Road / Selwyn Road / Goulds Road
- Shillingford Boulevard (CRETS Collector) / Goulds Road (future intersection)
- CRETS Collector / Dunns Crossing Road (future intersection)
- Selwyn Road / East Maddisons Road
- Selwyn Road / Springston Rolleston Road.

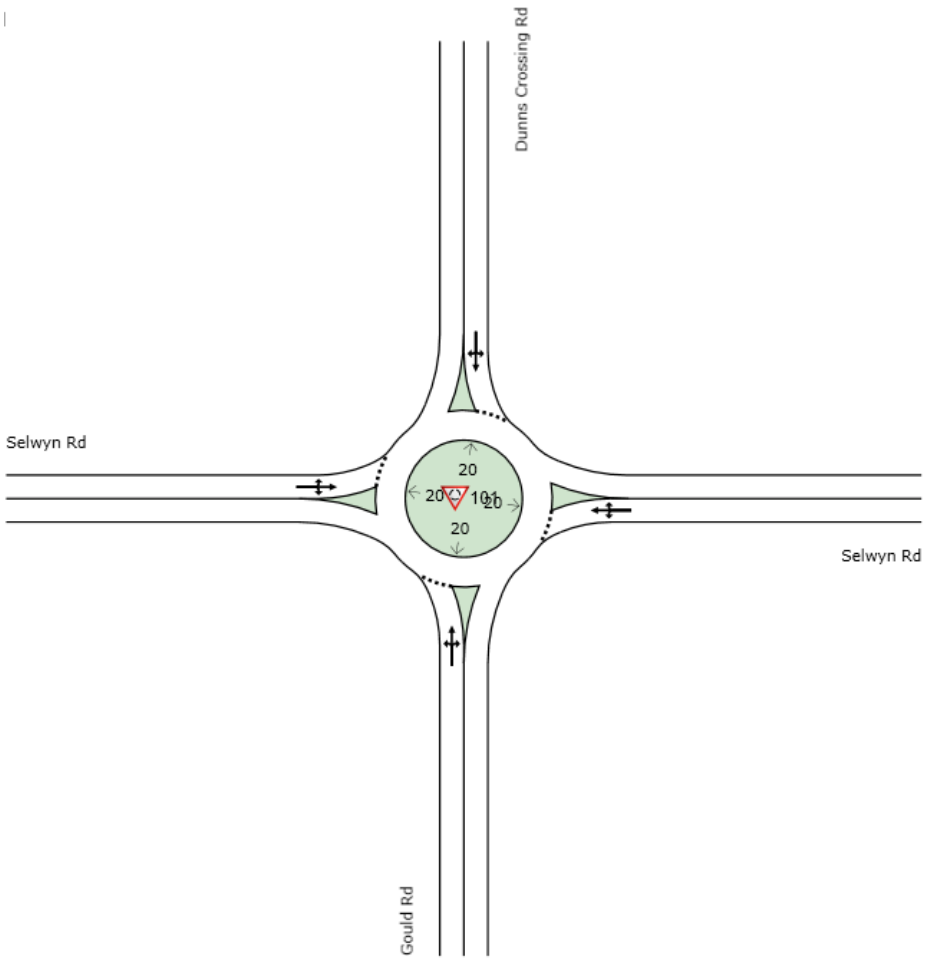
These intersections have been assessed for the morning and evening peak hours. Two scenarios have been assessed with the same intersection layout but different traffic volumes

- Base scenario – traffic volumes without the plan change, based on the traffic demands obtained from the 2033 Rolleston Paramics model. This scenario assumes that the Plan Change sites remain as rural zoning
- Plan Change scenario – traffic volumes with the Plan Change, as described in Section 5.1.

### 5.3.1 Dunns Crossing Road / Selwyn Road / Goulds Road

As discussed in Section 2.2.1, the intersection has been proposed to be upgraded to a roundabout in the future, with Goulds Road being realigned further north to intersect with Dunns Crossing Road only. The modelled layout for this intersection is shown in Figure 21.

**Figure 21: SIDRA modelled layout – Dunns Crossing Road / Selwyn Road / Goulds Road**




A summary of the predicted intersection operation is as follows:

- The overall intersection performance is expected to be LOS A in both morning and evening peaks, both for the Base Case and Plan Change scenarios
- The most congested movement is the right turn movement on the Gould Road approach during the evening peak hour, which is predicted to operate at LOS B for the Base Case and Plan Change scenarios
- The Plan Change is expected to have minimal effect on delays at the intersection, and minimal effect on queueing at the intersection.

### 5.3.2 Shillingford Boulevard (CRETS Collector) / Goulds Road (future intersection)

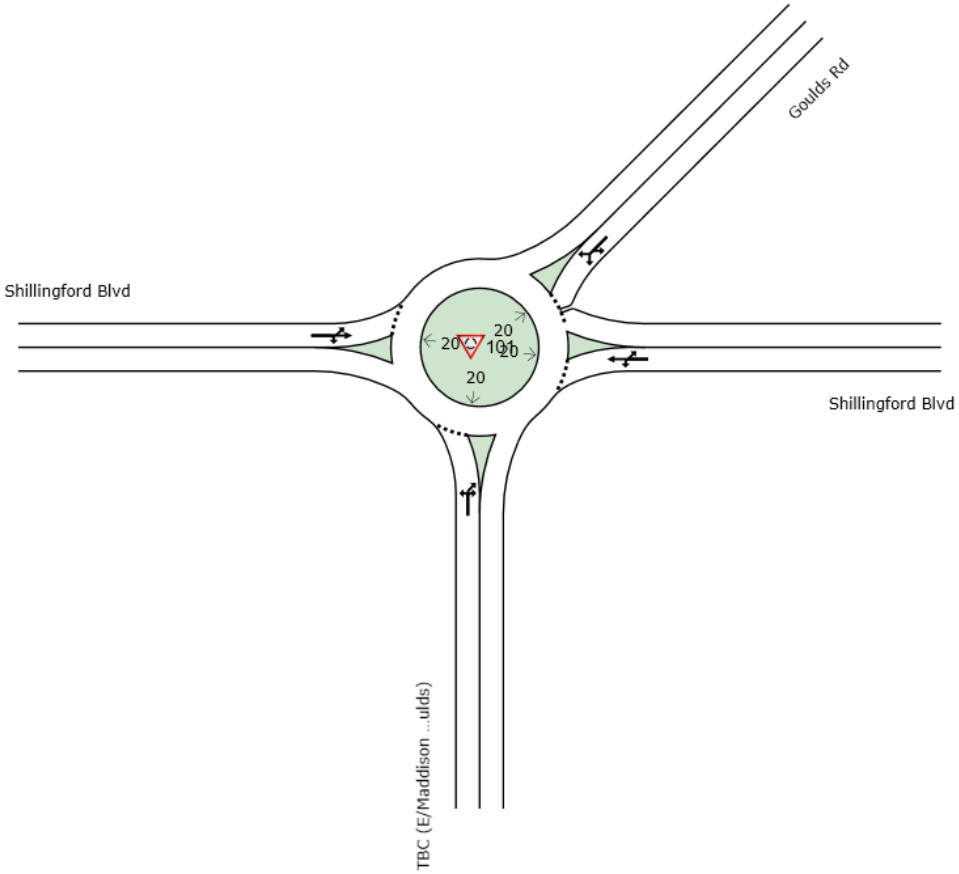
It is proposed that the intersection will be formed by extending the existing Shillingford Boulevard further west to both Dunns Crossing Road and Goulds Road. A roundabout layout has been proposed for the intersection and the modelled layout is shown in Figure 22.

A summary of the predicted intersection operation is as follows:

- LOS A is predicted for the intersection in the morning peak under both scenarios, with LOS B predicted for the right turn movements of both Shillingford Boulevard approaches

- Similarly for the evening peak, the intersection is predicted to operate with LOS A, and with LOS B predicted for the right turn movement on the Shillingford Boulevard east approach.

**Figure 22: SIDRA modelled layout – Shillingford Boulevard (CRETS Collector)/Goulds Road**



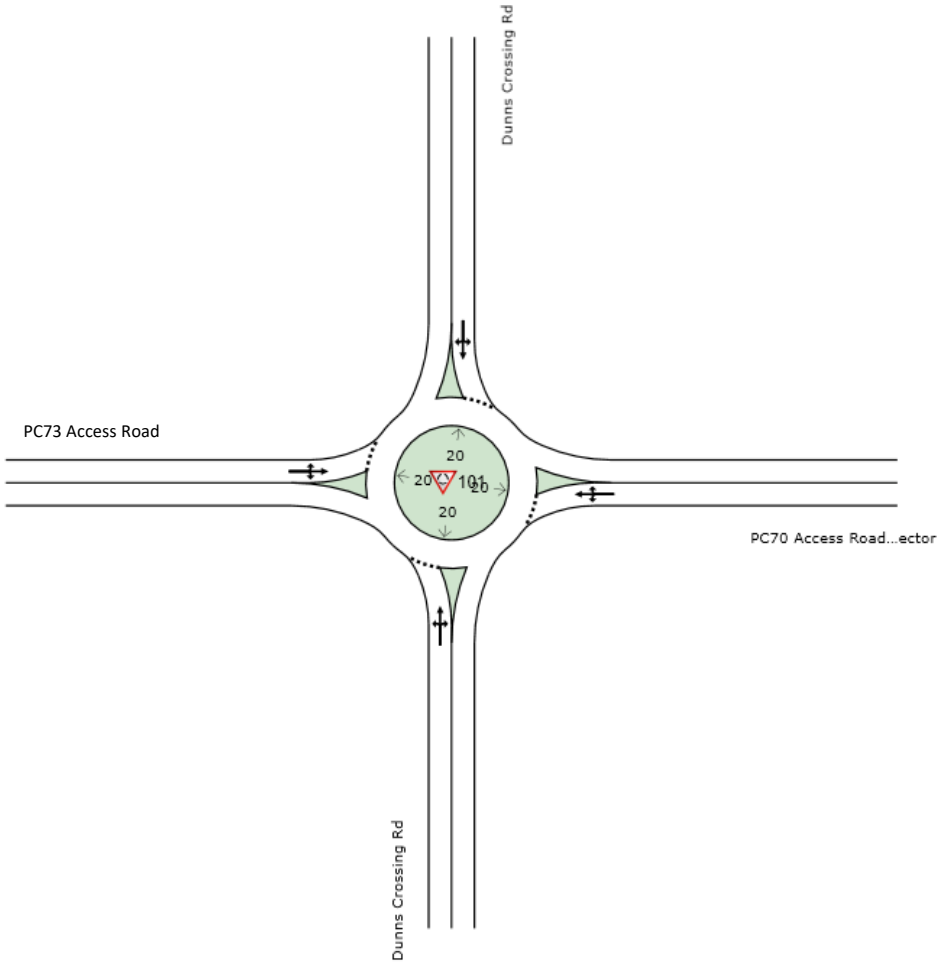

### 5.3.3 CRETS Collector / Dunns Crossing Road (future intersection)

We have assumed that this future intersection will be developed as a roundabout, as part of Plan Change 70. The modelled layout is presented in Figure 23. We note that the PPC73 access road, proposed in the PPC73 ODP, does not align directly with the CRETS Collector through PPC70. However, we consider that this can be addressed independently from this Plan Change, and this does not affect our conclusions in this report.

A summary of the predicted intersection operation is as follows:

- It is predicted that the intersection will operate with LOS A in both morning and evening peaks under both scenarios.

**Figure 23: SIDRA modelled layout – CRETS Collector/Dunns Crossing Road**



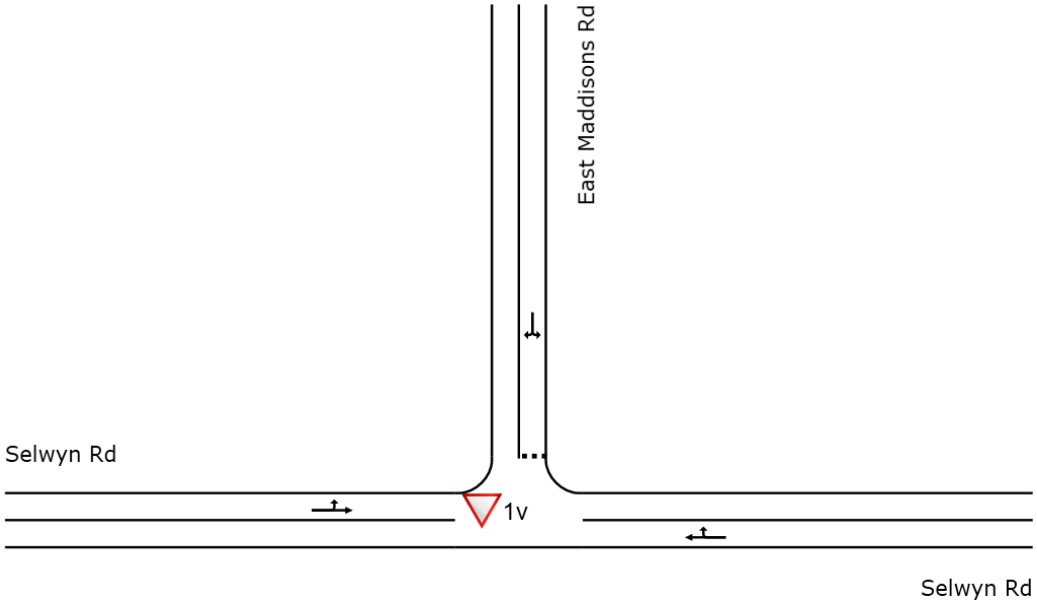

### 5.3.4 Selwyn Road / East Maddisons Road

It is proposed that the intersection will retain its existing layout. The modelled layout is shown in Figure 24.

A summary of the predicted intersection operation is as follows:

- The intersection is forecasted to operate adequately for both daily peaks, with an intersection LOS A
- LOS B and C is predicted for the right turn movement into East Maddisons Rd for the morning and evening peaks, respectively.

**Figure 24: Sidra modelled layout – Selwyn Road/East Maddisons Road**




### 5.3.5 Selwyn Road / Springston Rolleston Road

As discussed in Sections 2.2.4 and 3.1, we understand that this intersection is planned to be upgraded to a roundabout with a single circulating lane. The modelled layout and the predicted intersection performance is provided as follows:

- For the morning peak, the intersection is predicted to operate with LOS A and B for the base scenario (existing volume counts) and development scenario respectively
- For the evening peak, the intersection will operate with LOS C, and LOS F for the base and development scenario, respectively
- The LOS F for the development scenario is identified as occurring at the Springston Rolleston Rd south approach with a queue slightly surpassing 760 metres

To remedy the above performance issue, an alternative layout of the intersection has been assessed which retains the proposed layout with the addition of a short left turn lane on the Springston Rolleston Road south approach, as indicated in Figure 26. We note that

- LOS B is still predicted for the intersection in the morning peak
- For the evening peak, the Springston Rolleston Road south approach is predicted to operate with LOS B, which is considered satisfactory.

However, following discussions with Council staff we understand that an existing pump station on the south western quadrant of the intersection may limit the ability to provide a short left turn lane. We recommend that Council further investigate effects at this intersection, as part of a wider reassessment of network performance as a result of land use changes within Rolleston that may eventuate as a result of the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act (2021).

**Figure 25: SIDRA modelled layout – Selwyn Road/Springston-Rolleston Road (proposed layout with single approach lanes)**

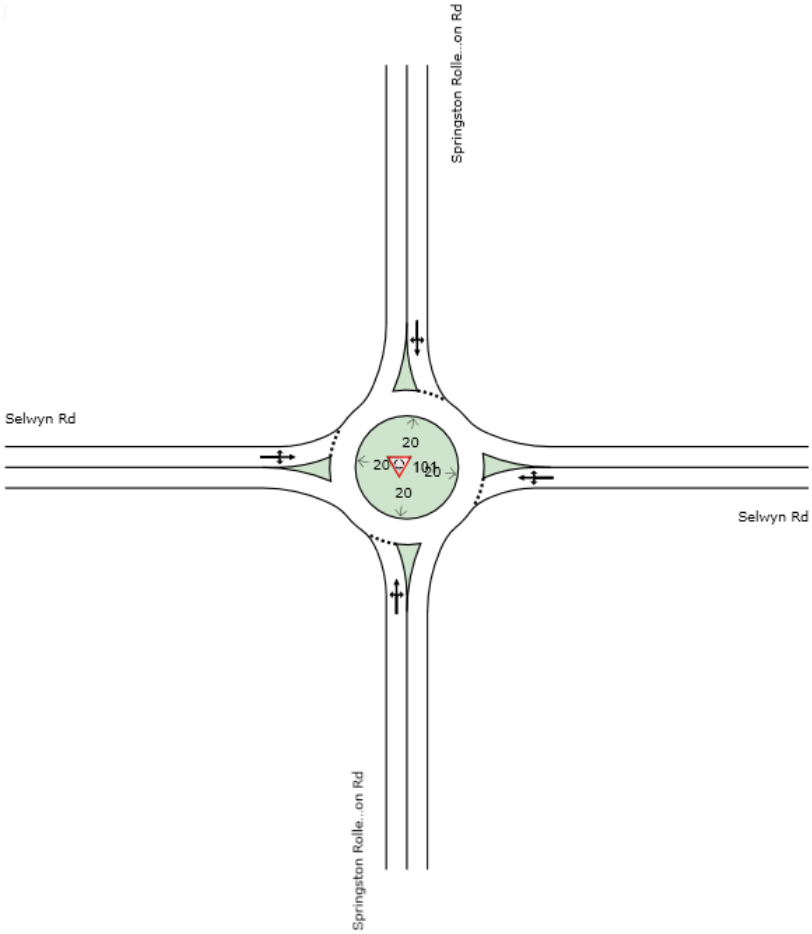
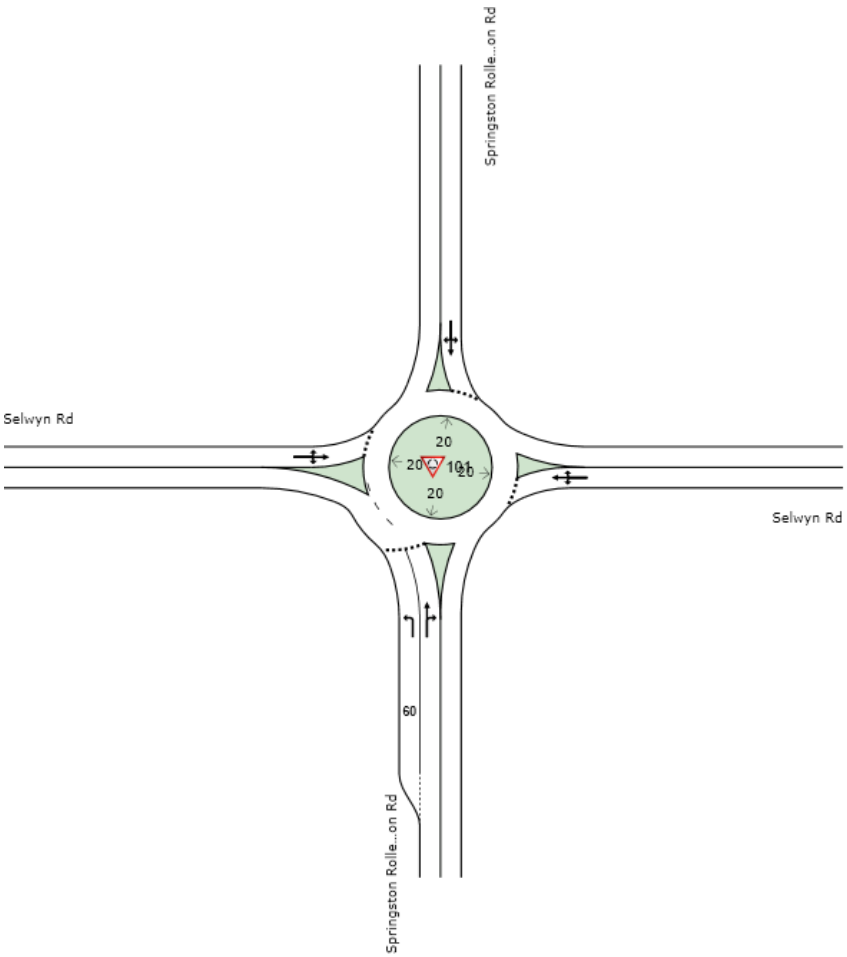


**Figure 26: SIDRA modelled layout – Selwyn Road/Springston-Rolleston Road (alternative layout)**




## 5.4 Modelling conclusions

Table 7 below is the summary of the performance of all the intersections for both peak hours and scenarios. A full SIDRA report for each scenario and intersection can be found in Appendix B.

**Table 7: Overall intersection performance summary (delays, level of service)**

| Intersection | Base Model | | Model with Plan Change | |
|---|---|---|---|---|
| | AM Peak | PM Peak | AM Peak | PM Peak |
| Dunns Crossing Road/Selwyn Road/Goulds Road | 5 s, LOS A | 5 s, LOS A | 5 s, LOS A | 5 s, LOS A |
| Shillingford Boulevard/Goulds Road | 6 s, LOS A | 6 s, LOS A | 7 s, LOS A | 6 s, LOS A |
| CRETS Collector/Dunns Crossing Road | 5 s, LOS A | 5 s, LOS A | 5 s, LOS A | 5 s, LOS A |
| Selwyn Road/East Maddisons Road | 2 s, LOS A | 3 s, LOS A | 2 s, LOS A | 3 s, LOS A |
| Selwyn Road/Springston-Rolleston Road – planned layout | 7 s, LOS A | 24 s, LOS C | 12 s, LOS B | 86 s, LOS F |

| | | | |
|---|---|---|---|
| Selwyn Road/Springston-Rolleston Road – alternative layout | N/A | 12 s, LOS B | 13 s, LOS B |

The modelling indicates that most intersections are predicted to have an overall LOS A – LOS B and with very modest delays for both peak hours and scenarios. The Selwyn Road / Springston Rolleston Road intersection is indicated to perform at LOS E or F for the worst movement with the proposed layout. These performance issues can be resolved by providing a dedicated left turn short lane on the Springston Rolleston Road south approach.

Based on this analysis, we recommend that

- The SH1/Dunns Crossing Road intersection is upgraded to a roundabout before any development occurs within Sites 1 and 3 (refer to Section 3.2)
- The Dunns Crossing Road/Selwyn Road/Goulds Road is upgraded to a roundabout before any development occurs within Sites 1, 2 and 3 (refer to Section 3.1)
- The Selwyn Road/Springston-Rolleston Road intersection is upgraded to a roundabout, with a separate short left turn lane on the Springston Rolleston Road south approach, before any development occurs within Sites 1 – 6 (refer to Section 3.1 and Section 5.3.5).

## 5.5 Traffic safety effects

We consider that safety effects on the adjacent transport network can be managed as the surrounding landuses transition to an urban environment, and existing roads are progressively upgraded to an urban form. Our recommendations in Section 5.4 along with the ODPs are adequate address safety effects on the adjacent transport network, at a Plan Change level.

The Rolleston Paramics model indicates that the future development within the Plan Change Sites will rely on Selwyn Road as a key route between Rolleston and Christchurch. Council has identified safety concerns with the operation of the Selwyn Road/Lincoln Rolleston Road and Selwyn Road/Weedons Road intersections, and is progressing a project to upgrade these intersections to roundabouts – to improve both the safety and efficiency.

We recommend that the Selwyn Road/Lincoln Rolleston Road and Selwyn Road/Weedons Road intersections are upgraded to roundabouts before any development occurs within Sites 1 – 6, to mitigate potential safety effects.

# 6 WIDER TRAFFIC EFFECTS

Flow has considered the outputs from two area wide transport models, in context to this Plan Change. We discuss these models in the following subsections.

## 6.1 Rolleston Paramics Model

Flow has acted as Council's transport expert for multiple Private Plan Changes within Rolleston. In this role we have reviewed several iterations of outputs from the 2033 Rolleston Paramics Model. This model was developed by Abley, on behalf of Council, and has been updated several times by various requestors of the multiple Private Plan Changes within Rolleston.

The 2033 Rolleston Paramics model identifies that the following intersections will be operating near to or over capacity by 2033 if all Private Plan Changes, discussed in Section 3.3, within Rolleston proceed

- SH1/Weedons Interchange South roundabout
- Lowes Road/Broadlands Drive priority intersection
- Levi Road/Ruby Drive priority intersection
- Levi Road/Strauss Drive priority intersection
- Levi Road/Weedons Road priority intersection
- Selwyn Road/Lincoln Rolleston Road priority intersection with seagull treatments
- Jones Road/Weedons Road roundabout.

Consistent with our recommendations when acting as Council's transport expert for the multiple Private Plan Changes, we consider that any upgrades to these intersections should be led by Council, and that that Development Contributions should be leveraged from Plan Change sites on a proportional basis relative to the level of traffic that each respective Plan Change sites contributes during peak hours.

As such, we consider that further assessment of the wider traffic effects of this Plan Change is not needed from an effects assessment perspective. We recommend that, separate to this Plan Change process, Council progress further assessment of these intersections in terms of improvements and funding mechanisms.

## 6.2 QTP Report

Helpfully, and independently to the multiple Private Plan Changes within the Selwyn District, Council has engaged QTP to assess the transport effects of two future land use scenarios for Selwyn District. The QTP report is attached as Appendix C.

The QTP analysis compares two future growth scenarios

- Scenario 1 (2038): growth in Selwyn based on forecasts agreed by Greater Christchurch Partnership Committee for households, population, and employment.
- Scenario 2 (2038): Scenario 1 plus an additional 10,000 dwellings (Selwyn District only), without any changes to employment, or any changes to households in Christchurch or Waimakariri. These households were added into the model to approximate the multiple Private Plan Changes for rezoning that have been lodged with Selwyn Council.

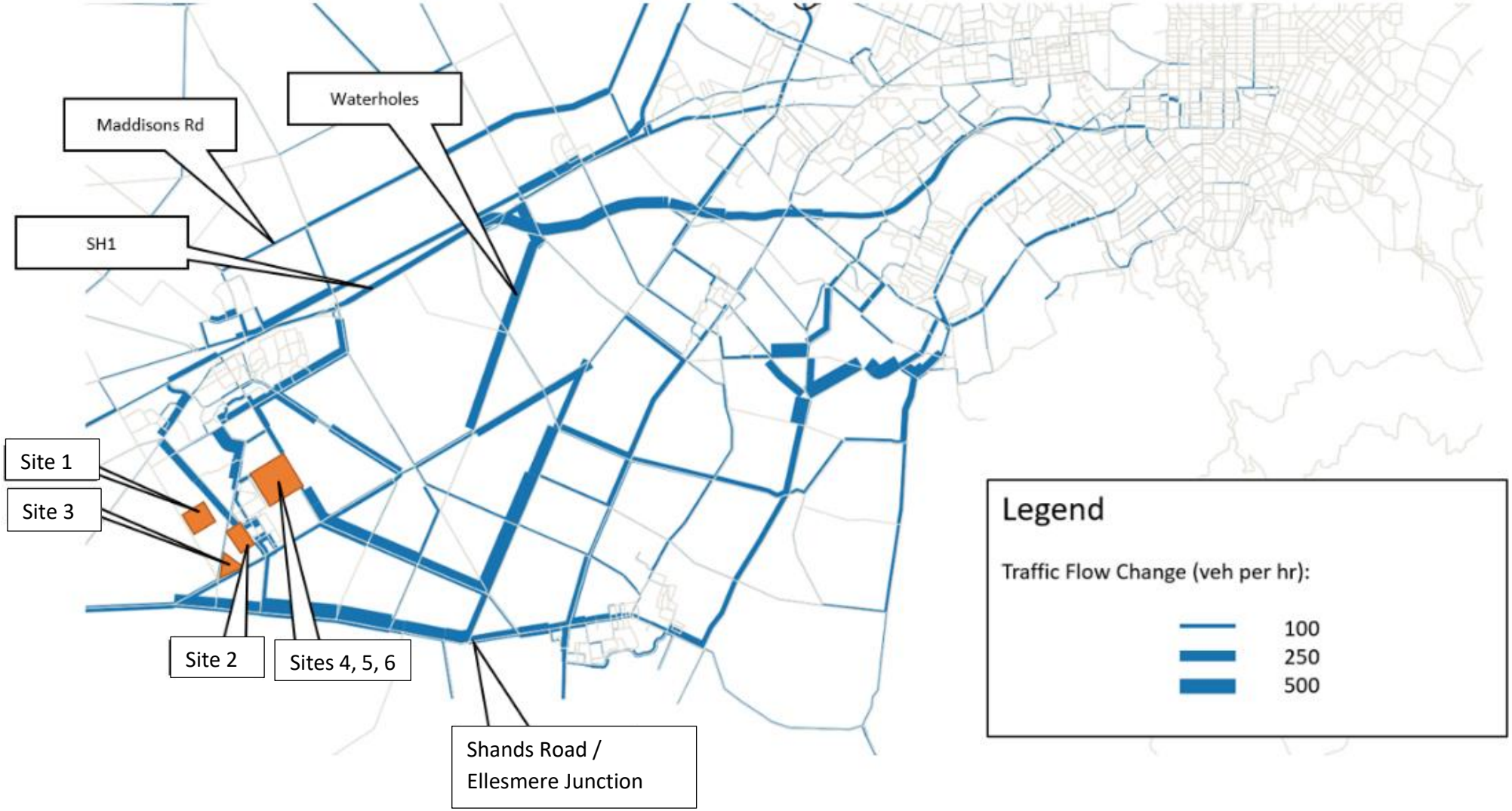
QTP found that

- Travel patterns in both Scenarios are indicated to remain similar to 2021, but with an increased magnitude proportional to population increase (increase of around 32% of peak hour trips)
- There will be high demand between Selwyn and Christchurch, with approximately 50% of Selwyn's peak hour trips starting or finishing in Christchurch, with trips distributing across available corridors between the two Districts
- For both Scenarios limited increases in traffic flows are indicated on some commuter routes (such as Springs Road and Shands Road, due to downstream constraints in Christchurch) resulting in other routes seeing a higher increase in traffic (such as SH1, East Maddisons Road, Lowes Road, and Waterholes Road)
- For both Scenarios, more than 90% of peak hour trips are indicated to be by private vehicle
- Figure 27 plots the difference in Scenario 2 peak hour traffic flows compared with Scenario 1.

In summary

- Should this Plan Change affect the quantum of residential growth within Selwyn, without a corresponding increase in local employment and access to services, additional impact on the Greater Christchurch transport network can be expected as additional residents in Selwyn travel to access services and employment
- However, the wider area effects of this Plan Change will not be overly apparent in a macro scale regional traffic model. As the vehicle movements generated by this Plan Change distribute across the wider transport network, they become a smaller and smaller proportion of the total trips on the network.
- We are therefore of the view that, while the Plan Change will have effects on the wider transport, these effects (including cumulative effects of other Plan Changes) are more appropriately addressed at by Council as part of the overall growth in the District.

**Figure 27: Indicative changes in AM traffic flows, Scenario 2 vs Scenario 1**



# 7 DISCUSSION OF RELEVANT PLANS AND POLICIES

Local and regional transport plans and policies that are relevant to the Proposal include

- Canterbury Regional Land Transport Plan 2021 – 2031[8]
- Canterbury Regional Public Transport Plan 2018 – 2028[9]
- Proposed Selwyn District Plan.

We discuss these in further detail below, and in summary we consider that the Plan Change is consistent with the transport related objectives and policies of these documents.

## 7.1 Canterbury Regional Land Transport Plan 2021 – 2031

The Canterbury Regional Land Transport Plan 2021 – 2031 details objectives to achieve the vision to "Provide all transport users with sustainable options that move people and freight around and through our region in a safe and efficient way that enables us to be responsive to future challenges". These objectives include

- Better freight transport options
- Reduced harm - fewer deaths and serious injuries on our roads
- Mode shift – sustainable transport choices (mode shift) with reduced negative environmental and health impacts
- Shared prosperity - a network that facilitates shared prosperity across our region (economic, social, environmental and cultural)
- Reliable and consistent journeys - a transport network with options that facilitate reliable and consistent journey times
- Resilience - a resilient transport network that can better cope with unknown stresses, natural disasters and climate change impacts
- Number of deaths and serious injuries on Canterbury's roads - 40% reduction in deaths and serious injuries
- Greenhouse gas emissions from land transport in Canterbury - 30% reduction in greenhouse gas emissions from land transport in Canterbury
- Tonnage of freight moved by rail in Canterbury - 100% increase in tonnage of freight moved by rail in Canterbury.

The Proposal and associated ODPs will enable the above objectives through the provision of development sites that are well connected by multiple transport modes.

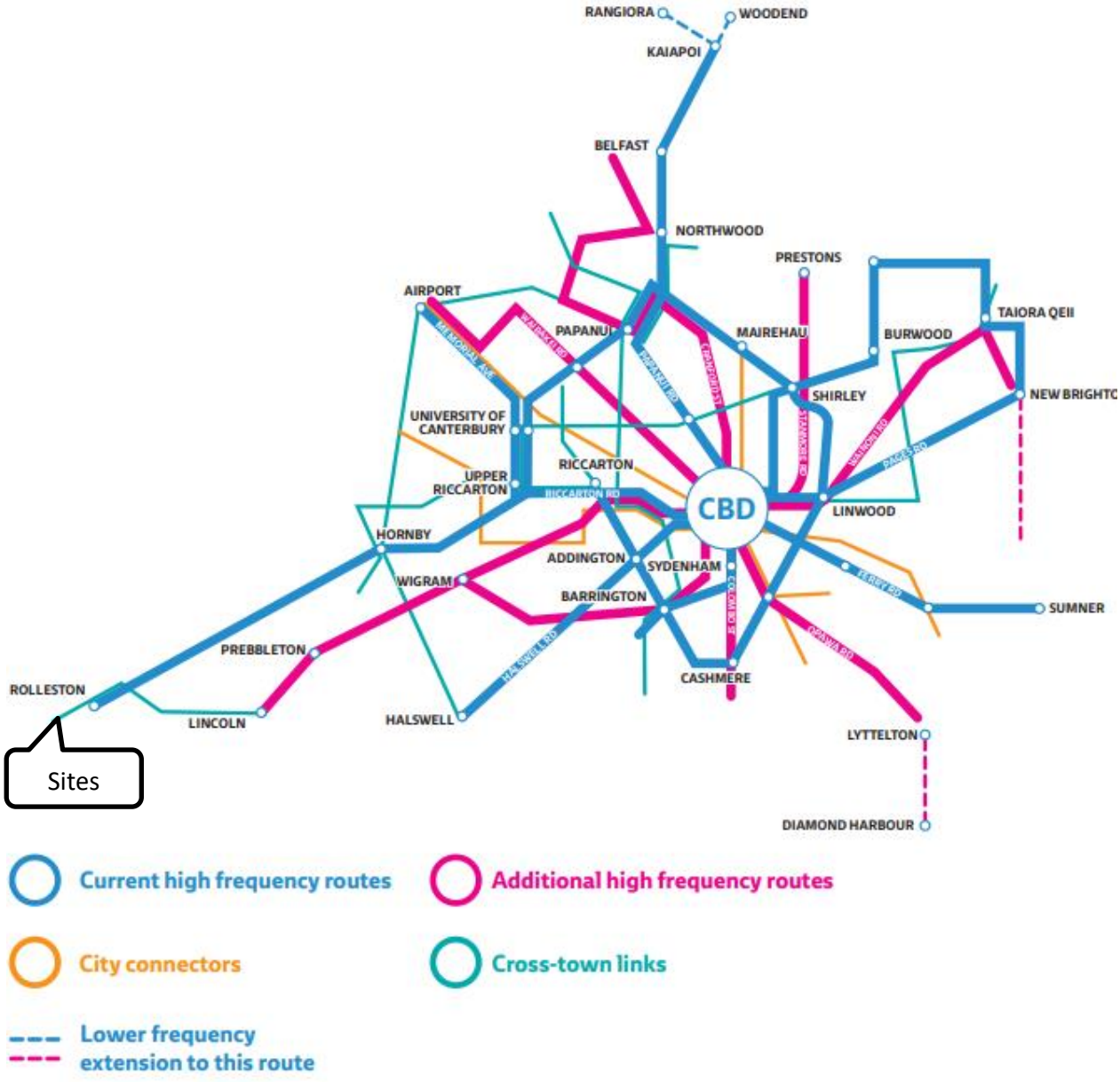
[8] Canterbury RLTP, available online at https://www.ecan.govt.nz/document/download?uri=4149803
[9] Canterbury RPTP, available online at https://www.ecan.govt.nz/document/download?uri=3582320

## 7.2 Canterbury Regional Public Transport Plan 2018 – 2028

The Canterbury Regional Public Transport Plan 2018-2028 (RPTP) sets out Environment Canterbury's objectives and policies for delivering public transport in Canterbury. A key aspect of the RPTP is Figure 8.1 (reproduced below in Figure 28), which identifies the anticipated future public transport network.

Figure 28 shows that Rolleston will be well connected to future high frequency routes through the cross-town linkage with Lincoln, further expanding on the existing public transport connections to neighbouring urban areas.

**Figure 28: RPTP Figure 8.1 proposed public transport network structure**




## 7.3 Proposed Selwyn District Plan (as notified)

Commentary on how this Plan Change relates to applicable objectives and policies of Transport Chapter of the Proposed Selwyn District Plan is provided in Table 8.

**Table 8: Proposed Selwyn District Plan - Part 2 Transport objectives**

| Objective / Policy | Commentary |
|---|---|
| TRAN-01 –<br>People and places are connected through safe, efficient, and convenient land transport corridors and land transport infrastructure which is well integrated with land use activities and subdivision development | The proposed road and transport infrastructure will provide safe and efficient travel options for communities |
| TRAN-02 –<br>Land Transport corridors and land transport infrastructure are protected from incompatible land use activities and subdivision development | The proposal seeks to support major land transport corridors through internal roading provisions |
| TRAN-03 –<br>Land Transport corridors and land transport infrastructure supports the needs of people and freight, while ensuring adverse effects on the surrounding environment from their establishment and operation are managed | This report demonstrates that the adverse effects from future development are managed. |
| Tran P1 –<br>The safety and efficiency of the District's land transport network and systems are enabled through integrated land use and subdivision development that:<br>1. Manages the levels of service, formation standards and the types of land transport corridors and land transport infrastructure, including through the network road classifications and compliance with the design and operational standards;<br>2. Provides land transport infrastructure that is consistent with the form, function, and character of each zone;<br>3. Ensures there is enough space within land transport corridors to support the efficient and effective operation of network utilities;<br>4. Provides for the safe and efficient movement and operation of emergency services; and<br>5. Recognises cross-boundary connections with adjoining districts. | All roads proposed within the site will have the road hierarchy classification applied with reference to Selwyn District, with efforts made to ensure that all roading infrastructure are consistent with the nature of the applicable residential zone |
| Tran P2 –<br>Manage any extensions to the District's land transport network to ensure it occurs in an integrated way by:<br>1. Co-coordinating the timing of land use activities and subdivision development with the availability of capacity in land transport corridors;<br>2. Providing a range of travel modes and ensuring these are integrated, including between walking, | Modelling has indicated the road network can adequately service the projected increase in traffic.<br>No roads are proposed to be arterials. Instead, they will be reflective of the character of adjacent local and access roads. |

| | |
|---|---|
| cycling, public transport, freight and private vehicle modes; and<br>3. Ensuring land use activities and subdivision development do not foreclose on the opportunity for land transport corridors to meet future land transport needs | |
| Tran P3 –<br>Require Integrated Transport Assessments to assess the effects of high trip generating activities on the surrounding land transport network to:<br><br>1. Maintain the safety and efficiency of land transport infrastructure by ensuring there is sufficient capacity in land transport corridors, including by integrating development with funded improvements to the network and ensuring the timing aligns with capacity; and<br>2. Establish whether the high trip generating activity can be supported by active transport modes, including accessibility to safe and convenient walking and cycling connections and access to public transport and public transport facilities. | Modelling has indicated the road network can adequately service the projected increase in traffic. |
| Tran P4 –<br>Manage the adverse effects of activities within the General Rural Zone that exceed the maximum number of vehicle movements for each site | The Sites will not be zoned General Rural Zone. |
| Tran P5 –<br>Promote a range of transport options to reduce the number of trips and distances travelled in private motor vehicles by:<br><br>1. Encouraging land use activities and subdivision development to include connected walking and cycling networks and access to public transport and public transport facilities, including within and between townships; and<br>2. Managing the design, layout and function of new land transport infrastructure to ensure they integrate with existing and future land transport corridors. | This ITA discusses how the proposal includes transport infrastructure which seek to link into the broader roading network in an effort to promote transport options for the community.<br>All proposed changes take into account the character of the surrounding environment |
| Tran P6 –<br>Enable safe, multi-modal connections that support walking, cycling, and access to public transport and public transport facilities through land use activities and subdivision development that: | Internal roads are proposed and will connect to the broader network with multi-model travel taken into consideration |

| | |
|---|---|
| 1. Establish levels of service and multi-modal transport options based on the network road classifications, including the provision of strategic level walking and cycling connections where they are identified in Development Plans or ODP;<br>2. Encourage residential blocks to be small, navigable and convenient to move around through legible, convenient and attractive walking and cycling routes to public transport facilities and between residential areas, business centres, community facilities, recreation space and local services;<br>3. Manage the number and design of cul de sacs, rear lots and accessways;<br>4. Provide for the interaction between vehicle access and manoeuvring, loading and parking areas when determining on-site pedestrian and cycling routes; and<br>5. Align street layouts to maximise views and landscape features to promote attractive streets. | |
| Tran P7 –<br>Recognise and protect the function of the District's land transport network and systems by managing land use activities and subdivision development to ensure the safe and efficient movement of people and goods by:<br><br>1. Managing adverse effects from activities on land transport corridors and land transport infrastructure, particularly where it may reduce safe and efficient traffic flows within the strategic transport network and links with Christchurch City;<br>2. Ensuring land transport corridors and land transport infrastructure can support the volume and type of transport movements based on the network road classifications; and<br>3. Requiring the design, positioning, and maintenance of accessways, corner splays, vehicle crossings, intersections, footpaths, plantings, and signs to ensure appropriate sightline visibility is provided to road users to support safe and efficient vehicle, pedestrian, and cycle movements | New local roads within the site will connect with the broader area.<br><br>External connections will be appropriately designed to mitigate any adverse effects, taking into account the safety of users and the efficiency of the wider transport network |
| Tran P8 –<br>Recognise and protect rail networks and systems by managing land use activities and subdivision development to ensure the safe and efficient movement of people and goods by: | Not applicable to this Plan Change |

| | |
|---|---|
| 1. Managing adverse effects of activities on rail networks and systems, while encouraging land use activities and subdivision development that support the movement of people and goods via rail;<br>2. Managing the location of buildings, structures or trees to ensure they do not impair the visibility of motorists, pedestrians, cyclists, or train drivers within the sightlines of railway lines at road/rail crossings;<br>3. Controlling the design and location of land use activities and subdivision development to reduce the need for pedestrians, cyclists, motorists, or other road users from crossing railway lines; and<br>4. Encouraging the movement of freight via rail as a viable alternative to road transportation. | |
| Tran P9 –<br>Manage on-site parking areas and loading facilities to maintain the safe and efficient operation of land transport corridors and land transport infrastructure. | Not Applicable to this Plan Change |
| Tran P10 –<br>Supporting the economic growth of commercial centres through the appropriate supply of vehicle and cycle parking areas and the establishment of public transport facilities that correspond with the type and function of each centre. | Not Applicable to this Plan Change |
| Tran P11 –<br>Manage vehicle access, vehicle crossings and manoeuvring areas to maintain the safe and efficient operation of land transport corridors and land transport infrastructure by:<br>5. Requiring all sites to have access to a road and to ensure that this access is constructed to the appropriate formation standards and is compatible with the network road classification;<br>6. Avoiding the need to reverse vehicles onto the strategic transport network;<br>7. Avoiding the establishment of new accessways and vehicle crossings to roads that require access across a rail line; and<br>8. Minimising the need to reverse onto Collector and Local Roads through the provision of appropriate on-site manoeuvring areas | Not Applicable to this Plan Change |
| Tran P12 –<br>Enable works to be carried out by network utility operators to construct, renew, improve, and operate network utilities within land transport corridors in an efficient manner, while managing the scale and types of works and activities. | The Plan Change will seek to design infrastructure consistent with this policy |

| | |
|---|---|
| Tran P13 –<br>Minimise the adverse effects of development on the physical and natural environment by:<br>1. Locating, designing and operating development while minimising the effects on, the amenity values of the surrounding environment, public access, and the health and safety of people.<br>2. Encourage development to consider alternative sites, routes or methods<br>3. Limiting the presence and effects of development within Outstanding Natural Landscapes, Visual Amenity Landscapes, Areas of Significant Indigenous Vegetation and habitats of indigenous fauna, sites of historic heritage and site and areas of significance to Māori to those which:<br>a. can demonstrate an operational or functional requirement for the location; and<br>b. can demonstrate through site, route or method selection the minimisation of effects on the environment; and<br>c. integrate design measures and management methods to mitigate adverse effects.<br>4. Requiring restoration of indigenous biodiversity and habitat following development in areas of Areas of Significant Indigenous Vegetation and habitats of indigenous fauna, and the on-going monitoring of that restoration<br>5. Considering biodiversity off-setting or compensation where the loss of significant indigenous vegetation cannot be restored and significant habitats of indigenous fauna or wetlands cannot be fully mitigated where the adverse effects cannot be avoided or remedied<br>6. Using the substantial upgrade of land transport infrastructure as an opportunity to reduce existing adverse effects. | The Plan Change proposes infrastructure to cater for cycling and foot traffic as an alternative to cars. In doing so, the impact to the surrounding natural environment is lessened.<br><br>Proposed roads seek to provide direct routes to amenities, reducing effects of longer trips. |

# 8 OUR CONCLUSIONS

We have assessed the transport effects of Councils proposed rezoning of approximately 50ha of currently rural land in Rolleston to enable urban development.

Our assessment has found that the transport safety and efficiency effects of the Plan Change can be adequately managed by

- Implementing Outline Development Plans, as discussed in Section 1.2, to guide the provision of a connecting street network that caters for all users
- Requiring the SH1/Dunns Crossing Road intersection to be upgraded to a roundabout before any development occurs within Sites 1 and 3 (refer to Section 3.2)
- Requiring the Dunns Crossing Road/Selwyn Road/Goulds Road to be upgraded to a roundabout before any development occurs within Sites 1, 2 and 3 (refer to Section 3.1)
- Requiring the Selwyn Road/Springston-Rolleston Road intersection to be upgraded to a roundabout, with a separate short left turn lane on the Springston Rolleston Road south approach, before any development occurs within Sites 1 – 6 (refer to Section 3.1 and Section 5.3.5). However, we note that site constraints may preclude a left turn lane. We recommend that Council further investigate effects at this intersection, as part of a wider reassessment of network performance as a result of land use changes within Rolleston that may eventuate as a result of the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act (2021).
- Requiring the upgrade of the Selwyn Road/Lincoln Rolleston Road and Selwyn Road/Weedons Road intersections to roundabouts before any development occurs within Sites 1 – 6, to mitigate potential safety effects (refer to Section 5.5).

The 2033 Rolleston Paramics model identifies that the following intersections will be operating near to or over capacity by 2033 if all Private Plan Changes within Rolleston proceed

- SH1/Weedons Interchange South roundabout
- Lowes Road/Broadlands Drive priority intersection
- Levi Road/Ruby Drive priority intersection
- Levi Road/Strauss Drive priority intersection
- Levi Road/Weedons Road priority intersection
- Selwyn Road/Lincoln Rolleston Road priority intersection with seagull treatments (however, Council intends to construct this as a roundabout, which will improve performance)
- Jones Road/Weedons Road roundabout.

Consistent with our recommendations when acting as Council's transport expert for the multiple Private Plan Changes, we consider that any upgrades to these intersections should be led by Council, and that that Development Contributions should be leveraged from Plan Change sites on a proportional basis relative to the level of traffic that each respective Plan Change site contributes during peak hours.

As such, we consider that further assessment of the wider traffic effects of this Plan Change is not needed from an effects assessment perspective. We recommend that, separate to this Plan Change process, Council progress further assessment of these intersections in terms of improvements and funding mechanisms.

Finally, we conclude that the Plan Change is consistent with the transport related objectives and policies of relevant regional and district plans.

# APPENDIX A Crash analysis

The following table shows the total number of crash incidents reported and the type of accident and cause.

| | Non-injury | Minor | Serious | Fatal | Cause |
|---|---|---|---|---|---|
| Goulds Rd/ Dunns Crossings Rd Rd/ Selwyn Rd | 3 | 3 | | | All incidents resulting from drivers failing to give-way to traffic on Selwyn Road. Sunstrike reported to influence two offending vehicles |
| Goulds Rd/ East Maddisons Rd (*Shillingford Blvd)* | 1 | | | | Driver heading south on Goulds Rd performed a right-turn into East Maddisons Rd at speed, lost control and hit a power pole |
| East Maddisons Rd/ Selwyn Rd | 1 | | | | Driver heading west on Selwyn Rd performed a right-turn into Goulds Rd at speed, lost control and hit a power pole |
| Springston-Rolleston Rd/ Selwyn Rd | 3 | 3 | 1 | 1 | All incidents resulting from drivers failing to give-way to traffic on Springston-Rolleston Road |
| Dunns Crossing Rd *(midblock)* | 3 | | 1 | | Majority due to drivers leaving the roadway, as was the case for the serious incident where the vehicle rolled multiple times. Report does not state why the driver has left the road |
| **Springston Rolleston Rd *(midblock)*** | 1 | | | | Driver has veered off the roadway, hitting a ditch. Police state the driver was intoxicated |

It is worth noting that the intersection of Goulds Road/East Maddisons Road/Shillingford Blvd has changed during the searched period. Listed below are highlights from the crash data record for the applicable intersections.

**Springston-Rolleston Rd/Selwyn Rd and Goulds Rd/Dunns Crossing Rd**

- A trend was identified whereby all offending vehicles failed to give way to priority traffic
  - Totalling 16 incidents between the two intersections of which;
  - 8 resulted in injury
  - 1 resulted in death (Springston Rolleston/Selwyn)

**Goulds Road/East Maddisons Road/Shillingford Blvd and East Maddisons Rd/Selwyn Rd**

- Although 2 incidents have been reported between both intersections, no trends have been identified

**Midblock**

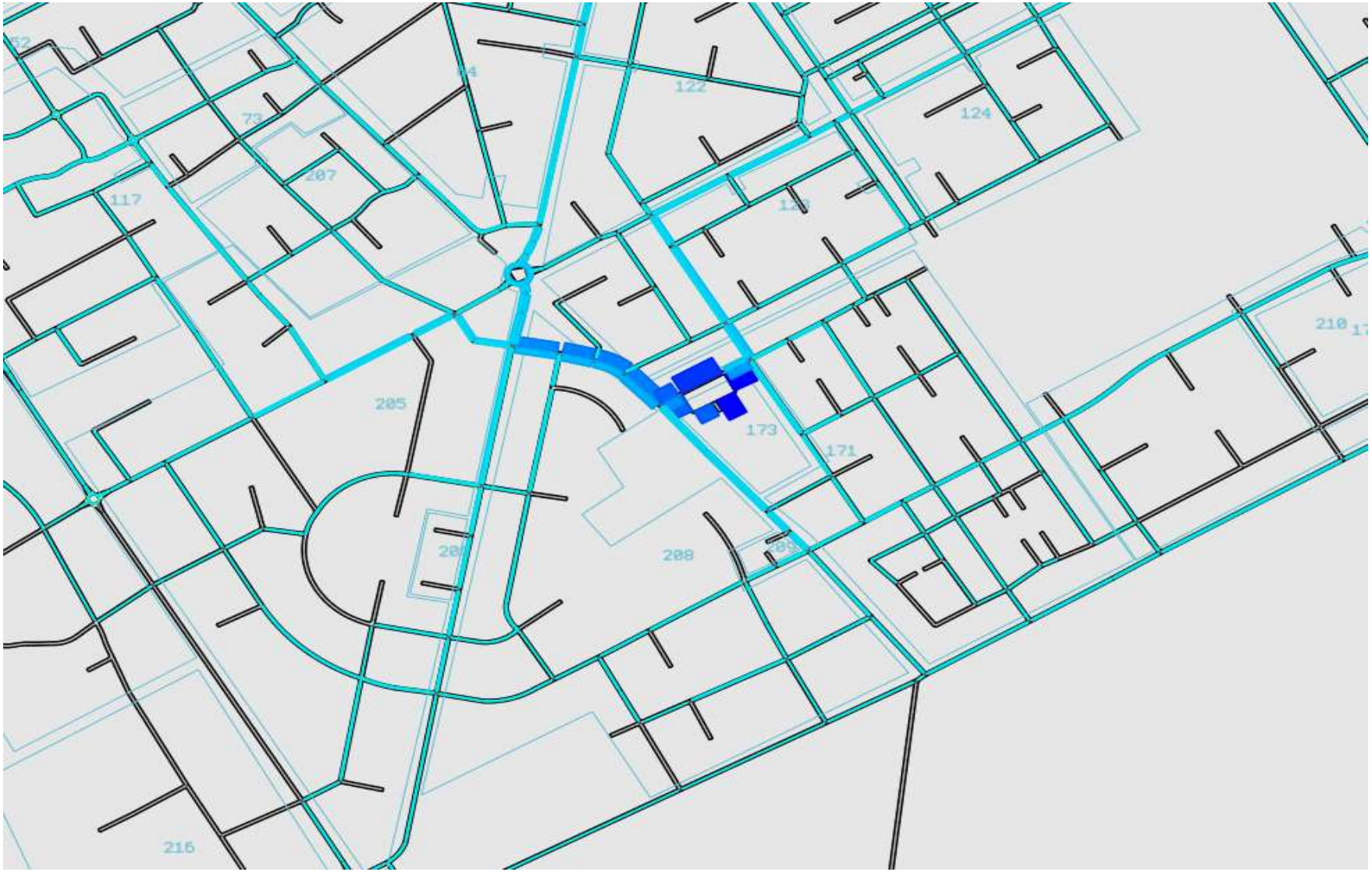
- A total of 5 incidents reported in the midblock sections
- 4 resulted in no injury
- 1 resulted in serious injury
- Majority were caused by drivers veering off the carriageway, but no discernible trend has been identified

In conclusion, we believe the trend highlighted above represents safety concerns for two of the assessed intersections along Selwyn Road. That is, failure to give-way at a priority intersection.

# APPENDIX B SIDRA and Select Link Analysis

**Block 1 - Zone 203, PC73**

**Block 2 - Zone 173**



**Block 3 - Zone 216, PC81**

**Block 4 - Zone 210**

# APPENDIX C QTP Report

Quality Transport Planning

# Future Year Transport Model Outputs

## Selwyn 2031 Update (Selwyn 2051)

**October 2021**

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## Document Issue Record

| Version No | Prepared By | Description | Date |
|---|---|---|---|
| V1 | John Falconer | Draft – 2021 AM Peak Outputs Only | 21 October 2021 |
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## Document Verification

| Role | Name | Signature | Date |
|---|---|---|---|
| Preparation | John Falconer |  | 21 October 2021 |
| Reviewer | | | |
| Approval | John Falconer |  | 21 October 2021 |

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# Contents



# Appendices

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# 1 Introduction

1.1 This report sets out the results of future year scenario transport modelling used to inform the Selwyn 2031 Update (Selwyn 2051).

1.2 The modelling utilises regional transport models (both CTM and CAST) that are jointly owned and operated by the Greater Christchurch Partnership (GCP). The GCP have agreed future year (2028, 2038 and 2048) base input assumptions relating to landuse and network supply agreed at the regional level, to enable a consistent planning approach. From these base scenarios, additional scenarios can be developed (e.g. redistributing where growth occurs and/or the overall scale of growth).

1.3 The purpose of the transport modelling in this application is to help understand both the current and potential future:

- transport patterns of Selwyn District based traffic, including trip origins, destinations and usage by the most common modes (light vehicles, heavy vehicles, bus and cycle), and how this relates to accessibility.
- performance of the Selwyn District transport network in terms of utilisation of road links by mode and the overall Level of Service (LoS) of road links and intersections.
- impact of Selwyn housing and employment on the Greater Christchurch network, including the proportion of traffic using key arterial roads and intersections.

1.4 Collectively, this information will inform the likely transport impacts of future landuse demand (additional population and employment) associated with the scale and location of particular growth areas and how this may vary across alternative scenarios.

1.5 The specific tasks performed by QTP are summarised below:

- Provide analysis of the current state of the transport network, across a range of transport modes (walking, cycling, car, and bus), including:
  a. Accessibility to land-use activities (e.g. employment, KACs, and schools);
  b. Peak time flows (vehicle trips and bus passengers) on road links;
  c. Trip patterns between key locations; and
  d. Identification of intersections and links that are at or near capacity (resulting in poor level of service);
- Assess the impact of current Selwyn housing and employment on the Greater Christchurch transport network; in particular the impact of peak time flows into and out of Selwyn's townships.
- The testing of alternate land-use scenarios, developed in conjunction with SDC.

1.6 The model outputs and outcomes associated with the first two bullets above are documented in the report titled '*Transport Model Outputs for Selwyn 2031 Update (Selwyn 2051) V1.PDF'*. This report documents the last bullet point; the testing of alternate land-use scenarios.

# 2 Transport Model Application

## 2.1 Modelling Overview

2.1.1 Greater Christchurch extends over three Territorial Local Authorities (TLAs); Christchurch City, Waimakariri District to the north, and Selwyn District to the south. While each TLA is governed separately, many decisions made by one TLA have an impact on the other two (and other stakeholders), especially in relation to transport.

2.1.2 As part of this, a joint committee known as the Greater Christchurch Partnership Committee (**GCPC**) has formally been established, with representatives from each Partner's organisations to lead and coordinate projects.

2.1.3 The GCPC have collectively prepared forecasts of population, households and employment and at the Territorial Local Authority (TLA) level (within the Greater Christchurch area). These forecasts are reasonably consistent with Statistics NZ (sub-national) population forecasts released in 2017[1]; when applying the Medium Growth projection within Christchurch City and the Medium-High projection to Waimakariri and Selwyn Districts.

2.1.4 In addition to the above 'default' forecasts (hereafter called Scenario 1), this report includes testing of an alternate land-use scenario (hereafter called Scenario 2), which includes an additional 10,000 households located in Selwyn townships by 2038. Population and Household totals for Christchurch City and Waimakariri District remain unchanged (i.e. Scenario 2 has a net gain of 10,000 households relative to Scenario 1 at 2038, all allocated to Selwyn District).

2.1.5 Specific locations (Meshblocks) where residential capacity has been added to Scenario 2 , as supplied by SDC, are included in **Appendix A**.

## 2.2 Software Capability

2.2.1 The CTM is a traditional regional four stage[2] transport model, covering the Greater Christchurch area and implemented in CUBE Voyager software. It was commissioned in 2005 and completed in 2009. The cost of the model was significant (in the order of $2m), with approximately half of this cost allocated to data collection. The CTM provides a meaningful response to the most critical factors that affect the transport system; travel demand (based on spatial population and landuse activity) and the available transport linkages (network provision) that facilitate movement between locations.

2.2.2 The CAST model, implemented in the SATURN software, uses travel demand estimated by the CTM and provides a much more detailed simulation of intersection operation and interaction, whilst still modelling the operation of the entire Greater Christchurch road network[3]. In this regard the modelling is extremely powerful as it simulates localised impacts whilst also capturing the effects on the wider road network. The detailed simulation modelling is achieved through use of the Cyclical Flow Profile which tracks

[1] Note the CTM and CAST models are currently being updated to 2018 Census data and new forecasts are imminent, however the 2017 forecasts still reasonably represent anticipated spatial growth patterns in the short to medium term.
[2] The four stages being trip generation, trip distribution, mode choice and traffic assignment.
[3] Some local roads such as cul-de-sacs and others without a significant through-traffic potential are not included.

the arrival and departure profiles of vehicles through the network through every 'step' (typically 1 second) of the adopted cycle time.

## 2.3 Model Limitations

2.3.1 When interpreting transport model outputs, it is important to note that the model attempts to represent complex human behaviour in a pragmatic manner such that it is possible to make reasonable and useful predictions of potential outcomes in the future.

2.3.2 While all such transport models are simplifications of reality, they provide a foundation for quantitative estimates of likely effects and potential benefits that can be helpful for decision-makers. In reality, there are many individual motivators for choosing to travel (or not) in the first place, let alone which mode or routes or modes are taken.

2.3.3 Any tool or model framework which 'aggregates' such individual choices will, inevitably, use generalised assumptions (such as aggregation to zones, 'household types', etc.). In many cases these assumptions may have a degree of error or simply be 'wrong' at an individual level. However, 'on the whole' such models seek to provide a reasonable approximation to the observed or anticipated behaviour of the target population at a particular point in time – and most pertinently for planning purposes, need to respond (sensibly) to key variables, including demographic changes and potential policy interventions or levers.

2.3.4 The transport models have been calibrated to reflect 2006 travel behaviour, with an inherent assumption that this will continue. While over the last few decades this has been proven (empirically) to be a valid assumption, the recent (2021) government policy statements on land transport and housing and urban development suggest (correctly) that significant intervention is needed in the near future to force travel behaviour change in order to address climate change, sustainability issues, urban design and to provide better long-term social outcomes.

2.3.5 The transport models will therefore continue to evolve to reflect latest policy and wider societal changes, with regularly updated planning horizons and modelling techniques based on the best information available at the time.

2.3.6 Indeed, it was the insights provided by transport models that have helped (in part) build the case for change are now seeing.

# 3 Future Year (2038) Network Model Outputs

## 3.1 Model Outputs

3.1.1 The full range of model output plots for the modelled 2038 year are included in Appendix B.

3.1.2 A selection of these are duplicated in this section where further discussion and interpretation is warranted. Due to space constraints, these have been reduced in size, however the reader may therefore refer to the full-size versions in the appendix for more detailed information.

3.1.3 Only the morning peak period has been reported because this period has the greatest impact within Selwyn District. The evening peak period generally has similar traffic patterns but in the inverse direction. However, trips travelling from Christchurch to Selwyn during the evening peak (i.e. peak flow direction) are highly constrained by the Christchurch City network, which regulates the rate at which trips cross the border from Christchurch to Selwyn. This limits effects relative to the morning peak.

3.1.4 In line with the project scope, the outputs have been grouped into four themes:

- ***Trip Patterns*** – to understand broadly where people (and goods) are travelling within Greater Christchurch.
- ***Traffic Flows*** – to understand the how traffic flows might change between 2021 and 2038 (for both Scenario 1 and Scenario 2) and also understand the differences at 2038 between Scenario 1 and Scenario 2.
- ***Network Performance*** – to identify how the traffic flows above relate to the available network capacity and the resulting Level of Service (LoS).

## 3.2 Trip Patterns

3.2.1 A summary of vehicle trips to and from Selwyn is provided below.

**Figure 3-1: Morning Peak 2021 Vehicle Trip Summary**

AM Peak 2038 Base – 2hr (0700-0900) Vehicle Trip Summaries by mode

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Light Vehicle | From Selwyn GC to | 9,180 | 2,620 | 9,700 | 70 | 1,330 | 50 | 22,950 |
| | To Selwyn GC from | 9,180 | 330 | 5,090 | 280 | 70 | 50 | 15,000 |
| | From Selwyn Ext to | 1,280 | 200 | 1,100 | 60 | 40 | 70 | 2,750 |
| | To Selwyn Ext from | 1,330 | 260 | 1,120 | 50 | 40 | 50 | 2,850 |
| | TOTAL Trips | 18,360 | 2,950 | 14,790 | 350 | 1,400 | 100 | 37,950 |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Heavy Vehicle | From Selwyn GC to | 120 | 10 | 360 | 30 | 30 | 30 | 580 |
| | To Selwyn GC from | 120 | 10 | 310 | 30 | 30 | 10 | 510 |
| | From Selwyn Ext to | 30 | 80 | 270 | 30 | - | 30 | 440 |
| | To Selwyn Ext from | 30 | 80 | 280 | 30 | - | 10 | 430 |
| | TOTAL Trips | 240 | 20 | 670 | 60 | 60 | 40 | 1,090 |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| TOTAL | From Selwyn GC to | 9,300 | 2,630 | 10,060 | 100 | 1,360 | 80 | 23,530 |
| | To Selwyn GC from | 9,300 | 340 | 5,400 | 310 | 100 | 60 | 15,510 |
| | From Selwyn Ext to | 1,310 | 280 | 1,370 | 90 | 40 | 100 | 3,190 |
| | To Selwyn Ext from | 1,360 | 340 | 1,400 | 80 | 40 | 60 | 3,280 |
| | TOTAL Trips | 18,600 | 2,970 | 15,460 | 410 | 1,460 | 140 | 39,040 |

3.2.2 This figure shows that during the morning peak period:

- Vehicle trip patterns are indicated to remain similar to 2021, but with increased magnitude (from 29,400 tips per day in 2021 to 39,000 in 2038, i.e. +32%).
- Heavy vehicle trips are a very small proportion (3%) of total Selwyn based traffic. This proportion remains similar to 2021.
- There is still high transport demand between Selwyn District and Christchurch in 2038 (with approximately 50% of Selwyn trips having an origin or destination in Christchurch, as was also the case in 2021), with more than 90% of trips indicated to be by private vehicle (despite assumed improved PT services in future years).

## 3.3 Traffic Flows

3.3.1 The following plots indicate the implication of the trip patterns in relation to the available roads that make up the transport network how these are used.

3.3.2 General traffic flow patterns for 2038 appear to be broadly similar to 2021, but are about 25% (on average) higher as indicated below shown below:

**Figure 3-2: Morning Peak 2021 Traffic Flow**

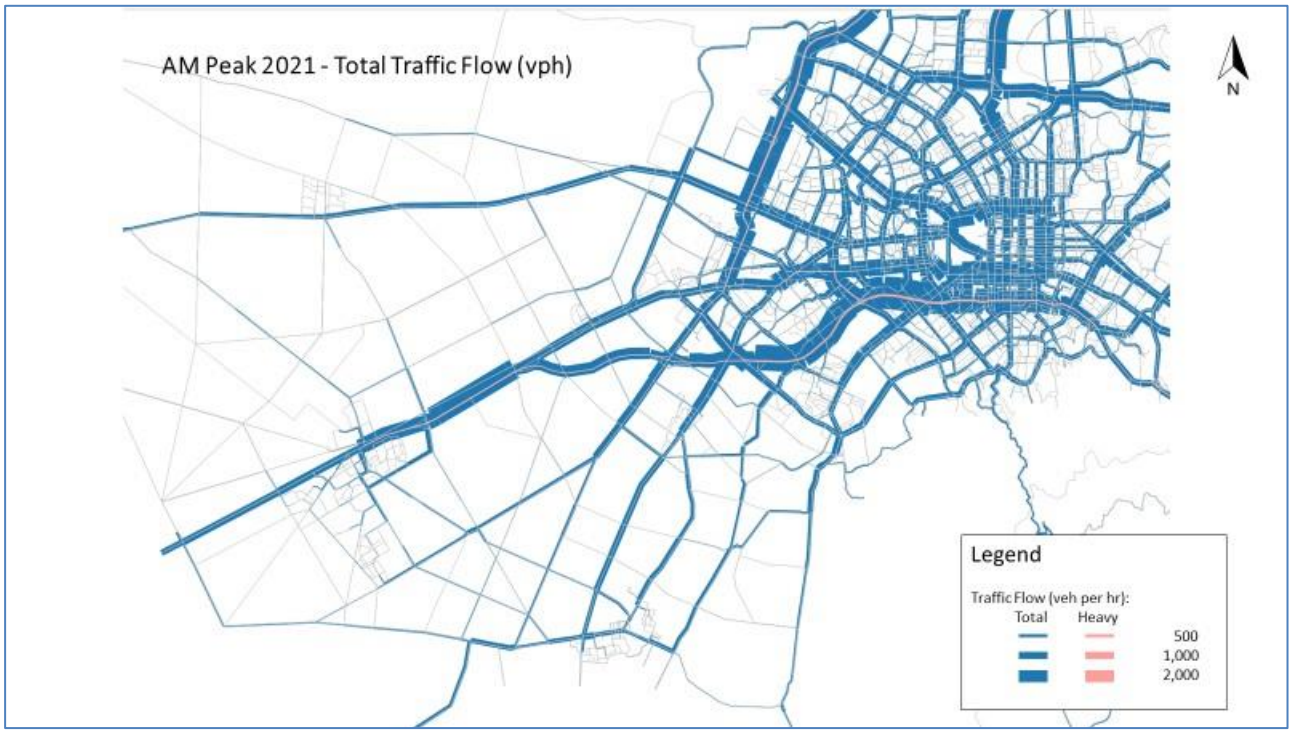
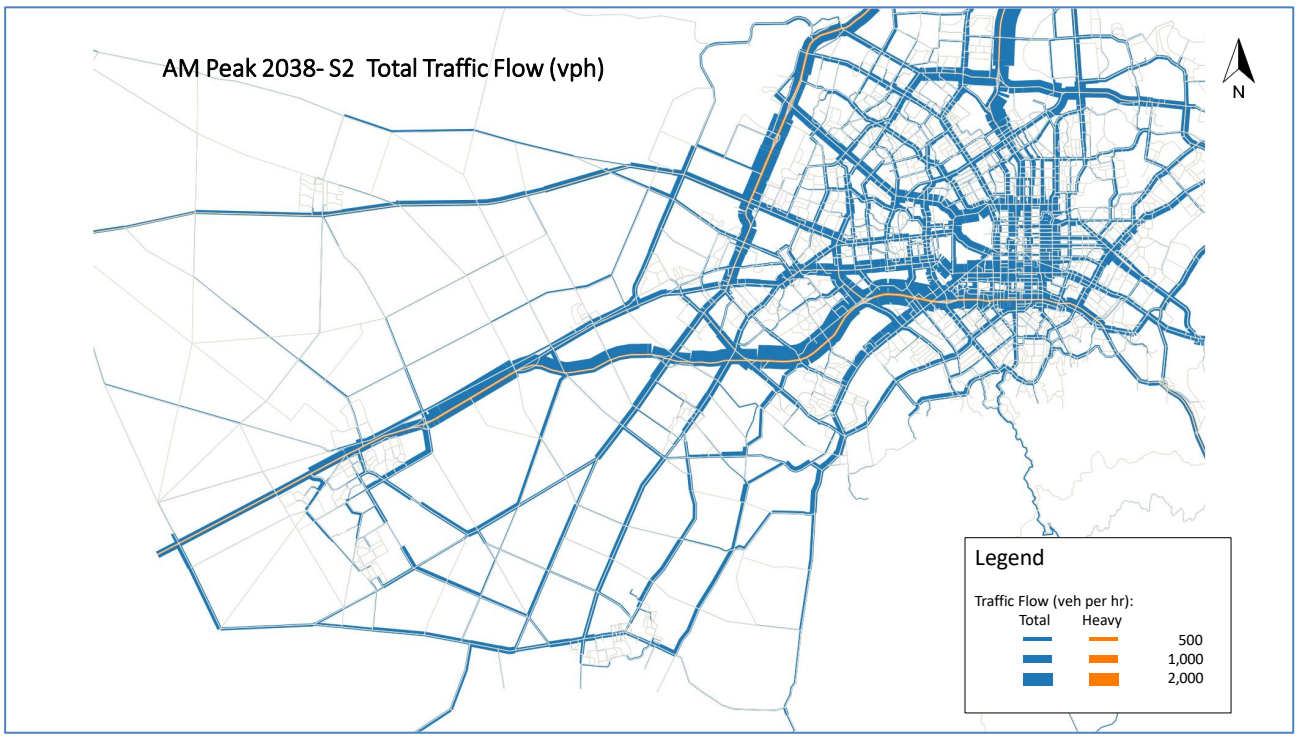



**Figure 3-3: Morning Peak 2038 Traffic Flow**



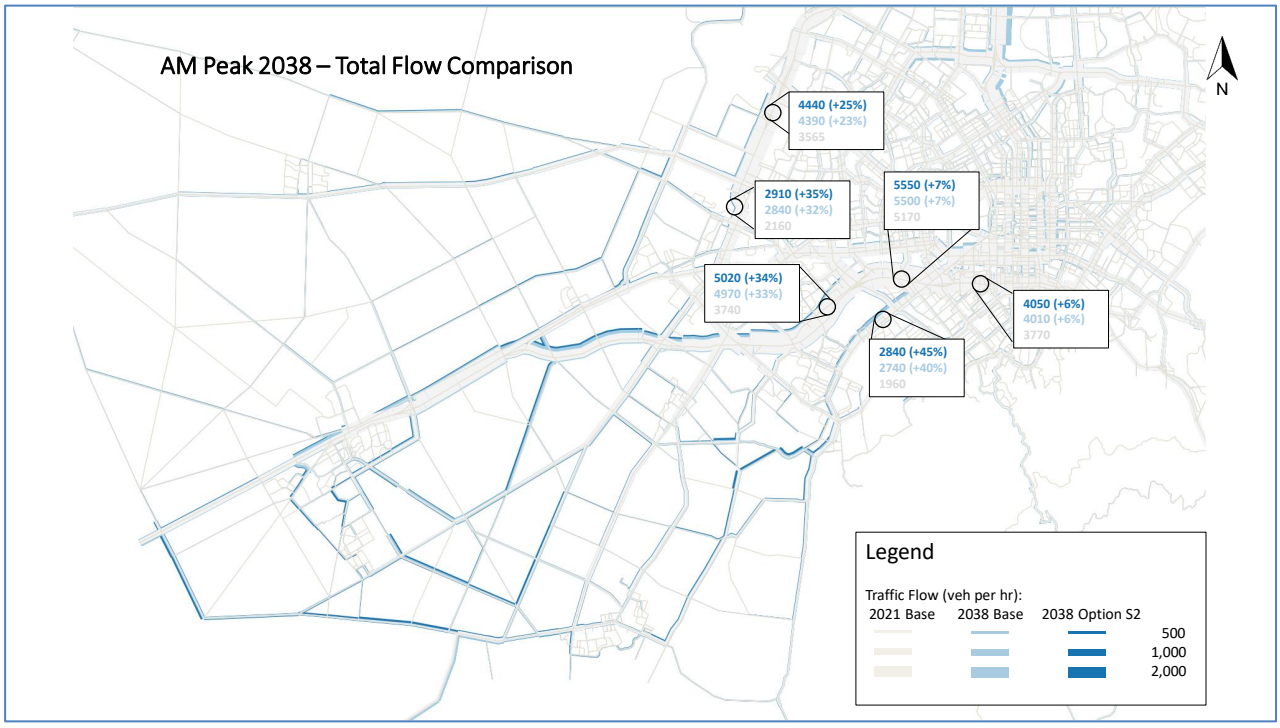
3.3.3 This increase in overall traffic flow is indicated to be almost directly proportional to the population increase as shown in Table 3-1 below.

**Table 3-1: Estimated increase in population and vehicle trips 2021 to 2038 (Scenario 2)**

| Greater Christchurch | Forecast Year | | Change | |
|---|---|---|---|---|
| | 2021 | 2038 | abs | % |
| Population | 495,027 | 617,262 | +122,235 | 25% |
| Vehicle Trips | 172,626 | 218,127 | +45,501 | 26% |

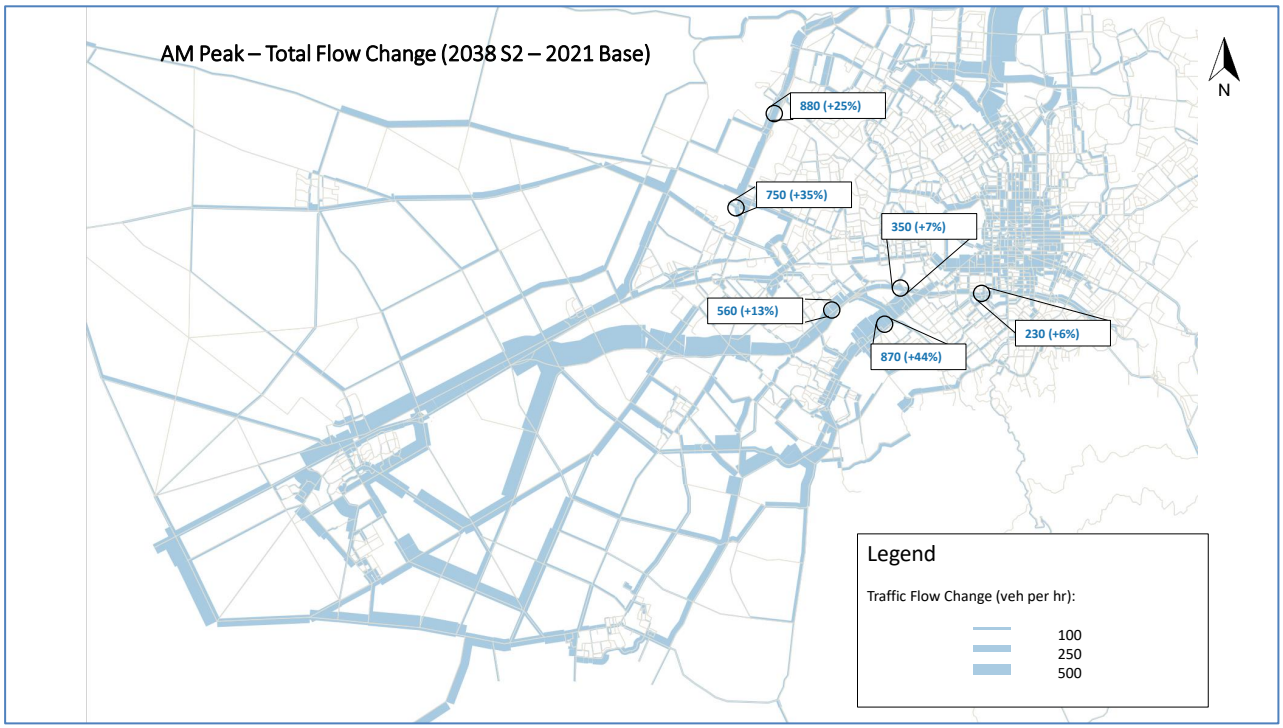
3.3.4 Figure 3-4 below shows just the Selwyn based component of traffic (with incremental changes for both Scenario 1 and 2 between 2021 and 2038).

**Figure 3-4: Morning Peak 2038 Selwyn Based Traffic Flow – Incremental Changes**




3.3.5 Figures on the following page show the change in 2038 (Scenario 2) relative to 2021 (Figure 3-5 and the change between Scenario 1 and 2 (Figure 3-7). This is the same information presented in Figure 3-4, but with an exaggerated bandwidth scale to better distinguish changes on individual roads.

**Figure 3-5: Morning Peak Base Traffic Change (2021 to 2038 Scenario 2)**




3.3.6 The above figures indicate that traffic travelling between Selwyn and Christchurch City will distribute itself over all available corridors across the boundary; SH74 West Coast Road, SH1Main South Road, CSM2, Shands Road, Springs Road, Whincops Road and SH75 Halswell Road.

3.3.7 It is apparent that traffic interactions and network constraints within Christchurch City, combined with ongoing development of south-west Christchurch, have a significant impact on how Selwyn traffic distributes to use the most viable routes.

3.3.8 For example, there is only very limited traffic growth on Springs and Sands Roads due to downstream constraints across the border in Christchurch reducing the attractiveness of these routes relative to alternatives. Such alternatives include Ellesmere Road connecting into Halswell Road. While Halswell Road is also indicated to be congested in the future, traffic growth distributes in varying extents to all available routes according to Waldrop's first and second principles[4].

3.3.9 These principles (which also underpin the traffic modelling) state that as networks become increasingly congested, trips spread themselves over multiple routes such that an equilibrium is reached where journey times by all available routes are similar. This also results in all routes being simultaneously degraded to some extent as a consequence of the increased traffic.

3.3.10 As a result of this equilibrium, some interesting route choices can materialise. A good

[4] https://en.wikipedia.org/wiki/John_Glen_Wardrop

example of that is the obvious increase in traffic on Waterholes Road. While overall total traffic flows on Waterholes Road remain relatively low compared to other roads, this route becomes increasingly attractive from south Rolleston to Christchurch, enabled by the roundabout at SH1/Dawsons, where eastbound (peak flow direction) traffic on SH1 have to give way to all traffic using the Waterholes Road route (where the latter turns right at the roundabout towards Christchurch but only having to give way to lesser westbound traffic flow).

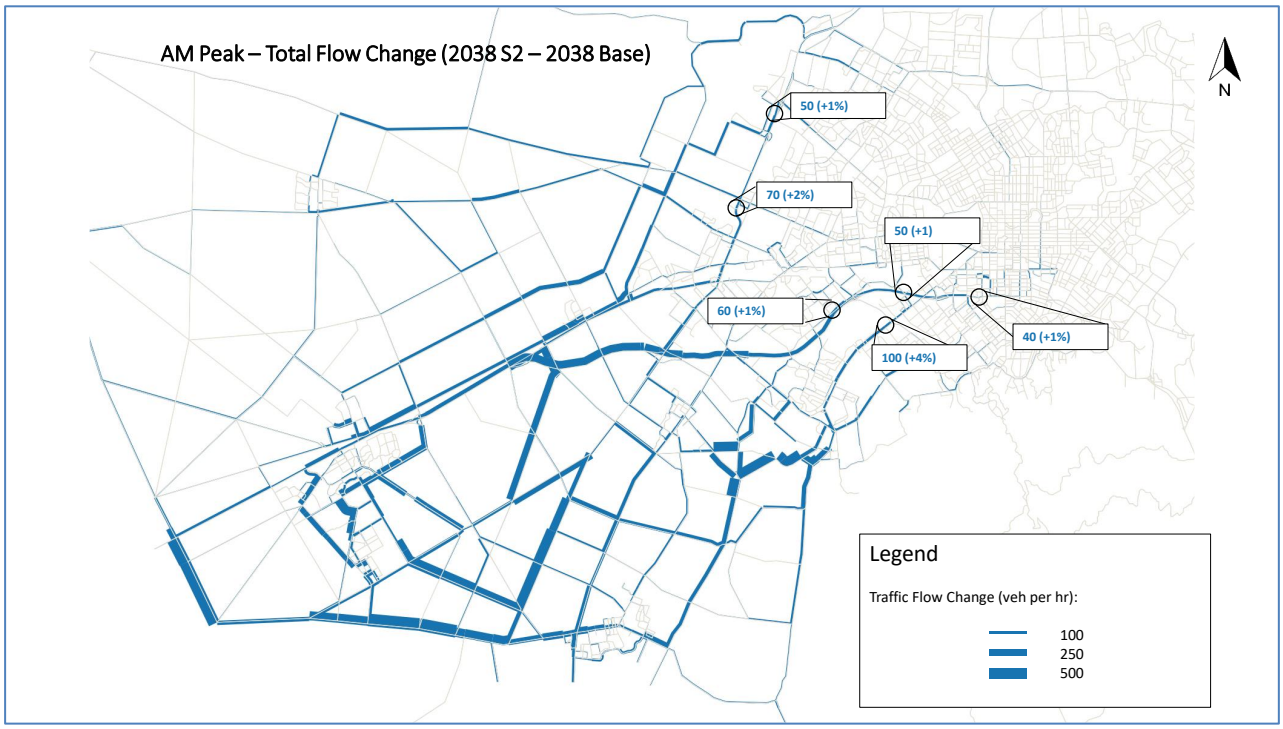
3.3.11 An additional factor (also included in the CAST model) is that trip demand is elastic. That is that demand for travel will change in response to cost[5]. Therefore, trip retiming (peak spreading), changing mode, or deciding not to make a trip, increasingly occur as congestion increases, which provides a dampening effect to increasing travel demand.

3.3.12 This effect, combined with the equilibrium theory described earlier, has resulted in a negligible increase in Brougham Street traffic in the future. This appears to be sensible, given that Brougham Street has already reached capacity during peak periods, resulting in long queues extending up the southern motorway during the morning peak, as recorded in the picture below (picture taken 2km west of Barrington Street during the morning peak in October 2021).

**Figure 3-6 – Existing morning peak queuing on southern motorway 2km west of Barrington Street.**


[5] This works both ways, where reducing travel delays and 'easing congestion' is likely to simply increase travel demand, and therefore congestion will still exist. This is known as 'induced traffic' and is why no city has ever been able to 'build its way out of congestion' (at least without resorting to some form of road pricing).

**Figure 3-7: Morning Peak Base Traffic Change (2021 to 2038 Scenario 2)**




3.3.13 The changes in traffic flows between Scenario 1 and Scenario 2 (at 2038) follow a similar pattern to the changes between 2021 and 2038. This is not surprising, given all the added capacity for Scenario 2 was added to the townships (primarily West Melton, Rolleston, Prebbleton and Lincoln), so it tends to simply reinforce existing growth areas which in turn reinforces existing travel patterns[6].

[6] Although theoretically an increasing level of self-sufficiency and opportunities for active modes should also result thereby offsetting some of the indicated traffic growth.

## 3.4 Network Performance

3.4.1 The following plots identify how traffic flows relate to the available network capacity and the resulting Level of Service (LoS).

3.4.2 Figure 3-8 provides a summary of average intersection delay, for each intersection as a whole, and for the worst movement (almost always a right turn). Link volume to capacity ratio (reflecting how much of the available capacity is being used) is also displayed.

3.4.3 Intersections normally have less overall capacity than adjacent road links. Therefore, intersections are often the limiting factor in terms of network capacity.

**Figure 3-8: Morning Peak 2038 Network Performance (Scenario 1)**

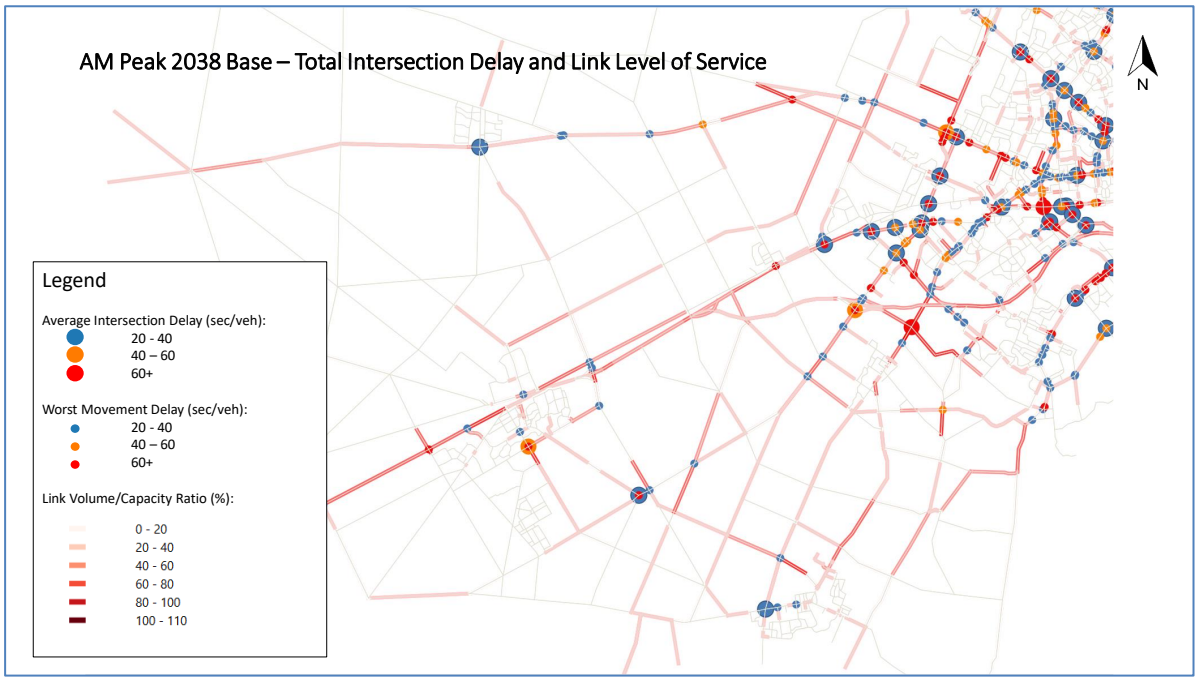
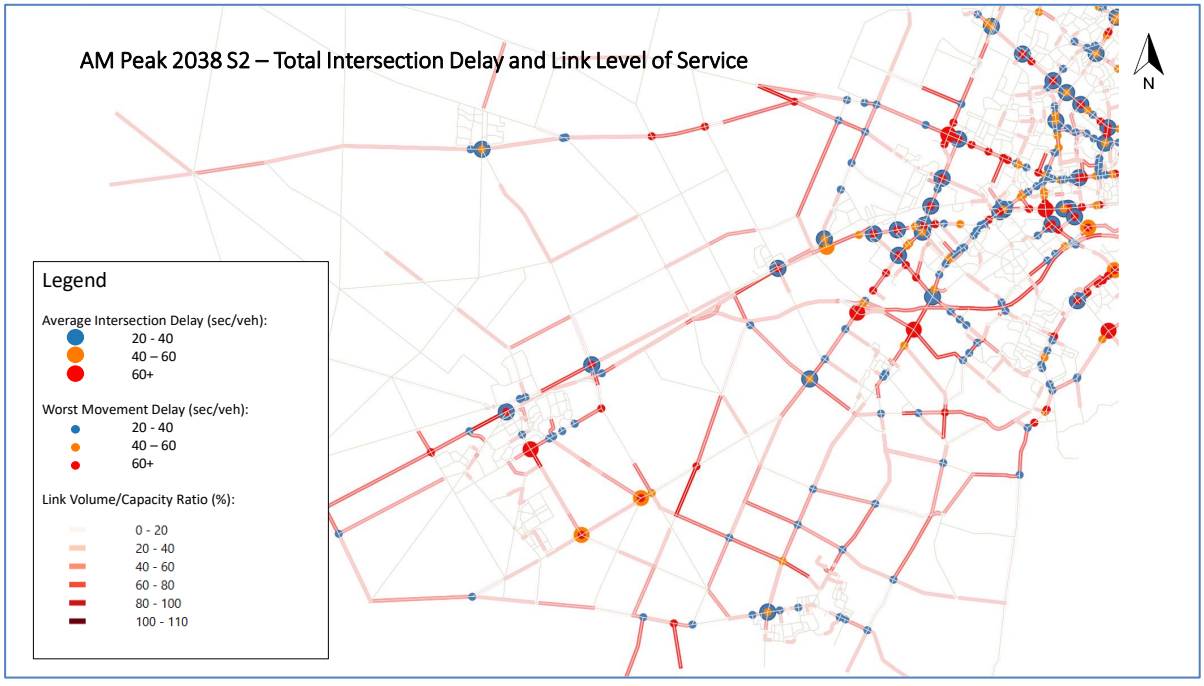



**Figure 3-9: Morning Peak 2038 Network Performance (Scenario 2)**



3.4.4 There appear to be a few deficiencies and bottlenecks within the Selwyn District portion of greater Christchurch in 2038 Scenario 1. A few potential issues (but note that these are not necessarily unacceptable and may in fact be required to achieve other desired outcomes) that stand out include:

- Tennyson/Lowes/Springston-Rolleston traffic signals.
- Springs Road/Marshs Road roundabout.
- Potential for congestion (due to high V/C) on some sections of SH1, Shands Rd and Springs Road.

3.4.5 It is noted that some deficiencies that occurred in 2021 no longer apply in 2038 due to various infrastructure improvements, especially those associated with the SH1 Rolleston improvements.

3.4.6 Relative to Scenario 1, additional deficiencies are apparent in Scenario 2. These are effectively all related to the increased population and include:

- Additional pressure on Tennyson/Lowes/Springston-Rolleston traffic signals.
- Additional pressure on Springs Road/Marshs Road roundabout.
- Lincoln Rolleston and Selwyn Road priority intersection.
- Springston Rolleston Road/Selwyn Road priority intersection.
- Ellesmere Jct/Gerald/Springs (Lincoln) traffic signals.
- Shands/Marshs traffic signals.
- Toswill/Trices priority intersection.

3.4.7 These ‘deficiencies’ do not necessarily need to be addressed or mitigated however, for the reasons stated in paragraphs 3.3.11 and 3.3.12 (the exception to this would be if there is an obvious safety risk or conflicts with other modes).

3.4.8 These types of deficiencies are also likely to occur at certain points in the network regardless of specific locations where residential growth is added.

3.4.9 From a transport planning point of view, the best strategy for accommodating growth (in the current environment) is therefore to consolidate as much as possible (with increased densities) to improve overall access to Public Transport and enable active modes (which require relatively short distances). This approach may make private vehicle travel less attractive than is currently is, although it will still be reasonably attractive relative to other modes, resulting in a better balance between modes, which in turn leads to more choice.

# APPENDIX A – Scenario 2 Inputs

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## Input Targets - Selwyn Scenario 1

| TLA[1] | Input Total | 2006 | 2013 | 2018 | 2028 | 2038 | 2048 |
|---|---|---|---|---|---|---|---|
| Selwyn | ERPopulation | 21,971 | 31,530 | 41,026 | 55,089 | 62,780 | 73,484 |
| | Households | 7,691 | 9,943 | 14,147 | 19,675 | 23,252 | 28,263 |
| | Adults (15+) | 16,963 | 24,536 | 32,795 | 43,777 | 50,950 | 60,495 |
| | Workers | 12,500 | 17,553 | 22,943 | 31,111 | 35,386 | 41,365 |
| | Students | 5,265 | 7,614 | 9,767 | 12,546 | 13,735 | 15,623 |
| | Non-Students | 15,124 | 21,299 | 28,855 | 38,895 | 45,265 | 53,743 |

[1]Note these refer to only the parts of the districts within the CTM/CAST model (UDS/LURP) area.

## Input Targets - Selwyn Scenario 2

| TLA[1] | Input Total | 2006 | 2013 | 2018 | 2028 | 2038 | 2048 |
|---|---|---|---|---|---|---|---|
| Selwyn | ERPopulation | 21,971 | 31,530 | 41,026 | 71,981 | 89,912 | 99,612 |
| | Households | 7,691 | 9,943 | 14,147 | 25,708 | 33,301 | 38,312 |
| | Adults (15+) | 16,963 | 24,536 | 32,795 | 57,200 | 72,969 | 82,004 |
| | Workers | 12,500 | 17,553 | 22,943 | 40,650 | 50,680 | 56,073 |
| | Students | 5,265 | 7,614 | 9,767 | 16,392 | 19,671 | 21,178 |
| | Non-Students | 15,124 | 21,299 | 28,855 | 50,821 | 64,828 | 72,852 |

[1]Note these refer to only the parts of the districts within the CTM/CAST model (UDS/LURP) area.

**Added Household Capacity for Scenaro 2**

| PC | Township | MB | 2028 | 2038 | Total |
|---|---|---|---|---|---|
| 64 | Rolleston F SE | 4010047 | 353 | 236 | 589 |
| | | 2719417 | 249 | 159 | 408 |
| 67 | West Melton S | 4011164 | 39 | 26 | 65 |
| | | 4011163 | 40 | 26 | 66 |
| 68 | Prebbleton W Hamptons | 4011165 | 492 | 328 | 820 |
| 69 | Lincoln | 2720800 | 600 | 400 | 1000 |
| | | 4010021 | 600 | 400 | 1000 |
| 70 | Rolleston F FW | 2719416 | 480 | 320 | 800 |
| 71 | Rolleston Flight Contours | 4008019 | 396 | 264 | 660 |
| 72 | Prebbleton Trices | 2500100 | 177 | 118 | 295 |
| 73 | Rolleston L3 | 2719004 | 600 | 400 | 1000 |
| | | 2719005 | 660 | 440 | 1100 |
| 74 | West Melton E | 4000454 | 78 | 52 | 130 |
| 75 | Rolleston E | 4008019 | 168 | 112 | 280 |
| 76 | Rolleston E Maddisons | 2719416 | 93 | 62 | 155 |
| 77 | West Melton W | 4000456 | 150 | 100 | 250 |
| | | 4000452 | 165 | 110 | 275 |
| 78 | Rolleston SE | 4008019 | 453 | 303 | 756 |
| 79 | Prebbleton | 2500200 | 120 | 80 | 200 |
| | | 2500400 | 120 | 80 | 200 |
| | | | 6033 | 4016 | 10049 |

# APPENDIX B – 2038 AM Plots

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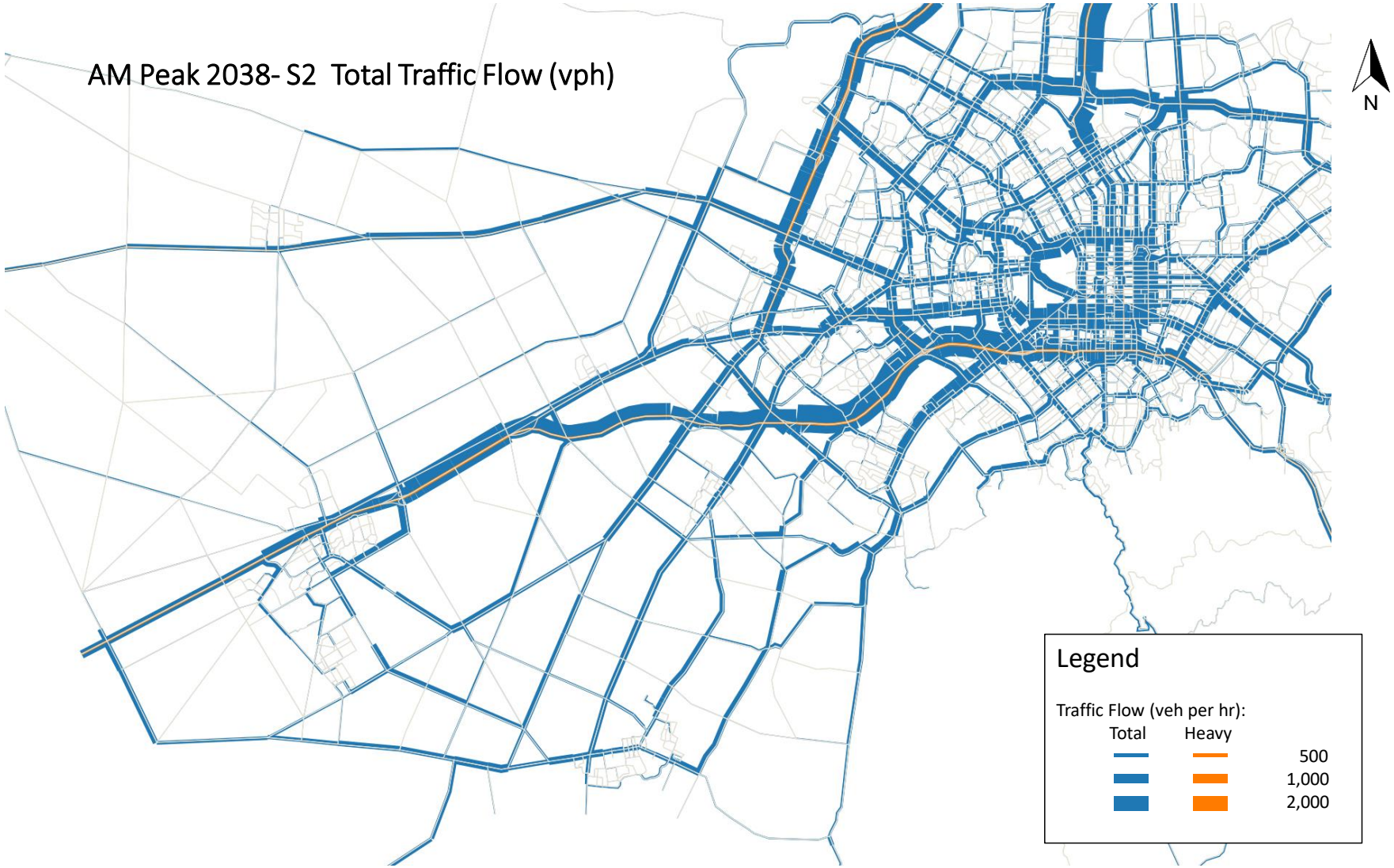
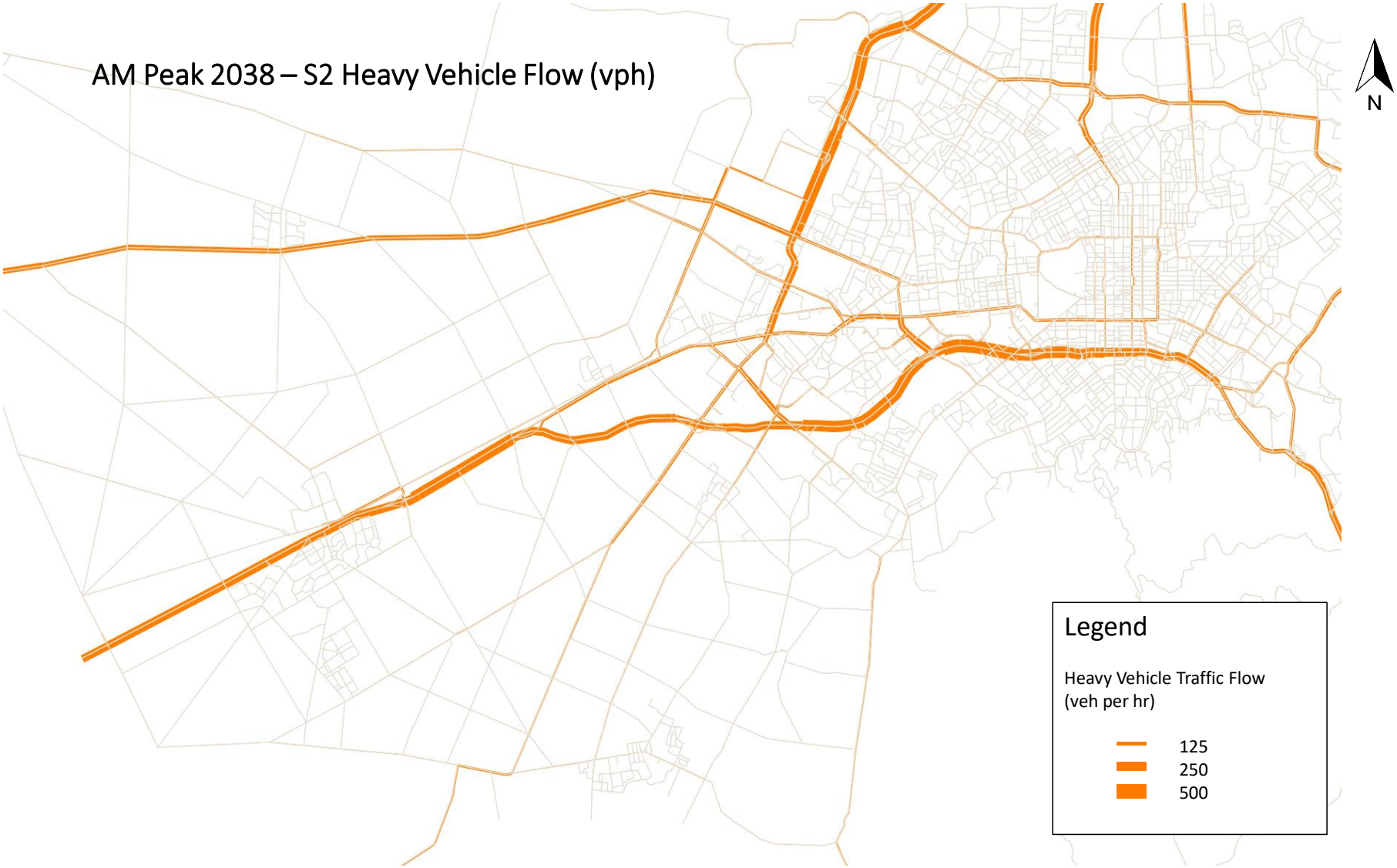
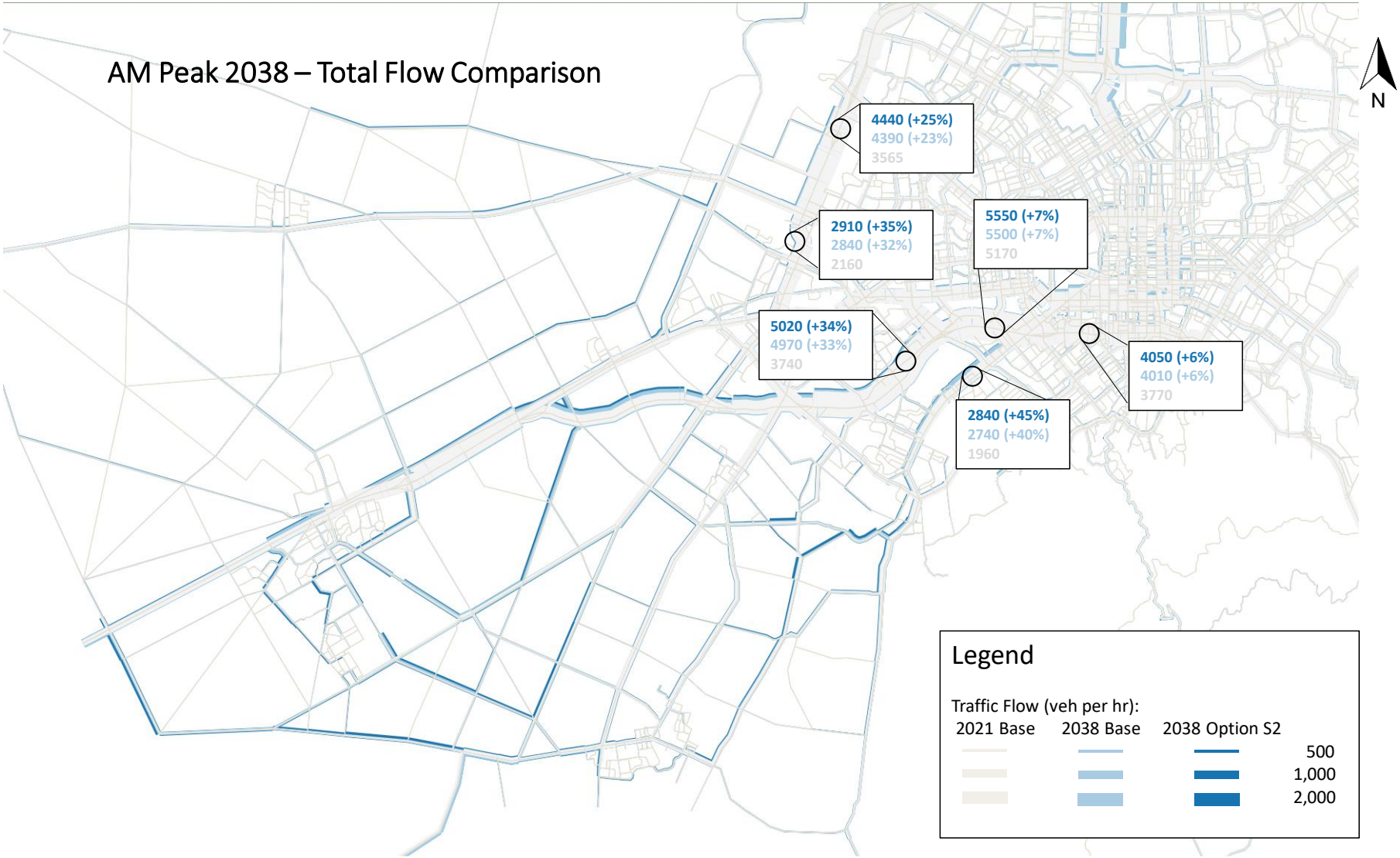
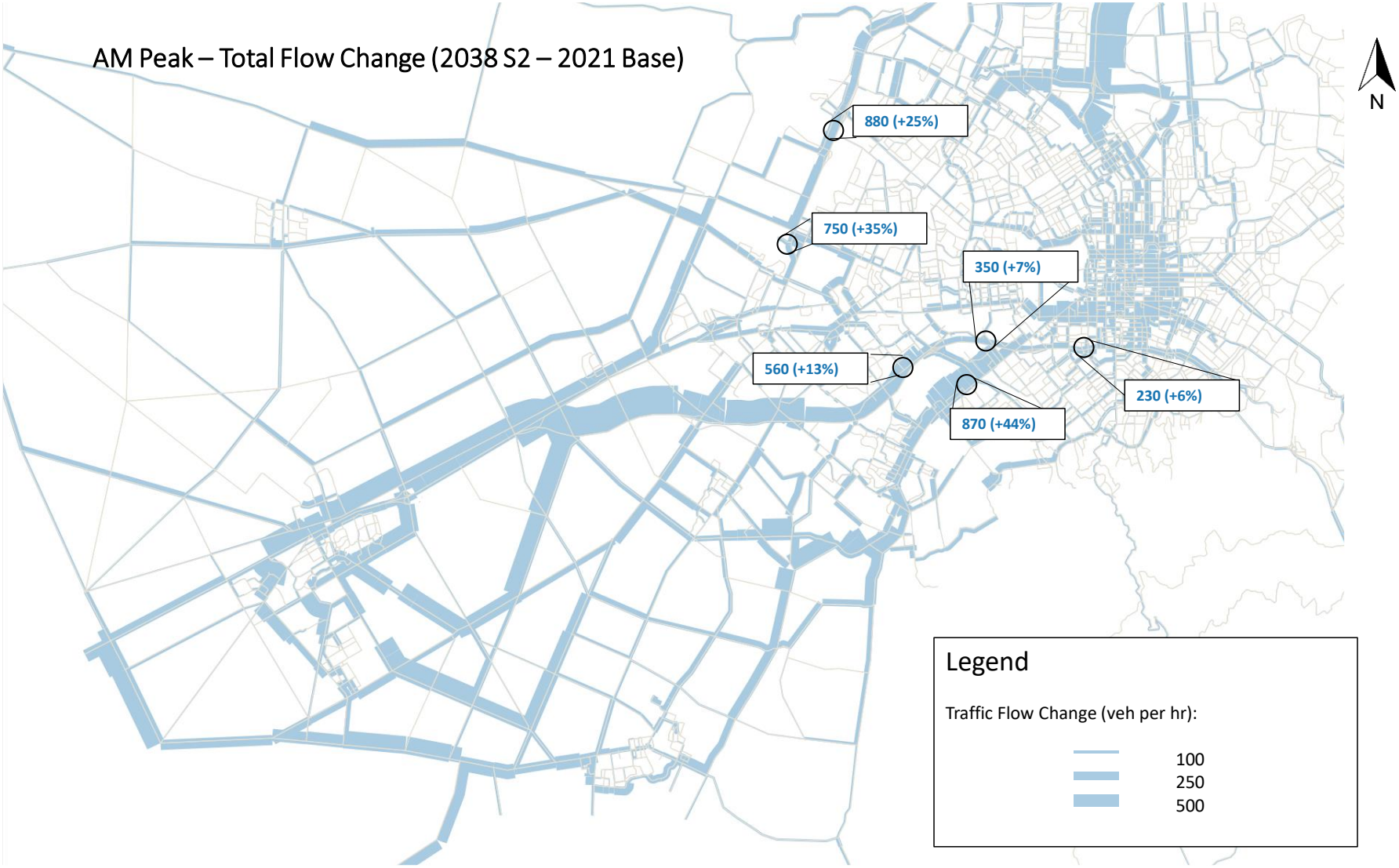
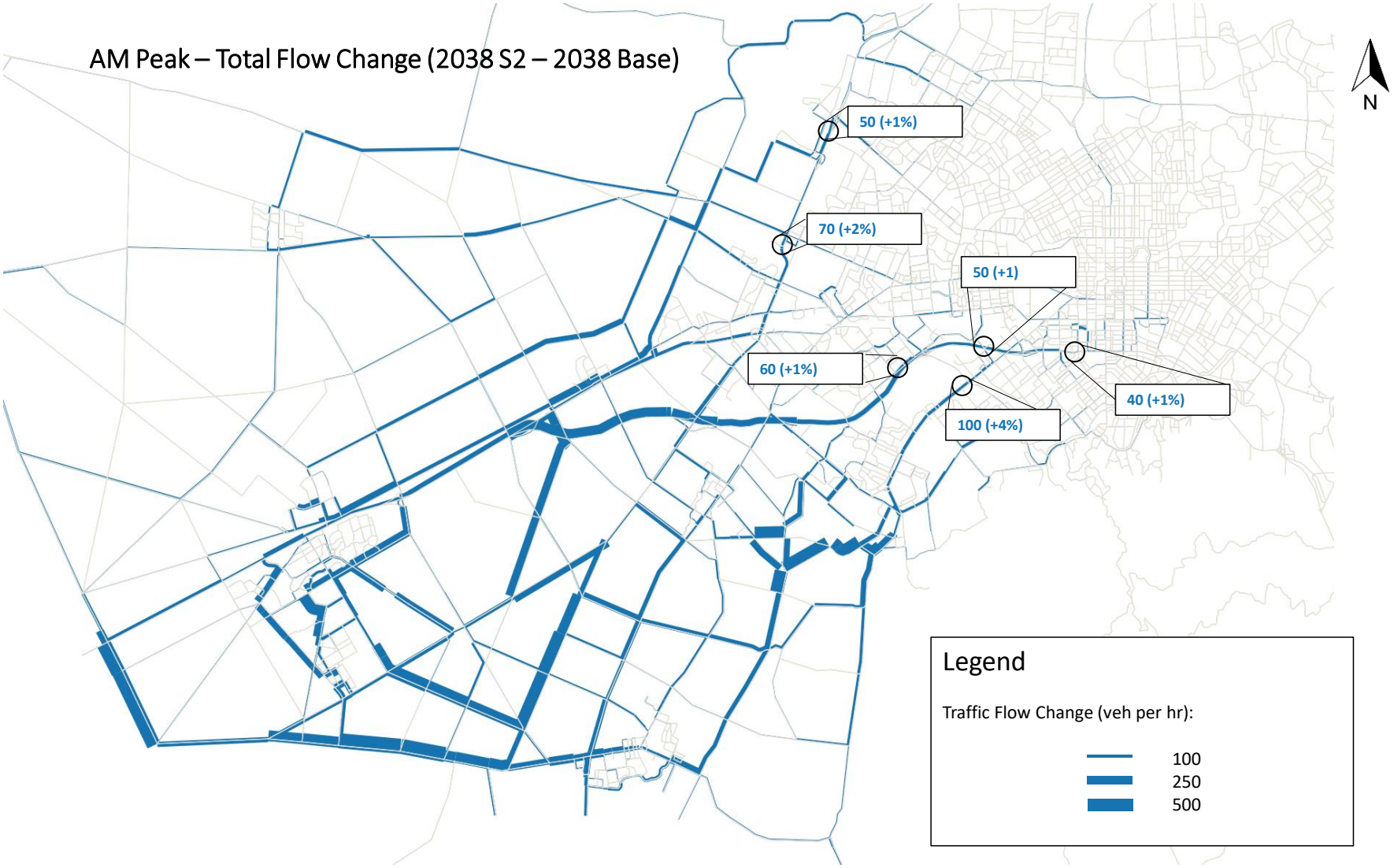

AM Peak 2038- S2 Total Traffic Flow (vph)
N
Legend
Traffic Flow (veh per hr):
Total
Heavy
500
1,000
2,000

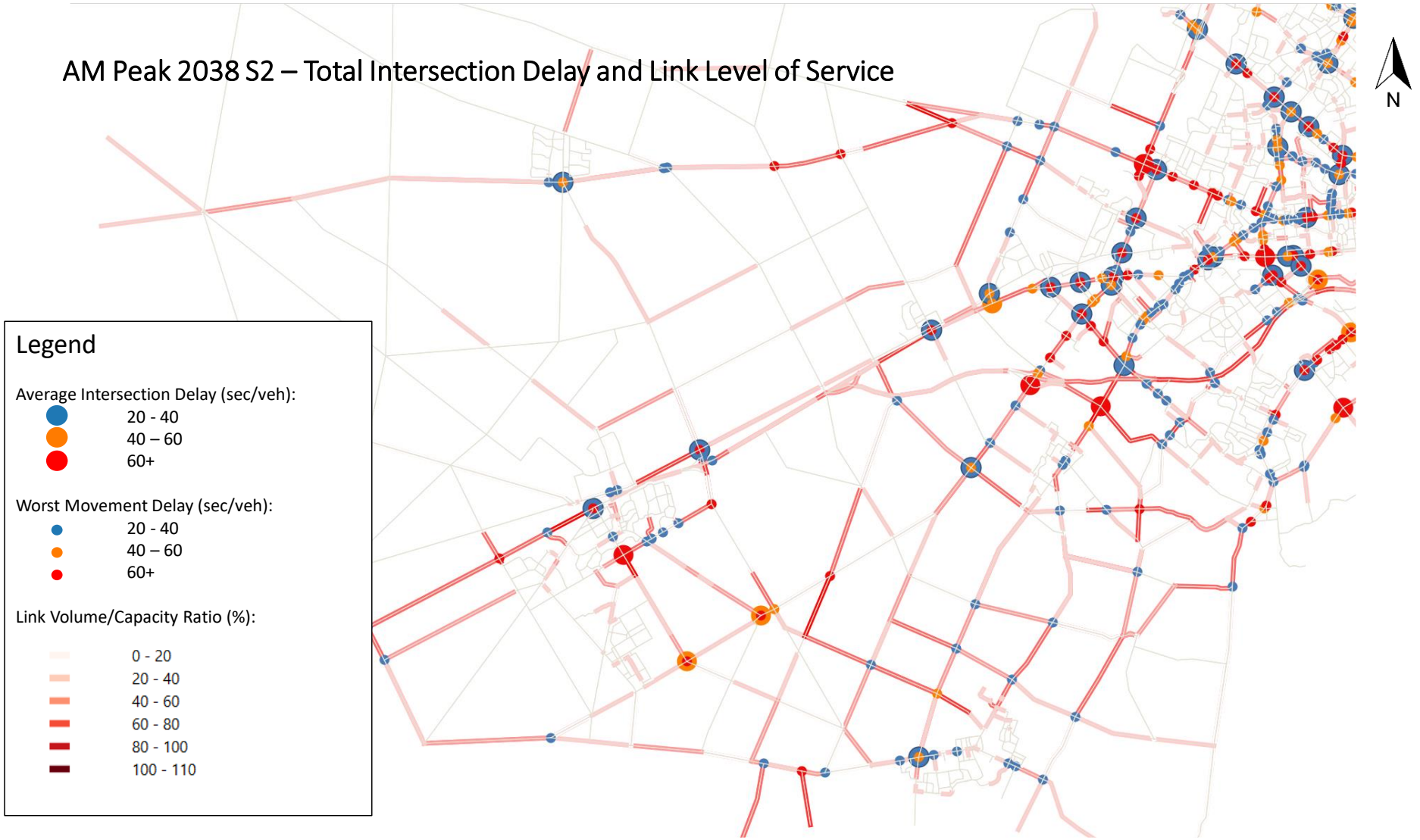

AM Peak 2038 – S2 Heavy Vehicle Flow (vph)
N
Legend
Heavy Vehicle Traffic Flow
(veh per hr)
125
250
500


AM Peak 2038 – Total Flow Comparison
N
4440 (+25%)
4390 (+23%)
3565
2910 (+35%)
2840 (+32%)
2160
5550 (+7%)
5500 (+7%)
5170
5020 (+34%)
4970 (+33%)
3740
4050 (+6%)
4010 (+6%)
3770
2840 (+45%)
2740 (+40%)
1960
Legend
Traffic Flow (veh per hr):
2021 Base
2038 Base
2038 Option S2
500
1,000
2,000

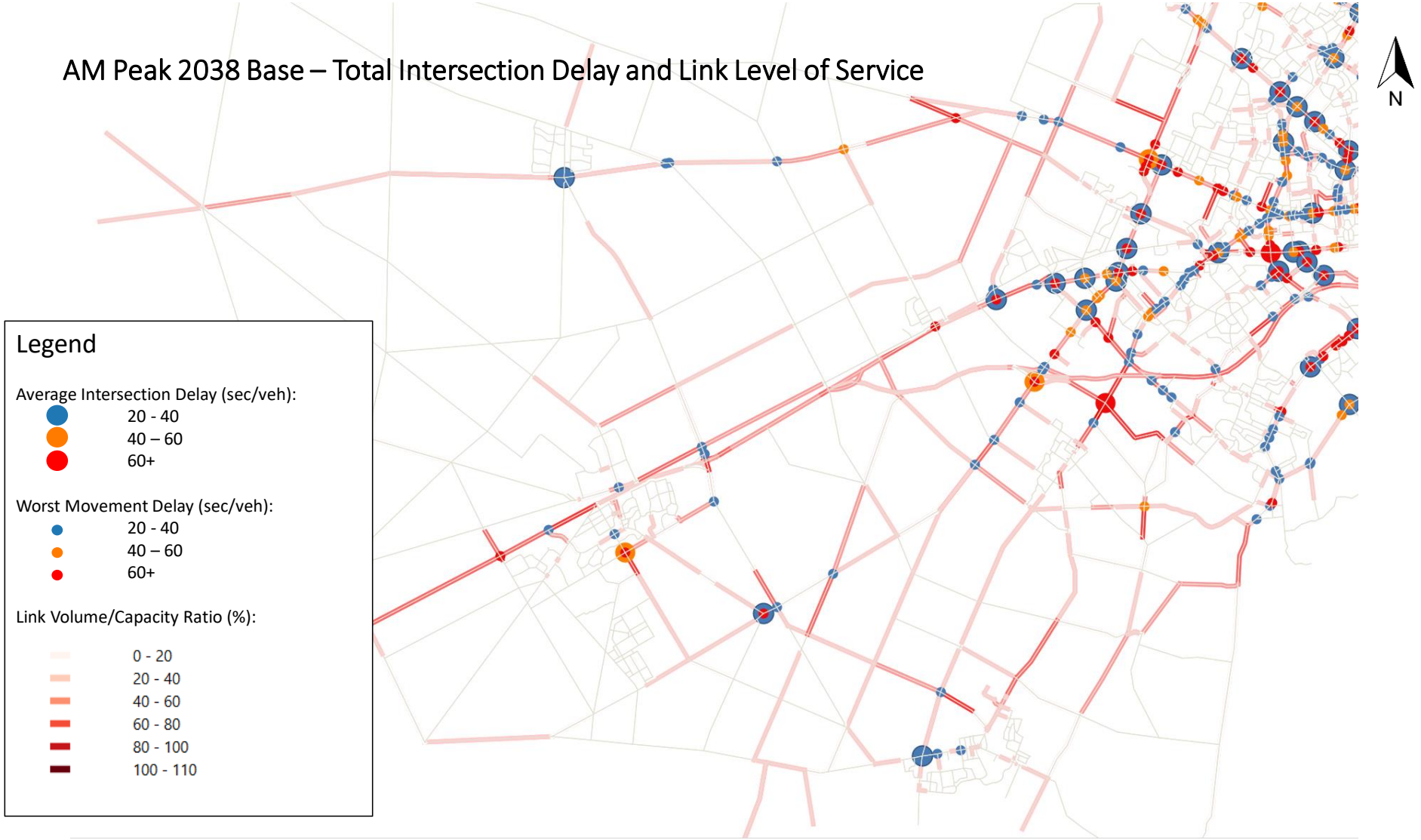




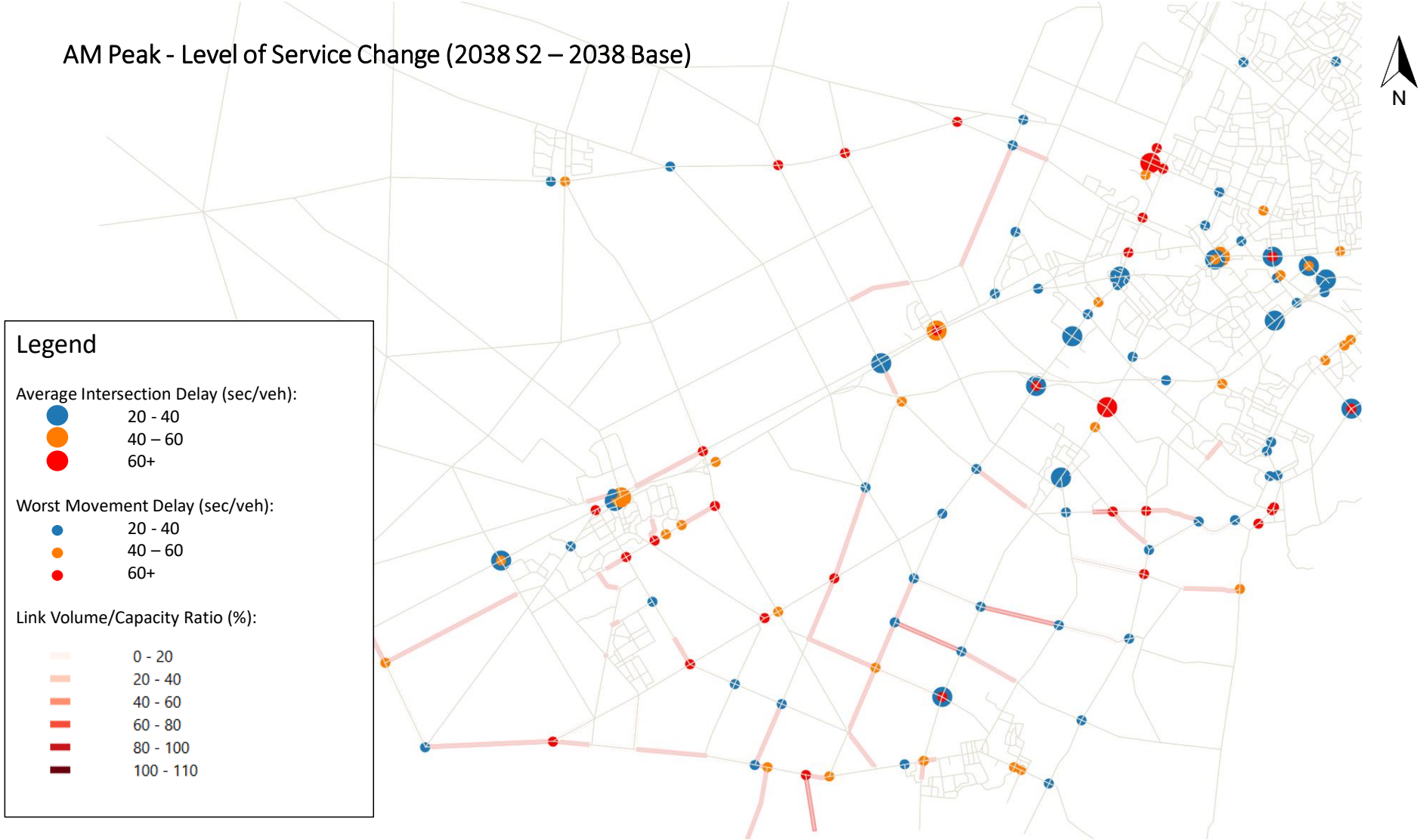
# AM Peak 2038 S2 – Total Intersection Delay and Link Level of Service



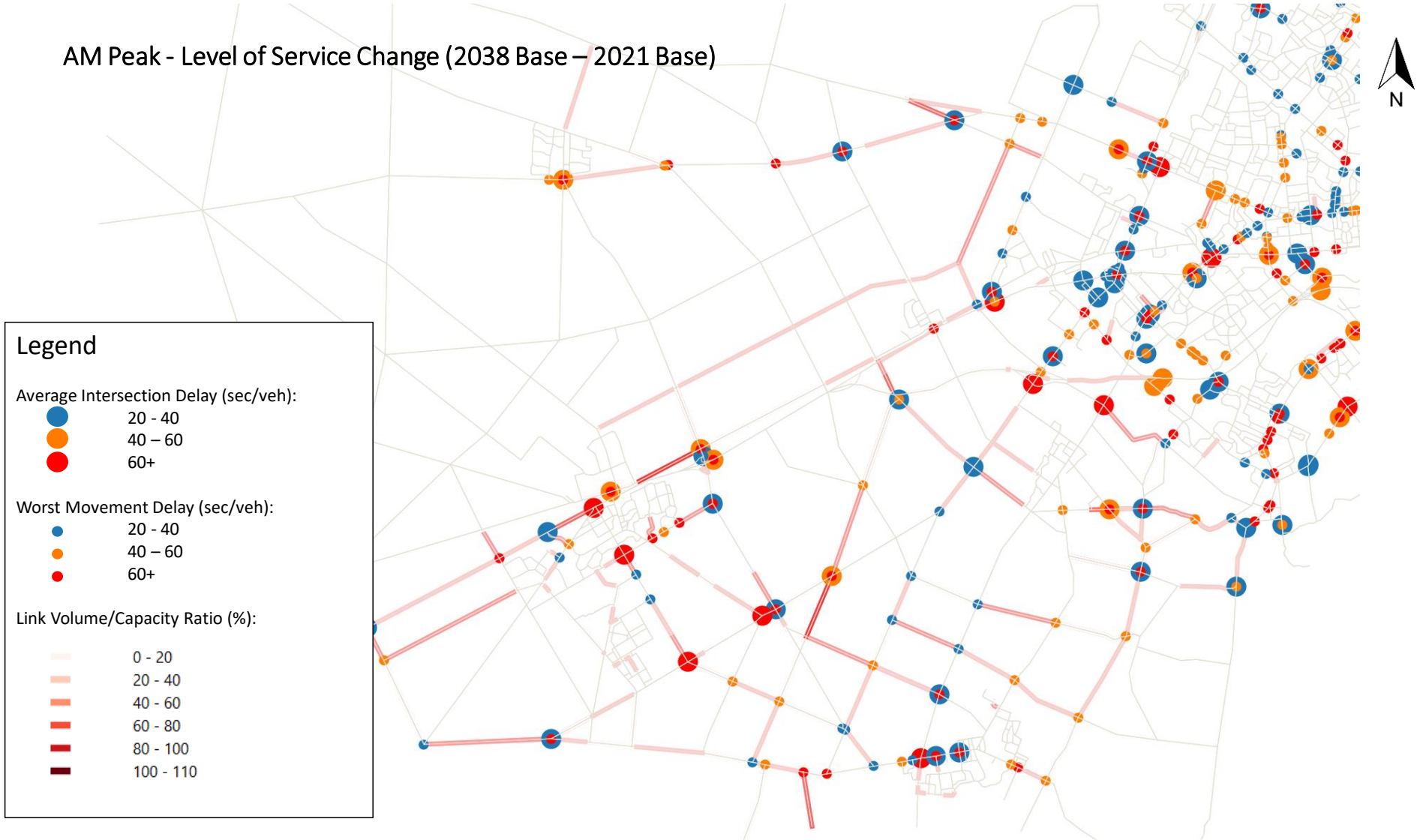
## AM Peak 2038 Base – Total Intersection Delay and Link Level of Service



## AM Peak - Level of Service Change (2038 S2 – 2038 Base)



## AM Peak - Level of Service Change (2038 Base – 2021 Base)



# AM Peak 2038 S2 – 2hr (0700-0900) Person Trip Summaries by mode

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Light Vehicle | From Selwyn GC to | 22,240 | 4,650 | 18,580 | 100 | 2,340 | 120 | 48,030 |
| | To Selwyn GC from | 22,240 | 520 | 6,950 | 230 | 90 | 60 | 30,090 |
| | From Selwyn Ext to | 2,260 | 200 | 1,190 | 50 | 60 | 90 | 3,850 |
| | To Selwyn Ext from | 2,340 | 260 | 1,220 | 40 | 60 | 60 | 3,980 |
| | TOTAL Trips | 44,480 | 5,170 | 25,530 | 330 | 2,430 | 180 | 78,120 |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| PublicTransport | From Selwyn GC to | 30 | 450 | 270 | 10 | - | - | 760 |
| | To Selwyn GC from | 30 | 10 | 70 | - | - | - | 110 |
| | From Selwyn Ext to | - | - | - | - | - | - | - |
| | To Selwyn Ext from | - | - | - | - | - | - | - |
| | TOTAL Trips | 60 | 460 | 340 | 10 | - | - | 870 |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Cycle | From Selwyn GC to | 910 | 60 | 220 | - | - | - | 1,190 |
| | To Selwyn GC from | 910 | - | 40 | - | - | - | 950 |
| | From Selwyn Ext to | - | - | - | - | - | - | - |
| | To Selwyn Ext from | - | - | - | - | - | - | - |
| | TOTAL Trips | 1,820 | 60 | 260 | - | - | - | 2,140 |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| TOTAL | From Selwyn GC to | 23,180 | 5,160 | 19,070 | 110 | 2,340 | 120 | 49,980 |
| | To Selwyn GC from | 23,180 | 530 | 7,060 | 230 | 90 | 60 | 31,150 |
| | From Selwyn Ext to | 2,260 | 200 | 1,190 | 50 | 60 | 90 | 3,850 |
| | To Selwyn Ext from | 2,340 | 260 | 1,220 | 40 | 60 | 60 | 3,980 |
| | TOTAL Trips | 46,360 | 5,690 | 26,130 | 340 | 2,430 | 180 | 81,130 |

# AM Peak 2038 S2 – 2hr (0700-0900) Person Trip Summaries by mode (%)

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Light Vehicle | From Selwyn GC to | 46% | 10% | 39% | 0% | 5% | 0% | 100% |
| | To Selwyn GC from | 74% | 2% | 23% | 1% | 0% | 0% | 100% |
| | From Selwyn Ext to | 59% | 5% | 31% | 1% | 2% | 2% | 100% |
| | To Selwyn Ext from | 59% | 7% | 31% | 1% | 2% | 2% | 100% |
| | TOTAL Trips | 57% | 7% | 33% | 0% | 3% | 0% | 100% |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| PublicTransport | From Selwyn GC to | 4% | 59% | 36% | 1% | 0% | 0% | 100% |
| | To Selwyn GC from | 27% | 9% | 64% | 0% | 0% | 0% | 100% |
| | From Selwyn Ext to | | | | | | | |
| | To Selwyn Ext from | | | | | | | |
| | TOTAL Trips | 7% | 53% | 39% | 1% | 0% | 0% | 100% |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Cycle | From Selwyn GC to | 76% | 5% | 18% | 0% | 0% | 0% | 100% |
| | To Selwyn GC from | 96% | 0% | 4% | 0% | 0% | 0% | 100% |
| | From Selwyn Ext to | | | | | | | |
| | To Selwyn Ext from | | | | | | | |
| | TOTAL Trips | 85% | 3% | 12% | 0% | 0% | 0% | 100% |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| TOTAL | From Selwyn GC to | 46% | 10% | 38% | 0% | 5% | 0% | 100% |
| | To Selwyn GC from | 74% | 2% | 23% | 1% | 0% | 0% | 100% |
| | From Selwyn Ext to | 59% | 5% | 31% | 1% | 2% | 2% | 100% |
| | To Selwyn Ext from | 59% | 7% | 31% | 1% | 2% | 2% | 100% |
| | TOTAL Trips | 57% | 7% | 32% | 0% | 3% | 0% | 100% |

# AM Peak 2038 S2 – 2hr (0700-0900) Vehicle Trip Summaries by mode

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Light Vehicle | From Selwyn GC to | 12,770 | 3,840 | 13,440 | 80 | 1,670 | 80 | 31,880 |
| | To Selwyn GC from | 12,770 | 370 | 4,820 | 200 | 70 | 50 | 18,280 |
| | From Selwyn Ext to | 1,610 | 140 | 850 | 40 | 40 | 70 | 2,750 |
| | To Selwyn Ext from | 1,670 | 180 | 870 | 30 | 40 | 50 | 2,840 |
| | TOTAL Trips | 25,540 | 4,210 | 18,260 | 280 | 1,740 | 130 | 50,160 |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Heavy Vehicle | From Selwyn GC to | 140 | 20 | 380 | 30 | 30 | 30 | 630 |
| | To Selwyn GC from | 140 | 10 | 330 | 40 | 30 | 10 | 560 |
| | From Selwyn Ext to | 30 | 80 | 270 | 30 | - | 30 | 440 |
| | To Selwyn Ext from | 30 | 80 | 280 | 30 | - | 10 | 430 |
| | TOTAL Trips | 280 | 30 | 710 | 70 | 60 | 40 | 1,190 |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| TOTAL | From Selwyn GC to | 12,910 | 3,860 | 13,820 | 110 | 1,700 | 110 | 32,510 |
| | To Selwyn GC from | 12,910 | 380 | 5,150 | 240 | 100 | 60 | 18,840 |
| | From Selwyn Ext to | 1,640 | 220 | 1,120 | 70 | 40 | 100 | 3,190 |
| | To Selwyn Ext from | 1,700 | 260 | 1,150 | 60 | 40 | 60 | 3,270 |
| | TOTAL Trips | 25,820 | 4,240 | 18,970 | 350 | 1,800 | 170 | 51,350 |

# AM Peak 2038 S2 – 2hr (0700-0900) Vehicle Trip Summaries by mode (%)

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Light Vehicle | From Selwyn GC to | 40% | 12% | 42% | 0% | 5% | 0% | 100% |
| | To Selwyn GC from | 70% | 2% | 26% | 1% | 0% | 0% | 100% |
| | From Selwyn Ext to | 59% | 5% | 31% | 1% | 1% | 3% | 100% |
| | To Selwyn Ext from | 59% | 6% | 31% | 1% | 1% | 2% | 100% |
| | TOTAL Trips | 51% | 8% | 36% | 1% | 3% | 0% | 100% |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Heavy Vehicle | From Selwyn GC to | 22% | 3% | 60% | 5% | 5% | 5% | 100% |
| | To Selwyn GC from | 25% | 2% | 59% | 7% | 5% | 2% | 100% |
| | From Selwyn Ext to | 7% | 18% | 61% | 7% | 0% | 7% | 100% |
| | To Selwyn Ext from | 7% | 19% | 65% | 7% | 0% | 2% | 100% |
| | TOTAL Trips | 24% | 3% | 60% | 6% | 5% | 3% | 100% |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| TOTAL | From Selwyn GC to | 40% | 12% | 43% | 0% | 5% | 0% | 100% |
| | To Selwyn GC from | 69% | 2% | 27% | 1% | 1% | 0% | 100% |
| | From Selwyn Ext to | 51% | 7% | 35% | 2% | 1% | 3% | 100% |
| | To Selwyn Ext from | 52% | 8% | 35% | 2% | 1% | 2% | 100% |
| | TOTAL Trips | 50% | 8% | 37% | 1% | 4% | 0% | 100% |

# AM Peak 2038 Base – 2hr (0700-0900) Person Trip Summaries by mode

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Light Vehicle | From Selwyn GC to | 16,740 | 3,150 | 13,020 | 80 | 1,860 | 70 | 34,920 |
| | To Selwyn GC from | 16,740 | 460 | 7,180 | 340 | 90 | 60 | 24,870 |
| | From Selwyn Ext to | 1,800 | 270 | 1,540 | 90 | 60 | 90 | 3,850 |
| | To Selwyn Ext from | 1,860 | 360 | 1,570 | 70 | 60 | 60 | 3,980 |
| | TOTAL Trips | 33,480 | 3,610 | 20,200 | 420 | 1,950 | 130 | 59,790 |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| PublicTransport | From Selwyn GC to | 30 | 300 | 190 | - | - | - | 520 |
| | To Selwyn GC from | 30 | 10 | 70 | - | - | - | 110 |
| | From Selwyn Ext to | - | - | - | - | - | - | - |
| | To Selwyn Ext from | - | - | - | - | - | - | - |
| | TOTAL Trips | 60 | 310 | 260 | - | - | - | 630 |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Cycle | From Selwyn GC to | 340 | 30 | 130 | - | - | - | 500 |
| | To Selwyn GC from | 340 | - | 40 | - | - | - | 380 |
| | From Selwyn Ext to | - | - | - | - | - | - | - |
| | To Selwyn Ext from | - | - | - | - | - | - | - |
| | TOTAL Trips | 680 | 30 | 170 | - | - | - | 880 |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| TOTAL | From Selwyn GC to | 17,110 | 3,480 | 13,340 | 80 | 1,860 | 70 | 35,940 |
| | To Selwyn GC from | 17,110 | 470 | 7,290 | 340 | 90 | 60 | 25,360 |
| | From Selwyn Ext to | 1,800 | 270 | 1,540 | 90 | 60 | 90 | 3,850 |
| | To Selwyn Ext from | 1,860 | 360 | 1,570 | 70 | 60 | 60 | 3,980 |
| | TOTAL Trips | 34,220 | 3,950 | 20,630 | 420 | 1,950 | 130 | 61,300 |

# AM Peak 2038 Base – 2hr (0700-0900) Person Trip Summaries by mode (%)

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Light Vehicle | From Selwyn GC to | 48% | 9% | 37% | 0% | 5% | 0% | 100% |
| | To Selwyn GC from | 67% | 2% | 29% | 1% | 0% | 0% | 100% |
| | From Selwyn Ext to | 47% | 7% | 40% | 2% | 2% | 2% | 100% |
| | To Selwyn Ext from | 47% | 9% | 39% | 2% | 2% | 2% | 100% |
| | TOTAL Trips | 56% | 6% | 34% | 1% | 3% | 0% | 100% |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| PublicTransport | From Selwyn GC to | 6% | 58% | 37% | 0% | 0% | 0% | 100% |
| | To Selwyn GC from | 27% | 9% | 64% | 0% | 0% | 0% | 100% |
| | From Selwyn Ext to | | | | | | | |
| | To Selwyn Ext from | | | | | | | |
| | TOTAL Trips | 10% | 49% | 41% | 0% | 0% | 0% | 100% |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Cycle | From Selwyn GC to | 68% | 6% | 26% | 0% | 0% | 0% | 100% |
| | To Selwyn GC from | 89% | 0% | 11% | 0% | 0% | 0% | 100% |
| | From Selwyn Ext to | | | | | | | |
| | To Selwyn Ext from | | | | | | | |
| | TOTAL Trips | 77% | 3% | 19% | 0% | 0% | 0% | 100% |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| TOTAL | From Selwyn GC to | 48% | 10% | 37% | 0% | 5% | 0% | 100% |
| | To Selwyn GC from | 67% | 2% | 29% | 1% | 0% | 0% | 100% |
| | From Selwyn Ext to | 47% | 7% | 40% | 2% | 2% | 2% | 100% |
| | To Selwyn Ext from | 47% | 9% | 39% | 2% | 2% | 2% | 100% |
| | TOTAL Trips | 56% | 6% | 34% | 1% | 3% | 0% | 100% |

# AM Peak 2038 Base – 2hr (0700-0900) Vehicle Trip Summaries by mode

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Light Vehicle | From Selwyn GC to | 9,180 | 2,620 | 9,700 | 70 | 1,330 | 50 | 22,950 |
| | To Selwyn GC from | 9,180 | 330 | 5,090 | 280 | 70 | 50 | 15,000 |
| | From Selwyn Ext to | 1,280 | 200 | 1,100 | 60 | 40 | 70 | 2,750 |
| | To Selwyn Ext from | 1,330 | 260 | 1,120 | 50 | 40 | 50 | 2,850 |
| | TOTAL Trips | 18,360 | 2,950 | 14,790 | 350 | 1,400 | 100 | 37,950 |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Heavy Vehicle | From Selwyn GC to | 120 | 10 | 360 | 30 | 30 | 30 | 580 |
| | To Selwyn GC from | 120 | 10 | 310 | 30 | 30 | 10 | 510 |
| | From Selwyn Ext to | 30 | 80 | 270 | 30 | - | 30 | 440 |
| | To Selwyn Ext from | 30 | 80 | 280 | 30 | - | 10 | 430 |
| | TOTAL Trips | 240 | 20 | 670 | 60 | 60 | 40 | 1,090 |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| TOTAL | From Selwyn GC to | 9,300 | 2,630 | 10,060 | 100 | 1,360 | 80 | 23,530 |
| | To Selwyn GC from | 9,300 | 340 | 5,400 | 310 | 100 | 60 | 15,510 |
| | From Selwyn Ext to | 1,310 | 280 | 1,370 | 90 | 40 | 100 | 3,190 |
| | To Selwyn Ext from | 1,360 | 340 | 1,400 | 80 | 40 | 60 | 3,280 |
| | TOTAL Trips | 18,600 | 2,970 | 15,460 | 410 | 1,460 | 140 | 39,040 |

# AM Peak 2038 Base -2hr (0700-0900) Vehicle Trip Summaries by mode (%)

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Light Vehicle | From Selwyn GC to | 40% | 11% | 42% | 0% | 6% | 0% | 100% |
| | To Selwyn GC from | 61% | 2% | 34% | 2% | 0% | 0% | 100% |
| | From Selwyn Ext to | 47% | 7% | 40% | 2% | 1% | 3% | 100% |
| | To Selwyn Ext from | 47% | 9% | 39% | 2% | 1% | 2% | 100% |
| | TOTAL Trips | 48% | 8% | 39% | 1% | 4% | 0% | 100% |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Heavy Vehicle | From Selwyn GC to | 21% | 2% | 62% | 5% | 5% | 5% | 100% |
| | To Selwyn GC from | 24% | 2% | 61% | 6% | 6% | 2% | 100% |
| | From Selwyn Ext to | 7% | 18% | 61% | 7% | 0% | 7% | 100% |
| | To Selwyn Ext from | 7% | 19% | 65% | 7% | 0% | 2% | 100% |
| | TOTAL Trips | 22% | 2% | 61% | 6% | 6% | 4% | 100% |

| | Location | Selwyn District | Christchuch Central City | Christchuch Other | Wiamakariri District | Selwyn External | Wimakariri External | TOTAL |
|---|---|---|---|---|---|---|---|---|
| TOTAL | From Selwyn GC to | 40% | 11% | 43% | 0% | 6% | 0% | 100% |
| | To Selwyn GC from | 60% | 2% | 35% | 2% | 1% | 0% | 100% |
| | From Selwyn Ext to | 41% | 9% | 43% | 3% | 1% | 3% | 100% |
| | To Selwyn Ext from | 41% | 10% | 43% | 2% | 1% | 2% | 100% |
| | TOTAL Trips | 48% | 8% | 40% | 1% | 4% | 0% | 100% |