Linwood-Central-Heathcote Community Board and Papanui-Innes Community Board
EXTRAORDINARY AGENDA

Notice of Meeting:

An Extraordinary meeting of the Linwood-Central-Heathcote Community Board and Papanui-Innes Community Board will be held on:

Date:	**Friday 31 May 2019**
Time:	**12.30pm**
Venue:	**Council Chamber, Level 2** **Civic Offices, 53 Hereford Street**

Membership

Chairperson	Ali Jones
Members	Emma Norrish
	Jo Byrne
	John Stringer
	Pauline Cotter
	Mike Davidson
	Sally Buck
	Jake McLellan
	Alexandra Davids
	Darrell Latham
	Tim Lindley
	Brenda Lowe-Johnson
	Deon Swiggs
	Sara Templeton
	Yani Johanson

28 May 2019

Elizabeth Hovell
Community Board Advisor
941 8637

www.ccc.govt.nz

Note: The reports contained within this agenda are for consideration and should not be construed as Council policy unless and until adopted. If you require further information relating to any reports, please contact the person named on the report.

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Strategic Framework

The Council's Vision – Christchurch is a city of opportunity for all.

Open to new ideas, new people and new ways of doing things – a city where anything is possible.

Whiria ngā whenu o ngā papa Honoa ki te maurua tāukiuki

Bind together the strands of each mat
And join together with the seams of respect and reciprocity.

The partnership with Papatipu Rūnanga reflects mutual understanding and respect, and a goal of improving the economic, cultural, environmental and social wellbeing for all.

Overarching Principle

Partnership – Our people are our taonga – to be treasured and encouraged. By working together we can create a city that uses their skill and talent, where we can all participate, and be valued.

Supporting Principles

- Accountability
- Affordability
- Agility
- Equity
- Innovation
- Collaboration
- Prudent Financial Management
- Stewardship
- Wellbeing and resilience
- Trust

Community Outcomes

What we want to achieve together as our city evolves

Strong communities

- Strong sense of community
- Active participation in civic life
- Safe and healthy communities
- Celebration of our identity through arts, culture, heritage and sport
- Valuing the voices of children and young people

Liveable city

- Vibrant and thriving central city, suburban and rural centres
- A well connected and accessible city
- Sufficient supply of, and access to, a range of housing
- 21st century garden city we are proud to live in

Healthy environment

- Healthy waterways
- High quality drinking water
- Unique landscapes and indigenous biodiversity are valued
- Sustainable use of resources

Prosperous economy

- Great place for people, business and investment
- An inclusive, equitable economy with broad-based prosperity for all
- A productive, adaptive and resilient economic base
- Modern and robust city infrastructure and community facilities

Strategic Priorities

Our focus for improvement over the next three years and beyond

- Enabling active citizenship and connected communities
- Maximising opportunities to develop a vibrant, prosperous and sustainable 21st century city
- Climate change leadership
- Informed and proactive approaches to natural hazard risks
- Increasing active, public and shared transport opportunities and use
- Safe and sustainable water supply and improved waterways

Part A **Matters Requiring a Council Decision**
Part B **Reports for Information**
Part C **Decisions Under Delegation**

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1. Apologies

There are no apologies to date.

2. Declarations of Interest

Members are reminded of the need to be vigilant and to stand aside from decision making when a conflict arises between their role as an elected representative and any private or other external interest they might have.

3. Confirmation of Previous Minutes

That the minutes of the Extraordinary Linwood-Central-Heathcote Community Board and Papanui-Innes Community Board meeting held on Wednesday, 8 May 2019 be confirmed (refer page 8).

4. Deputations by Appointment

Deputations may be heard on a matter or matters covered by a report on this agenda and approved by the Chairperson.

4.1 Cranford Street Downstream Effects Management Plan – St Albans School

Aaron Tunnicliff (Deputy Chair of the St Albans School Board of Trustees), Ginnie Warren (Principal of St Albans School) and Juliet Calder (Parent Representative, St Albans School Board of Trustees) will speak on behalf of the St Albans School Board of Trustees regarding the Downstream Effects Management Plan.

SUBMISSION CONTENT
As the Board of Trustees for a school of more than 600 learners whose zone will be split in two by this proposal, we discuss, read and respond with three concerns in mind:

1. Safety
We are concerned about the following aspects of the design as we believe they will raise the risk of our community being harmed beyond the current risk level.

Crossing Cranford Street
We would like to see specific details around safe crossing options for Cranford Street including but not limited to, the consideration of an elevated pedestrian crossing, pedestrian refuges in the centre of the road and longer pedestrian cross signals that are further separated from red light runners during peak school commute times. These crossing options should be regularly spread along Cranford Street to reduce the temptation to cross at uncontrolled points and yet work in concert with traffic flows to help ensure compliance and limit frustration. All pedestrian crossing points should also take into account the current prevalence of scooters as a primary means of transport for school age children and that many accompanying whanau push toddlers and babies in push chairs and buggies.

Local road calming measures

We are concerned that the extensive proposed local road calming measures will lead to non-compliance and more reckless behaviour as frustrations rise. In particular we note that local road calming measures taken around the Papanui Parallel cycleway have been unsuccessful in their intended purpose.

Examples of this are the turning restrictions from Rutland St into Westminster St which are so often ignored that the physical barrier has been replaced multiple times and is no longer there at all, and when it is in place traffic often performs three point turns further up Rutland St in order to turn east bound into Westminster St. In this instance it is easy to conceive of a St Albans school learner not expecting a vehicle to turn from a direction it's not supposed to and being injured as a result.

Another example is the 30 kph zone along Trafalgar Street which is largely ignored despite all measures taken and we fear that a broadening of these artificial means of calming traffic makes it more difficult for our learners and whanau to safely cross these roads because it's significantly harder to safely judge incoming traffic when that traffic can be travelling at vastly differing speeds.

Our hope is that traffic flow can be maintained along Cranford Street at all times so that Northern Arterial route users don't look for alternative routes and increase the risks into the wider suburb where the narrower streets, sharp corners and more densely populated areas provide more risk of injury and harm.

Parking restrictions leading to unsafe drop off practices
We fear that parking restrictions and limited access to existing parking facilities will lead to less safe school drop off practices. We currently have multiple measures in place to help encourage and promote safe school drop off practices which includes staff, students and volunteers guiding and enforcing our safe drop off practices. However we fear that as access to the English Park car park, Shepard Place and Westminster St drop off areas becomes harder and less convenient whanau and caregivers will drop off learners in non-safe drop locations increasing the associated risk. We also fear that the local road calming measures will restrict our whanau and caregivers from being able to drop learners off as part of their own commute to work as access is reduced by road closures, road narrowing and reduced speed limits, the resulting tension and heightened risk from more stress filled drop off times cannot lead to positive outcomes.
We do note the "Safe access to school (Study)" zone along 300 metres of Cranford St and would like more information but are concerned that the proposal under estimates the school's local impact having more than 600 learners commuting to and from school daily who access the school from multiple entry points and who are travelling to us from every direction.

2. Accessibility
We have reservations that the proposal as outlined will reduce access or at least make access to our school harder and more time consuming. In particular stage 2 as proposed will have a large impact on the majority of learners' journeys to school in a detrimental way. Our learners use multiple methods of transport to travel to school, while we don't track this daily and it varies depending on season, weather, etc., in descending order these tend to be:

- Car (200+)
- Walk (200+)

- Scoot (100)
- Cycle (10- 15)
- Tricycle/Tandem (2)

Some of these commutes are multi stage journeys with learners dropped off at the home of a neighbour or another local family before travelling with that family to school. These journeys influence the ability of our learners to participate fully in school and get the most from their education, as longer and more stressful commutes and riskier commutes will all make our learners less ready and able to get the most from their education and we would implore you to maintain access to the school as safe, quick and easy as possible so that we may maximise the educational outcomes of our learners.

In addition to St Albans School being a primary school that attracts local in zone enrolments, it is also much more:

It is a special interest school providing Maori emersion education for the surrounding area, a large number of whom travel from out of the immediate school zone. It is a school that opens its facilities to numerous community groups that range from after school schemes, martial arts, hockey, football, rugby, allowing swimming pool access to the wider community during summer time and numerous other out of school activities. We view this as a responsibility to our local community as an active and positive part of the St Albans area and relish the opportunities it affords our learners who are often a part of these out of school-based activities. It would be disappointing to see these opportunities for our learners and wider community reduced because: "The local football coach can longer get to the school facilities from their work in a reasonable time to hold weekday afternoon practices"

"Martial arts enrolments drop and become unviable because parents cannot make class times as it's too difficult to access the classes hosted at school"

"After school and holiday programmes are no longer offered because other local schools and facilities are more convenient"

Accessibility is a contributing factor to the success of this school which is currently at full capacity for student enrolments and has just been given such an exceptional rating by the Ministry of Education that the Minister of Education (The Rt. Hon. Chris Hipkins) reached out and congratulated the Principal, staff and board directly on the appraisal.

We would urge you to reconsider stage 2 and ensure that those changes are carefully balanced to ensure that the local community is not restricted in its use of our school facilities regardless of their means of transport.

3. Community

St Albans School has a diverse zone and school population which contributes to what we think of as a very special and positive culture. Parts of our zone are leafy broad residential streets with traditional and sizeable houses on large manicured sections, parts are higher density flats and townhouses on busier streets, and more are somewhere in between. Like all St Albans residents we fear that the increasing traffic on Cranford Street will create a division that effectively segregates our students into "East" and "West" of Cranford, limiting out of school socializing and other out of school opportunities.

But more than this that the local traffic calming measures will further restrict the opportunities for children inside our school zone to get the most from school by mixing with other learners from the south and north of our zone (if stage 2 effects are not balanced and limit the ability for parents and caregivers to pick up children from playdates etc).

In summary, while we appreciate the efforts in stage 1 to safely balance traffic flow with safety and access, we do have concerns over the effects of local traffic calming measures (both their effectiveness and unintended consequences as witnessed by the recent implementations of these measures against the Papanui Parallel cycleway) and have reservations about the potential effect of the stage 2 proposals that will make safe and easy access to our school more difficult. We would welcome the chance to present to the community board about this proposal and welcome any further opportunity to work with the council to refine the plans to further support the needs of our school community.

Yours sincerely,

Aaron Tunnicliff
Deputy Chair,
St Albans School Board of Trustees

Christchurch City Council

Linwood-Central-Heathcote Community Board and Papanui-Innes Community Board
OPEN MINUTES

Date:	**Wednesday 8 May 2019**
Time:	**9.24am**
Venue:	**Council Chambers, Level 2, Civic Offices, 53 Hereford Street, Christchurch**

Present

Chairperson	Ali Jones
Members	Emma Norrish
	Jo Byrne
	John Stringer
	Pauline Cotter
	Mike Davidson
	Jake McLellan
	Darrell Latham
	Tim Lindley
	Deon Swiggs
	Sara Templeton
	Yani Johanson

8 May 2019

Elizabeth Hovell
Community Board Advisor
941 8637

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Part A **Matters Requiring a Council Decision**

Part B **Reports for Information**

Part C **Decisions Under Delegation**

The agenda was dealt with in the following order.

1. Apologies

Part C

Joint Committee Resolved JM-LA/2019/00001

That the apologies for absence from Sally Buck and Alexandra Davids be accepted.

Member Davidson/Member Byrne **Carried**

2. Declarations of Interest

Part B

There were no declarations of interest recorded.

3. Deputations by Appointment

Part B

There were no deputations by appointment.

4. Downstream Effects Mitigation Plan - comments received

Joint Committee Resolved JM-LA/2019/00002 (original staff recommendation adopted without change)

That the Linwood-Central-Heathcote Community Board and Papanui-Innes Community Board:

1. Receive the comments submitted on the Downstream Effects Mitigation Plan.

Member Templeton/Member Norrish **Carried**

The Joint Meeting Heard from the following:

- Duncan Webb – MP for Christchurch Central
- Jenny Smith and Rodney Routledge
- A joint presentation from Axel Wilke and Emma Twaddell – SARA, representing Emma Twaddell, SARA, Axel Wilke, Ngahuia Freed, Mark Wilson, Jason Harvey and Simon Geary.

Member Lindley arrived 9.51am.

- Shane Dixon and Nathan Burford– Paparoa Primary School Board of Trustees.
- Peggy Kelly

Member Cotter left the meeting at 10.43am and returned to the meeting at 10.45am.
Member Byrne left the meeting at 10.44am and returned to the meeting at 10.46am.

- Kirsty Humm

The meeting adjourned at 10.55am and reconvened at 11.07am. All members were in attendance apart from Member Swiggs.

- David Wells
- Peter Jasper

Member Swiggs joined the meeting at 11.10am.

- Connie Christensen – Go Cycle Christchurch
- Margaret Stewart. Tabled a letter from Minister of Transport Hon Phil Twyford (**Attachment 1)**.

Member Lindley left the meeting at 11.30am.

- Francine Bills
- Jessica Halliday
- Andrew Willis
- Connie Christensen
- Robina Dobbie
- Dike De Lu – Spokes Canterbury
- Aynsley McNab
- Martin Meehan – Kidds Cakes and Bakery
- Clarrie Pearce
- David Moorhouse

Member Lindley returned to the meeting at 12.25pm.
Member Templeton left the meeting at 12.30pm.

- Martin Pinkham

Member Templeton returned to the meeting at 12.33pm.
Member Swiggs left the meeting at 12.34 pm.

- Connie Christensen presented on behalf of Vince Eichholtz
- Peter Davey
- Paul van Herpt
- Annie Broughton and Rose Bayldon - Generation Zero Christchurch
- John Ingles – Ourvets St Albans

Meeting concluded at 1.09pm.

CONFIRMED THIS 22nd DAY OF MAY 2019.

ALI JONES
CHAIRPERSON

ATTACHMENT 1 – LETTER TABLED BY MARGARET STEWART

Hon Phil Twyford

MP for Te Atatu
Minister of Housing and Urban Development
Minister of Transport

26 APR 2019

Margaret Stewart
Margaret.Stewart@synlait.com

Dear Margaret

Thank you for your email of 4 April 2019 regarding the Christchurch City Council's Downstream Effects Management Plan to mitigate the effects of additional traffic in your area caused by the Christchurch Northern Corridor.

I understand you are concerned about the effects additional traffic will have on St Albans and would like the council's management plan to emphasise public transport and active modes of travel. I encourage you to share your views with the council, as I understand they are currently consulting the public regarding this plan.

Thank you for bringing this matter to my attention.

Yours sincerely

PP B Hamilton

Hon Phil Twyford
Minister of Transport

+64 4 817 8704 Private Bag 18041, Parliament Buildings, Wellington 6160, New Zealand p.twyford@ministers.govt.nz beehive.govt.nz

5. North Avon Road - No Stopping Restrictions - Post-Construction Safety Audit

Reference: 19/382225

Presenter(s): Kirsty Mahoney, Project Manager Transport

1. Purpose of Report

1.1 The purpose of this report is to request the Linwood-Central-Heathcote Community Board and Papanui-Innes Community Board to approve the installation of no-stopping restrictions on North Avon Road as a result of post-construction safety audit recommendations.

2. Executive Summary

2.1 The construction of the North Avon Road Street Renewal project was completed in early October 2018.

2.2 A post-construction safety audit was undertaken in November 2018. Recommendations of this safety audit included installation of no-stopping line restrictions to mitigate the potential conflict between parked vehicles, cyclists and moving vehicles.

2.3 This report requests the approval of no-stopping restrictions as outlined in the staff recommendations below.

3. Staff Recommendations

That the Waikura/Linwood-Central-Heathcote and the Waipapa/Papanui-Innes Community Boards:

1. Approve that under clause 7 of the Christchurch City Council Traffic and Parking Bylaw 2017, that the stopping of vehicles be prohibited at any time on the parts of North Avon Road, Nicholls Street and Stapletons Road as indicated in the attached drawing TP324002 Issue 1, dated 08/04/2019.
2. Revoke any previous resolutions pertaining to traffic controls made pursuant to any bylaw to the extent that they are in conflict with the traffic controls described in this report.
3. Approve that these resolutions take effect when there is evidence that the restrictions described in the staff report are in place.

4. Context/Background

Issue

4.1 The construction of the North Avon Road Street Renewal project commenced in January 2018, and was completed in early October 2018. A post-construction safety audit was carried out in November 2018. This safety audit identified a number of recommendations to ensure the safe use of the completed works along North Avon Road.

4.2 The recommendations included installation of additional no-stopping restrictions at the following locations to mitigate the potential conflict between parked cars, cyclists and moving vehicles:

4.2.1 Approximately 20 metres outside 41 and 43 North Avon Road, which is in the vicinity of Kids First Kindergarten. The safety audit has recommended that the extent of the

parking area outside Kids First Kindergarten is clearly defined and no stopping lines are provided to cover the extent of the tapered cycle lane ahead of the raised median island. As there can be high parking turnover here during pick up and drop off times, cyclists riding past these parked vehicles are in the car door opening zone.

4.2.2 Approximately an additional 10 metres northbound on the western side of Nicholls Street from its intersection with North Avon Road. The safety audit has recommended various approach delineation methods to minimise the opportunity for drivers to crash into the offset kerb build-out at this intersection. These options include the installation of no-stopping lines on the western side of Nicholls Street to remove potential conflict between parked vehicles, cyclists and moving vehicles in both directions.

4.2.3 Approximately 30 metres outside 51 and 55 North Avon Road. The safety audit has recommended that extent of the parking area at this location is clearly defined and no stopping lines are provided to cover the extent of the tapered cycle lane. Cyclists riding past these parked vehicles are in the car door opening zone.

4.2.4 Approximately an additional 10 metres northbound on the western side of Stapletons Road from its intersection with North Avon Road. The safety audit has recommended various approach delineation methods to minimise the opportunity for drivers to crash into the offset kerb build-out at this intersection. These options include the installation of no-stopping lines on the western side of Stapletons Road to remove potential conflict between parked vehicles, cyclists and moving vehicles in both directions.

4.2.5 Approximately 20 metres outside 82 and 84 North Avon Road. The safety audit has recommended consideration is given to removing parking from this section of North Avon Road as the 1.7m width available is too narrow and parked cars encroach the cycle lane and introduce the car door opening safety concern. As a minimum, yellow no stopping should be extended beyond the boundary of 82/84 North Avon Road to remove the potential for cars to park in the location where drivers cut across the cycle lane.

Strategic Alignment

4.3 The recommendations in this report seek to mitigate potential conflicts between parked vehicles, cyclists and moving vehicles within the carriageway.

4.4 This report supports the Council's Long Term Plan (2018 - 2028):

4.4.1 Activity: Traffic Safety and Efficiency

- Level of Service: 10.0.6.1 Reduce the number of casualties on the road network - =129 (reduce by 5 or more per year)

Decision Making Authority

4.5 Pursuant to clause 32 of Schedule 7 of the Local Government Act 2002, the Council delegates the responsibilities, duties and powers under the Christchurch City Council Traffic and Parking Bylaw 2017 to Community Boards to exercise within their communities (as defined in the Local Government Act 2002).

4.6 This delegation includes Clause 7 of the Bylaw to *"restrict the stopping, standing or parking of vehicles, or any class of vehicles, on any road; or …"* (Part D – Sub Part 1 – Community Boards, Christchurch City Council Delegations Register, 18 Dec 2018).

4.7 Any decision by a Community Board must be consistent with any policies or standards or resolutions adopted by the Council.

Previous Decisions

4.8 The preferred scheme design for the North Avon Road reconstruction project was approved to proceed by the Shirley/Papanui, Burwood/Pegasus and Hagley/Ferrymead Community Boards on 4 October 2016. The Council approved the preferred scheme plan at its meeting held on 2 November 2016.

Assessment of Significance and Engagement

4.9 The decisions in this report are of low significance in relation to the Christchurch City Council's Significance and Engagement Policy.

4.10 The level of significance was determined by Council staff assessment of the criteria in the Council's Significance and Engagement Policy.

5. Options Analysis

Options Considered

5.1 The following reasonably practicable options were considered and are assessed in this report:

- Install the no-stopping restrictions recommended by the post-construction safety audit
- Do nothing.

Options Descriptions

5.2 **Preferred Option: Option 1 - Installation of no-stopping restrictions**

5.3 **Option Description:** The post-construction safety audit recommendations included installation of additional no-stopping restrictions at the following locations to mitigate the potential conflict between parked vehicles, cyclists and moving vehicles:

- Approximately 20 metres outside 41 and 43 North Avon Road, which is in the vicinity of Kids First Kindergarten
- Approximately an additional 10 metres northbound on the western side of Nicholls Street from its intersection with North Avon Road
- Approximately 30 metres outside 51 and 55 North Avon Road
- Approximately an additional 10 metres northbound on the western side of Stapletons Road from its intersection with North Avon Road
- Approximately 20 metres outside 82 and 84 North Avon Road

5.3.1 **Option Advantages**

- The advantages of installing these no stopping restrictions is the mitigation of potential conflict between cyclists and parked and moving vehicles.

5.3.2 **Option Disadvantages**

- Loss of potential on-street parking space that has been historically used by members of the community.

5.4 **Option 2 – Do nothing**

5.4.1 **Option Description:** The do nothing option will retain the status quo.

5.4.2 **Option Advantages**

- Existing on-street parking opportunities will remain in place.

5.4.3 **Option Disadvantages**

- There is increased risk of conflict or incidents between cyclists with parked and moving vehicles.
- There is an increased risk of challenge as a significant identified safety risk as not been addressed.

Analysis Criteria

5.5 The key assessment criteria were based on the findings and recommendations of the post-construction safety audit.

6. Community Views and Preferences

6.1 The contractor had been instructed to install the no-stopping lines as part of the defects list for completion. It is noted that the no-stopping lines proposed outside the Kids First Kindergarten were installed for a distance greater than recommended by the safety audit, which has caused concern for the parents and staff of the Kids First Kindergarten.

6.2 The contractor has removed the lines not included in the recommendation.

7. Legal Implications

7.1 There is not a legal context, issue or implication relevant to this decision.

7.2 This report has not been reviewed and approved by the Legal Services Unit.

8. Risks

8.1 The key risk sits with maintaining the status quo (i.e. do nothing) as this will not address the potential conflict between road users (i.e. parked vehicles, cyclists and moving vehicles).

9. Next Steps

9.1 The approval of the staff recommendations will enable the no stopping restrictions to be legalised.

10. Options Matrix

Criteria		Option 1 – Install no stopping restrictions	Option 2 – Do nothing
Financial Implications	**Cost to Implement**	$6,405	Nil
	Maintenance/Ongoing	Re-marking as required	No material implication
	Funding Source	Project budget (capital work)	Not required
	Impact on Rates	Nil	Nil
(Criteria 1 e.g. Climate Change Impacts)		No material impact	No material impact
(Criteria 2 e.g. Accessibility Impacts)		Reduces potential existing parking opportunities	Maintains status quo with regard to on-street parking
(Criteria 3 e.g. Health & Safety Impacts)		Reduces potential safety conflicts	Maintains increased risk of collisions involving cyclists and vehicles (parked and moving)
(Criteria 4 e.g. Future Generation Impacts)		No material impact	No material impact

Criteria	Option 1 -	Option 2 -
Impact on Mana Whenua	Nil	Nil
Alignment to Council Plans & Policies	Aligns with Council Plans and Policies to improve traffic safety and efficiency.	Reduces alignment with Council's aims for traffic safety and efficiency.

Attachments

No.	Title	Page
A ⇩	North Avon Road - Post-Construction Safety Audit - No Stopping Restrictions	20

Confirmation of Statutory Compliance

Compliance with Statutory Decision-making Requirements (ss 76 - 81 Local Government Act 2002).

(a) This report contains:

(i) sufficient information about all reasonably practicable options identified and assessed in terms of their advantages and disadvantages; and

(ii) adequate consideration of the views and preferences of affected and interested persons bearing in mind any proposed or previous community engagement.

(b) The information reflects the level of significance of the matters covered by the report, as determined in accordance with the Council's significance and engagement policy.

Signatories

Authors	Kirsty Mahoney - Project Manager Sharon O'Neill - Team Leader Project Management Transport
Approved By	Lynette Ellis - Manager Planning and Delivery Transport David Adamson - General Manager City Services Richard Osborne - Head of Transport

Christchurch City Council

Original size mm 100 50 30 10 0

10 5 0 10 20 30 40
SCALE (m)

Christchurch City Council

North Avon Road Improvements
Proposed No Stopping Restrictions
For Board Approval

Original Plan Size: A3
ISSUE. 1 08/04/2019
TP324002 MJR CP501296

6. Christchurch Northern Corridor Downstream Effects Management Plan

Reference: 19/401838

Presenter(s): Andy Richards (Project Manager) Shane Turner (Independent Traffic Expert)

1. Purpose of Report

1.1 The purpose of this report is to request the Waipuna/Papanui-Innes and Waikura/Linwood-Central-Heathcote Community Boards receive the final Downstream Effects Management Plan and recommend to Council the endorsement of the final Downstream Effects Management Plan.

1.2 Council staff have worked with the relevant Community Boards throughout the development of the methodology that has informed the Downstream Effects Management Plan. Although the decision-making authority for the final Downstream Effect Management Plan belongs to Council, staff wish to continue to communicate and seek the endorsement and support for any recommendation to Council for matters relating to the Christchurch Northern Corridor.

2. Executive Summary

2.1 Under the conditions of the relevant Consent Order, Christchurch City Council is required to:

2.1.1 Mitigate the downstream traffic effects arising from the operation of the Christchurch Northern Corridor.

2.1.2 Engage an independent traffic expert to identify the potential impacts on those streets at the end of the Christchurch Northern Corridor which may be potentially affected as a result of the operation of the Christchurch Northern Corridor and recommend appropriate traffic mitigation measures to Council.

2.1.3 Engage with certain owners/occupiers and specified persons/groups regarding the Independents Expert's recommendations.

2.1.4 Carry out ongoing monitoring and identify the anticipated future increase in traffic as a result of the Christchurch Northern Corridor.

2.1.5 Carry out any recommended traffic mitigation measures if traffic volumes are anticipated to increase by over 30% on any street. Council must implement mitigation measures as soon as reasonably practicable and in accordance with the timeframes required by the Consent.

2.2 Council received the draft Downstream Effects Management Plan in February 2019 for consultation and Council staff have now completed the second phase of community engagement. Feedback received during this engagement has fed into the attached final version of the Downstream Effects Management Plan (**Attachment A**) that has been prepared by the Independent Traffic Expert.

2.3 The final Downstream Effects Management Plan anticipates that main roads and some local roads in the study area will likely see an increase of more than 30% in traffic volume upon the opening of the Christchurch Northern Corridor. The report proposes a prioritised work programme to address this.

3. Staff Recommendations

That the joint Linwood-Central-Heathcote Community Board and Papanui-Innes Community Board:

1. Receive and endorse the final Downstream Effects Management Plan.
2. Recommend to Council to endorse the final Downstream Effects Management Plan.
3. Note that Council Staff will proceed to design and consult on the proposed interventions in Stage 1A and will develop a programme and costings for the remaining stages.

4. Context/Background

Designation Conditions

4.1 In mid-2015 a Hearings Panel of Independent Commissioners confirmed the Notice of Requirement for the Northern Arterial, the Northern Arterial Extension and the Cranford Street Upgrade, subject to conditions.

4.2 That decision was appealed to the Environment Court. One appeal related to the turning bays and u-turn bays north of Innes Road on Cranford Street and the other was property-related. None of the appeals lodged concerned the condition which addressed downstream traffic effects or the proposal as a whole. Both appeals were settled by agreement without the need for a hearing.

4.3 In February 2016 the Environment Court considered the consent memorandum of the parties which resolved the appeals lodged and issued a Consent Order which included the addition of one further condition and associated plans for turning bays and u-turn bays on the northern end of Cranford Street. All other conditions for the Northern Arterial Extension and the Cranford Street Upgrade remained unchanged.

4.4 Along with the Northern Arterial, these projects would subsequently become collectively known as the Christchurch Northern Corridor.

4.5 Condition 26 of the Notice of Requirement Conditions for the Northern Arterial and Cranford Street Upgrade Designation, RMA92024074 (Designation condition) relates to downstream traffic effects. Condition 26 states:

> *"Prior to operating the Northern Arterial Extension and Cranford Street Upgrade (NAE/CSU) authorised by this designation Christchurch City Council shall implement the Downstream Effects and Property Amenity Traffic Management Plan contained in Appendix A to these conditions to address any downstream effects relating to traffic arising from the operation of the NAE/CSU."*

4.5 Appendix A of the Notice of Requirement Conditions is the *Downstream Effects and Property Amenity Traffic Management Plan* (**management plan**). This management plan outlines the following objectives:

- To identify preferred vehicle access routes, particularly for trucks, between the end of the Christchurch Northern Corridor and Central City;
- To identify strategies to keep vehicles on preferred vehicle access routes; and

- To discourage vehicles away from public transport and walking or cycling routes such as Main North Road/Papanui Road and Rutland Street corridors respectively.

4.6 Appendix A then goes on to state that the purpose of the management plan is to:

- Assess the existence, nature and extent of any increased traffic on streets adjacent to, or adjoining Cranford St attributed to the Northern Arterial Extension and Cranford Street Upgrade that might cause or contribute to a loss of a service to any of these streets for up to 10 years after the opening date of the Northern Arterial Extension and Cranford Street Upgrade;
- Implement measures to avoid, remedy or mitigate such effects, where these are more than minor, in a timely and cost effective manner and where appropriate and practicable; and
- Monitor efficacy of the measures for an appropriate period and implement further remedial action, if this is necessary and appropriate.

4.7 Appendix A also requires Council to appoint an independent expert, who is a suitably qualified traffic engineer. They will investigate and design an appropriate methodology to identify the potential impacts (if any) and address the requirements of the Designation conditions.

Independent Expert

4.8 Council appointed Dr Shane Turner as an independent traffic expert to develop a methodology to identify potential impacts and draft the Downstream Effects Management Plan. As part of the development of a methodology, Dr Turner recommended preliminary engagement with the local community prior to drafting the Downstream Effects Management Plan. This preliminary engagement was not required as part of the Designation conditions.

4.9 Dr Turner completed the draft Downstream Effects Management Plan and Council staff sought community feedback on this in March/April 2019 in accordance with the Designation conditions.

4.10 Following consideration of the community feedback received, Dr Turner has completed the final Downstream Effects Management Plan. This sought to balance the needs of local communities with safety and accessibility considerations, while ensuring an accessible city for all Christchurch residents, businesses and visitors. The staged approach proposed timely monitoring, an arterial corridor upgrade, local road traffic calming and improving access to schools, parks and commercial areas.

Strategic Alignment to National, Regional and Local Strategies

4.11 Various national, regional, and local strategies exist which have also helped guide the direction of the attached Downstream Effects Management Plan. Any options developed need to be conscious of the relevant objectives contained within those strategies.

National

4.12 The Government Policy Statement on Land Transport 2018 has four strategic directions:

- Safety.
- Access.
- Environment.
- Value for Money.

4.13 These strategic directions were considered during option conception and in the application of the multi-criteria analysis to assess the efficacy of any proposed options regarding the impact on the local community.

4.14 The Safer Journeys Strategy (2010-2020) guides how safety concerns will be addressed in New Zealand over the period 2010-2020. It outlines the Safe System approach which recognises the vulnerability of road users, and the four pillars of safe roads and roadsides, safe speeds, safe vehicles, and safe road use, under which safety is to be addressed. In urban areas the safety of pedestrians (especially vulnerable pedestrians; young, and elderly) and cyclists needs to be considered alongside vehicle safety. This is considered as an integral part of the staged recommendations of the Downstream Effects Management Plan. It suggests safer speeds for the local areas and has an emphasis on developing safer access to schools, parks and commercial areas. The plan also recommends investing in an alternative secondary cycle route on the eastern side of Cranford Street and if required, an additional pedestrian crossing facility along Cranford Street.

Regional

4.15 The Regional Land Transport Plan (2015-2025) outlines five regional objectives:

- A land transport network that addresses current and future transport demand
- A land transport system that is increasingly free from death and serious injury
- The Canterbury Earthquake recovery is supported
- The land transport network is resilient and supports long-term sustainability
- Investment in land transport infrastructure and services is efficient.

4.16 In addressing the downstream effects, the formation of the Downstream Effects Management Plan has been particularly conscious of regional objectives 1, 2, and 5, as well as long-term sustainability mentioned in objective 4. Resilience was considered less of a priority due to the various routes available in Christchurch should, for example, Cranford Street become temporarily unavailable. Any implementation of works must also be conscious of earthquake recovery projects when they occur.

Sub-regional

4.17 The Greater Christchurch Transport Statement 2012 provides an overarching framework for managing the transport network and focuses on key links within Greater Christchurch. It acknowledges northern growth issues as a priority for the sub-region and refers to the importance of connectedness, travel choice, safe journeys and liveable communities.

4.18 Whilst the Downstream Effects Management Plan is prepared in support of the Christchurch Northern Corridor, it primarily focusses on discouraging through traffic onto local residential streets, as well as away from the key prioritised routes for public transport and cycling.

4.19 The Downstream Effects Management Plan also aims to improve accessibility and safety for schools, commercial areas and parks within the study area. It proposes a secondary cycle route on the eastern side of Cranford Street and endorses using the Healthy Street Framework to create safe, healthy and liveable local streets.

City

4.20 The Christchurch Transport Strategic Plan has four goals:

- Improve access and choice

- Create safe, healthy, and liveable communities
- Support economic vitality
- Create opportunities for environmental enhancements.

4.21 The Downstream Effects Management Plan seeks to align with the Christchurch Transport Strategic Plan by:

- Supporting the Christchurch Northern Corridor that is currently being built to support growth and economic activity within the region. The CNC will improve access into the City from the north and will remove heavy and other traffic off some sub-urban roads, making them safer, encouraging walking, cycling and the use of public transport – especially through Redwood and Belfast.
- Discouraging general traffic from the Main North Road/Papanui Road Public Transport corridor and Papanui Parallel Major Cycle Route corridor. The Plan seeks to improve safe access to schools, parks and commercial activity areas. It proposes a secondary cycle route to the east of Cranford Street and develops Healthy Street Framework to encourage mode choice.
- It integrates with a wider package of workstreams referenced in from section 4.23 below which seek to reduce single occupancy vehicle trips and encouraging Public Transport express services.

4.22 The Long Term Plan 2018-2028 sets out Christchurch City Council's funding priorities for transport over the next 10 years. Funding has been allocated in the Long Term Plan for projects from the Downstream Effects Management Plan in the period 2018/19 to 2023/24. This Long Term Plan outlines Council's commitment to the Christchurch Northern Corridor along with other key programmes such as Central City Transport, Major Cycle Routes, a local cycle network (connecting to major cycle routes), pedestrian improvements plan, and Public Transport Infrastructure.

Other related workstreams

4.23 There are a number of inter-related workstreams across the northern area of Christchurch that Council are managing or actively participating in. These specifically include the High Occupancy Vehicle lane and Northern Travel Demand Management measures, as well as a city-wide programme of work to address growth, safety and changing travel patterns across the city.

4.24 These workstreams are all investigating ways for either managing the downstream effects for when the Christchurch Northern Corridor opens, or reducing the number of single occupancy vehicle trips during peak hours. To integrate these workstreams, a Programme Steering Group has been established which includes staff from Christchurch City Council, the New Zealand Transport Agency, Environment Canterbury and Waimakariri District Council.

4.25 High Occupancy Vehicle lane – Christchurch Northern Corridor:

- The New Zealand Transport Agency has competed a detailed business case for the High Occupancy Vehicle lane on the Christchurch Northern Corridor. This was endorsed by their Board in late 2018.
- The current proposal is to install a High Occupancy Vehicle lane from the Tram Road interchange to approximately 450 metres north of the Cranford Street roundabout.

- Through an update report to the Greater Christchurch Partnership Committee (**Attachment B**), it has been confirmed that investigation, design and construction funding has been allocated to the project.

4.26 Christchurch Northern Area Supporting Travel Demand Management Measures

4.27 The New Zealand Transport Agency, along with partners including Christchurch City Council, Environment Canterbury and Waimakariri District Council, have developed a Business Case titled 'Christchurch Northern Area Supporting Travel Demand Management Measures' to support the southbound High Occupancy Vehicle lane and cycle path across the Waimakariri Bridge on State Highway 1 and along the Christchurch Northern Corridor. This is yet to be endorsed by the partners. A copy of the draft business case forms **Attachment C**.

4.28 The business case recommends a range of interventions across an extended timeframe. Outlined below are the measures it recommends occur prior to or upon opening the HOV lane and CNC:

- Communication Plan - to promote new infrastructure and to provide regular updates on construction and disruptions.
- Marketing and promotional campaign - This will aim to raise awareness and understanding in the community regarding the High Occupancy Vehicle lane and its operation as well as the improved public transport service offering.
- Mobility as a Service – This considers first and last mile connections and includes the launch/development of an app based tool that combines public transport, carpooling/rideshare and micro mobility travel options.
- Training and education – Provide training and education to make commuters more comfortable with using alternative modes of transport.
- Downstream travel demand management measures – Continued investigation into downstream measures which incentivise greater use of the High Occupancy Vehicle lane such as parking incentives.
- Park and Ride - Interim Park and Ride sites in Kaiapoi and Rangiora, each with a capacity of 120 spaces. The Park and Ride will facilitate existing bus services (Blue Line and Service 95) and could include secure cycle lockers and bus and vehicle access.
- Travel planning - Residents will be invited to participate in a personalised journey planning programme to encourage behaviour change to alternative modes of transport. This initiative will also target schools and workplaces.
- New express public transport service - an additional express bus service targeting peak hour commuters and travelling between Rangiora, Kaiapoi and the central city along the new High Occupancy Vehicle lane. This includes 10 minute frequencies (between 7-9 AM and 4-6 PM) and a total of 24 additional services a day (12 in each peak period).

4.29 Public Transport Business Case:

Staff from the Greater Christchurch Partnership have prepared a business case for the sub-region, titled Public Transport Futures. This has been endorsed by the Public Transport Joint Committee and is currently with the New Zealand Transport Agency awaiting the approval of their Board. If approved, this will likely result in three further business cases as follows:

- Rapid Transit (on the North and South-West Corridors).

- Foundations (focusing on the current five core bus routes – Orbiter, Yellow Line (Rolleston/Hornby -New Brighton), Blue Line (Rangiora/Belfast - Cashmere), Orange Line (Halswell – Queenspark) and Purple Line (Airport/Sheffield Crescent – Sumner).
- Rest of Network (the remaining bus routes, including the four additional core routes proposed in the Regional Public Transport Plan).

4.30 The intention is to complete these business cases so they can feed into the 2021-2031 Long Term Plan's for the relevant authorities and the 2021 National Land Transport Programme.

4.31 All of the above workstreams, including the cycle clip-on lane across the Waimakariri Bridge, are important improvements to the northern corridor to encourage more people to move in fewer vehicles and to provide alternative choices to how they travel between the Waimakariri District and Christchurch City.

Decision Making Authority

4.32 Christchurch City Council.

Previous Decisions

4.33 On 14 February 2019 Council resolved CNCL/2019/00025, that the Council:

- Receive the draft Downstream Effects Management Plan for staff to commence engagement with the community on the recommendations contained within the draft Downstream Effects Management Plan.
- Request Staff to work with the local communities on local access needs and provide the relevant Community Boards a briefing on the Travel Demand Management options currently being investigated.

Assessment of Significance and Engagement

4.34 The decisions in this report are of high significance in relation to the Christchurch City Council's Significance and Engagement Policy.

4.35 The level of significance was determined by comparing factors relating to this decision against the criteria set out in Council's Significance and Engagement Policy. The level of significance reflects the high numbers of people affected and the high level of community interest and involvement in the Christchurch Northern Corridor over many years.

4.36 The community engagement outlined in this report reflects the assessment and has been developed in accordance with the Designation conditions within the Consent Order approving the Northern Arterial, the Northern Arterial Extension and the Cranford Street Upgrade and previous feedback received during the initial engagement in 2018.

5. Options Analysis

Options Considered

5.1 The following options are considered and assessed in this report:

- Option 1 – Endorse the final Downstream Effects Management Plan
- Option 2 – Do not endorse the final Downstream Effects Management Plan

5.2 Staff did not consider any other options.

Options Descriptions

5.3 Preferred Option: Option 1 – Endorse the final Downstream Effects Management Plan (**Attachment A**)

5.3.1 **Option Description:** The final Downstream Effects Management Plan is the result of the methodology to assess the likely downstream effects of the Christchurch Northern Corridor.

5.3.2 The report notes the following:

- The modelling analysis indicates that the traffic impacts on Cranford Street south of Innes Road is anticipated to be immediate upon the opening of the Christchurch Northern Corridor.
- A number of local streets are also expected to be affected by increased traffic volumes of more than 30% following the opening of the Christchurch Northern Corridor.
- Given the uncertainty around these effects, based on land use estimates and expected driver behaviour, a key aspect is monitoring traffic volumes once the Christchurch Northern Corridor opens.
- Community feedback has followed a number of themes (further detail in Section 6):
  - Feedback on community impacts
  - Support for non-car transport
  - Specific plan related feedback
  - A proposed community plan
  - Working with strategic partners

5.3.3 The report recommends a prioritised work programme in three stages.

- Stage 1 – Works that need to be undertaken prior to the opening of the Christchurch Northern Corridor. These fall into two sub-stages:
  - Stage 1A - Work that must be completed to meet the Designation conditions of the Consent Order.
  - Stage 1B - Work that would be of benefit to the community to complete, but is not a requirement of the Designation conditions.
- Stage 2 – Monitoring the efficacy of Stage 1 implementation and undertaking additional works as required. Commencement, completion and implementation of identified studies. This will occur for up to three years following the opening of the Christchurch Northern Corridor.
- Stage 3 – Implementation of works as required by monitoring and studies, until the end of the commissioning period.
- Some of the above projects in Stages 2 and 3 may be required by the Designation conditions. This will be identified by staff at the time that projects are identified to the Community Board and Council.

5.3.4 The proposed work programme for Stage 1 is summarised below (the complete programme is available as **Attachment F**):

Stage 1A - Recommendations required in order to meet the Designation conditions prior to the opening of the Christchurch Northern Corridor:

- Major Road Upgrades:
  - Cranford Street (Innes Street to Berwick Street) and Cranford Street/ Sherbourne Street (Berwick Street to Bealey Ave), or
  - Berwick Street/Warrington Street to Forfar Street/ Madras Street and Barbadoes Street.
- Intersection Upgrades:
  - Westminster Street/ Cranford Street, Berwick Street/ Cranford Street, Forfar Street/ Warrington Street and Barbadoes Street/ Warrington Street.
- Traffic Calming:
  - Mersey and Berwick Streets (Innes Road to Forfar Street), Knowles Street, Weston Road, McFaddens Road, Malvern Street (left in left out at Cranford St intersection) and Dee Street (left in left out at Cranford St intersection).
- Traffic Monitoring:
  - Traffic counts be collected at over 50 locations on main roads and local streets with a high potential for rat-running.

Stage 1B – Further recommendations to be carried out prior to the opening of the Christchurch Northern Corridor

- Environmental Monitoring:
  - Vehicle emission, noise, vibration impacts.
- Introduce nine 30km/h (or 40km/h) reduced speed limit areas through the downstream local road network.
- Interim improvements on Cranford Street to increase the safety of pedestrians crossing Cranford Street.
- Initiate the following studies:
  - Safe Access to Schools across Cranford Street.
  - Safe Cycling Routes including: Cycle Wayfinding Signage, McFaddens Road Secondary Cycle Corridor, Westminster/ Courtenay Secondary Cycle Corridor.

5.3.5 **Option Advantages**

- The final Downstream Effects Management Plan is in accordance with the conditions of the Notice of Requirement, in particular condition 26 and Appendix A of the Environment Court Consent Order.
- The final Downstream Effects Management Plan seeks to balance the needs of local communities with safety and accessibility considerations, while ensuring an accessible city for Christchurch residents, businesses and visitors through:
  - Assisting with traffic congestion relief and encourages vehicles to remain on preferred routes (arterials) and away from residential roads and community facilities (including schools).
  - Improve/retain amenity in residential streets.

- Provide public transport benefits through reliable journey times.
- Encouraging modal shift away from single occupancy journeys.
- Improving access to schools, parks and commercial areas.
- Introduction of cycle routes through local roads.

- The proposed projects form an integral part of a wider work package to manage the volume of traffic travelling into Christchurch from the north. This includes the development and implementation of travel demand measures to reduce single occupancy vehicle trips, such as a high occupancy vehicle lane and park and ride/rapid bus services.
- Provides a prioritised programme of monitoring and implementation projects to mitigate the effects of increased traffic from the operation of the Christchurch Northern Corridor. Some of these will be implemented before opening in 2020.

5.3.6 **Option Disadvantages**

- The recommendations have financial implications that have been allowed for in the Long Term Plan 2018-2028.
- The development of work packages and monitoring requirements will result in a staged approach to the delivery of solutions for the community. This will need to be reviewed regularly to ensure that it addresses the needs of the community.
- Monitoring of traffic volumes on local streets may result in a delay to implementing interventions to prevent rat-running traffic. The use of regular monitoring and assessments against baseline counts will improve the ease of decision making and speed of implementation.
- Community concern has been raised over the number of single occupancy vehicle trips that will travel through the local community following the opening of the Christchurch Northern Corridor. This is being addressed through the Northern Travel Demand Management package and other projects across Council and the New Zealand Transport Agency.
- Detailed responses to the submissions are outlined in the table after section 6.11 of this report.

5.4 Option 2 – Do not endorse the final Downstream Effects Management Plan

5.4.1 **Option Description:** This option is to not endorse the final Downstream Effects Management Plan (**Attachment A**) or proceed with the prioritised work programme identified in Section 5.3.3.

5.4.2 This option has significant impacts on the ability of New Zealand Transport Agency and Council to effectively operate and obtain the benefits from the Northern Arterial, Northern Arterial Extension and Cranford Street Upgrade, as detailed in Sections 6 and 7 of this report. The Northern Arterial could open between Chaney's Corner and Queen Elizabeth II Drive as it is not a party to the Consent Order as this section of the Christchurch Northern Corridor is owned by the New Zealand Transport Agency.

5.4.3 However, according to Section 7 of this report, if Council wishes to comply with the Designation condition, then withholding approval of the final Downstream Effects Management Plan would mean Council cannot open the Northern Arterial Extension to public traffic.

5.4.4 The resulting impact on the road network would be that all Northern Arterial traffic would have to exit at the Queen Elizabeth II interchange, which is not designed to accommodate these traffic volumes. This would likely lead to severe traffic congestion due to rerouting traffic along Queen Elizabeth II Drive, Main North Road-Papanui Road Corridor, Marshland Road Corridor and Innes Road Corridor and filtering through the local road network.

5.4.5 Public transport and cycling routes would also be affected due to the impacts associated with increased traffic flows on these routes.

5.4.6 **Option Advantages**

- The funding allocated in the Long Term Plan 2018-2028 to construct the recommendations in the Downstream Effects Management Plan could be reallocated to other projects.

5.4.7 **Option Disadvantages**

- The main disadvantage of this option is that Council will not fulfil its statutory obligations. This is detailed in Section 7 under legal obligations.
- Furthermore, there is potential for enforcement action due to a breach of Designation conditions.
- The Northern Arterial Extension section of the Christchurch Northern Corridor could not open, leading to:
- Increased congestion on the road network.
- Negative impact on Public Transport journey times and reliability.

Analysis Criteria

5.5 The Designation conditions require Council to produce a Downstream Effects Management Plan and sets out how this should be delivered. It specifies that an Independent Expert be engaged to provide a methodology to assess the impact of the Christchurch Northern Corridor on the local network. It also requires Council to have completed this Plan prior to opening of the Christchurch Northern Corridor. If Council fails to fulfil this requirement then it cannot operate the Northern Arterial Extension. Council have already begun construction of the Northern Arterial Extension and Cranford Street Upgrade, due to be completed mid-2020. The preferred option allows Council to legally operate the Northern Arterial Extension and Cranford Street Upgrade.

Options Considerations

5.6 Endorsing the attached Downstream Effects Management Plan fulfils Council's statutory obligations under the Resource Management Act and allows Council to open the Northern Arterial Extension and Cranford Street Upgrade.

6. Community Views and Preferences

6.1 In May 2018 engagement was undertaken with an information document seeking early community feedback to inform the draft Downstream Effects Management Plan. This was sent to approximately 12,000 properties.

6.2 As a result of this engagement Council staff received 408 submissions including a "Change.org" petition signed by over 2,000 people (**Attachment D**). The results from this engagement were reported to the Community Board in January 2019 and then Council in

February 2019. The feedback received was considered and helped inform the draft Downstream Effects Management Plan.

6.3 Comment was then sought on the draft Downstream Effects Management Plan between Monday 11 March 2019 and Monday 15 April 2019.

6.4 Council Staff delivered the consultation document to 6350 properties and posted to 1880 absentee landowners. An email was sent to 101 key stakeholders and all submitters from the previous engagement in 2018 were also advised we were now seeking feedback on the draft Downstream Effects Management Plan.

6.5 Information was available on the Have Your Say web site, Council Staff ran a Newsline story and three Facebook posts were shared with the St Albans Community Group. The Facebook posts generated very little engagement. However, we had 1823 views on our Have Your Say web page and 185 views on the Newsline article.

6.6 Council Staff held four drop in sessions for the community to discuss the draft Downstream Effects Management Plan and ask any questions of the project team prior to providing their feedback. Representatives of the St Albans Residents Association also set up an information stand at these sessions and spoke to the residents about the Community Plan. Overall these sessions were attended by approximately 60 people.

6.7 A joint meeting of the Papanui-Innes and Linwood-Central-Heathcote Community Boards was held on Wednesday 8 May 2019 for submitters to speak to elected members regarding their submission prior to the final Downstream Effects Management Plan being prepared.

6.8 At the close of consultation we received 227 submissions. A full analysis of these submissions forms **Attachment E**.

6.9 All submitters have been advised the outcome of the consultation, with links to the consultation analysis, and details of the Community Board and Council meetings.

Summary of matters raised as a result of community engagement:

6.10 Issues raised during consultation can generally be sorted into three groups:

6.10.1 Key transport issues that need to be considered and have solutions implemented prior to the opening of the Christchurch Northern Corridor, these include:

- Interventions that are required to be completed to meet the requirements of the Designation conditions.
- Interventions that would be of benefit to the community but are not a requirement of the Designation conditions.

6.10.2 Transport issues that require monitoring and will be implemented when required. Many of the issues raised by the community (especially site-specific issues) fall into this category.

6.10.3 Local transport issues that would have occurred despite the Christchurch Northern Corridor opening (e.g. outside the study area or as a result of baseline traffic growth).

6.11 The Table below summarises the matters raised as a result of consultation and the Independent Traffic Expert's responses to those issues.

#	Item	*Response*
A	Strong emphasis on reducing single occupancy vehicle trips	- *The Downstream Effects Management Plan recommends that Council should investigate adding additional peak hour capacity to the main*

	and overall number of vehicle trips from the north traveling through St Albans.	*arterial roads south of Innes Road to reduce rat-running through local road network.*
		- *This additional capacity could include additional lanes at traffic signals, peak hour tidal clearways and clearways that are restricted to buses and other high occupancy vehicles.*
		- *However, High Occupancy Vehicle lanes will not increase the capacity of general traffic on main arterial roads and can lead to:*
		  - *Rat-running on local streets.*
		  - *Vehicles diverting to Main North/Papanui Road and Rutland Street, which are principal bus and cycling corridors.*

B	More emphasis needs to go on getting people onto buses (public transport) rather than using private motor-vehicles. Request for 24-7 bus lanes on Cranford Street.	- *The Downstream Effects Management Plan supports wider Travel Demand Management measures.*
		- *Traffic analysis completed as part of the report shows the Christchurch Northern Corridor along with proposed peak hour clearways will likely reduce traffic levels on Main North Road/Papanui Road Corridor and supports public transport improvements.*
		- *Through monitoring, the proposed clearway can be adjusted as a managed lane to encourage more car sharing per vehicle (High Occupancy Vehicles) along with express buses and eventually this managed lane could be re-designated as a bus lane.*
		- *There are concerns that the immediate installation of permanent bus lanes on Cranford Street will:*
		  - *Push traffic back onto Main North Road and Rutland Street impacting on safe and efficient bus and cycle usage of these routes.*
		  - *Lead to increased rat-running on local streets in St Albans.*
		  - *Result in the permanent removal of on-street parking.*
		- *The negative impacts associated with bus lanes would be considerably greater than with High Occupancy Vehicle lanes.*
		- *Compare to permanent bus lanes on Cranford Street, the managed lane allows a flexibility to timely implement other Travel Demand Management measures and encourage mode shift.*

C	Transport partners (e.g. Christchurch City Council and New Zealand Transport Agency) need to do work together to change travel behaviour (e.g. looking at parking controls in Central City and allocating road space to buses). The focus should be on moving people not vehicles.	- *Since September 2018, a Programme Steering Group comprising members from Christchurch City Council, New Zealand Transport Agency, Environment Canterbury and Waimakariri District Council has been established to lead the following key studies along the Northern Corridor:*
		  - *Christchurch Northern Corridor High Occupancy Vehicle Lane Business Case (New Zealand Transport Agency lead).*
		  - *Travel Demand Management (Northern Package) Study (New Zealand Transport Agency lead).*
		  - *Downstream Effects Management Plan (Christchurch City Council lead).*
		
		- *Measures that are being investigated include:*
		  - *A peak-hour southbound High Occupancy Vehicle lane on the Christchurch Northern Corridor.*
		  - *Interim Park 'n Ride sites in Kaiapoi and Rangiora.*
		  - *Investigations into measures which incentivise greater use of High Occupancy Vehicle lane such as parking incentives.*
		  - *New express bus service between Rangiora, Kaiapoi and the central city along the new High Occupancy Vehicle lane.*
		  - *A marketing and promotional campaign to raise the awareness and understanding of the High Occupancy Vehicle lane and the improved public transport offering.*

		- *Launch/development of an app based tool that combines public transport, carpooling/car -sharing and micro-mobility options.* - *Training and education – cycle training courses & bus information.* - *Personalised travel planning.* - *However, the Greater Christchurch Partners need to consider the impacts these measures could have in the Central City, on retail businesses, and on parking outside residential properties before implementing.* - *The recommendations in the Downstream Effect Management Plan do not preclude the provision of High Occupancy Vehicles and bus-lanes in the future.*
D	Not enough measures around walking, cycling and public transport to be introduced before the Christchurch Northern Corridor opens. Most of the changes appear to come later after traffic volumes have increased and should be in place before Christchurch Northern Corridor opens (Stage 1 improvements).	- *The Stage 1 proposals improve safety and access for these modes. For example:* - *The implementation of a High Occupancy Vehicle lane will assist less congestion on public transport and MCR (Major Cycle Route) Corridors which will ultimately improve safety, journey times and trip reliability for buses and cycling.* - *The traffic signals at Warrington/Forfar Streets and Warrington/Barbadoes Streets intersections will improve access and safety for pedestrians and cyclists crossing Warrington Street and using St Albans Park.* - *Signage and marking of an alternative north-south cycling route through quiet local streets to the east of Cranford Street. This could be done relatively quickly and be in place before the Christchurch Northern Corridor opens.*
D	Confusion around the type of cycling facilities to be installed as part of secondary cycle routes network. Are they to be separated cycle lanes?	- *The Downstream Effects Management Plan recommends the installation of secondary cycleways.* - *It is not recommended these cycleways will not include separators like those provided on the Major Cycle Routes (e.g. Papanui Parallel). These cycleways will consist of painted cycle lanes and bicycle greenways (i.e. use of quiet streets).* - *Proposed cycleways will be consulted on with the community.*
E	Lack of safe cycling facilities on Cranford/Sherborne Streets during Clearway operation.	- *The Downstream Effects Management Plan encourages Council to investigate how a consistent level of service throughout the Cranford Street Corridor can be provided to cyclists during clearway operation.* - *The Downstream Effects Management Plan includes a number of recommendations to encourage cyclists away from the Cranford/ Sherborne Street Corridor and onto the Papanui Parallel and other quieter routes.*
F	Concerns around staging of traffic calming on various streets and concerns on the time it might take to implement measures to address rat-running that does occurs after the Christchurch Northern Corridor opens	- *The Downstream Effects Management Plan recommends that Council should carry out vehicle monitoring before the Christchurch Northern Corridor is opened.* - *Vehicle monitoring will be collected to establish baseline data which will be used:* - *To confirm the validity of the traffic modelling.* - *As part of the ongoing monitoring of each street in relation to the impact of the Christchurch Northern Corridor.* - *The Downstream Effects Management Plan allows Council to implement traffic calming on streets that have not been identified in the plan that have been found to have 30% plus increase in traffic compared with pre Christchurch Northern Corridor.* - *The Downstream Effects Management Plan recommends that Council should look to implement improvements as early as possible on streets with a 30% plus increase compared with pre Christchurch Northern Corridor.*

		- *Temporary measures (or rapid implementation measures) are an option to reduce rat-running on some streets, especially if the effects are well over 30%. For example, use of temporary islands and hit posts to ban some turning movements.*

G	Right turn movements during clearway operation (e.g. into new play-centres on Cranford Street) will impact on capacity of two-lane clearway operation.	- *Right turns on the proposed clearways can reduce the capacity of the road, however it has limited effect on the capacity of the road if opposing flow (non-peak direction) is low as the right turning vehicle can make this manoeuvre quickly.*
		- *The recommendations in the Downstream Effects Management Plan propose:*
		  - *Right turning restrictions at side-roads.*
		  - *The provision of right turn bays at most traffic signals allowing traffic to turn right safely.*

H	Concerns around peak period prohibition of car parking for clearways on roads with high kerbside parking demand.	- *As with all large-scale roading projects, Council will carry out parking surveys and look at managing parking demand by different users (e.g. local resident, commuters and short duration parking near shops).*
I	Why the Downstream Effects Management Plan does not consider the downstream effects of Christchurch Northern Corridor on Innes Road and McFaddens/ Mays/ Normans corridors, given Innes Road is already heavily congested in peak periods.	- *The traffic analysis completed as part of the Downstream Effects Management Plan indicates that traffic levels on Innes Road will not be affected due to the Christchurch Northern Corridor and is not considered as part of the study.* - *Congestion can be addressed as part of the operational or capital improvements through the Council's Long Term Plan.*

J	Will there be monitoring of air, noise and vibration from traffic before and after the Christchurch Northern Corridor opens.	- *Council will monitor air, noise and vibration before the Christchurch Northern Corridor opens to establish baselines.*
		- *It also recommends that Council monitors annually or biennially so that any impacts of the additional traffic can be assessed.*
		- *The recommended locations to carry out this monitoring are at:*
		  - *Cranford Street north of McFaddens Road*
		  - *Cranford Street north of Berwick Street*
		  - *Berwick Street immediately east of Cranford Street*
		  - *Madras Street north of Edgeware Road*
		  - *Barbadoes Street north of Edgeware Road*

K	Concerns around pedestrian safety of children in the proximity of schools.	- *The Downstream Effects Management Plan has identified pedestrian safety concerns on Cranford Street between the Westminster and Berwick Street intersections. It recommends Council to improve both intersections considering pedestrian safety. It also recommends to monitor and investigate additional signalised crossing facility on Cranford Street, if required in front of the English Park.* - *The Downstream Effects Management Plan also suggests to lower the speed limit on Cranford Street at school peak hours to further improve pedestrian safety.* - *It is currently proposed that these measures will be implemented as part of a package of works on Cranford Street.*
L	Requests to install tolls on the Waimakariri Bridge (SH1) to reduce number of cars travelling into Christchurch (as a traffic	- *Tolls:* - *Current New Zealand legislation does not permit existing roads to be tolled. Tolls can only be applied to new roads where suitable alternative routes are available. This option was not investigated*

	demand management measure).	*as part of the Christchurch Northern Corridor and is not part of the existing Designation conditions.* - *Changes would be required to the Designation conditions and associated conditions for the Northern Arterial, Northern Arterial Extension and Cranford Street Upgrade.* - *If Council were to implement tolling on the Northern Arterial Extension, then the alternative available transport route would be through the Christchurch Northern Corridor /Queen Elisabeth II Drive interchange. This interchange has not been designed to cater for the likely additional traffic and will require significant changes which is not part of the existing Alliance design.* - *Additionally, the likely re-routing will significant impact the operation of Main North Road and Cranford Street north of the roundabout.* - *Congestion Charging:* - *Similar to the road tolling option, Congestion Charging has not been investigated as part of the Christchurch Northern Corridor and does not form part of the existing Designation conditions.* - *Best practice recommends the following factors to be investigated prior to making a decision on congestion charging –* o *Political position.* o *Well planned public relations campaigns.* o *Single empowered agency.* o *Public recognition of need.* o *Ring fencing of revenues.* o *Proven technology.* o *Lengthy development.* o *Clear business case.* - *This option is not currently considered as part of the northern package Travel Demand Management study that was recently completed by the New Zealand Transport Agency.* - *While implementation of such a measure will require ministerial and wider public approval, there is limited information to evaluate the likely impact of such a significant Travel Demand Management measure.*

Table 1: Matter raised during engagement and the Independent Traffic Expert's response.

7. Legal Implications

7.1 There is legal context, issues and implications relevant to this decision.

7.2 This report has been reviewed and approved by the Legal Services Unit.

7.3 Condition 26 of the Northern Arterial and Cranford Street Upgrade Designation (RMA92024074) states:

> *"Prior to operating the Northern Arterial Extension and Cranford Street Upgrade (NAE/CSU) authorised by this designation Christchurch City Council shall implement the Downstream Effects and Property Amenity Traffic Management Plan [***Management Plan***] contained in Appendix A to these conditions to address any downstream effects relating to traffic arising from the operation of the NAE/CSU."*

7.4 Appendix A of the Designation conditions contains the Management Plan. Under Section 2 of the Management Plan, Council must appoint an independent traffic expert to investigate and design an appropriate methodology to identify the potential impacts (if any) of traffic effects on those streets at the end of the Christchurch Northern Corridor which may potentially be

affected as a result of the operation of the Northern Arterial and Cranford Street Upgrade. This includes identifying potentially affected streets; the use of modelling to identify future increases in traffic caused by or attributable to, the operation of the Northern Arterial and Cranford Street Upgrade; and, consider the effects arising from growth in traffic flows on potentially affected streets.

7.5 After the traffic expert has carried out their investigation, Clause 2.2(e) of the Management Plan states that, where an increase in traffic-related effects within potentially adversely affected streets is caused by or contributed to by the Northern Arterial and Cranford Street Upgrade, the independent traffic expert must recommend appropriate mitigation measures to Council and, where required, the local Community Board (where that Board holds the requisite delegation for any works required) as soon as practicable, and institute monitoring procedures to verify the outcome of the mitigation measures.

7.6 The recommendations made to Council must include appropriate remedial steps to be taken to avoid, remedy or mitigate any increase in adverse traffic-related effects where such effects are more than minor. These remedial steps may include a programmed series of measures to be delivered over time, with the intention that any recommended remedial steps must be undertaken as soon as reasonably practicable after that recommendation is made. All remedial steps must be completed within 10 years of the road opening (the **Commissioning Period**).

7.7 The Downstream Effects Management Plan – Report and Recommendations prepared by the independent traffic expert appointed by Council, Dr Shane Turner (**Dr Turner**), has been done in accordance with the Management Plan as outlined above. Modelling has been carried out, potentially affected streets have been identified and recommendations have been made to avoid, remedy or mitigate any increase in adverse traffic-related effects.

7.8 Section 4 of the Management Plan contained in the Designation conditions sets the traffic level at which Council must implement the recommendations made by Dr Turner in the Downstream Effects Management Plan – Report and Recommendations. Clause 4.1 states:

> *"If the independent traffic expert determines that the increase in traffic to be experienced prior to the expiry of the Commissioning Period that is caused by or attributable to the operation of the NAE/CSU, is likely to raise or has raised the level of vehicle movements on any of the potentially affected streets by more than 30 per cent above the traffic level that would have occurred without the operation of the NAE/CSU* ***then measures to improve the operation of Cranford Street and Sherbourne Street and/or calming work will be undertaken by the Council as recommended****."* [Emphasis added]

7.9 The modelling and investigations conducted by Dr Turner as part of the Downstream Effects Management Plan – Report and Recommendations indicates the threshold of more than 30 per cent will likely be triggered as soon as the Christchurch Northern Corridor is opened. In accordance with the Management Plan, Dr Turner has made recommendations to avoid, remedy or mitigate these effects in Stage 1A of his Downstream Effects Management Plan – Report and Recommendations.

7.10 The other recommendations made in the Downstream Effects Management Plan – Report and Recommendations are part of the programmed approach and Section 4 of the Management Plan does not require those works to be carried out at this time.

7.11 To comply with its obligations under the Designation conditions, Council must undertake the Stage 1A recommendations in the Downstream Effects Management Plan – Report and

Recommendations as soon as reasonably practicable to ensure any effects of traffic increases remain at an acceptable level. Council will be in breach of Condition 26 of the Designation conditions if it does not adopt (and carry out) the Stage 1A recommendations in Dr Turner's Downstream Effects Management Plan – Report and Recommendations to mitigate the more than 30% increase in traffic on the affected streets.

7.12 The timeframe within which the Council must undertake any of the recommended remedial steps is "as soon as reasonably practicable". In this context, this will be as soon as possible allowing for some delays to implement design, contractual and other matters required to allow the physical works to be undertaken. Council staff have advised that, if Council adopts the Stage 1A recommendations now (which on an as soon as reasonably practicable basis would be consistent with the Designation conditions/Management Plan requirements), then the mitigation measures can be implemented immediately with completion prior to the road opening.

7.13 Failing to comply with Appendix A is a breach of Condition 26 of the Designation. A breach of the Designation conditions exposes Council to the risk of enforcement action. Enforcement action could include some form of abatement or enforcement order under the Resource Management Act 1991. Penalties could also be imposed, which could be financial and/or prosecution.

7.14 There are both legal and reputational risks if Council breaches its obligations under the Designation condition and enforcement action is taken against it. Any enforcement action would likely result from complaints being made by members of the public in the Christchurch area to this Council as the local authority. Any enforcement action required to be taken would be this Council in its capacity as the local authority (and therefore the enforcement body) against this Council in its capacity as the designation authority. As well as this potential enforcement action, New Zealand Transport Agency may also choose to take some form of enforcement action against this Council, who is a party to this roading project and is contractually obligated to complete the project.

7.15 If Council did not adopt the Stage 1A recommendations under the Downstream Effects Management Plan – Report and Recommendations there are two options available to Council to achieve compliance with the conditions of the Designation.

7.16 The first option is to not operate the Northern Arterial and Cranford Street Upgrade. Cranford Street is an existing road so this could operate as it currently operates. However, using any of the additional lanes or services that form part of the upgrade is likely to be considered as operating the Cranford Street Upgrade.

7.17 Not operating the Northern Arterial and Cranford Street Upgrade would expose Council to serious risk in terms of its contractual and legal obligations under the Christchurch Northern Corridor Alliance and any other contractual obligations it has entered into.

7.18 Council is party to a number of contracts with New Zealand Transport Agency in relation to the governance, funding and construction of the Northern Arterial Extension. As defined in the contracts, the Northern Arterial Extension includes the Cranford Street Upgrade. Under the Multi-Party Funding Agreement Council records that it has agreed to

> *"deliver the construction of the NAE… including obtaining the Required Approvals and the Required Land to enable construction and operation of the NAE as a local road".*

7.19 A failure to open and operate the road could therefore expose Council to a claim for fundamental breach of contract not only by New Zealand Transport Agency, but by express extension under the contracts, the other Alliance participants. By way of remedy, the New

Zealand Transport Agency (or another of the Alliance participants) could pursue the Council for an award of damages or an order for specific performance. Council also risks significant reputational damage with key stakeholders for breaching these contracts and failing to do what it has represented it will do.

7.20 Another issue is that a decision by Council not to operate the Northern Arterial Extension and Cranford Street Upgrade does not affect New Zealand Transport Agency operating the Northern Arterial. New Zealand Transport Agency will likely be in breach of its obligations under the Christchurch Northern Corridor Alliance and other contractual arrangements if it does not operate the Northern Arterial, so it is likely to begin operation of the Northern Arterial mid-2020, which will push traffic onto Queen Elizabeth II Drive.

7.21 The second option if Council did not wish to adopt the recommendations set out in Stage 1A of the Downstream Effects Management Plan – Report and Recommendations would be to make an application under Section 181 of the Resource Management Act 1991 to delete or vary Condition 26 (and any other associated conditions) of the Designation. Lodging such an application would not legalise the use of the road, the road would still need to remain closed until all matters concerning the change of the condition application were resolved (including appeal periods and appeal processes).

7.22 Any application made to change the Designation condition(s) that proposed changes that reduced the requirement for mitigation measures to address the downstream effects, or left the effects unaddressed, may not be successful. Clauses 1.2 and 1.3 of the Management Plan record that, during the hearing for the Designation, expert reports identified potential adverse effects on residences and businesses in the immediate area around the southern end of the CSU. This was the reason for condition 26 being included in the Designation conditions. The Management Plan was proffered by Council (as designation authority) at the hearing and then finalised with the input of the relevant party's traffic experts.

7.23 Council cannot mitigate the adverse effects identified without dealing with downstream effects in some way. As a result, there is a risk that any application to change the designation condition or Appendix A would be declined or, Council would be left with a new condition and/or Management Plan which has similar (or even more onerous) requirements and/or obligations to the existing Designation condition and Management Plan.

8. Risks

8.1 Therefore, according to Section 7 of this report, the following key risks have been identified by Council Staff if Council does not endorse the Downstream Effects Management Plan:

8.1.1 Christchurch City Council will not be able to open the Northern Arterial Extension to public traffic as outlined in Section 7 of this report.

8.1.2 The resulting impact on the road network is that all Northern Arterial traffic would have to exit at the Queen Elizabeth II interchange which is not currently designed to accommodate these traffic volumes. This would likely lead to severe traffic congestion due to rerouting traffic along Queen Elizabeth II Drive, Main North Road-Papanui Road Corridor, Marshland Road Corridor and Innes Road Corridor and filtering through the local road network.

8.1.3 The Cranford Street Upgrade may have to be closed between Cranford Street/Main North Road and Cranford Street/Innes Road.

8.2 Other potential risks include:

8.2.1 Possible contractual penalties could be applied if Council did not comply with the contractual obligations for the Christchurch Northern Corridor.

8.2.2 Option 2 will likely impact the relationship with the Greater Christchurch Partnership and undermine the success of delivering the Northern Package Travel Demand Management measures including the High Occupancy Vehicle lane along Christchurch Northern Corridor.

9. Next Steps

9.1 Council to consider the endorsement of the final Downstream Effects Management Plan.

9.2 Staff will undertake a programme of work to design, consult on and implement the work programme identified in Section 5.3.3.

10. Options Matrix

Issue Specific Criteria			
Criteria		**Option 1 –** Endorse the Downstream Effects Management Plan (**Preferred Option)**.	**Option 2 –** Do not endorse the Downstream Effects Management Plan
Financial Implications	**Cost to Implement**	• Preliminary estimate = approximately $10- 15 million • The financial implication of the projects will be reported at the time of implementing the work programme.	Nil
	Maintenance/Ongoing	The proposed managed lane option will increase operational cost however it is envisage that the additional cost will be recovered through the enforcement measures.	Nil
	Funding Source	• ID#17088 RONS Downstream Intersection Improvements : Cranford Street Downstream • ID#41976 Route Improvement: Barbadoes St & Madras St (Bealey to Warrington)	Nil
	Impact on Rates	Nil	Nil
Criteria 1 - Climate Change Impacts		• Overall, the Downstream Effects Management Plan, with the other supporting TDM measures, encourages mode shift by supporting alternatives to single occupancy vehicle trips. • Additionally the Downstream Effects Management Plan supports the Northern Corridor Travel Demand Management measures. • The Downstream Effects Management Plan also: - Supports journey time reliability for the Main North Road-Papanui Road Public	• Not endorsing the Downstream Effects Management Plan will not support the Northern Corridor Travel Demand Management measures. • As indicated by the traffic analysis the Christchurch Northern Corridor will likely increase traffic congestion on the arterial road network and traffic re-routing through residential areas. This situation will ultimately result in slow moving vehicles which will likely increase CO_2 emissions within the study area.

	Transport corridor and Papanui Parallel Major Cycle Route. - Investigate a secondary cycle route on the eastern side of Cranford Street. - Proposes to use the healthy street framework on local streets. • The traffic analysis confirmed that the Downstream Effects Management Plan will not induce any additional traffic on the network.	
Criteria 2 - Central City regeneration	• The Downstream Effects Management Plan supports the Central City regeneration by providing reliable journey times for all modes especially during peak periods between the north of Christchurch and the City Centre.	Nil
Criteria 3 - Transport Congestion	• The Downstream Effects Management Plan proposes interventions to reduce traffic re-routing through the local residential areas and other key Public Transport and Major Cycle Route corridors. • Overall it improves network capacity for all modes.	• Traffic analysis confirmed significant traffic congestion along Cranford Street Corridor and its surrounding residential areas.
Criteria 4 - Impact on partnership relationship	• Supports the Christchurch Northern Corridor and Northern Corridor Travel Demand Management Measures.	• Significant – as this option will likely undermine the success of delivering the Northern Package Travel Demand Management measures including High Occupancy Vehicle lane along Christchurch Northern Corridor.
Criteria 5 - Timing	• Delay in approving the Plan will create significant pressure to deliver the recommendations as proposed within the Plan.	Nil

Statutory Criteria

Criteria	Option 1 - (**Preferred Option**).	Option 2 -
Impact on Mana Whenua	Nil	Nil
Alignment to Council Plans & Policies	• The proposal is aligned with Council Plans and Policies	• Negative impact on Council's Plans and Policies, as it adversely affects the journey time reliability of Public Transport and Active Transport corridors which could discourage mode shift.

Attachments

No.	Title	Page
A ⇩	Final Downstream Effects Management Plan Report and Recommendations	46
B ⇩	Greater Christchurch Partnership Committee - Transport Update - 10 May 2019	196
C ⇩	Draft Christchurch Northern Area Supporting Travel Demand Management Measures Summary	200
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Confirmation of Statutory Compliance

Compliance with Statutory Decision-making Requirements (ss 76 - 81 Local Government Act 2002).
(a) This report contains:
  (i) sufficient information about all reasonably practicable options identified and assessed in terms of their advantages and disadvantages; and
  (ii) adequate consideration of the views and preferences of affected and interested persons bearing in mind any proposed or previous community engagement.
(b) The information reflects the level of significance of the matters covered by the report, as determined in accordance with the Council's significance and engagement policy.

Signatories

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Christchurch City Council

Christchurch Northern Corridor Downstream Effects Management Plan (DEMP) – Report and Recommendations

Christchurch City Council

Insightful solutions. Empowering advice.

Christchurch Northern Corridor Downstream Effects Management Plan (DEMP) – Report and Recommendations

Christchurch City Council

Quality Assurance Information

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Date issued	Status	Approved by
		Name
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18 October 2018	Draft Report revised	Phil Peet (Stantec)#
27 May 2019	Final Draft	Stephen Carruthers
22 May 2019	Final Report	Stephen Carruthers
23 May 2019	Final Report	Stephen Carruthers

The first two versions of this report were prepared when the Independent Traffic Expert was working at Stantec NZ. Hence why it was approved for release by a Stantec Employee. With a change in employer this report has now been issued by Ably Ltd.

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Abbreviations

AC	Access to Commercial Centres
AP	Access to Parks
AS	Access to Schools
CAST	Christchurch Assignment and Simulation Traffic
CBD	Central Business District
CCC	Christchurch City Council
CNC	Christchurch Northern Corridor
CPTED	Crime Prevention Through Environmental Design
CSU	Cranford Street Upgrade
CTSP	Christchurch Transport Strategic Plan
DEMP	Downstream Effects Management Plan
ECan	Environment Canterbury
HOV	High Occupancy Vehicle
LILO	Left-In and Left-Out
MCA	Multi Criteria Analysis
MR	Major Roads
NAE	Northern Arterial Extension
NoR	Notice of Requirement
ONRC	One Network Road Classification
QEII	Queen Elizabeth II Drive (State Highway 74)
SANF	Safety Audit and Network Functionality
SC	Safer Cycling routes
SSCA	Safe Speed Community Areas
TC	Traffic Calming
V/C	Volume over road Capacity
WDC	Waimakariri District Council

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Executive Summary

Introduction

This Report recommends a programme of work to reduce the downstream traffic effects of the Christchurch Northern Corridor (CNC). It has been compiled in accordance with the northern Arterial and Cranford Street Upgrade Designation for the CNC for an independent traffic expert to investigate and design an appropriate methodology to identify the potential impacts (if any) of those streets at the end of the CNC which may be potentially affected as a result of the operation of the NAE/CSU (CNC) (the Report). Where possible, it has been formulated to be consistent with national, regional, and local transport policy and to address transport concerns raised by stakeholders and the public during consultation. To minimise the impact of improvements on private land, the Report has focused as far as possible on remedial treatments that can occur within the existing road reserve.

The Report supports further travel demand management initiatives in northern Christchurch and beyond, to reduce the volume of vehicles with single occupants entering the urban road network. To discourage single occupancy vehicles, the report recommends that Council investigate whether much of the additional road capacity added to arterials roads (e.g. the peak period clearways) can be restricted to high occupancy vehicles (HOV), including buses only when first opened. The use of HOV lanes better aligns with the community who want a reduction in vehicles and more people on buses through St Albans.

Issue Identification

As specified in the designation conditions, key objectives of the Report are to identify the preferred vehicle access routes for the additional traffic from the CNC, including trucks, that will occur on the downstream road network. To manage this traffic so that it uses the preferred routes and mitigate where possible adverse effects of the increase in traffic resulting from the operation of the CNC, especially on local streets. A transport model has been used to assess the routes drivers are likely to take travelling from the CNC into the city centre in 2021 (opening year) and 2031 (design year).

This modelling indicates that the preferred traffic routes, the arterials and collector streets, do not have adequate capacity to accommodate all the additional traffic (including trucks) and, without intervention, there would be a lot of rat-running traffic in local streets. The designation conditions specify that when the rat-running traffic volumes on these local streets are greater than 30% above what would have been expected had the CNC not been built, then intervention is required to avoid, remedy, or mitigate these effects. The modelling shows that many local streets trigger this greater than 30% increase, especially in 2031, if there is no mitigation measures taken.

Whether on the main routes or local streets, the additional traffic from the CNC will adversely impact other road users, and specifically pedestrians and cyclists that use the roads affected. Of particular concern is how this traffic will impact on safety and access of less able pedestrians, such as school children, elderly, and those with a disability. The additional traffic will in some cases impact on local residents' ability to safely access various community facilities (e.g. schools, parks, and commercial centres) and their own properties by walking, cycling, and driving/parking. The Report has considered how these impacts might be avoided, remedied, or mitigated. In most cases localised studies have been recommended to look at these matters and develop suitable interventions.

Option Development

Based on an understanding of the likely transport impacts of the additional CNC traffic, two option development stages were undertaken. The first stage of the option development focused on options that would encourage the additional vehicles from the CNC to primarily use arterial and collector routes, and not use local streets. The second stage then considers how the increased safety and access requirements of different road users can be improved on streets with additional traffic flows.

Stage 1: Major Route and Traffic Calming Upgrades

During the first stage of option development both arterial/collector upgrades and traffic calming options were developed to keep the extra traffic from the CNC on the main routes. In the first assessment the independent expert considered either arterial/collector upgrades or traffic calming measures on their own. Several options were developed that looked at a combination of arterial upgrades (e.g. peak period clearways) and traffic calming measures were considered. The arterial/collector road improvements were developed to address capacity constraints that were identified along these routes; both midblock and at intersections, using local experience and the transport modelling. The traffic calming measures were developed for local streets that are expected to have a significant amount of rat-running traffic (defined as greater than 30% increase in traffic) with or without arterial/collector upgrades. The full list of major upgrade options considered in the modelling are presented below.

Table 1-1 Major route and traffic calming upgrades

- Do Nothing – this results in rat-running on a lot of local streets
- Option 1. Traffic Calming Only
- Option 2. Arterial Upgrades Only. This included three-laning of Barbadoes Street and Madras (Forfar) Street, Cranford Street Clearways and Berwick Street / Warrington Street capacity improvements)
- Option 3 (a). Traffic Calming and Arterial Upgrades. Arterial upgrades as per Option 2 except clearways on Barbadoes Street and Madras (Forfar) Street instead of permanent three-laning
- Option 3 (b). Traffic Calming and Arterial Upgrades. Arterial upgrades as per Option 2, so permanent three-laning of Barbadoes and Madras (Forfar) Streets
- Option 3 (c). Traffic Calming and Arterial Upgrades. Arterial upgrades as per Option 2 except extension of Barbadoes / Madras one-ways to Warrington Street.
- Option 4 (a). Traffic Calming and Clearways on Cranford / Sherborne Streets from Innes Road to Bealey Avenue
- Option 4 (b) Traffic Calming and permanent four-laning on Cranford / Sherborne Street (option included to allow comparison of options with a more major upgrade of arterial roads)
- Option 5. Traffic Calming plus combined Arterial Options (Options 3(a) and 4(a))

The analysis of these options was undertaken using the CAST (Christchurch Assignment and Simulation Traffic) transport model. This model indicated how successful the options were in keeping traffic on the main routes and discouraging rat-running in local streets.

A multi-criteria analysis (MCA) workshop was then undertaken of each option to determine the best performing options. This involved a number of transport specialists and an urban designer. The MCA looked at a number of factors, including impact on safety of different road users, whether the options met the objectives of the Designation, journey time benefits, timeframe to implement, construction costs, impacts on local businesses, social and amenity impacts, and environment impacts. The workshop participants, including the independent traffic expert, agreed the criterion and the weighting of each criteria and discussed and assessed the various options. The highest weighting went on community impacts (the last three criteria above). Journey time benefits only had a 10% weighting. The best performing options in order were 3 (c), 4(a) and 3 (a).

All three options have very similar upgrades on Cranford Street north of Berwick Street and along Berwick Street and Warrington Streets. They differ in the improvements south of Berwick Street on Cranford/Sherborne Streets, Forfar/Madras Streets and Barbadoes Street. Hence the Report recommends that the improvements along Berwick and Warrington Streets and Cranford Street north are progressed to scheme design and the three options south of Berwick Street are further investigated and presented to the community for input before deciding on a preferred southern option (see Table 1 below).

The arterial upgrades include adding peak period clearways. While the modelling assumed that these clearways would be for all vehicles, our preference is that the clearways are high occupancy vehicle (HOV) lanes giving priority access to buses and vehicles with more than one occupant, as this better aligns with the national and local transport strategies and the feedback from the public during consultation.

While some submitters to the Report have requested that any additional capacity (be it clearways or permanent four-laning) be bus lanes, the relatively low bus volumes on Cranford Street, even if express buses to the Waimakairiri District where to be added, would in our view cause severe congestion on this route. This would result in an increase in rat-running on local streets and diversion of traffic back onto Main North Road which is undesirable given it is the preferred bus corridor to northern Christchurch. With HOV lanes commuters would have additional options to the bus through carpooling that would reduce the number of vehicles entering Cranford Street, which is desirable.

In the future if further TDM measures (e.g. parking restrictions in CBD and other employment hubs) are successfully implemented and bus patronage levels to the Waimakariri District and northern Christchurch increase then these clearways could be converted to bus lanes and even the hours of operation of the clearways could be extended, after further consultation with the local community. While the independent expert has a preference for HOV clearways over general traffic clearways, further investigation (including modelling) is required to assess the impacts of HOV lanes on rat running and wider network impacts. This further work and a decision on the operation of the clearways needs to be undertaken and implemented before the CNC opens.

In addition to infrastructure changes, education, and enforcement aspects of the improvements, especially the peak period clearways, needs to be investigated and implemented.

A list of routes that are expected to require traffic calming has also been developed, based on the transport modelling. Careful monitoring of traffic volumes on local streets is required before the CNC is opened to assess the benefits of traffic calming measures and any streets that are adversely impacted by rat-running traffic as a result of drivers selecting alternative rat-running routes. Nine safe speed community areas are also proposed in the wider St Albans network to discourage rat-running.

Stage 2: Safe Access to Community Facilities

During the second option development phase, the impacts the additional traffic would have on all road users was considered, specifically those who live in or near the impacted road network and their ability to safely access various destinations within the local road network. The project has been split up into:

1. Safe access to School
2. Safer Cycling
3. Access to Parks
4. Access to Commercial Centres

Most of the issues raised by the public and stakeholders fit into one of these categories. One specific matter that does not is safe access into properties on arterial and collector roads with peak period clearways, like Cranford Street. The identification of issues with access and possible solutions to improve access will need to be assessed as part of the implementation of the clearways.

The key issues in terms of safe access to schools is access across Cranford Street for children walking to and from St Albans School. The children primarily use the Cranford Street /Westminster Street signalised intersection to access the school, but some also use the Berwick Street/Cranford Street signalised intersection. Due to several close (crash) misses, the school currently employees a cross warden at the Cranford Street /Westminster Street intersection to help children cross the road. With the proposed upgrades of this intersection (also Berwick Street /Cranford Street) the potential for a crash will increase if no safety improvements are made. As an interim measure it is proposed to investigate a lower the speed limit to 40km/h from north of Westminster Street to south of Berwick Street during school start and finish times, install a textured surface at the Westminster Street intersection and look at changes to the signals before the CNC opens. Further improvements need to be investigated and implemented within 3 years of the CNC opening.

The introduction of peak period clearways along Cranford Street down to Berwick Street and possibly other clearways further south makes such routes less safe for cycling, especially during the peak periods. While not ideal, it is proposed to make the footpath along Cranford Street a shared path for those who live on this road or still choose to cycle along it during clearways operation. Given the shared path will have a lower standard than normally provided it is important that the route is subject to a safety audit, and that sight lines between vehicles at driveways and cyclists are maximised and that the cycle facilities at intersections are closely examined. It is also important that safety is monitored during the ten years after the CNC is opened. In addition to the vehicle versus cycle conflict, the cycle versus pedestrian (including scooter) conflict needs to be considered.

Our preference however is to direct cyclists onto other routes, like the Papanui Parallel. The general increase in traffic across the network will also make it less safe to cycle on a number of other roads (e.g. Edgeware Road) without improved cycle facilities. To encourage local people to cycle and to direct them to use the Papanui Parallel cycleway (a separated north-south cycle path) on Rutland Street, Trafalgar Street, and Colombo street, it is proposed to develop three east-west secondary cycle routes (along McFaddens Road, Westminster/ Courtenay Streets and Edgeware Road). These will be feeder routes to the Papanui Parallel and will be a combination of on-road cycle lanes and off-road paths. It is also proposed that a secondary north-south cycle route be provided on the eastern side of Cranford Street to link cyclists that have origins and destinations on the eastern side of the main route to the city centre and St Albans Park.

The additional traffic generated by the CNC will also increase traffic volumes around St Albans Park, and to a lesser degree around Malvern Park. The three main roads around St Albans Park; Barbadoes Street, Forfar Street and Warrington Street, will have increased traffic flows making it more difficult to access the Park. The proposed traffic signals at Forfar Street /Warrington Street and Barbadoes Street /Warrington Street and the proposed new north-south cycleway to the east of Cranford Street will improve access to the north of the park. However, there are still challenges for pedestrians wanting to cross Forfar Street and Barbadoes Street further south. There have been a number of vulnerable road user crashes at the northern end of Barbadoes Street and the additional traffic from the CNC will exacerbate existing access issues. Hence, a study is proposed to look at access and safety issues for St Albans Park (and Malvern Park) and develop options to make access safer.

Local residents also need to have safe access to their local (shopping and eating) commercial centres. Christchurch City Council are keen to see local centres become more vibrant and for locals to walk and cycle to these centres. Access to these centres by vehicle, along with parking, is also required for some trips, especially those made by less able-bodied residents. A neighbourhood improvement plan has already been developed for the Edgeware Village and so a new plan for that centre is not proposed, although improvement options for cycling and walking along Edgeware Road will need to be integrated into that plan. It is a requirement of the transport studies are undertaken for the four local activity centres impacted by the CNC traffic; the Westminster Street /Cranford Street, Warrington Street /Barbadoes Street, Edgeware Road /Barbadoes Street and Rutland Street activity centres. Corridor assessments, along Edgeware Road and Westminster/Courtenay Streets are also required to look at enhancing access and amenity for pedestrians of all abilities. The improvements that are required in these studies should be implemented to offset the access and safety consequences of the additional traffic.

The key outcomes that are desired from all the proposed studies and improvements is a network of roads that are safer and 'healthier', even with the increased traffic volumes. Hence it is important that all designs go through a road safety and healthy streets review in order to maximise the benefits of such improvements. With respect to safety, in addition to traditional safety audits, it is recommended that all designs are assessed using the Austroads safe system assessment framework which targets crash risk that could lead to serious injury and fatal crashes. To achieve healthier streets, it is recommended that all street upgrades are assessed using the Heathy Streets framework that has been developed by Transport for London.

The Downstream Effects Management Plan

Table 1-2 shows a summary of the studies and improvement options that are proposed to avoid, remedy, or mitigate the impacts of the CNC. This is based on analysis and review of the transport issues using modelling and experience. Council are required to undertake ongoing monitoring of the transport flows (including pedestrian and cycle volumes), vehicles speeds, and environmental impacts (vehicle emissions, noise and vibration). Of particular importance will be how traffic flows through the downstream road network in the years following the opening of the CNC. While arterial and collector upgrades and traffic calming measures will be introduced to encourage drivers to use the major roads, it is

highly likely that some drivers will choose to use local streets as rat-runs, and that they may behave in ways not predicted by the transport models. Hence the monitoring will identify issues that may require other changes to the road network such as traffic calming of additional streets and upgrades of signalised intersections. The monitoring is expected to have the greatest impact on the composition of the Stage 3 projects.

While ideally some of the Stage 2 projects are undertaken before the CNC opens, there is limited time to make all the changes and hence the most crucial changes to prevent excessive congestion and rat-running have been prioritised in Stage 1 (to be in place ideally before CNC opens), with other projects delayed. The impact of this maybe adverse transport effects in the short-term. Hence it is important that Council act as soon as reasonably practicable to address the worst of any adverse transport effects (e.g. high levels of rat-running) once the CNC opens. The independent expert would recommend rapid implementation of projects, where this is practical, and other temporary measures to address the effects that are identified in the monitoring.

Table 1-2 – Lists of improvement projects and studies categorised by stage

(note some projects appear in two or more stages as they consist of more detailed studies and the implementation of improvements)

Stage 1 – Projects and studies to be undertaken before the CNC opens
Major Road (MR) Upgrades: **MR1 (Cranford Street Clearways)** – Peak Period Clearways along Cranford Street from Innes Road to Berwick Street. **MR2 (Westminster/Cranford Intersection)** – Upgrades to Westminster Street /Cranford Street intersections, including pedestrian and bicycle access and safety measures. **MR3 (Berwick/Warrington Upgrades) –** Upgrading of Berwick Street /Cranford Street signalised intersection and signalisation of the Forfar Street /Warrington Street and Barbadoes Street /Warrington Street intersections, including pedestrian and bicycle access and safety measures. **MR4 (South Berwick Upgrades)** – Option scoping study of potential improvements to arterial routes south of Berwick Street at intersections and along the mid-block. **MR5 (HOV lanes on Cranford-Sherborne)** – Undertake investigation for extending the southern HOV (high occupancy vehicle) lanes on the CNC through to Bealey Avenue and investigate the potential for installing a northbound HOV lane. Based on these investigations implement any recommendations around HOV lanes before CNC opens. **Safe System Community Areas (SSCA):** **SSCA 1 to 9** – Introduce nine 40km/h (or 30km/h) reduced speed limit areas through the downstream local road network **Traffic Calming (TC) Measures:** Introduce traffic calming on **TC1 – Mersey and Berwick Streets (Innes Road to Forfar Street), TC2 – Knowles Street, TC 3 – Weston** Road, **TC 4 – McFaddens Road, TC7 – Malvern Street (LILO) and TC8 – Dee Street (LILO)** **Safe Access to Schools (AS):** **AS1 – Safe Access Across Cranford Street** – Commence a study that will look at a range of options, including upgrades at the Berwick/ Cranford and Westminster/ Cranford intersections and a new mid-block signalised crossing across Cranford Street near the English Park Carpark entrance. **AS2 – Interim Improvements on Cranford Street** – As an interim measure it is suggested that as part of **MR1 (Cranford Clearways)** and **MR2 (Westminster/Cranford Intersection)** a 40km/h speed limit be introduced during school arrival and departure time on Cranford Street from approximately 50m north of Westminster Street to 50m south of Berwick Street, a coloured surfacing be installed at the Westminster/Cranford Intersection, and left and right turning

red arrows be used as protection for crossing pedestrians. These options and others to be investigated in ASI, MRI and MRR.

Safe Cycling Routes (SC):

SC1 (Cycle Wayfinding Signage) – Development of and implementation of a wayfinding signage plan that directs cyclists at the northern end of Cranford Street (at McFaddens Road) and southern end of Cranford Street to safer cycling routes on adjoining streets (e.g. Papanui Parallel and other quiet local streets).

SC2 (McFaddens Road Secondary Cycle Corridor) – Commence a route study of a cycling route both west (towards the Papanui Parallel) and east (towards new north south route) on McFaddens Road.

SC3 (Westminster/Courtenay Secondary Cycle Corridor) – Commence a route study of a cycling route both west and east of Cranford Street.

SC4 (Edgeware Road Secondary Cycle Corridor) – Commence a route study of a cycling route both west and east of Cranford Street.

SC5 (North-South Secondary Cycle Corridor) – Commence a route study of an alternative north-south cycle route through traffic calmed streets to the east of Cranford Street. Use the MCA and SANF process to select the preferred route.

Any quick-wins projects (e.g. - signage and marking improvements) in SC2 to SC5 are to be identified and implemented where possible before the CNC opens. Studies will commence in Stage 1 and be completed early on in Stage 2.

Monitoring collections of baseline data on traffic, pedestrian and cycle volumes, vehicle speeds and environmental effects (emissions, noise and vibration) on key routes.

Stage 2 – Projects and Studies that need to be undertaken within three years of CNC opening

Monitoring

All key local routes that are expected to be impacted by rat-running traffic (or for which there have been a number of public complaints about rat-running) will have traffic counts undertaken within 3 months of the CNC opening. For streets impacted in a major way a further traffic count will be collected at around 6 months after the CNC is opened and then annually. Those streets that have a more than 30% increase in traffic volumes will be included in the traffic calming street list for Stage 2 (even if not currently on the lists below). Where large increases occur temporary works (using rapid implementation methods where relevant) may be implemented ahead of more permanent upgrades.

Undertake monitoring of pedestrian and cycle volumes and environmental effects (emissions, noise and vibration). Compare with baseline data where relevant.

Traffic Calming (TC) Measures:

When the monitoring confirms a 30% increase in traffic values, introduce traffic calming on **TC9 – Roosevelt Avenue, TC12 - Caledonian Road, TC13 - Edgware Road (Village), TC14 – Manchester Street and TC15 - Westminster Street /Courtenay Street**. Implement traffic calming on any other local streets that have a greater than 30% increase in traffic following CNC.

Safe Access to Schools (AS):

AS1 – Safe Access Across Cranford Street – Assess effectiveness of interim measures in AS2. Where required implement any further options identified in this study. This may include new mid-block signalised crossing across Cranford Street near the English Park Carpark entrance.

Safe Cycling Routes (SC):

SC2 (McFaddens Road Secondary Cycle Corridor) – Design and implement a secondary cycling route both west (towards the Papanui Parallel) and east (towards new north south route) on McFaddens Road.

SC3 (Westminster/Courtenay Secondary Cycle Corridor) – Design and implement a secondary cycling route both west and east of Cranford Street.

SC4 (Edgeware Road Secondary Cycle Corridor) – Design and implement a secondary cycling route both west and east of Cranford Street.

SC5 (North-South Secondary Cycle Corridor) – Design and implement an alternative north-south cycle route through traffic calmed streets to the east of Cranford Street.

Access to Parks (AP):

Several of the improvements in Stage 1 will improve access to the two parks. For St Albans Park the two new traffic signals on Warrington Street and the South of Berwick upgrades will improve safe access. The traffic calming of Malvern Street (2020) will also limit rat-running past Malvern Park. The Access Plan in this section will focus on other access and safety improvements that can be made.

Implement any quick wins and priority projects that come out of the AP1 and AP2 plans within Stage 2.

AP1 (St Albans Park Access Plan) – Development of a plan that will look at access to the park by pedestrians (of different abilities), cyclists, and motorists.

AP2 (Malvern/Rugby Park Access Plan) – Development of a plan that will look at access to the park by pedestrians (of different abilities), cyclists, and motorists.

Access to Commercial Centres (AC):

Some the improvements in Stage 1 will also improve access and safety at commercial areas. Transport studies will consider additional improvements that can be made.

AC1 – Westminster/Cranford Local Activity Centre Transport Study. Undertake study that will consider safe access to this activity centre by pedestrians, cyclists, and motorists.

AC2 – Barbadoes/Warrington Local Activity Centre Transport Study. Undertake study that will consider safe access to this activity centre by pedestrians, cyclists, and motorists.

AC3 – Barbadoes/Edgeware Local Activity Centre Transport Study. Undertake study that will consider safe access to this activity centre by pedestrians, cyclists, and motorists.

AC4 – Rutland Street Local Activity Centre Transport Study. Undertake study that will consider safe access to this activity centre by pedestrians, cyclists, and motorists.

AC5 – Westminster/Courtenay Corridor Study (Rutland to Forfar) – Undertake this study which will focus on safe access by pedestrians along the route and crossing the route especially for vulnerable road users.

AC5 – Edgware Corridor Study (Springfield to Barbadoes) – Undertake this study which will focus on safe access by pedestrians along the route and crossing the route especially for vulnerable road users.

Implement any quick wins and priority projects that come out of the studies in Stage 2.

Stage 3 – Projects that could be undertaken any time between the opening of the CNC and the end of the Commissioning Period

Monitoring

Ongoing monitoring of traffic, pedestrians and cycle volumes, crashes and vehicles speeds, emissions, noise and vibration on major roads and some local streets is to occur annually, or when required more often, after the CNC opens to validate the Reports and projects already identified in this document, and through the various studies that are specified.

It is expected that additional interventions will be required to avoid, remedy or mitigate the effects of the additional CNC traffic including the impact of trucks, that is identified in this monitoring. In terms of local streets, intervention is required if the traffic volumes increase by greater than 30% above what might have been expected on the route if the CNC had not been built. In terms of other interventions (e.g. arterial upgrades) this will be the result of congestion or safety concerns with respect to all road users. Some improvement may also not be required (e.g. if local road traffic does not increase by greater than 30%, as predicted by the modelling). Consultation on all proposed changes will be undertaken.

An indication of Stage 3 improvement projects is provided below. This list will need to be reviews and where necessary revised once the actual impacts of the CNC traffic is known from the monitoring.

Traffic Calming (TC) Measures:

Introduce traffic calming only where monitoring indicates high levels of rat-running are occurring (may include additional streets): **TC – 5 McFadden, Knowles, Weston (east Cranford), TC6 – Jameson, TC10 – Forfar Street, TC11 – Flockton Street, TC16 – Severn Street, TC17 – Thames Street, TC 18 – Aylesford Street, TC19 – Kensington Avenue, TC 20 – Philpotts Road and TC 21- Francis Avenue.**

Safe Cycling Routes (SC):

Monitor and upgrade routes as required.

Access to Parks (AP):

AP1 (St Albans Park Access Plan) – Implementation of the access plan as required to address access and safety issues.

AP2 (Malvern/Rugby Park Access Plan) – Implementation of the access plan as required to address access and safety issues.

Access to Commercial Centres (AC):

AC1 – Westminster/Cranford Local Activity Centre Transport Study. Implement study recommendations

AC2 – Barbadoes/Warrington Local Activity Centre Transport Study. Implement study recommendations.

AC3 – Barbadoes/Edgeware Local Activity Centre Transport Study. Implement study recommendations

AC4 – Rutland Street Local Activity Centre Transport Study. Implement study recommendations

AC5 – Westminster/Courtenay Corridor Study (Rutland to Forfar) – Implement study recommendations.

AC6 – Edgeware Corridor Study (Springfield to Barbadoes) – Implement study recommendations

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1. Introduction and Background

Planning for a new arterial route from the Christchurch CBD (Four Avenues) to the northern suburbs of Christchurch and beyond has been ongoing for many decades. Over the last decade a preferred route has been identified and designed for the northern section of this route. This preferred route is called the Christchurch Northern Corridor (CNC) which, at the time of this report, is under construction with a planned completion date of mid-2020. The CNC is expected to increase traffic volumes on the urban road network south of the project[1]. The Downstream Effects Management Plan (the Report) considers the impact of this additional traffic and what changes are required to the network to minimise the impact of this additional traffic travelling from the CNC through to the CBD. The Report has been compiled to satisfy the requirements of the Notice of Requirement (Designation) ruling for the CNC (Appendix A). The rest of this introduction provides background and history of the CNC (decades of transport planning on a northern route), that helps set the context of the Report.

1.1 Christchurch Northern Corridor and Requirement for a Downstream Effects Management Plan

The Christchurch Northern Corridor (CNC) project is an alliance project currently being undertaken by the New Zealand Transport Agency (NZ Transport Agency), and Christchurch City Council[2]. As part of this project a new four-lane motorway will connect SH1 from just south of the Waimakariri Bridge with Cranford Street about 500m north of the McFaddens Road / Cranford Street Intersection (**see Figure 1-1**). The project also includes new pedestrian and cycle facilities[3].

Figure 1-1: Christchurch Northern Corridor

(Source: https://www.nzta.govt.nz/assets/projects/christchurch-northern-corridor/CNC-Map-Poster.pdf)

A section of Cranford Street (the southern end of the CNC) will also increase from a two-lane road to four-lanes with a median. As part of the project the Innes Road / Cranford Street intersection will also be subject to works to enlarge its capacity. A representation of these changes, including active mode provisions, are shown in Appendix B.

In July 2015 Independent Hearings Commissioners heard the designation case for the CNC. The designation was approved subject to a number of conditions. A major concern raised by submitters was the downstream effects of the CNC, especially on local roads within St Albans and adjoining suburbs. To address this concern a condition was added

[1] Refer to Section 4.1.2.1
[2] Information on this project can be found at https://www.nzta.govt.nz/projects/christchurch-motorways/christchurch-northern-corridor/
[3] https://www.nzta.govt.nz/projects/christchurch-motorways/christchurch-northern-corridor/faqs/#1

that required Christchurch City Council to engage a suitably qualified independent traffic expert who would produce a Downstream[4] Effects Management Plan. Dr Shane Turner of Stantec, now Ableys, was appointed to this role.

The Report is the outcome of investigations on likely downstream effects of the CNC and recommends works that could be undertaken to address those effects. Given the uncertainty around the effects, which are based on land use estimates and expected driver behaviour, a key aspect of the Report is the monitoring of transport effects once the CNC opens, and comparing these with conditions prior to the CNC (minus expected network growth without the CNC). However, given the increase in traffic volume from day 1 some improvements do need to be in place before the CNC is opened (expected to be in 2020).

Following discussions with Christchurch City Council, the NZ Transport Agency have investigated the addition of a third southbound lane (high occupancy vehicle (HOV) lane) across the Waimakariri River and the extension of the HOV lane in the southbound direction initially to just north of the QEII interchange. Hence southbound along the CNC one traffic lane will be for general traffic and the second lane will be restricted to vehicles with two or more passengers (called a T2 lane). A subsequently study has recommended that this HOV lane be extended further south to just north of the Cranford Street Roundabout.

A study is also in progress on a travel demand management (TDM) strategy for Northern Christchurch which is considering among other measures, express bus services from Kaiapoi and Rangiora to the city centre via the CNC with supporting ParkNRide facilities in the Waimakariri District. The study is also considering extension of the HOV lanes southbound along Cranford and Sherbourne Streets as peak period clearways to Bealey Avenue and also northbound from Bealey Avenue through to at least north of Innes Road. In this analysis the permanent HOV lanes southbound only to just north of QEII were considered, as this was all that had been formally agreed when the main study was undertaken. Conformation of additional TDM measures has not been made at the time this report was issued.

1.2 History of the Christchurch Northern Arterial (now CNC)

Various traffic corridor plans have been conceived in planning for Christchurch since the 1950s. In 1962 the Christchurch Regional Planning Authority proposed the Northern Arterial Concept Route; roughly following the path of the current Northern Arterial however extending further south through St Albans. During the 2nd review of the Reports the corridor was changed so that new arterial would extend to Bealey Avenue where it would connect with the one-way pair; Barbadoes and Madras Street. In 1989 the Northern Arterial Designation was narrowed in width at the Redwood/Belfast portion. Later, the St Albans portion of the designation was removed from the Christchurch City District Scheme.[5] The following excerpt is taken from Christchurch City Centre – 40 years of Change, and it explains some of the reasons why the network has been developed the way it has in Northern Christchurch:

> "During the 1980s…the Christchurch City Council made successive reductions to the proposed road network in suburban areas. These changes were in response to a combination of other factors including: slower population growth, economic downturn – less central employment, limited funding based on benefit/cost ratios, community acceptance of greater congestion, increasing opposition from affected residents, councillor opposition in the 70s and 80s. Subsequently in the agreed 1989 regional plan the road network and hierarchy of roads were generally retained but the motorways were deferred still further on the assumption that the arterial "at-grade" road network would suffice. This policy, together with the reliance on benefit/cost for national funding, supported the ongoing construction of major arterial all-purpose roads in the suburbs."[6] (Christchurch City Centre – 40 Years of Change, Traffic, Planning – 1959-1999, Malcom Douglass, Christchurch City Council, 2000 (p11)).

Clearly, there has been much discussion and investigation on the north – south transport connections in Northern Christchurch for at least the last 50 – 60 years. During that time larger motorway connections (passing through urban Christchurch) have been considered, planned, and eventually withdrawn. The history of these decisions has been important in the preparation of the Report as it is not intended to re-litigate or reconsider past discarded options, or options of a similar nature and scale, which have shown to be out of favour.

[4] Downstream as defined by the Notice of Requirement means south of the Innes Road / Cranford Street intersection. For the purposes of the DEMP, 'south' of the CNC has been interpreted as including local and collector roads between Innes and McFaddens due to the interconnectivity of the local road network.
5 https://www.nzta.govt.nz/assets/projects/northern-arterial/docs/nart-project-timeline.pdf
6 Christchurch City Centre – 40 Years of Change, Traffic, Planning – 1959-1999, Malcom Douglass CCC, 2000 (p11)

Given the history and strong views of the local community, the Report is focused on using existing roads to carry the additional traffic associated with the CNC. It also seeks to minimise the impact of any upgrades on private property and especially building structures within the urban area. Hence wherever possible the focus is on remaining within current road reserves.

An important part of the Report is understanding the impact that the additional CNC traffic could have on the local community, and how this can be avoided, remedied or mitigated. This includes minimising the impact of the additional CNC traffic on safe access to parks, schools, businesses and housing. It is also important that the future transport network supports transport choice, and in particular walking, cycling, and public transport. A legacy of the Report should also be improvements in amenity and urban design to streets within the community.

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2. Report Structure

The report begins (Section 3) by summarising (in brief) the various national, regional, and local transport planning strategies that have been agreed and outlines the current road network and operating conditions for different road users, including any existing road safety issues.

The report then outlines the purpose and objectives of the study and the methodology that has been adopted to undertake the transport assessment (Section 4). It also specifies the 'balanced' transport planning approach that has been applied to minimise the impact of the additional traffic on local streets, but also provides for, and encourages, greater use of other transport modes, or at the very least, higher occupancy rates in motor vehicles.

Section 5 discusses the transport modelling that has been undertaken to understand the likely impacts of the additional traffic from CNC (currently expected to open in mid-2020) on the downstream road network in 2021 (represents opening year) and 2031 (design year) if no changes are made. The modelling assesses the impacts of the CNC against what is expected in terms of traffic growth on the wider network if the CNC was not built.

The consultation undertaken with stakeholders and the public in both rounds of consultation are summarised in Section 6. Wherever possible the concerns raised by the public and various organisations have been addressed in the option development. However, not all issues raised can be addressed, as many fall outside the scope of this assessment, or are in conflict with other issues and options raised.

The option development phase is presented in Section 7. The first iteration of the option development focused on the local streets that had greater than a 30% increase in traffic and also capacity constraints on the urban arterial/collector network. The focus at this level being to minimise the number of local streets impacted by a combination of arterial/collector road upgrades and local road traffic calming and speed limit reductions. The second iteration of the option development looks at options to minimise the impact of the additional traffic on safe access to schools, safe cycling through the network, access to parks, and access to local and neighbourhood activity/community centres.

Section 8 and 9 present the recommended downstream improvement plan. It highlights key outcomes to achieve and associated improvements that need to be undertaken before the opening of the CNC to address impacts associated with the sudden increase in traffic as a result of the CNC opening. It then outlines outcomes to be achieved and improvements that could be undertaken shortly after the opening and through to approximately ten years after the opening (up to design year 2031). The Report has a strong monitoring focus to assess the impact of traffic growth between opening and 2031. The timing of upgrades beyond the opening will be tied to the impacts observed in the monitoring. Some upgrade projects may be delayed, and other projects brought forward depending on the monitoring outcomes, and new projects may be identified based on traffic effects not predicted in the modelling (e.g. local street rat-running).

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3. Background Review

This section outlines briefly the key national, regional, and local transport strategies that have been agreed by various organisations for transport planning activities within Christchurch. It then provides an overview of the existing transport network and how this operates. This includes bus and cycling routes, and road safety issues. There are a number of existing transport issues on the current road network but only some of these issues will be impacted by the CNC traffic, and need to be addressed in the Report. More information on these issues is presented in Section 6.

3.1 National, Regional, and Local Strategies

Various national, regional, and local strategies exist which have guided the direction of the Report. Their respective relevance to the Report is that the options need to be conscious of, and aim to satisfy (where possible), the relevant objectives contained in those strategies.

National

The latest Government Policy Statement has four strategic directions; Safety, Access, Environment, and Value for Money. This strategic direction was considered during option development, and influenced the criteria used in the multi-criteria evaluation of the options.

The Safer Journeys Strategy (2010-2020) guides how safety concerns will be addressed in New Zealand over the period 2010-2020[7]. It outlines the Safe System approach which recognises the vulnerability of road users, and the four pillars of safe roads and roadsides, safe speeds, safe vehicles, and safe road use, under which safety is to be addressed. In urban areas the safety of pedestrians (especially vulnerable pedestrians; young, and elderly) and cyclists needs to be considered alongside vehicle safety.

Regional

The Regional Land Transport Plan (2015-2025) outlines five regional objectives; 1) A land transport network that addresses current and future transport demand, 2) A land transport system that is increasingly free from death and serious injury, 3) The Canterbury earthquakes recovery is supported, 4) The land transport network is resilient and supports long-term sustainability, and 5) Investment in land transport infrastructure and services is efficient.

In addressing the downstream effects, the formation of the Report considered the regional objectives 1, 2, and 5, as well as long-term sustainability mentioned in objective 4. Resilience was considered less of a priority due to the various routes available in Christchurch should, for example, Cranford Street becomes temporarily unavailable. It should be noted, however, that any implementation of works must also be conscious of earthquake recovery projects when they occur.

Local

The Christchurch Transport Strategic Plan (CTSP)has four goals; 1) Improve access and choice, 2) Create safe, healthy, and liveable communities, 3) Support economic vitality, and 4) Create opportunities for environmental enhancements. The Report seeks to align with the CTSP[8]; namely to use the existing road network more efficiently. Therefore, the Report has concentrated on low impact, at grade, treatments.

The Long-Term Plan (LTP) sets out Christchurch City Council's funding priorities for transport over the next 10 years (2018-2028). The Council's commitment to the CNC is outlined there, along with other key projects such as Accessible City, Major Cycle Routes, a local cycle network (connecting to major cycle routes), pedestrian improvements plan, and Public Transport Infrastructure. Achieving mode shift (including better mode choices) is one of the level of service targets for the active transport in the LTP. Indicative funding has also been allocated in the LTP for Down-stream Effects Management Plan projects in the period 2018/19 to 2023/24.

[7] http://www.saferjourneys.govt.nz/
[8] https://www.ccc.govt.nz/assets/Documents/The-Council/Plans-Strategies-Policies-Bylaws/Strategies/ChristchurchStrategyTransportPlan2012.pdf

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3.2 Local Network Conditions & Description

This section of the report provides an overview of the existing down-streams urban transport network south of the CNC.

Route and Road User Hierarchy

Streets vary significantly in function. Some are used only for through movements (for example a motorway), while others are mainly used for access (a cul-de-sac). In response to this, the road network is categorised into hierarchy which enables planning and decisions to be made, some of which have wide effects. The route hierarchy in the vicinity of Cranford Street (which is relevant here) is presented in Figure 3-1 from Christchurch City Council's District Plan. A similar hierarchy is given in the CTSP.

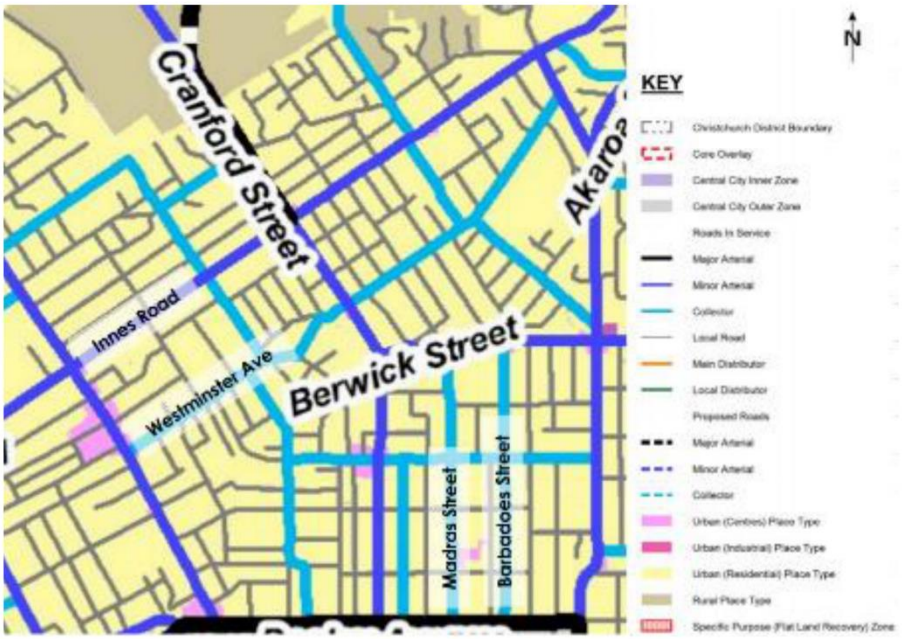

Figure 3-1: Road Hierarchy

(Source: http://www.proposeddistrictplan.ccc.govt.nz/Images/DistrictPlanImages/Chapter%207%20Transport/Operative/OperativeFig7.17a.jpg (note: some street names added))

A key objective of the Report is to keep the majority of vehicles on principal routes (arterials, distributors, and collectors).

Cranford Street from the connection of the CNC to Innes Road is a major arterial, south from there it becomes a minor arterial[9] primarily as it moves through community centres like Westminster Street / Cranford Street, and Edgeware Village. Innes Road and Berwick Street / Warrington Street are also classified as minor arterials. Collector roads in the vicinity of Cranford Street include McFaddens Road, Rutland Street, Westminster Street / Courtenay Street / St Albans Street, Madras Street, and Barbadoes Street.

Based on this hierarchy the bulk of the north-south traffic from the CNC should be accommodated on Cranford, Berwick, Warrington, Madras, Barbadoes, and Sherborne Streets. While Rutland Street and Springfield Road are also collectors,

[9] Definitions of the respective road hierarchies can be found in the Council's District Plan

Rutland Street now forms part of a major cycle route and hence it is desirable to keep traffic volumes on Rutland Street at lower levels.

NZ Transport Agency's One Network Road Classification (ONRC) system[10] also classifies Christchurch's urban roads. This system shows Madras Street and Barbadoes Street on an equivalent hierarchy to Cranford Street and Sherborne Street (arterials[11]), and also highlights the importance of Forfar Street, which is classified as a primary collector under the ONRC.

Active Modes and Public Transport

Christchurch City Council have been active in promoting active and public transport modes in the northern suburbs of Christchurch, by identifying and installing infrastructure to support these travel options. Christchurch City Council and Environment Canterbury (ECan) are planning to do more upgrades, and promotion, to support greater use of these modes. Further improvements are important in order to move people out of cars (especially single occupancy car trips) and into other transport modes.

Christchurch City Council are currently investing in the development of separated cycleways[12] as part of their Major Cycle Route (MCR) project, which will eventually deliver 13 major cycleways. The Papanui Parallel Cycleway was one of the first to be constructed, and its alignment through the subject area can been seen in Figure 3-2. Further cycleways are planned in the wider area including; the Northern Line, and the shared use path along the CNC, as well as a network of secondary cycle routes connecting to the major cycleway network[13]. The CNC shared use path will eventually allow cyclists to travel from the Waimakariri District to the Papanui Parallel and into the city. The CNC also includes a shared use path to the east along QEII Drive. Limited work has been undertaken to date around key secondary cycle route (normally unseparated cycle lanes and quiet streets) linkages to the Papanui Parallel. The development of such routes is important to encourage safer journeys and more people cycling as traffic volumes grow in this network.

Christchurch City Council have a project to create a link between the CNC and the Papanui Parallel, called the Grassmere Link. Council have allocated funding for this project in the 2020 to 2024 financial years.

[10] Details can be found here: https://www.nzta.govt.nz/roads-and-rail/road-efficiency-group/onrc/.

[11] ONRC divides New Zealand's roads into categories based on how busy they are, whether they connect to important destinations, or are the only route available. Within this arterial is broadly defined as 'link regionally significant places and industries' (Source: https://www.nzta.govt.nz/assets/Road-Efficiency-Group/docs/ONRCPMsgeneralguide.pdf)

[12] https://ccc.govt.nz/transport/cycling/major-cycle-routes/about-cycle-routes/

[13] https://www.ccc.govt.nz/assets/Documents/The-Council/Plans-Strategies-Policies-Bylaws/Plans/Long-Term-Plan/draft2018/service-plans/Long-Term-Plan-2018-28-draft-Service-Plan-Active-Travel2.pdf

Figure 3-2: Cycle Network (Adapted from: https://www.ccc.govt.nz/assets/Documents/Transport/Cycling/map/Cycle-map.PDF)

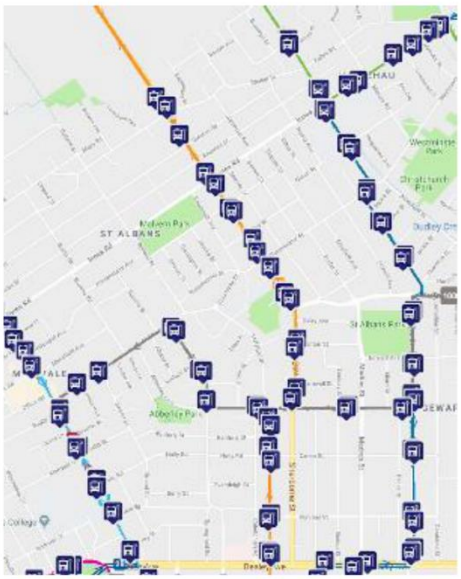

Figure 3-3: Bus Routes (Source: http://www.metroinfo.co.nz/map/)

Bus routes in the vicinity of Cranford Street are shown in (Figure 3-3). The Orange Line bus route is located on Cranford Street. From the Christchurch Northern Corridor connection, the Orange Line continues down Cranford Street as far as Edgeware Road where it moves across to Colombo Street. Other nearby bus routes include '44 Shirley', '100 Wigram/The Palms', the Orbiter which turns right from Innes Road (east) onto Cranford Street under the new route, and the Blue Line which connects Rangiora to Christchurch City Centre via Papanui Road. ECan have plans to increase the frequency of bus services (on the Orange Line) on Cranford Street..

One benefit of the CNC is that it is expected to reduce traffic volumes on Main North Road and Papanui Road allowing better bus priority on this corridor especially for people living in Northern Christchurch. The Main North Road and Papanui Road corridors have been identified in previous transport planning studies of northern Christchurch as the key bus route to the north, especially for the Christchurch northern suburbs. Further bus priority measures are currently being planned for this corridor after some of the through traffic is diverted across to the CNC[14]

ECan, CCC, WDC and the NZ Transport Agency are investigating Park N Ride facilities in the Waimakariri District as part of a package of travel demand management (TDM) measures. This package is also investigating express bus services from potential Park-N-Ride sites and the satellite towns of Rangoria and Kaipoi/Pegasus to the city centre. The provision of a high occupancy vehicle (HOV) lane southbound on the CNC will provide a priority corridor for these express buses, shared with those who carpool (cars with two or more occupants). Further investigation will consider extending the HOV lanes (using clearways) onto Cranford Street and Sherborne Street through to Bealey Avenue in both southbound and northbound directions.

The implementation of these initiatives would encourage less travel in single occupancy vehicles by prioritising trips by bike, bus, or walking (especially for shorter trips).

Existing Traffic Conditions and Crash Analysis

Historical crash data is available for the network south of the CNC but there are limited traffic counts available for the existing road network. The traffic counts that are available are shown in Appendix C. As part of the monitoring a lot more (baseline) traffic counts are being collected before the CNC opens.

[14] https://www.ccc.govt.nz/news-and-events/newsline/show/2047

The crash history shows that generally the majority of crashes (in the period 2012-2016) in the downstream network have occurred on higher volume roads such as Cranford Street, Innes Road, and Hills Road. In general, the data aligns with what would be expected relative to a typical network hierarchy; high volumes on arterials and collectors, and a relationship between traffic flow and crash incidence.

Of the death and serious crashes that have occurred during the 2012-2016 timespan, the majority have involved turning or crossing traffic mainly at intersections. Hence particular attention needs to be given to reducing the occurrence of such crashes in the re-design of intersections, especially given traffic volumes are expected to increase.

Pedestrian crashes have occurred east of Cranford Street on Innes Road (near school crossing), and also around Edgeware Village and near St Albans Park. In total there were 11 pedestrian (including one mobility) crashes that occurred in the study area in the period of 2012-2016. Of these, two pedestrian crashes involved minor injury, and three crashes involved people older than 65. Two of the crashes involved two Death and/ or Serious Injuries (DSI) (only 8% of the total DSI crashes) which is lower than the national average for 2016[15] (10%).

There were three recorded bicyclist crashes involving death or serious injury in the study area (12.5% of the total DSI crashes), which is higher than the national average of 6.2% for 2016, but fairly typical of Christchurch where cycle numbers are higher than other urban areas of New Zealand. Cyclist crashes have generally occurred south of Westminster Street. Cranford Street has also experienced a relatively higher amount of motorcycle crashes.

Speed has also been a factor in many crashes. Cranford Street had a lower number of speed related crashes compared with other arterial roads, except around the Westminster Street / Cranford Street intersection, and immediately south of the Berwick Street / Cranford Street intersection. Locations where speeds were a key factor in crashes include Barbadoes Street between Edgeware Road and Warrington Street, and Flockton Street. This is likely to be due to the wide lanes on these roads (which encourage higher speeds) and the unsignalised Barbadoes/ Warrington intersection.

More detail on current crash patterns is provided in Appendix C. The pre-CNC crash data will form an important baseline for monitoring the crash impacts on the network following the opening of the CNC.

[15] https://www.ccc.govt.nz/news-and-events/newsline/show/2047

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4. Purpose of the Report

4.1 CNC Northern Arterial and Cranford Upgrade Designation (Designation)

The primary purpose of the Report, as specified in Appendix A the Designation Conditions , is to identify the potential traffic impacts (if any) on those streets at the end of the CNC downstream effects (from the southern end of the NAE/CSU[16]) which may be potentially affected as a result of the operation of the NAE/CSU (CNC) and recommend appropriate mitigation measures to Council and, where required, the local Community Board. This requires identifying what streets adjacent to or adjoining Cranford Street will be affected by the operation of the NAE/CSU and what level of monitoring and interventions are required to mitigate adverse effects throughout the commissioning period.

Objectives

The objectives of the investigation, as stated in Appendix A to the Designation conditions, into the downstream effects are:

a) To identify preferred vehicle access routes, particularly for trucks, between the end of the Christchurch Northern Corridor and the Central City (that is between the end of the NAE/CSU and the City centre); and

b) To identify strategies to keep vehicles on preferred vehicle access routes; and

c) To discourage vehicles away from priority public transport routes and walking or cycling routes such as Main North Road / Papanui Road and Rutland Street corridors respectively.

These objectives are limited in scope and are motor vehicle centric. While objective 3 may consider other modes, it does not cover improved infrastructure over the network for other modes to offset the additional traffic volumes. To be consistent with the various national, regional, and local transport strategies it is important that the recommendations developed consider a number of other transport planning matters (e.g. safe access to schools), and especially the impacts of the additional CNC traffic on walking, cycling, and public transport on the downstream road network. Hence the recommendations include improvements that extend beyond these objectives.

Designation Effects Management

Appendix A to the Designation conditions also states that: This Management Plan is to ensure downstream effects are appropriately managed and to:

a) Assess the existence, nature, and extent of any increased traffic on streets adjacent to, or adjoining Cranford Street attributable to the NAE/CSU that might cause or contribute to a loss of service to any of these streets for up to 10 years after the opening date of the NAE/CSU;

b) Implement measures to avoid, remedy or mitigate such effects, where these are more than minor, in a timely and cost-effective manner and where appropriate and practicable; and

c) Monitor the efficacy of the measures for an appropriate period and implement further remedial action, if this is necessary and appropriate.

Here the independent expert has taken a broader view on the measures that need to be undertaken to avoid, remedy, or mitigate the traffic effects. It is not just a matter of keeping the traffic on main roads and discouraging vehicle users from using local streets and routes currently prioritised for public transport (Main North Road) and cycling (Rutland Street), but also mitigating the effects on other modes of the increased traffic. For example, the large increase in traffic on Cranford Street will impact 1) on safety of school children crossing the corridor to access St Albans School, 2) cyclists who use

[16] NAE refers to 'Northern Arterial Extension' (the connection between SH74 and Cranford Street), CSU refers to 'Cranford Street Upgrade'. Both form part of the greater Christchurch Northern Corridor (CNC) project.

Cranford Street and 3) pedestrians and drivers who want to access the Westminster/Cranford local activity centre. Measures to mitigate these three risks have been considered in the Report.

30% Traffic Growth Threshold

The Designation condition stipulates that in order to be considered for improvements and/or calming work a street must have experienced in excess of 30% increase on the traffic volume that would have occurred without the operation of the CNC. Underlying traffic growth is not included. It was also made clear that in the event of a street exceeding the threshold that works did not necessarily need to be undertaken to reduce the traffic volume.

When the CNC is completed and connected to the existing network, it will be relatively simple to deduce where a more than 30% increase has occurred exclusive of non-CNC related growth. However, the complexity of accurately making this calculation will concatenate the longer time passes from the opening date and near the end of the Commissioning Period.

While this threshold will be relatively simple on local roads, which carry modest volumes, arterial roads and some collector streets will be complex to assess. Many of the arterials, and especially some of the intersections, will experience congestion well before there is more than a 30% increase in traffic. If changes are not made to the arterials to remove severe congestion, it will be difficult to mitigate an excess of 30% growth in traffic on some local streets. Hence our approach with arterials is to look at where severe congestion is expected to occur and look at options to reduce it where this will also reduce the number of local streets impacted by more than 30% additional traffic. It is acknowledged that some congestion is advantageous (especially in peak periods) in getting people to change transport mode (e.g. to bike) or car-pool.

Monitoring the over 30% Threshold

The streets that are expected to reach the greater than 30% traffic threshold by end of the commissioning period or are likely to increase based on local knowledge will be monitored from 2020 through to the end of the commissioning period. Baseline data from these streets was collected in 2018.

There are many societal events which affect the number of trips undertaken on a network; land use changes, economic changes, and political changes to name a few. Given time, changes will occur, which will require updating in a base model. There are also many specific changes that will occur on the network which will also need to be updated within the base model. These changes are relatively simple to take care of in a model. However, a much more difficult undertaking is to uncouple changes made to the downstream network in response to the CNC; changes which affect the traffic volume on various streets (increases and decreases) which may not have been undertaken had the CNC not been constructed, or at least not within the set timespan outlined in the Designation. Over time it will become increasingly difficult to separate the impact of these downstream treatments and the CNC itself in terms of their consequence to the network's performance. Section 8.1 discusses the monitoring method that is suggested to be used to monitor traffic volume increases.

It is recommended that Council monitor the vehicle emission, noise, and vibration impacts of the additional traffic on arterials and collector routes. This monitoring is in response to concerns raised by the community.

4.2 Methodology

The Designation sets out the framework for the appointment and methodology for the recommendations made. Prior to the operating of the CNC, Christchurch City Council were to appoint a suitably qualified independent traffic engineering expert to investigate and design an appropriate methodology. To avoid doubt the Designation states what is expected to be included in the methodology. The following headings outline the methodology I have adopted to respond to the various elements expected by the Designation. Identify affected streets – Adjacent to and Adjoining Cranford Street Affected by the Operation of the CNC Streets expected to be affected by the operation of the CNC were primarily identified using the CAST Saturn Model. The model outputs highlighted midblock locations that exceeded the over 30% growth requirement of the Designation in the AM Peak, PM Peak, and all-day.

A model was used as the network size is too great to attempt to conceptualise the impact only through the experience of individuals.

Models are limited in their ability to reflect dynamic human choices, due to the many variables, and varying importance of the variables, that can influence trip distribution. Therefore, a sense check of the streets likely to be affected was undertaken, taking into account local knowledge of the road network and views expressed during consultation and by discussion with other traffic experts.

The monitoring of the majority of local streets in this area of the city between 2020 and the end of the commissioning period will identify the actual streets impacted by the operation of the CNC by more than a 30% increase in traffic, which may or may not align with that shown in the modelling. The local streets affected by the operation of the CNC (from modelling and local knowledge) if no arterial upgrades occur are shown in Section 5.4. The local streets expected to be impacted under the two arterial upgrade options are shown in Section 7.2.

Assess Current Vehicle Usage and Service of Affected Streets in Proximity to Southern End of CNC

Various sources were available to assess the baseline traffic volumes for the recommendations. The primary source is the CAST transport model (flow estimates are included in Appendix D1) and a small number of manual counts (Appendix C). Before the CNC is opened, traffic counts will be collected at over 50 locations in the road network to establish baseline traffic volumes which will be used as part of the ongoing monitoring of each street in relation to the impact of the CNC. Monitoring screens have been developed and are presented in Appendix E. I recommend traffic counts be collected on streets with high potential for rat-running within three months of the CNC opening, and then at 6 months. After this initial monitoring I recommend ongoing annual or biannual monitoring of the streets that are expected to carry most of the additional traffic is required, while other streets only need to be monitored if adverse effects are reported (e.g. an increase in rat-running or speeding). These counts will include the proportion of heavy vehicles. Separate baseline intersection counts will also collect pedestrian and bicycle traffic volumes.

Consider Extent of and Effects of Growth in Traffic Flows on Potentially Affected Streets That is Reasonably Attributable to the Operation of the CNC

The effects on all transport modes as a result of the increased CNC traffic flows have been assessed based on community issues raised during consultation, expert knowledge of the network, and advice from transport engineers and an urban designer during three issue and option development workshops. These methods are limited insofar that they require a reliance on the predicted affected streets from the CAST model. The monitoring programme is therefore required to help ascertain and confirm exactly where and to what level the transport effects actually manifest. This may identify that streets not shown in the transport modelling are impacted.

Recommendation of Appropriate Mitigation Measures

An issues and options workshop was held involving a number of transport professionals. The purpose of the workshop was to review the feedback from the community consultation and identify key issues raised. Workshop participants helped develop a range of options that could address the issues for the major improvements (arterial upgrades). A multi-criteria analysis framework was developed by the transport professionals, and the options were rated against different pre-agreed outcome measurements (which reflected key national and local transport priorities).

Once the type and scope of the major improvements and arterial upgrades were settled upon a second iteration of mitigation measures were investigated, which concentrated on improvements that could mitigate the effects on access to schools, parks, commercial centres, and cycling in light of the arterial upgrades.

This process identified issues that need to be addressed before the CNC opens, and after opening depending on monitoring outcomes following the CNC opening, up to the end of the commissioning period.

Recommendation of Further Remedial Steps if Monitoring Confirms a Continued Increase in Adverse Traffic Effects on Affected Streets that is More than Minor

While the Report outlines the issues and upgrade options that may need to be actioned in the few years following the opening of the CNC to the expiry of the Commissioning Period, what recommendations are made or need to be done will depend on the outcome of transport monitoring. It is possible that new issues arise as a result of the operation of the CNC that are not reflected in the transport modelling undertaken or in the crash history. The routes expected to be affected may not be affected as predicted and thus not need to be upgraded.

4.3 Balanced Transport Planning Approach

Wherever possible, I have taken a balanced transport planning approach to the development of my recommendations that looks to mitigate some of the impact of the additional traffic on arterial roads and local streets without widening existing road designations i.e. with minimal impact on private property.

As cities grow they are faced with growth in land transport trips. It is not suitable to accommodate all such trips in single occupancy vehicles. NZ Transport Agency and Christchurch City Council have actively looked to provide transport options for these trips in Northern Christchurch[17]. This includes the provision and promotion of bus, cycle, and car-pooling initiatives, along with infrastructure upgrades to ease congestion and reduce the proportion of people in single occupancy vehicles. While I am supportive of more investment and promotion in this area, I am of the view that such initiatives, particularly in the short term, will have limited impact on the number of vehicles that will enter Cranford Street when the CNC opens.

To achieve a balanced transport planning outcome, which encourages the use of other transport options, means provision of an expressway (e.g. permanent four-lane route) through St Albans to the City Centre via widening the road reserve of current arterials or on a new arterial alignment was not considered. Only a small number of people who participated in the consultation favoured such an approach. The support for a balanced approach to transport planning and the promotion of alternative transport modes and car-pooling was promoted by many stakeholders and the general public in the consultation. This is consistent with the findings of a number of consultation processes managed by Christchurch City Council citywide (e.g. Share an Idea campaign) in northern Christchurch.

However, the CNC is currently being constructed, and it is clear from the transport modelling undertaken that its operation will significantly increase vehicle flows on Cranford Street (south of Innes) on opening and through to 2031. While one option is to do nothing and allow congestion to occur, this will result in severe congestion which is undesirable to the community in terms of pollution and road safety. Hence to address severe congestion and discourage use of local streets by commuter traffic, a measured plan of arterial upgrades and traffic calming of local and collector roads is proposed. Wherever possible the upgrades are being achieved within the current road reserve. Given this constraint, there will still be congestion on the arterial/collector roads, especially at the Berwick Street /Cranford Street and Westminster Street /Cranford Street intersections as traffic volumes grow towards 2031.

The Report also includes a number of transport improvements that are expected to encourage more walking and cycling in the community. Where possible this includes mitigating the adverse impacts of the additional CNC traffic. While this is not possible on all routes, this is to a degree offset with other transport improvements in the local road network e.g. improved bicycle routes running parallel with and crossing Cranford Street.

The Report gives limited attention to travel demand management measures to move people out of cars, other than improving transport facilities to support use of other transport modes (e.g. walking and cycling). Travel demand management is typically an intervention considered strategically for a wide area; such as the Greater Christchurch urban area or the northern part of Christchurch and Waimakariri District. Any demand management interventions specific to this project would shift or create issues across the network if not coordinated with other projects. For example, bus priority lanes on Cranford Street are likely to push a considerable amount of traffic back away from the CNC and onto Main North Road and Rutland Street, which will impact on bus priority and bicycle improvements on these corridors.

Therefore, the Report does not closely look at hard[18] mode shift interventions or other wider demand management strategies for treating rises in traffic volumes. This is not required, as Christchurch City Council and its partners ECan and the NZ Transport Agency, are already investigating and planning to introduce more travel demand management measures in Northern Christchurch that focus on reducing congestion and travel in single occupancy vehicles on the Northern Corridor[19]. I strongly support these initiatives. Such measures include a southbound HOV lane on parts of the CNC, improvements to bus services to the Waimakariri District, potential HOV lanes on Cranford and Sherborne Streets, promotion of carpooling, and investigation of park and ride (and bike) facilities.

Another key aspect of the project scope is that only problems that arise directly attributable to the operation of the CNC are being addressed as part of this project. All other network issues are to be addressed via other funding arms of the

[17] https://www.nzta.govt.nz/projects/christchurch-motorways/northern-corridor-congestion/
[18] Measures such as price tolling, or land zoning changes.
[19] https://www.nzta.govt.nz/projects/christchurch-motorways/northern-corridor-congestion/

relevant transport authority. The Designation provides that an increase of vehicle movements on any of the potentially affected streets by more than 30% on top of traffic expected to have occurred without the operation of the CNC is the trigger point to take measures to mitigate those affected streets. Hence transport impacts created by general traffic growth in Northern Christchurch, and not by the CNC, will not necessarily be addressed by the Report.

5. Transport Modelling

Transport modelling forms an important part of the analysis that informs problem identification and option analysis. Modelling has been used as the effects of the project are yet to be experienced, and in many instances will be significant enough to warrant treatment prior to the opening of the CNC. For example, this is likely to be the case on arterial routes and at busy intersections where a sudden influx of traffic will make upgrades after the CNC more disruptive.

The important outputs required from the modelling were to estimate which local roads were likely to experience a 30% increase of traffic volume (either during the morning or evening peak, or daily) on top of what would have been expected at the same point of time in a scenario where the CNC was not constructed.

Therefore, the transport modellers were requested to model[20]:

a) The downstream network in 2021 and 2031 without the CNC

b) The downstream network in 2021 and 2031 with the CNC

c) The downstream network in 2021 and 2031 with the CNC and various downstream treatment packages (as outlined below)

These were to be modelled during the weekday AM Peak and PM Peak, and all (week) day.

No modelling of weekend traffic flows was undertaken as there is no current CAST weekend model. Weekend traffic volumes peaks can be relatively high but are not tidal like weekday peaks, so do not generally cause the same level of congestion. It will be important to monitor traffic volumes after CNC opens in the weekends to identify any capacity issues during the weekends.

The 2021 model represents the open year of the CNC (currently expected to open in September 2020). The 2031 model represents the design year. The expected effects beyond 2031 have not been assessed in this report as per the requirements of the Designation.

Modelling was undertaken for this study by Jacobs (a modelling consultant). This modelling included the roading changes associated with the Papanui Parallel cycleway that makes Rutland Street and Trafalgar Street less attractive for through traffic. The model also assumed the latest version on the CNC design, including a third motorway lane southbound on the Waimakariri River and southbound HOV lanes south of this extending to north of the QEII Drive interchange. The most recent land-use forecasts (at the time the modelling commenced) for Northern Christchurch and the Waimakariri District were used in the modelling. A summary of the modelling undertaken by Jacobs has been prepared for Christchurch City Council.

5.1 Limitations of Transport Modelling

Modelling a network requires a series of assumptions to estimate trip patterns. These include assumptions relating to land use, population, and the propensity of people to choose particular modes given the attraction of trip generators. All of these (and others not mentioned here) have varying degrees of certainty. The assumptions can become erroneous following events such as policy changes, land developments, and economic changes. They can also be erroneous in how they predict the movements of vehicles which are controlled by individual humans who can (and do) employ dynamic decision making, rather than decisions made with rigid logic.

Christchurch has a grid like network (owing to primarily to its topography), where drivers have many route choices. In such circumstance, models are a useful tool to show how congestion on one corridor can impact vehicle rerouting and the subsequent impact on adjacent corridors, with the route choice being determined by the congestion levels on each corridor. It is fair (at least relatively) to assume drivers will use direct arterial routes (which operate, and are generally modelled with higher speeds and less aggressive volume delay relationships than local streets) if the level of service is acceptable to the driver. When the arterial becomes less desirable, due to congestion, exactly which local streets, and to

[20] More details available in Appendix D

what magnitude, will be affected is a complex behavioural issue which is approximated in the model with vehicle routing decisions being based upon changes in travel time and distance on each route.

Underlying assumptions, such as traffic growth, will also change in response to changes in the rate of land-use development in different parts of the city. Indeed, the rate of development of identified growth areas (or approved subdivisions) is influenced by market forces.

As such, the model will be more accurate in 2021 than in 2031, due to the assumed rates of development to the north of the city in 2031, Therefore monitoring to track growth following 2021 is critical to validating the model findings.

Nonetheless, even with these limitations, modelling is the best tool we have to estimate what may occur in the future, and to develop a program of improvement projects.

5.2 Expected Transport Impacts Caused by CNC Traffic

In order to understand impacts caused by the CNC, it is important to first understand what level of growth on roads in Northern Christchurch would have occurred if the CNC had not been built. The pattern of travel would be impacted by the ability of the transport network to accommodate additional traffic. The modelling then considers how the CNC will concentrate traffic where it links to the arterial network at QEII Drive and Cranford Street. The pattern of travel is then influenced by the future road networks ability to accommodate this traffic. Upgrades to roads will influence which roads the traffic will use. This includes both capacity upgrades on arterials/collectors and at intersections and discouraging traffic through using traffic calming. Even small changes will impact on the route drivers take to travel through Northern Christchurch.

Expected Traffic Growth Without CNC

Initial modelling has been undertaken (using CAST (Saturn) model) to identify the level and location of expected network traffic growth and traffic congestion if CNC had not been built, refer to **Figure 5-1**. Note that 'V/C' stands for volume over road capacity.

Areas of the network in excess of 80% experience congestion, as traffic volumes approach capacity (V/C = 1) and unstable flow conditions occur. This results in slower moving vehicles and smaller, and less frequent, gaps for vehicles to enter traffic flow from side streets. This in turn results in queuing on side streets, and risk taking when selecting gaps to enter.

Marshland Road and Main North Road are two important arterial routes in Northern Christchurch, and without the CNC additional congestion would have occurred on these routes by 2021 and be worse in 2031 due to growth in traffic flows from Northern Christchurch suburbs and Waimakariri District (dark red and red sections). But, as the maps shows, there are other congestion areas further south on Cranford Street and Hills Road. Barbadoes Street, especially closer to the intersection with Bealey Avenue, is also affected. All of these areas have been circled on the maps.

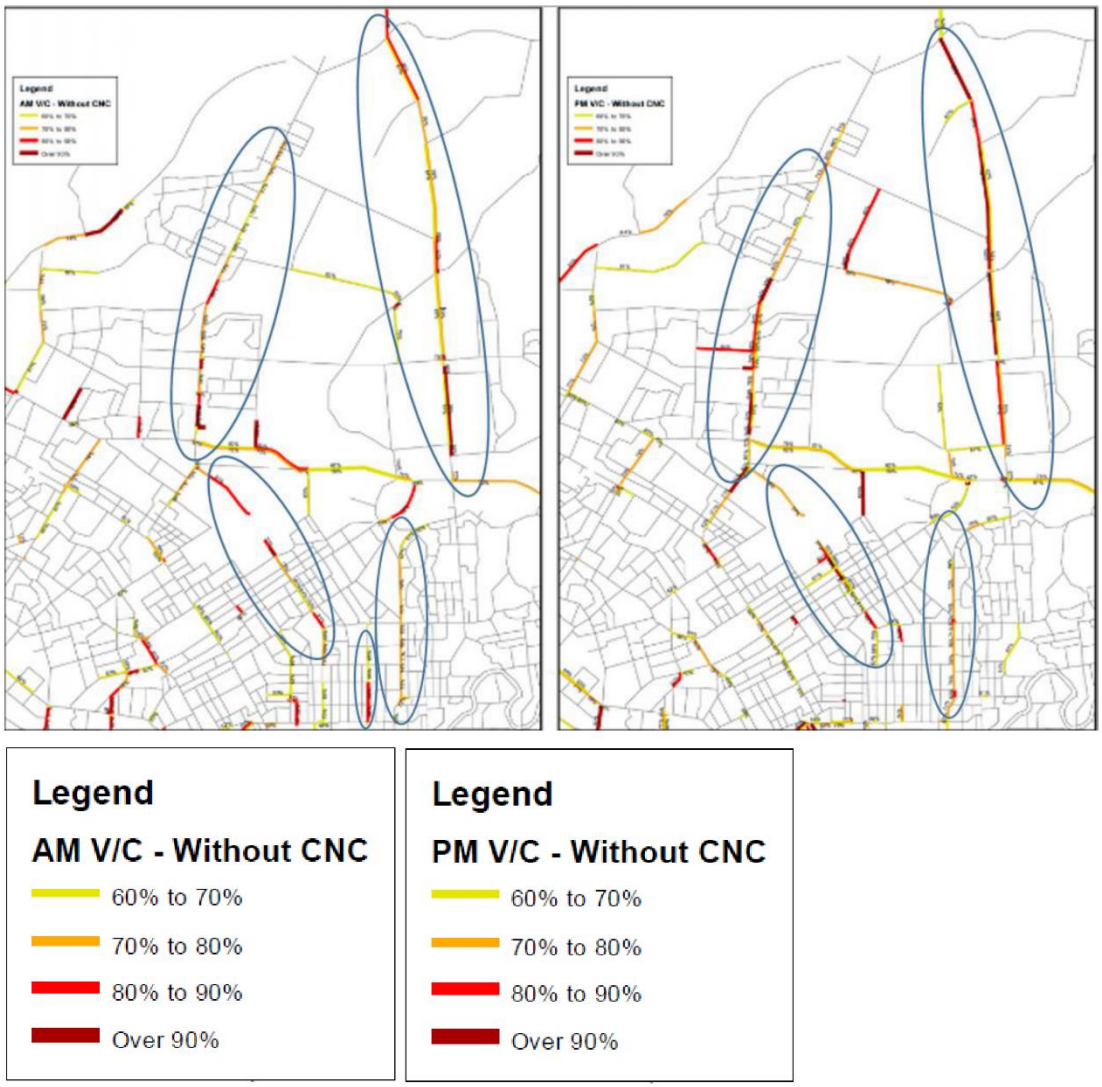

Figure 5-1: Expected Underlying Growth 2031 (Without CNC) (Left AM, right PM)

Additional Traffic Growth Across Local Network as a Result Of CNC

Modelling has been undertaken to assess the growth of traffic in the network overall and around the southern end of the CNC following the completion of the CNC (less the underlying expected growth if CNC had not been built). Streets (arterials, collectors, and local streets) that are likely to have an increase of 30% more traffic in peak periods by 2031 compared to 2021 without the CNC have been highlighted in the following figures. **Figure 5.2** shows the larger picture and how traffic will divert from Marshland Road, Main North Road and Johns Road (blue lines) to the CNC and downstream routes (red lines).

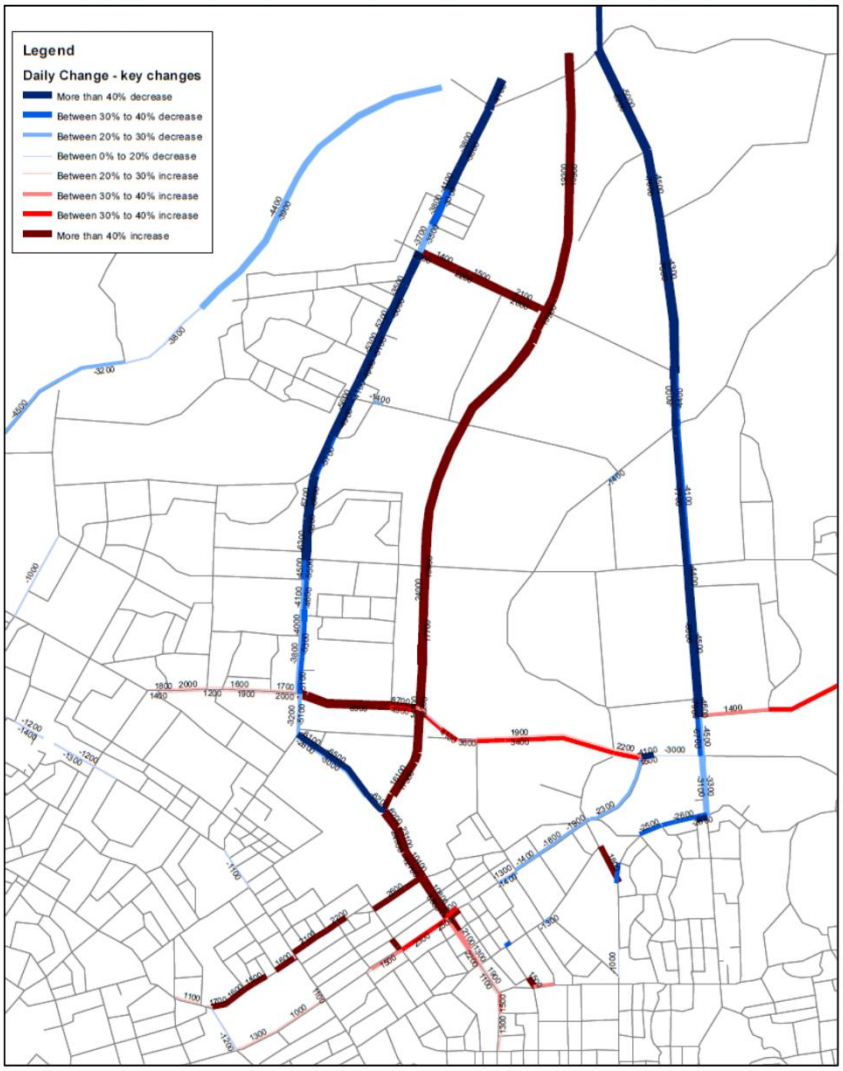

Figure 5-2: Major changes in traffic volumes as a result of CNC (compared with no CNC) in 2031

At a more localised level the impact of CNC on traffic volumes in the AM Peak, PM Peak, and all day in 2021 and 2031 are shown in Figure 5-3 to 5-8. Those streets which are expected to have a greater than 30% increase in traffic are shown in black (arterials) and orange (local roads).

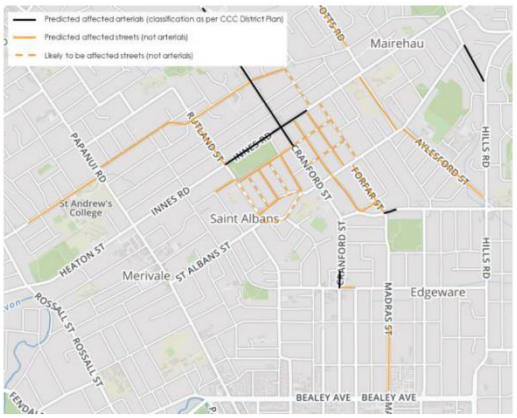

Figure 5-3: Streets expected to be affected by more than 30% in AM Peak, 2021

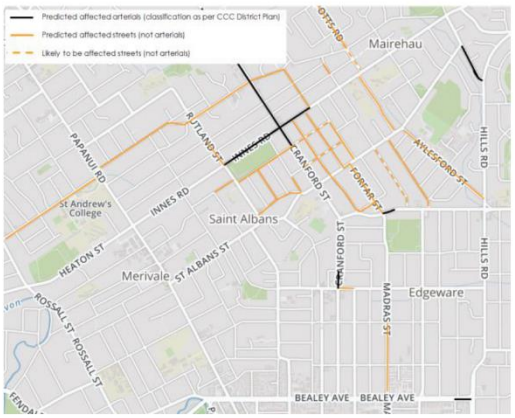

Figure 5-4: Streets expected to be affected by more than 30% in AM Peak, 2031

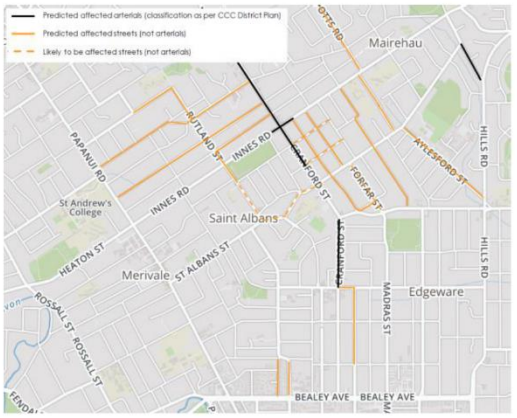

Figure 5-5: Streets expected to be affected by more than 30% in PM Peak, 2021

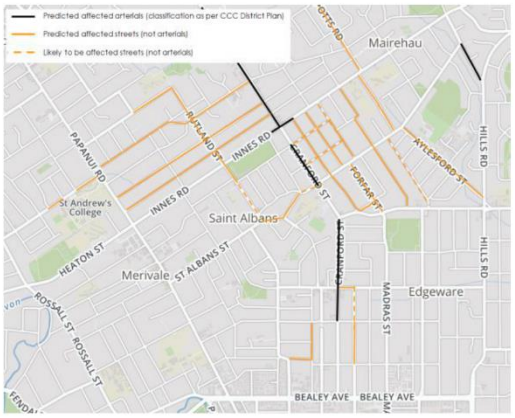

Figure 5-6: Streets expected to be affected by more than 30% in PM Peak, 2031

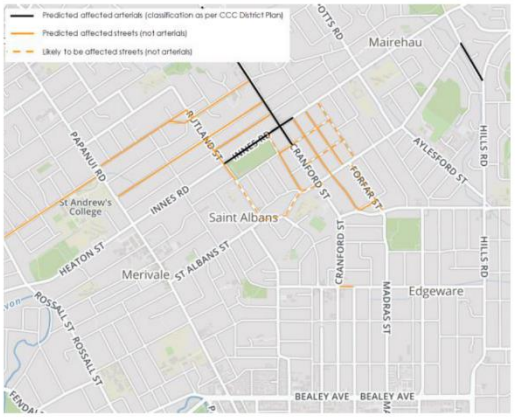

Figure 5-7: Streets expected to be affected by more than 30% all day, 2021

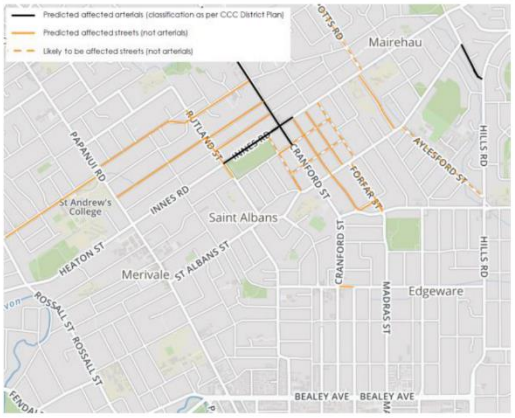

Figure 5-8: Streets expected to be affected by more than 30% all day, 2031

These figures show a significant number of local streets are expected to have at least a 30% increase in traffic volumes due to rat-running traffic. The effect is more pronounced in 2031, although the majority of streets are also impacted in 2020/21. If no arterial/collector upgrades progress, then a lot of streets need to be traffic clamed before the CNC opens. However, with the level of congestion expected on Cranford Street it will be challenging to design and construct traffic calming that deters rat-runners.

It was agreed early on in the project with CCC that the impacts of the CNC on Innes Road and several parallel routes, especially west of Rutland Street, would not be considered in the DEMP. Rather Council will monitor the effects after the CNC opens and if necessary, look at what changes may need to be made to the transport system.

5.3 Modelling of Improvement Options

The initial modelling excluded any change to downstream routes and intersections. This was done subsequent to options being developed and is presented in the following sections, and **Appendix D**.

5.4 Impacts of Additional Traffic

The main impacts of the additional traffic are road safety, access to shops, parks, school and housing, air pollution, pavement deterioration, and amenity (urban design).

There is a known relationship between traffic volume and crash risk. This means streets with an increase in traffic volume (particularly if not treated) tend to experience more crashes if not treated. Deterring vehicles, especially heavy vehicles away from local streets (for example by traffic calming) and onto better designed arterial routes will reduce the safety impact of the CNC traffic. Lower operating speeds (ideally around 30km/h) on local roads will also reduce both the number and severity of crashes. On arterial and some collector (distributer) streets where traffic volumes will increase significantly, a combination of route upgrades and temporary speed limit reductions (for example school zones) can be used to address crash risk. As traffic volumes increase, the headway between vehicles decreases and consequently the ability for drivers to enter and exit the traffic flow (via accesses, or intersections) reduces.

Road pavement tends to wear out faster with higher traffic volumes; however, this is more dependent on the relative volume of heavy vehicles, rather than necessarily the total traffic volume.

The Report looks to address as many of these impacts of the CNC traffic as possible, acknowledging that some issues cannot be easily addressed. The intention of the Report being to minimise rather than fully eliminate the effects of the additional traffic volumes as a result of the CNC.

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6. Community and Stakeholder Concerns

6.1 Purpose and Outcomes of Early Community Engagement

Consultation with the public and key stakeholders has and will continue to be an important part of the development and advancement of the Report. The St Albans community, in particular, have been very active in expressing their views on the various northern arterial scenarios that have been presented by Christchurch City Council and the Crown over the last 50 plus years, including the Christchurch Northern Corridor (CNC). Ae major concern expressed during consultation on the CNC, is how the additional traffic from the arterial will impact on the St Albans and surrounding communities, and how this can be mitigated. Concerns that were expressed at the CNC Designation hearing led to the requirement to produce a DEMP (the Report).

In order to involve the public and key stakeholder in the process as required by the Designation and Christchurch City Council's own internal processes, a consultation strategy was developed by Christchurch City Council. The first step of the strategy focused on capturing all the issues and concerns of the general public, key stakeholders, and politicians (community board and Christchurch City Council). In order to achieve an independent perspective (from Christchurch City Council) on the issues and concerns, the independent expert participated in the majority of the consultation meetings.

Subsequent phases will involve consultation on the Report and each of the improvement projects within the Report. The Designation has some specific requirements around consultation which are stated below. Most of these matters apply to consultation on the options that are developed in the Report. Section 4.5 list some of the key stakeholders that need to be consulted.

> 4.5. Where traffic calming work is recommended, Christchurch City Council will consult with:
>
> 4.5.1. Residents of the streets where traffic calming measures are proposed to be taken;
>
> 4.5.2. Canterbury District Health Board;
>
> 4.5.3. Mairehau Primary School, Our Lady of Fatima School[21], Paparoa Street Primary School, St Albans Catholic Primary School, and St Albans School;
>
> 4.5.4. St Albans Residents Association and Mairehau Community Trust; and
>
> 4.5.5. Cyclists through Spokes;
>
> 4.6. Consultation shall include the distribution of a newsletter including feedback form prior to the review.

Section 5 of the Designation also provided guidance on the process for consultation prior to implementation of the Report.

> 5.2 Owners and occupiers of properties on streets identified by the independent traffic expert as requiring mitigation measures shall be:
>
> 5.2.1 Advised of the recommendations of the independent traffic expert under clause 3, including proposed mitigation measures, within 30 working days following the provision of the recommendation to Christchurch City Council;
>
> 5.2.2 Provided a period of 20 working days to comment on the proposed mitigation measures; and
>
> 5.2.3 Advised by Christchurch City Council of the final mitigation measures to be implemented, at least 20 workings days prior to commencement of any works.

[21] Now known as St Francis of Assisi School

The initial phase of stakeholder and public consultation was focused on identifying all the existing and potential future transport issues associated with the CNC traffic on the downstream transport network. To help the public in assessing the potential effects of the CNC, transport modelling outputs of the likely impacts of the CNC were provided. More specifically, this identified the streets that are expected to have more than 30% additional (rat-running) traffic in 2031. In order for the public to consider how changes to the arterial and collector roads may reduce the amount of traffic using local streets, the benefits of a potential arterial upgrade options were provided. This preliminary option included clearways on Cranford Street, upgrades to three intersections on Berwick and Warrington Street and three-laning of Madras/Forfar and Barbadoes Streets from Bealey Avenue to Warrington Street in the higher flow direction.

The first-round consultation (May and June 2018) consisted of the following steps:

1. One-on-one meetings with 20 key stakeholders, which included the parties specified in the Designation (e.g. the local schools) and other stakeholders such as shop owners expected to be impacted.
2. Four public open days attended by 123 members of the community at which plans were presented of the impacted area and a potential arterial upgrade option.
3. Distribution of a newsletter to approximately 12,000 households and businesses in the affected road network (Appendix F). This included a submission form. Over 400 submissions were received from the community.
4. Several meetings with the Papanui-Innes Community Board and Infrastructure, Transport and Environment (ITE) Council committee of Council to discuss the process being used in consultation and the issues identified in the transport modelling.
5. A half day consultation hearing of submissions from stakeholder and the public that was chaired by the Community Board.

The feedback from the public and stakeholders was compiled into common themes for consideration at future stages of the project. The key topics raised from consultation are as follows[22] (Christchurch City Council have prepared a report that provides more detail on each submission);

Clearway comments (mostly Cranford Street, but also in general)

• Take the clearway through to Bealey Avenue	• Ongoing monitoring/policing	• Loss of parking
• Pedestrian safety – upgrades required and design concerns	• Improved facilities for public transport / park and ride	• Provision of safe cycling facilities
• Access to English Park	• Impact on Cranford Street properties	• Impact on businesses
• Impact on side streets	• Impact on driveway safety	• Consider HOV lanes

Intersection changes comments

• Parking concerns	• Impact on businesses	• Leave as is and monitor traffic impact first
• Forfar Street roundabout doesn't need to change, and safety concerns	• Impact on St Albans Park	• Pedestrian safety – both concern for increasing pedestrian risk and also support for changes

[22] The Council summary of submissions can be found here:
https://www.ccc.govt.nz/assets/Documents/Consultation/2018/July/Cranford-Street-Feedback-Summary.pdf

• Cycling safety – both concern for increasing cyclist risk and also support for changes	• Barbadoes / Warrington needs lights	• Berwick Street – pinch point and congestion
• Traffic light phasing	• Two new sets of lights could cause short cutting through side streets	• Flockton Street issue – will vehicle and bus manoeuvres be possible due to proximity to traffic signals

Three laning – Madras Street and Barbadoes Street

• Prefer clearway	• Loss of parking undesirable	• Bus blocking inside lane during clearway operation
• Leave as is and monitor	• Pedestrian safety	• Impact on businesses
• Improve public transport options	• Cyclist safety	• Impact on St Albans Park users
• Impact on residents	• Increase in truck movements undesirable – vibration and noise	• Continuation of the one-way system all the way through

Cranford / Westminster, Cranford / Berwick, Madras / Edgeware, and Barbadoes / Edgeware

• Safety – driver behaviour and vehicle speed concerns, pedestrian safety (especially children), and also desire to leave as is.	• Turning arrows or separate turning lanes	• Lower the speed
• Leave intersection(s) as is	• Have red light camera at intersection	• Pedestrian and cycle focus
• Parking – provision for shops/businesses and increase P15 to P30.	• Impact on businesses and residents	• Widen road – do not narrow

The feedback from consultation provided good insight into the community's thoughts and concerns on the project. The results were considered during the issue and options workshops which led into option development, and the multi-criteria analysis of different options. Refer to Section 7.4 for discussion on how the consultation outputs informed option analysis.

Many of the issues with the options can be mitigated, or possibly resolved, during the later design phases of this project, however others may be more challenging. On-going dialogue and consultation will therefore be crucial to try to achieve the best upgrade options for the community.

As per the requirements of Section 5.2 of the Designation, and Christchurch City Council's own processes, the second round of consultation has also occurred on the Proposed Downstream Effects Management Plan and a further third round of consultation will be undertaken on the projects that are recommended in the Report. This third round of consultation will inherently be more detail specific on the individual treatment selection (say speed platform vs carriageway narrowing); however, it is important that the resultant decisions remain holistic to the network. A treatment decision on one street may result in a significant impact on another; perhaps even acting as a catalyst for another street exceeding the 30% threshold. Consequently, decisions cannot be made in isolation, or without consideration of their wider impact. The monitoring regime will be an important part of monitoring the impacts of various interventions and identifying any knock-on effects of such changes to other parts of the transport network.

6.2 Changes in Transport Modelling

Since the initial transport modelling was undertaken, that informed the consultation material, further modelling has been undertaken of the downstream effects. The most recent transport modelling has changed some of the streets that are expected to be impacted by greater than 30% traffic in 2031 and also looked at the impacts in 2021. One major change to the modelling that impacts on routes impacted downstream is the proposed layout of the Innes Road/Cranford Street intersection, which is being upgraded as part of the CNC project. Other changes that have been made include restricting a number of side-roads on major routes to left-in and left-out (LILO). For example, Malvern Street and Dee street intersections on Cranford Street. These network changes have impacted on traffic flows on Mersey Street (which now carries more traffic) and Malvern Street (which carries less traffic).

6.3 Changes to the Report following second round of Engagement

The second round of consultation sought to understand the community and stakeholder view on the proposed works in the draft management plan and identify any gaps and concerns with this plan. There was active participation by the community and stakeholder groups with four open days and 230 submissions received on the proposed plan.

A review of the submissions and comments received during the open days was undertaken. Issues raised during consultation can be sorted into three groups:

1. General local transport issues that are not caused by the construction of the CNC (e.g. outside the study areas or would have occurred even if CNC was not constructed). These are being referred to the relevant transport and project manager within Council.
2. Transport issues that can be addressed at the next stage of option development or that can await the results of monitoring after the CNC is opened. Many of the issues, and especially site-specific issues fall into this category. These do not need to be addressed by this plan.
3. Key transport issues have been considered in finalising this report.

Key issues and the response to these issues are as follows (this report has been modified in line with these responses):

- ISSUE: Strong emphasis on reducing single occupancy vehicle trips and overall number of vehicle trips from the north traveling through St Albans *RESPONSE – That the Council should investigate the additional link capacity (clearways and additional lanes at traffic signals) being restricted to buses and higher occupancy vehicles (e.g. to be HOV or T2 lanes). There are expected negative local and wider network impacts of HOV lanes, in terms of more rat-running on local streets and a high likelihood that significant number of vehicles will be diverted to Main North/Papanui Road and Rutland Street, which are principal bus and cycling corridors, and associated adverse effects of this. These transport effects need to be understood before a decision can be made to restrict access to the clearways to HOVs.*
- ISSUE: More emphasis needs to go on getting people onto buses (public transport) rather than using private motor-vehicles. Request for 24-7 bus lanes on Cranford Street. *RESPONSE – We support endeavours to get more people onto public transport and to apply further TDM measures. However, our preference is on HOV clearways (not bus lanes) in study area given the limited number of people that we believe would use bus services from the Waimakariri District to the city centre. Permanent bus lanes on Cranford Street will push traffic back onto Main North Road and Rutland Street impacting on safe and efficient bus and cycle usage of these routes. It would also lead to a lot of rat-running on local streets in St Albans; considerably more than HOV lanes.*
- ISSUE: Transport partners (e.g. CCC and NZTA) need to do work together to change travel behaviour (e.g. looking at parking controls in CBD and allocating road space to buses). The focus should be on moving people not vehicles. *RESPONSE The Greater Christchurch Transport Partnership has been considering measures to change travel choices in Northern Christchurch for many years. There are several studies on the go at present. This matter is complex as while changes like parking management in CBD and other key employment hubs may move some people to alternative transport modes like buses, there are also impacts, especially in the CBD, on retail businesses, and on parking outside residential properties. Also, with many trips with destinations outside the CBD it is not simply a matter of putting in an express bus from Waimakariri District to the city but also to other destinations. Making such network changes takes considerable time and the timing is not ideal for introducing further parking charges in the CBD given the retail sector is still recovering from the*

earthquakes. The proposed arterial changes do not preclude the provision of HOV and bus-lanes in the future, once TDM measures like parking management and ParkNRide is further progressed.

- ISSUE: Not enough measures around walking, cycling and public transport to be introduced before the CNC opens. Most of the changes appear to come later after traffic volumes have increased and should be in place before CNC opens (Stage 1 improvements) *RESPONSE: The Stage 1 proposals improves safety and access for these modes. For example, the traffic signals at Warrington/Forfar and Warrington/Barbadoes will improve access and safety for pedestrians and cyclists crossing Warrington Street and using St Albans Park. We have also added a requirement in stage 1 to commence several studies and implement 'quick wins' before the CNC opens and other changes as early as possible within the three years after the CNC opens. An example would be signage and marking of an alternative north-south cycling route through quiet local streets to the east of Cranford Street. This could be done relatively quickly and be in place before the CNC opens. We have also moved the construction of the north-south route into the three years following the CNC (previously in Stage 3). The timeframes for other projects need to allow time for suitable engagement with the community.*

- ISSUE: Confusion around the type of cycling facilities to be installed as part of secondary cycle routes network. Are they to be separated cycle lanes? *RESPONSE: In the DEMP report we have made it clear that the secondary cycle-ways won't generally include separators like provided on the MCRs (e.g. Papanui Parallel). There may-be some shared paths proposed, but most of these routes will consist of painted cycle lanes and bicycle greenways (i.e. use of quiet streets). Also, the public will get to see all designs that impact on street cross-section including kerbside parking provision as part of consultation on specific projects.*

- ISSUE: Lack of safe cycling facilities on Cranford/Sherborne Streets during Clearway operation. *RESPONSE: Two strategies to address this are 1) directing majority of through cyclists away from corridor and onto Papanui Parallel and other routes, and 2) improvements to be made to Cranford Street to better accommodate cyclists who still chose to cycle on this route. Council will investigate several options to achieve this, including providing a wider kerbside lane during clearway operation.*

- ISSUE: Concerns around staging of traffic calming on various streets and concerns on the time it might take to implement measures to address rat-running that does occurs after the CNC opens *RESPONSE: Have made it clear that monitoring of rat running in local streets needs to happen soon after CNC opens. Specifically, that within 3 months of opening of CNC all streets that are expected to be impacted by rat-running, or for which public complaints are made, have traffic counts collected and examined. Look to implement improvements as early as possible on streets with a 30% plus increase compared with pre-CNC. Specified that temporary measures (or rapid implementation measures) are an option to reduce rat running on some streets, especially if the effects are well over 30%. For example, use of temporary islands and hit posts to ban some turning movements. Could also be used to test potential measures where there is some opposition from the community, as options can be removed if necessary.*

- ISSUE: Right turn movements during clearway operation (e.g. into new play-centres on Cranford Street) will impact on capacity of two-lane clearway operation. *RESPONSE: Highlight that the improvement proposed do ban the high right turning movements at side-roads or provide right turn bays at most traffic signals. The right turns at English Park carpark will also be banned. Some right turning demand is typical on roads with clearways and while it can reduce the capacity of the road it has limited effect on capacity if opposing flow (non-peak direction) are low as is expected on these routes.*

- ISSUE: Concerns around peak period prohibition of car parking for clearways on roads with high kerbside parking demand. *RESPONSE: The DEMP does require examination of parking effects of the schemes. This will require the Council to do parking surveys and look at managing parking demand by different users (e.g. local resident, commuters and short duration parking near shops), given the loss of parking expected when clearways are operating.*

- ISSUE: Why the Report does not consider the downstream effects of CNC on Innes Road and McFaddens/Mays/Normans corridors, given Innes Road is already heavily congested in peak periods. *RESPONSE: The DEMP report states that a study of these effects was excluded from the brief. Generally modelling does not indicate that Innes Road, especially the western end, will be heavily impacted by the CNC and the impacts are well below the levels of transport impact on Cranford Street. This issue is mainly an existing problem and Council will monitor the situation and determine after CNC is opened whether anything needs to be done on this route. The expectation is that congestion on Innes Road will result in drivers re-route further north and using Northcote Road and the Blighs/Idris corridor to head west. Additional road capacity may add additional traffic to Cranford Street and Innes Road which is undesirable.*

- ISSUE: Will there be monitoring of air, noise and vibration from traffic before and after the CNC opens. *RESPONSE: Made it clear in the DEMP that Council will be doing this monitoring both before and after the CNC opens so that any impacts of the additional traffic can be assessed*
- ISSUE: Concerns around pedestrian safety of children in the proximity of schools. *RESPONSE We have highlighted the improvements that will be made before the CNC opens to address safety concerns from crossing school children, especially across Cranford Street. Such improvements are being made as part of the arterial road upgrades, especially at the Cranford/Westminster and Cranford/Berwick intersections. Speed limit reductions on local streets to 30 or 40km/h will also improve safety for school children, general pedestrians and cyclists.*
- ISSUE: Requests to install tolls on the Waimakariri Bridge (SH1) to reduce number of cars travelling into Christchurch (as a traffic demand management measure). *RESPONSE: Current New Zealand legislation does not permit existing roads to be tolled. Only new roads.*

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7. Issues and Option Development

This section of the report outlines the expected transport issues that will result from the CNC, along with associated improvement options and desired outcomes (as identified during the stakeholder and public consultation), transport modelling, and review of the network by the independent expert. The Report presents various options that have been developed to avoid, remedy or mitigate the expected transport issues (i.e. the desired outcomes) and fulfil the objectives stated in the Designation conditions. The main objective is to achieve the desired outcomes of avoiding, remedying and mitigating the transport effects of the CNC, especially on the local community. In most cases this will be achieved by undertaking the proposed improvement options in this plan or from the recommended studies. However, given the Report extends over a period of more than ten years, the options implemented may change as a result of the monitoring results or if alternative options will result in even better transport outcomes.

As with any area-wide transport plan, it is also important that the options are as consistent as possible with the objectives of local, regional, and national strategies. As outlined in the CTSP and the national Government Policy Statement (GPS) on transport, road safety, and access for all road users is a high priority.

Section 7.1 outlines the issue and option development process that has been adopted for the Report. Given the focus on keeping upgrades within the existing road reserve wherever possible (e.g. not looking at any new arterials or major arterial upgrades), there are a limited number of options available for increasing road capacity and mitigating the impact of the additional traffic on various road users (e.g. cyclists and pedestrians) and the local community.

7.1 Issues and Option Development Process

The first step in developing options was to clearly set out all of the issues that may be experienced on the network following the opening of the CNC. These included existing issues that may be exacerbated, and new issues. Compiling the issues was done by using the data available on the network (such as crash data), outputs from the model (such as where congestion might occur), feedback from the public, and expert knowledge of the network. A knowledge of the issues (or at least likely issues) was important so that the subsequent options considered would be focused on addressing these issues.

The option development was focused on the key desired transport outcomes specified in the Designation (e.g. keep traffic on preferred traffic routes) and also was to be as consistent as possible with the objectives of local, regional, and national strategies. It has been separated into two development stages. Stage One involved developing options to encourage the additional traffic that will come down the CNC, when it opens and through to the end of the commissioning period, to stay primarily on the arterials and collector routes and off the local streets. This can be achieved by using a combined 'carrot' and 'stick' approach. The carrot being to upgrade some of the arterial and main collector routes. The stick being to traffic calm a number of local streets to push traffic back onto the arterial and collector routes. In addition to the traffic calming, up to 9 'safe speed community areas (SSCA)' are proposed in the study area to deter rat-running traffic on local streets and to reduce the risk of serious and fatal crashes from any traffic.

It is acknowledged that the community wants to also see travel demand management measures that reduce the volume of vehicles coming down the CNC and into the St Albans road network. Christchurch City Council, Ecan, Waimakairiri District Council and NZ Transport Agency are investigating measures that encourage more trips by alternative transport modes (e.g. bikes and bus) and more car-pooling. While such measures would reduce traffic volumes, the impact on traffic volumes coming off the CNC, at least initially, is likely to be relatively small (it is estimated that effective measures might result in up to 10% reduction in traffic volumes) and so the focus of this study has been dealing with a significant increase in traffic through the network when the CNC opens and out to the end of the commissioning period.

The second development stage focuses on improvements that need to be made on several roads to mitigate the impact of the additional traffic from the CNC on all road users and the community. The key outcome is a network of roads that supports and promotes use of transport options other than the single occupancy motor vehicle, which retains or improves access to key community facilities (parks, schools, and shops) and, where possible, addresses the safety impacts of the additional traffic. The second stage of option development included projects in the following four categories:

1. Safe Access to Schools
2. Safe Cycling Routes
3. Access to Parks

4. Access to Commercial Centres

Two over-arching principles are promoted in the development of the options; delivering healthier streets and a safer (transport) system. With the growing understanding that streets have a vital role to play in developing vibrant and healthy communities, the Report includes a requirement to develop street improvements that lead to healthier streets wherever possible. It is proposed doing baseline (before treatment) and design assessments of each impacted route using the Healthy Streets framework developed by Transport for London (see Guide to the Healthy Streets Indicators). The ten key healthy street indicators are shown in **Figure 7-1** below. Preference should be given to options that lead to more healthy streets or, where this is not possible due to increasing traffic volumes, that minimise the impact on the health of a street.

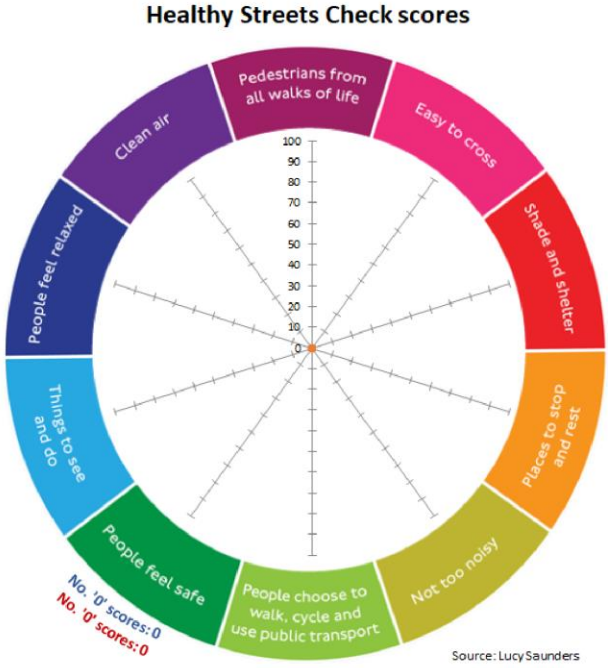

Figure 7-1: Healthy Street Framework

In terms of improving road safety and moving towards a safer transport system the Austroads safe system assessment framework should be used, in addition to safety auditing, to evaluate all infrastructure improvement options. The safe system framework breaks the risk of fatal and serious injury crashes into three components: exposure, likelihood, and severity. The exposure is typically the volume of transport users (pedestrians, cyclists, and motorists) on the street. With the increase in traffic volumes on many routes in the network as a result of the CNC, the crash risk will increase if no improvements are made. To compensate for this increase in crash risk it is proposed that both the 'likelihood' and 'severity' of crashes must go down. To achieve a reduction in 'likelihood' the facilities for road users, especially pedestrians and cyclists, in urban areas must improve. For example, the introduction of traffic signals, the greater use of pedestrians crossing aids (islands) and shorter crossing distances, and introduction of cycle lanes and paths. Crash severity is influenced by operating speeds which are related to speed limits and road design. Hence improvements that reduce operating speeds and lower speed limits reduces crash severity. In this network this will be achieved on local roads through introduction of the safe speed areas.

While at first reading the DEMP does not provide much in the way of public transport improvement options it is important to realise that the CNC itself does support public transport in two ways. The first is to attract traffic away from the Main North/Papanui Road corridor so that better bus priority measures can be applied to that route, without causing severe congestion. The second is with the inclusion of the high occupancy vehicle (HOV) lanes southbound across the Waimakariri River and through to just north of the new Cranford Street Roundabout. The HOV lanes will provide priority for buses and vehicles with at least two occupants. As traffic volumes grow on this corridor this will result in buses having travel time savings.

As part of this plan, extending the HOV lanes further south, and providing them northbound is to be investigated, as this would give priority to buses and people who carpool (i.e. increasing vehicle occupancy). Given that the bulk of buses will be on Main North Road, the principal northern bus route, there is no requirement for a bus-only lane on Cranford Street, at least not initially. It is possible in the future, with further growth in the Waimakariri District and Northern Christchurch (e.g. Belfast), and once further TDM measures (like parking controls in CBD) are implemented, a case may be made to change the proposed clearway lanes to bus-lanes. If special purpose lanes (HOV lanes in this case) are installed from the start then it is a lot easier to change the vehicles that have access to them, than if they were to start as general traffic lanes. However, there are potential adverse effects of providing HOV lanes down Cranford Street in that they may cause more rat-running in local streets and also divert traffic back onto Main North Road, making it more difficult to install bus priority onto that route. This matter needs more investigation, and hence why this plan does not specify that the clearways have to be HOV. But rather this option needs to be well investigated.

In terms of specifics on the proposed HOV north of Innes this would result in permanent HOV lanes in both directions. South of Innes the HOV would be provided in peak period clearways. Extension of the HOV lanes through to Bealey Avenue is already being investigated by CCC and their partners... In terms of the study area, the needs of public transport should be considered in the more detailed designs, including location of bus stops, bus shelters, and reducing delays on routes, especially at traffic signals.

The next five sections talk in more detail about the issues and options in the Report.

7.2 Arterial/Collector Capacity Issues

Context

One of the main issues identified for the arterial and collector roads was that they would be under greater strain (in terms of vehicle flows) than before the CNC during peak periods. When a road becomes severely congested vehicle movements slow and gap selection becomes more difficult and dangerous leading to greater queuing on local streets. It also becomes more dangerous to cross the road; especially before vehicle speeds drop due to congestion. To a degree, arterial/collector congestion is to be expected, especially during peak hours. However, the modelling outputs indicate that congestion will rise (especially during weekday peak hours) to a point where drivers will be more likely to choose to use local roads impacting on safety and amenity in primarily residential areas. Therefore, the issue identified was that the key arterial roads will likely be unable to cater for the increased vehicle demands, resulting in a redistribution of movements to local roads. The key arterial and collector capacity constraints have been identified for the current network in the transport modelling (during weekday peaks periods) and are as follows (noting that an extensive number of plots have been used to identify these issue):

1. The merge south of the Cranford Street / Innes Road intersection when the CNC opens. Two through lanes north and through the intersection become one lane southbound. The modelling in the AM Peak indicates that the V/C (expected volume to road capacity) ratio in 2021 would be 0.97 and in 2031 would be 0.98 (noting that anything over 0.8 is poor and will lead to disruptive traffic flows). Modelling indicates a lot of rat-running, especially onto Mersey Street if this matter is not addressed.

2. The through lane capacity at the Westminster Street /Cranford Street Intersection. The current intersection has a shared through and right lane and through and left lane with a short merge lane, especially northbound (due to parking for the shops). With right turning demand there is effectively only a single through lane at the intersection, which severely constrains the capacity of intersection in both north and southbound directions. Queues already form heading northbound in PM Peak period.

3. Northbound and southbound through lane capacity at the Berwick Street /Cranford Street intersection. Currently only one through lane and a short right turn lane is provided heading north through the intersection. With CNC flows, the northbound through movement has a V/C of 0.85 in 2021. There is currently one through and one short

left turn lane heading southbound. With CNC flows and the clearways on Cranford to Berwick the V/C is 0.91 in 2021. Both constraints would cause peak period delays.

4. Right turn capacity turning right from Berwick Street into Cranford Street. The single right turn lane is a major capacity constraint for traffic heading north on Madras Street /Forfar Street wishing to turn into Cranford Street. The impact of this constraint in isolation is difficult to assess given upstream capacity constraints. Option modelling has shown that with a double right turn in 2021, this route will have a V/C 0.74. From this it can be determined that a single right turn will have a much poorer V/C.

5. The single-lane Forfar Street /Warrington Street roundabout is also a capacity constraint. In 2021 the North bound Forfar Street approach will be 0.81 in the PM Peak and this deteriorates further in 2031. The impact of this has again been assessed using the option modelling because of upstream capacity constraints. The option modelling includes traffic signals with a double left turn from Forfar Street into Berwick Street. This movement has a V/C is 0.62 in the PM Peak. A single left, as provided with the roundabout, would have a V/C well over 0.8. In the AM Peak the single through lane V/C from Berwick Street into Warrington Street at a signalised intersection would be 0.87. This indicates that two through lanes (or both a through and through and right turn lane) are required which can-not be accommodated at the current roundabout. In addition, roundabouts often experience safety problems when they operate near capacity due to risk taking as drivers pick smaller gaps. It is expected crash numbers will increase if the roundabout is not upgraded.

6. Capacity constraints at Barbadoes Street /Warrington Street priority T-intersection. Right turn movements out of Barbadoes Street will become increasingly difficult due to increased traffic volumes during peak periods. At the priority intersection the V/C for the right turn out of Barbadoes Street is 0.82 in the evening peak in 2021. Considerable delays for this movement in the evening peak, in the absence of CNC traffic was observed.

7. Edgeware Road intersections at Cranford Street /Sherborne Street, Madras Street, and Barbadoes Street can only effectively accommodate a single through lane, like Westminster Street /Cranford Street, due to right turners sharing the lane with through vehicles, and short shared left and through lanes.

8. Southbound capacity constraint at Barbadoes Street / Bealey Avenue intersection. The single lane through movement on the mid-block approach to the intersection (there are two through lanes at the intersection itself) already causes congestion in the AM Peak, which the models predict to increase going forward, especially if more traffic from the CNC is pushed down this route.

9. Northbound capacity constraint at Madras Street /Bealey Avenue intersection. In the PM Peak the two through lanes have to merge quickly on the exit of the intersection due to a short merge to accommodate kerbside parking. This creates safety issues for motor vehicles and especially cyclists as the motor vehicles are often travelling at higher speeds having come off the one-way system with traffic signal coordination.

10. Southbound capacity constraint at the Sherborne Street /Bealey Avenue intersection. The single lane right-turn at this intersection into Bealey Avenue and single through lane approach up Sherborne Street causes queuing especially in the AM Peak, mainly to right turners but also to left turners stuck in the queue. The modelling of clearways down Sherborne Street indicates V/C of 0.91 in 2021 and 0.95 in 2031 for right turn into Bealey Avenue if this intersection is not upgraded.

11. While the Innes Road /Cranford Street intersection is being upgraded as part of the CNC the left turn from the west into Cranford Street has only a short lane and hence drivers travelling north on Rutland Street may choose to travel through on Rutland Street and use Knowles Street, Weston Road, or McFaddens Road to access Cranford Street instead of Innes Road.

12. The installation of traffic signals at St Albans Street /Rutland Street intersection and limited right turn phase time from Rutland Street into Innes Road at the St Albans Street /Rutland Street intersection as part of the cycleway upgrade has reduced the traffic volumes on this route (a good outcome given cycle safety considerations), and also the influenced how drivers heading north access Cranford Street, as in bullet point 11.

Arterial upgrades typically involve increasing the capacity of transport corridors to attract trips from local roads to arterials and collectors during peak flow periods. The idea is that if arterials/collector routes have adequate capacity then drivers are less inclined to use local roads which tend to be designed more for accessing adjacent residential land uses rather than for movement of vehicles.

There is a range of ways in which the capacity of a road can be increased, such as physically creating more capacity (more lanes) at intersections and mid-blocks. Time controlled additional capacity is another treatment such as 'clearways' where part of the carriageway can be used as an additional lane during heavier traffic flows but returns to parking at other times of the day, so it can be used for other purposes i.e., parking. These clearways are further divided into general traffic clearways and special purpose lanes/clearways. Special purpose clearways range from bus-lanes (which are already being used on high frequency bus routes across Christchurch) to high occupancy lanes (with 2 or more or 3 or more occupants – T2 and T3 lanes). These are typically used on routes with fewer buses. Christchurch currently does not have one of these special purpose lanes. There are though many HOV lanes across New Zealand. These special purpose lanes are normally used as part of a wider package of TDM measures to support more bus-use and car-pooling. Applying right turning bans at intersections can also increase road capacity.

Bealey Avenue, as a key arterial, forms a southern boundary of this project. Bealey Avenue runs approximately west to east and provides connections with the one-way pair box, and four avenues. There are several arterials and collectors located south of the CNC and north of Bealey Avenue that will carry additional traffic from the CNC. The key ones being Cranford Street, Sherborne Street, Berwick/Warrington Street, Barbadoes Street, Madras Street, and the Innes, Rutland/Springfield corridor. The extent to which each street will carry the extra traffic depends on the capacity that is added to these streets at intersections and to midblock. Early on in the study, modelling was undertaken to assess whether improvements to the QEII Drive/Innes roundabout, Innes Road, and Hills Road might move some of the traffic expected down Cranford Street onto Hills Road. The modelling indicated that even with higher cost improvements along this route very few drivers would divert to the Hills Road route.

As with all capacity improvement projects, there is a risk that adding capacity can simply shift the location of congestion; for example, by relieving pressure at one location traffic will flow freely until encountering the next constriction. However, if there is too much congestion on arterial roads then drivers will be more inclined to 'rat-run' using local roads. Hence the Report, therefore balances these issues by providing some additional arterial capacity, while calming local streets. While capacity is being added to arterial and collector roads there will still be some peak period congestion. The actual traffic effects after CNC is opened will be monitored to see whether more arterial capacity, and/or local road traffic calming is required.

North of Berwick Street Issues and Options

North of Berwick Street there are only two existing arterial and collector route options available to drivers coming down from the CNC. One option is the Rutland Street /Springfield Road corridor. As discussed previously, with the improvement made to the corridor as part of the Papanui Parallel separated cycleway (on Rutland Street), and being less direct, this corridor is less attractive than the main route option of Cranford Street.

The split of extra traffic between the routes is approximately 550vpd (vehicles per day) on Rutland Street and 4,100vpd on Cranford Street south of Innes Road when the CNC opens in 2020 (without any improvements). This increases to around 900vpd on Rutland Street and 5,000vpd on Cranford Street by 2031. While there is an increase in traffic on Rutland Street, it is minimal given the total increase in traffic from CNC and will have minimal adverse effects on the Papanui Parallel cycleway. Further details on traffic volumes on various routes are provided in Appendix D2.

As identified earlier, the main issues on this route are the capacity constraints as traffic heads south in the morning and north in the evening, via one single through lane south of Innes Road. The other constraint is right turning vehicles blocking the through lane at side roads and at the English Park carpark. While this will occur at other accessways along the route, the intersections and the carpark are the major traffic generators of right turning movements. Other issues, such as the safety of school children crossing Cranford Street, are covered in later sections.

While no changes are proposed to Rutland Street, the key outcome needed for Cranford Street is the provision of additional capacity from Innes Road to Berwick Street in order to accommodate the increase in traffic from the CNC. The two main options that can be accommodated in the current road reserve are four-laning and peak period clearways. The latter is preferred because it allows parking on Cranford Street near the Westminster Street /Cranford Street local commercial centre outside peak periods. Ideally these clearways are HOV lanes so that priority is provided to buses and higher occupancy vehicles. Changes are also proposed at the Westminster Street /Cranford Street intersection (see **Figure 7-2**). A right turn ban will apply at this intersection during the AM peak period, to provide two through lanes southbound. There is no room to accommodate a right turn bay given the close proximity of the shops. Northbound a new right turn bay is required on the southern approach of the intersection. Given the increased traffic volumes through the intersection, to accommodate cyclists (via cycle lane) and to address safety concerns with drivers hitting the signal pole (westbound) along Westminster Street, widening of the western approach is proposed (more on this later). Right

turn bans will be installed permanently at the Dee Street and Malvern Street approaches on both sides of Cranford Street using throat islands. It is also proposed that the English Park carpark access be redesigned and right turns in and out of this carpark be banned.

Figure 7-2: Proposed Arterial Upgrades North of Berwick Street

South of Berwick Street Issues and Options

A key outcome desired for the arterial network south of Berwick Street is again the provision of additional capacity for the increased volume of traffic from the CNC. South of Berwick Street there are three preferred traffic routes that could carry the additional traffic from the CNC through to Bealey Avenue, being Cranford Street /Sherborne Street, Forfar Street /Madras Street, and Barbadoes Street. The extent to which each route carries this additional traffic depends on the best combinations of upgrades to accommodate this additional traffic. The key capacity issues are at the nine intersections in the network that are on these routes intersecting with Berwick Street /Warrington Street, Edgeware Road, and Bealey Avenue. The key intersection constraints are along Berwick and Warrington streets. The issues being lack of right turn capacity (from a single right turn lane) from Berwick into Cranford, and the capacity and safety of the Forfar Street/Warrington Street roundabout and Barbadoes Street /Warrington Street priority-controlled intersection with the increase in traffic volumes. The other six intersections capacity issues can be addressed by installing right turn bays or banning right turn and/or adding approach lane capacity.

In terms of a continuous route connecting Cranford Street (clearway) and Bealey Avenue, there are two main options with several sub-options for one of the options proposed. Both options involve upgrading the Cranford Street /Berwick Street, Forfar Street /Warrington Street, and Barbadoes Street /Warrington Street intersections along with some capacity improvements to Berwick and Warrington Streets to provide approach-lane capacity. Option A involves adding clearways to Cranford and Sherborne Streets and Option B involves upgrading the capacity of Barbadoes and Madras/Forfar Streets (two sub-options being clearways or extending one-ways). Ideally much of the additional capacity provided, especially mid-block, is in the form of HOV lanes, rather than general traffic lanes, to encourage increasing bus use and

carpooling. In addition, there are a number of intersection upgrades required. More on each of these options and analysis is given later on in this report.

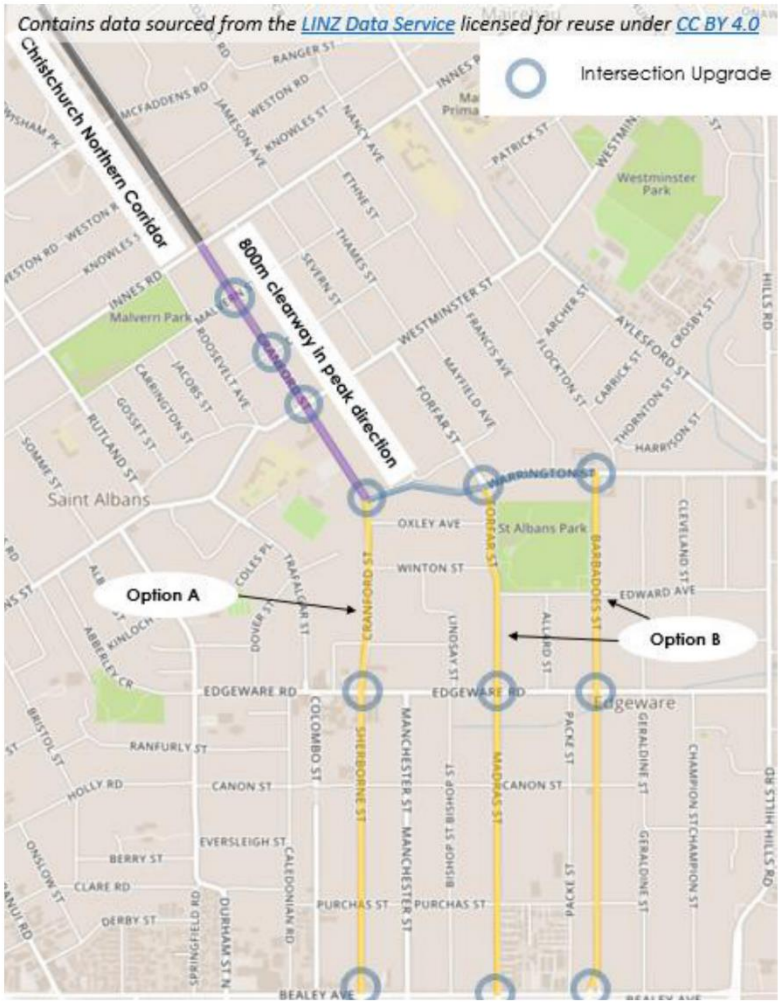

Figure 7-3: Proposed Arterial Upgrade South of Berwick Street

Local Streets Affected by Traffic following Arterials Improvements

Transport modelling was undertaken to assess how effective the arterial upgrades would be in reducing the number of local streets that have a greater than 30% increase in traffic in 2021 and 2031. This analysis effectively repeated that undertaken early on in the study for no network changes (as presented in section 5.4) but this time including the two arterial upgrade options. Both options looked at the clearway from Innes Road to Berwick Street, improvements to the Cranford Street / Westminster Street intersections and upgrades to capacity along Berwick and Warrington Streets. The two options south of Berwick were A (Cranford/Sherborne clearways) and B (Madras Street /Forfar Street and Barbadoes Street clearways) as shown in **Figure 7-3.**

Figures 7-4 to 7-9 shows the local streets that will trigger the 30% increase in AM Peak, PM Peak and all-day in 2021 and 2031 for Option A. **Figures 7-10 to 7-15** show the same plots but for Option B. These figures were produced using

the change flow maps from the transport modelling, as presented in Appendix D4. These figures show the streets that are expected to trigger a greater than 30% increase in traffic compared with what might have occurred if the CNC had not been built.

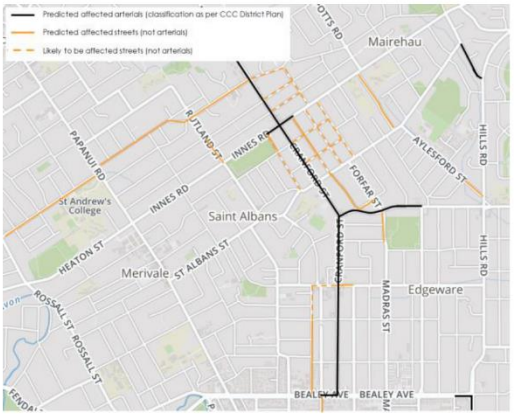

Figure 7-4: Streets expected to be affected by more than 30% in AM Peak, 2021, Option A

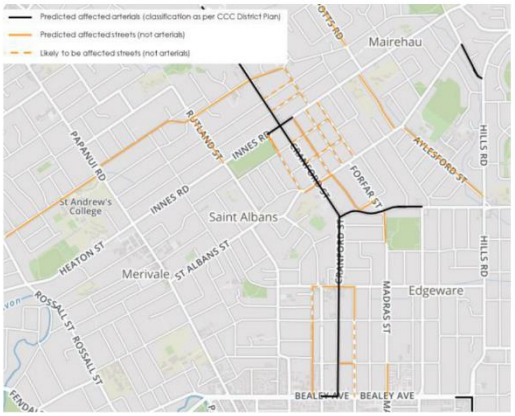

Figure 7-5: Streets expected to be affected by more than 30% in AM Peak, 2031, Option A

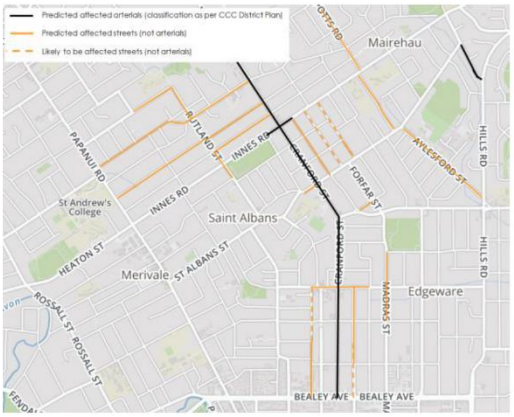

Figure 7-6: Streets expected to be affected by more than 30% in PM Peak, 2021, Option A

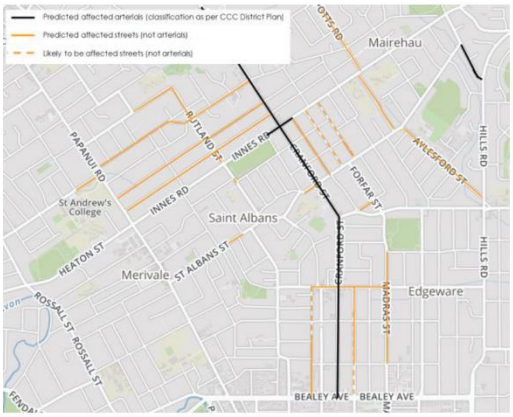

Figure 7-7: Streets expected to be affected by more than 30% in PM Peak, 2031, Option A

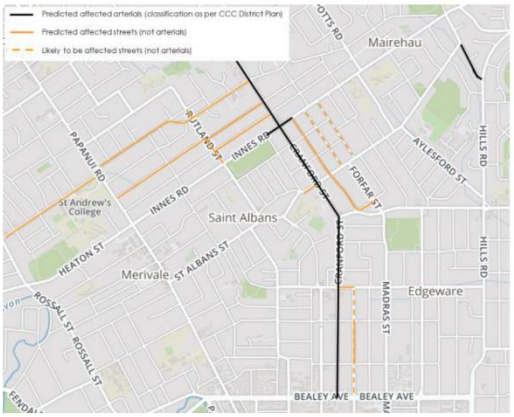

Figure 7-8: Streets expected to be affected by more than 30% all day, 2021, Option A

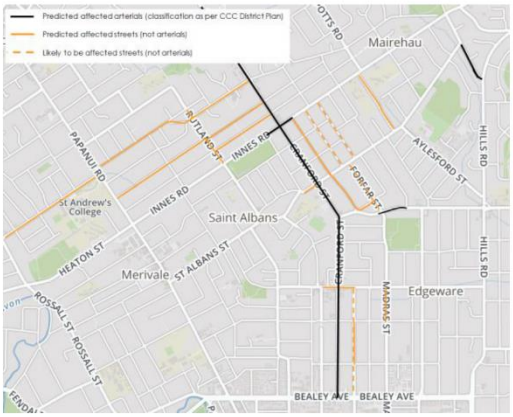

Figure 7-9: Streets expected to be affected by more than 30% all day, 2031, Option A

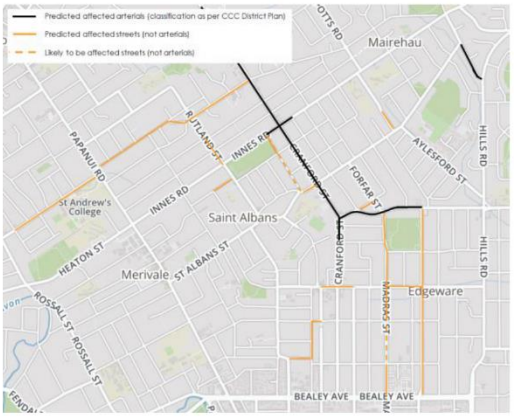

Figure 7-10: Streets expected to be affected by more than 30% in AM Peak, 2021, Option B

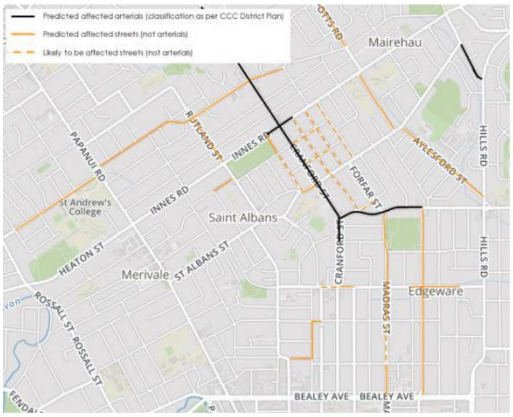

Figure 7-11: Streets expected to be affected by more than 30% in AM Peak, 2031, Option B

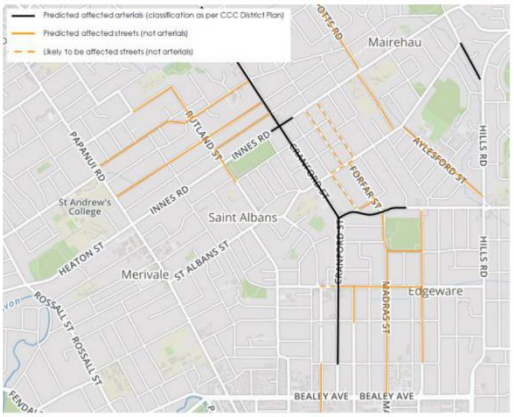

Figure 7-12: Streets expected to be affected by more than 30% in PM Peak, 2021, Option B

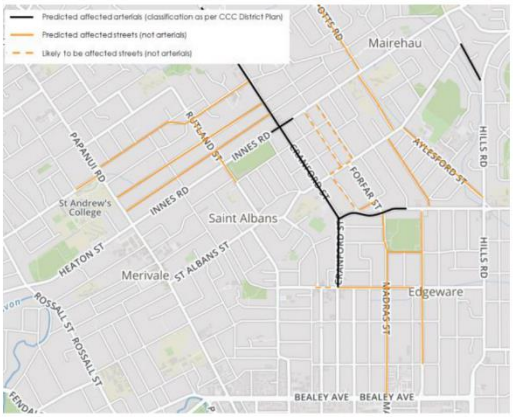

Figure 7-13: Streets expected to be affected by more than 30% in PM Peak, 2031, Option B

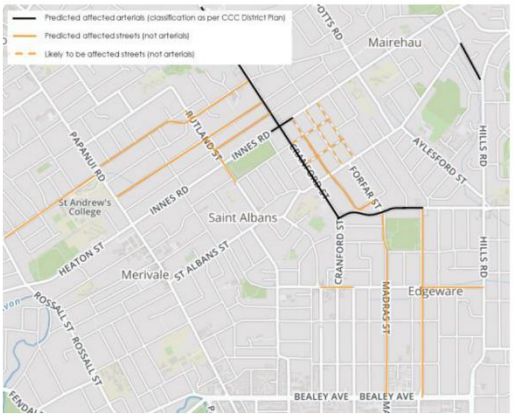

Figure 7-14: Streets expected to be affected by more than 30% all day, 2021, Option B

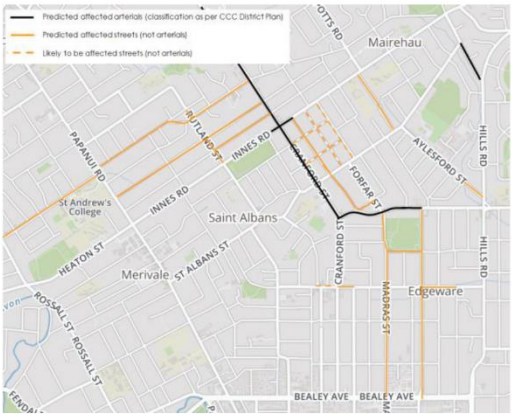

Figure 7-15: Streets expected to be affected by more than 30% all day, 2031, Option B

Care needs to be taken in interpreting these plots as there is considerable uncertainty in how much these streets will be impacted by the CNC traffic, due to the limitation in transport modelling. What it does indicate is streets that need to be treated before the opening of the CNC or shortly after. For the other streets (those not impacted by an additional 30% traffic in 2021), the traffic monitoring will identify the actual increase and determine whether traffic calming changes are required to these streets.

The outcome of this analysis informs the streets that are likely to need traffic calming when the CNC is opened or shortly after (e.g. Mersey Street). These are streets that are shown to be impacted in most scenarios, and those that can be monitored and treated at a later date (e.g. Forfar Street). Figures 7-4 to 7-9 show the additional rat-running streets south of Berwick Street, including Edgeware Road, Manchester Street, and Caledonian Road (the last two are wide local streets) that are impacted by Option A, extending clear-ways down Sherborne Street. A detailed list of streets that need to be (or may need to be) treated are provided in Chapter 8. Details on the types of traffic calming that should be provided, along with supporting speed limit restrictions, are provided in Section 7.5. Specific traffic calming treatments need to be developed and discussed with affected parties and the public for each street.

7.3 Options Considered to Address Issues

During the first stage (iteration) of option development, the independent traffic expert developed project options that used a combination of traffic calming of local streets and capacity upgrades of arterial and collector routes to attract the extra vehicles from the CNC to the arterial and collector routes. The intention of each of the options is to encourage the additional CNC traffic to use the preferred arterial and collector roads and reduce rat-running on local roads. In the transport modelling it was assumed that the arterial upgrades would be for all vehicles.

The Stage 1 options were developed following the first round of consultation with stakeholders and the public. The public expressed interest in 1) a greater use of clearways, rather than permanent three-laning 2) the option of extending the Barbadoes Street /Madras Street one-way system north to Warrington Street, and 3) using clearways down the Cranford Street /Sherborne Street corridor south of Berwick Street. The full list of options was discussed and evaluated during several issue and option workshops and meetings.

The main options considered in Stage 1 are summarised as follows (see Appendix G for option diagrams).

- Do Nothing – this results in rat-running in a lot of local streets.
- Option 1. Traffic Calming Only.
- Option 2. Arterial Upgrades Only. The option used was three-laning of Barbadoes Street and Madras (Forfar) Street, Cranford Street Clearways and Berwick Street / Warrington Street capacity improvements).
- Option 3 (a). Traffic Calming and Arterial Upgrades. Arterial upgrades as in Option 2 except clearways on Barbadoes Street and Madras (Forfar) Street instead of permanent three-laning.

- Option 3 (b). Traffic Calming and Arterial Upgrades. Arterial upgrades as in Option 2, so permanent three-laning of Barbadoes and Madras (Forfar) Streets.
- Option 3 (c). Traffic Calming and Arterial Upgrades. Arterial upgrades as in Option 2 except extension of Barbadoes Street /Madras Street one-ways to Warrington Street.
- Option 4 (a). Traffic Calming and Clearways on Cranford Street / Sherborne Street from Innes Road to Bealey Avenue plus Berwick Street and Warrington Street Improvements.
- Option 4 (b) Traffic Calming and permanent four-laning on Cranford Street / Sherborne Street (option included to allow comparison of options with a more major upgrade of arterial roads)
- Option 5. Traffic Calming plus combined Arterial Options of all three routes (Options 3(a) and 4(a)).

Most of the options include new right turn bays or right turn bans at intersections, including traffic signals (e.g. Cranford Street / Westminster Street) to improve through-traffic efficiency. The traffic signal right turn bans only operate when the clearways are operating.

Some of the stakeholders have also suggested use of bus lanes or high occupancy vehicle (HOV) clearway lanes. These lanes encourage people to car-pool and/or use the bus. Currently HOV lanes are proposed on part of the CNC; in southbound direction but ending before the Cranford Street Roundabout. Further modelling is required to demonstrate the impact of these restrictions on local street rat-running and on the wider transport network, before limiting the use of these lanes. Subject to further investigation the restriction of these additional clearway traffic lanes to HOV lanes is recommended as this is expected to reduce the number of vehicles with one occupant. Given that even with express buses from the Waimakariri this corridor will have a relatively low number of buses, the independent expert does not support bus-lanes like on Main North Road and Papanui Road.

7.4 Multi-Criteria Analysis of Options

Before commencing the MCA assessment, an MCA facilitator was selected by the independent traffic expert. The facilitator developed a number of criteria for evaluating the options based on previous assessments of this type he had undertaken and based on the strategic transport documents that were relevant for this study area. During the first issues and options workshop the criterion and weightings for each criterion were discussed and agreed by a panel of transport professionals, selected by the independent traffic expert and Council. The attendees at the workshops were selected to cover various transport and other relevant disciplines, including urban design. The attendees intentionally wanted limited weighting placed on journey time and more on community impacts to reflect the outcomes from the consultation, which wanted a focus on community impacts.

During the second and third workshops, participants gave ratings to the various options listed above. This involved robust discussion over each of the ratings. Feedback from the consultation process was used during discussion (such as exactly where safety or environmental concerns were) which allowed for more specific rating analysis. The ratings of each option (considering the positive and negative consequences) are compared with the transport network in 2020 immediately before the CNC becomes operational; the baseline option. Hence, the sum of rankings for all options do have a negative value as they include CNC traffic, while the baseline option does not. To provide a relative score between the options each option has been compared with the do-nothing option and, in this case, most of the options have a positive score. The results of the MCA are presented in **Table 7-1**.

Table 7-1: Multi-Criteria Analysis Results

Criteria	Weighting	Do Nothing	Option 1	Option 2	Option 3a	Option 3b	Option 3c	Option 4a	Option 4b	Option 5
			Traffic Calming (only)	Arterial Upgrades (only)	Arterial Upgrade (clearways)	Arterial Upgrade (3 laning)	Arterial Upgrade (Extend one-ways)	Cranford / Sherborne Clearways	Cranford / Sherborne 4 laning	Combined Arterial Upgrades
Safety	20%									
Safety for pedestrians										
Safety for vulnerable users										
Safety for cyclists										
Safety for motorists										
Strategic Context	20%									
Keep vehicles on preferred vehicle access routes										
Encourage mode change										
Alignment with local and national transport strategies										
Journey Time (End to End)	10%									
Delay for motor vehicles on arterial roads										
Retain or improve PT travel times and reliability										
Main Considerations	40%									
Impact to local businesses and economic develo	10%									
Social and amenity impact	20%									
Environmental impacts	10%									
Implementability	10%									
Timeframe										
Construction and on-going costs										
Grand total										

Scale	Significant positive	Moderate positive	Minor positive	Neutral (no noticable change from pre-CNC conditions)	Minor negative	Moderate negative	Signficant negative	Serious negative	Fatal flaw

The MCA indicates that option 3(c), which involves extending the one-way pair of Madras (Forfar) Street and Barbadoes Street, along with clearways on Cranford Street to Berwick and capacity upgrades including new signals on Warrington Street and traffic calming of local streets has the best overall (score) ranking.

However, two other options also rank relatively well being option 3(a) which is similar to option 3(c) but has clearways on Madras (Forfar) Street and Barbadoes Street rather than converting them to one-way streets. The other high ranked option is 4(a) which includes clearways on Cranford Street /Sherborne Street through to Bealey Avenue, with traffic signals at Forfar Street /Warrington and Barbadoes Street /Warrington Street. While option 3(b) also has a similar scoring overall it did score more poorly in terms of 'main considerations', with permanent three-laning impacting more on business and residential kerb-side car parking. Given that additional capacity is only required in peak periods, the peak period clearway option (3a) is preferable as a two-way configuration, and so it has not been carried forward.

Option 5 provides both sets of upgrades. It is unlikely by 2031 that both upgrade Options (3(a) and 4(a)) will be required. Indeed, capacity constraints on Cranford Street north of Berwick Street will limit need for all upgrades. Hence this option is not preferred.

Preferred Option Discussion

Option 3(a) includes upgrades to Berwick Street and Warrington Street, as does Option 3(c). However, instead of extending the one-way streets it proposes peak period clearways on Madras (Forfar) Street and Barbadoes Streets south of Warrington Street. A key reason this option is not scoring as well as the one-way extension is the additional lane during peak periods would impact on the following: 1) Kerbside parking (for business and residents), 2) Difficulty accommodating cycle facilities (due to clearway), and 3) Much wider crossing distance across Forfar Street and Barbadoes Street to St Albans Park. The main negatives with the one-way extension is extra travel distance for some trips to Madras Street and Barbadoes Street businesses and residents (this is minimal in this case due to the grid network of roads), and a potential increase in speeds if road does not get suitable narrowing.

Option 4(a) includes extending clearways further south on Cranford Street and along Sherborne Street. This option has slightly better travel time savings compared to Options 3(a) and 3(c). But, as can be seen in the MCA analysis, travel time has a relatively low weighting overall (at 10%) compared to many other matters assessed. Negative impacts include poor provision for cyclists when clearway is in operation, right turn ban at Berwick Street (from Cranford Street), additional traffic through Edgeware Village, and removal of parking on Sherborne Street from Bealey Avenue to Purchase Street permanently as part of upgrading the Bealey Avenue/Sherborne Street intersection. The main advantage of this option is that change will not need to be made to most of Madras (Forfar) Street and Barbadoes Street. However, this is also a negative as these routes, especially Madras (Forfar) Street, will experience traffic growth which will impact on safe access to St Albans Park as there will be additional traffic that pedestrians have to give-way to.

Development of a Preferred Option

All three options would provide the additional traffic capacity required to minimise rat-running on local streets. All three include peak period clearways on Cranford Street to Berwick Street and improvements to the Westminster Street /Cranford Street and Berwick Street /Cranford Street intersections. The modelling indicates that Madras Street would have significant additional traffic using it with all three options and that the Warrington Street /Forfar Street intersection needs to be signalised, along with associated upgrades to Berwick and Warrington Streets. It is also highly recommended upgrading the Barbadoes Street/ Warrington Street intersection, which already experiences considerable delays and has safety concerns, especially for crossing pedestrians and buses.

For the three highest ranking options, the capacity upgrades required on Berwick Street /Warrington Street and north of Berwick Street (Cranford clearways) are very similar and hence these elements of the options are included as part of the proposed Plan (some differences in intersection layouts at new traffic signals). However, south of Berwick Street there are three options, with one, Sherborne Street clearways, appearing to be quite different to the other two that utilised Barbadoes Street and Madras Street to carry the additional CNC traffic. However, all three routes, Sherborne Street /Cranford Street, Madras Street /Forfar Street, and Barbadoes Street already have a role in distributing traffic from Cranford North to Bealey Avenue and further south, and vice versa. Drivers tend to choose the route that best positions them to use Bealey Avenue and access the two sets of one-way pairs (Madras Street /Barbadoes Street and Durham Street /Montreal Street), depending on their destination (or origin). Drivers will still have both choices following the opening of the CNC but will distribute themselves depending on the level of congestion on each route.

Modelling to date on this study has been undertaken with the CAST model. This model is useful for looking at preferred route choice at a network level. It is not sensitive enough to assess the more detailed operation of the road network at an intersection and individual road link level. Also, stakeholders and the public are keen to see more detail on what each upgrade option would look like, and the detailed effects. These effects include removal of parking outside residences and business, rat-running through several local routes, such as Edgeware Road through the village. It has also been suggested during consultation that express buses from the Waimakariri District could be routed down Cranford Street, then Edgeware Road onto the top end of Manchester Street and eventually into the bus-street section of Manchester Street and the transport (bus) interchange. It is therefore suggested that all three options are progressed to a scoping study.

This scoping study would look in more detail at the design of each route, the nine main intersections from Warrington Street to Bealey Avenue and possible routes for express buses. This would involve more detailed modelling of each option to look at how the options might be staged (e.g. where are clearways required in 2020, compared with 2031), and seek further community and stakeholder input on the proposed upgrades. It is possible that the preferred option may involve some upgrades to all three routes.

In all three cases the upgrades would connect into the Berwick Street /Warrington Street capacity improvements which should progress to detail design and construction ideally ahead of the CNC opening. It is expected that during the design phase and based on community feedback that these will be changes made to the preferred option that may differ to options assessed in this report. As long as those changes still achieve an outcome that encourages traffic to stay on the preferred (arterial and collector routes) and are not a major deviation to the preferred options (e.g. no permanent four lanes of Cranford St) then they can be considered to be in general alignment with what has been proposed in this report.

7.5 Traffic Calming and Safe Speed Community Areas

Development of Traffic Calming Measures

Local streets have a primary function of providing access to adjoining land-use and lack some of the safe design features of arterial and, to a lesser degree, collector routes. While many of the streets in the St Albans area are narrow or have been narrowed to reduce vehicle speeds, there are a number of local streets in the study area that are very wide and may attract fast moving rat-running traffic, including larger trucks. Speeding issues if not treated, can increase the risk of crashes involving serious injuries and deaths. A range of treatments exist which can limit, dissuade, or mitigate vehicle movements through parts of the transport network where these movements are less desired, or unexpected. Most of these treatments are categorised as 'traffic calming' and should also reduce vehicle speeds and discourage access by larger vehicles (except on bus routes). Treatments typically include[23];

- Vertical deflection - watts profile speed humps, raised platforms (mid-block and intersection), raised pavements, and wombat crossings (raised pedestrian crossings).
- Horizontal deflection – lane narrowing/kerb extensions, slow points, centre blister islands, driveway links, median treatments, and roundabouts.
- Diversion devices – full road closure, half road closure, diagonal road closure, modified T-intersection, left-in/left out islands.
- Signs, line marking, and other treatments – speed limit signs and indication devices, prohibited traffic movement signs, one-way street signs, give-way signs, stop signs, shared zones, school zones, threshold treatments, tactile surface treatments, bicycle facilities, and bus facilities.

The traffic calming measures range in severity. Some completely close off available movements, such as converting a street that had multiple vehicle entries to a cul-de-sac. A treatment such as this would remove all through movements from the street. Other treatments are less severe, allowing for full access but reducing vehicle speeds and making the street less comfortable to negotiate. In the Report less severe traffic calming measures should be implemented to start, as these are typically more acceptable to the public prior to high levels of rat-running being observed on streets.

If traffic monitoring indicates this is not effective, more severe traffic calming, such as banning movements or partially, or fully closing streets, may be necessary. While there is a focus on the less severe traffic calming to start, there are some obvious more severe traffic calming measures (e.g. restricting arms of intersections to entry or exit only) that could be made for relatively low cost, compared to traffic calming an entire street. Such options should be discussed with local residents and if supported progressed.

Another beneficial side effect of traffic calming streets is that it can improve the level of service for cyclists and pedestrians. This can be achieved by treatments such as kerb protrusions that reduce the crossing distance for pedestrians, or by reducing speeds so cyclists feel more comfortable cycling in the traffic lane.

The Report identifies the streets that are expected to have a greater than 30% increase in traffic volumes as a result of the CNC in the AM or PM peak periods (in some cases in both) or all day by 2031. The modelling indicates some of these streets may need to be treated before or shortly after the CNC opens.

While permanent traffic calming schemes may be installed on some routes initially, the use of temporary upgrades (rapid-implementation trials) is recommended when 1) timeframes for getting a permanent design constructed are too long (e.g. pressures to install all schemes before CNC opens and if a route is getting a lot of rat-running after CNC opens and a quick response is required) and 2) where there is a number of affected land owners who have concerns with a

[23] Adapted from Austroads Guide to Traffic Management Part 8 Local Area Traffic Management. p121

proposed design and want it trialled (and assessed) before it is made permanent. An example is closing the local street at an intersection and installing a cul-de-sac head or banning specific traffic movements.

The monitoring programme will pick up changes in traffic volumes and speeds and indicate which streets need to traffic calmed later on; between 2021 and 2031.

Safe Speed Community Areas (SSCA)

In addition to physical changes to streets it is proposed to create up to 9 safe speed (community) areas either side of Cranford and Sherborne Streets as shown in **Figure 7-16.**

In addition to reducing travel speeds on local streets and reducing crash risk, the SSCA also signal to drivers that they are entering lower volume and lower speed streets where they should be more alert as children and elderly people may be on or crossing the road; hence the reason for including 'safe' in the signage. Ideally SSCA should have a 30km/h speed limit, as that is the 'safe speed' where collisions with pedestrians and cyclists have a very low likelihood of causing fatal or severe injuries. However, under the current guidelines (speed management guide) a 40km/h speed limit is more likely to be approved.

It is recommended that all traffic calmed local streets be designed to operate at around 30km/h. However, some of the streets within these areas will remain untreated and so a 40km/h speed limit may be more appropriate until such time as all the streets in an area are treated and have operating speeds between 30 and 40km/h. The 40km/h speed limit is also more consistent with what has already been applied to other residential streets in the city. In either case, a drop in the speed limit and the associated signage is expected to reduce the number of crashes and the severity of any crashes which do occur.

Note that it is not essential to lower the speeds in area 2B, as these are not through routes, although as part of the changes it is strongly recommended these routes have lower speed limits.

The public have also suggested other streets that could have lower speed limits, such as the streets in and around the Papamoi Primary School and streets either side of the northern section of Barbadoes Street. A number of people also suggested dropping the speed limit on Rutland Street to 40km/h given the narrow width of the traffic lanes and the number of cyclists along the route. As part of consultation on these speed limit changes the Council should consider adding additional streets to those being treated.

Figure 7-16: Safe Speed (Community) Areas

7.6 2nd Stage of Option Development

The additional CNC traffic coming into Cranford Street causes a number of transport, social, and environment effects on the downstream (primarily St Albans) community. The proposed arterial/collector street upgrades (and associated traffic calming and speed management) address some of these effects, but do not address others, and in some cases create new traffic effects. The Stage 2 option development process considered these other effects. Other issues and associated improvement options have been divided into five categories;

1) Safe access to schools,

2) Safer cycle facilities,

3) Access to parks,

4) Access to commercial activity centres, and

5) Other effects.

The other effects include issues like access to properties along the arterial routes.

A number of the Stage 1 infrastructure improvement options do address these wider transport effects. For example:

- New traffic signals at the Warrington/Forfar and Warrington/Barbadoes will improve access and safety for pedestrians and cyclists crossing each of these routes, including those from the north wanting to walk to St Albans Park.

- The upgrades at the Westminster/Cranford and Berwick/Cranford intersections will involve changes that make it safer for pedestrians (general and school children) and cyclists. The introduction of a reduced speed limit of 40km/h on Cranford during school start and finish and turning arrows at both intersections will improve pedestrian safety. Cycle lanes are also to be installed on the approach of Westminster Street on Cranford Street.

- The safe speed areas and associated lower speed limits on local streets will improve safety for pedestrians and cyclists using these roads.

A number of studies are proposed to look at the specific impacts of the additional traffic on each focus area and how these impacts can be mitigated. These studies, which will commence before the CNC is opened, will identify the 'quick wins' improvements that can be implemented before the CNC opens (e.g. signage directing through cyclists to quiet local streets).

An outcome of these studies will be a number of improvement options, some of which need to be implemented soon after the CNC is opened, and others which can be made later in the ten-year monitoring period (known as the commissioning period). The ongoing monitoring may also indicate that additional improvement options are required in these categories to address specific issues. As mentioned earlier, the healthy streets and the safe system framework methods are proposed, alongside traditional safety auditing, to maximise the safety and amenity benefits of route and intersection upgrades.

The next few sections outline some of the issues that need to be addressed by these improvement options.

Safe Access to Schools

Increased traffic volumes in the area will impact on safe access to key destinations in the local area, and specifically schools, parks, and commercial activity centres, and especially for those walking to these locations. Of particular concern, is access to these locations by the young (e.g. school children), elderly (which there are increasing numbers of), and those with disabilities, such as those with a mobility or visual impairment. Increased risk of crashes is a direct result of the additional traffic from the CNC, especially on arterial and collector roads. Hence improvements need to be made including infrastructure improvements and speed limit changes.

There are a number of primary schools in the study area and consideration needs to be given to how the additional traffic from the CNC may impact on the safety of school children that are walking around the network and especially crossing the road. Typically, it is older primary school children (year 5 and 6) that are walking unaccompanied by adults. There may also be a small number of primary school pupils that cycle to school. While there are also a number of preschools in the area, children of this age will in almost all cases be accompanied by an adult.

The main school impacted by the CNC downstream traffic is St Albans Primary School. Some of the school children need to cross Cranford Street to walk to the school. Children also cross Westminster Street (west of Cranford) and Courtenay Street. While signalised intersection crossings are provided at the Westminster Street and Berwick Street intersections, there have been a number of near misses, particularly at the former, between crossing children and turning traffic (typically turning when the signal has gone red, often due to traffic congestion and no turning arrows). St Albans School currently employees a cross-guard at this intersection before and after school to guide pupils across the road. Traffic calming has already been introduced on Westminster Street both sides of Courtenay Street, including a pedestrian refuge and road narrowing, to slow down traffic and aid crossing of the route by school children.

The additional traffic on Cranford Street, as a result of the CNC, will increase the risk of crashes involving pedestrians, including school children, if no changes are made. There are several improvements that can be made on Cranford Street to address this safety risk including a temporary speed limit before and after the school north of Westminster to south of Berwick, putting the Westminster Street / Cranford Street intersection on a platform or using a textured surface, and introducing smarter signals phasing as part of widening the western approach of the intersection. The latter being part of a proposed upgrade of Westminster Street and Courtenay Street to improve amenity and accommodate cycling infrastructure. Banning of right turns into Westminster Street in the AM peak (and PM commuter peak) will also reduce the risk of turning crashes involving pedestrians crossing Westminster Street. Additional enforcement be it a red-light running camera, or increased Police presence, is also recommended.

Another option that should be considered is a mid-block crossing outside the English (ASB) Park carpark, approximately mid-way between the two intersections (Berwick and Westminster). An at-grade mid-block crossing would have the advantage of no turning movements. As raised by submitters, a grade separated crossing (sub-way or overbridge) would

remove the conflict with vehicles altogether. However, there are a number of issues with such an option, with the key issue being the lack of room to accommodate the overbridge within the current road reserve. It would be difficult based on the number of daily users to justify the cost of such a structure and there are major visual impacts associated with installing an overbridge in this location.

The banning of right turn vehicles from Cranford Street north into Westminster Street in the morning peak will also help reduce this risk.

Another safety issue identified during the consultation was the school crossings on Innes Road outside Mairehau Primary School and Our Lady of Fatima School[24]. While there are zebra crossings outside each school, many drivers are not stopping, especially at the Mairehau Primary School crossings. A signalised crossing would be more effective, perhaps located at the Mairehau school crossing. Although the traffic volumes on Innes Road are not expected to increase significantly (and not above 30%) when the CNC is opened it is strongly recommended Christchurch City Council signalise one of the crossings as part of its safer routes to school programme.

There are also incidents on Rutland Street outside St Albans Catholic School between school children and cyclists on the cycleway. Christchurch City Council have been looking into these issues as part of the major cycleway programme and hence the Report does not consider this matter further, other than raising it as an issue that needs to be monitored going forward. It is possible that the increased traffic flows on Rutland Street as a result of the CNC may impact on the safety of crossing school children. Options to address any concerns may need to be considered as a Stage 3 project.

It is important that through the 'safe routes to school programme' that there is additional education of pupils, teachers, and parents, especially associated with safe crossing behaviour in and around each school, leading up to the opening of the CNC.

Safer Cycle Facilities

A key impact of the additional CNC traffic and the need for peak period clearways on Cranford Street and other routes is a deterioration in the facilities provided for cyclists on these routes. Not only is there additional traffic on the clearway routes, there is not adequate room to provide cycle lanes or adequate room for cyclists when clearways are in use. The proposed 3.7m wide kerbside lane is not adequate for a truck or bus to safely pass a cyclist. When parking is occurring in the clearway lanes then cyclists have some space between the parked car and main traffic lane. Such a facility is only suitable for confident cyclists and not the new cyclists that Christchurch City Council want to encourage into cycling. It is also a poorer option than the cycle paths that are provided down the CNC and on Cranford Street down to McFaddens Road. The option of a shared path on the berm is also less than ideal due to safety concern associated with backing vehicles from residential properties. Because of issues associated with visibility from backing vehicles, narrowing the berm and widening the carriageway to accommodate cycle lanes is also not considered a safe option.

With the Papanui Parallel nearby and with the provision of additional infrastructure and suitable wayfinding (at each end of clearway sections), the majority of cyclists should be accommodated on alternative routes. Some cyclists will choose to cycle on Cranford Street anyway, mostly the confident cyclists that will use the space when available or cycle in the traffic lane. Others of varying abilities with origins or destinations on routes like Cranford Street will either ride on the footpath or cycle in the narrow traffic lane during the clearway operations. While riding on the footpath is less than ideal the independent expert believes it is the safer option than riding in a narrow traffic lane. We recommend marking and signing the footpath as a shared path but retaining the current footpath width to help manage down cycle speeds. While there are concerns with pedestrian safety, the installation of signs will alert pedestrians to cyclists riding on the footpath, as is the case at many similar locations around Christchurch, such as in the Edgeware village. The provision of a berm also provides room for cyclists to overtake pedestrians. It is also recommended the Council contacts residents along the treated section of Cranford Street that they back into their driveways and exit in the forward direction where-ever possible. We recommend that the operation of this shared path be monitored and if it is found to be unsafe that fuller works are undertaken to slow down cyclists or divert them to alternative routes.

To provide improved facilities for cyclists coming from the north (to and from the city) and the local community it is recommended that investigation of several secondary cycle routes including one further north-south cycle link and at least three east-west cycle links to the Papanui Parallel and the new north-south cycleway, which needs to be on the eastern side of Cranford Street. These secondary cycle routes will typically consist of marked cycle lanes (of around

[24] Now known as St Francis of Assisi School

1.6m width) and bicycle greenways (low volume and low speed streets). There may be some use of shared paths but unlikely to be any fully separated cycleways as provided on Rutland Street and northern section of Colombo Street.

The need for the new north-south route, especially north of Westminster Street, is that the deviation to the Papanui Parallel will be too great for some cyclist's trips, especially from cyclists that originate from Mairehau, which is to the east of Cranford Street. Wayfinding needs to be provided at the McFaddens Road/Cranford Street intersection to the north. In the south, cyclists heading north from the city should be encouraged to use the Colombo Street cycleway or the Manchester Street cycle lanes.

The new north-south link should start on the eastern side of Cranford Street at the McFaddens Road / Cranford Street intersection. The preferred route needs to go through a routes selection process and Safety Audit and Network Functionality (SANF) assessment (see Appendix H for details). One potential route that utilises streets that need to be traffic calmed, is shown in Figure 7-17. The route follows McFaddens Road, Jameson Avenue, Severn Street, Forfar Street, then alongside Madras Street and through St Albans Park, Allard Street, Packe Street, Purchas Street, and then onto Manchester Street. The route would be a combination of quiet streets and shared paths. Suitable crossings would need to be provided across Innes Road, Westminster Street, and Edgeware Road. Signing and marking of this alternative route for cyclists is one of the 'quick-win' options that could be installed before the CNC is opened. Further work could be undertaken to make this route safer for cyclists including formal crossings of the arterial roads, like Innes Road and Westminster Street.

The key east-west links are McFaddens Road, Westminster/Courtenay Street and Edgeware Road. The McFaddens Road cycle connection would be considered as part of the traffic calming of this route on both sides of Cranford Street. The Westminster Street/Courtenay Street and Edgeware Road cycle facilities would be included in two corridor studies that are recommended for these routes, with the extent of these studies shown in Purple in **Figure 7-17**. This will be a combination of on-road cycle lanes and shared facilities. Extension of the Manchester Street cycle lanes from Bealey Avenue to Edgeware Road is also recommended.

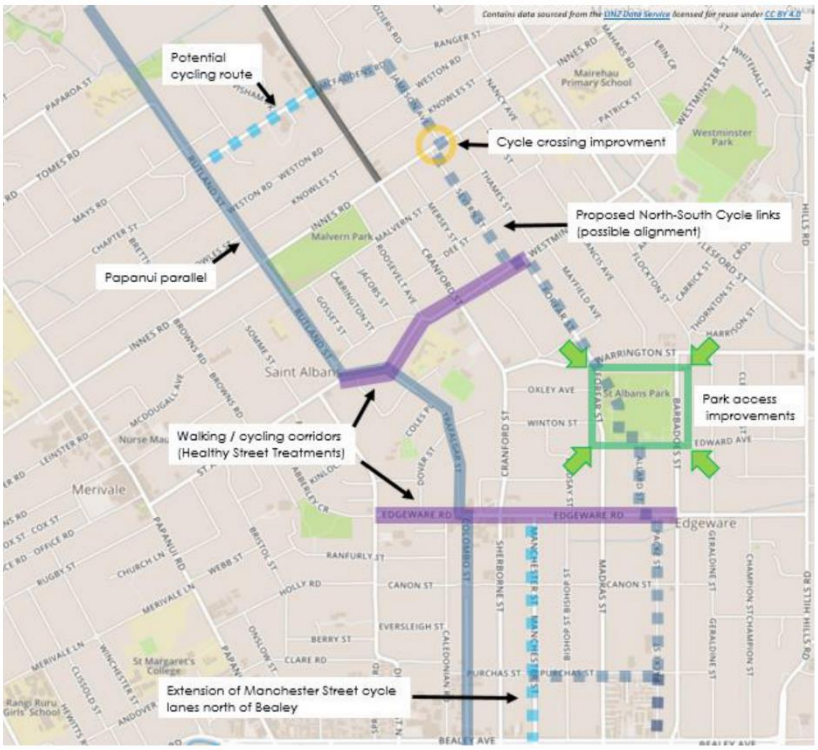

Figure 7-17: Suggested new cycle routes

Safe Access to Parks

The additional traffic from the CNC will potentially impact on traffic flows around at least two of the parks, St Albans Park and to a lesser degree Malvern/Rugby Park. Given St Albans Park is surrounded by three main routes that are likely to have an increased traffic volume, being Warrington Street, Barbadoes Street, and Forfar (Madras) Street, it is the most affected by additional traffic. Current pedestrian (and cycle) access to the park is not ideal with the wide carriageway on Forfar Street and Barbadoes Street, and a roundabout and only pedestrian crossing aids at Forfar/ Warrington and Barbadoes Street /Warrington Street respectively. Cycle access to the north is provided by these main roads. With the relatively lower traffic volumes the impact on access and safety has been limited. With the increased traffic it will be difficult in peak periods to access the Park.

The installation of traffic signals at Forfar Street /Warrington Street and Barbadoes Street /Warrington Street as part of the major road improvement (MR3) will improve access and safety considerably to pedestrians and cyclists even with the increasing traffic volumes. The new north-south cycle facility (SC5) in conjunction with east-west links (SC3 and SC4) will also improve cycle access to the park. The remaining issues are mid-block crossings across Forfar Street /Madras Street and Barbadoes Street. The new design of these routes needs to consider how both routes can be narrowed alongside the park so that pedestrians have shorter crossing distance and speeds are managed to lower levels. This is particularly an issue for the mobility impaired and also caregivers with prams.

In terms of Malvern Park, rat-running traffic on Roosevelt Avenue and Malvern Street would impact on access to the park. Traffic calming measures will be required to manage traffic volumes and speeds around the park. Access across Innes Road to Malvern Park will also become more difficult due increasing traffic volumes. There is an alleyway provided between Innes Road and Knowles Street /Weston Road which includes a refuge island on Innes Road. With increased traffic flows on Innes Road, the mid-block crossing will be more difficult.

Safe Access to Commercial Centres

There are a number of commercial centres that are likely to be impacted by the downstream traffic generated from the CNC. This includes the Edgeware Village Neighbourhood Centre and four local commercial centres, being Westminster/Cranford shops, Barbadoes/Warrington shops, Barbadoes/ Edgeware shops, and the Rutland Street shops.

Recent changes on Rutland Street have provided improved access to these shops by bicycle (Papanui Parallel) and pedestrians (crossing aids). Parking has also been considered in the new design. However, there are concerns from businesses that there is not enough short-term parking nearby. This is a matter that needs to be monitored by Christchurch City Council and addressed as needed.

The Edgeware Village has been the subject of several recent studies, including the Edgeware Village masterplan. This has resulted in improved north-south cycle facilities (Papanui Parallel) and a signalised pedestrian crossing of Edgeware Road. Modelling indicates that traffic volumes may increase on Edgeware Road, both to west (and east) of Cranford Street and on Cranford Street /Sherborne Street. This is likely to impact on cycle access to the village and the Papanui Parallel, especially from the east. The corridor plan recommended for Edgeware Road (in Figure 7-17) should consider how cyclists can move through the Village east to west and vice-versa. Any option development through the village needs to be developed in conjunction with refinement of the Edgeware Village masterplan.

The centre most impacted by the extra CNC traffic is the Cranford Street /Westminster Street local centre. Since the earthquakes this centre has become more vibrant with several new businesses setting up in this area. The current pedestrian and cycle connections around the centre are not good, although there is a signalised intersection to get across Cranford Street. With Christchurch City Council wanting to promote walking and cycling, and encourage people to use these local centres, in addition to the increasing traffic through the centre, preparation of a plan for the centre in conjunction with the corridor study of Westminster (and Courtenay) Streets is recommended. The Report should look at cycle and pedestrian linkages to the centre. This will require widening of the western approach to the traffic signals and new footpaths. The Report should also consider parking requirements and options to provide additional parking, especially off-road parking.

The Warrington Street /Barbadoes Street local centre also has relatively poor pedestrian and cycle facilities. Access to the north will be improved with the proposed traffic signals. A plan should also be prepared that looks at opportunities to improve pedestrian facilities, especially to the park/west side of Barbadoes Street. The study should also look at parking requirements, as parking demand is high from residents and the café customers who are not able to use the off-road car-park, with the clearway option impacting on parking availability. Special consideration needs to be given to the Audiology

business on west side of Barbadoes Street (sensitive to noise, including construction) and also the location of the bus stop outside the café (can this be moved to allow short stay parking for the café).

The Barbadoes Street /Edgeware Road local centre has poor cycle facilities but reasonable pedestrian access via the traffic signals. Again, a plan should be prepared for this centre. Cycle facilities should be provided on Edgeware Road as part of the Edgeware corridor study. Parking requirements should be considered given the potential for the clearway to limit parking in the morning peak period.

8. Recommendations (Management Plan)

The overall downstream effects plan will be implemented over approximately a 10-year period. Some network changes need to be in place before the CNC is opened in mid-2020 due to the expected jump in traffic volumes on Cranford Street from traffic diverting from other routes. While the focus is on routes that are expected to be impacted by traffic growth of greater than 30% by end of the commissioning period as result of the CNC, the timing of upgrades is dependent on a number of factors, such as increased crash risk, overall increase in rat-running, level of congestion on arterial roads and impacts of construction after CNC opens.

The following sections outline the recommended improvements and further studies that are proposed to avoid, remedy and mitigate the traffic impacts of the CNC on the downstream road network. This builds on the option development process discussed above. Firstly, discussion of the staging of the upgrades and monitoring requirements before presenting the options across the seven option (and study) categories occurs.

8.1 Monitoring and Project Staging

Introduction

The Report presented in this report is based on traffic modelling, which is based on land-use projections and assumptions on drivers' behaviours. There is no certainty of how much traffic will use the CNC and downstream roads, especially by 2031. However, there is an expectation that there will be an initial increase in traffic due to drivers diverting to the CNC from Marshlands Road and Main North Road, and hence the Report looks to address the impact of this increase and then monitoring will be used to confirm transport impacts between 2021 and 2031 and determine what needs to be addressed.

Some parts of the network may be initially more sensitive to the impact of the CNC than others, and once drivers become more accustomed to the new layout, driving behaviours will become more obvious. Driver rat-running behaviours are difficult to predict using a transport model and so it is expected some behaviour will be different to what has been modelled.

The capacity interventions, particularly on Cranford Street and Berwick Street, do need to be in place before the CNC becomes operational to restrict excessive rat-running (greater than 30% increase) on a large number of local roads. There were some suggestions during consultation that no works should be undertaken prior to the CNC opening, and to see how the network performs. This approach has merit on parts of the network, however if universally adopted it is likely to result in major traffic impacts on a large number of (rat-running) routes after the CNC is opened and severe congestion on arterial roads. Making changes following the opening of the CNC may also be very disruptive on commuters and the community once the network is already heavily congested.

Proposed Monitoring

As previously stated, the Report is focused on parts of the network that are expected to experience a greater than 30% increase in vehicles (minus underlying traffic growth). In order to ascertain whether a part of the network has exceeded the 30% threshold, the simplest approach would be interpolate between the growth expected on 2021 and 2031 with the volume recording at any given time. However, there are a number of limitations in using this approach as outlined below.

There are many societal events which affect the number of trips undertaken on a network; land-use changes, economic changes, and political changes to name a few. Given time, changes will occur, and these will need to be updated in a base model. There are also many specific changes that will occur on the network which will also need to be updated within the base model. These changes are relatively simple to take care of in a model. However, a much more difficult undertaking is to uncouple changes made to the downstream network in response to the CNC; changes which affect the traffic volume on various streets (increases and decreases) which may not have been undertaken had the CNC not been constructed, or at least not within the set timespan outlined in the Designation. One example of this is the provision of additional capacity on (any) arterial corridor in order to relieve traffic from local streets. Any expansion of capacity on the network will likely illicit a redistribution of vehicle movements, but the net effect may on balance be the most desirable. Consequently, there may be scenarios where Christchurch City Council are best to increase the traffic flow on some arterial or collector roads (perhaps even in excess of the 30% threshold). Over time it will become increasingly difficult to separate the impact of these downstream treatments and the CNC itself in terms of their consequence to the network's performance.

The easiest method, therefore, is to gather baseline data from the monitoring sites, and apply an assumed base growth rate on the network to these streets as representing growth that would have occurred if the CNC was not build. Then traffic volumes can be monitored and, when a site increases beyond a 30% growth above this standard level of growth, the next step of investigation can begin. In our view, a greater than 30% downstream wide blanket threshold is a relatively blunt approach to network management of this magnitude. It fails to acknowledge fundamental network differences, and the interrelationship between hierarchy elements. Networks vary in where it can, and cannot, accommodate growth, or indeed what exactly might be considered acceptable or unacceptable growth. The relationship between effects of traffic, and volume of traffic, is also not strictly linear. Some effects respond differently to the volume of traffic, and effects also vary depending by road environment.

A time unit for the traffic volume increase was not stipulated in the Designation (for example a greater than 30% increase on the number of vehicles per day). The tidal nature of the commuter flow in Northern Christchurch means that the greatest effects is usually experienced during the morning peak, and to a lesser extent the evening peak. Therefore, for the purposes of the Report, the assumed time unit for the greater than 30% threshold includes the daily count, AM peak count, or the PM peak count.

A decision tree conceptualisation of the process outlined in the Designation is shown below:

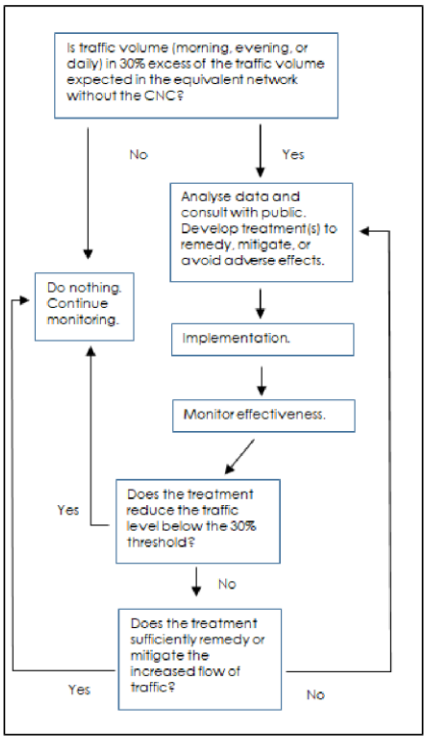

Figure 8-1: Decision Tree for Designation Monitoring of Traffic Volumes

The monitoring programme will involve the collection of daily traffic volumes and vehicle speeds (over a minimum of three 24hour days – normally seven days). The baseline data (pre-CNC) has been collected in 2018 at over 50 sites/streets in the downstream road network. The locations of the counts are shown on the screen lines in Appendix E. Following the opening of the CNC, Christchurch City Council will typically collect counts annually or biennially on the routes that are most likely to impacted by rat-running traffic, as indicated by the transport modelling. A number of the streets included in the baseline counts are not expected to be impacted, but counts are being collected in case rat-running does occur so there can be a comparison made of traffic conditions before the CNC opened. For these streets, and also the regularly monitored streets out of sequence, special counts may be collected if rat-running does appear to be an issue. It may also be necessary to monitor adjoining streets after traffic calming is applied if traffic just diverts across to these other streets.

It is also important to monitor pedestrians and cyclists volumes before and after the CNC opens. Intersection movement counts will be collected around the network. At the very least at the Westminster/Cranford, Berwick/Cranford and Forfar/Warrington intersections. Council should also investigate collecting data on the origins and destination of pedestrians and cycle trips in order to understand the key destinations and help prioritise improved facilities for these modes.

One of the key issues raised during consultation was the impact of additional traffic on an arterial route as vehicle emissions, noise and vibration. Many residents reported they already experience the impacts of these environmental effects and are concerned about these effects being exacerbated by the additional traffic. To assess the impact of the additional CNC traffic it is proposed to monitor the vehicle emission, noise, and vibration impacts on the key arterials. Baseline data (before the CNC is opened) will be collected along with annual or biennial measurements through to 2031. The arterial sites being monitored include:

- Cranford Street south of McFaddens Road
- Cranford Street north of Berwick Street
- Berwick Street immediately east of Cranford Street
- Madras Street north of Edgeware Road
- Barbadoes Street north of Edgeware Road

The intention being to collect air pollution levels using detectors at the same site at each of these locations. Christchurch City Council will investigate suitable technology for this monitoring and decide appropriate sites to collect the data.

Noise and vibration measurements should also be collected at sites along these routes which are worst affected by heavy vehicles (eg. houses and businesses closest to the vibration and noise source). The source of noise and vibration should be identified using video (CCTV) cameras.

Based on the monitoring, Christchurch City Council will assess how the additional traffic has impacted on vibration, noise and emissions at each monitored site. Where impacts are significant the Council will investigate whether any measures can be undertaken to mitigate the effects. Any improvements will be at the discretion of Council.

Staging of Improvements

The proposed improvements and associated studies have been grouped into three time periods. Stage 1 upgrades are those upgrades that need to be in place before the CNC is opened, to address severe traffic congestion and excessive rat-running in local streets. It also includes studies that need to commence before the CNC is opened (but not necessarily completed). Stage 2 upgrades are those improvements that will reduce other traffic effects of the CNC opening traffic flows, including additional traffic calming schemes, safe cycling, and safe access to schools, parks, and commercial areas. These improvements should be implemented within three years of the opening of the CNC, with higher priority upgrades being made as early as possible following opening of the CNC. It is recommended that the studies into the issues and options for these upgrades also commence before the CNC opens, with any quick wins being implemented as soon as practicable. While these improvements should ideally also be in place before the CNC opens, it is acknowledged that it will take time to develop and implement these options. Stage 3 upgrades are those improvements that the modelling indicates will be required between 2021 and 2031. This includes traffic calming and some additional safe cycling improvements. The timing of these upgrades will depend on the outcomes from the monitoring. In some cases (e.g. high levels of rat-running) temporary measures (by rapid implementation) may be put into place to address traffic impacts.

8.2 Proposed Improvement Options

This section outlines the various improvement options and associated studies that are recommended to address the expected impacts of the CNC traffic that will flow into the downstream road network. The options have been split into Stage 1, 2, and 3 depending on when the upgrades should be implemented. The improvements options have been grouped into the following categories:

1. Major Roads (MR Options)

2. Traffic Calming (TC Options) and Safe Speed Community Areas (SSCA Options)
3. Safe Access to Schools (AS Options)
4. Safe Cycling Routes (SC Options)
5. Access to Parks (AP Options)
6. Access to Commercial Centres (AC Options)

Each of the options are presented in the following sections and have been developed in-line with the processes outlined previously.

Major Roads (MR Options)

All of the major road upgrade options need to be in place before the CNC opens. So, all options are in Stage 1.

The major road options have been separated into those north and south of Berwick Street, and on Berwick Street / Warrington Street.

North of Berwick Street Options

The options proposed north of Berwick Street include the following:

MR1 (Cranford Clearways) – Peak Period Clearways along Cranford Street – to extend from Innes Road through to Berwick Street. This option is to include right turn restrictions at Dee Street and Malvern Street and at English Park Carpark. Council need to assess the vehicle accesses along the route and how drivers will be able to manoeuvre in and out of each driveway when the clearway is operating (the same to be applied to other clearway options further south). Council is to consider options to accommodate cyclists that still choose to use Cranford Street. A plan will also need to be produced on how to enforce the clearways.

MR2 (Westminster/Cranford Intersection) – Upgrades to Westminster Street /Cranford Street Intersection. This is to include banning right turns into Westminster Street West in the morning peak period, widening of the western approach and include cycle lanes on Westminster Street. It should also include other changes to improve safety for crossing school children as discussed later on.

Along Berwick Street and Warrington Street the following option is proposed. This should be undertaken as a single option given the close proximity of the intersections and associated road widening between each.

MR3 (Berwick/Warrington Upgrades) – Upgrading of Berwick Street /Cranford Street intersection to include double right turn into Cranford Street and signalisation of the Forfar Street /Warrington Street and Barbadoes Street Warrington Street Intersections, plus any road widening between these intersections. Simulation modelling will be required to assess what extra lanes are required.

South of Berwick Street Options

South of Berwick Street there are several upgrade options possible on the three arterial/collector routes (i.e. options 3(a), 3(c) or 4(a), refer to Section 7.3). A scoping study needs to be undertaken, using a simulation model to develop these options further and determine what needs to be in place by 2021 and then through to 2031. Consideration needs to be given to the high kerbside parking demands on Madras Street and Barbadoes Street due to medium density developments in this area in the development of options. A parking survey needs to be undertaken as part of the scoping study. The access requirements of the proposed St Albans Shopping Centre on Madras Street also need to be considered in option development. It is suggested up to three options should then go to the public for feedback before finalising the option. This may delay the project construction until after the CNC opens, but ideally these changes are made before the CNC opens. The MR 1, 2, and 3 options above are the more critical projects that need to be in place when the CNC opens.

MR4 (South Berwick Upgrades)– Preferred downstream of Berwick Street arterial upgrade option that comes out of the scoping study that will look in more detail at Options 3(a), 3(c) and 4(a) and any sub-options of these options. These improvements will consist of upgrades to up to six traffic signal intersections and midblock capacity improvements.

Investigation of High Occupancy Vehicle Lanes

MR5 (HOV lanes on Cranford Sherborne) – Council to investigate with the NZ Transport Agency extending the southern HOV lanes on the CNC through to Bealey Avenue and installing a northbound HOV lane.

It is recommended that Christchurch City Council work with NZ Transport Agency to do a study extending the High Occupancy Vehicle (HOV) lanes on the CNC in the southbound direction from north of the Cranford Roundabout down through the arterial road network and along Cranford and Sherborne Streets This study is to also consider HOV lanes on Cranford Street north of the Innes Road intersection. Alternatively, the HOV lanes could go down Madras and Barbadoes Streets south of Berwick Street. The HOV lane should also be provided northbound from Bealey Avenue though to at least the CNC roundabout on Cranford Street. The study will assess the likely movement of traffic onto local streets (rat-running) and other arterial routes like Main North Road. With HOV, further traffic calming of local streets may be required. If the study recommends the HOV (clearway) lanes, these should be implemented during Stage 1.

No other major road upgrade options are proposed.

Local Roads: Traffic Calming of Local Streets (TC Options) and Safe Speed Community Areas (SSCA Options)

As mentioned in Section 7.5, it is proposed that nine safe speed community areas (**SSCA 1 to 9**) are introduced in the downstream road network making up most of the local streets. Council to investigate whether to apply a 40km/h or 30km/hr speed limit in these areas. The location of these areas on each side of Cranford Street and Sherborne Street are shown in Figure 8-1 and listed below.

- SSCA1 – Ranger Street
- SSCA2 – Knowles Street
- SSCA3 – Thames Street
- SSCA4 – Roosevelt Avenue
- SSCA5 – Flockton Street
- SSCA6 – Trafalgar Street
- SSCA7 – Oxley Ave
- SSCA8 - Caledonian Road
- SSCA9 – Bishop Street

It is desirable that all the SSCA areas speed restrictions are in place before the opening of the CNC, as a deterrent for rat-running. It is recommended over time that all the streets in these areas are traffic calmed so that the reduced speed limit is self-explaining on each street. It is also recommended that Council investigate dropping the speed limit on Rutland Street to 40km/h.

The modelling has identified the streets that are likely to require traffic calming through to 2031. As specified previously, some of these streets need to be traffic calmed in Stage 1 (before CNC opens), while others can wait until the CNC opens and following monitoring of actual rat-running traffic (to implement in Stage 2 and 3). It is also possible the monitoring will identify rat-running streets not identified in the transport modelling. **Table 8-1** shows the streets that are expected to have an increase in traffic volumes through to 2031 even with the arterial upgrades and the proposed staging of these options, based on the expected timing of a greater than 30% increase in rat-running traffic on these routes. Potential rat-running routes west of Rutland Street have been excluded from assessment (Christchurch City Council will monitor and treat these routes if required separate from this Plan).

Table 8-1: Traffic Calming Routes and Their Likely Staging

Street	Start and Finish	Staging
TC1 - Mersey Street (plus Berwick*)	Innes Road to Forfar Street	Stage 1

TC2 - Knowles street	Rutland Street to Cranford Street	Stage 1
TC3 – Weston Road	Rutland Street to Cranford Street	Stage 1
TC4 – McFaddens Road	Rutland Street to Cranford Street	Stage 1
TC5 – McFaddens Road	Cranford Street to Ranger Street	Stage 2
TC6 – Jameson Avenue	McFaddens Road to Innes Road	Stage 2
TC7 – Malvern Street	Rutland Street to Cranford Street	Stage 1#
TC8 – Dee Street	Roosevelt Avenue to Cranford Street	Stage 1#
TC9 – Roosevelt Avenue	Innes Road to Westminster Street	Stage 2
TC10 – Forfar Street	Westminster Street to Warrington Street	Stage 3
TC11 – Flockton Street	Westminster Street to Warrington Street	Stage 3
TC12 – Caledonian Road	Bealey Avenue to Edgeware Road	Stage 3
TC13 – Edgeware Road	Caledonian Road to Manchester Street	Stage 3
TC 14 – Manchester Street	Bealey Avenue to Edgeware Road	Stage 3

As part of the Cranford Street Clearways Project (MR1) these streets will become left-in and left-out only which effectively works as traffic calming. If the clearways are extended down Sherborne Street, then left-in and left-out restrictions may also be required at Purchas and Cannon Streets.

* This is also to include the short section of Berwick Street between Forfar and Mersey Streets.

Safe Access to Schools (AS)

The main school impacted by the CNC downstream traffic is St Albans Primary School. Some of the school children need to cross Cranford Street to walk to the school. Given the range of options that are possible to address this risk it is recommended that a study be undertaken to identify the preferred option(s). This study is to commence in Stage 1 and be implemented during Stage 1 and Stage 2. Improvements to address safety concerns are also proposed as part of the upgrades to the Cranford/Westminster and Cranford/Berwick intersections upgrades.

AS1 – Safe Access across Cranford Street – This study will look at a range of options, and confirm the interim improvements in AS2 and other potential improvements like a new mid-block signalised crossing across Cranford Street near the English Park Carpark entrance. Some improvement (interim improvements AS2) will be made during Stage 1 and monitored for effectiveness once the CNC is opened. Other options will only be progressed if these earlier options are not effective.

AS2 – Interim Improvements on Cranford Street - As an interim measure it is suggested that, as part of **MR1 (Cranford Clearways)** and **MR2 (Westminster/Cranford Intersection),** a 40km/h speed limit be introduced during school arrival and departure time on Cranford Street from north of Westminster Street, a coloured surfacing be installed at the Westminster Street /Cranford Street Intersection, and left turning red arrows be used as protection for crossing pedestrians. As with MR1 and MR2 these changes should be undertaken as a Stage 1 improvement.

Safer Cycling Routes (SC Options)

One of the new transport effects of the CNC, is that during clearway operation Cranford Street will be less safe for cyclists. Given the future traffic volumes down Cranford Street, this is not ideal. The preferred approach is to direct cyclists onto the Papanui Parallel and other secondary cycle routes that are proposed below. However, some cyclists will

still use Cranford Street and so the Council needs to investigate how these cyclists can be accommodated along the route, including widening of the roadway.

A number of secondary cycle routes are required to help direct cyclists off Cranford Street and to address safety concerns associated with additional traffic on roads through this part of Christchurch. It is highly recommended that the Council use the MCA and SANF processes used in developing the major cycling routes (MCR) to refine the options (an example is provided in Appendix H).

The proposed five cycle facility upgrades are as follows:

SC1 (Cycle Wayfinding Signage) – Development of a wayfinding signage plan that directs cyclists at the northern end of Cranford Street (at McFaddens Road) and southern end of Cranford Street to safer cycling routes. This should be a Stage 1 improvement and coincide with introduction of the peak period clearways.

SC2 (McFaddens Road Secondary Cycle Corridor) – Development of a safe cycling route both west (towards the Papanui Parallel) and east (towards new north south route) on McFaddens Road of ideally slow streets or off-road routes. Route study to commence in Stage 1 and any 'quick win' improvements identified should be implemented in Stage 2.

SC3 (Westminster/Courtenay Secondary Cycle Corridor) – Development of a safe cycling route both west and east of Cranford Street. May consist of on-road and off-road cycling facilities, or just on-road facilities. Route study to commence in Stage 1 and any 'quick win' improvements identified should be implemented in Stage 2.

SC4 (Edgeware Road Secondary Cycle Corridor) - Development of a safe cycling route both west and east of Cranford Street. To consist of mainly on-road cycling facilities. Route study to commence in Stage 1 and any 'quick win' improvements identified should be implemented in Stage 2.

SC5 (North-South Secondary Cycle Corridor) – Development of an alternative north-south cycle route through traffic calmed streets to the east of Cranford Street. To consist of bicycle greenways, cycle lanes and shared paths. A key cycle linkage to St Albans Park from the north and south. Route study to commence in Stage 1 and any 'quick win' improvements identified should be implemented in Stage 2.

These Westminster Street /Courtenay Street and Edgeware Road corridors are also key accesses routes for pedestrians to the Westminster Street /Cranford Street local activity centre and the Edgeware Village, as specified below.

Access to Parks (AP Options)

Two studies are proposed to look at safe access to St Albans and Malvern parks and what improvements could be made to improve safety around the parks.

AP1 (St Albans Park Access Plan) – This plan will look at access to the park by pedestrians (of different abilities), cyclists, and motorists. It will consider carparking requirements, given the proposed arterial upgrades likely on Forfar Street and Barbadoes Street, and parking requirements of cyclists. The study will commence early in stage 2, with any quick-win options identified being implemented also in Stage 2. The remaining options identified will be implemented during Stage 3.

AP2 (Malvern/Rugby Park Access Plan) – This plan will look at access to the park by pedestrians (of different abilities), cyclists, and motorists. It will consider carparking requirements of Malvern Park and also what traffic calming may be required to reduce traffic speeds on Malvern Street and Roosevelt Avenue to create safer crossing places. The study will commence early in stage 2, with any quick-win options identified being implemented also in stage 2. The remaining options to be implemented during Stage 3.

Access to Commercial (Activity) Centres (AC options)

It is recommended that four activity centre transport studies and two corridor studies be undertaken early in Stage 2 and 'quick wins' implemented in Stage 2. The remaining options to be implemented during Stage 3, as outlined below. With a Masterplan having already been prepared for the Edgeware village it not proposed to do a further study of that centre. There are some overlaps between these studies and the safer cycling route studies, so this will need careful coordination to get the best outcomes.

AC1 – Westminster/Cranford Local Activity Centre Transport Study. This study will consider safe access to this activity centre by pedestrians, cyclists, and motorists. It will consider amenity improvements that can be made to the centre. A key focus will be on improving access along Westminster Street and Courtenay Street in the associated corridor study and across the intersection as part of MR2.

AC2 – Barbadoes/Warrington Local Activity Centre Transport Study. This study will consider safe access to this activity centre by pedestrians, cyclists, and motorists. It will consider amenity improvements that can be made to the centre. A key change at this location will be the installation of traffic signals at the Barbadoes Street /Warrington Street intersection to improve walking access to the north. High kerbside parking demands and the noise sensitive audiology centre are key matters that need to be considered.

AC3 – Barbadoes/Edgeware Local Activity Centre Transport Study. This study will consider safe access to this activity centre by pedestrians, cyclists, and motorists. It will consider amenity improvements that can be made to the centre.

AC4 – Rutland Street Local Activity Centre Transport Study. This study will consider safe access to this activity centre by pedestrians, cyclists, and motorists. It will consider amenity improvements that can be made to the centre. Given that there have been several changes outside these shops with the new cycleways, major changes are not likely to be required at this activity centre.

AC5 – Westminster/Courtenay Corridor Study (Rutland to Forfar) – This study will be a companion study to the cycle corridor study (SC3) but focus on safe access by pedestrians along the route and crossing the route, especially for vulnerable road users.

AC6 – Edgware Corridor Study (Springfield to Barbadoes) – This study will be a companion study to the cycle corridor study (SC4) but focus on safe access by pedestrians along the route and crossing the route especially for vulnerable road users.

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9. Summary

Table 9-1 summarises the improvements and studies (to commence) that are required before the CNC opens (Stage 1 improvements and studies) and those options that should be implemented within three years of the opening (Stage 2 - less critical but expected to be actioned early in the ten-year monitoring period). Given the big increase in traffic volumes on Cranford Street expected when the CNC opens some work needs to be undertaken before it opens to avoid excessive congestion and rat-running in the down-streams network.

While some of the Stage 2 projects should ideally be in place before the CNC opens there is limited time to progress all the studies and projects identified before it opens and hence the more crucial projects have been prioritised in Stage 1 and the remaining projects listed in Stage 2. Any 'quick wins' projects from Stage 1 that could be completed before the CNC opens or shortly after should be implemented. This will mainly be projects that only require signage and marking or could be enhancements to existing projects. The impact of delaying some projects to Stage 2 (up to three years after the CNC opens) is that there may be some adverse transport effects in the short term. Council will need to prioritise the worst of these transport effects, as identified in the monitoring (e.g. excessive rat-running in some local streets), for early intervention, including rapid implementation projects (using interim measures) where practical.

Other projects, those in Stage 3, can be implemented after the CNC opens. The traffic monitoring will show the actual transport impacts of the CNC and allow the projects developed in Stage 3 (and studies and projects in Stage 2) to be refined and changes made to the streets treated and options implemented in response to the observed traffic, pedestrian and cycling volumes, operating speed and other adverse outcomes (e.g. increase in crashes).

Table 9-1: Lists of improvement projects and studies categorised by Stage
(note some projects appear in two or more stages consisting of the studies and the implementation of improvements)

Stage 1 – Projects and studies to be undertaken before the CNC opens
Major Road (MR) Upgrades: **MR1 (Cranford Street Clearways)** – Peak Period Clearways along Cranford Street from Innes Road to Berwick Street. **MR2 (Westminster/Cranford Intersection)** – Upgrades to Westminster Street /Cranford Street intersections, including pedestrian and bicycle access and safety measures. **MR3 (Berwick/Warrington Upgrades) –** Upgrading of Berwick Street /Cranford Street signalised intersection and signalisation of the Forfar Street /Warrington Street and Barbadoes Street /Warrington Street intersections, including pedestrian and bicycle access and safety measures. **MR4 (South Berwick Upgrades)** – Option scoping study of potential improvements to arterial routes south of Berwick Street at intersections and along the mid-block. **MR5 (HOV lanes on Cranford-Sherborne)** – Undertake investigation for extending the southern HOV (high occupancy vehicle) lanes on the CNC through to Bealey Avenue and investigate the potential for installing a northbound HOV lane. Based on these investigations implement any recommendations around HOV lanes before CNC opens. **Safe System Community Areas (SSCA):** **SSCA 1 to 9** – Introduce nine 40km/h (or 30km/h) reduced speed limit areas through the downstream local road network **Traffic Calming (TC) Measures:** Introduce traffic calming on **TC1 – Mersey and Berwick Streets (Innes Road to Forfar Street), TC2 – Knowles Street, TC 3 – Weston** Road, **TC 4 – McFaddens Road, TC7 – Malvern Street (LILO) and TC8 – Dee Street (LILO)** **Safe Access to Schools (AS):** **AS1 – Safe Access Across Cranford Street** – Commence a study that will look at a range of options, including upgrades at the Berwick/ Cranford and Westminster/ Cranford intersections and a new mid-block signalised crossing across Cranford Street near the English Park Carpark entrance.

AS2 – Interim Improvements on Cranford Street – As an interim measure it is suggested that as part of **MR1 (Cranford Clearways)** and **MR2 (Westminster/Cranford Intersection)** a 40km/h speed limit be introduced during school arrival and departure time on Cranford Street from approximately 50m north of Westminster Street to 50m south of Berwick Street, a coloured surfacing be installed at the Westminster/Cranford Intersection, and left and right turning red arrows be used as protection for crossing pedestrians. These options and others to be investigated in ASI, MRI and MRR.**Safe Cycling Routes (SC):**

SC1 (Cycle Wayfinding Signage) – Development of and implementation of a wayfinding signage plan that directs cyclists at the northern end of Cranford Street (at McFaddens Road) and southern end of Cranford Street to safer cycling routes on adjoining streets (e.g. Papanui Parallel and other quiet local streets).

SC2 (McFaddens Road Secondary Cycle Corridor) – Commence a route study of a cycling route both west (towards the Papanui Parallel) and east (towards new north south route) on McFaddens Road.

SC3 (Westminster/Courtenay Secondary Cycle Corridor) – Commence a route study of a cycling route both west and east of Cranford Street.

SC4 (Edgeware Road Secondary Cycle Corridor) – Commence a route study of a cycling route both west and east of Cranford Street.

SC5 (North-South Secondary Cycle Corridor) – Commence a route study of an alternative north-south cycle route through traffic calmed streets to the east of Cranford Street. Use the MCA and SANF process to select the preferred route.

Any quick-wins projects (e.g. - signage and marking improvements) in SC2 to SC5 are to be identified and implemented where possible before the CNC opens. Studies will commence in Stage 1 and be completed early on in Stage 2.

Monitoring collections of baseline data on traffic, pedestrian and cycle volumes, vehicle speeds and environmental effects (emissions, noise and vibration) on key routes.

Stage 2 – Projects and Studies that need to be undertaken within three years of CNC opening

Monitoring

All key local routes that are expected to be impacted by rat-running traffic (or for which there have been a number of public complaints about rat-running) will have traffic counts undertaken within 3 months of the CNC opening. For streets impacted in a major way a further traffic count will be collected at around 6 months after the CNC is opened and then annually. Those streets that have a more than 30% increase in traffic volumes will be included in the traffic calming street list for Stage 2 (even if not currently on the lists below). Where large increases occur temporary works (using rapid implementation methods where relevant) may be implemented ahead of more permanent upgrades.

Undertake monitoring of pedestrian and cycle volumes and environmental effects (emissions, noise and vibration). Compare with baseline data where relevant.

Traffic Calming (TC) Measures:

When the monitoring confirms a 30% increase in traffic values, introduce traffic calming on **TC9 – Roosevelt Avenue, TC12 - Caledonian Road, TC13 - Edgware Road (Village), TC14 – Manchester Street and TC15 - Westminster Street /Courtenay Street**. Implement traffic calming on any other local streets that have a greater than 30% increase in traffic following CNC.

Safe Access to Schools (AS):

AS1 – Safe Access Across Cranford Street – Assess effectiveness of interim measures in AS2. Where required implement any further options identified in this study. This may include new mid-block signalised crossing across Cranford Street near the English Park Carpark entrance.

Safe Cycling Routes (SC):

SC2 (McFaddens Road Secondary Cycle Corridor) – Design and implement a secondary cycling route both west (towards the Papanui Parallel) and east (towards new north south route) on McFaddens Road.

SC3 (Westminster/Courtenay Secondary Cycle Corridor) – Design and implement a secondary cycling route both west and east of Cranford Street.

SC4 (Edgeware Road Secondary Cycle Corridor) – Design and implement a secondary cycling route both west and east of Cranford Street.

SC5 (North-South Secondary Cycle Corridor) – Design and implement an alternative north-south cycle route through traffic calmed streets to the east of Cranford Street.

Access to Parks (AP):

Several of the improvements in Stage 1 will improve access to the two parks. For St Albans Park the two new traffic signals on Warrington Street and the South of Berwick upgrades will improve safe access. The traffic calming of Malvern Street (2020) will also limit rat-running past Malvern Park. The Access Plan in this section will focus on other access and safety improvements that can be made.

Implement any quick wins and priority projects that come out of the AP1 and AP2 plans within Stage 2.

AP1 (St Albans Park Access Plan) – Development of a plan that will look at access to the park by pedestrians (of different abilities), cyclists, and motorists.

AP2 (Malvern/Rugby Park Access Plan) – Development of a plan that will look at access to the park by pedestrians (of different abilities), cyclists, and motorists.

the Report**Access to Commercial Centres (AC):**

Some the improvements in Stage 1 will also improve access and safety at commercial areas. Transport studies will consider additional improvements that can be made.

AC1 – Westminster/Cranford Local Activity Centre Transport Study. Undertake study that will consider safe access to this activity centre by pedestrians, cyclists, and motorists.

AC2 – Barbadoes/Warrington Local Activity Centre Transport Study. Undertake study that will consider safe access to this activity centre by pedestrians, cyclists, and motorists.

AC3 – Barbadoes/Edgeware Local Activity Centre Transport Study. Undertake study that will consider safe access to this activity centre by pedestrians, cyclists, and motorists.

AC4 – Rutland Street Local Activity Centre Transport Study. Undertake study that will consider safe access to this activity centre by pedestrians, cyclists, and motorists.

AC5 – Westminster/Courtenay Corridor Study (Rutland to Forfar) – Undertake this study which will focus on safe access by pedestrians along the route and crossing the route especially for vulnerable road users.

AC5 – Edgware Corridor Study (Springfield to Barbadoes) – Undertake this study which will focus on safe access by pedestrians along the route and crossing the route especially for vulnerable road users.

Implement any quick wins and priority projects that come out of the studies in Stage 2.

Stage 3 – Projects that could be undertaken any time between the opening of the CNC and the end of the Commissioning Period

Monitoring

Ongoing monitoring of traffic, pedestrians and cycle volumes, crashes and vehicles speeds, emissions, noise and vibration on major roads and some local streets is to occur annually, or when required more often, after the CNC opens

to validate the Reports and projects already identified in this document, and through the various studies that are specified.

It is expected that additional interventions will be required to avoid, remedy or mitigate the effects of the additional CNC traffic including the impact of trucks, that is identified in this monitoring. In terms of local streets, intervention is required if the traffic volumes increase by greater than 30% above what might have been expected on the route if the CNC had not been built. In terms of other interventions (e.g. arterial upgrades) this will be the result of congestion or safety concerns with respect to all road users. Some improvement may also not be required (e.g. if local road traffic does not increase by greater than 30%, as predicted by the modelling). Consultation on all proposed changes will be undertaken.

An indication of Stage 3 improvement projects is provided below. This list will need to be reviews and where necessary revised once the actual impacts of the CNC traffic is known from the monitoring.

Traffic Calming (TC) Measures:

Introduce traffic calming only where monitoring indicates high levels of rat-running are occurring (may include additional streets): **TC – 5 McFadden, Knowles, Weston (east Cranford), TC6 – Jameson, TC10 – Forfar Street, TC11 – Flockton Street, TC16 – Severn Street, TC17 – Thames Street, TC 18 – Aylesford Street, TC19 – Kensington Avenue, TC 20 – Philpotts Road and TC 21- Francis Avenue.**

Safe Cycling Routes (SC):

Monitor and upgrade routes as required.

Access to Parks (AP):

AP1 (St Albans Park Access Plan) – Implementation of the access plan as required to address access and safety issues.

AP2 (Malvern/Rugby Park Access Plan) – Implementation of the access plan as required to address access and safety issues.

Access to Commercial Centres (AC):

AC1 – Westminster/Cranford Local Activity Centre Transport Study. Implement study recommendations

AC2 – Barbadoes/Warrington Local Activity Centre Transport Study. Implement study recommendations.

AC3 – Barbadoes/Edgeware Local Activity Centre Transport Study. Implement study recommendations

AC4 – Rutland Street Local Activity Centre Transport Study. Implement study recommendations

AC5 – Westminster/Courtenay Corridor Study (Rutland to Forfar) – Implement study recommendations.

AC6 – Edgeware Corridor Study (Springfield to Barbadoes) – Implement study recommendations

Appendices

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Appendix A – CNC Designation Conditions associated with DEMP

Introduction and Purpose

1.1. Christchurch City Council (**Council**) lodged an application for a Notice of Requirement (**Designation**) for the Northern Arterial Extension and Cranford Street Upgrade (**NAE/CSU**) in October 2013. As part of that application, on 3 November 2014, the Council lodged a report: Northern Arterial Extension and Cranford Street Upgrade Transport Assessment Addendum (**TAA**).

1.2. The TAA reported on the Christchurch Northern Corridor and included an assessment that, at the city end of that corridor, more traffic is expected to use Cranford Street than would be the case without the Project. The principal reason for this anticipated increase in use is re-routing traffic within the Christchurch Northern Corridor to benefit from the improved travel conditions provided by the NZ Transport Agency's Northern Arterial, and the Council's NAE/CSU.

1.3. While the project, and the full Christchurch Northern Corridor is considered by the Council to be necessary to deliver a wide range of outcomes for the urban form, shape and growth for northern Christchurch and Waimakariri District, additional traffic may have potential adverse effects on residences and businesses in the immediate area around the southern end of the NAE/CSU (referred to as "**downstream effects**" in this Management Plan). In particular, more vehicles may travel on adjacent or nearby roads which were not the subject of any improvement or upgrading as part of the Designation application.

1.4. The modelling used for the Designation predicts what will happen at 2031 so long as the modelled assumptions are borne out. The TAA recommends continued investigation of the downstream effects of the Christchurch Northern Corridor (i.e. NAE/CSU) with the following objectives:

(a) To identify preferred vehicle access routes, particularly for trucks, between the end of the Christchurch Northern Corridor and the Central City (that is between the end of the NAE/CSU and the City centre); and

(b) To identify strategies to keep vehicles on preferred vehicle access routes; and

(c) To discourage vehicles away from public transport routes and walking or cycling routes such as the Main North Road / Papanui Road and Rutland Street corridors respectively.

1.5. This Management Plan is to ensure downstream effects are appropriately managed and to:

(a) Assess the existence, nature and extent of any increased traffic on streets adjacent to, or adjoining Cranford Street attributable to the NAE/CSU that might cause or contribute to a loss of service to any of these streets for up to 10 years after the opening date of the NAE/CSU;

(b) Implement measures to avoid, remedy or mitigate such effects, where these are more than minor, in a timely and cost-effective manner and where appropriate and practicable; and

(c) Monitor the efficacy of the measures for an appropriate period and implement further remedial action, if this is necessary and appropriate.

1.6. Some traffic increase can be expected if development to the north of Christchurch continues to grow or exceeds present expectations, whether or not the NAE/CSU project proceeds. For the avoidance of doubt, this Management Plan is to identify any adverse traffic effects that arise between the commissioning date of the NAE/CSU (expected to be approximately 2021) and up to ten years after that opening date (referred to in this Management Plan as the "Commissioning Period"). If any adverse effects are identified, a response to appropriately-manage these adverse effects, within this Commissioning Period will be considered and implemented.

1.7. The precise areas to be covered under this Management Plan will be established as part of the methodology referred to below. The methodology will assess the existence, nature and extent of any increased traffic attributable to the NAE/CSU on a number of streets at the southern end of the NAE/CSU including, but not limited to Mersey Street, Malvern Street, Roosevelt Avenue, Severn Street, Dee Street, Weston Road, Knowles Street and McFaddens Road (potentially adversely affected streets).

1.8. For the avoidance of doubt, while these listed streets are described as potentially adversely affected streets, this Management Plan is not confined to those streets, nor does it mean all of these listed streets will be adversely affected.

Appointment and Methodology

2.1. Prior to operating the NAE/CSU the Council will appoint an independent expert who is a suitably qualified traffic engineer to investigate and design an appropriate methodology to identify the potential impacts (if any) on those streets at the end of the Christchurch Northern Corridor which may be potentially affected as a result of the operation of the NAE/CSU.

2.2. That methodology is to apply commonly accepted professional standards to assess traffic-related effects and, for the avoidance of doubt, will include procedures to:

(a) Identify and confirm all streets adjacent to or adjoining Cranford Street affected by the operation of the NAE/CSU;

(b) Assess the current level of vehicle usage and service of each of the potentially adversely affected streets in proximity to the southern end of the NAE/CSU;

(c) Include modelling where appropriate to identify the anticipated future increase in the use of potentially affected streets that may be caused by, or attributable to, the operation of the NAE/CSU;

(d Consider the extent of and effects (if any) arising from such growth in traffic flows, on those potentially affected streets that are reasonably attributable to the operation of the NAE/CSU;

(e) Recommend appropriate mitigation measures (where an increase in traffic-related effects within potentially adversely affected streets, is caused by or contributed to by the NAE/CSU) to Council and, where required, the local community board (if the community board holds the requisite delegation for Council for any of the traffic calming works required) as soon as practicable, and institute monitoring procedures to verify the outcome of the mitigation measures; and

(f) Recommend further remedial steps to Council and, where required, the local community board (if the community board holds the requisite delegation for Council for any of the traffic calming works required) (under 3.1 below) if monitoring confirms a continued increase in adverse traffic-related effects on the affected streets that is more than minor.

2.3 Any appropriate mitigation measures may be delivered on an iterative basis that is by first assessing the efficacy of an initial stage of mitigation measures before undertaking a further stage or stages of mitigation measures.

2.4 Where monitoring is required that monitoring must be completed within six months from the completion of the mitigation works.

2.6 The independent expert will support and where necessary, assist Council with consultation and/or the communication required as part of this management Plan.

3. Recommendation to Council

3.1. The independent traffic expert recommendation to Council must include appropriate remedial steps to be taken to avoid, remedy or mitigate any increase in adverse traffic-related effects where such effects are more than minor, identified under the methodology as being caused by or attributable to the operation of the NAE/CSU. This may include but is not limited to:

(a) Measures to improve the operation of Cranford Street and Sherborne Street, including capacity measures such as peak hour clearways;

(b) The introduction of speed restrictions in some or all affected streets;

(c) The introduction of chicanes in some or all affected streets;

(d) The introduction of speed bumps in some or all affected streets;

(e) Any other suitable traffic calming mechanisms, including those identified within the Council's Infrastructure Design Standard.

3.2 The remedial steps may include a programmed series of measures to be delivered over time, with the intention that any recommended remedial steps must be taken as soon as reasonably practicable after that recommendation is made. All remedial steps must be completed within the Commissioning Period.

4. Work to be Carried Out by Council

4.1. If the independent traffic expert determines that the increase in traffic to be experienced prior to the expiry of the Commissioning Period that is caused by or attributable to the operation of the NAE/CSU, is likely to raise or has raised the level of vehicle movements on any of the potentially affected streets by more than 30 per cent above the traffic level that would have occurred without the operation of the NAE/CSU then measures to improve the operation of Cranford Street and Sherborne Street and/or calming work will be undertaken by the Council as recommended.

4.2. Any calming work may be undertaken iteratively, (that is by first assessing the efficacy of an initial stage of calming work before undertaking a further stage or stages of calming work). In such a situation the monitoring previously undertaken must be repeated within six months of each stage of calming work being completed. This further monitoring is to assess whether further or other calming work is needed.

4.3. For the avoidance of doubt no calming work will need to be investigated or carried out unless the NAE/CSU has raised the level of vehicle movements by more than 30 per cent above the traffic level that would have occurred without the operation of the NAE/CSU. Further, the purpose of any calming work undertaken is to mitigate (effects from) any increased traffic movement to an acceptable level but does not mean a requirement to reduce traffic movements or their effects to the levels occurring prior to the opening date of the NAE/CSU.

4.4. The desired outcome of this Management Plan is to, within the Commissioning Period, avoid, remedy or mitigate downstream traffic effects, such that they are no more than minor. The Council shall take all practicable steps to ensure any works reasonably-necessary to achieve this outcome are completed within that time.

4.5. Where traffic calming work is recommended Council will consult with:

1. Residents of the streets where traffic calming measures are proposed to be taken;
2. Canterbury District Health Board;
3. Mairehau Primary School, Our Lady of Fatima School, Paparoa Street Primary School, St Albans Catholic Primary School and St Albans School;
4. St Albans Residents Association and Mairehau Community Trust; and
5. Cyclists through Spokes;
6. Consultation shall include the distribution of a newsletter including feedback form prior to the review.

5. Communication with Residents

5.1. Prior to operating the NAE/CSU, the Council shall prepare and implement a Communication Plan that sets out procedures detailing how the public and stakeholders will be communicated with throughout the Commissioning Period. As a minimum, the Communication Plan shall include:

1. Details of a public liaison person including contact details;
2. Methods to inform and to communicate details to property owners and occupiers within potentially affected streets of the recommendations from the independent traffic expert and any proposed mitigation measures to be carried out by Council;
3. Methods to deal with any concerns raised by property owners or occupiers; and
4. Monitoring and review procedures for the Communication Plan.

5.2 Owners and occupiers of properties on streets identified by the independent traffic expert as requiring mitigation measures shall be:

1. Advised of the recommendations of the independent traffic expert under clause 3, including proposed mitigation measures, within 30 working days following the provision of the recommendation to the Council;
2. Provided a period of 20 working days to comment on the proposed mitigation measures; and
3. Advised by Council of the final mitigation measures to be implemented, at least 20 workings days prior to commencement of any works.

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Appendix B - Cranford Street (north of Innes Road) Details

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Figure B-1: Cranford Street Changes (Source: https://www.nzta.govt.nz/assets/projects/christchurch-northern-corridor/CNC-Project-Update-Cranford-Street-August-2017.pdf)

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Appendix C - Existing Traffic Flow and Crash Record

There is currently in excess of 20,000 vehicles per day on Cranford Street north of Berwick Street (2017). Warrington Street (2013) and Berwick Street (2014) have traffic counts of 10,790 and 12,326 vehicles per day respectively. Madras Street and Barbadoes Street have traffic counts of 8,274, and 8,191 vehicles per day (in 2016). The counts presented here are reasonably recent. Older counts are also available however become less useful over time.

Crash Record

Given the large area impacted by traffic from the CNC, aggregated crash maps from Urban KiwiRAP (New Zealand Road Assessment Programme) is referred to. Urban KiwiRAP uses estimate death and serious injury equivalents along with distance (risk per kilometre for collective risk). It is a useful tool to examine safety risks comparative to the rest of the transport network, including other cities in New Zealand. Sections with high and medium-high risk are the key areas of focus.

An interrogation of Urban KiwiRAP data highlighted corridors that currently experience high numbers of crashes; either by kilometre (collective risk), or by number of vehicles (personal risk) in the study area.

Figure C-1: Collector Risk Map (Source: https://roadsafetyrisk.co.nz/maps/collective-risk#Canterbury)

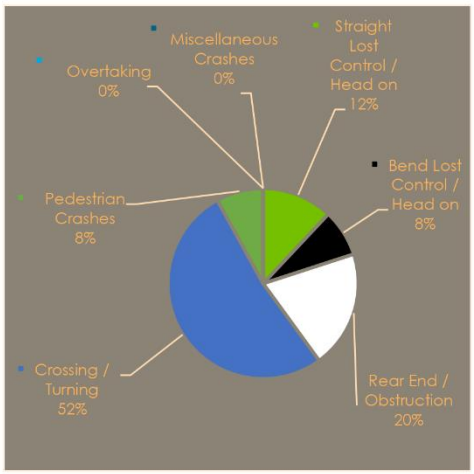

Figure C-2: Death and Serious Injury by Movement Type (2013-2017)

The Collective Crash Risk[25] in the vicinity of Cranford Street for 2012-2016 is shown in Figure C-2 (note the maps have been filtered so that only the High and Medium-High risk corridors are shown). The streets with the highest risk[26] that relate most directly to the potential downstream effects are Cranford Street (to Edgeware Road), Innes Road, and Madras Street. It is typical that the highest volume routes have the greatest concentration of crashes, and so this is to be expected.

For the period 2012-2016 there are few routes in the study area with a high Personal Risk (this is the risk per vehicle going down each street). The only routes that have medium-high crash risks are Malvern Street, Westminster Street (west of Cranford) and Edgeware Road through and either side of the Edgeware village. Improvements to these routes should consider local safety risks.

[25] The highest collective risks are often located on streets with the higher traffic volumes

[26] Note that the maps present a risk that aggregates the crash history over the length of the road section selected, and that these sections have not been created to only constitute streets directly affected by CNC. For example, the Madras Street section length extends from Warrington Street to Gloucester Street.

Figure C-2 shows the existing incidence of crashes and DSI within the project area. The majority of DSI crashes involved turning or crossing traffic mainly at intersections. Hence particular attention needs to be given to the design of intersections.

Crash heat maps for the period of 2012-2016 period are shown in Figures C-3 to C-6.

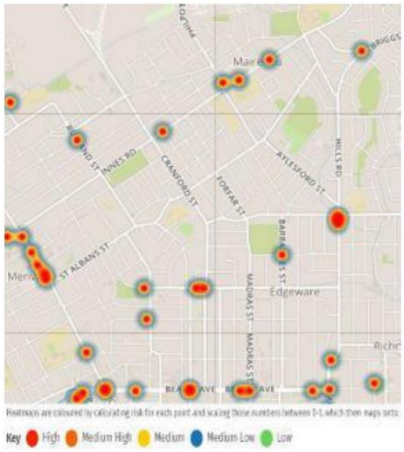

Figure C-3: Pedestrian (Source: https://roadsafetyrisk.co.nz/maps/heat-maps#-43.50249565148537,172.6360273361206,15)

Figure C-4: Cyclist (Source: https://roadsafetyrisk.co.nz/maps/heat-maps#-43.50249565148537,172.6360273361206,15)

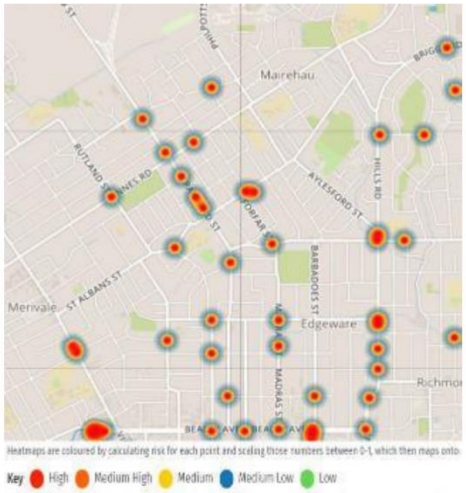

Figure C-5: Motorcyclist (Source: https://roadsafetyrisk.co.nz/maps/heat-maps#-43.50249565148537,172.6360273361206,15)

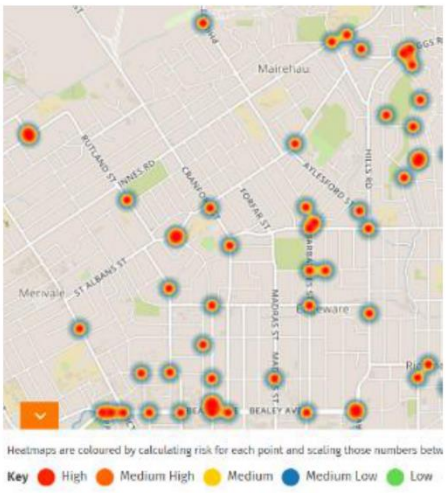

Figure C-6: Speed (https://roadsafetyrisk.co.nz/maps/heat-maps#-43.50249565148537,172.6360273361206,15)

In terms of vulnerable users Cranford Street has experienced a higher amount of motorcycle crashes than most other nearby streets.

Pedestrian crashes have occurred east of Cranford Street on Innes Road (near school crossing), and also around Edgeware Village and near St Albans Park. In total there were 11 pedestrian (including one mobility) crashes that

occurred in the study area in the period of 2013-2017. Of these 2 were minors, and 3 were older than 65. The crashes resulted in 2 DSI (8% of the DSI) which is lower than the national average[27] for 2016 (10%).

There were 3 recorded cyclist DSI in the study area (12.5% of the DSI), which is higher than the national average of 6.2% for 2016. Cyclist crashes have generally occurred south of Westminster Street.

Figure shows crashes that had speed as a main factor. Cranford Street performed relatively well compared with other major roads, except around the Westminster Street / Cranford Street intersection, and immediately south of the Berwick Street / Cranford Street intersection. Locations were speeds was a bigger factor include Barbadoes Street between Edgeware Road and Warrington Street, and Flockton Street. This may be a result of the current wide lanes on these roads and the unsignalised Barbadoes/ Warrington intersection.

The pre-CNC crash data will form an important part of monitoring the crash effects of the CNC.

Table C-1: Selection of Existing Vehicle Counts (Source: http://ccc.interpret.co.nz/trafficcount/)

Location	AADT
Berwick Street (East of Cranford)	12,326 (2014)
Cranford Street (North of Berwick)	20,596 (2017)
Warrington Street (East of Forfar)	10,790 (2013)
Courtenay Street (NE Trafalgar)	2,632 (2013)
Barbadoes (North of Bealey)	8,191 (2016)
Madras (North of Bealey)	8,274 (2016)
Sherborne (South of Canon)	12,974 (2017)

[27] National data for pedestrians and cyclists obtained from: https://www.transport.govt.nz/resources/road-safety-resources/roadcrashstatistics/motorvehiclecrashesinnewzealand/motor-vehicle-crashes-in-new-zealand-2016/

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Appendix D - Jacobs Modelling (D1 to D4)

The figures in this appendix are to be viewed with the understanding that traffic modelling has certain limitations. In particular, the predicted changes to low volume roads have more ambiguity due to there being a multitude of route choices.

Furthermore, there are streets that appear in these modelling plots as affected that maynot necessarily be affected. This is resultant from a limitation of the modelling tools that they show effects well away from the major network changes. We have made this judgement based on expert knowledge of the network, and monitoring will pick-up any wider effects that are significant.

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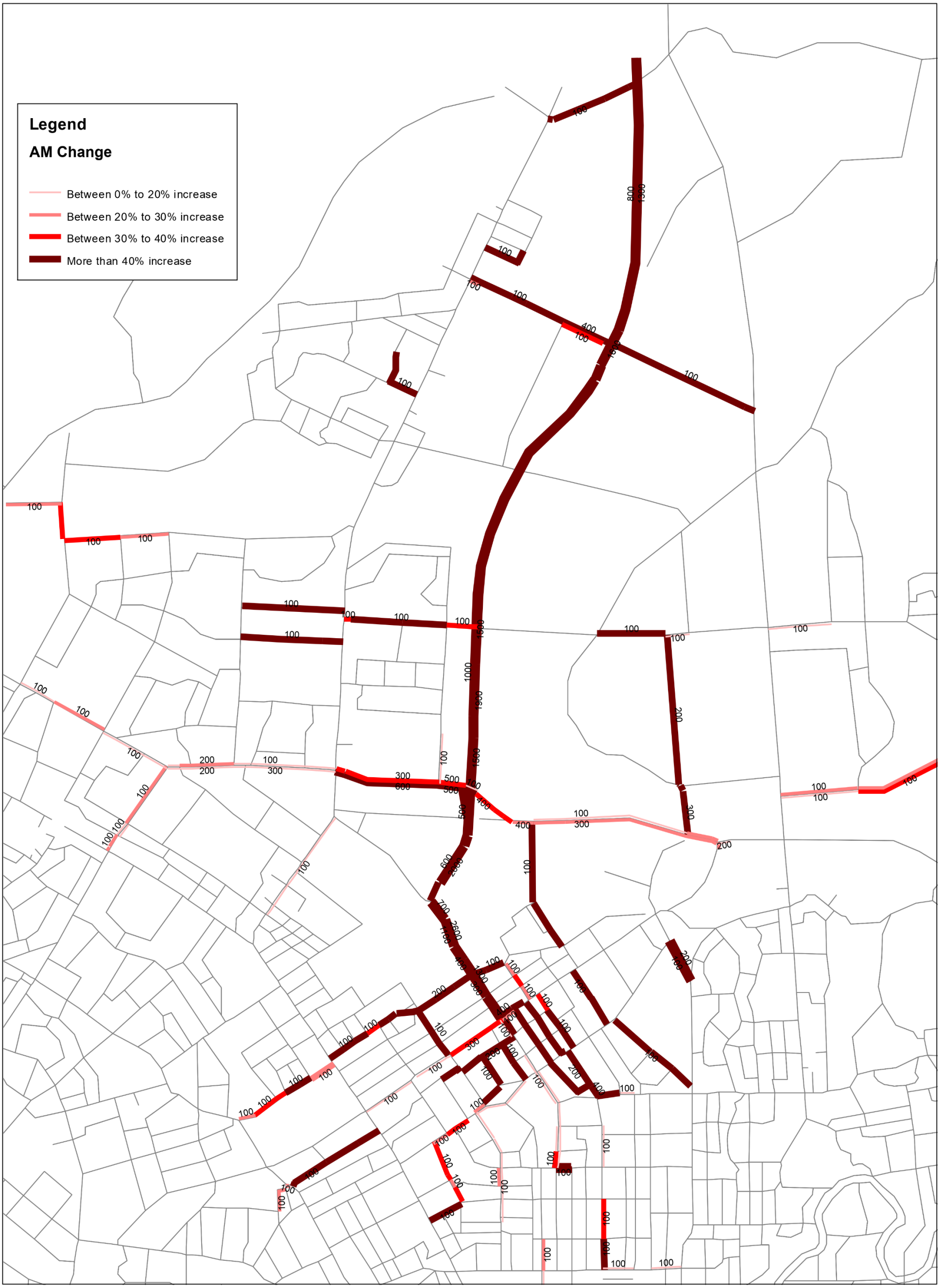
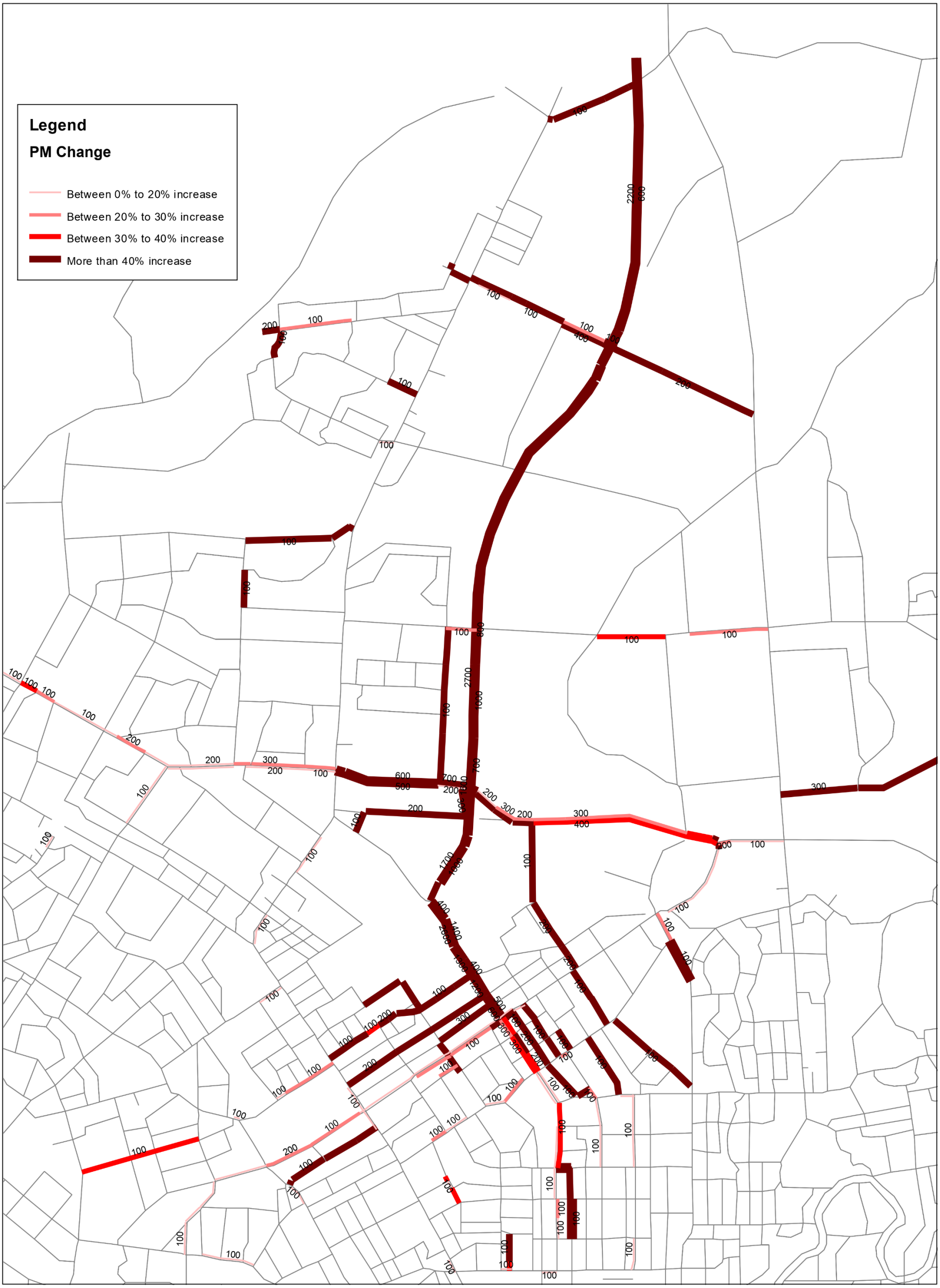
Do Nothing Change Flow Plots

Appendix D

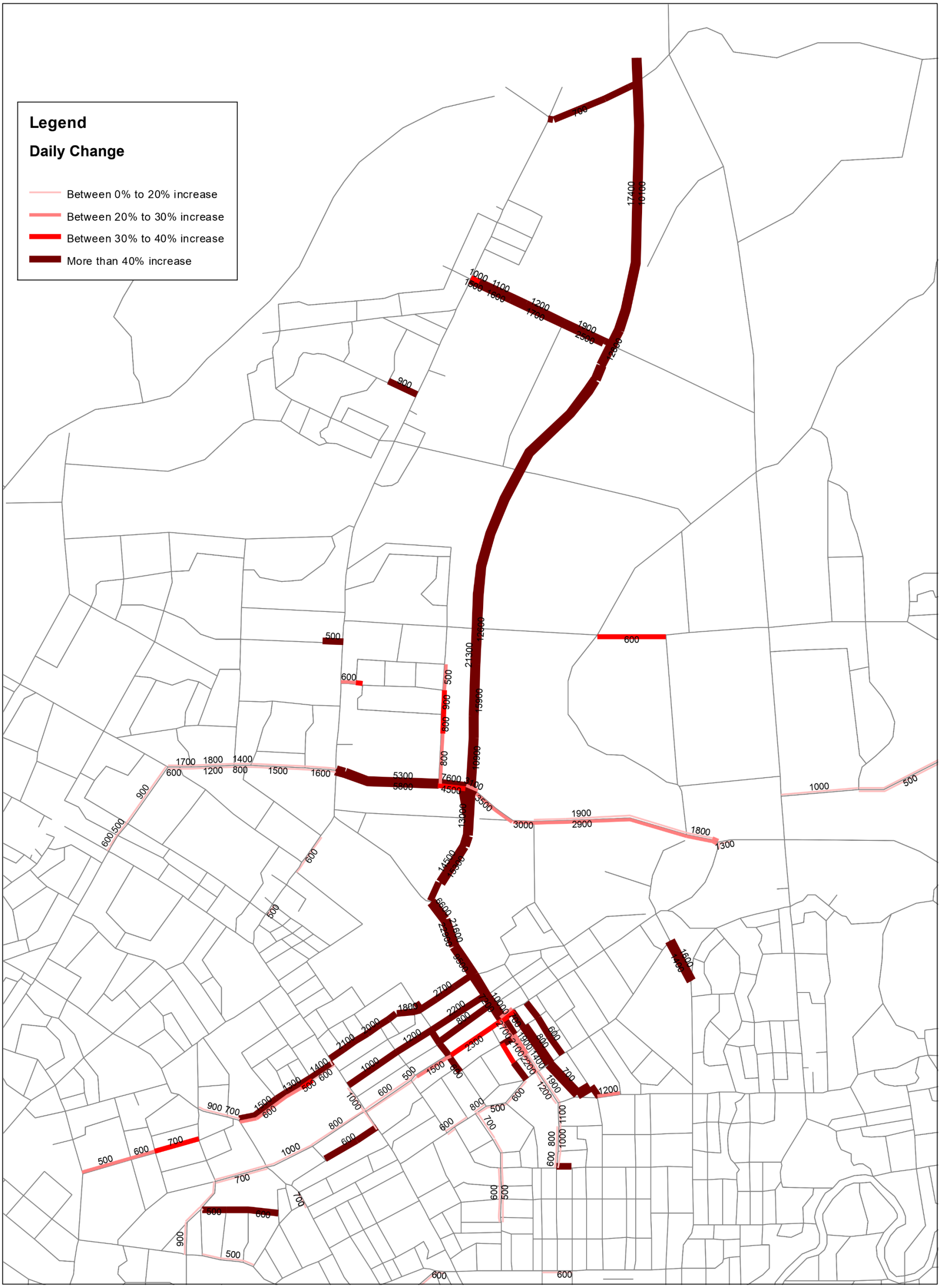
Issue Date:
10 May 2019



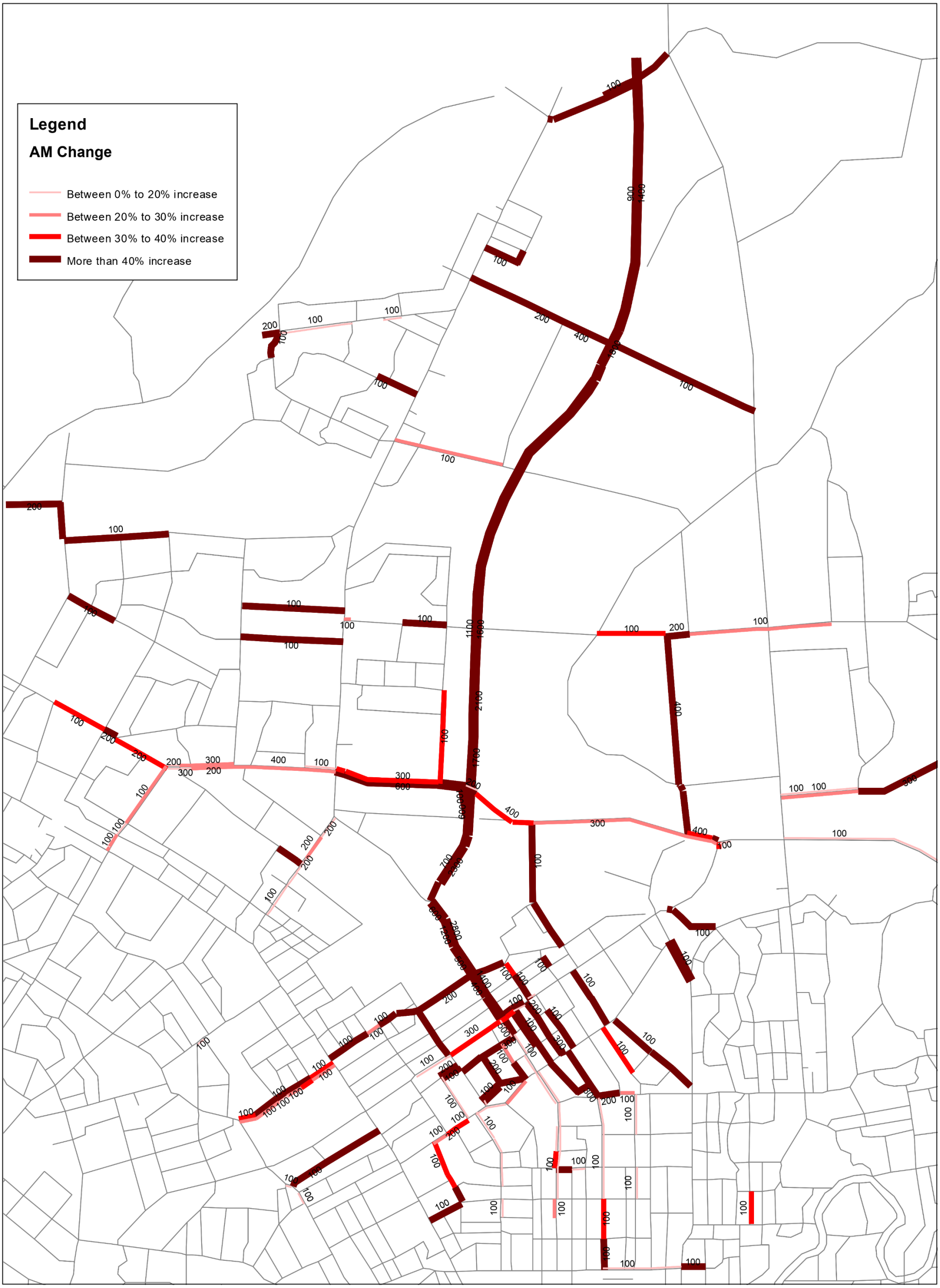
Year 2021: Hourly Traffic Volume Difference (PCUs) - with/without CNC
CNC03 vs NoCNC03 (Differences less than 50 pcu/h are not shown on the plot)



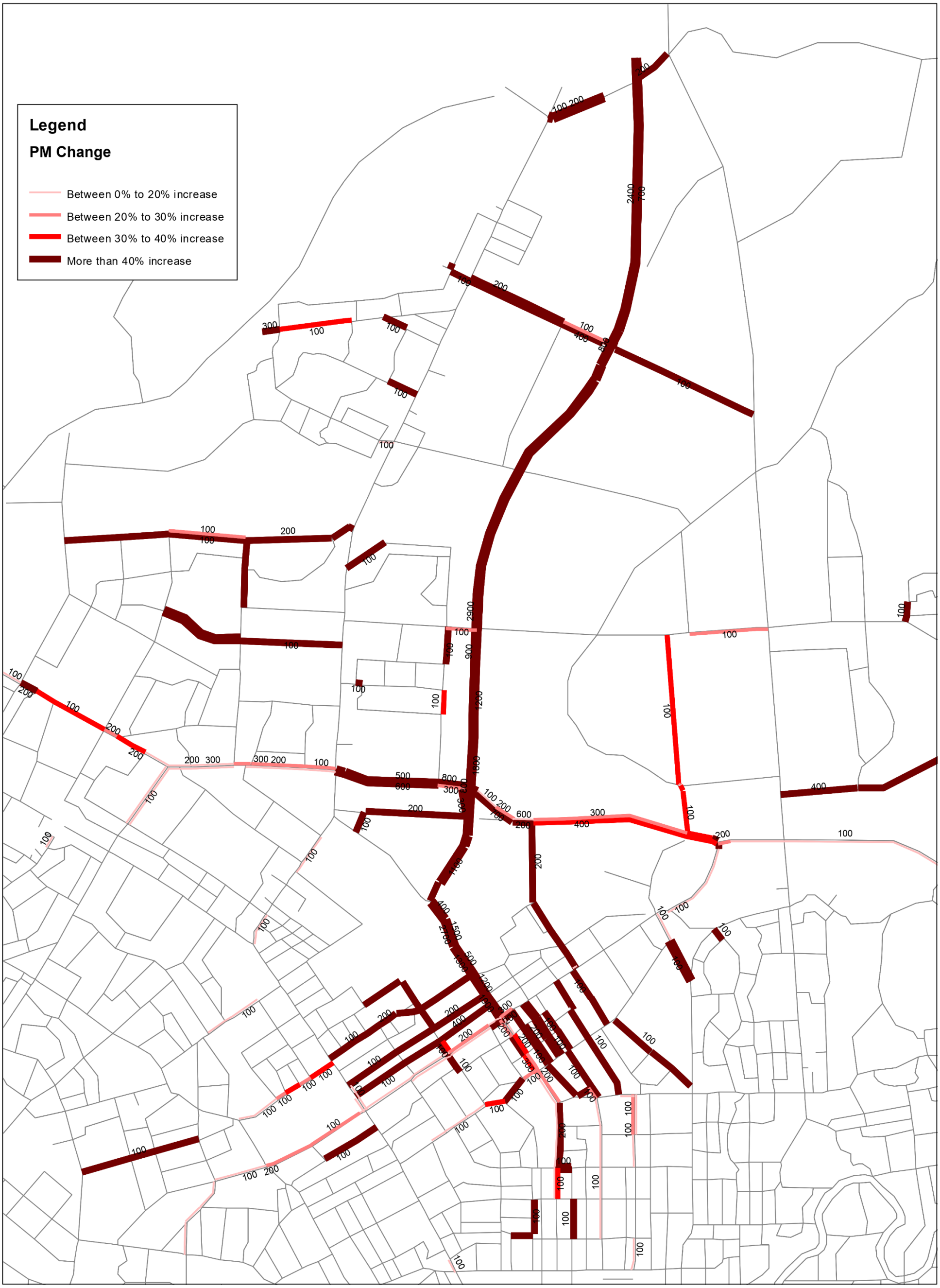
Year 2021: Hourly Traffic Volume Difference (PCUs) - with/without CNC
CNC03 vs NoCNC03 (Differences less than 50 pcu/h are not shown on the plot)



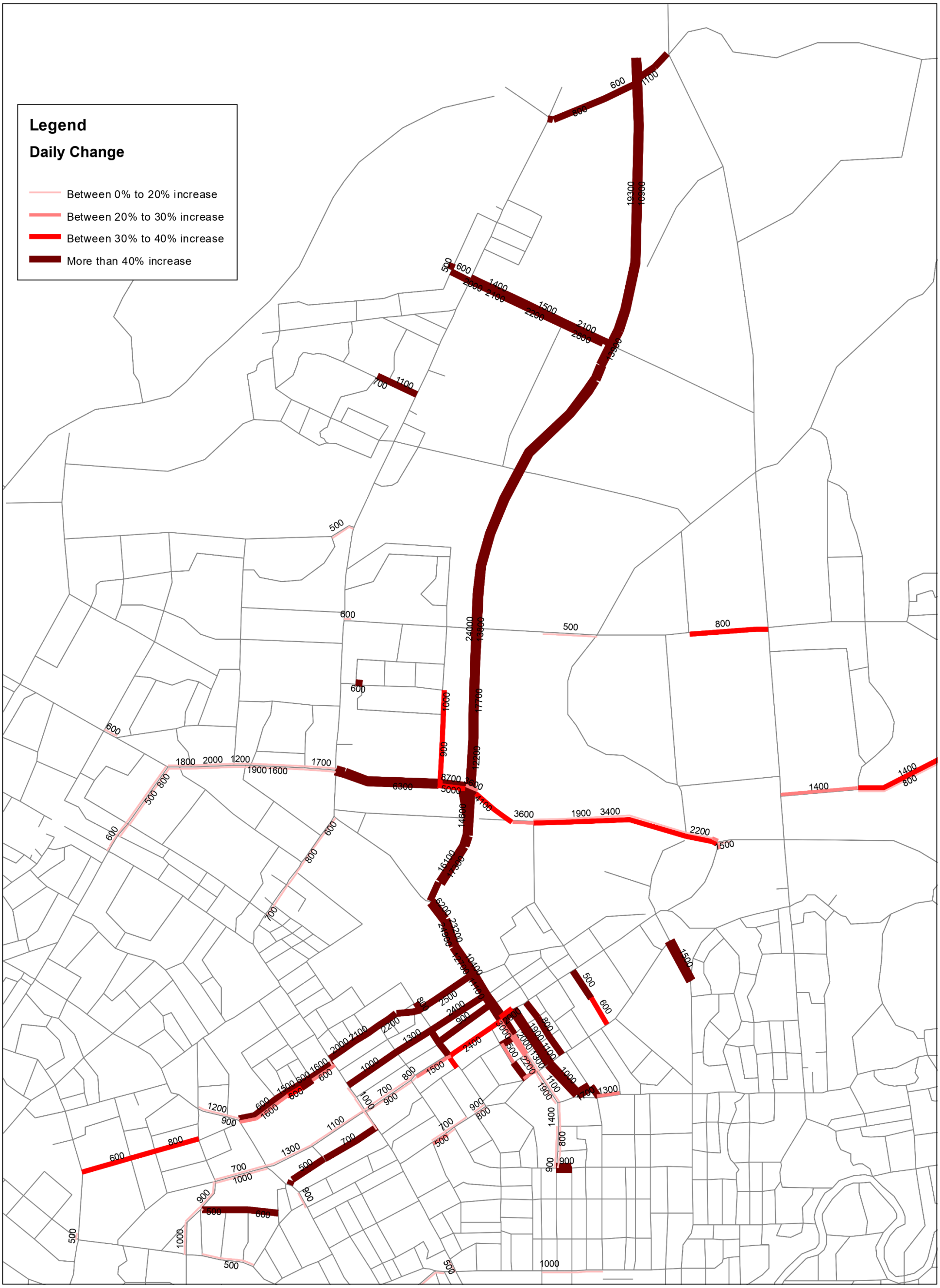
Year 2021: Daily Traffic Volume Difference - with/without CNC
CNC03 vs NoCNC03 (Differences less than 500 vpd are not shown on the plot)



Year 2031: Hourly Traffic Volume Difference (PCUs) - with/without CNC
CNC03 vs NoCNC03 (Differences less than 50 pcu/h are not shown on the plot)



Year 2031: Hourly Traffic Volume Difference (PCUs) - with/without CNC
CNC03 vs NoCNC03 (Differences less than 50 pcu/h are not shown on the plot)



Year 2031: Daily Traffic Volume Difference - with/without CNC
CNC03 vs NoCNC03 (Differences less than 500 vpd are not shown on the plot)

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Traffic Volumes

Appendix D

Issue Date:
10 May 2019

* zones connected
^ on screenline, not monitored

AADT			DM	DM with CNC	Clearway with CNC	Clearway with CNC (Innes to Bealey & signals)
			NoCNC03	CNC03	CNC04e	CNC04g
			2021			
Screenline	Location	Direction	AADT			
North South 1 (East of Cranford Street/Sherborne Street)	McFaddens Road	EB	1,520	1,518	1,263	1,282
		WB	968	368	324	358
		Total	**2,488**	**1,886**	**1,586**	**1,639**
	Weston Road	EB	292	6	0	0
		WB	439	137	111	128
		Total	**730**	**143**	**111**	**129**
	Knowles St	EB	18	-	-	-
		WB	0	-	-	-
		Total	**19**	**-**	**-**	**-**
	Innes Road	EB	5,947	7,500	6,426	6,560
		WB	6,067	8,282	8,332	8,434
		Total	**12,014**	**15,782**	**14,758**	**14,994**
	Malvern Street	EB	960	187	204	266
		WB	932	182	35	59
		Total	**1,891**	**368**	**239**	**326**
	Dee Street	EB	284	128	98	104
		WB	982	427	273	298
		Total	**1,266**	**556**	**371**	**402**
	Westminster Street	EB	3,247	2,501	2,213	2,447
		WB	2,492	2,109	2,053	2,227
		Total	**5,739**	**4,611**	**4,265**	**4,673**
	Berwick Street	EB	5,943	6,274	8,507	7,335
		WB	4,523	4,775	8,043	5,352
		Total	**10,466**	**11,049**	**16,550**	**12,687**
	Oxley Avenue (not in model)	EB				
		WB				
		Total	**-**	**-**	**-**	**-**
	Winton Street	EB	397	721	364	593
		WB	2,006	1,956	1,012	974
		Total	**2,403**	**2,677**	**1,377**	**1,567**
	Cornwall Street^	EB	45	38	39	40
		WB	893	1,057	208	935
		Total	**938**	**1,096**	**248**	**975**
	Edgware Road	EB	905	1,537	1,538	1,769
		WB	1,027	1,401	1,668	2,459
		Total	**1,932**	**2,937**	**3,206**	**4,229**
	Canon Street	EB	2,076	1,873	1,720	1,478
		WB	2,855	2,756	2,165	2,687
		Total	**4,932**	**4,629**	**3,885**	**4,166**
	Purchas Street	EB	2,715	2,583	3,005	2,182
		WB	3,987	3,965	3,591	3,235
		Total	**6,701**	**6,548**	**6,596**	**5,417**
North South 2 (West of Cranford Street/Sherborne Street)	McFaddens Road*	EB	1,644	4,357	4,439	4,228
		WB	2,160	1,621	1,699	1,618
		Total	**3,804**	**5,978**	**6,137**	**5,846**
	Weston Road*	EB	479	2,655	2,389	2,473
		WB	182	76	88	78
		Total	**661**	**2,731**	**2,478**	**2,550**
	Knowles St*	EB	13	796	705	612
		WB	10	-	-	-
		Total	**24**	**796**	**705**	**612**
	Innes Road	EB	6,381	5,785	5,765	5,787
		WB	7,222	9,518	9,243	9,229
		Total	**13,603**	**15,303**	**15,008**	**15,016**
	Malvern Street	EB	2,210	1,962	1,703	1,706
		WB	649	1,071	566	541
		Total	**2,859**	**3,032**	**2,270**	**2,247**
	Westminster Street	EB	404	632	694	614
		WB	424	500	498	466
		Total	**828**	**1,132**	**1,192**	**1,081**
	Courtenay Street	EB	3,196	3,617	3,522	3,732
		WB	4,700	5,269	4,700	4,530
		Total	**7,896**	**8,886**	**8,222**	**8,262**
	Edgware Road	EB	1,037	1,228	1,247	1,476
		WB	2,068	2,253	2,698	2,212
		Total	**3,105**	**3,481**	**3,944**	**3,689**
	Canon Street	EB	2,473	2,179	2,390	1,669
		WB	2,093	1,877	1,921	1,453
		Total	**4,566**	**4,056**	**4,311**	**3,122**
	Purchas Street	EB	5,806	5,470	5,510	4,841
		WB	2,348	2,154	2,594	1,492
		Total	**8,153**	**7,624**	**8,104**	**6,333**
	Rutland Street	NB	1,897	4,379	4,096	3,997
		SB	1,872	2,131	2,219	2,222
		Total	**3,769**	**6,510**	**6,314**	**6,219**

East West 1 (North of Innes Road)	Cranford Street	NB	10,381	16,819	17,787	17,502
		SB	10,513	20,536	20,997	21,051
		Total	**20,894**	**37,355**	**38,784**	**38,552**
	Jameson Avenue	NB	1,091	964	969	966
		SB	1,391	1,433	1,259	1,266
		Total	**2,482**	**2,397**	**2,228**	**2,232**
	Nancy Avenue	NB	283	179	152	182
		SB	346	229	236	196
		Total	**630**	**407**	**388**	**378**
	Philpotts Road	NB	1,705	1,774	1,602	1,611
		SB	1,353	222	197	181
		Total	**3,057**	**1,995**	**1,798**	**1,792**
East West 2 (South of Innes Road)	Papanui Road	NB	9,280	9,468	9,308	9,304
		SB	8,616	8,346	8,274	8,308
		Total	**17,896**	**17,814**	**17,582**	**17,612**
	Browns Road	NB	1,596	1,358	1,385	1,396
		SB	1,615	1,569	1,475	1,495
		Total	**3,211**	**2,927**	**2,860**	**2,891**
	Somme Street*	NB	1,103	1,142	932	887
		SB	1,218	1,476	1,397	1,302
		Total	**2,321**	**2,618**	**2,329**	**2,189**
	Rutland Street	NB	3,018	3,419	3,229	3,072
		SB	1,731	1,873	1,938	1,868
		Total	**4,749**	**5,292**	**5,167**	**4,940**
	Gosset Street (not in model)	NB				
		SB				
		Total	-	-	-	-
	Carrington Street	NB	42	114	109	85
		SB	263	585	311	286
		Total	**305**	**700**	**419**	**371**
	Jacobs Street (not in model)	NB				
		SB				
		Total	-	-	-	-
	Roosevelt Avenue	NB	343	237	208	228
		SB	2,212	3,015	2,102	2,109
		Total	**2,555**	**3,253**	**2,310**	**2,337**
	Cranford Street	NB	9,382	11,522	12,954	12,700
		SB	8,459	10,395	13,667	13,757
		Total	**17,841**	**21,917**	**26,621**	**26,456**
	Mersey Street*	NB	2	1,395	1,450	1,542
		SB	254	1,032	583	662
		Total	**255**	**2,427**	**2,034**	**2,204**
	Severn Street	NB	429	759	451	430
		SB	376	971	269	269
		Total	**805**	**1,730**	**720**	**699**
	Thames Street	NB	559	544	462	488
		SB	470	702	403	466
		Total	**1,029**	**1,246**	**864**	**955**
	Francis Avenue	NB	547	239	123	175
		SB	806	138	128	88
		Total	**1,354**	**377**	**251**	**263**
	Kensington Avenue	NB	1,568	2,067	2,053	2,053
		SB	1,210	1,157	1,142	1,142
		Total	**2,778**	**3,223**	**3,195**	**3,195**
	Mahars Road	NB	609	638	641	614
		SB	699	727	748	728
		Total	**1,308**	**1,364**	**1,389**	**1,342**
	Manuka Street^	NB	28	0	0	0
		SB	0	0	0	0
		Total	**28**	**1**	**1**	**0**
	Hills Road	NB	5,633	4,647	4,672	4,658
		SB	5,611	5,480	5,422	5,520
		Total	**11,244**	**10,127**	**10,094**	**10,178**
West 3 (St Albans Road)	Bristol Street	NB	795	902	711	755
		SB	1,785	2,083	1,802	1,642
		Total	**2,581**	**2,985**	**2,514**	**2,398**
	Gordon Avenue (not in model)	NB				
		SB				
		Total	-	-	-	-
	Abberley Crescent	NB	491	638	625	646
		SB	348	354	346	337
		Total	**839**	**993**	**971**	**983**
	Albany Street (not in model)	NB				
		SB				
		Total	-	-	-	-
	Springfield Road	NB	5,969	6,195	5,869	5,766
		SB	7,673	8,346	7,639	7,490
		Total	**13,642**	**14,540**	**13,507**	**13,257**
	Trafalgar Street*	NB	381	386	381	378
		SB	550	549	536	535
		Total	**931**	**935**	**917**	**913**
	Cranford Street	NB	10,784	11,978	13,388	13,075
		SB	10,147	12,014	15,029	15,337

East (South of St		**Total**	**20,930**	**23,992**	**28,417**	**28,412**
	Mersey Street*	NB	497	1,669	1,478	1,572
		SB	251	960	578	647
		Total	**748**	**2,629**	**2,056**	**2,219**
	Forfar Street*	NB	3,520	2,126	2,313	1,935
		SB	1,487	1,724	796	797
		Total	**5,007**	**3,849**	**3,109**	**2,731**
	Mayfield Avenue (not in model)	NB				
		SB				
		Total	-	-	-	-
	Francis Avenue	NB	131	214	84	135
		SB	1,352	268	154	126
		Total	**1,482**	**481**	**238**	**261**
	Flockton Street*	NB	47	74	56	54
		SB	1,069	1,050	1,072	1,016
		Total	**1,116**	**1,124**	**1,128**	**1,070**
	Aylesford Street	NB	1,559	1,912	1,946	1,946
		SB	1,037	1,072	1,116	1,114
		Total	**2,596**	**2,984**	**3,062**	**3,060**
East West 4 (South of Berwick Street)	Cranford Street	NB	8,557	9,050	6,725	9,314
		SB	6,445	7,531	7,846	9,537
		Total	**15,003**	**16,581**	**14,571**	**18,851**
	Forfar Street	NB	5,414	5,743	10,604	7,107
		SB	4,546	4,691	2,488	3,763
		Total	**9,960**	**10,434**	**13,092**	**10,870**
	Barbadoes Street	NB	1,977	1,974	926	1,034
		SB	5,618	5,701	10,591	6,605
		Total	**7,596**	**7,676**	**11,517**	**7,639**
	Geraldine Street*	NB	16	23	51	189
		SB	18	20	6	8
		Total	**35**	**43**	**57**	**197**
	Cleveland Street	NB				
		SB				
		Total	-	-	-	-
	Woodville Street	NB				
		SB				
		Total	-	-	-	-
	Hills Road	NB	8,770	8,436	8,139	8,347
		SB	8,961	8,601	7,616	8,505
		Total	**17,731**	**17,037**	**15,755**	**16,852**

* zones connected
^ on screenline, not monitored

AADT			DM	DM with CNC	Clearway with CNC	Clearway with CNC (Innes to Bealey & signals)
			NoCNC03	CNC03	CNC04e	CNC04g
			2031			
Screenline	**Location**	**Direction**	**AADT**			
North South 1 (East of Cranford Street/Sherborne Street)	McFaddens Road	EB	1,441	1,689	1,448	1,528
		WB	821	300	288	313
		Total	**2,262**	**1,989**	**1,736**	**1,841**
	Weston Road	EB	246	71	1	9
		WB	285	78	68	89
		Total	**532**	**149**	**69**	**98**
	Knowles St	EB	15	-	-	-
		WB	0	0	-	-
		Total	**15**	**0**	**-**	**-**
	Innes Road	EB	6,076	8,123	6,761	6,895
		WB	6,239	8,904	8,862	8,924
		Total	**12,316**	**17,027**	**15,622**	**15,819**
	Malvern Street	EB	1,120	168	173	235
		WB	1,042	304	20	49
		Total	**2,162**	**472**	**192**	**285**
	Dee Street	EB	262	110	83	99
		WB	960	424	226	278
		Total	**1,222**	**535**	**309**	**377**
	Westminster Street	EB	3,215	2,514	2,302	2,483
		WB	2,568	2,188	2,143	2,345
		Total	**5,784**	**4,702**	**4,445**	**4,828**
	Berwick Street	EB	5,690	5,796	8,302	6,886
		WB	4,877	5,004	8,202	5,496
		Total	**10,567**	**10,800**	**16,505**	**12,381**
	Oxley Avenue (not in model)	EB				
		WB				
		Total	**-**	**-**	**-**	**-**
	Winton Street	EB	480	647	397	545
		WB	1,853	1,515	1,041	1,040
		Total	**2,333**	**2,162**	**1,438**	**1,585**
	Cornwall Street^	EB	53	35	43	46
		WB	950	838	153	819
		Total	**1,003**	**872**	**195**	**864**
	Edgware Road	EB	1,282	2,156	1,820	2,300
		WB	1,362	1,908	1,964	2,743
		Total	**2,644**	**4,064**	**3,783**	**5,043**
	Canon Street	EB	2,065	1,841	1,772	1,387
		WB	2,867	2,863	2,196	2,831
		Total	**4,931**	**4,704**	**3,969**	**4,218**
	Purchas Street	EB	2,610	2,357	2,896	1,993
		WB	4,039	3,887	3,688	3,028
		Total	**6,649**	**6,245**	**6,584**	**5,021**
North South 2 (West of Cranford Street/Sherborne Street)	McFaddens Road*	EB	1,785	4,238	4,297	4,231
		WB	2,048	1,434	1,550	1,423
		Total	**3,833**	**5,672**	**5,848**	**5,653**
	Weston Road*	EB	444	2,871	2,916	2,907
		WB	176	44	52	47
		Total	**620**	**2,915**	**2,968**	**2,954**
	Knowles St*	EB	24	899	770	717
		WB	15	-	-	-
		Total	**39**	**899**	**770**	**717**
	Innes Road	EB	6,568	6,239	5,977	6,103
		WB	7,314	9,688	9,472	9,389
		Total	**13,882**	**15,928**	**15,449**	**15,492**
	Malvern Street	EB	2,099	2,066	1,843	1,723
		WB	666	1,159	700	631
		Total	**2,765**	**3,225**	**2,544**	**2,354**
	Westminster Street	EB	534	775	757	698
		WB	539	610	615	581
		Total	**1,073**	**1,386**	**1,372**	**1,279**
	Courtenay Street	EB	3,236	3,630	3,626	3,680
		WB	5,103	5,505	5,135	5,108
		Total	**8,339**	**9,134**	**8,760**	**8,788**
	Edgware Road	EB	1,170	1,417	1,357	1,732
		WB	2,298	2,508	2,829	2,355
		Total	**3,468**	**3,926**	**4,186**	**4,087**
	Canon Street	EB	2,420	2,029	2,335	1,477
		WB	2,168	2,003	2,038	1,582
		Total	**4,587**	**4,033**	**4,373**	**3,058**
	Purchas Street	EB	5,467	5,414	5,299	4,669
		WB	2,349	1,988	2,509	1,384
		Total	**7,816**	**7,402**	**7,808**	**6,053**
	Rutland Street	NB	2,253	4,411	4,297	4,285
		SB	2,097	2,205	2,264	2,285

East West 1 (North of Innes Road)		**Total**	**4,350**	**6,615**	**6,561**	**6,570**
	Cranford Street	NB	10,728	18,475	19,069	18,738
		SB	10,852	21,773	22,283	22,287
		Total	**21,580**	**40,249**	**41,353**	**41,025**
	Jameson Avenue	NB	1,351	926	933	929
		SB	1,614	1,694	1,500	1,559
		Total	**2,965**	**2,620**	**2,433**	**2,488**
	Nancy Avenue	NB	289	233	182	235
		SB	347	332	252	235
		Total	**636**	**565**	**433**	**470**
	Philpotts Road	NB	1,726	1,994	1,872	1,825
		SB	1,354	176	162	153
		Total	**3,081**	**2,170**	**2,035**	**1,978**
East West 2 (South of Innes Road)	Papanui Road	NB	9,763	9,805	9,647	9,710
		SB	8,819	8,621	8,565	8,566
		Total	**18,582**	**18,426**	**18,212**	**18,275**
	Browns Road	NB	1,681	1,414	1,349	1,349
		SB	1,731	1,642	1,525	1,528
		Total	**3,412**	**3,056**	**2,875**	**2,877**
	Somme Street*	NB	1,277	1,306	1,150	1,026
		SB	1,287	1,637	1,551	1,470
		Total	**2,563**	**2,944**	**2,702**	**2,495**
	Rutland Street	NB	3,164	3,576	3,391	3,391
		SB	1,929	2,046	2,061	1,980
		Total	**5,093**	**5,622**	**5,452**	**5,371**
	Gosset Street (not in model)	NB				
		SB				
		Total	-	-	-	-
	Carrington Street	NB	38	110	110	85
		SB	209	616	348	298
		Total	**246**	**726**	**459**	**382**
	Jacobs Street (not in model)	NB				
		SB				
		Total	-	-	-	-
	Roosevelt Avenue	NB	435	174	298	243
		SB	2,436	2,984	2,180	2,242
		Total	**2,871**	**3,158**	**2,478**	**2,484**
	Cranford Street	NB	10,013	12,033	13,399	13,186
		SB	8,906	10,877	14,274	14,344
		Total	**18,918**	**22,910**	**27,673**	**27,530**
	Mersey Street*	NB	9	1,900	1,919	2,024
		SB	275	1,438	1,053	1,084
		Total	**284**	**3,338**	**2,972**	**3,108**
	Severn Street	NB	475	868	536	508
		SB	400	1,186	350	419
		Total	**875**	**2,055**	**886**	**927**
	Thames Street	NB	561	589	473	503
		SB	481	816	523	650
		Total	**1,042**	**1,404**	**996**	**1,153**
	Francis Avenue	NB	581	360	211	283
		SB	869	289	142	115
		Total	**1,450**	**649**	**353**	**398**
	Kensington Avenue	NB	1,556	2,129	2,160	2,112
		SB	1,169	1,080	1,066	1,066
		Total	**2,725**	**3,210**	**3,226**	**3,178**
	Mahars Road	NB	713	640	630	614
		SB	679	719	726	705
		Total	**1,392**	**1,359**	**1,356**	**1,319**
	Manuka Street^	NB	110	66	44	1
		SB	0	0	0	0
		Total	**110**	**66**	**44**	**1**
	Hills Road	NB	5,818	4,903	4,938	5,013
		SB	6,058	5,890	5,847	5,964
		Total	**11,876**	**10,793**	**10,785**	**10,977**
est 3 bans Road)	Bristol Street	NB	972	1,070	851	874
		SB	1,887	2,283	2,052	1,876
		Total	**2,859**	**3,353**	**2,903**	**2,750**
	Gordon Avenue (not in model)	NB				
		SB				
		Total	-	-	-	-
	Abberley Crescent	NB	733	924	899	882
		SB	373	378	380	381
		Total	**1,106**	**1,302**	**1,278**	**1,263**
	Albany Street (not in model)	NB				
		SB				
		Total	-	-	-	-
	Springfield Road	NB	6,216	6,313	6,127	6,016
		SB	8,384	8,861	8,338	8,281
		Total	**14,600**	**15,174**	**14,465**	**14,296**
	Trafalgar Street*	NB	395	408	398	397
		SB	541	568	545	538
		Total	**935**	**976**	**943**	**935**
		NB	11,411	12,471	14,067	13,766

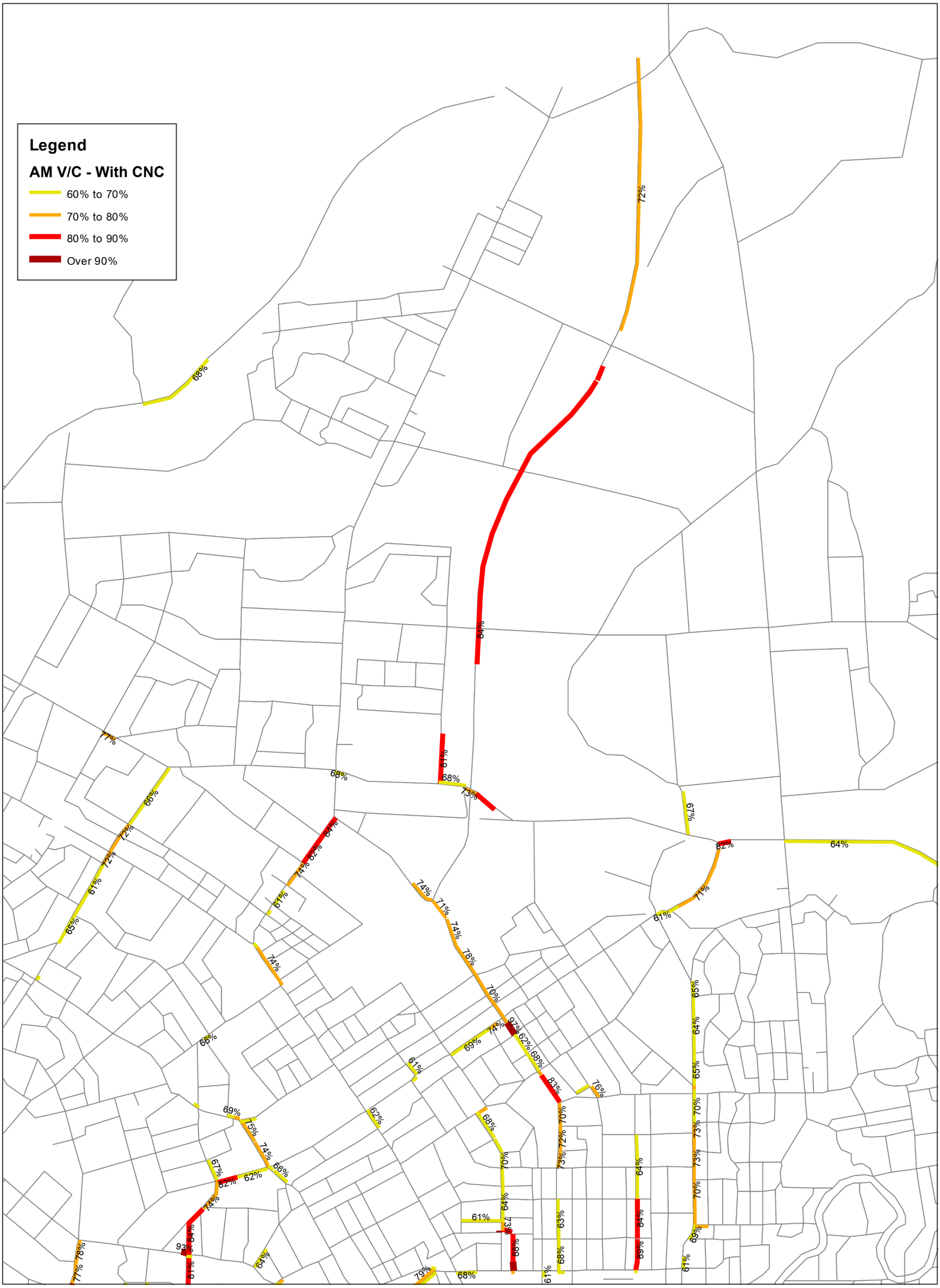
East We (South of St Al	Cranford Street	SB	10,483	12,403	15,439	15,652
		Total	**21,894**	**24,874**	**29,506**	**29,419**
	Mersey Street*	NB	599	2,260	1,942	2,089
		SB	336	1,344	1,005	1,079
		Total	**935**	**3,603**	**2,947**	**3,168**
	Forfar Street*	NB	3,831	2,267	2,454	2,120
		SB	1,695	2,141	1,121	1,217
		Total	**5,526**	**4,408**	**3,575**	**3,337**
	Mayfield Avenue (not in model)	NB				
		SB				
		Total	-	-	-	-
	Francis Avenue	NB	269	422	141	219
		SB	1,629	478	172	210
		Total	**1,899**	**899**	**313**	**430**
	Flockton Street*	NB	46	77	72	60
		SB	1,105	1,208	1,255	1,102
		Total	**1,151**	**1,285**	**1,328**	**1,162**
	Aylesford Street	NB	1,556	1,982	2,049	2,018
		SB	1,099	1,029	1,079	1,080
		Total	**2,655**	**3,011**	**3,128**	**3,098**
East West 4 (South of Berwick Street)	Cranford Street	NB	8,887	9,372	7,201	9,870
		SB	7,097	8,458	8,419	10,313
		Total	**15,984**	**17,830**	**15,620**	**20,183**
	Forfar Street	NB	6,102	6,531	11,173	7,778
		SB	4,550	4,710	2,500	3,954
		Total	**10,652**	**11,241**	**13,673**	**11,732**
	Barbadoes Street	NB	2,432	2,441	1,172	1,311
		SB	6,110	6,329	11,108	7,012
		Total	**8,542**	**8,770**	**12,280**	**8,323**
	Geraldine Street*	NB	35	36	78	217
		SB	29	51	9	11
		Total	**64**	**87**	**87**	**227**
	Cleveland Street	NB				
		SB				
		Total	-	-	-	-
	Woodville Street	NB				
		SB				
		Total	-	-	-	-
	Hills Road	NB	9,060	8,926	8,675	8,879
		SB	9,167	8,942	8,170	8,835
		Total	**18,228**	**17,868**	**16,846**	**17,714**

Insightful solutions. Empowering advice.

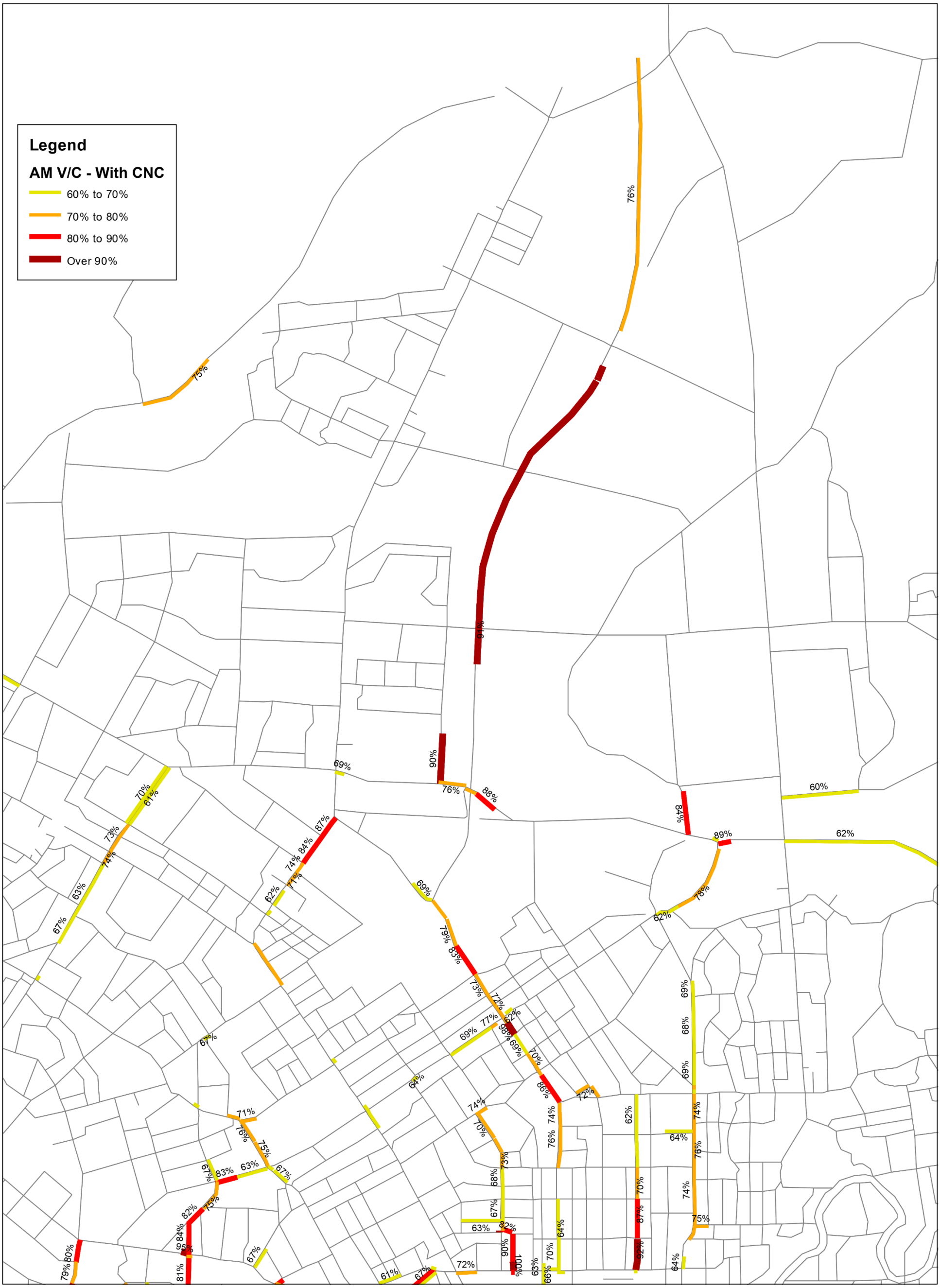
V/C Ratios and Delay for Key Intersections

Appendix D

Issue Date:
10 May 2019

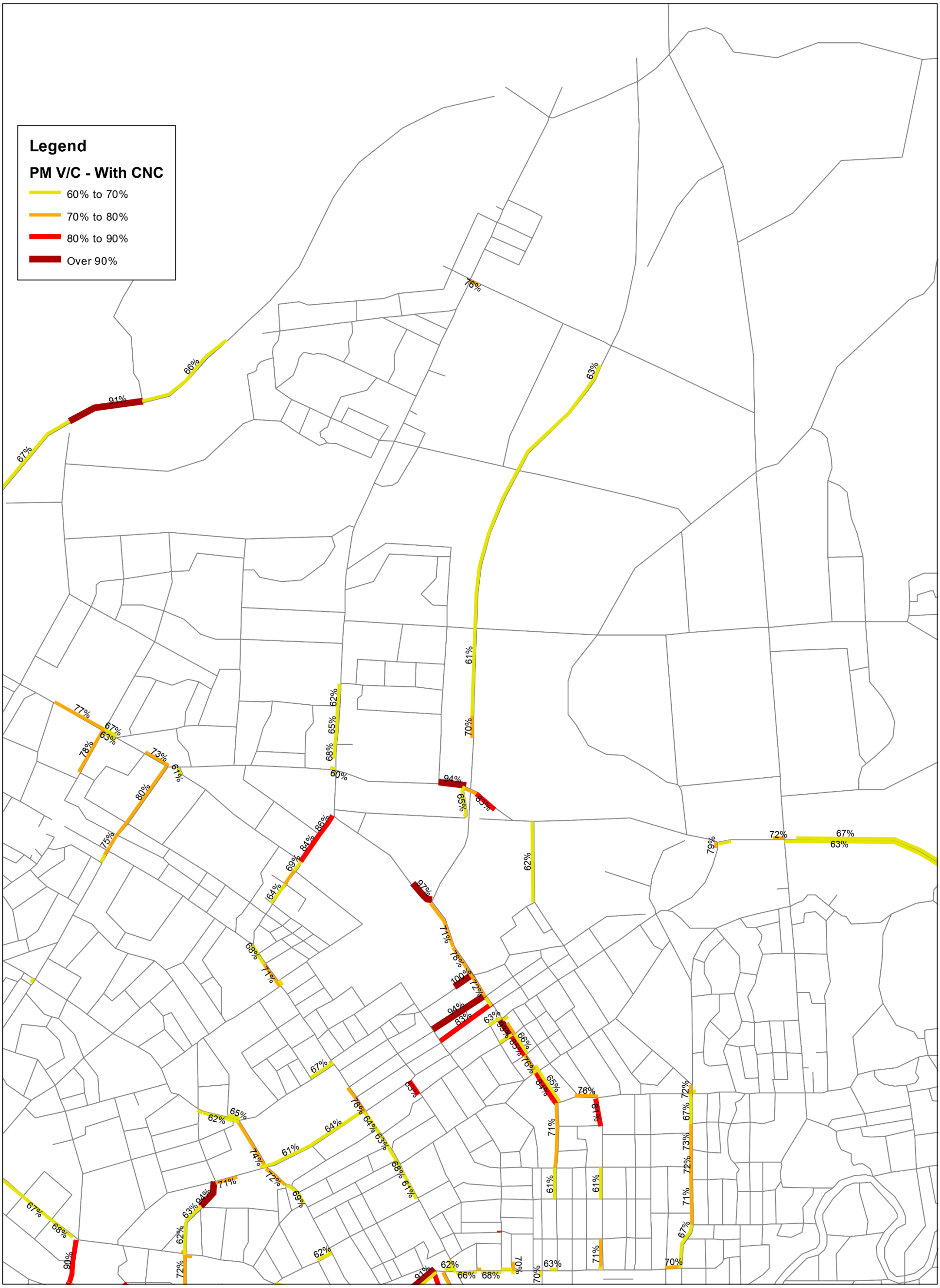


Year 2021: Volume/Capacity Ratio - Option CNC03
(V/C less than 60% are not shown on the plot)

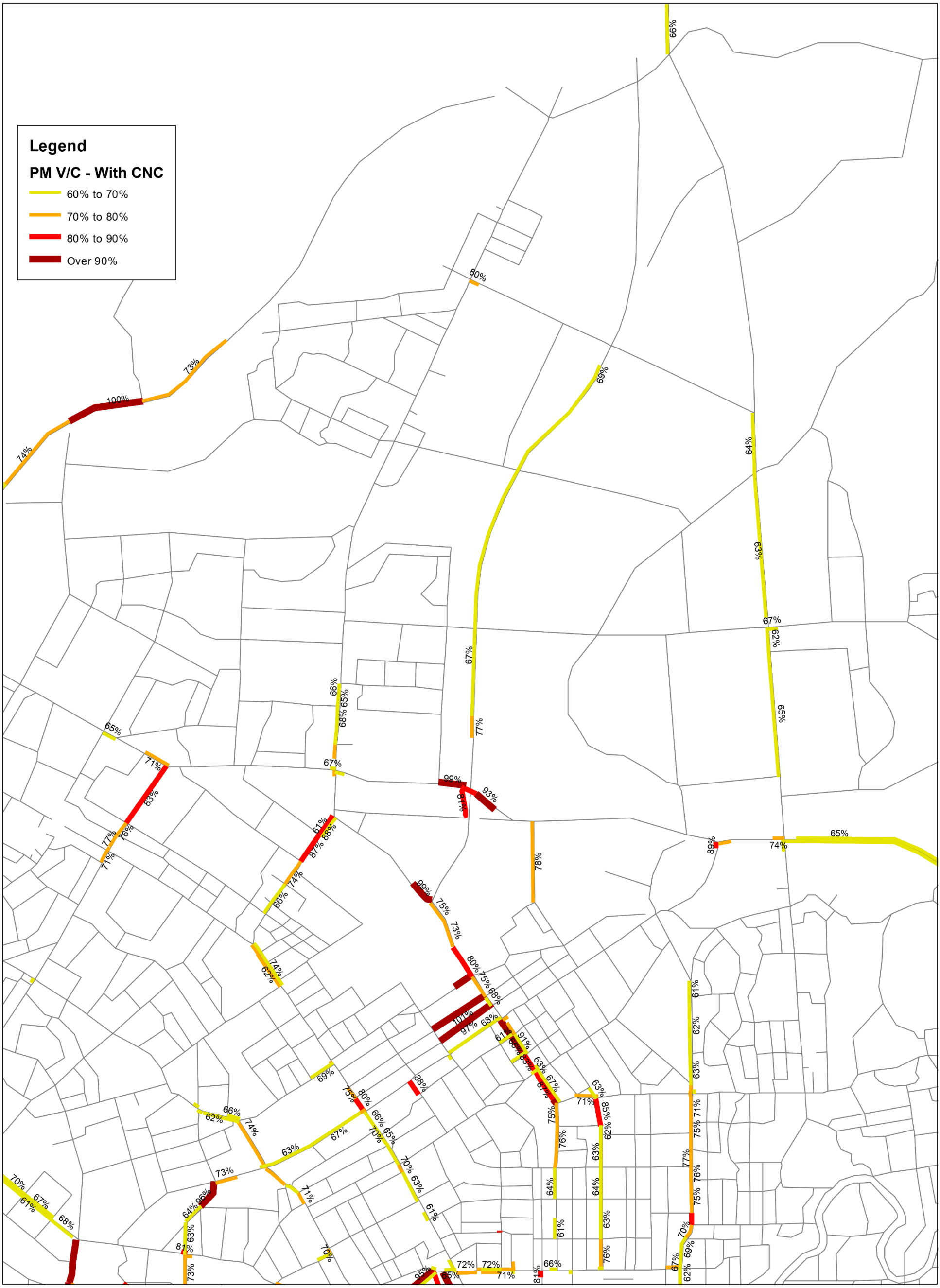


Year 2031: Volume/Capacity Ratio - Option CNC03
(V/C less than 60% are not shown on the plot)

Christchurch City Council



Year 2021: Volume/Capacity Ratio - Option CNC03
(V/C less than 60% are not shown on the plot)



Year 2031: Volume/Capacity Ratio - Option CNC03
(V/C less than 60% are not shown on the plot)

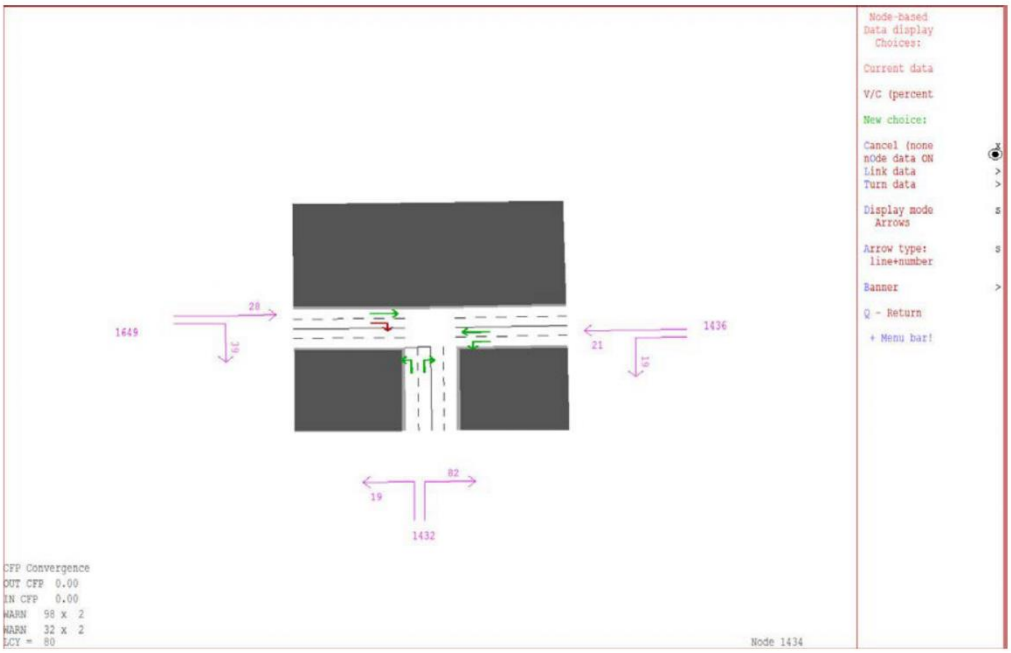


Figure 1: Barbadoes / Warrington Intersection, 2021 PM peak CNC03

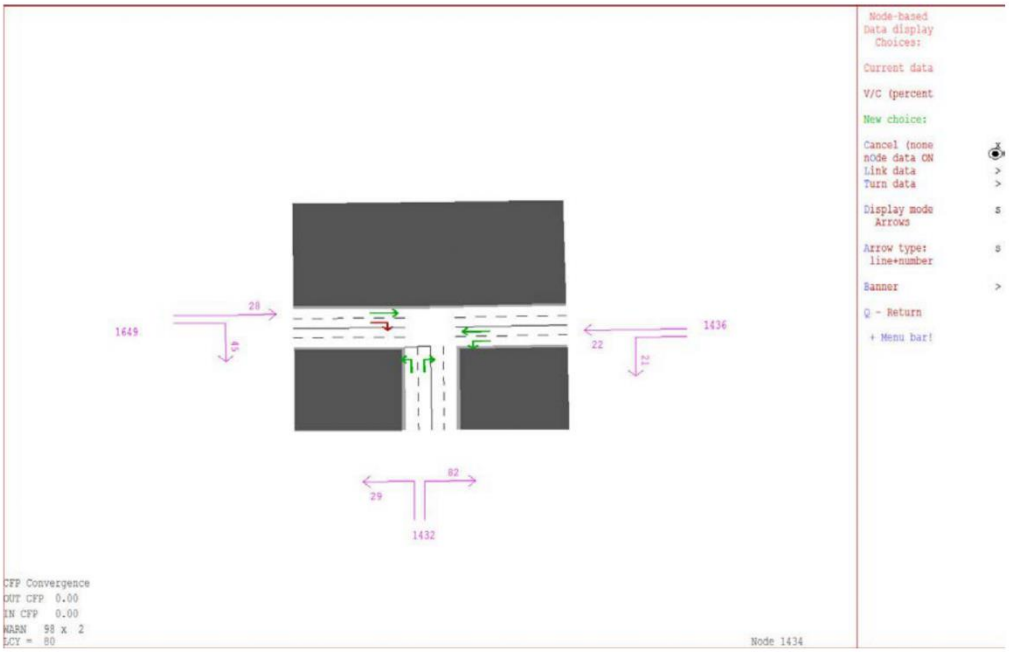


Figure 2: Barbadoes / Warrington Intersection, 2031 PM peak CNC03

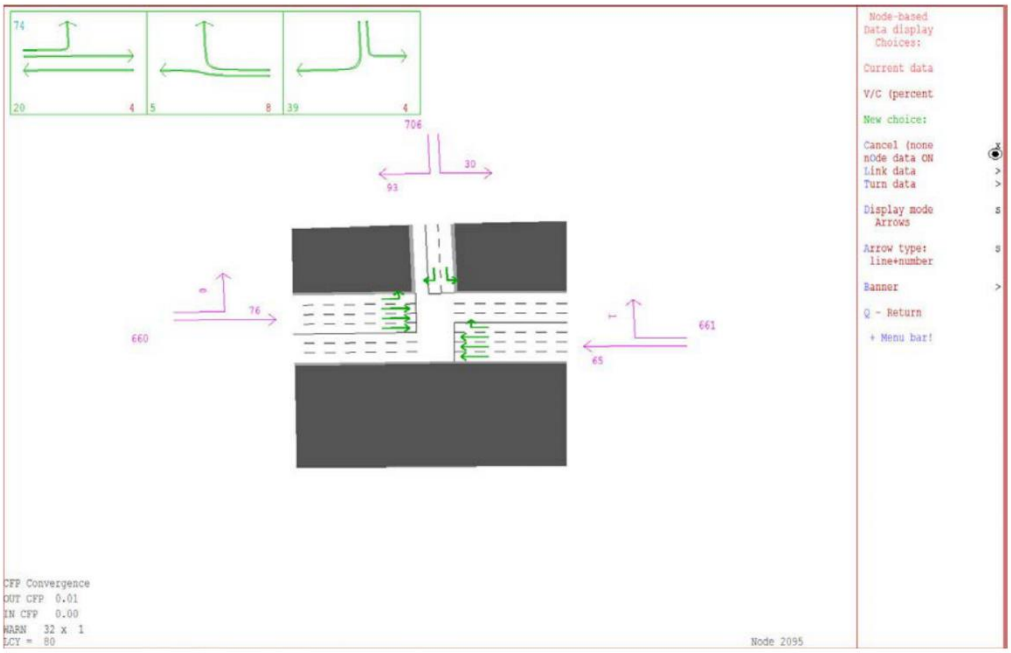


Figure 3: Bealey / Sherborne Intersection, 2021 AM peak CNC03

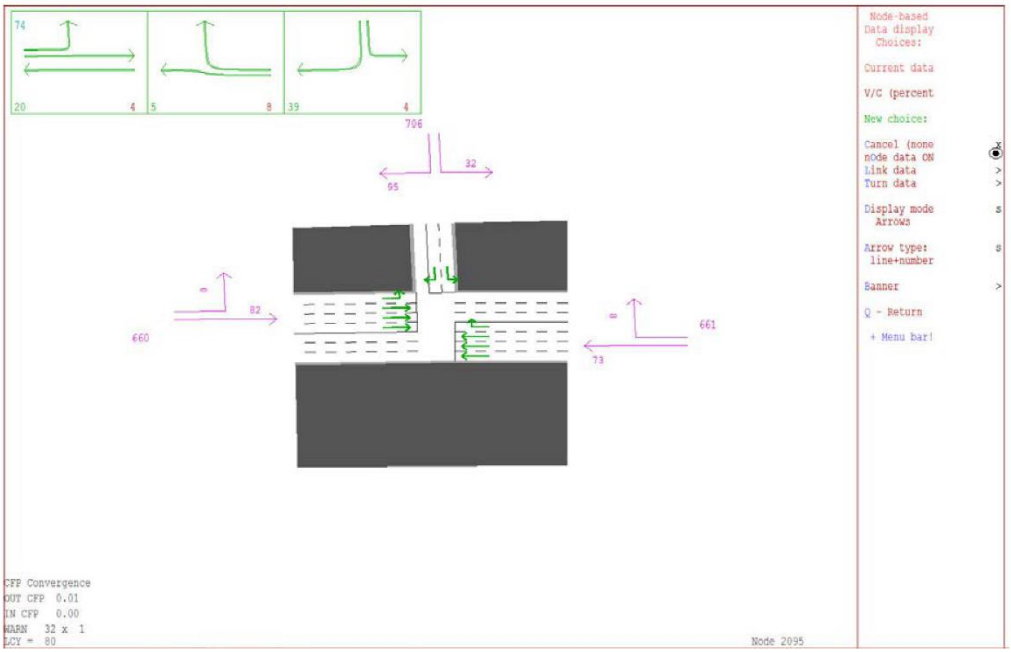


Figure 4: Bealey / Sherborne Intersection, 2031 AM peak CNC03

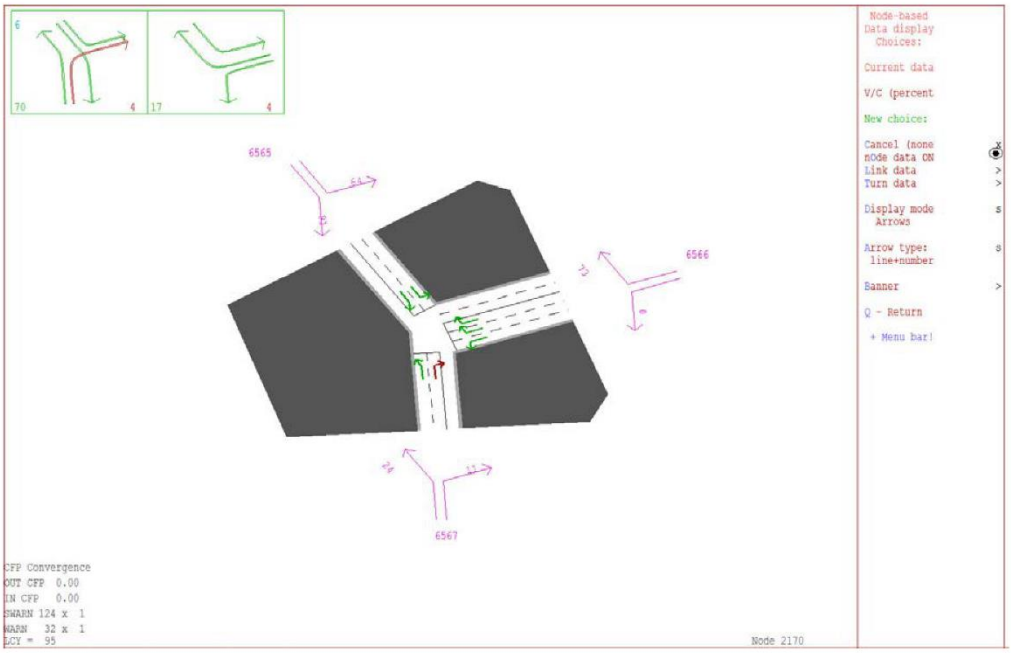


Figure 5: Berwick / Cranford Intersection, 2021 AM peak CNC04e

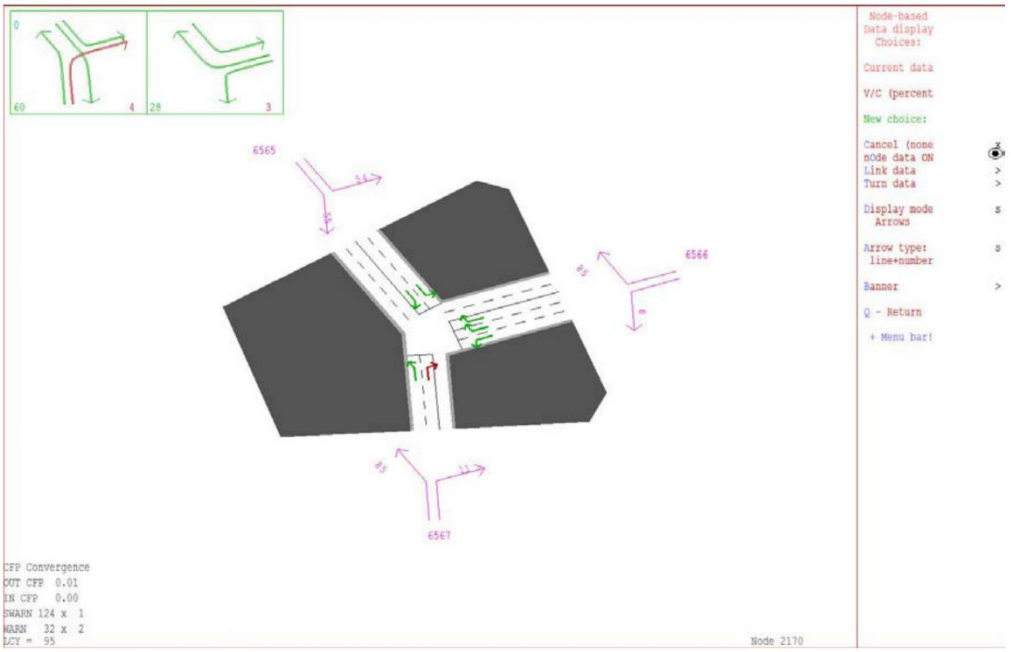


Figure 6: Berwick / Cranford Intersection, 2021 PM peak CNC04e

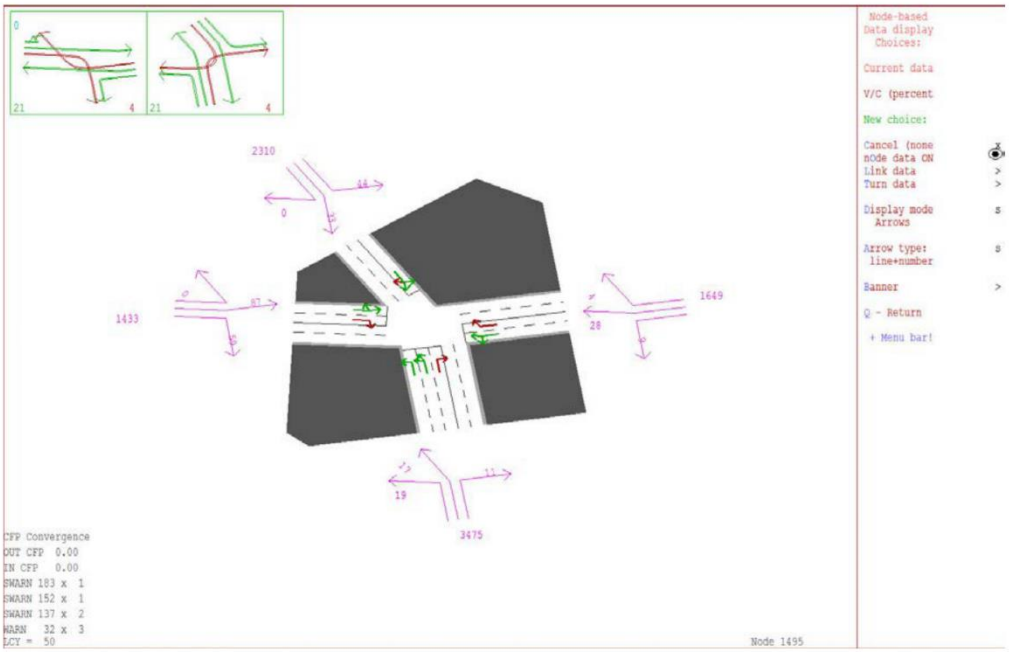


Figure 7: Forfar / Warrington Intersection, 2021 AM peak CNC04e

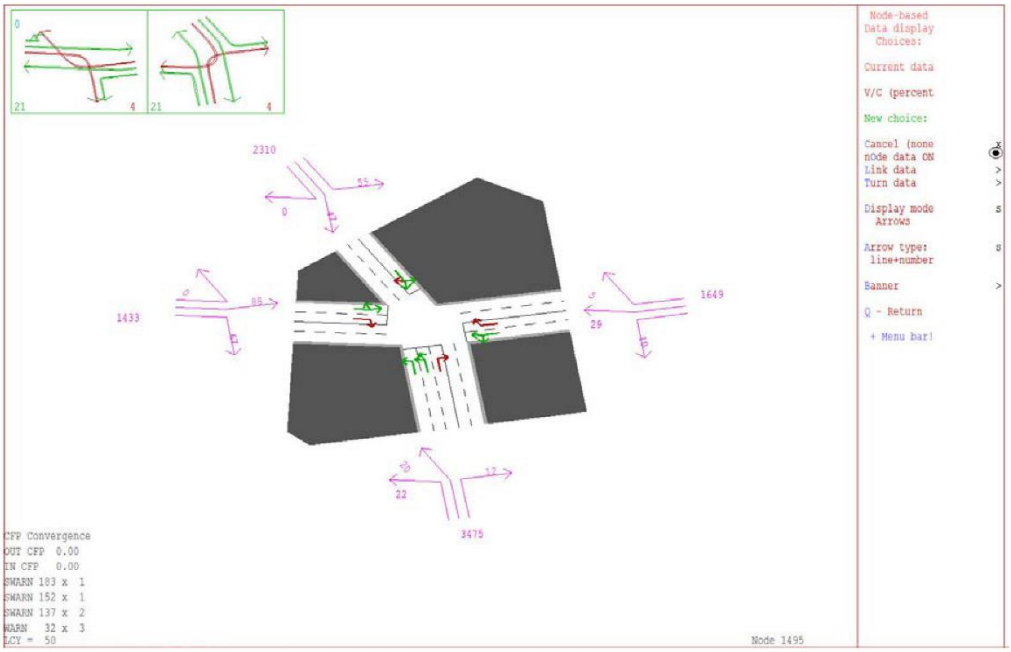


Figure 8: Forfar / Warrington Intersection, 2031 AM peak CNC04e

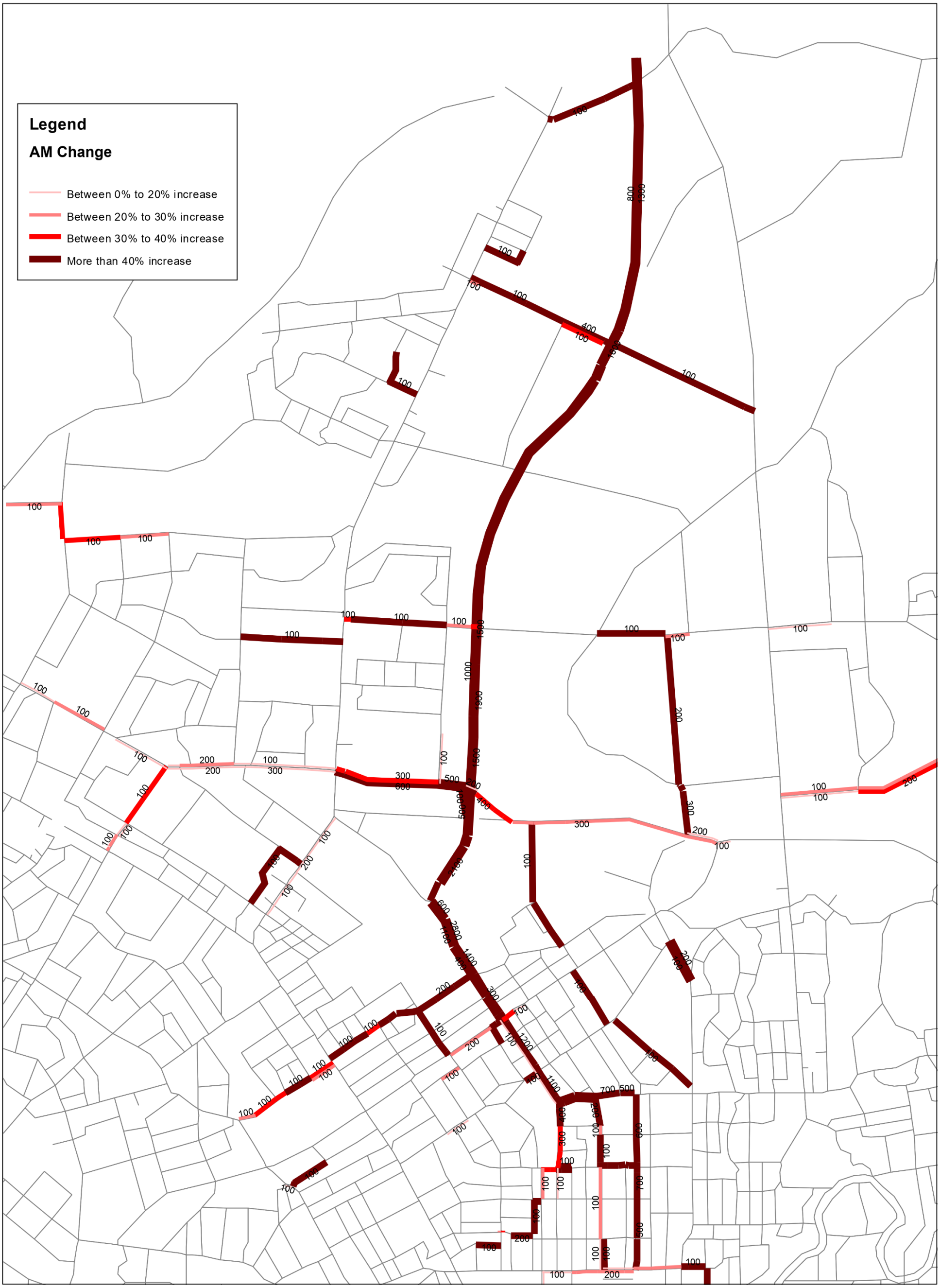
Insightful solutions. Empowering advice.

Change Flow Plots with Arterial Upgrades

Appendix D

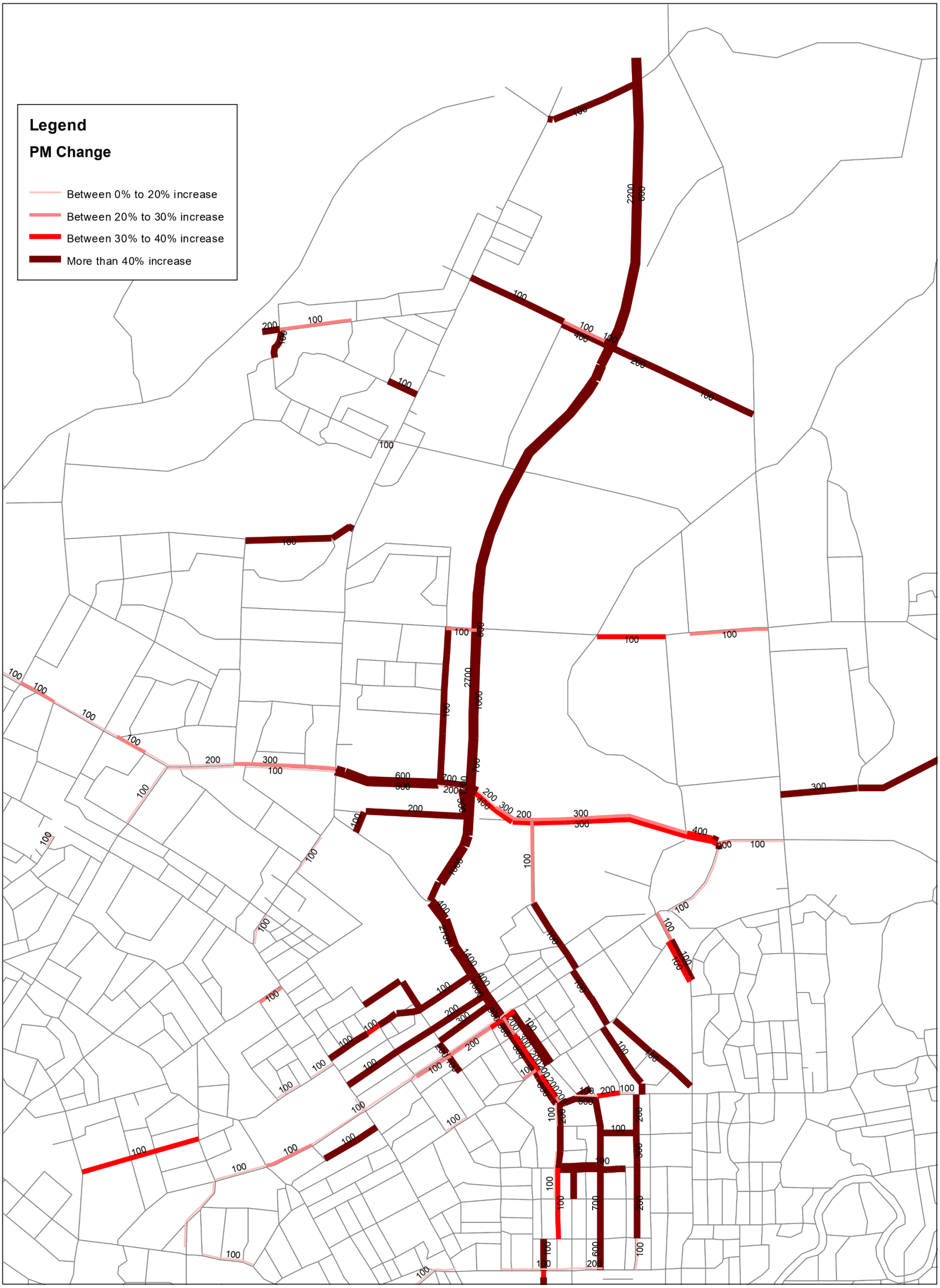
Issue Date:
10 May 2019

Christchurch City Council



Year 2021: Hourly Traffic Volume Difference (PCUs) - with/without CNC
CNC04e vs NoCNC03 (Differences less than 50 pcu/h are not shown on the plot)

Christchurch City Council



Year 2021: Hourly Traffic Volume Difference (PCUs) - with/without CNC
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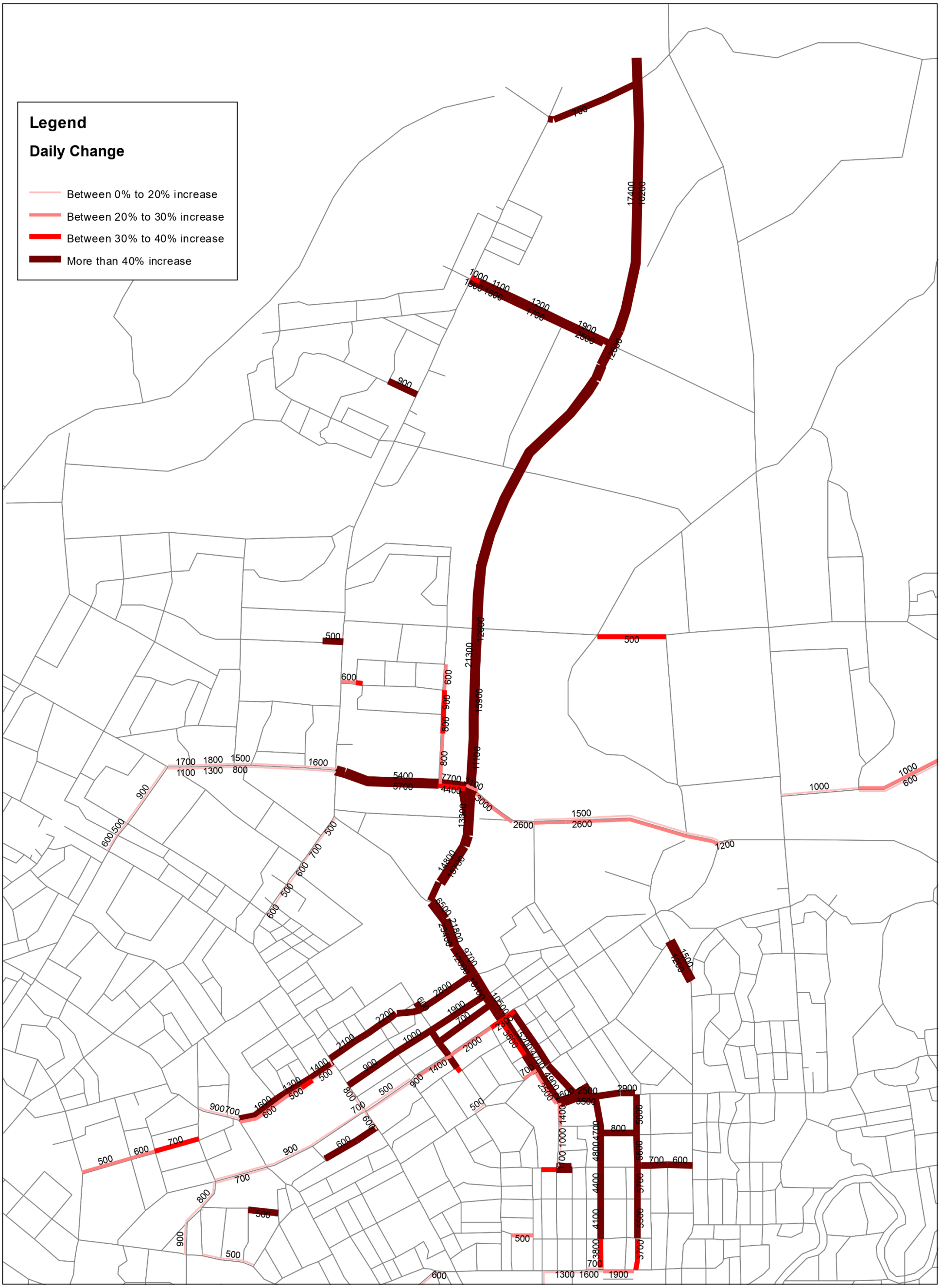
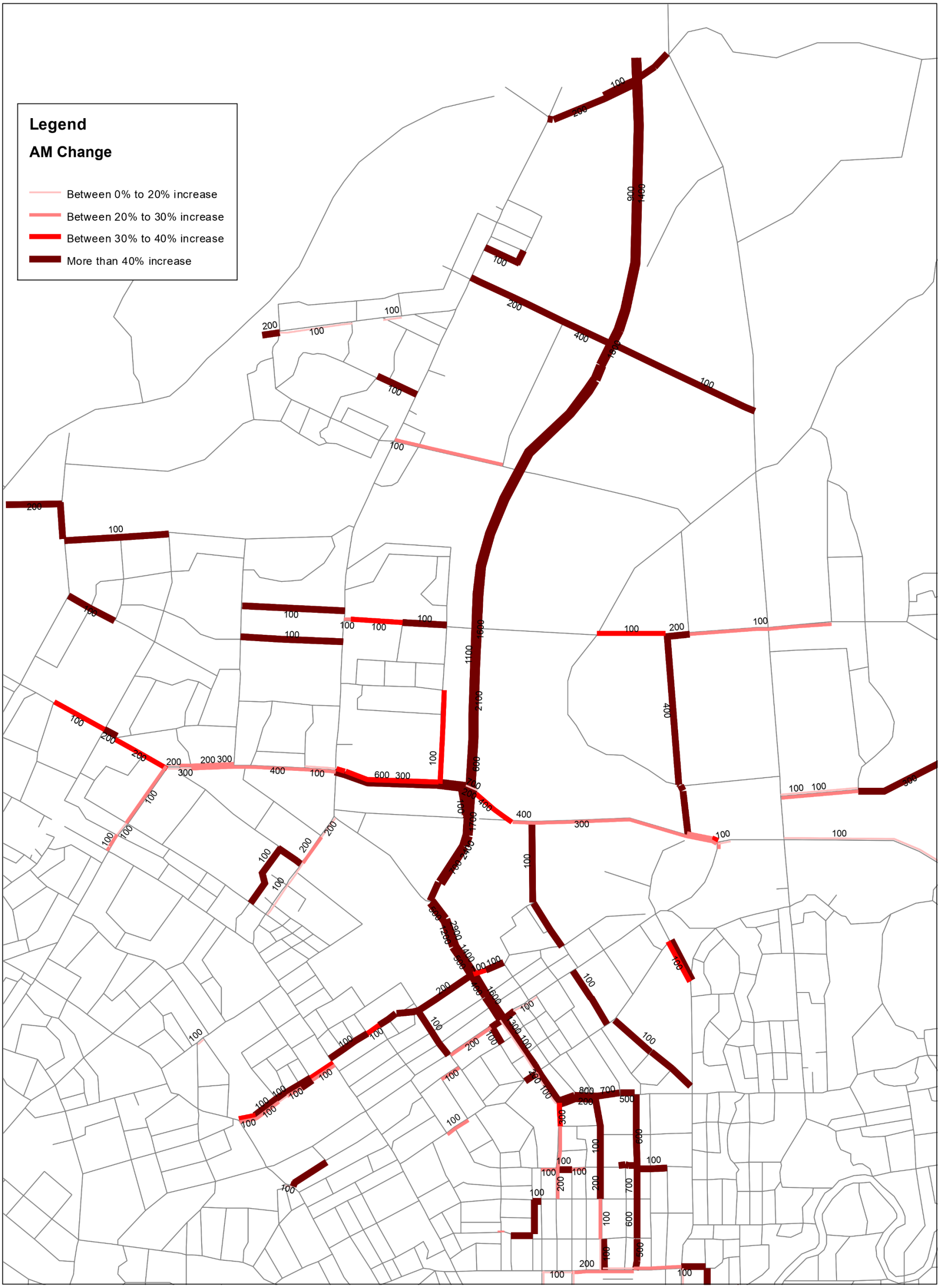
Christchurch City Council



Year 2021: Daily Traffic Volume Difference - with/without CNC
CNC04e vs NoCNC03 (Differences less than 500 vpd are not shown on the plot)



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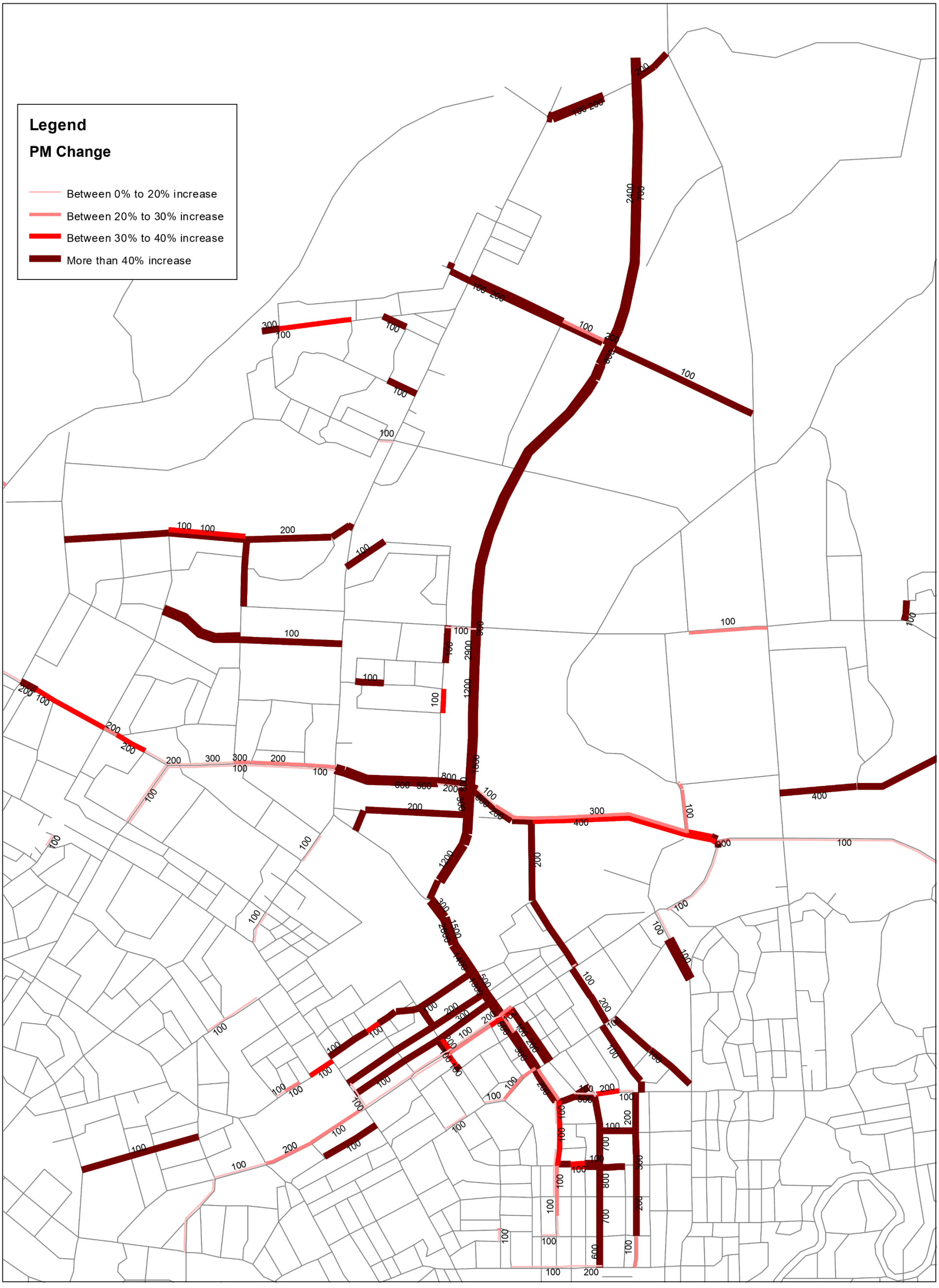
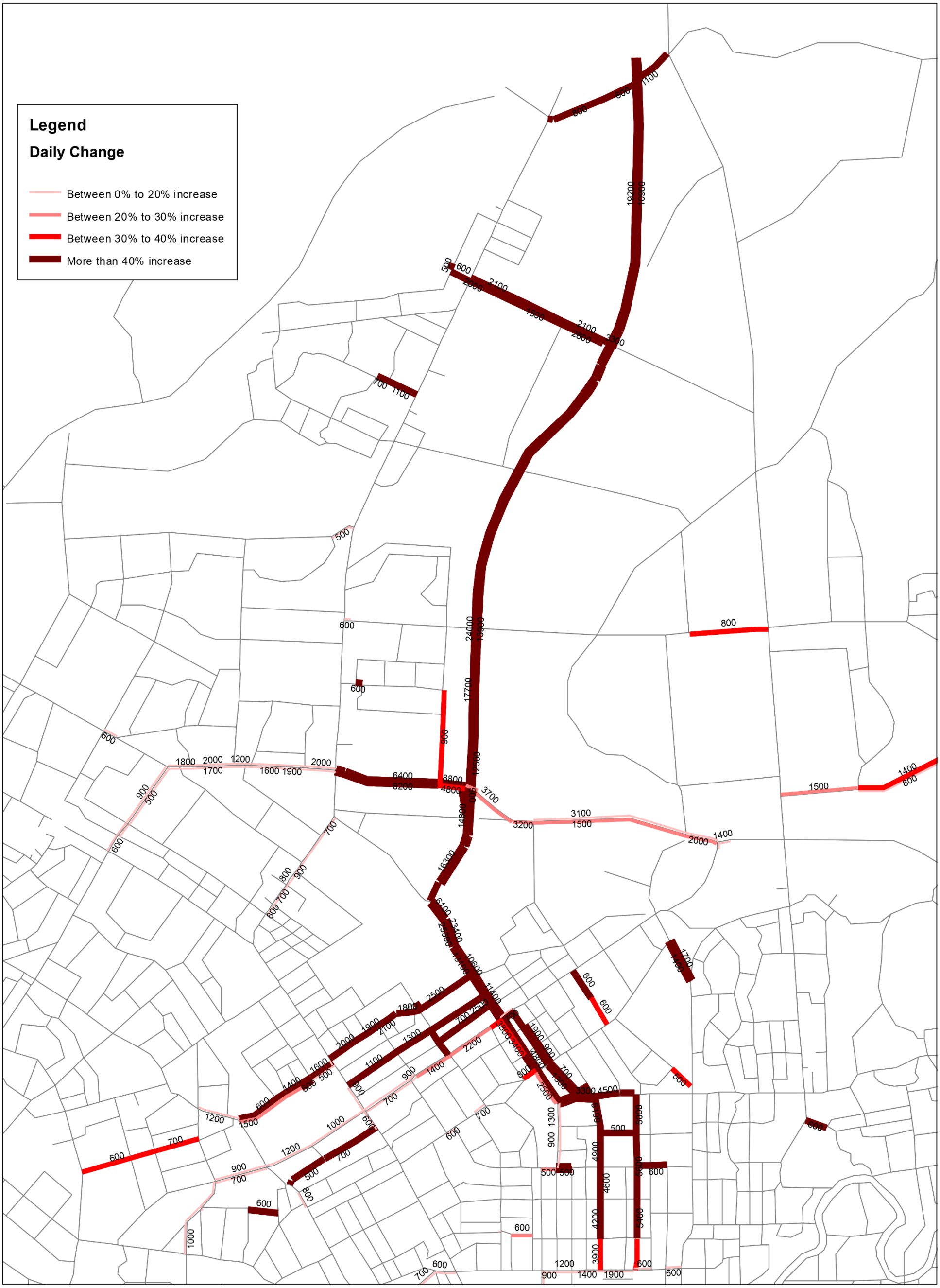
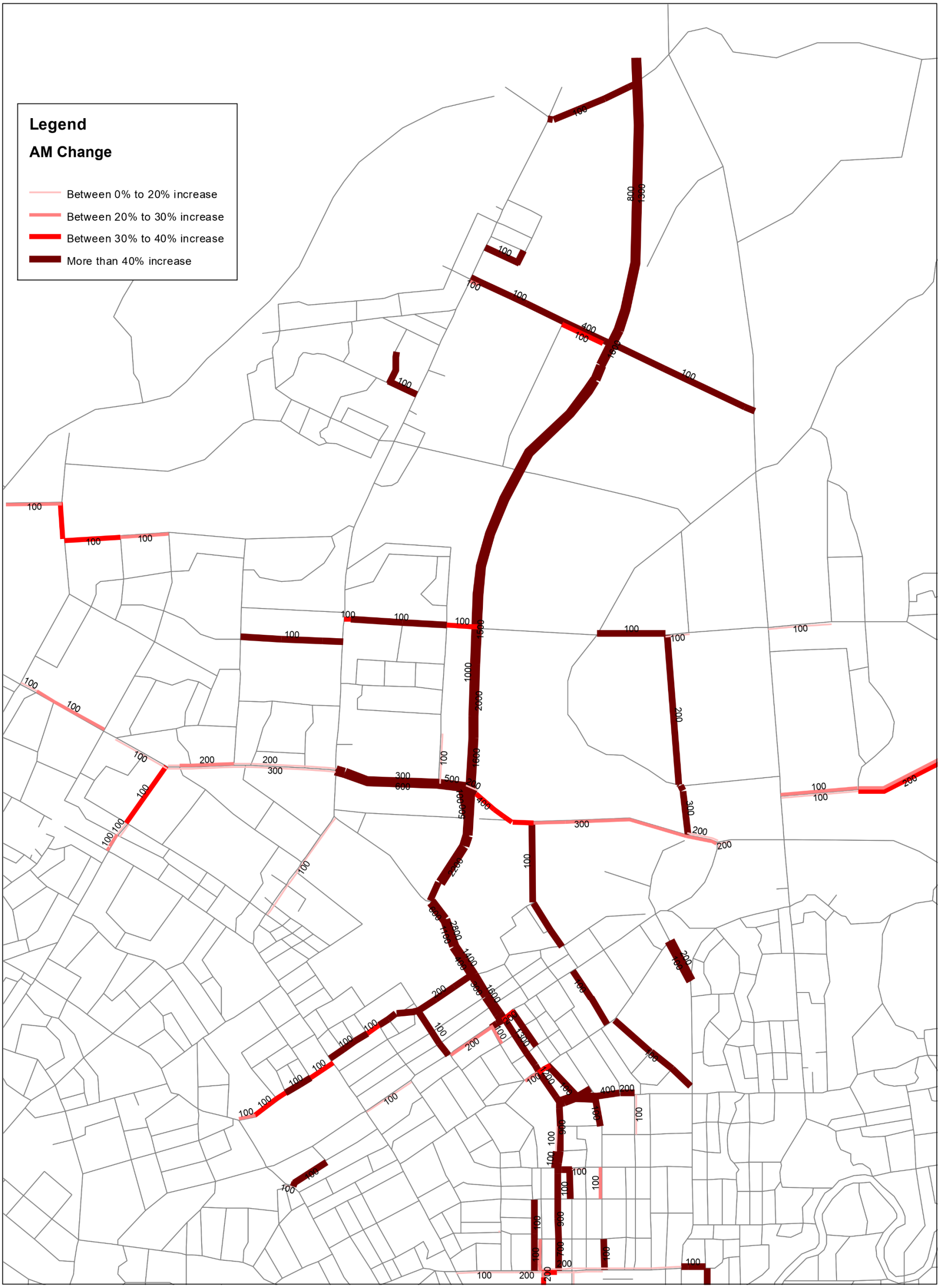
CNC04e vs NoCNC03 (Differences less than 50 pcu/h are not shown on the plot)



Year 2031: Hourly Traffic Volume Difference (PCUs) - with/without CNC
CNC04e vs NoCNC03 (Differences less than 50 pcu/h are not shown on the plot)

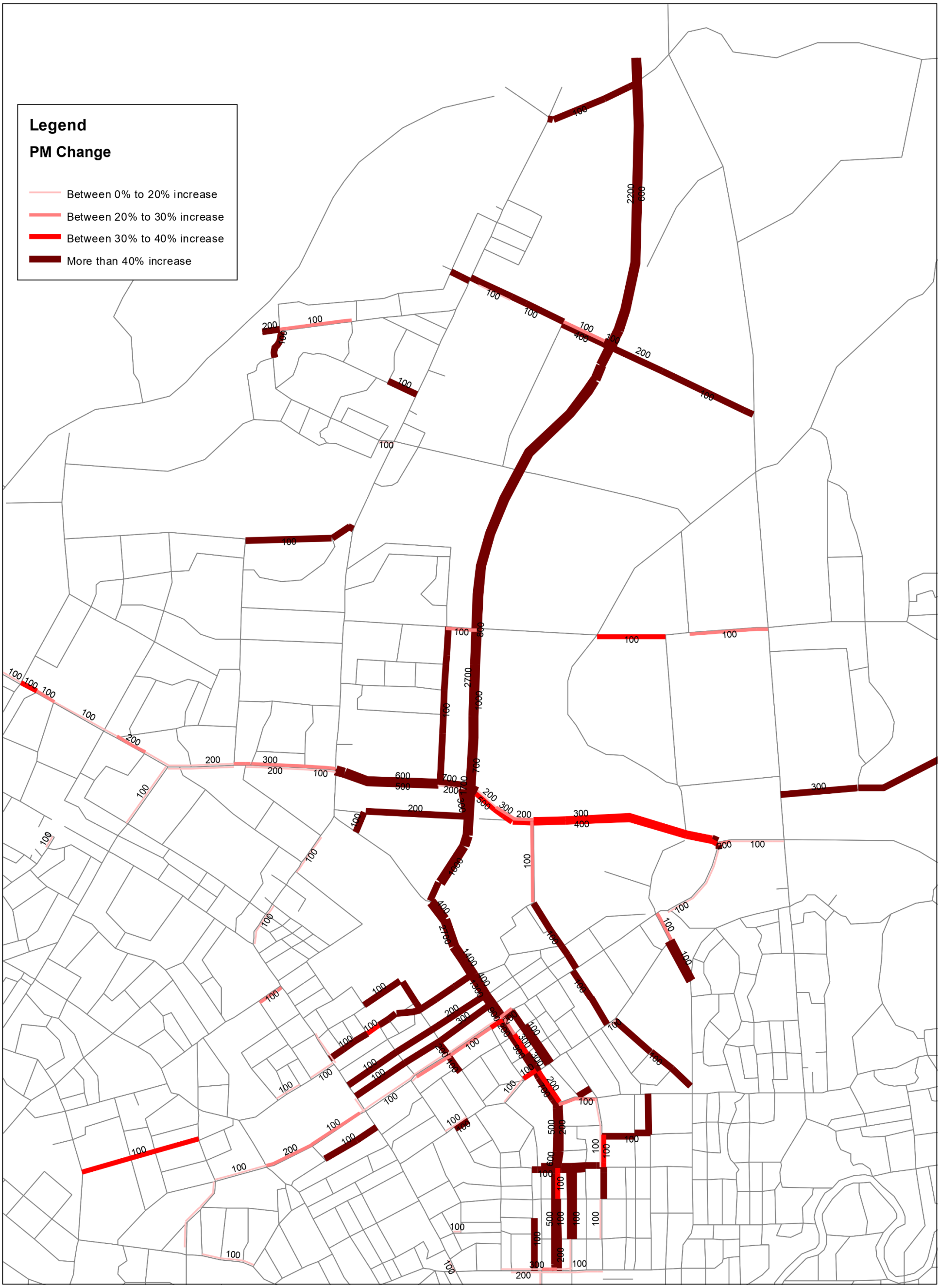


Year 2031: Daily Traffic Volume Difference - with/without CNC
CNC04e vs NoCNC03 (Differences less than 500 vpd are not shown on the plot)



Year 2021: Hourly Traffic Volume Difference (PCUs) - with/without CNC
CNC04g vs NoCNC03 (Differences less than 50 pcu/h are not shown on the plot)

Christchurch City Council



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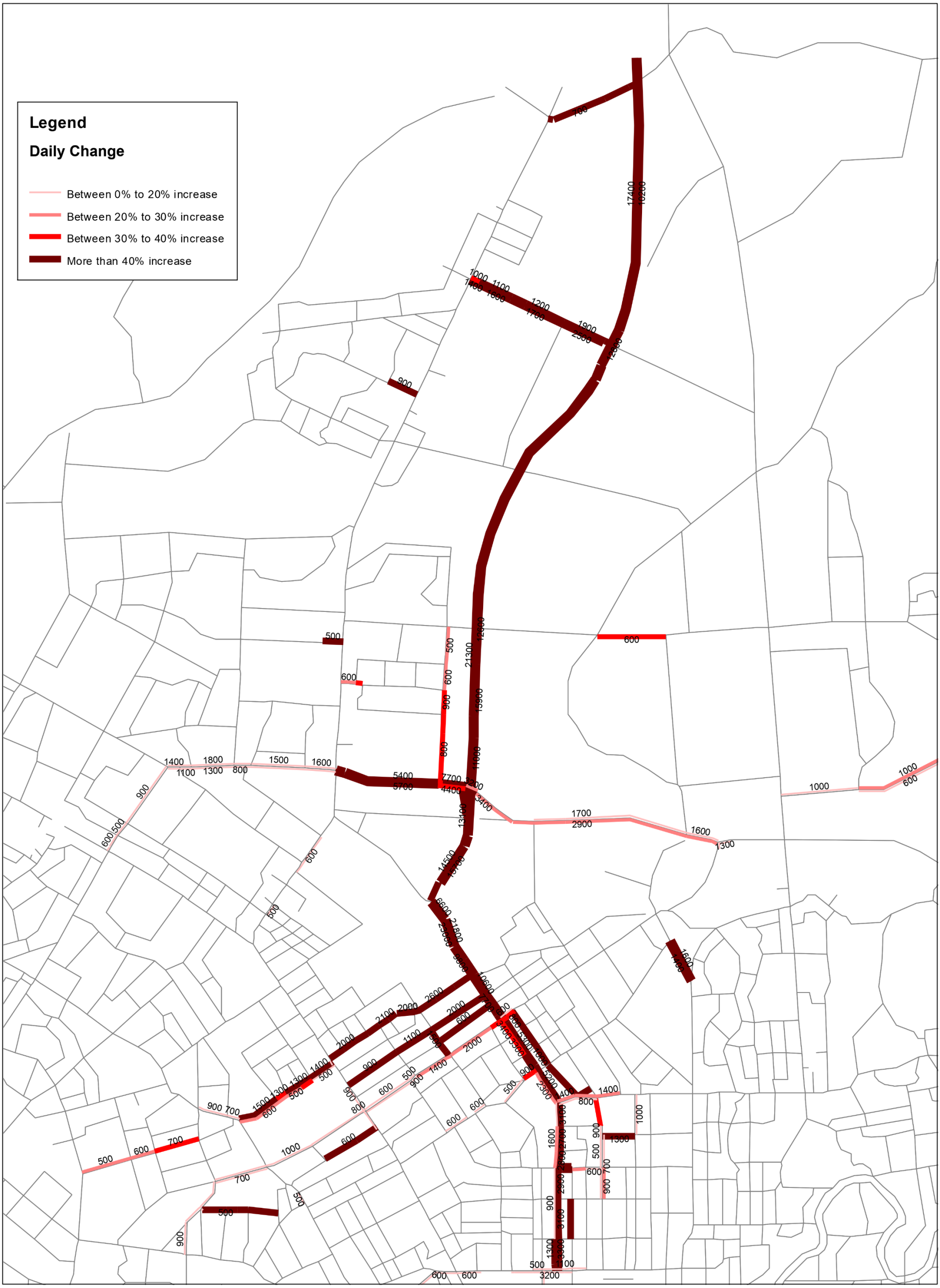
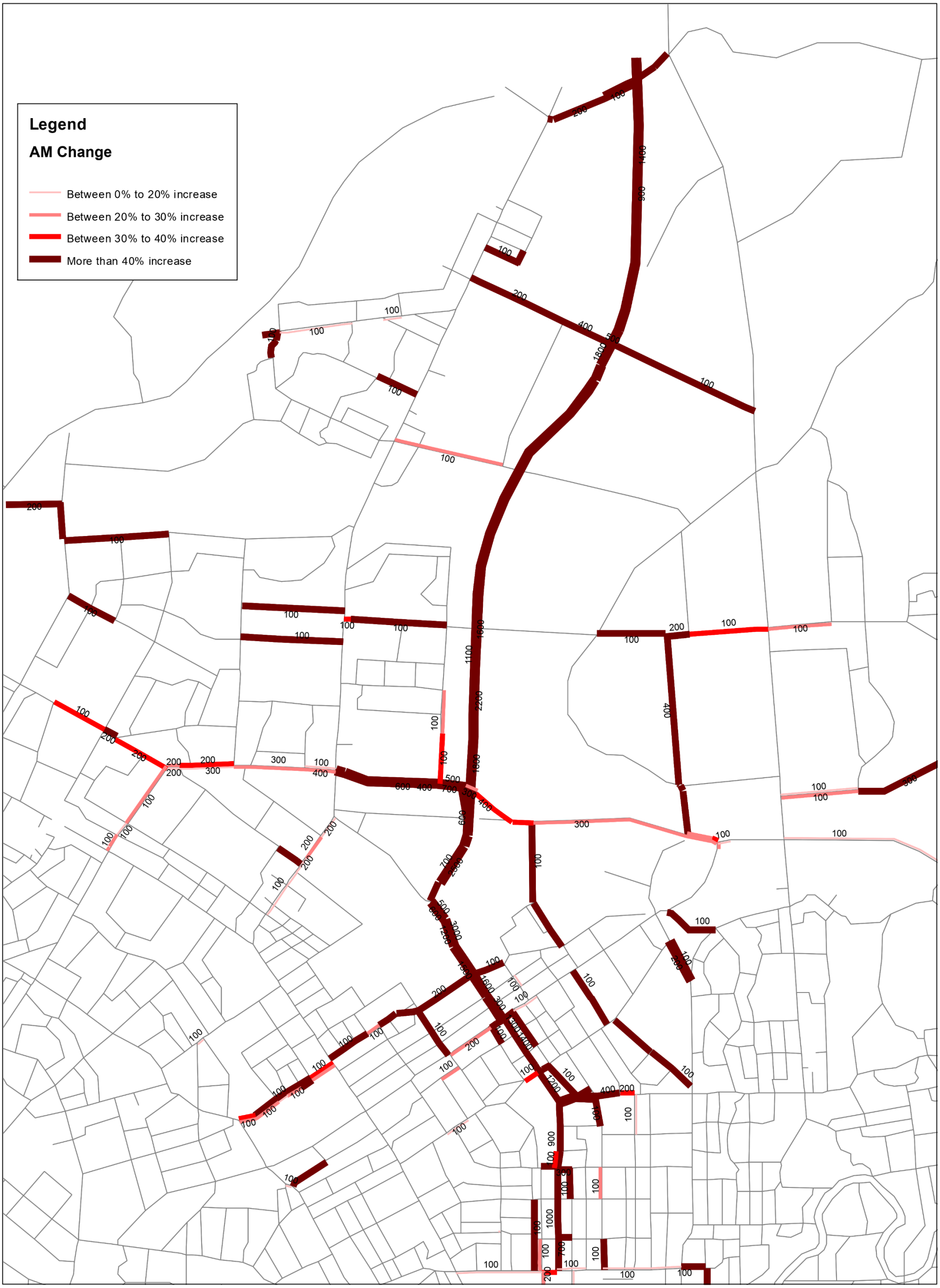
CNC04g vs NoCNC03 (Differences less than 50 pcu/h are not shown on the plot)



Year 2021: Daily Traffic Volume Difference - with/without CNC
CNC04g vs NoCNC03 (Differences less than 500 vpd are not shown on the plot)

Christchurch City Council



Year 2031: Hourly Traffic Volume Difference (PCUs) - with/without CNC
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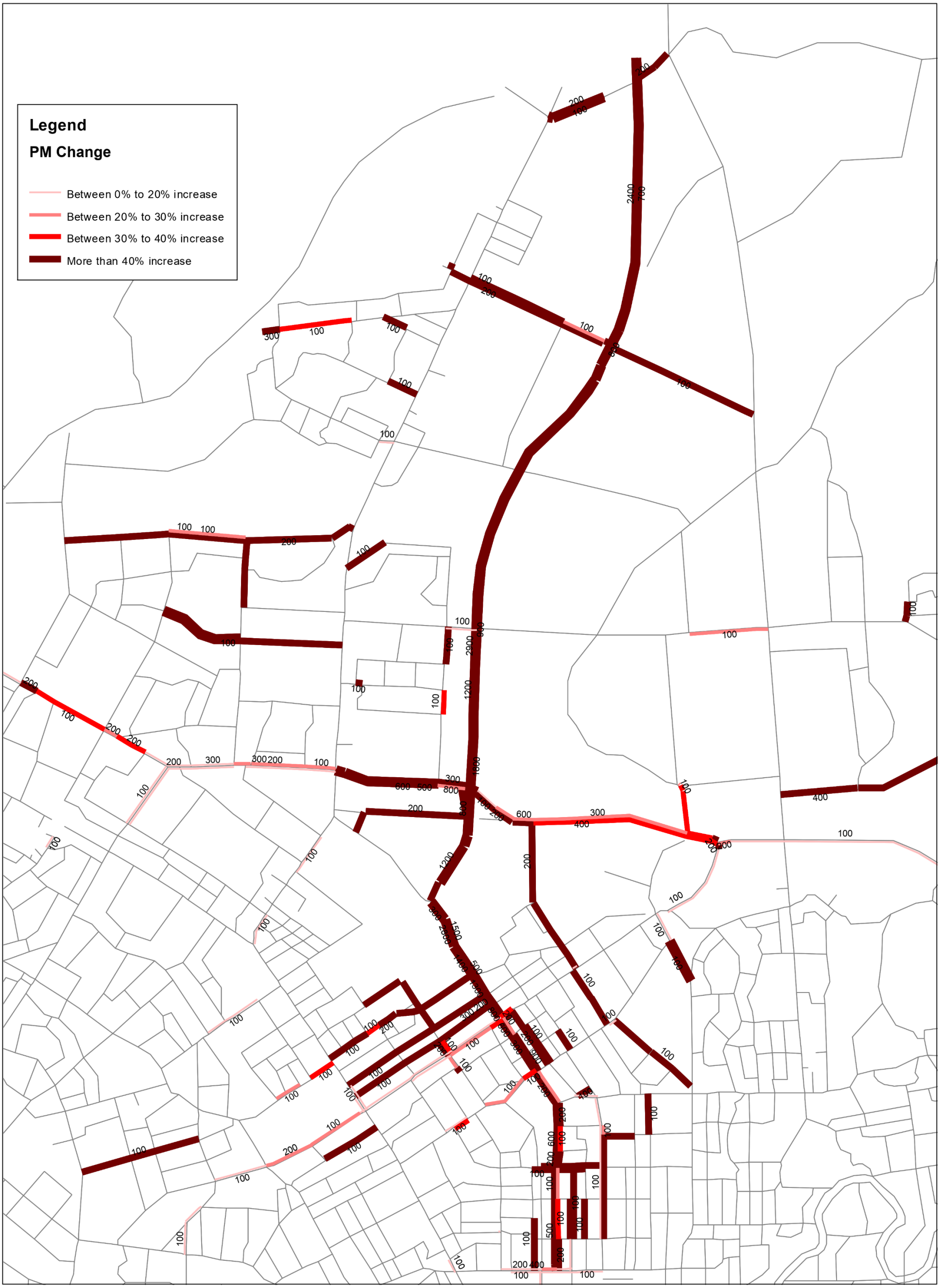
Christchurch City Council



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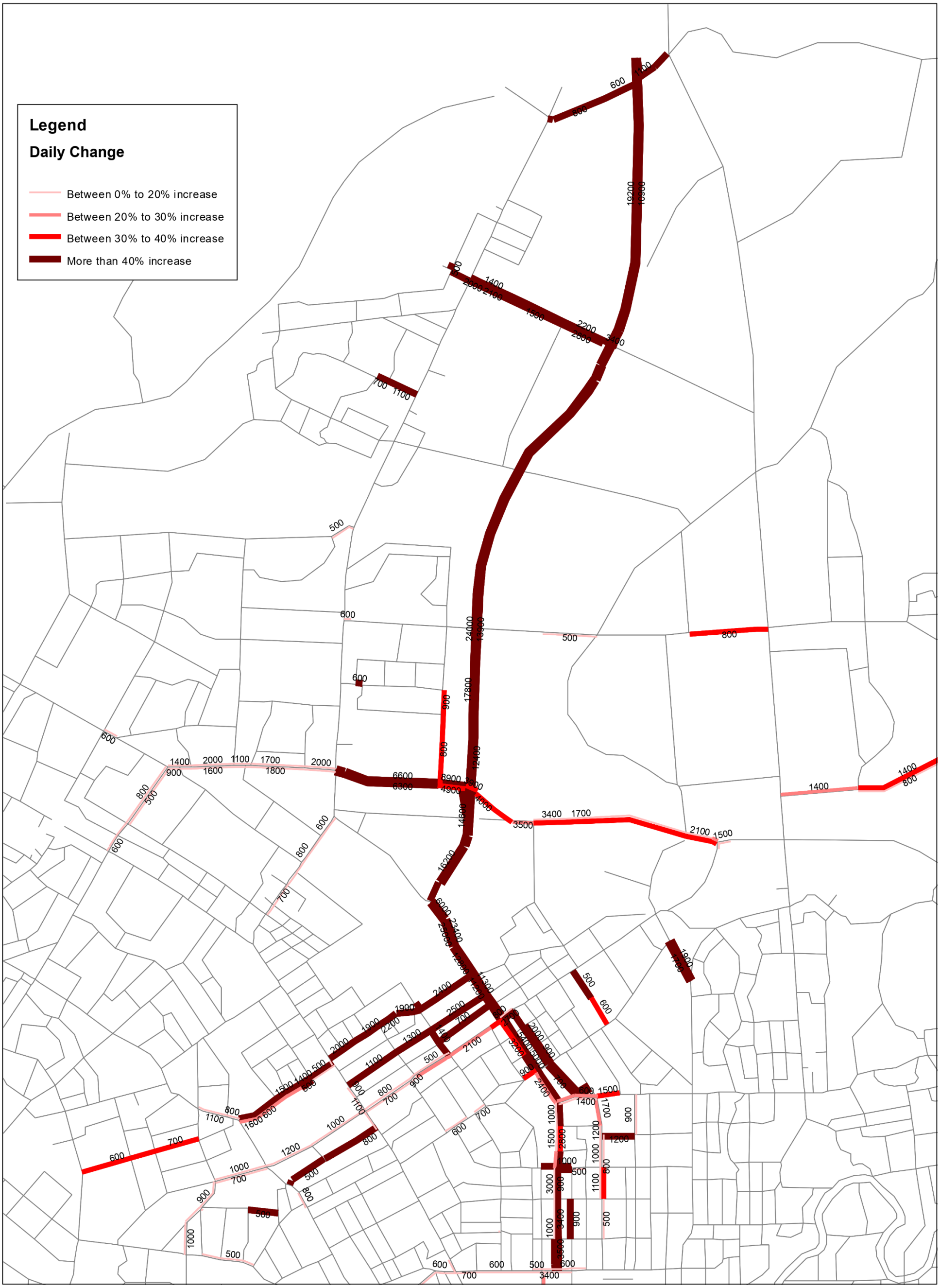


Year 2031: Daily Traffic Volume Difference - with/without CNC
CNC04g vs NoCNC03 (Differences less than 500 vpd are not shown on the plot)

Insightful solutions. Empowering advice.

Appendix E - Monitoring Screens

Appendix D

Issue Date:
10 May 2019

Insightful solutions. Empowering advice.

Appendix F - Consultation Leaflets (1st & 2nd round of consultation)

Timeline

- Consultation
- Downstream effects management plan prepared
- Consultation on individual projects
- Construction of approved projects

Drop-in sessions

Come and talk to staff about the proposal

Monday 7 May 2018
Anytime between 4pm – 7pm
St Albans School
17 Sheppard Place, St Albans

Thursday 10 May 2018
Anytime between 10am – 2pm
English Park
Cranford Street, St Albans

Wednesday 16 May 2018
Anytime between 4pm – 7pm
Papanui Street School
120 Paparoa Street, Papanui

Thursday 17 May 2018
Anytime between 10am – 2pm
Edgeware Bowling Club, St Albans Park
6 Forfar Street, Edgeware

Engagement Team

03 941 8717
ann.campbell@ccc.govt.nz
53 Hereford Street, Christchurch
PO Box 73016, Christchurch 8154
ccc.govt.nz/haveyoursay

Christchurch City Council

Open until Monday 4 June 2018

ccc.govt.nz/haveyoursay

HAVE YOUR SAY

Proposed changes to Cranford Street and the surrounding area

Why we need to make changes

We're proposing changes to Cranford Street and the surrounding roads to coincide with the completion of the Christchurch Northern Corridor. We'd like to hear your thoughts on how to make this work for commuters and local communities.

We're expecting a significant increase in people travelling on Cranford Street when the Christchurch Northern Corridor opens in 2020. The Christchurch Northern Corridor will improve travel times to and from the north of the city. It will decrease the number of people driving in some areas such as Main North Road and increase the number of people using parts of Cranford Street.

We need to make some changes to Cranford Street and the surrounding streets to improve the travel times for people travelling through and minimise people taking short cuts through side streets which could affect local residents.

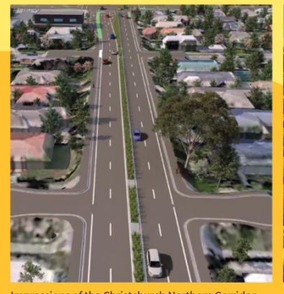
Why are we consulting?

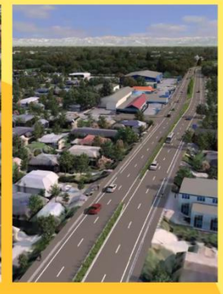
The Christchurch Northern Corridor will extend the Northern Motorway through to QEII Drive and Cranford Street. You can find out more about the project at **nzta.govt.nz/cnc**.

This project finishes at the intersection of Cranford Street and Innes Road. A downstream effects management plan for Cranford Street and the surrounding area south of Innes Road will be prepared to manage the impact of the additional people and vehicles travelling through.

The plan will look to improve connections to help commuters to get where they need to go while maintaining the sense of community for businesses and residents in the area. This consultation will help to inform that plan.

Further consultation on each individual project from tha plan will happen before it is implemented.





Impressions of the Christchurch Northern Corridor

Where is the traffic coming from?

We have done some investigations on the traffic impact on the area south of Innes Road. Even without the Christchurch Northern Corridor there will be increased traffic through the area due to population growth.

The drawing shows how the Christchurch Northern Corridor will take some traffic from Main North Road and Marshlands Road. Main North Road is the major bus route to and from the north of the city and reduced traffic will allow for better bus priority. Reduced commuter traffic on Marshlands Road will allow for additional residential traffic as the area is developed.

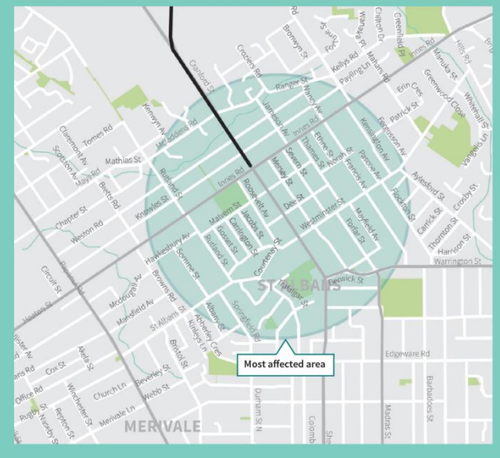
The shared path that runs alongside the Christchurch Northern Corridor will connect into the Papanui Parallel cycleway providing a continuous cycle route.

What is the traffic impact?

Investigations we have done show that local streets will be affected in the morning and evening peak periods if no road improvements are made. The impact will vary street by street but a number of streets will have a traffic increase of over 30 percent.

The most affected area is shown in the image below.

We have considered a number of options and found that the best option both for traffic flow and to minimise short cuts through local streets is a combination of main road improvements and some measures to reduce speed in quieter streets. These options are shown over the page.



Christchurch City Council

Options for your feedback

No.1

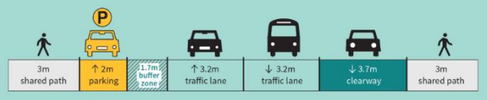
Proposed Cranford Street clearway and one-way connections

A clearway on part of Cranford Street and three-laning sections of Madras/Forfar Street and Barbadoes Street would help to improve the traffic flow in the area and minimise short cuts through local streets.

The clearway on Cranford Street would operate from Innes Road to Berwick Street. There would be a clearway heading south towards the city in the morning peak and a clearway heading north out of town in the evening. This will allow more people to travel through in peak hours.

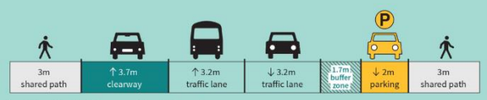
There would be no parking during the hours that the clearway operates.

Morning peak hours: 7 – 9am



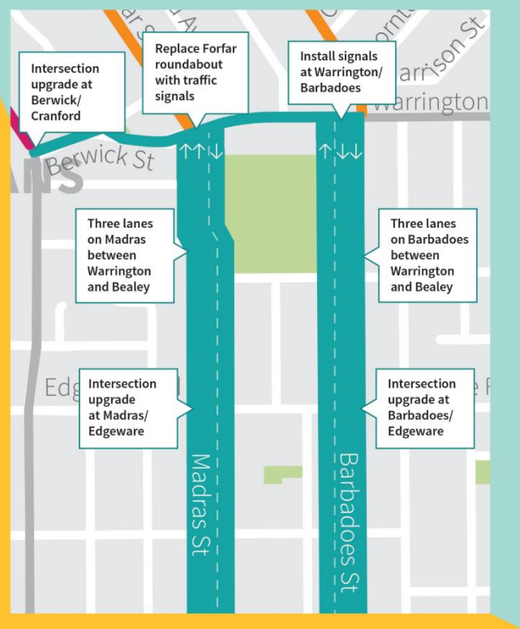
Looking North: Clearway Southbound

Afternoon peak hours: 4 – 6pm

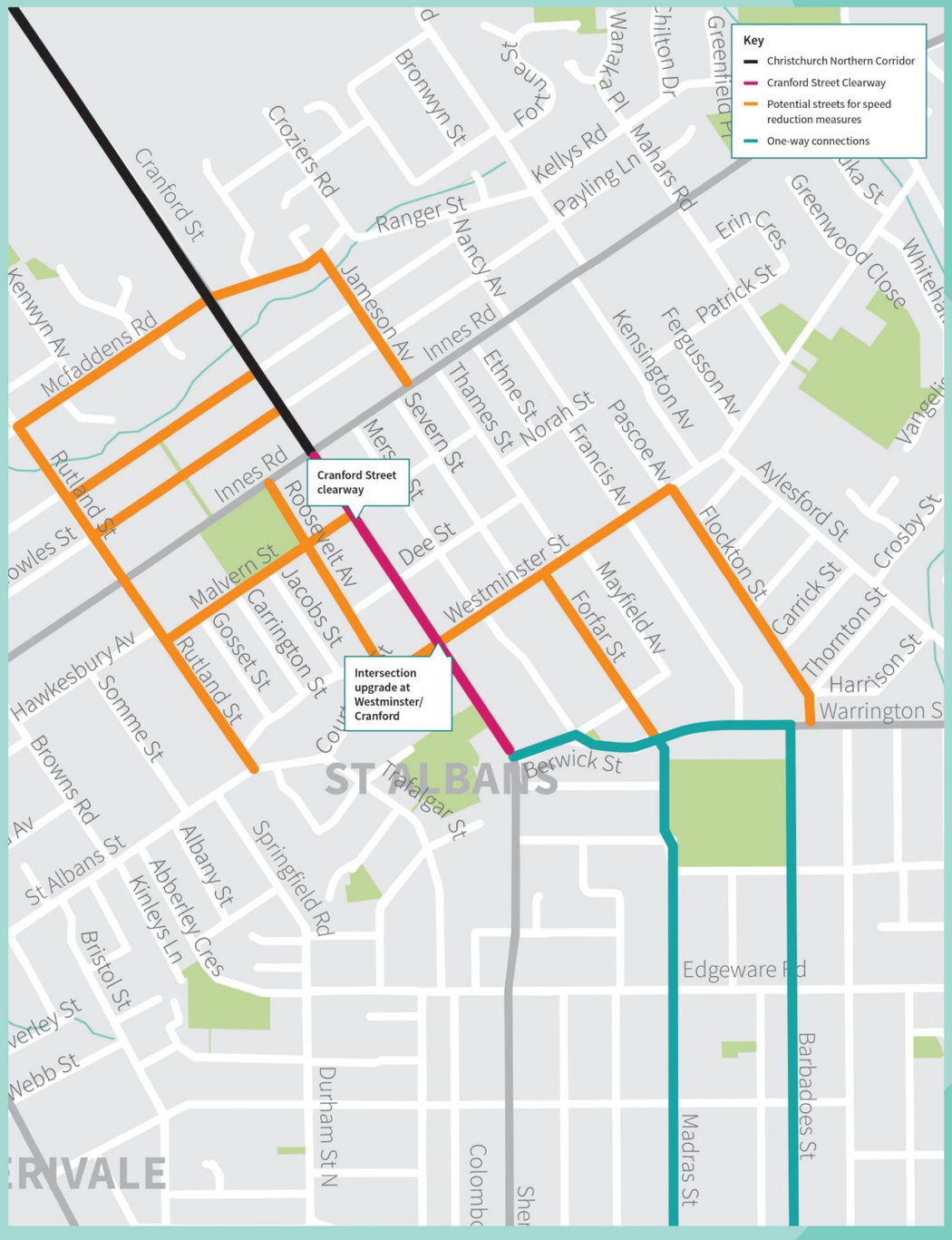


Looking North: Clearway Northbound

Sections of Madras/Forfar Street and Barbadoes Street between Warrington Street and Bealey Avenue would be three-laned within the existing corridor resulting in some loss of parking. The intersections in the area would need to be upgraded to support this change as shown in the map below.



Proposed options showing a reduced number of affected local streets



No.2

Proposal to reduce traffic on side streets

Our investigations show that if the Cranford Street clearway and improved links to the one-way streets are implemented there will be less short cuts through side streets.

These improvements will reduce the number of streets that will require traffic calming as shown on the map.

To discourage short cuts through side streets and improve safety there are a number of options:

- Raised intersections
- Narrowing sections of the road
- Chicanes, bends and landscaping
- Mid-block raised platforms
- Turning restrictions

Raised intersection with improved pedestrian crossing facility

Mid block raised platform with road narrowing

Raised intersection

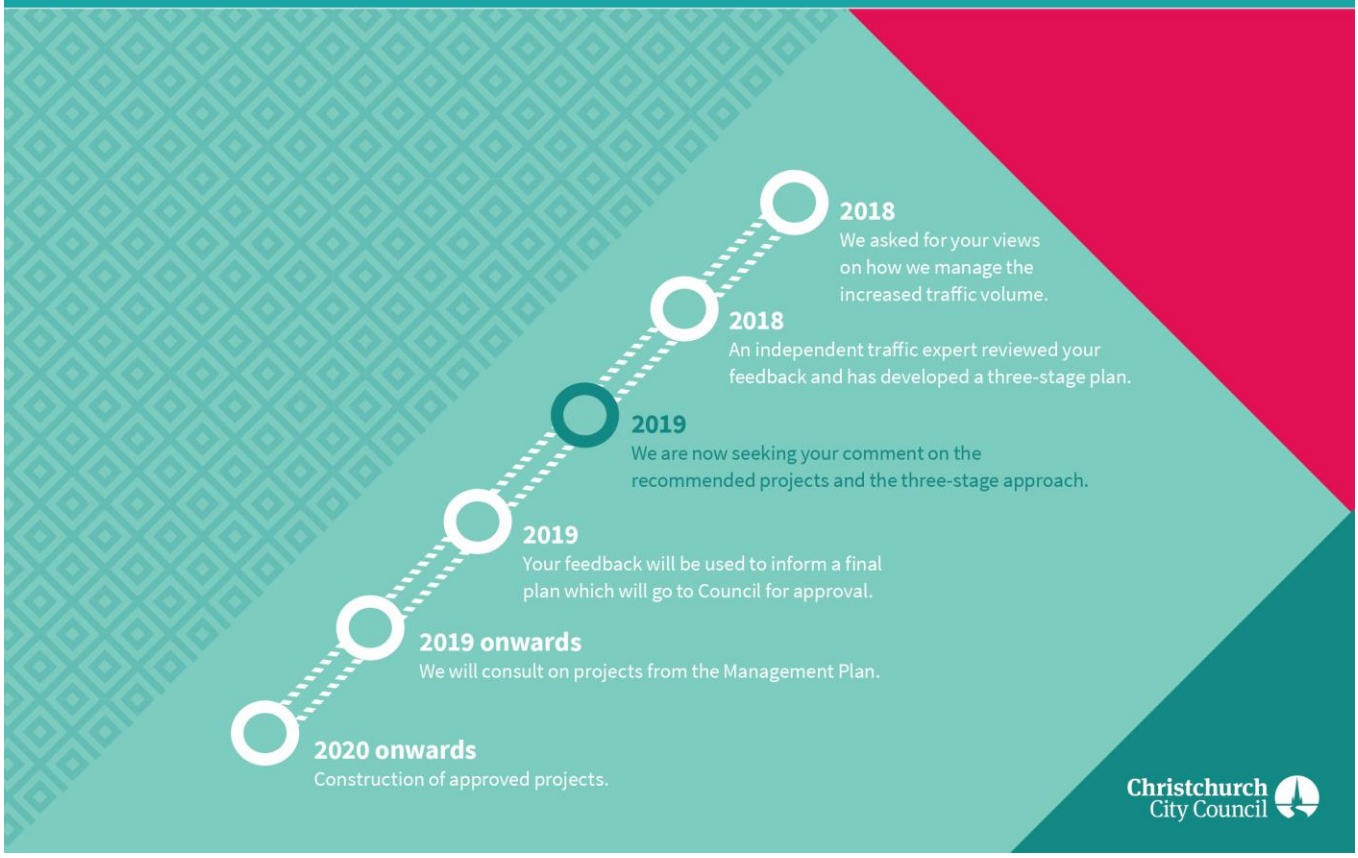
HAVE YOUR SAY

How we propose to manage the increase in traffic when the Christchurch Northern Corridor opens

We are seeking your comment on recommendations for the St Albans, Edgeware and Mairehau areas.

Feedback received until 5pm, Monday 15 April 2019.

ccc.govt.nz/haveyoursay



Background

The Christchurch Northern Corridor (CNC) will help people to travel to and from the north of Christchurch. The CNC extends the Northern Motorway to connect QEII Drive and Cranford Street, through to Innes Road.

The Downstream Effects Management Plan that we are asking you to comment on covers the impacts on all streets in the St Albans, Edgeware and Mairehau area south of McFaddens Road. The recommendations of the Plan are covered on the following pages.

The Plan looks at ways to manage additional traffic and to mitigate the impacts of the additional traffic that will enter the local network at Cranford Street.

However, some of the methods of reducing the number of vehicles, such as encouraging ridesharing, the use of public transport and active transport, require work to happen outside of the area considered by the Plan. These methods are:

- upgrading the bus network
- providing express buses
- park and ride facilities
- further developing the existing cycle network

The Christchurch Northern Corridor and the Downstream Effects Management Plan are part of a wider package of transport projects to improve travel to and from northern Christchurch. Other projects include the Main North Road bus priority lanes (still to be constructed), Western Belfast bypass, Papanui Parallel cycleway and Northern Line cycleway (still be constructed) and the CNC shared path.

Previous feedback can be read at ccc.govt.nz/the-council/consultation-and-submissions/haveyoursay/show/142

Feedback received from the community helped shape the Management Plan. We listened when you said you wanted safe access for schools, parks and shopping areas and safe areas for all people to walk and cycle.

The requirement for a Downstream Effects Management Plan came from an Environment Court ruling when the Christchurch Northern Corridor was approved. Council must complete the Plan before the opening of the Christchurch Northern Corridor and mitigate the effects additional traffic will have on the local network.

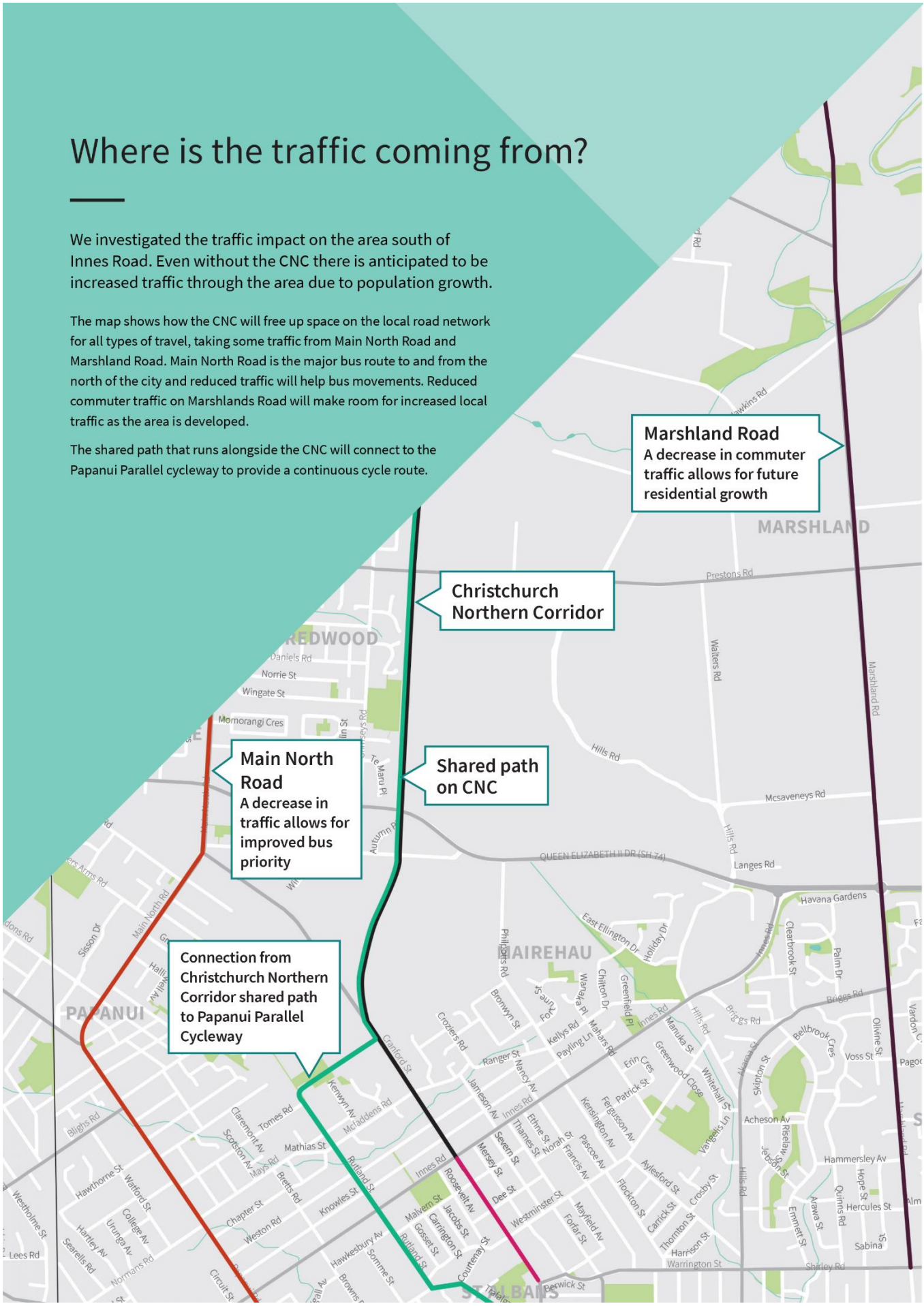
Read the full Management Plan at ccc.govt.nz/haveyoursay

Where is the traffic coming from?

We investigated the traffic impact on the area south of Innes Road. Even without the CNC there is anticipated to be increased traffic through the area due to population growth.

The map shows how the CNC will free up space on the local road network for all types of travel, taking some traffic from Main North Road and Marshland Road. Main North Road is the major bus route to and from the north of the city and reduced traffic will help bus movements. Reduced commuter traffic on Marshlands Road will make room for increased local traffic as the area is developed.

The shared path that runs alongside the CNC will connect to the Papanui Parallel cycleway to provide a continuous cycle route.



What this draft Plan recommends

This draft Plan seeks to balance the needs of local communities with safety and accessibility considerations, while ensuring an accessible city for all Christchurch residents, businesses and visitors.

Major arterial upgrades
Using the existing road corridor, arterial road upgrades include:

- Upgrading of intersections
- Introducing clearways
- Investigating whether the clearway lanes should be High Occupancy Vehicle Lanes for vehicles carrying two or more people

Local road traffic calming
Options being considered:

- Raised intersections
- Narrowing sections of road
- Chicanes, bends and landscaping
- Mid-block raised platforms
- Turning restrictions

Introduction of speed zones
Nine safe speed community areas are proposed in St Albans to improve safety and discourage drivers selecting alternative short cut routes.

Safe access to school
The key issue in terms of safe access to schools is access across Cranford Street for children walking to and from St Albans School. Several improvements are being assessed.

Cycling
The introduction of peak period clearways on Cranford Street make this route during peak periods less safe for non-confident cyclists. It is anticipated that most cyclists will use the dedicated Papanui Parallel Cycleway and other quieter safer routes.

Access to parks
You have told us safe access to parks is important to you. A study is proposed to look at access and safety issues for St Albans Park and Malvern Park and develop options to make access safer.

Access to commercial areas
You have asked for safe access to your local (shopping and eating) commercial centres. The draft plan recommends transport studies are done for the four local activity centres impacted by the increased traffic. Corridor assessments along Edgeware Road and Westminster/Courtenay Streets are also required to look at enhancing access and amenity for pedestrians and cyclists.

Monitoring
Council will continue to monitor:

- Vehicle, pedestrian and cycle volumes
- Vehicle speeds
- Vehicle emissions
- Road noise and vibration
- Crashes

Additional projects might be required where monitoring indicates congestion or safety concerns.

Timeframes
Funding was allocated in the Long Term Plan 2018-2028 to complete projects identified in the Downstream Effects Management Plan.

The following pages break down the recommendations into three delivery stages:

Stage 1 Projects proposed before the CNC opens in 2020

Stage 2 Projects proposed within three years of the CNC opening

Stage 3 Projects proposed to be delivered any time between the opening of the CNC and 2031

Read the full Management Plan at ccc.govt.nz/haveyoursay

Stage 1 – projects proposed before the CNC opens

There will be opportunities for further public input on projects within the Plan.

Proposed major road upgrades:

- **Cranford Street clearways** – peak period clearways along Cranford Street from Innes Road to Berwick Street.
- **Westminster Street/Cranford Street intersection** – upgrades to Westminster Street/Cranford Street intersection.
- **Berwick Street/Warrington Street upgrades** – upgrading of Berwick Street/Cranford Street signalised intersection and signalisation of the Forfar Street/ Warrington Street and Barbadoes Street/Warrington Street intersections.
- **South Berwick upgrades** – Downstream of Berwick Street arterial upgrade option that comes out of the scoping study.
- **High Occupancy Vehicle (HOV) lane on Cranford-Sherborne Streets** – Investigate using the peak period clearways as HOV lanes (must have more than one person in the vehicle). This effectively extends the proposed CNC HOV lane south to Bealey Avenue and a northbound HOV lane up Sherborne and Cranford Streets.

Proposed introduction of speed zones

Introduce nine 30km/h (or 40km/h) reduced speed limit areas through the downstream local road network.

Proposed traffic calming measures

Proposed traffic calming on the following streets:

- Mersey Street (Innes Road to Berwick Street)
- Knowles Street (Cranford Street to Rutland Street)
- Weston Road (Cranford Street to Rutland Street)
- McFaddens Road (Cranford Street to Rutland Street)
- Malvern Street – left in and left out only at Cranford Street
- Dee Street – left in and left out only at Cranford Street

Proposed safe access to schools

Safe access across Cranford Street (study) – this study will look at a range of options including a new mid-block signalised crossing across Cranford Street near the English Park carpark entrance.

Proposed safe cycling routes

Cycle wayfinding signage

Development of and implementation of a wayfinding signage plan that directs cyclists at the northern end of Cranford Street (at McFaddens Road) and southern end of Cranford Street to safer cycling routes, such as Papanui Parallel Cycleway.

North-South cycle study

Undertake a study of an alternative north-south secondary cycle route through traffic calmed streets to the east of Cranford Street. This will enable safer north-south cycling without having to cross Cranford Street to access Papanui Parallel.

East-West cycle study

This will enable cyclists to more safely connect to the Papanui Parallel and the proposed north-south route.

- McFaddens Road secondary cycle corridor – undertake a route study of a cycling route both west (towards the Papanui Parallel) and east (towards the proposed north-south route) on McFaddens Road.
- Westminster Street/Courtenay Street secondary cycle corridor – undertake a route study of a cycling route both west and east of Cranford Street.
- Edgeware Road secondary cycle corridor – undertake a route study of a cycling route both west and east of Cranford Street.

Read the full Management Plan at ccc.govt.nz/haveyoursay

Stage 1 Projects proposed before the Christchurch Northern Corridor opens

– Proposed local traffic calming (construction)
– Proposed clearway (construction)
– Proposed intersection improvements (construction)
– Study and proposed delivery of arterial upgrade options south of Berwick Street
– Cranford Street high occupancy vehicle lane study
– Proposed 30km/h or 40 km/h speed zone on local streets
– Safe access to school (study)
– Indicative safe cycling route running east to west (study)
– Indicative safe cycling routes running north to south (study)

Christchurch Northern Corridor - Downstream Management Plan 7

Stage 2 – projects proposed within three years of the CNC opening

There will be opportunities for further public input on projects within the Plan.

Proposed traffic calming measures

Proposed traffic calming on the following streets where expected increases in traffic volumes are validated by the monitoring data:

- Roosevelt Street
- Caledonian Road
- Edgeware Road (Village)
- Manchester Street
- Westminster Street/Courtenay Street

Safe access to schools

Safe access across Cranford Street – implement any options identified in the study undertaken that have not happened through the intersection stage 1 upgrades.

Proposed safe cycling routes

McFaddens Road secondary cycle corridor – construct a secondary cycling route both west (towards Papanui Parallel) and east towards new south route on McFaddens Road.

Westminster Street/Courtenay Street secondary cycle corridor – construct a secondary cycling route both west and east of Cranford Street.

Edgeware Road secondary cycle corridor – construct a secondary cycling route both west and east of Cranford Street to connect to the Papanui Parallel and proposed north-south cycle routes.

Access to parks

St Albans Park – Develop a plan that will look at improving access to the park by pedestrians of different abilities, cyclists and motorists.

Malvern/Rugby Park – Develop a plan that will look at improving access to the park by pedestrians of different abilities, cyclists and motorists.

Access to commercial centres

A study that will consider safe access to activity centres by pedestrians, cyclists, and motorists:

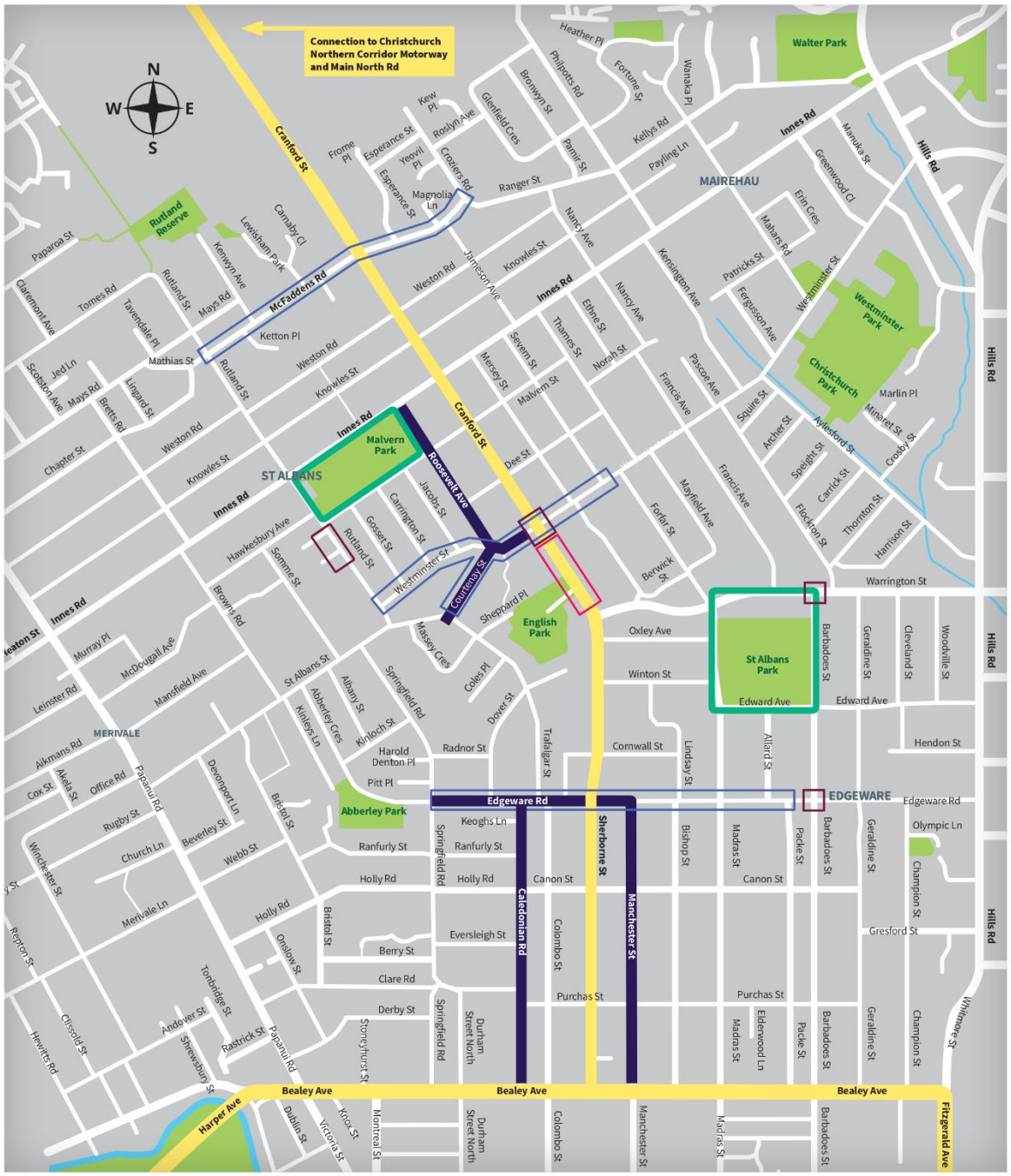
- Westminster Street/Cranford Street Local Activity Centre Transport Study.
- Barbadoes Street/Warrington Street Local Activity Centre Transport Study.
- Barbadoes Street/Edgeware Road Local Activity Centre Transport Study.
- Rutland Street Local Activity Centre Transport Study.

A study which will focus on safe access by pedestrians along the route and crossing the route especially for vulnerable road users:

- Westminster Street-Courtenay Street Corridor Study (Rutland Street to Forfar Street)
- Edgeware Road Corridor Study (Springfield Road to Barbadoes Street).

Read the full plan at ccc.govt.nz/haveyoursay

Stage 2 Projects proposed within three years of the Christchurch Northern Corridor opening



– Proposed local traffic calming (construction)

– Proposed safe access to school (construction)

– Proposed safe cycling routes running east to west (construction)

– Access to parks (plan)

– Access to commercial centres (study)

Christchurch Northern Corridor - Downstream Management Plan 9

Stage 3 – projects proposed after the opening of the CNC and up to 2031

There will be opportunities for further public input on projects within the Plan.

Proposed traffic calming measures
Introduce additional traffic calming measures only where monitoring indicates high levels of short cutting are occurring. Possible routes include:

- McFaddens Road (Cranford Street to Ranger Street)
- Knowles Street (Cranford Street to Philpotts Road)
- Weston Road (Cranford Street to Nancy Avenue)
- Jameson Avenue
- Forfar Street (Warrington Street to Westminster Street)
- Flockton Street
- Severn Street
- Thames Street
- Aylesford Street
- Kensington Avenue
- Philpotts Road
- Francis Avenue

Safe cycling routes
North-South secondary cycle corridor – construct an alternative north-south cycle route through traffic calmed streets to the east of Cranford Street. This is likely to involve road marking, signage and new crossing facilities.

Access to parks
St Albans Park Access Plan – Implementation of the access plan as required to address access issues.

Malvern/Rugby Park – Implementation of the access plan as required to address access issues.

Access to commercial centres
Implement the following study recommendations:

- Westminster Street/Cranford Street Local Activity Centre Transport Study.
- Barbadoes Street/Warrington Street Local Activity Centre Transport Study.
- Barbadoes Street/Edgeware Road Local Activity Centre Transport Study.
- Rutland Street Local Activity Centre Transport Study.
- Westminster Street-Courtenay Street Corridor Study (Rutland Street to Forfar Street).
- Edgeware Road Corridor Study (Springfield Road to Barbadoes Street.

Read the full Management Plan at ccc.govt.nz/haveyoursay

Stage 3 Projects proposed to be delivered any time between the opening of the Christchurch Northern Corridor and 2031

– Indicative area for possible safe cycling routes running north to south (construction)

– Proposed local traffic calming (construction)

– Access to parks (implementation of plan)

– Access to commercial centres (implementation of study)

– Proposed East/West cycle routes

Christchurch Northern Corridor - Downstream Management Plan 11

How to give feedback

You can provide your feedback in a number of ways:

Fill out the submission form at:

ccc.govt.nz/haveyoursay

Mail to:

Postage is free (you don't need a stamp), if you send your comments to:

Freepost 178
Attention: Ann Campbell
CNC Downstream Effects Mitigation Plan
Public Information and Participation Unit
Christchurch City Council
PO Box 73016
Christchurch 8154

Email:

Send your feedback and any attachments to **ann.campbell@ccc.govt.nz** with Downstream Effects Management Plan in the subject line. Please make sure you include your full name and address with your submission.

Deliver to:

Civic Offices, 53 Hereford Street or any Council Service Centre

Feedback received until 5pm, Monday 15 April 2019.

Drop-in sessions

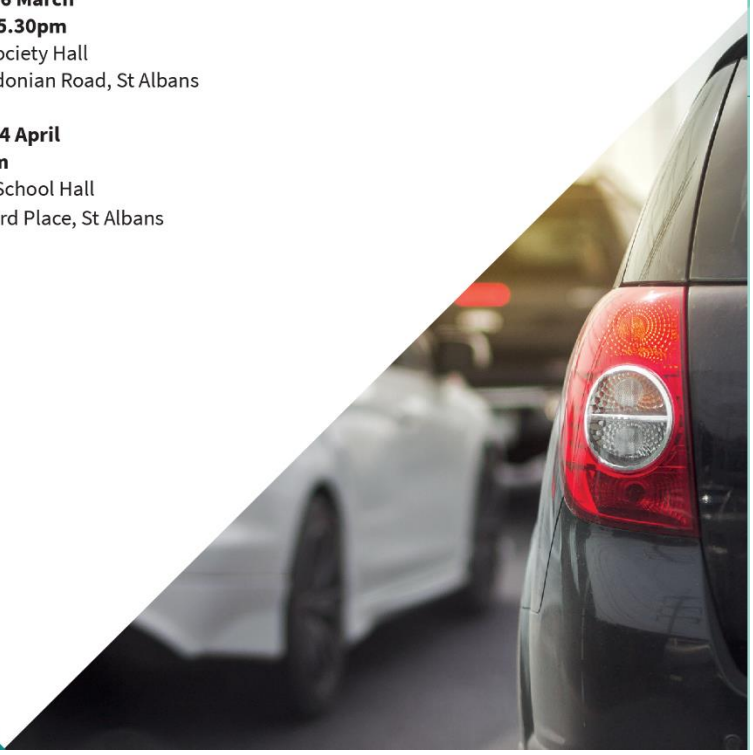
Come and talk to us about this plan.

Wednesday 20 March
10.30am – 12.30pm
Scottish Society Hall
136 Calendonian Road, St Albans

Tuesday 26 March
3.30pm – 5.30pm
Scottish Society Hall
136 Calendonian Road, St Albans

Monday 25 March
5pm – 7pm
St Albans School Hall
17 Sheppard Place, St Albans

Thursday 4 April
5pm – 7pm
St Albans School Hall
17 Sheppard Place, St Albans



Ann Campbell
Engagement Team

03 941 8717
ann.campbell@ccc.govt.nz
53 Hereford Street, Christchurch
PO Box 73016, Christchurch 8154
ccc.govt.nz/haveyoursay

Have your say

Make sure your comments gets to us before 5pm on Monday 15 April 2019.

ccc.govt.nz/haveyoursay

Please indicate your views:

Prior to final adoption of this plan for St Albans, Edgeware and Mairehau we would like to hear your views:

fold fold

Do you have any comments on the recommended projects?

Do you have any comments on the project stages?

fold fold

Have we missed anything?

tape here

Would you like the opportunity to speak to the Community Boards about your feedback? *(please provide a contact phone number)*

☐ Yes ☐ No

Christchurch City Council

Name* .....

Address* .....

.....

Postcode .....

Phone .....

Email* .....

* required fields

Please note:

We require your contact details as part of your submission – it also means we can keep you updated throughout the project.

Your submission, name and address are given to decision-makers (Community Board/Committee/Council) to help them make their decision. Submissions, with names only, go online when the decision meeting agenda is available on our website.

If requested, submissions, names and contact details are made available to the public, as required by the Local Government Official Information and Meetings Act 1987.

If there are good reasons why your details and/or submission should be kept confidential, please contact our Engagement Manager on (03) 941 8999 or 0800 800 169 (Banks Peninsula).

Please fold with the reply paid portion on the outside, seal and return by 5pm, Monday 15 April 2019

fold staple or tape here fold

fold fold

FREEPOST Authority No.178

Free

tape here

Attention: Ann Campbell
CNC Downstream Effects Mitigation Plan
Public Information and Participation Unit
Christchurch City Council
PO Box 73016
Christchurch 8154

Christchurch City Council

Christchurch City Council

Feedback received until 5pm, Wednesday 10 April 2019.

Drop-in sessions

Come talk to us about this plan.

Wednesday 20 March
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ann.campbell@ccc.govt.nz
53 Hereford Street, Christchurch
PO Box 73016, Christchurch 8154
ccc.govt.nz/haveyoursay

Christchurch City Council

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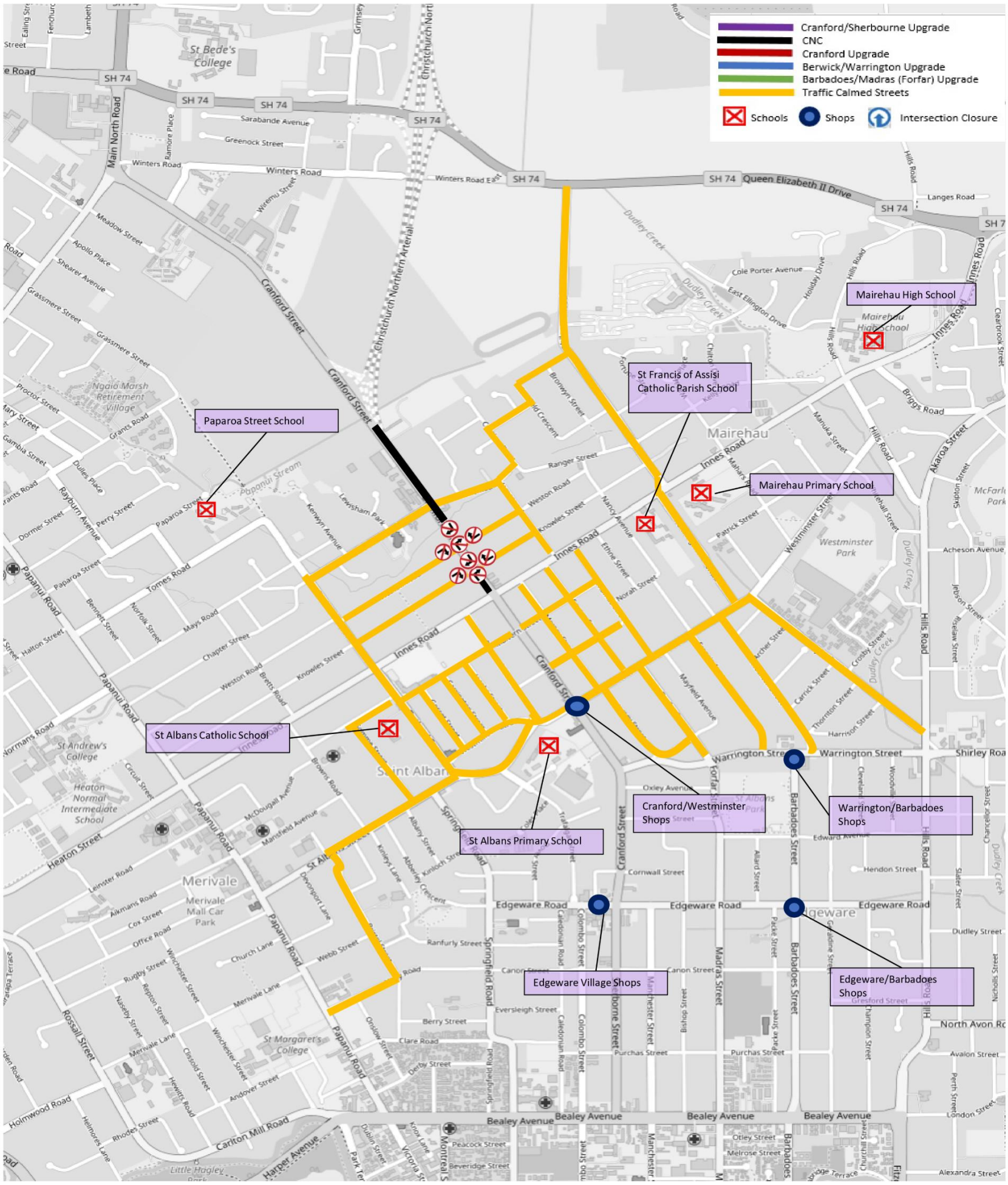
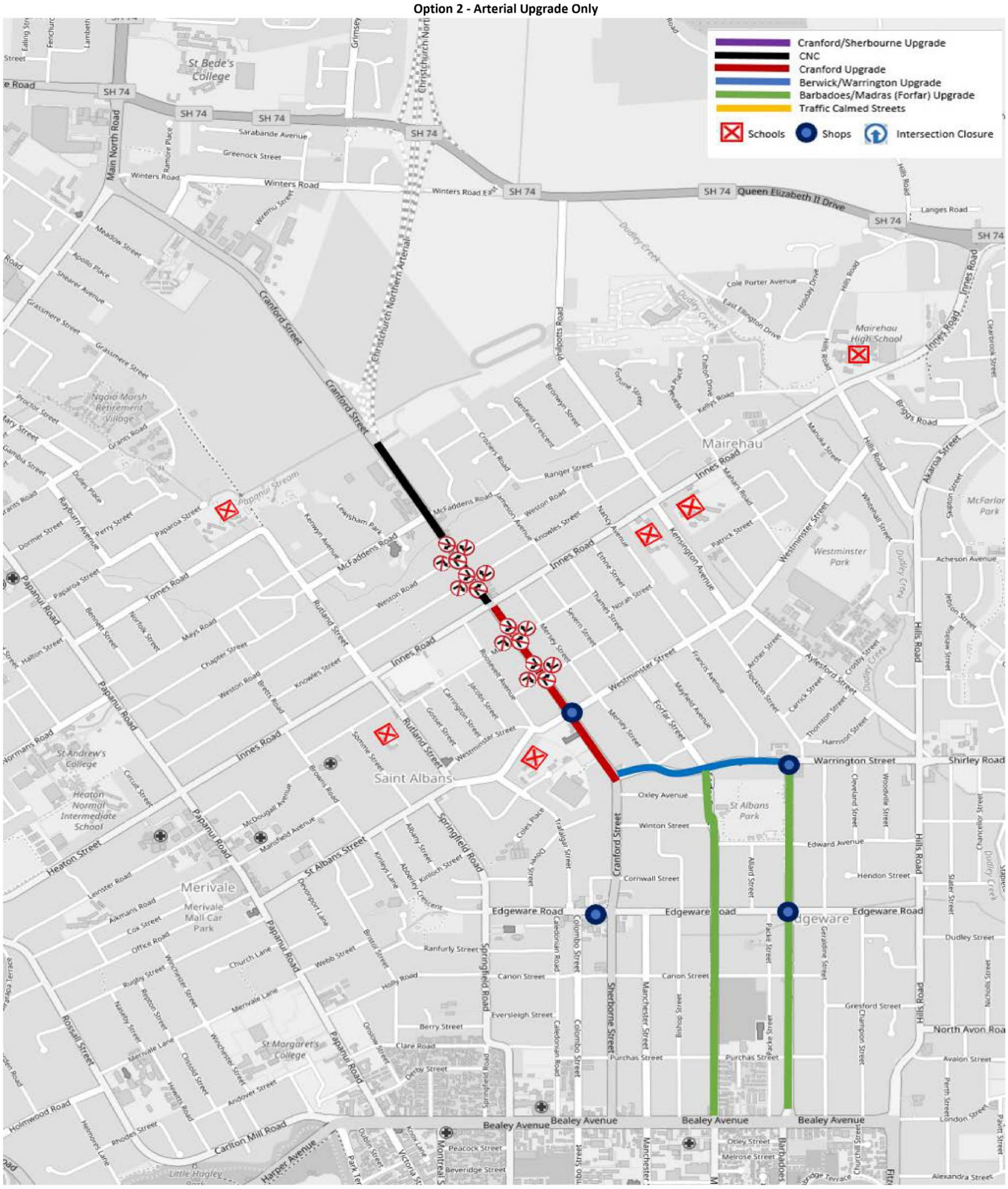
Appendix G- Options Diagrams

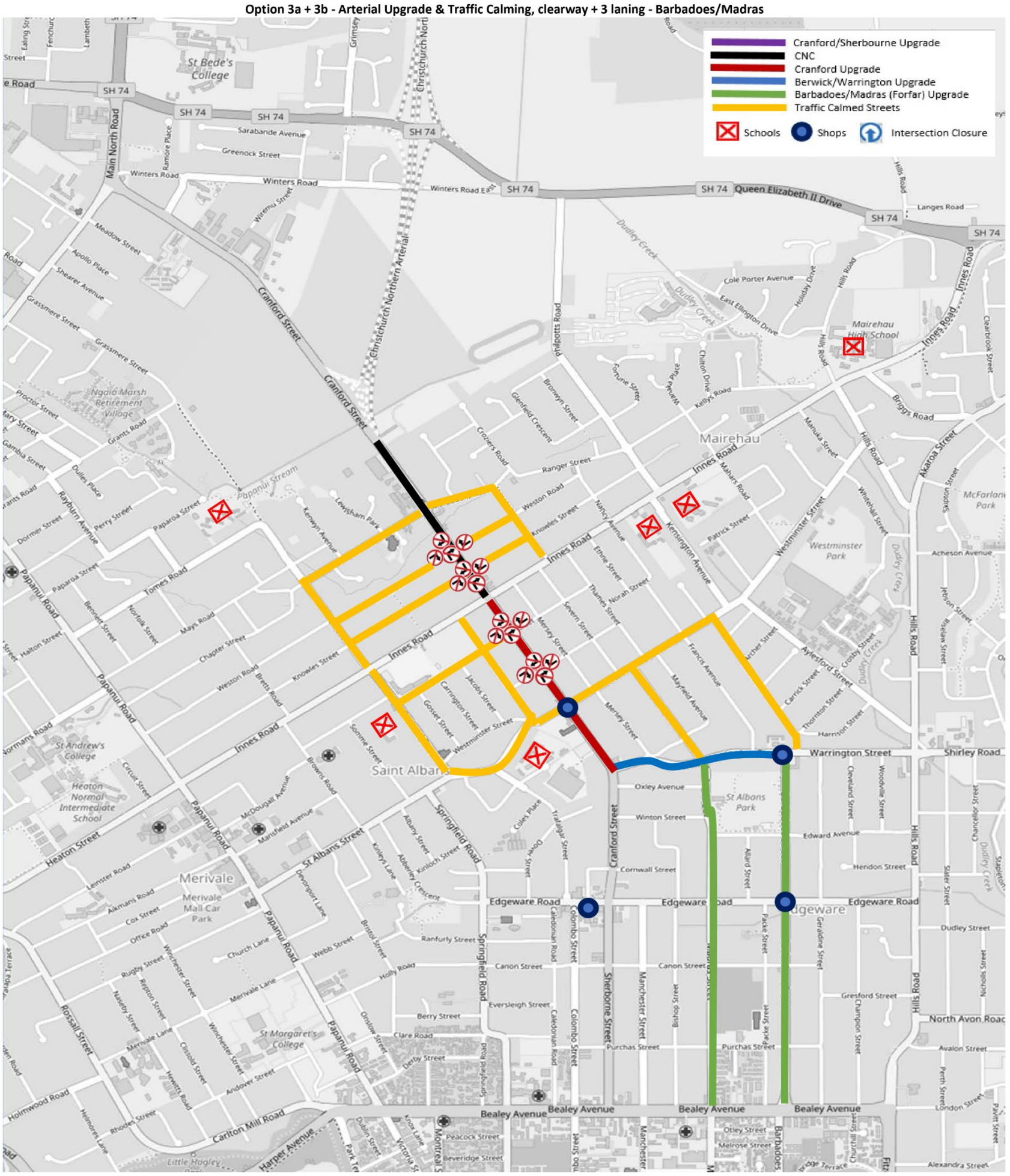
Do Nothing (yellow streets & arterials affected) + Option 1 - traffic calming only (all yellow streets)



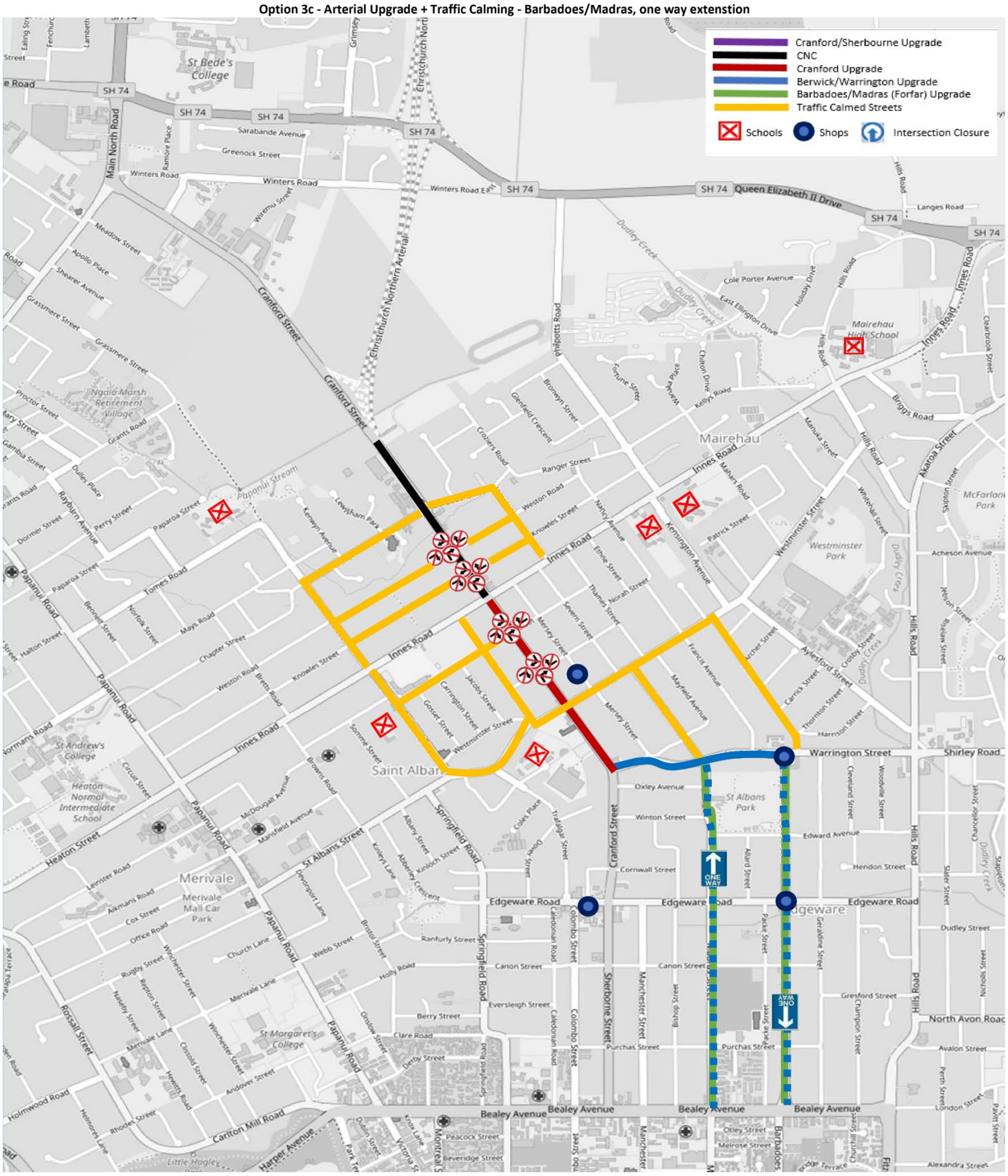
Option 2 - Arterial Upgrade Only



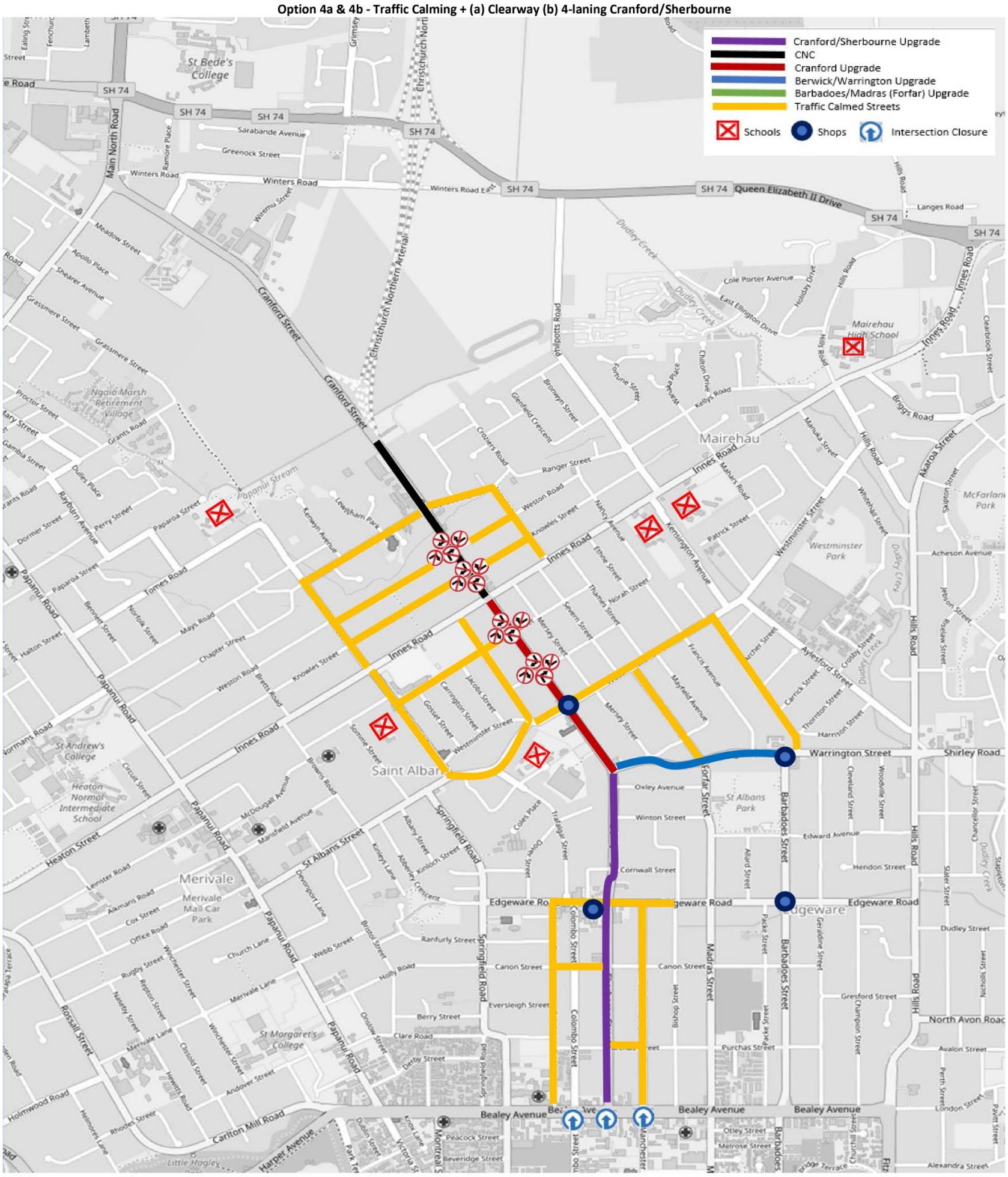
Option 3a + 3b - Arterial Upgrade & Traffic Calming, clearway + 3 laning - Barbadoes/Madras



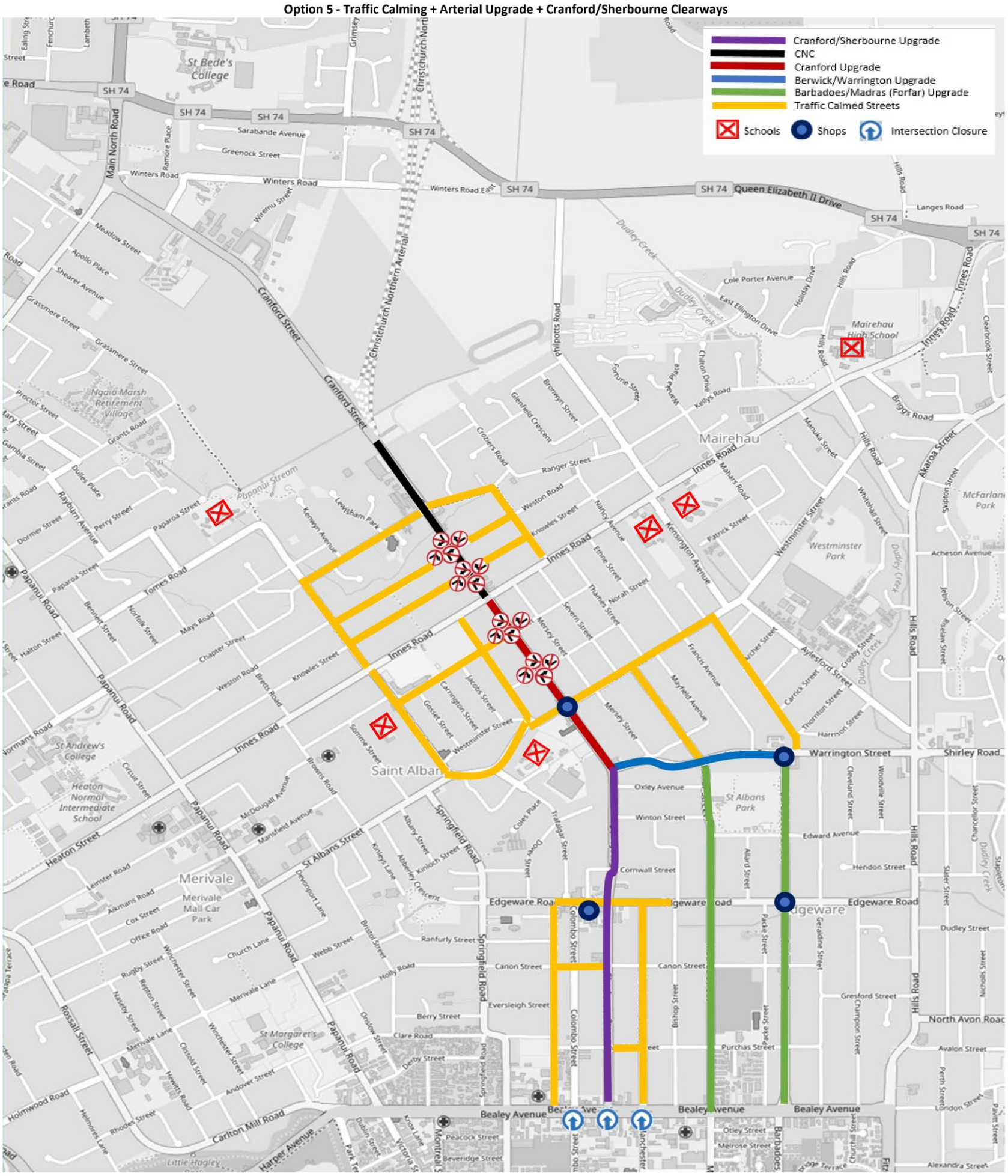
Option 3c - Arterial Upgrade + Traffic Calming - Barbadoes/Madras, one way extenstion



Option 4a & 4b - Traffic Calming + (a) Clearway (b) 4-laning Cranford/Sherbourne



Option 5 - Traffic Calming + Arterial Upgrade + Cranford/Sherbourne Clearways



Insightful solutions. Empowering advice.

Appendix H- Cycle Route MCA and Safety and Network Functionality Assessments

Multi Criteria Analysis – SANF Application to Cycle Route Identification

Identification, evaluation and selection of a preferred cycle route requires an objective transparent process that can withstand peer review, public scrutiny and permit informed decisions by elected members. This is achieved through a Multi Criteria Analysis (MCA) tool and Safety Audit and Network Functionality (SANF) process.

The purpose of an analysis is to select a preferred route from a number of identified on and off-road route options using a Multi Criteria Analysis (MCA) tool. The MCA assessment process is presented in the July 2016 version of Council's "Cycle Design Guidelines Part B: Design Principles Best Practice Guide".

Route Identification and MCA Assessment

The assessment process involves a site and desktop review of streets within the Route Corridor (an area connecting the start and end points) with streets being linked to form possible routes. Possible facility types are identified, based on cross sectional width, traffic volumes and constraints and are presented on a plan overlaying the land use types.

A shortlist of Route Options is identified from the possible routes, based on logical links to key connections/attractors and available roads within the corridor.

The Route Options are scored in an MCA assessment by a diverse team of people. This assessment scores each option against the following criteria: Safety, Directness, Coherence, Attractiveness, Comfort, Crime Prevention Through Environmental Design (CPTED), Business impact (i.e. change in access and loss of on-street parking), Residence impact (i.e. reduction in on-street parking), operational and network impacts (i.e. changes to the street layout, reduced road width, potential delay to other road users, additional signalised intersections), ease of construction and costs, land purchase/easements and consents. The results are reviewed using sensitivity testing (applying 70% weighting to the broad categories of cyclist criteria, impacts and costs) to confirm the best route option.

SANF Assessment

A SANF assessment involves an independent team of diverse people undertaking a holistic review of the route identification and MCA assessment outcomes to determine whether sufficient analysis has been completed to reach the conclusions and recommendations. A supportive SANF assessment provides transparency and confidence to decision makers that the analysis and impacts on affected parties has been adequately considered. A SANF demonstrates to the public that independent peer reviews have been undertaken.

Christchurch City Council

Attachment A Item 6

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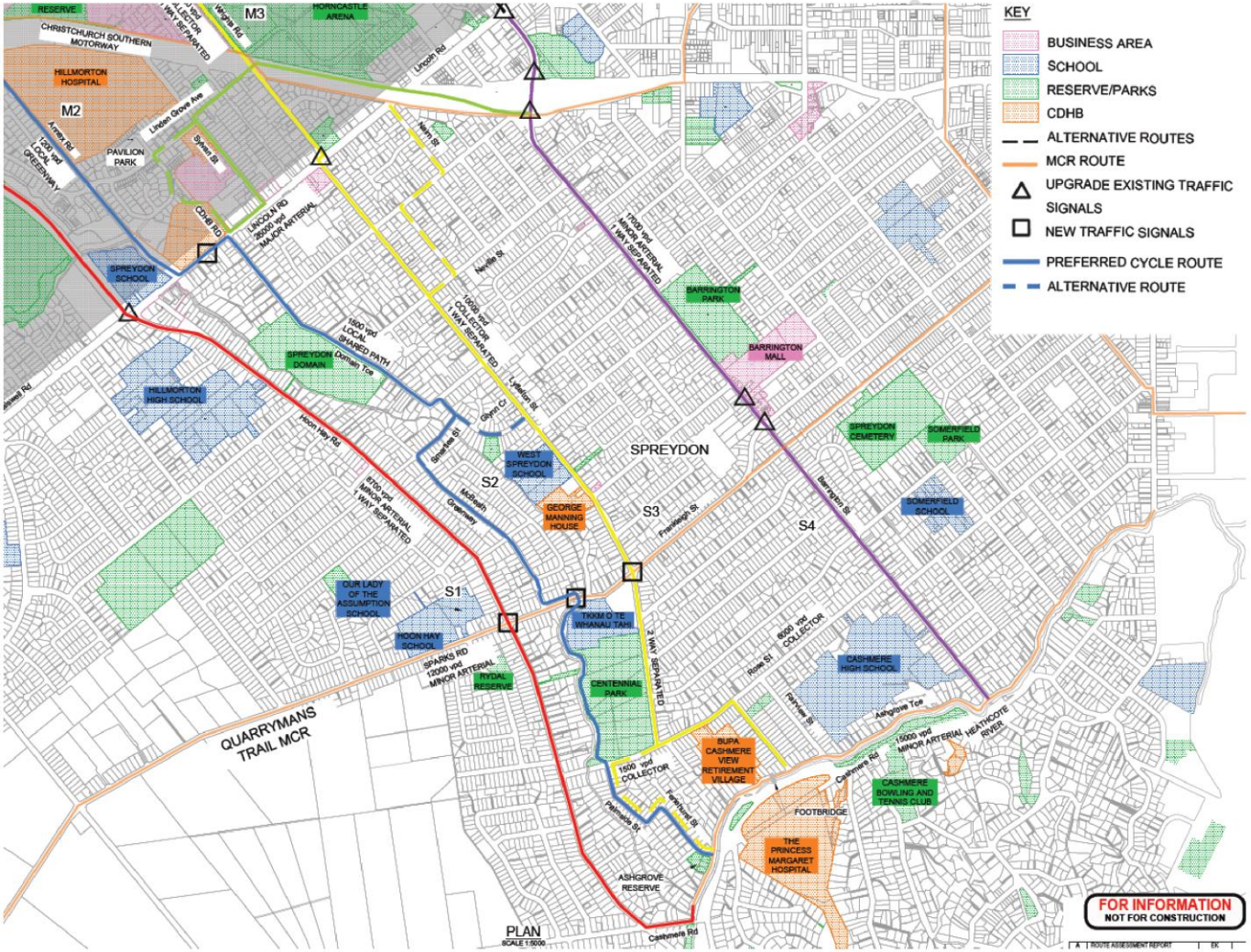

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Greater Christchurch Partnership Committee
10 May 2019

5. Christchurch Northern Corridor and Christchurch Southern Motorway - Progress Update

Reference: 19/456402
Presenter(s): Jim Harland, Regional Director, New Zealand Transport Agency

1. Purpose of Report

1.1 The purpose of this report is to provide the Greater Christchurch Partnership Committee with relevant information on the progress made to date on the development of the Christchurch Northern Corridor Project, Christchurch Southern Motorway, managed lane investigations and the immediate next steps.

2. Relationship to Partnership Objectives

2.1 These projects relate to improving transport system performances and mode choices.

3. Staff Recommendations

That the Greater Christchurch Partnership Committee:

1. Receive this update information on the Northern Corridor and Southern Motorway Projects.

4. Christchurch Northern Corridor Project

Context/Background

4.1 The NZ Transport Agency has been working closely with stakeholders to progress a series of business cases aimed at identifying integrated multimodal transport improvements that can be implemented on the Northern Corridor and the surrounding transport system to enhance the accessibility and liveability of communities.

4.2 The focus of the business cases has been on ensuring a joint approach to addressing network challenges and to develop solutions that reflect the change in demands and priorities for the agency, stakeholders and communities. This approach was agreed with the Greater Christchurch Partnership Committee.

4.3 Stakeholders have placed an emphasis on investigating travel demand management (TDM) solutions such as High Occupancy Vehicles (HOV) facilities and public transport improvements to respond to these changing demands and to future proof the wider transport system.

4.4 On 14 December, the Greater Christchurch Partnership Committee received an update on the Northern Arterial Programme and recommended that NZTA report back early in the New Year with the final design and costs associated with the High Occupancy Vehicle (HoV) lane and recommendations on supporting TDM measures and preliminary associated costs. (GCPC/2018/00032).

4.5 On 12 April 2019, the Greater Christchurch Partnership Committee requested an update on the Northern Corridor Project and Southern Motorway project, including traffic flow data for the Southern entry to the city.

Business Case Development Update

4.6 In July 2017, the NZ Transport Agency Board endorsed the Greater Christchurch Northern Access Programme Business Case. The recommended improvements include several different transport elements such as HOV, public transit services, and cycling facilities.

4.7 In December 2018, the NZ Transport Agency endorsed the Waimakariri Connectivity Business Case to proceed to pre-implementation. The recommended option is comprised of an HOV lane, cycleway and TDM improvements as shown in Figure 2.

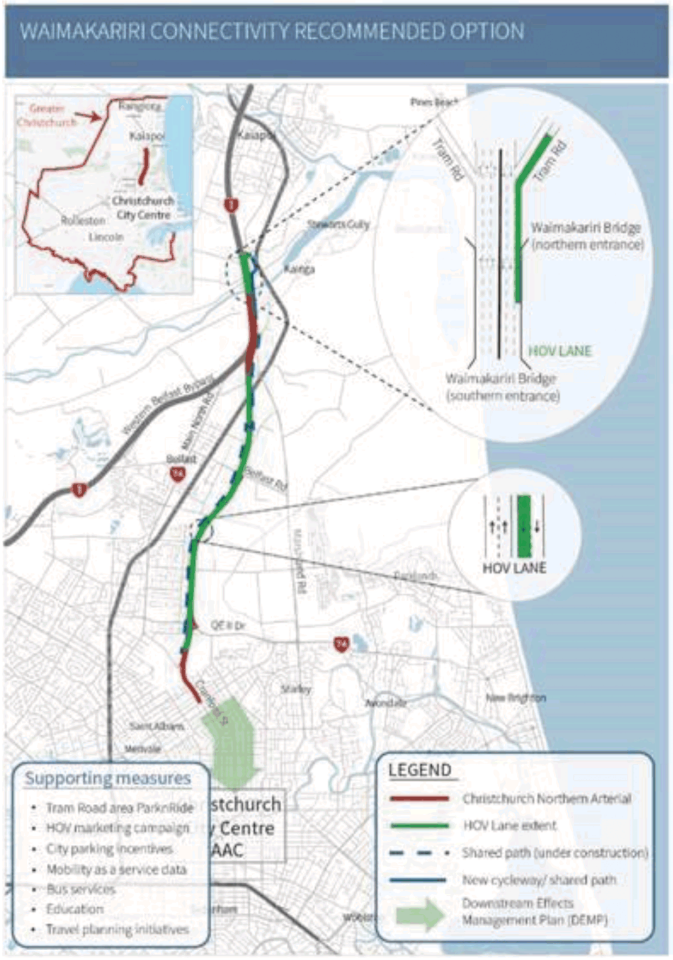

Figure 2: Recommended Option in Waimakariri Connectivity Business Case

Recommended Option

4.8 The recommended option has now been taken forward to pre-implementation stage. This stage will focus on further refining the design and operation of the recommended option. The components include:

4.8.1 Physical lane design elements: comprises the detailed design of a 3rd southbound lane and a shared use path cycle facility.

4.8.2 Operational design elements: includes concept of operation, enforcement technology, and other ITS infrastructure.

4.8.3 Supporting TDM measures: comprises the development of TDM solutions for the HOV lane. This includes Park 'n Ride facilities and express bus services.

4.9 Funding is a key concern for all GCP partners involved in the implementation of the various elements of the proposed HOV solution, in particular the TDM components. Below are details of aspects that are currently funded and those that funding is not yet confirmed.

4.9.1 Funding has now been approved for the construction of the HOV solution.

4.9.2 Funding for TDM measures such as any necessary public transport services, park 'n ride facilities, marking and education initiatives is yet to be approved.

4.9.3 Discussion is continuing on contributions to support HOV project components relating to TDM.

4.10 An enforcement strategy and plan consistent with the national approach is under development.

5. Christchurch Southern Motorway

Background/context

5.1 The Christchurch Southern Motorway Stage 2 (CSM2) is part of a package of improvements designed to address increased travel demand, congestion and safety in the south of Christchurch and Canterbury. The Christchurch Southern Motorway Stage 2 (CSM2) is made up of a new section of four-lane median separated motorway, from Halswell Junction Road to SH1 near Robinsons Road and an upgrade of the existing Main South Road (SH1), from north of Robinsons Road to near Rolleston, to four lanes.

5.2 The CSM2 is currently under construction and is projected to be completed and opened by November 2020. With the opening of CSM2 in 2020 the Brougham Street corridor is expected to face significant issues related to increase demand up to 20% higher by 2046. Due to concerns for potential congestion and increasing single occupant vehicles (SOVs), the Greater Christchurch Public Transport Joint Committee asked NZ Transport Agency to investigate the viability of implementing managed lane facilities along the corridor.

CSM Managed Lanes

5.3 The NZ Transport Agency has undertaken preliminary investigations into the viability of implementing managed lane facilities. These investigations are ongoing and will be incorporated into the testing for the Brougham Moorhouse Project.

Traffic Flow Data

5.4 As per request, the projected traffic volumes from the Christchurch Transport Model area are demonstrated below for the 2021 AM peak and the 2020 annual average daily traffic counts (AADT).

2021 AM PEAK

2021 AADT

Attachments

There are no attachments to this report.

Christchurch Northern Area Supporting Travel Demand Management Measures

April 2019

This report summary represents advice to the NZ Transport Agency and partners. Feedback on the report is being collated.

Christchurch Northern Area
Travel Demand Management

More information

NZ Transport Agency
Published March 2019

If you have further queries, call our contact centre on 0800 699 000 or write to us:

NZ Transport Agency
Private Bag 6995
Wellington 6141

This document is available from the NZ Transport Agency on request.

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GLOSSARY OF TERMS

Abbreviation	Term
AAC	An Accessible City
BCR	Benefit Cost Ratio
CAST	Christchurch Assignment and Simulation of Traffic
CAPEX	Capital Expenditure
CBD	Central Business District
CCC	Christchurch City Council
CTM	Christchurch Transport Model
DEMP	Downstream Effects Management Plan
ECan	Environment Canterbury
GC TDMS	Greater Christchurch Travel Demand Management Strategy
GPS	Government Policy Statement
HOV	High Occupancy Vehicle
KPI	Key Performance Indicator
MaaS	Mobility as a Service
NZ Transport Agency	The New Zealand Transport Agency
OPEX	Operational Expenditure
QE2	Queen Elizabeth II
RoNS	Roads of National Significance
SH1	State Highway 1
SOV	Single Occupancy Vehicle
SSBC	Single Stage Business Case
TDM	Travel Demand Management
WDC	Waimakariri District Council

Term	Definition
Reliability	Reliability in the context of this report relates to the ability of a traveller to plan and carry out a trip with a degree of confidence that the time taken will generally be as expected from one weekday peak to the next weekday peak
Attractiveness	Attractiveness in the context of this report relates to the comparison of total travel times and travel costs for each mode of transport, with all costs converted to travel time equivalents to give total perceived times. If the total perceived time for mode X is quicker than that for mode Y, then mode X is considered to be “attractive”

EXECUTIVE SUMMARY

The purpose of this report is to outline the investment case for the implementation of Travel Demand Management (TDM) measures to support the southbound High Occupancy Vehicle (HOV) lane and cycle path proposed for the Waimakariri Bridge on State Highway 1 (SH1) and the Christchurch Northern Corridor.

Due to the increased population growth in the Waimakariri District and northern areas of Christchurch, travel demands are forecast to increase over time. The CAST travel demands show that without supporting TDM measures the additional capacity at the Waimakariri Bridge will be exceeded within a few years of opening.

Forecasts predict that the proposed supporting TDM measures will see a 15% reduction in Single Occupancy Vehicle travel and an increase to a 10% public transport mode share by 2048 for all traffic travelling south over the Waimakariri Bridge in the AM Peak period. This is expected to alleviate congestion downstream and ultimately help to achieve objectives identified for the proposed HOV lane and cycle path.

Context

The Christchurch Northern Corridor is under construction and is due to become operational by mid-2020. The HOV lane and cycleway improvements proposed for the Christchurch Northern Corridor are still being considered as part of a separate business case, the Waimakariri Connectivity Single Stage Business Case (December, 2018).

This project forms a part of a larger network wide programme which investigates the need for TDM solutions for Greater Christchurch. It follows the development of a Greater Christchurch Travel Demand Management Strategy and a network-wide draft Travel Demand Management Strategic Business Case and aligns with the overarching objectives defined within these documents. This project is also guided by the problem statements identified within the draft Travel Demand Management Strategic Business Case:

- **Problem 1:** The current transport system and land use favours travel by car, which if continued will result in increased traffic and congestion, decreasing access to economic and social opportunities as the city grows.
- **Problem 2:** The relative attractiveness of travel in single occupancy vehicles encourages travel behaviours, which have broad negative effects to quality of life and liveability of local communities.

What is Travel Demand Management

The Greater Christchurch Travel Demand Management Strategy defines TDM as a set of strategies, policies or interventions which aim to reduce travel demand or redistribute travel demand across multiple modes of transport or over longer time-periods of the day. TDM measures can drive behavioural change and encourage customers to rethink their travel choices and consequently change their travel patterns and behaviours.

As outlined above, the existing transport network and land use characteristics within Greater Christchurch favour car travel, with 85% of commuters travelling via Single Occupancy Vehicles (SOV). Without further mechanisms and incentives which drive

behavioural changes, the implementation of the proposed HOV lane and cycle path along the Christchurch Northern Corridor and Waimakariri Bridge will only go so far in promoting alternative modes of travel. TDM measures will maximise the benefits of larger infrastructure investments, such as the HOV lane.

Growth Context

Greater Christchurch currently has a population nearing half a million people as at June 2018. From July 2017 and June 2018, Christchurch City's population increased by 1.8%, slightly lower than the national average of 1.9%. In the year to June 2018, the Selwyn District population increased by 4.8%, while the Waimakariri District population increased by 2.4%.

Future projections indicate this growth will continue over the next 10 years, with an average annual growth rate of 1.2% for Greater Christchurch.

The Greater Christchurch Partnership have recently updated the spatial plan (Our Space 2018–2048), which proposes several future developments areas within Kaiapoi, Pegasus and Woodend, indicating the region is expected to continue to grow into the future.

Transport Context

The rapid growth has led to a number of recent transport network developments and initiatives. Table 1 provides a summary of the existing transport systems servicing the northern corridor and the Waimakariri District and future developments in this area.

Table 1 Transport system context summary

Existing Transport systems / future development	Description
New Infrastructure	As identified above, the improvements to the SH1 along the Waimakariri Bridge and the Christchurch Northern Corridor are the two new pieces of infrastructure currently being constructed. Key aspects of these project include: ▪ An additional lane in each direction on the Waimakariri Bridge ▪ A shared pedestrian and cycle path running the length of the Christchurch Northern Corridor (including along the Bridge) ▪ A four-lane motorway starting just south of the Waimakariri River to connect with Queen Elizabeth II (QE2) Drive ▪ the Northern Arterial Extension to Cranford St and four Laning of Cranford St to Innes Road and four laning of QE2 to Innes Road ▪ A southbound HOV lane (being one of the two southbound lanes) from halfway over bridge then south of West Belfast Diverge
Draft Downstream Effects Management Plan (DEMP)	Higher traffic volumes travelling from the north will create additional transport movement demands particularly south of Cranford Street/Innes Road intersection. A number of draft staged downstream measures have been identified to mitigate the impacts of this demand.
Public transport offering	There are currently two existing public transport service routes that serve the suburbs to the north of Waimakariri Bridge and connect to Christchurch City: the Blue Line bus service and the 95 bus.

EXISTING TRANSPORT SYSTEMS / FUTURE DEVELOPMENT	DESCRIPTION
Multi-occupancy vehicle trips	Currently, a low proportion of vehicle trips have greater than one person per vehicle. Northern area commuter research undertaken in 2016/17 indicates that 85% of vehicles travelling within the Waimakariri District were single occupant.[1]
Walking and Cycling	Walking and cycling networks are provided in Kaiapoi, Rangiora and Christchurch City but no dedicated connections are currently provided across the Waimakariri River.

Customer Insights

In 2016 the Waimakariri District Council and NZ Transport Agency, undertook initial customer research targeting commuters travelling from the Waimakariri District south to Christchurch at least once a week. More recent customer surveys (April 2019) have been undertaken providing insights of the existing travel behaviours and the propensity to change travel behaviours for commuters who will potentially use the Christchurch Northern Corridor.

The customer surveys provide the following key insights:

- Southbound trips are largely dominated by private vehicle travel with 90% of people survey in 2016 and 100% of people surveyed in 2019 driving as part of their morning commute
- Travel times have significantly reduced since 2016 which has led to a greater overall commuter satisfaction for those travelling south. This may be due to the opening of the Belfast Western Bypass
- The longer travel times by public transport was the number one factor stopping people from using public transport in both 2016 and 2019
- Express bus services, higher frequency bus services and more convenient routes and stops were some of the interventions which would encourage greater public transport use
- It was also identified that the provision of a HOV lane and greater flexibility with carpooling including a flexible carpooling app would influence greater uptake of ridesharing

This data not only provides baseline measures which can be assessed overtime but also provides relevant information for the design and development of the TDM interventions and the potential uptake of public transport and ridesharing.

User Demand

The design of the TDM interventions is based on the existing and future user demand along the Christchurch Northern Corridor and the potential or propensity for customers to change their travel behaviours. A transport assessment has been undertaken which assesses origin

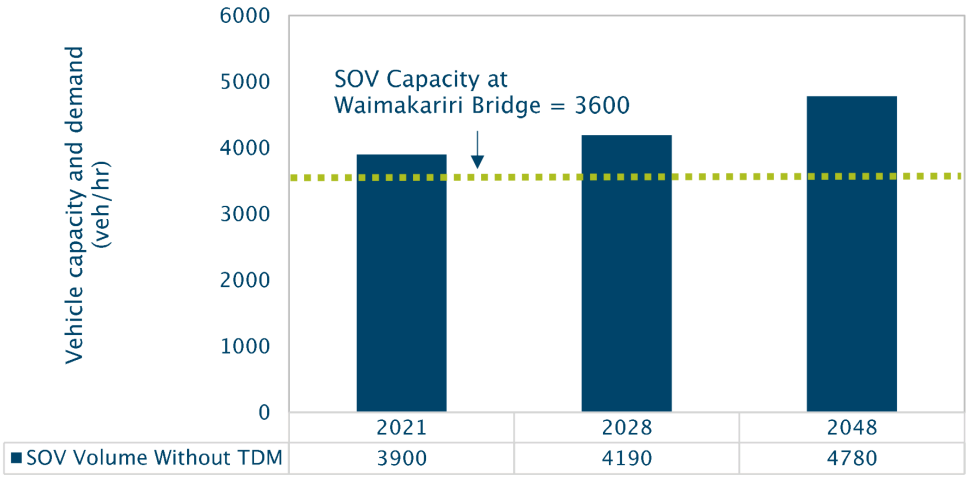
[1] Research First, Waimakariri District Council, NZ Transport Agency, Northern Corridor Commuter's Research 2016 Research Report, January 2016.

– destination patterns over time, total travel demand, and the potential mode change along the Christchurch Northern Corridor (assuming the HOV lane has been implemented).

The origin – destination patterns firstly show substantial southbound movements along the corridor by 2048 (approximately 15,000 person trips within the AM peak period). One third of these trips have a destination south of Queen Elizabeth II Drive and the city centre. A high proportion of southbound traffic also have a destination in the northern areas of Christchurch.

The projected high growth in demand over the next 30 years means that even with the new infrastructure being put in place now, the capacity available will become increasingly insufficient unless there is a significant shift to higher vehicle occupancies. Figure 1 highlights the increasing travel demand at Waimakariri Bridge (assuming the additional lane is operational but not a HOV lane or supporting TDM measures) and compares this against its capacity for the AM peak period. The figure shows the SOV demand exceeding capacity in 2021 with the problem worsening significantly by 2048.

Figure 1 Traffic demand and capacity at the Waimakariri Bridge in the AM peak (one hour) without TDM measures



Travel Demand Management measures

The following TDM measures have been identified to meet the requirements and customer needs as outlined within the user demand assessment and customer insights research. A staged approach is recommended given the various role each measure plays within the wider TDM strategy. Each stage is summarised in Table 2.

Table 2 TDM measure summary

	TDM Measure	Description	Focus Area
Stage 1 –	Communication Plan	Communication plan to promote new infrastructure and to provide regular updates on construction and disruptions	Greater Christchurch

	TDM Measure	Description	Focus Area
	Marketing and promotion campaign	This will aim to raise awareness and understanding in the community regarding the HOV lane and its operation as well as the improved public transport service offering.	Greater Christchurch
	Mobility as a Service	This considers first and last mile connections and includes the launch/development of an app based tool that combines public transport, carpooling/rideshare and micro mobility travel options.	Greater Christchurch
	Training and education	Provide training and education to make commuters more comfortable with using alternative modes of transport - Cycle training courses - Bus information	Kaiapoi, Rangiora & Woodend
	Downstream TDM measures	Continued investigation into Downstream measures which incentivise greater use of the HOV lane such as parking incentives	Central City
Stage 2 – Upon opening	Park and Ride	Interim Park and Ride sites in Kaiapoi and Rangiora, each with a capacity of 120 spaces. The Park and Ride will facilitate existing bus services (Blue Line and Service 95) and could also include secure cycle lockers and bus and vehicle access.	Rangiora and Kaiapoi
	Travel Planning	Residents will be invited to participate in a personalised journey planning programme to encourage behaviour change to alternative modes of transport. This initiative will also target schools and workplaces.	Kaiapoi, Rangiora & Woodend
	New Express public transport service	An additional express bus service targeting peak hour commuters and travelling between Rangiora, Kaiapoi and the central city along the new HOV lane. • 10 minute frequencies (between 7–9 AM and 4–6 PM) • Total of 24 additional services a day (12 in each peak period)	Starts journey at Rangiora, passes through Kaiapoi Park and Ride and ends journey in Central City
Stage 3 – Staged	Park and Ride expansion	Expand Park and Ride to a permanent facility: • 200 to 350 space Park and Ride at Rangiora with capacity to increase as demand requires	Rangiora and Kaiapoi

	TDM Measure	Description	Focus Area
		• 320 to 500 space Park and Ride at Kaiapoi South or Tram Road with capacity to increase as demand requires	
	Further public transport service improvements	Increase public transport service: • Transition to a **5 minute** frequency by 2028 or as demand requires. • Increase to a **2.5 minute** frequencies by 2048 or as demand requires.	Starts journey at Rangiora, passes through Kaiapoi Park and Ride and ends journey in Central City

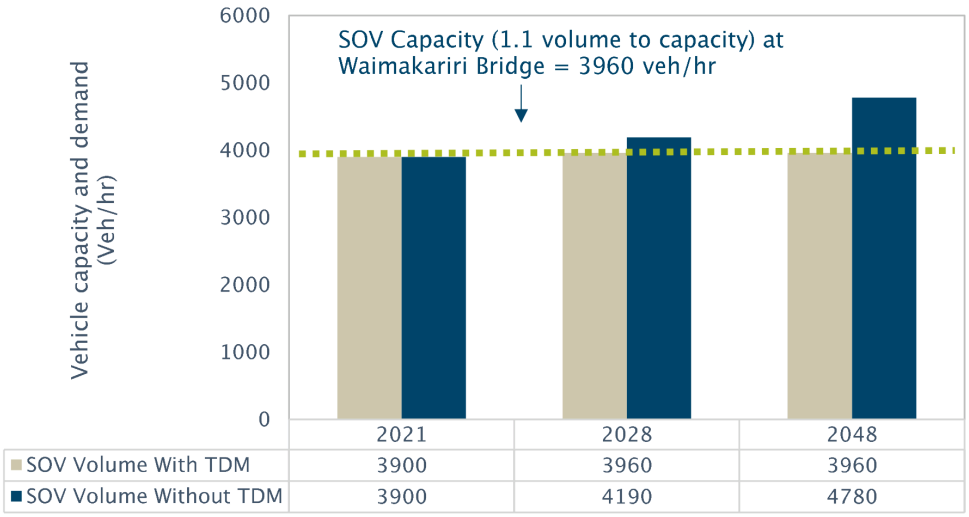
Recommended options assessment

Behaviour change opportunities

The potential for behaviour change along the Christchurch Northern Corridor has been determined by considering a number of different mode share scenarios and applying those to the traffic demand forecasts for the point along the corridor with the highest traffic flows. The highest flow point on the corridor between Tram Road and Bealey Avenue is forecast to be across the Waimakariri Bridge.

Figure 2 below compares the SOV volume against SOV capacity with and without TDM measures. As shown below, in 2048, there is a clear reduction in SOV travel demand in 2048 (approximately 15% reduction). This can be attributed to the behaviour changes expected for the corridor.

Figure 2 Traffic demand and capacity at Waimakariri Bridge in the AM Peak period with and without TDM measures

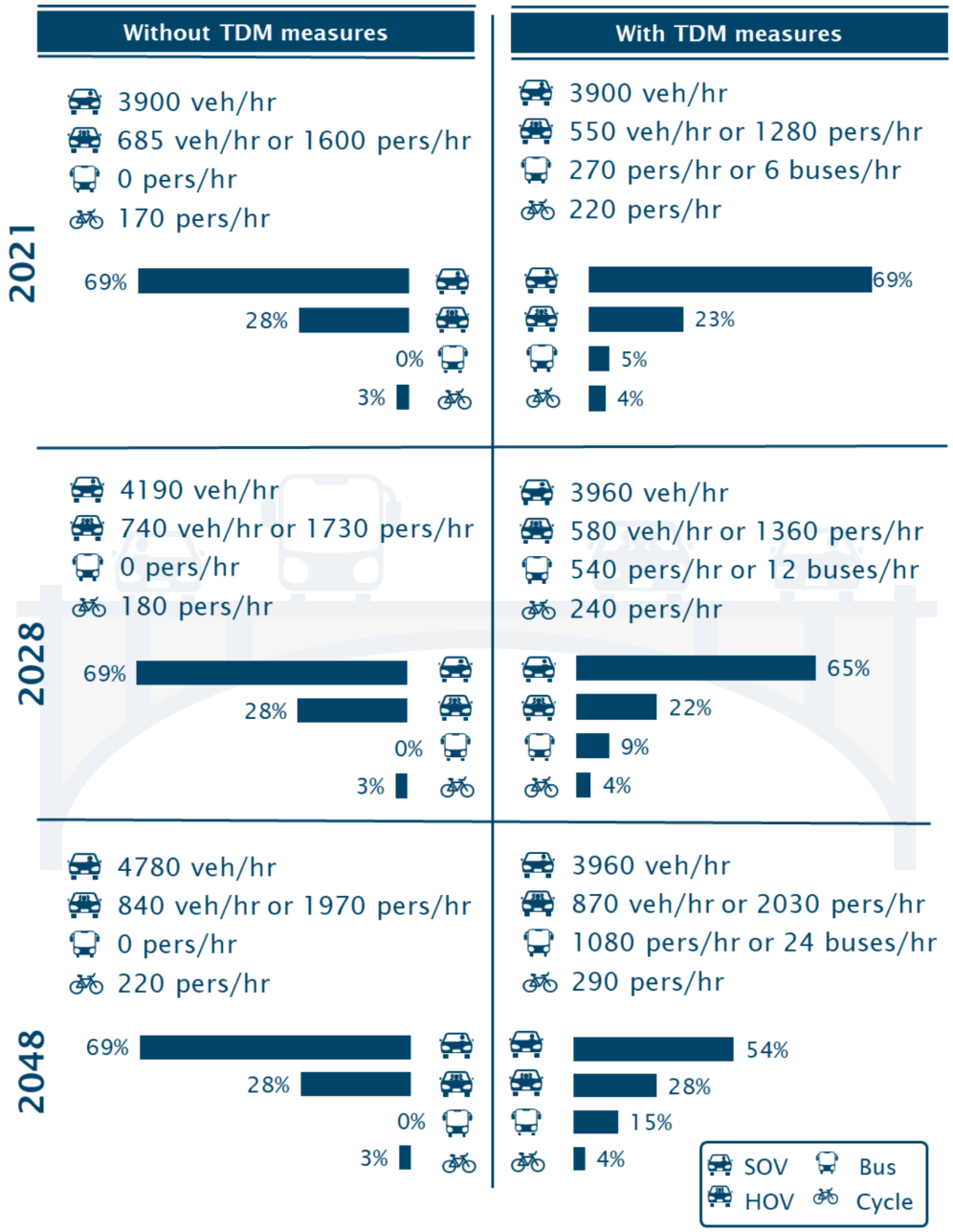


	2021	2028	2048
SOV Volume With TDM	3900	3960	3960
SOV Volume Without TDM	3900	4190	4780

Figure 3 provides a detailed comparison of traffic volumes and the resulting mode share for each of the modelled timeframes (2021, 2028 and 2048) at the Waimakariri Bridge. The figure highlights that by 2048, the TDM measures are likely to encourage a 15% public transport mode share, a 17% reduction in SOV's and a slight increase in cycling.

Furthermore, by 2048 the single HOV/bus lane is predicted to take around 3,100 people per hour, which is substantial and well in excess of either a general traffic lane (with a capacity of approximately 2,150 people per hour), or a lane for SOV's (approximately 1,800 people per hour).

Figure 3 Traffic volumes and mode share with and without TDM measures



The implementation of the TDM supporting measures will deliver wider improvements to the Greater Christchurch transport system including:

- Enabling and supporting growth
- Improving travel choice
- Travel time reliability and access by non-SOV modes
- Safety, health and the environment
- Value for money

Increasing the uptake of walking, cycling, public transport and ridesharing will help provide a more balanced transport system, and provides opportunities to optimise and extend the lifecycle of current and future assets and services.

Based on the assessments undertaken to date and the assumptions detailed in this report, the recommended TDM measures (from opening) are forecast to deliver the following transport outcomes as in Table 3.

Table 3 Expected outcomes

Investment Objective	Investment KPI	Measure	Baseline	Target Outcome
Investment Objective 1: Increase the people moving capacity when the HOV lane is operational	**KPI / Measure 1.1:** Decrease in percentage of SOV mode split in AM peak:	Across the Waimakariri River (SH1 Bridge southbound)	85%	69% SOV mode split by March 2021 across the Waimakariri River (SH1 Bridge southbound)
		At Cranford/Innes intersection (southbound)		62% SOV mode split by March 2021 south of QE2 (southbound)
	KPI / Measure 1.2: Increase in percentage of HOV mode split in AM peak:	Across the Waimakariri River (SH1 Bridge southbound)	15%	27% HOV mode split by March 2021 across the Waimakariri River (SH1 Bridge southbound)*
		At Cranford/Innes intersection (southbound)		34% HOV mode split by March 2021 at Cranford/Innes intersection (southbound)
	KPI / Measure 1.3: Increase in average vehicle occupancy in AM peak:	Across the Waimakariri River (SH1 Bridge southbound)	1.15	1.3 average vehicle occupancy by March 2021 across the Waimakariri River (SH1 Bridge southbound)
		At Cranford/Innes intersection (southbound)		1.4 average vehicle occupancy by March 2021 at Cranford/Innes intersection (southbound)

Investment Objective 2: Trip reliability for non-SOV vehicles between Tram Road and Bealey Avenue when the HOV lane is operational	**KPI / Measure 2.1:** Reduce/ maintain peak travel time variability between Tram Rd and Bealey Ave for each priority mode:	HOV – reduce annual avg. travel time variability	80 seconds	Achieve annual average travel time variability within 1 minute for HOV's (along extent of priority lane) by March 2021
		PT – reduce annual avg. travel time variability		Achieve annual average travel time variability within 1 minute for PT by March 2021
Investment Objective 3: Improve the attractiveness of high occupancy vehicle travel when the HOV lane is operational	**KPI / Measure 3.1:** Reduce the travel time of HOV's comparable to SOV's in the AM peak for trips between:	Tram Rd and Bealey Av	Same as SOV	HOV 10 minutes quicker by March 2021 for AM peak trips between Tram Rd and Bealey Ave
		Tram Rd and Cranford/Innes intersection		HOV 6 minutes quicker by March 2021 for AM peak trips between Tram Rd and Cranford/Innes intersection
	KPI / Measure 3.2: Reduce the travel time difference between public transport and SOV's in the AM peak for trips between:	Tram Road and Bealey Avenue	Same as SOV	PT trips between Tram Road and Bealey Avenue to be at least 8 minutes quicker than SOV by March 2021
		Tram Road to Cranford/Innes		PT trips between Tram Road and Cranford/Innes to be at least 6 minutes quicker than SOV by March 2021
Investment Objective 4: Minimise downstream impact consistent with the draft DEMP requirements	**KPI / Measure 4.1:** Limit the number of additional vehicles on Cranford St prior to the Innes Rd intersection		1,000	No more than 1,800 vehicles per hour on Cranford St (prior to Innes Rd intersection) by March 2021
Investment Objective 5: Improve safety	**KPI / Measure 5.1:** Minimise the severity and number of accidents on the northern corridor by maintaining the KiwiRAP star rating and the personal risk rating		5 star rating, personal risk rating low	Maintain 5 star safety rating and a personal risk rating of low on the northern corridor

outcomes for all customers	**KPI / Measure 5.2:** Reduce the number of active mode accidents between Tram Rd and Bealey Ave as a proportion of mode share (5 year)	9 (last 5 years)	No more than 9 active mode accidents between Tram Rd and Bealey Ave by March 2026
	KPI / Measure 5.3: Increase the proportion of respondents to an annual survey who perceive non-SOV modes to be safe	96% for PT, 96% for carpooling, and 77% for cycling	The proportion of respondents who feel safe using non-SOV travel modes by 2021 to be equal or better than 96% for PT, 96% for carpooling, and 77% for cycling

Table 3 demonstrates how the recommended TDM measures deliver well against the Investment Objectives and target outcomes identified for this project. The measures provide for the forecast growth north of the Waimakariri Bridge and allow for a phased approach to scale the TDM measures over time.

Costs and Benefit Cost appraisal

An indicative programme cost has been estimated at approximately $7.470m to implement the TDM measures considered necessary prior to opening of the HOV lane. The estimated cost of implementing the longer term TDM measures is estimated to be between $17M and $39M (excluding land purchase).

A Benefit Cost appraisal has been undertaking for two scenarios:

- Scenario 1: a most likely estimate
- Scenario 2: a conservative estimate that shows what level of benefit would be required to lead to a Benefit Cost Ratio of 1.

The analysis indicates an expected Benefit Cost Ratio of 1.4 (for scenario 1), while scenario 2, with a more conservative set of assumptions, shows the level of benefit required to reach a Benefit Cost Ratio of 1.

It needs to be recognised that the Benefit Cost Ratio only provides part of the story. The project is anticipated to have a number of strategic transport benefits, including prioritising modes of transport that carry more people, as identified elsewhere in this report, which cannot fully be demonstrated within the current level of analysis of downstream benefits due to the project.

Risks

The project team held a risk identification workshop with stakeholders at the commencement of the project. During this workshop stakeholders identified a range of risks relevant to the development and delivery of this project. Through the development of the recommended TDM measures the risk register has been updated to reflect any new information as identified. Key risks include:

- Land acquisition
- Consenting

- Integration with other workstreams
- Park and Ride facility utilisation
- Financial
- Funding
- Timing of delivery

Next steps

It is recognised that additional transport assessments, technical investigations and design work is required prior to the implementation of the supporting TDM measures identified in this report.

If the recommended TDM measures required by mid-2020 are approved and the funding secured, the next steps for the implementation of the TDM measures includes:

- NZ Transport Agency, Waimakariri District Council, Christchurch City Council and Environment Canterbury (supporting TDM measures)
    - Work collaboratively to consider the 'end to end' journey experience for customers through the design and development of the TDM measures
    - Implement the TDM measures required prior to and upon opening of the Christchurch Northern Corridor.

INTRODUCTION

This report sets out the investment case for the implementation of Travel Demand Management (TDM) measures to support the proposed improvements on State Highway 1 (SH1) and the Christchurch Northern Corridor to the north of Christchurch (referred to as 'the project' in this report).

The TDM measures aim to drive behavioural change and encourage customers to rethink their travel choices and consequently change their travel behaviour. TDM measures are required to support the new 10 kilometre section of State Highway between Tram Road and the intersection of Innes Road and Cranford Street, which includes a proposed southbound High Occupancy Vehicle (HOV) lane and cycleways as shown in Figure 4. Whilst the physical infrastructure has a defined study area, this TDM project is focussed on customers at their journey origin and destination and therefore the TDM study area spans from Waimakariri District to the Central City to consider end to end journeys.

Figure 4 Project location

The New Zealand Transport Agency (NZ Transport Agency) is seeking to confirm a preferred package of TDM measures to progress to pre-implementation. These TDM measures are required to support a reduction in the use of Single Occupancy Vehicles (SOV's). The measures aim to improve trip reliability and relative travel times for active modes and public transport users. This investment case has investigated TDM measures to support end to end journeys between Waimakariri District and Christchurch City.

The TDM measures also aim to maximise the benefits from investment in a proposed southbound HOV lane on the SH1 Waimakariri Bridge and Christchurch Northern Corridor (currently being designed and due to open mid-2020). The proposed southbound HOV lane is critical to achieving behaviour change and forms a key part of the TDM programme.

These measures are also planned to reduce the negative impacts that are being experienced and expected to worsen in the St Albans and Mairehau communities if the number of vehicles, including a high proportion of SOV's, along this corridor are not carefully managed.

This report builds on previous studies undertaken in the area[2] and also highlights the current risks and further planning, investigation and design that will be required to implement the recommended TDM interventions.

This report has been developed with key project partners from Environment Canterbury, Christchurch City Council and Waimakariri District Council, as well as a number of teams within the NZ Transport Agency.

Project history

Waimakariri Connectivity Single Stage Business Case (2018)

In July 2017, the NZ Transport Agency Board endorsed the Greater Christchurch Northern Access Programme Business Case which identified enhancements to SH1 between the Ashley River and Belfast to address reliability, safety and travel demand management challenges in this section of the road network.

The NZ Transport Agency sought to identify and confirm a preferred option through the Waimakariri Connectivity Single Stage Business Case (SSBC) that was completed in December 2018. The Waimakariri Connectivity SSBC builds upon previous studies undertaken in the area and identifies a recommended option for improving accessibility across the Waimakariri River on SH1 whilst also addressing demand management opportunities for the wider transport system.

The SSBC identified increasing demand for travel between the Waimakariri District and Christchurch City in the morning peak. This is due to a number of factors including increased population growth (which is at historically very high levels and forecast to remain at high levels in the future) and comparatively limited employment opportunities to the north. This is resulting in reduced access in the morning peak period due to low public transport patronage and a high proportion of single occupancy vehicles (SOV's).

Many studies have been undertaken to identify solutions to these issues. This has resulted in a number of projects south of Waimakariri District being further investigated, designed or

[2] This report should be read in conjunction with the Waimakariri Connectivity SSBC that outlines a preferred option for a southbound HOV lane on the SH1 Waimakariri Bridge and Christchurch Northern Corridor.

implemented, such as the recently opened Western Belfast Bypass and the Christchurch Northern Corridor which is currently under construction.

Even with the implementation of these projects, the problems are forecast to worsen. The recent Picton to Christchurch Programme Business Case identified the short and long term plan for this area of the transport network. This included the provision of an additional lane over the Waimakariri Bridge in the southbound direction for the use of HOV and public transport vehicles only, and a new cycle lane 'clip on' bridge. This recommendation was supported by the NZ Transport Agency in June 2017.

The HOV solution allows for the provision of the forecast growth north of the Waimakariri River whilst minimising the increase in the number of SOV's. This provides a more efficient use of existing infrastructure, providing for the forecast growth through the provision of increased people movement rather than increased vehicle capacity.

The Waimakariri Connectivity SSBC recommends that the HOV solution is supported by a suite of wider TDM measures to ensure the success of the HOV lane. The Waimakariri Connectivity SSBC recommends further investigation of the following TDM measures:

- Marketing and communications
- Park and Ride
- Mobility as a Service software
- Express bus services
- Customer insights research
- Education campaign
- Travel planning

Travel Demand Management

This project also forms part of a network-wide programme investigating the need for TDM solutions for Greater Christchurch. It follows the development of a Greater Christchurch Travel Demand Management Strategy and a network-wide draft Travel Demand Management Strategic Business Case.

Greater Christchurch Travel Demand Management Strategy (2009)

A Greater Christchurch Travel Demand Management Strategy and Action Plan (GC TDMS) was adopted in 2009 by the Greater Christchurch partners (NZ Transport Agency, Environment Canterbury, Christchurch City Council, Selwyn District Council, and Waimakariri District Council).

The Strategy defines TDM as the application of strategies, policies and initiatives to reduce travel demand, or to redistribute this demand across multiple modes of transport or over longer time-periods of the day. TDM programmes typically attempt to redistribute demand away from SOV trips during peak hours to an increased use of public transport, carpooling and active modes such as walking and cycling.

The GC TDMS identifies a joint policy direction, targets and actions. It sets out four goals:

1. A reduction in the number of trips made by private car (single occupant)
2. An increase in proportion of trips made using sustainable travel options
3. A reduction in the distance travelled between origin and destination
4. A change in the time of travel.

Travel Demand Management Business Case (Draft, 2018)

The Greater Christchurch partners progressed a Strategic Case for TDM in 2018, which provides further context and identifies two draft problem statements:

Problem 1: The current transport system and land use favours travel by car, which if continues will result in increased traffic and congestion, decreasing access to economic and social opportunities as the city grows.

Problem 2: The relative attractiveness of travel in single occupancy vehicles encourages travel behaviours which have broad negative effects to quality of life and liveability of local communities.

Four draft Investment Objectives were also developed with a series of key performance indicators to guide investment planning:

1. Improve the relative attractiveness of non-single occupancy vehicle travel compared to single occupancy vehicle travel in peak periods
2. Improve transport and land use integration to support liveability and reduce vehicle emissions
3. Improve travel time predictability for high occupancy vehicles, public transport and active modes on key corridors
4. Improve safety outcomes.

The draft Strategic Case also identified a wide range of alternatives and options for TDM in Greater Christchurch that are to be considered for further investigation to determine the preferred programme of interventions to achieve these Investment Objectives. This work also resulted in the development of an emerging programme of TDM measures for the northern area of Greater Christchurch.

A copy of the draft Greater Christchurch Strategic Case and the emerging Travel Demand Management Programme for the Northern Area are provided in Appendix A and B.

Purpose of this report

The purpose of this report is to set out the investment case for the implementation of a package of TDM interventions to support the proposed southbound HOV lane on the SH1 Waimakariri Bridge and Christchurch Northern Corridor and identifies next steps required for implementation of these interventions. This report includes:

- A summary of previous work undertaken and an overview of the future growth context
- Identification of the existing transport system and analysis of expected future demand
- A summary of the Investment Objectives and targeted outcomes from the investment
- Identification of the priority TDM measures and how these can achieve the targeted outcomes
- Commentary on supporting downstream TDM interventions (those outside the project area but critical to achieving the Investment Objectives)
- Identification of next steps and a potential implementation strategy
- A summary of the risks and uncertainties

GROWTH CONTEXT

Greater Christchurch currently has a population nearing half a million people as at June 2018. From July 2017 and June 2018, Christchurch City's population increased by 1.8%, slightly lower than the national average of 1.9%. In the year to June 2018, the Selwyn District population increased by 4.8%, while the Waimakariri District population increased by 2.4%.

Future projections indicate this growth will continue over the next 10 years, with an average annual growth rate of 1.2% for Greater Christchurch.

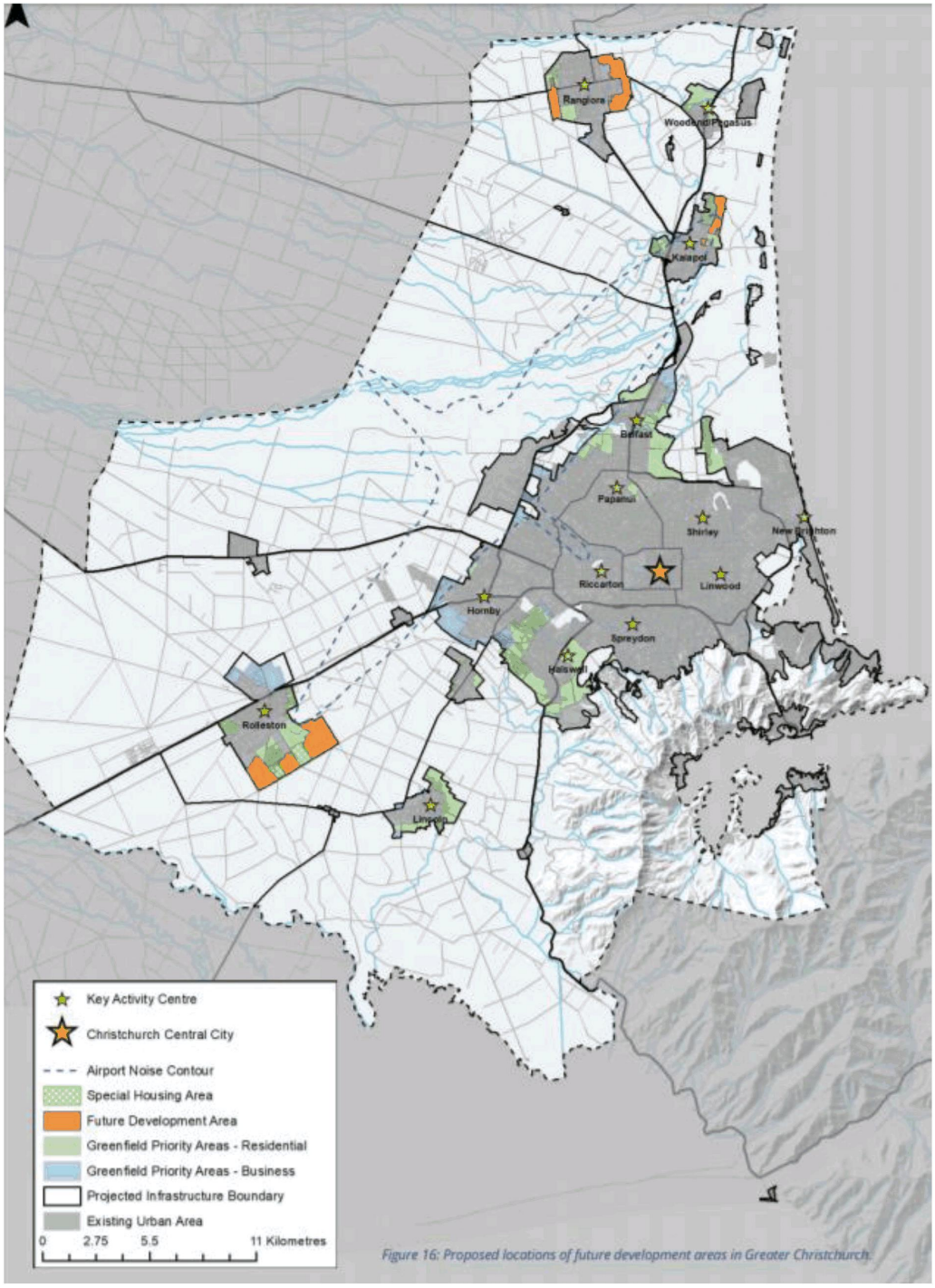
Greater Christchurch experienced rapid population growth to the satellite towns located north of the Waimakariri River immediately following the 2010 and 2011 Canterbury earthquakes. The number of households in this region increased by 29% between 2008 and 2018. Within the same period the population increased by 14,800 people (32%). This high growth trend is forecast to continue with an additional 13,600 to 16,000 new dwellings (approximately 34,000 to 40,000 people) forecast for the Waimakariri District over the next 30 years.

Christchurch City is the key employment hub for the region with over 200,000 employees and 42,000 business located in the Christchurch City Council area. However, both Selwyn and Waimakariri Districts also saw considerable employment and business growth in the period after the earthquakes. Between 2012 and 2017, the number of people employed grew by 14% in Christchurch City, whilst in Selwyn and Waimakariri Districts employment grew by 25%.

Employment growth outstripped population growth in both Christchurch City and the Waimakariri District indicating both a fall in unemployment across the region, increase in the working age people as part of the whole population and the intensification of the regions key activity centres such as Rangiora, Kaiapoi and Rolleston.

The Greater Christchurch Partnership have recently updated the spatial plan (Our Space 2018–2048), which proposes several future development areas as shown in Figure 5.

Figure 5 Proposed locations of future development in Greater Christchurch



TRANSPORT SYSTEM CONTEXT

New infrastructure investment

The Christchurch Northern Corridor was identified as a Roads of National Significance (RoNS) project in 2009. The project was rebranded as the Christchurch Northern Corridor and is currently under construction, which is expected to open in mid-2020.

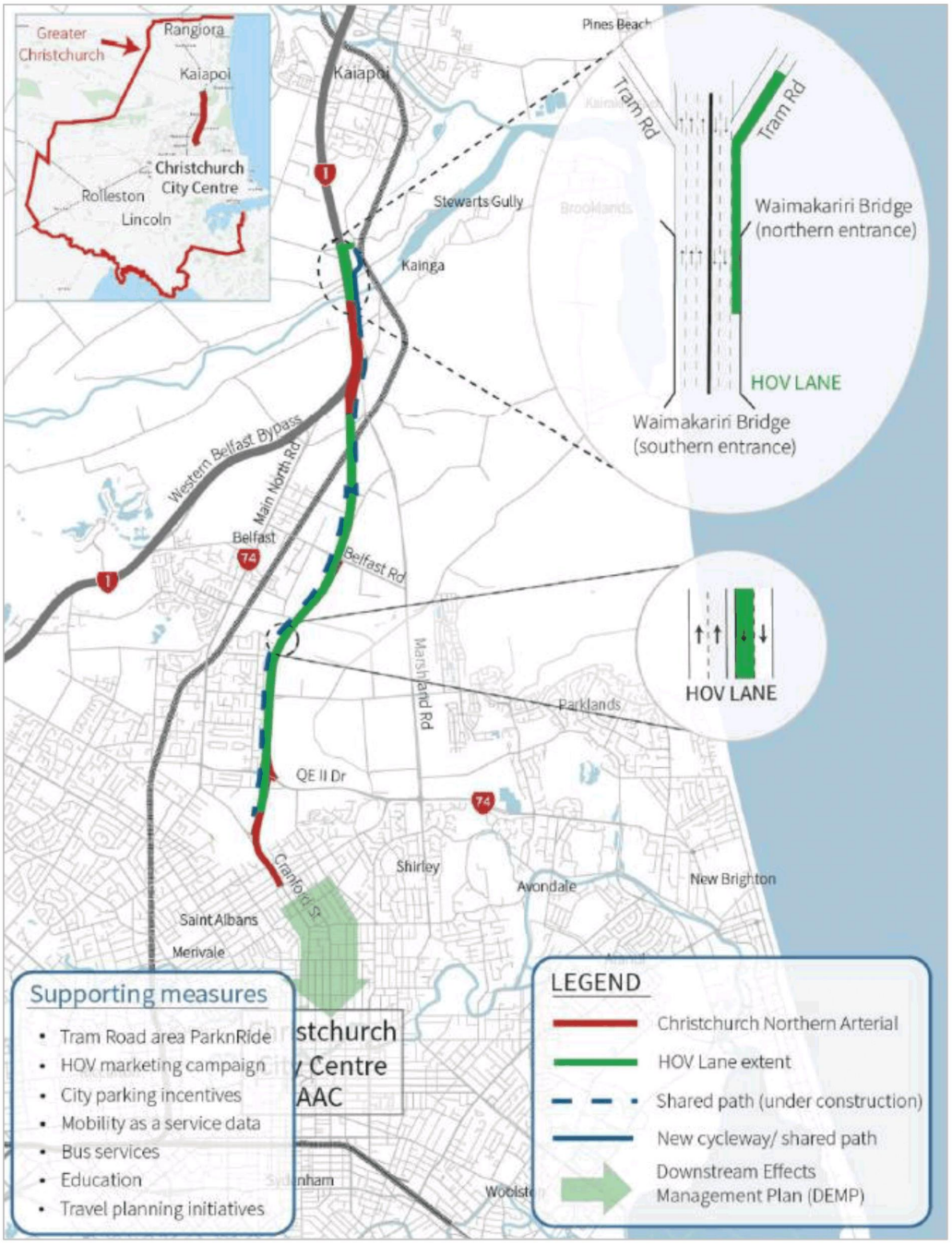
The project aims to provide an improved connection between the SH1 Waimakariri Bridge and Cranford Street in Christchurch City in order to alleviate congestion along Main North Road and Marshland Road.

A full description of the preferred option is provided in the Waimakariri Connectivity Single Stage Business Case (SSBC) (a Detailed Business Case to proceed to Pre-Implementation draft, December 2018) and is summarised in Figure 6.

The project includes:

- The addition of a third north and southbound lane on the Waimakariri Bridge
- A four-lane motorway starting just south of the Waimakariri River to connect with Queen Elizabeth II (QE2) Drive near Winters Road and then continue to link with Cranford Street
- An upgrade of QE2 Drive to four lanes between Main North Road and the northern extent of Innes Road
- An upgrade of Cranford Street to Innes Road to four lanes with an improved Cranford/Innes intersection
- A southbound HOV lane from Tram Road to north of the Cranford Street roundabout
- A shared pedestrian and cycle path running the length of the Christchurch Northern Corridor. A clip-on shared path will be added to the SH1 Waimakariri Bridge
- Shared paths will also link to and improve cycle and pedestrian facilities along QE2 Drive
- From Cranford Street, a Christchurch City Council project will link the Christchurch Northern Corridor cycle facilities to the Papanui Parallel (a Major Cycle Route).

Figure 6 Waimakariri Connectivity SSBC recommended option



Note for the purposes of this study Park and Ride sites have been investigated at several locations and not just Tram Road.

Downstream Effects Management Plan

The Waimakariri Connectivity SSBC also identifies the need to manage the downstream effects of the new corridor. Higher traffic volumes travelling from the north will create additional transport movement demands particularly south of Cranford Street/Innes Road intersection.

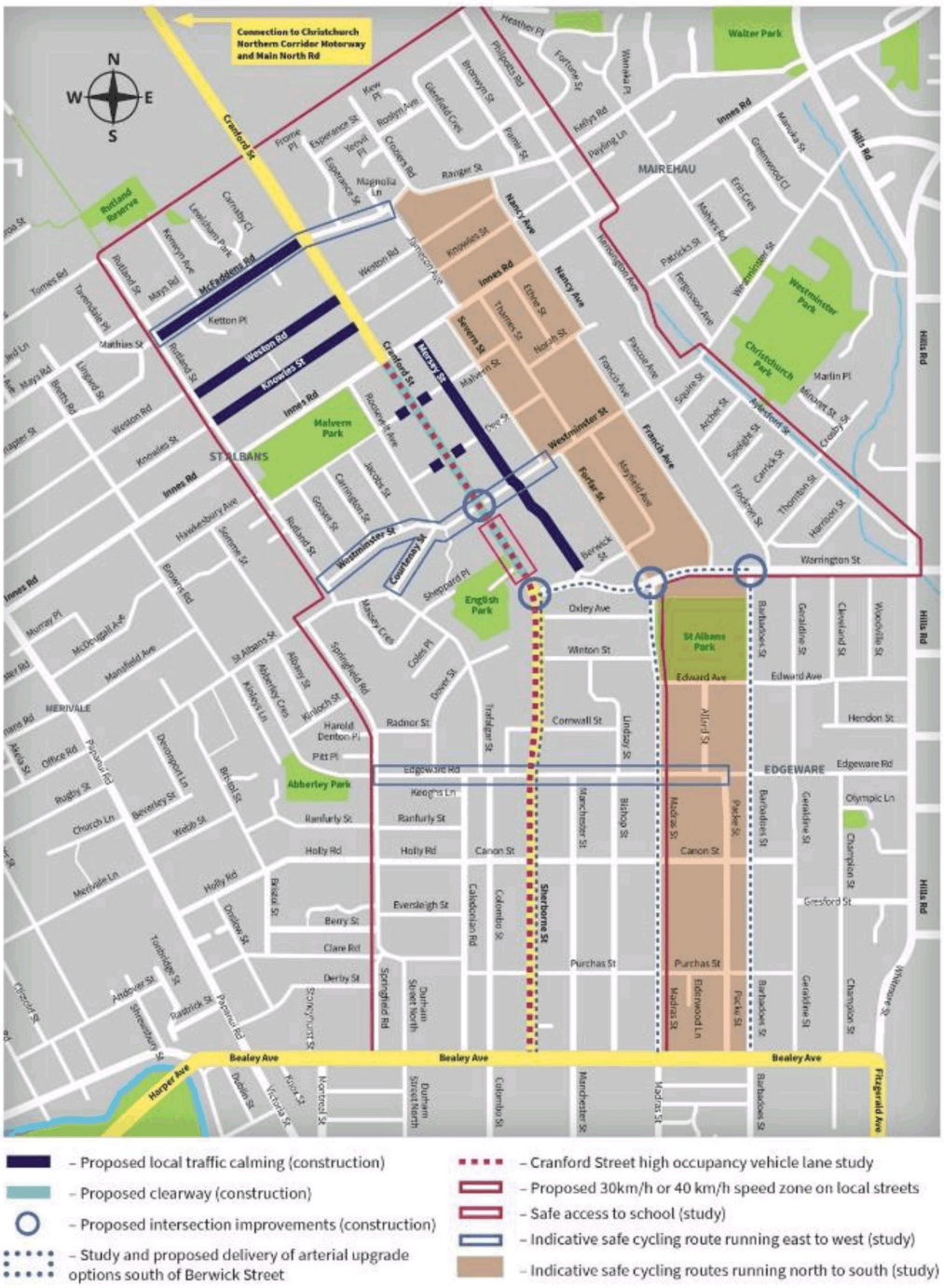
The requirement for a Downstream Effects Management Plan (DEMP) came from an Environment Court ruling when the Christchurch Northern Corridor was approved. Christchurch City Council is responsible for completing the Plan before the opening of the Christchurch Northern Corridor and mitigating the effects additional traffic will have on the local transport network.

A number of draft downstream measures have been identified to mitigate the impacts of this additional demand. These measures are staged based on future traffic volumes and are currently being consulted on as part of the DEMP. The projects proposed in stage 1 before the Christchurch Northern Corridor opens are summarised below and in Figure 7 overleaf:

- Cranford Street clearways: peak period clearways along Cranford Street from Innes Road to Berwick Street
- Westminster Street/Cranford Street intersection: upgrades to Westminster Street/Cranford Street intersection
- Berwick Street/Warrington Street upgrades: upgrading of Berwick Street/Cranford Street intersection and signalisation of the Forfar Street/Warrington Street and Barbadoes Street/Warrington Street intersections
- South of Berwick upgrades: arterial upgrade option downstream of Berwick Street
- High Occupancy Vehicle (HOV) lane on Cranford Street and Sherborne Street: investigate using the peak period clearways as HOV lanes (must have more than one person in the vehicle). This effectively extends the proposed Christchurch Northern Corridor HOV lane south to Bealey Avenue and a northbound HOV lane up Sherborne and Cranford Streets
- Speed limit changes: Introduce nine 30km/h (or 40km/h) reduced speed limit areas through the downstream local road network
- Proposed traffic calming on the following streets:
    - Mersey Street (Innes Road to Berwick Street)
    - Knowles Street (Cranford Street to Rutland Street)
    - Weston Road (Cranford Street to Rutland Street)
    - McFaddens Road (Cranford Street to Rutland Street)
    - Malvern Street – left in and left out only at Cranford Street
    - Dee Street – left in and left out only at Cranford Street
- Proposed safe access to schools and develop and implementation a wayfinding plan
- Undertake a study of an alternative north-south secondary cycle route through traffic calmed streets to the east of Cranford Street
- East-West cycle study to connect the Papanui Parallel and the proposed north-south route

At the time of drafting this report Christchurch City Council is currently seeking public feedback on the recommendations detailed in the draft DEMP. Consultation is due to close on 15th April 2019.

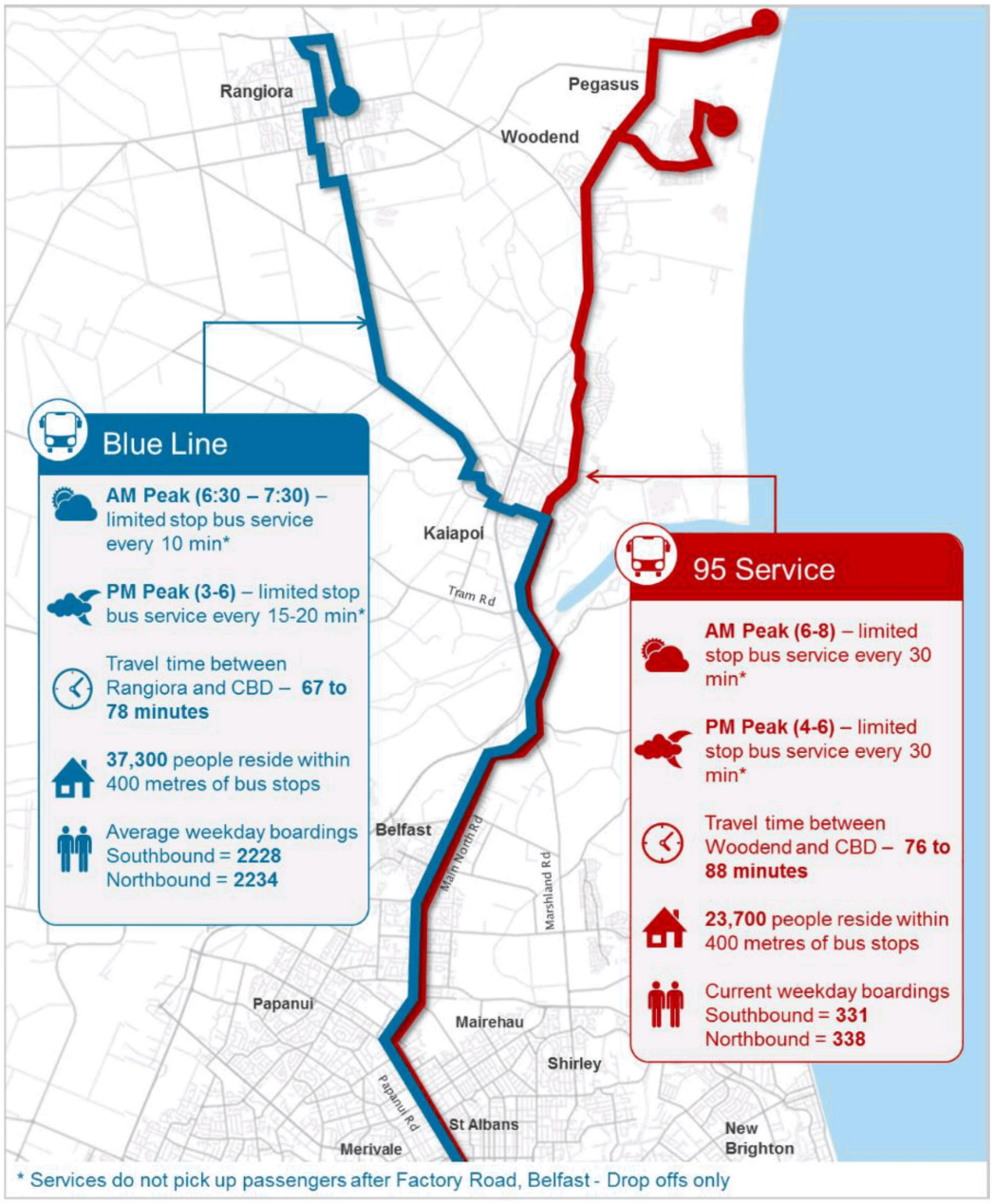
Figure 7 Stage 1 DEMP measures (draft)



Public transport offering

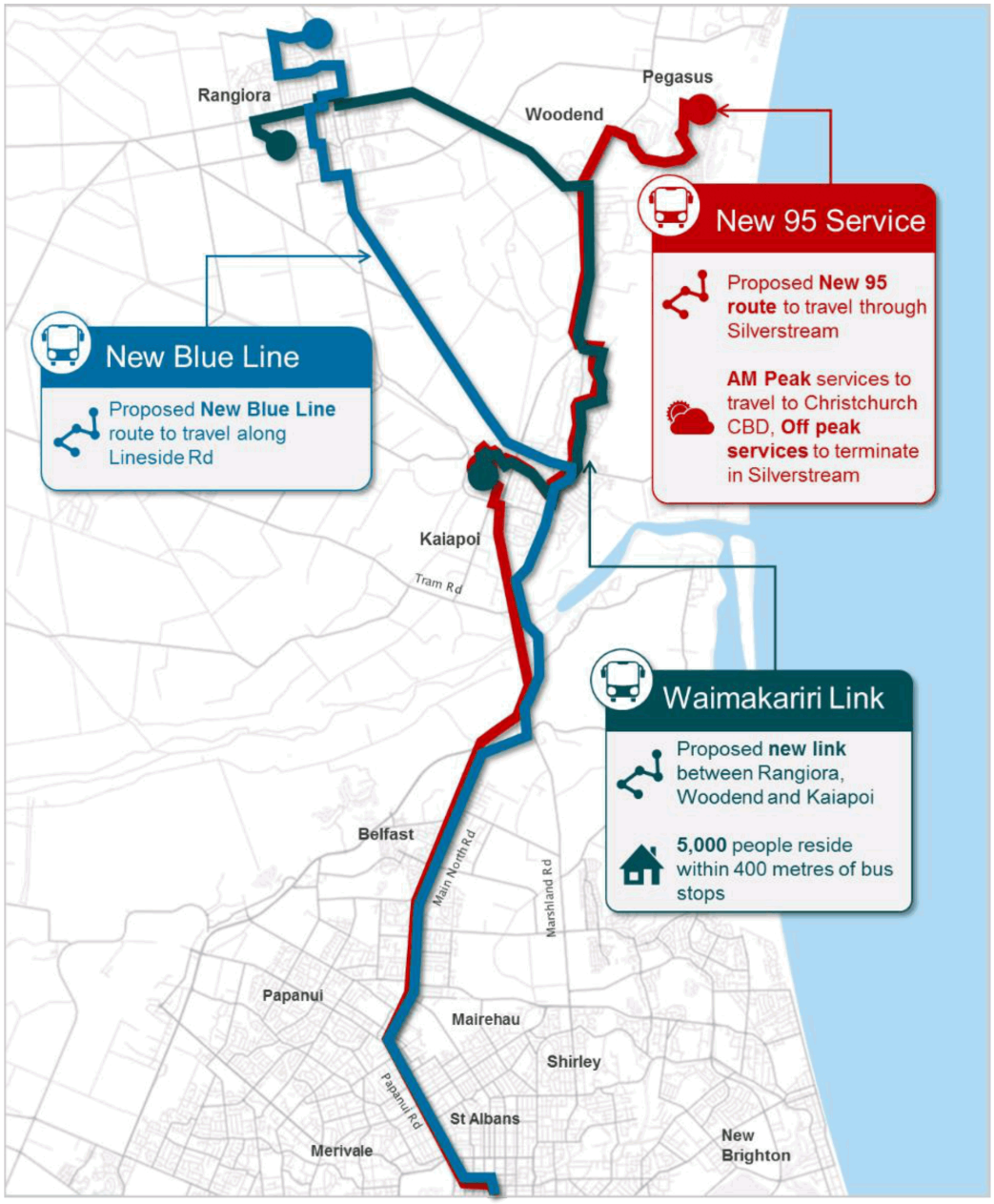
There are currently two existing public transport service routes that serve the suburbs to the north of Waimakariri Bridge. These are the Blue Line bus service that connects Rangiora with Christchurch City and the 95 bus service which connects Woodend, Pegasus and Waikuku to Christchurch City as shown in Figure 8.

Figure 8 Existing transport services serving Waimakariri District



Environment Canterbury are progressing a Waimakariri public transport service review that will shortly be undertaking public consultation. As part of the service review the public will be consulted on potential changes to the routing of the existing Blue Line service and service 95, which are shown in Figure 9 below. A new Waimakariri Link service (from Rangiora to Silverstream via Woodend and Kaiapoi) will also be consulted on in the near future. The Waimakariri Link will provide all-day connections between local suburban areas with connections to frequent services to enable travel to other destinations.

Figure 9 Proposed new transport services serving Waimakariri District



Multi-occupancy vehicle trips

Currently, a low proportion of vehicle trips have greater than one person per vehicle and the majority of the multi-occupancy trips are parents taking children to school. Recent survey data shows that only 4% drive with non-related passengers or are not work colleagues. This indicates that ridesharing or carpooling for journeys from the Waimakariri District across the Waimakariri River into Christchurch City is currently limited. This is further evidenced by the low occupancy rates of vehicles in peak periods. Northern area commuter research undertaken in 2016/17 indicates that 85% of vehicles travelling within the Waimakariri District were single occupant[3].

Anecdotal evidence suggests there is widespread general knowledge of ridesharing app based taxi services. However very few residents have visited the 'Let's Carpool Smart Travel' website. This is an online resource that helps people to connect with each other so that they can carpool. The website matches individuals who share similar origin and destination points and also provides suggestions on the best routes. In the Northern Corridor Commuter's Research 2016 survey it was stated that 80% of respondents had not visited this website[4], potentially suggesting that further marketing and promotion is required.

The demographics and trip purpose of each individual will play a large part in the likelihood of the individual adopting this type of arrangement. Parents needing to drop children off at school prior to going to work, individuals that work in shifts or not typical working hours and people who use their vehicle for their trade are unlikely to adopt carpooling or ridesharing initiatives. It is therefore crucial to understand both the demographic and their reason for travelling.

Walking and cycling

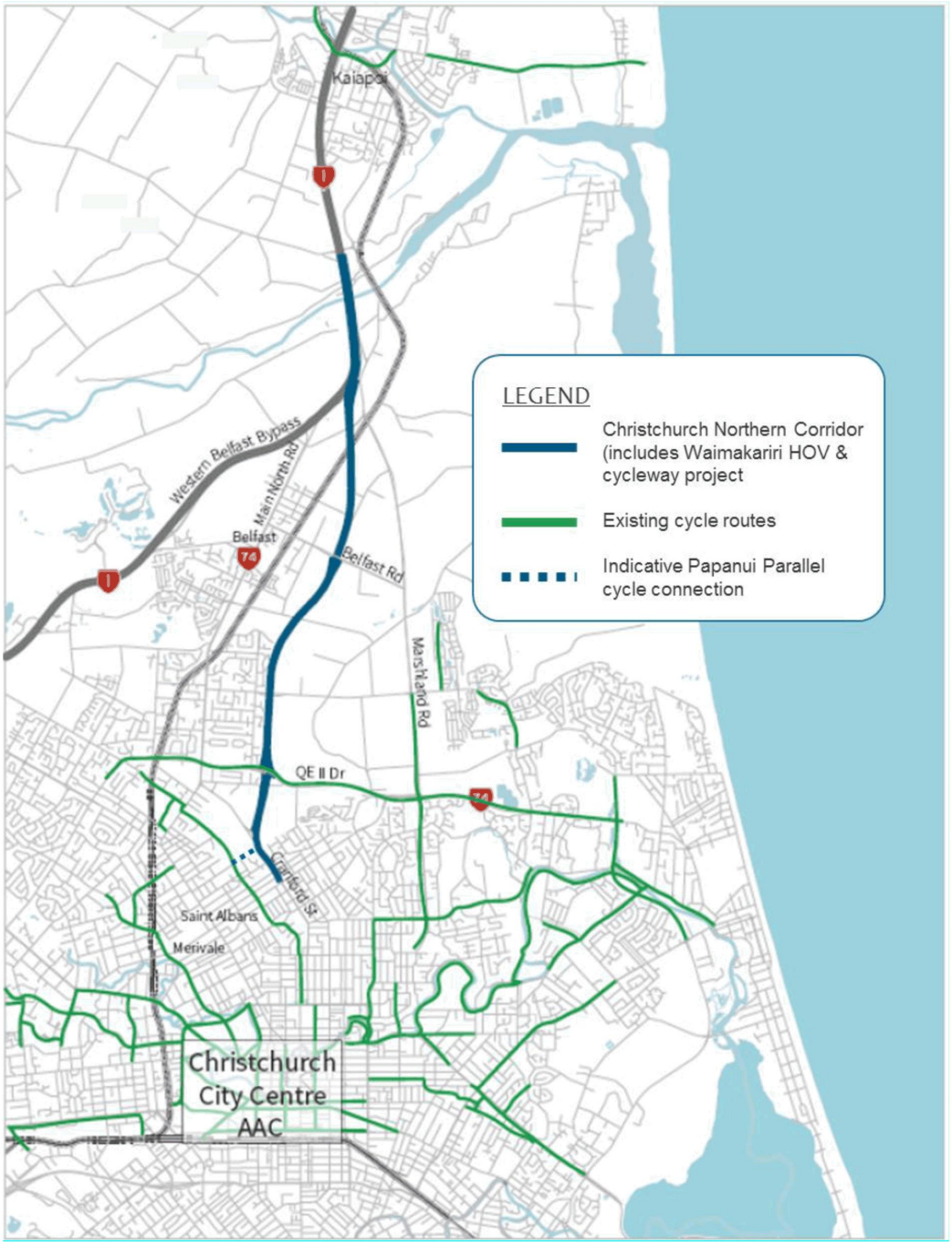
Walking and cycling networks are provided in Kaiapoi, Rangiora and Christchurch City but no dedicated connections are currently provided across the Waimakariri River. State Highway 1 is classified as a motorway environment. As such, pedestrians and cyclists are currently not permitted to use this route. Existing cycleways in northern Christchurch are shown in Figure 10 below.

The recommended option (as detailed in the Waimakariri Connectivity SSBC) is to provide enhanced walking and cycling facilities, including:

- Extension of the Christchurch Northern Corridor shared path across the Waimakariri River on a new dedicated bridge
- Shared path link to Wrights Road
- Two-way on-road cycleway from Wrights Road on the west side of Main North Road to the Tram Road intersection signals.

[3] Research First, Waimakariri District Council, NZ Transport Agency, Northern Corridor Commuter's Research 2016 Research Report, January 2016.
[4] Ibid.

Figure 10 Existing cycle facilities



CUSTOMER INSIGHTS

Customer insight research has formed an essential part of this project. The research has involved gathering information about customers' experiences and using the information gathered to develop insights about an individuals present travel behaviours and to understand their needs to help develop appropriate TDM solutions.

Customer surveys were originally undertaken in January 2016[5] targeting individuals using the Northern Corridor at least once a week for their morning commute. The study has a survey sample of 388 respondents. Recent customer survey data (April, 2019) provides an up to date insight of commuter attitudes and behaviours and how they have changed since 2016. However this study has a slightly smaller survey sample of 265, which should be considered when comparing the two data sets. Key differences are summarised in Figure 11 and Figure 12 below.

It should be noted that since January 2016, there have been a number of variables which will have affected people's travel behaviours and attitudes including:

- City Wide
  - Public transport service changes
  - Major Cycle Routes implemented or currently being designed or constructed
  - Parking provision
  - Micro-mobility uptake (e-scooters and e-bikes)
- Central City
  - Parking provision
  - An Accessible City which improves accessibility for pedestrians, cyclists and public transport in the Central City
- Northern Area
  - The opening of the Western Belfast Bypass

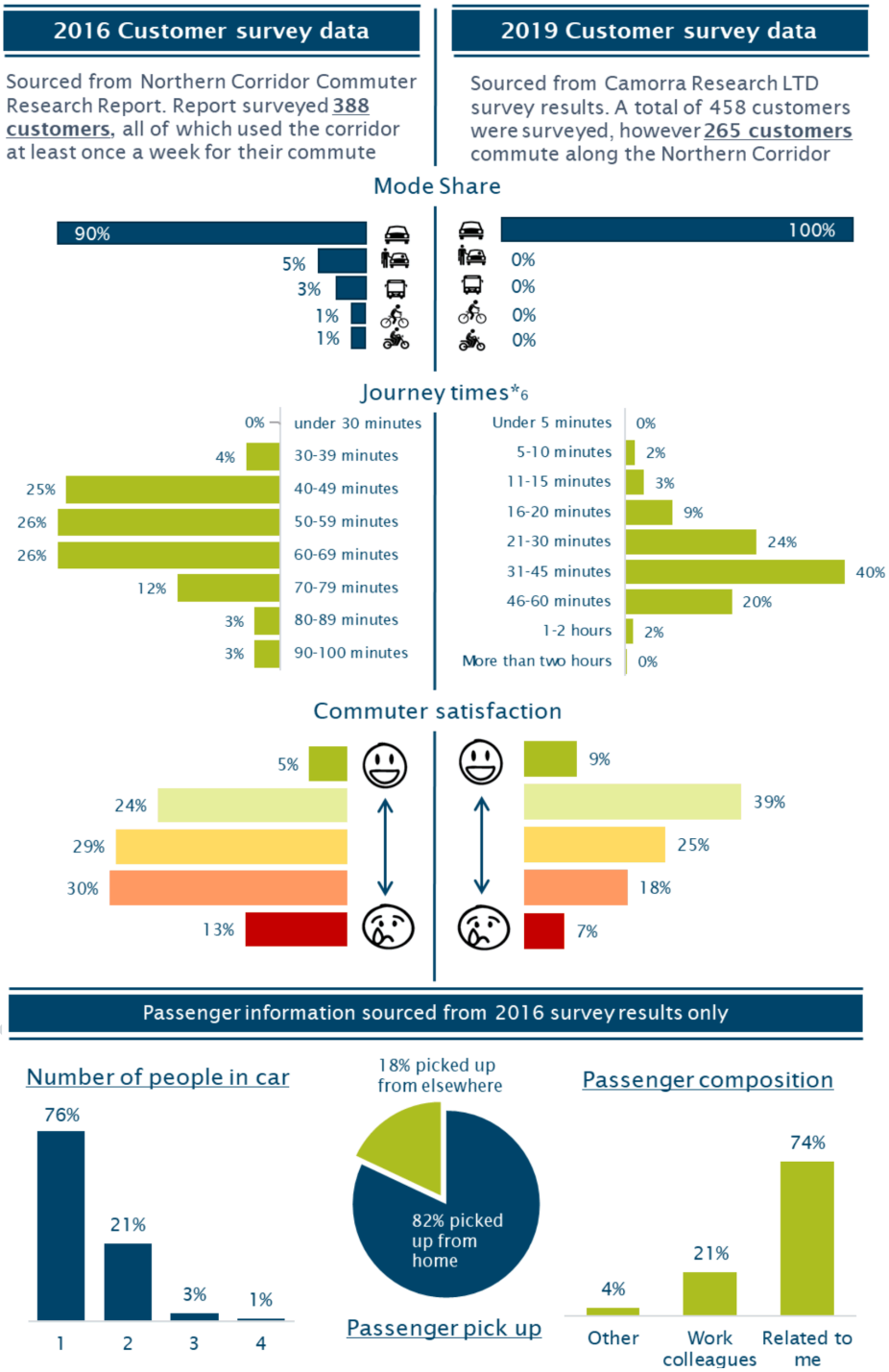
In addition the Waimakariri District has experienced significant population growth within the last few years.

Existing customer behaviour

Customer behaviour patterns and levels of satisfaction with the morning commute for residents north of the Waimakariri Bridge to destinations across the city are summarised in Figure 11. This report has not undertaken targeted analysis based on specific customer segmentation. It is recommended that this work is undertaken by the partners to better understand individual customer segments and their drivers and barriers to behaviour change. These insights will assist in informing a targeted behaviour change campaign.

Figure 11 Existing customer behaviours (2016 vs 2019 customer surveys)[6]

[5] Source: Northern Corridor Commuters Research Report
[6] Note the time groupings for perception of journey time differ between the 2016 and 2019 surveys



The graphic emphasises the high dependency on private vehicles with the majority of people driving as part of their daily commute. It should be noted that 100% of people surveyed in 2019 use either a private or work vehicle for their commute compared with 90% in 2016.

Whilst this may be attributed to the smaller survey sample, the opening of the Western Belfast Bypass may have also contributed to this change in mode share patterns.

Passenger insights have been sourced from 2016 results as there were no passengers identified in the 2019 survey results. In 2016, an average of 76% of those driving did not travel with passengers. Of the 24% of drivers with passengers, the majority were related to the driver and most commenced their morning trips from home. However, 18% of passengers were picked up from somewhere else indicating that there may be some people utilising an 'informal' Park and Ride within the area, or picking up a neighbour or work colleague who lives nearby.

In 2016 the perceived peak travel time from Waimakariri District origins to the Central City was 57 minutes, while the average perceived off-peak travel time was 35 minutes (20 minutes quicker than at peak times). In 2019, journey times had changed significantly, with the majority of people indicating an average travel time of between 31 and 45 minutes. Again this may be attributed to the opening of the Western Belfast Bypass and other city centre initiatives. It may also be the result of fewer construction works along the route.

Subsequently, commuter satisfaction has also shifted, with a higher proportion of respondents being satisfied or highly satisfied with their commute.

Evidently, travel times plays a key role in the overall satisfaction of an individual's commute. Shorter public transport travel times will likely encourage a greater mode shift. However there are several other factors affecting people's travel choices.

Perceptions of alternative travel options

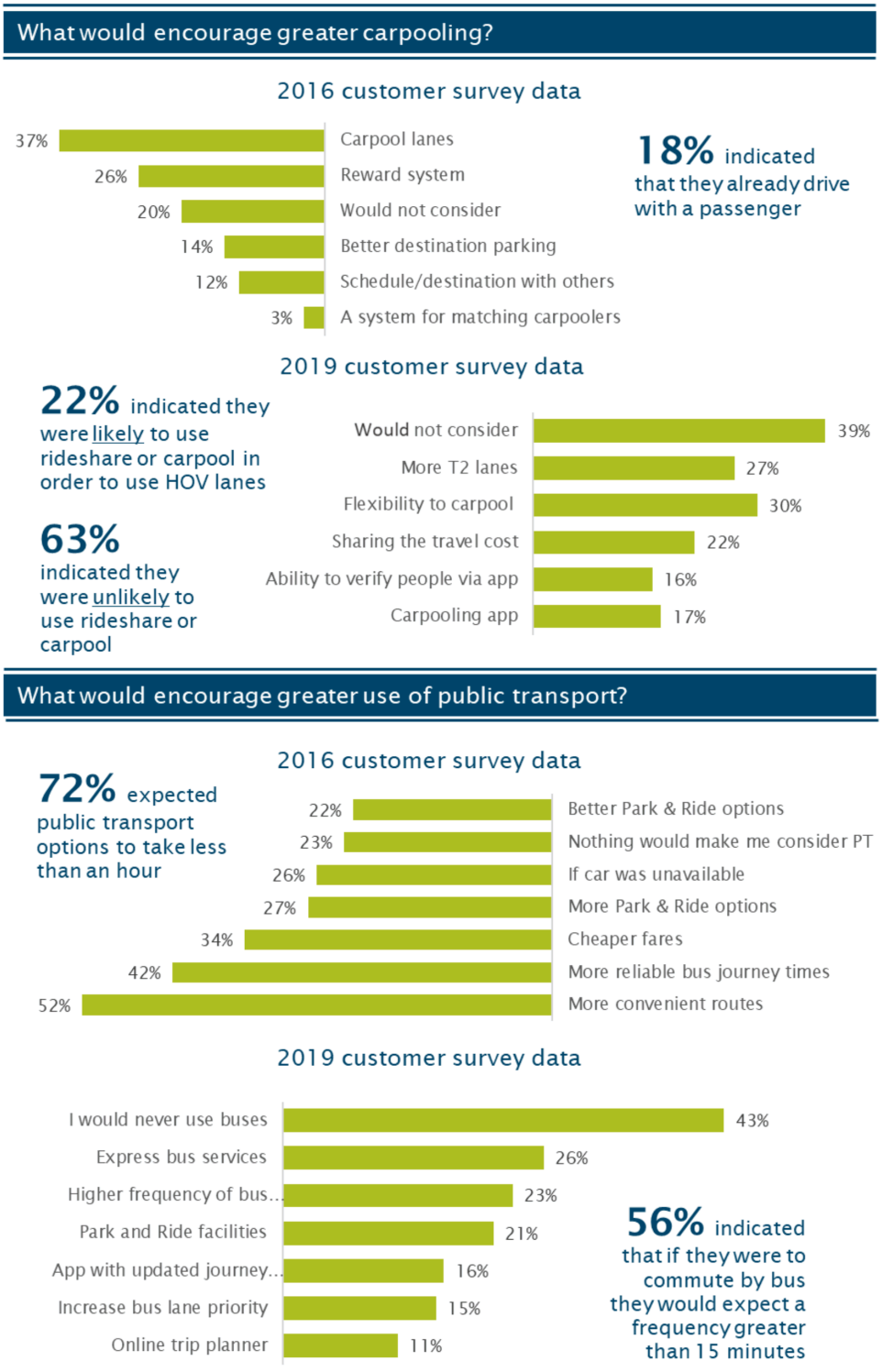
Individuals who usually drove for their commute were asked why they had not considered using other modes of transport, specifically public transport. Both the 2016 and 2019 survey results showed longer travel time to be the number one factor influencing commuters' choices. Other significant factors stopping individuals using public transport include:

- Lack of flexibility
- Bus times and routes being inconvenient
- There were no other viable options for alternative modes of transport

Commuters were then asked what would encourage them to use public transport. In 2016 over half of the respondents stated more convenient routes would have an impact on their travel choices. However, the 2019 results show that both the provision of express bus services and high frequency bus services to be a influencing factor.

It should be noted however, that a much higher proportion indicated an unwillingness to change to public transport in 2019. It is recommended that further targeted analysis be undertaken to determine why there is an unwillingness to change.

Figure 12 Factors influencing behaviour change (2016 vs 2019 survey results)



The potential for carpooling was also tested. High occupancy vehicle lanes, rewards systems for carpooling, a carpooling app and greater flexibility were some of the top initiatives identified by respondents in both 2016 and 2019, which would encourage more people to carpool. However 20% of people in 2016 and 39% in 2019 stated that they would not consider carpooling (see Figure 12).

In 2016, almost 50% of commuters indicated that they might use Park and Ride facilities. In 2019 however, only 22% of respondents stated they were likely to use a Park and Ride facility. The 2016 results also showed the top five locations being Kaiapoi, Rangiora, Tram Road, Woodend and Silverstream, with a total of 36% of respondents indicating that they would drive to the Park and Ride site and 13% indicating that they would ride or walk to the site. In the 2019 survey, only Rangiora and Kaiapoi were tested as potential Park and Ride locations, with slightly more indicating they would prefer Kaiapoi (53%).

STRATEGIC CONTEXT

National policy

Government Policy Statement (GPS) 2018 transforms the focus of investment for land transport in New Zealand. It has resulted in increased funding for public transport, walking and cycling improvements, local road improvements and promotion of road safety and travel demand management activities.

Three key themes have been included in GPS 2018 to assist local authorities to understand how to effectively deliver on the government's transport priorities. The themes influence how projects should be delivered to achieve the best transport solutions for New Zealand. The themes are:

- A mode-neutral approach to transport planning and investment decisions
- Incorporating technology and innovation into the design and delivery of land transport investment
- Integrating land use and transport planning, and delivery.

Figure 13 outlines the strategic priorities for the land transport in GPS 2018.

Figure 13 Government Policy Statement Strategic Priorities

GPS 2018 represents a transformational shift in New Zealand's transport policy that focuses on the wider impacts of transport on the lives of all New Zealanders. In particular it supports:

- A stronger focus on road safety
- An emphasis on "access" as a critical transport outcome and greater focus on providing improved travel options (especially public transport, walking and cycling)
- A greater focus on environmental outcomes
- Improved balance across different transport investment areas in the activity class "funding bands", in particular increased funding for public and active transport.

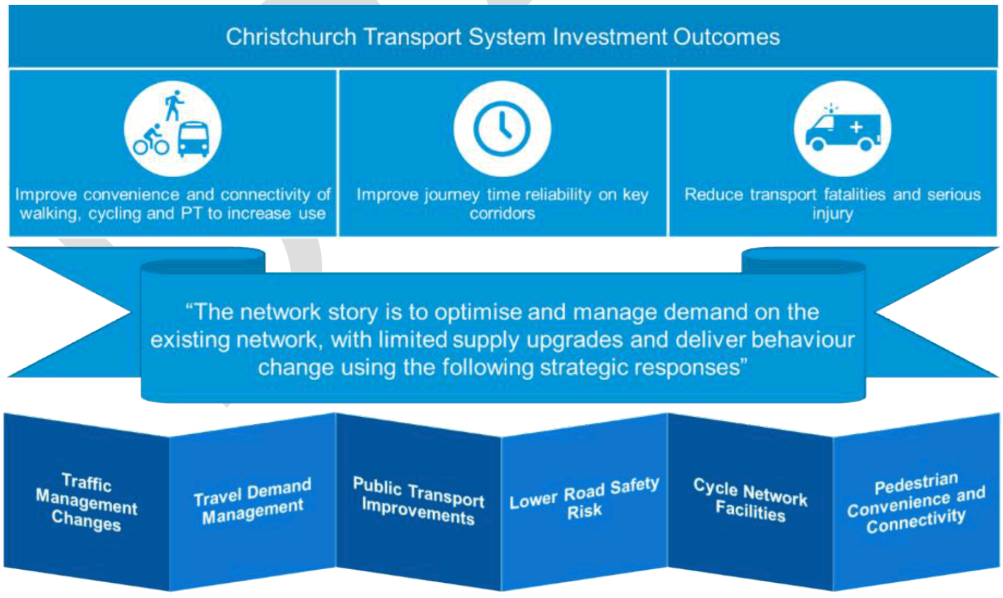
Travel Demand Management is referenced in GPS 2018 as an investment option "*to change people's behaviour and optimise the system's efficiency, for example travel demand management initiatives and technologies can provide people with choices about how to access and move easily between modes*".

Greater Christchurch context

Over the past three years the agencies responsible for transport provision in Greater-Christchurch have been working together to develop an aligned strategic approach to the development of the Greater Christchurch transport system over the next 30 years.

In 2017, a recommended strategic approach was agreed by NZ Transport Agency and Christchurch City Council and summarised in the Greater Christchurch Transport Investment Story and other regional planning frameworks. This framework is based on three integrated components as shown in Figure 14.

Figure 14 Greater Christchurch transport systems investment story

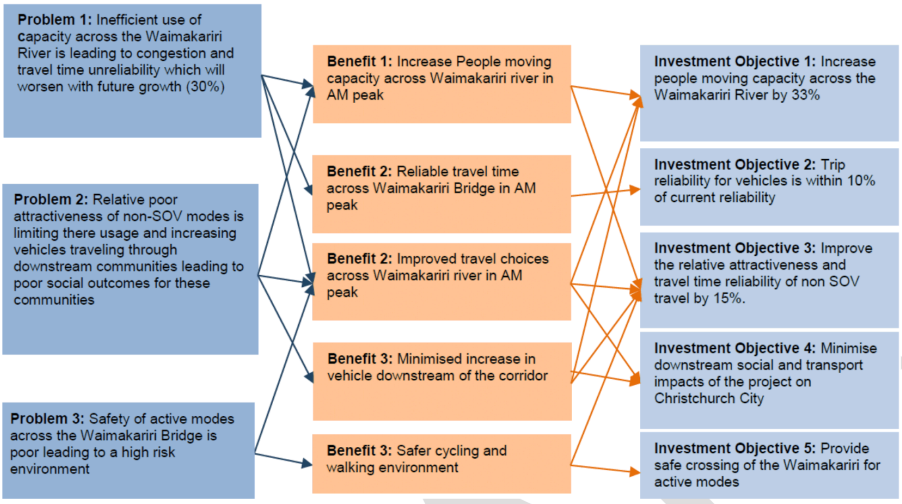


As shown in Figure 14 managing demand and delivering behaviour change forms a key part of the integrated strategic response for Greater Christchurch.

Project context

The draft Waimakariri Connectivity SSBC identified three key problems and benefits, and outlines five key Investment Objectives as shown in Figure 15.

Figure 15 Waimakariri Connectivity SSBC problems, benefits and Investment Objectives



Subsequent to the development of the Waimakariri Connectivity SSBC, the Investment Objectives and performance measures have been reviewed and refined collaboratively with the partners. The refined Investment Objectives are shown in Table 4.

Table 4 Refined Waimakariri Connectivity SSBC Investment Objectives

Waimakariri Connectivity SSBC Investment Objectives (as at December 2018)	Refined Investment Objectives
Investment Objective 1: Increase people moving capacity across the Waimakariri River by 33%	**Investment Objective 1:** Increase the people moving capacity when the HOV lane is operational
Investment Objective 2: Trip reliability for vehicles is within 10% of current reliability	**Investment Objective 2:** Trip reliability for non-SOV vehicles on the Northern Corridor between Tram Road and Bealey Avenue when the HOV lane is operational
Investment Objective 3: Improve the relative attractiveness and travel time reliability of non SOV travel by 15%	**Investment Objective 3:** Improve the attractiveness of high occupancy vehicle travel when the HOV lane is operational
Investment Objective 4: Minimise downstream social and transport impacts of the project on Christchurch City	**Investment Objective 4:** Minimise downstream impacts consistent with the draft DEMP requirements
Investment Objective 5: Provide safe crossing of the Waimakariri for active modes	**Investment Objective 5:** Improve safety outcomes for all customers

To align with the Investment Objectives, the investment partners have further refined the draft Waimakariri Connectivity SSBC key performance indicators and performance measures. These performance measures have been informed by the assessment undertaken for this investment case as shown in Figure 16.

Figure 16 Refined Waimakariri Connectivity Investment Objectives and performance indicators

Objective	KPI/Measure	Baseline	2021	2028	2048
Investment Objective 1: Increase the people moving capacity when the HOV lane is operational	**KPI / Measure 1.1:** Decrease in percentage of SOV mode split in AM peak: • Across the Waimakariri River (SH1 Bridge southbound) • At Cranford/Innes intersection (southbound)	• 85% SOV mode split from Waimakariri District	**Targeted Outcome 1.1:** • 69% SOV mode split by March 2021 across the Waimakariri River (SH1 Bridge southbound) • 62% SOV mode split by March 2021 south of QE2 (southbound)	**Targeted Outcome 1.1:** • 65% SOV mode split by March 2028 across the Waimakariri River (SH1 Bridge southbound) • 58% SOV mode split by March 2028 south of QE2 (southbound)	**Targeted Outcome 1.1:** • 54% SOV mode split by March 2048 across the Waimakariri River (SH1 Bridge southbound) • 46% SOV mode split by March 2048 south of QE2 (southbound)
	KPI / Measure 1.2: Increase in percentage of HOV mode split in AM peak: • Across the Waimakariri River (SH1 Bridge southbound) • At Cranford/Innes intersection (southbound)	• 15% HOV mode split from Waimakariri District	**Targeted Outcome 1.2:** • 27% HOV mode split by March 2021 across the Waimakariri River (SH1 Bridge southbound)* • 34% HOV mode split by March 2021 at Cranford/Innes intersection (southbound)	**Targeted Outcome 1.2:** • 31% HOV mode split by March 2028 across the Waimakariri River (SH1 Bridge southbound)* • 39% HOV mode split by March 2028 at Cranford/Innes intersection (southbound)	**Targeted Outcome 1.2:** • 42% HOV mode split by March 2048 across the Waimakariri River (SH1 Bridge southbound)* • 50% HOV mode split by March 2048 at Cranford/Innes intersection (southbound)
	KPI / Measure 1.3: Increase in average vehicle occupancy in AM peak: • Across the Waimakariri River (SH1 Bridge southbound) • At Cranford/Innes intersection (southbound)	• 1.15 average vehicle occupancy	**Targeted Outcome 1.3:** • 1.3 average vehicle occupancy by March 2021 across the Waimakariri River (SH1 Bridge southbound) • 1.4 average vehicle occupancy by March 2021 at Cranford/Innes intersection (southbound)	**Targeted Outcome 1.3:** • 1.3 average vehicle occupancy by March 2028 across the Waimakariri River (SH1 Bridge southbound) • 1.5 average vehicle occupancy by March 2028 at Cranford/Innes intersection (southbound)	**Targeted Outcome 1.3:** • 1.45 average vehicle occupancy by March 2048 across the Waimakariri River (SH1 Bridge southbound) • 1.85 average vehicle occupancy by March 2048 at Cranford/Innes intersection (southbound)
Investment Objective 2: Trip reliability for non-SOV vehicles between Tram Road and Bealey Avenue when the HOV lane is operational	**KPI / Measure 2.1:** Reduce/ maintain peak travel time variability between Tram Rd and Bealey Ave for each priority mode: • HOV – reduce annual avg. travel time variability • PT – reduce annual avg. travel time variability	▪ Annual average travel time variability of 80 seconds	**Targeted Outcome 2.1:** • Achieve annual average travel time variability within 1 minute for HOV's (along extent of priority lane) by March 2021 • Achieve annual average travel time variability within 1 minute for PT by March 2021	**Targeted Outcome 2.1:** ▪ The same or better than 2021 ▪ The same or better than 2021	**Targeted Outcome 2.1:** ▪ The same or better than 2021 ▪ The same or better than 2021
Investment Objective 3: Improve the attractiveness of high occupancy vehicle travel when the HOV lane is operational	**KPI / Measure 3.1:** Reduce the travel time of HOV's comparable to SOV's in the AM peak for trips between: • Tram Rd and Bealey Ave • Tram Rd and Cranford/Innes intersection	▪ HOV travel time is currently the same as SOV	**Targeted Outcome 3.1:** • HOV 10 minutes quicker by March 2021 for AM peak trips between Tram Rd and Bealey Ave • HOV 6 minutes quicker by March 2021 for AM peak trips between Tram Rd and Cranford/Innes intersection	**Targeted Outcome 3.1:** • HOV 12 minutes quicker by March 2028 for AM peak trips between Tram Rd and Bealey Ave • HOV 8 minutes quicker by March 2028 for AM peak trips between Tram Rd and Cranford/Innes intersection	**Targeted Outcome 3.1:** • HOV 20 minutes quicker by March 2048 for AM peak trips between Tram Rd and Bealey Ave • HOV 12 minutes quicker by March 2048 for AM peak trips between Tram Rd and Cranford/Innes intersection
	KPI / Measure 3.2: Reduce the travel time difference between public transport and SOV's in the AM peak for trips between: • Tram Road and Bealey Avenue • Tram Road and Cranford/Innes	▪ HOV travel time is currently the same as SOV	**Targeted Outcome 3.2:** • PT trips between Tram Road and Bealey Avenue to be at least 8 minutes quicker than SOV by March 2021 • PT trips between Tram Road to Cranford/Innes to be at least 6 minutes quicker than SOV by March 2021	**Targeted Outcome 3.2:** • PT trips between Tram Road and Bealey Avenue to be at least 10 minutes quicker than SOV by March 2028 • PT trips between Tram Road to Cranford/Innes to be at least 8 minutes quicker than SOV by March 2028	**Targeted Outcome 3.2:** • PT trips between Tram Road and Bealey Avenue to be at least 18 minutes quicker than SOV by March 2048 • PT trips between Tram Road to Cranford/Innes to be at least 12 minutes quicker than SOV by March 2048
Investment Objective 4: Minimise downstream impacts consistent with the draft DEMP requirements	**KPI / Measure 4.1:** Limit the number of additional vehicles on Cranford St prior to the Innes Rd intersection	▪ 1,000 vehicles per hour on Cranford St (prior to Innes Rd intersection)	**Targeted Outcome 4.1:** No more than 1,800 vehicles per hour on Cranford St (prior to Innes Rd intersection) by March 2021	**Targeted Outcome 4.1:** No more than 1,800 vehicles per hour on Cranford St (prior to Innes Rd intersection) by March 2028	**Targeted Outcome 4.1:** No more than 1,800 vehicles per hour on Cranford St (prior to Innes Rd intersection) by March 2048
Investment Objective 5: Improve safety outcomes for all customers	**KPI / Measure 5.1:** Minimise the severity and number of accidents on the northern corridor by maintaining the KiwiRAP star rating and the personal risk rating	▪ 5 star safety rating and a personal risk rating of low on the northern corridor	**Targeted Outcome 5.1:** Maintain 5 star safety rating and a personal risk rating of low on the northern corridor	**Targeted Outcome 5.1:** Maintain 5 star safety rating and a personal risk rating of low on the northern corridor	**Targeted Outcome 5.1:** Maintain 5 star safety rating and a personal risk rating of low on the northern corridor
	KPI / Measure 5.2: Reduce the number of active mode accidents between Tram Rd and Bealey Ave as a proportion of mode share (5 year)	▪ 9 active mode injury accidents between Tram Rd and Bealey Ave	**Targeted Outcome 5.2:** No more than 9 active mode injury accidents between Tram Rd and Bealey Ave by March 2026	**Targeted Outcome 5.2:** No more than 9 active mode injury accidents between Tram Rd and Bealey Ave by March 2028	**Targeted Outcome 5.2:** No more than 9 active mode injury accidents between Tram Rd and Bealey Ave by March 2048
	KPI / Measure 5.3: Increase the proportion of respondents to an annual survey who perceive non-SOV modes to be safe	▪ 96% of users perceive PT to be safe ▪ 96% of users perceive carpooling to be safe ▪ 77% of users perceive cycling to be safe	**Targeted Outcome 5.3**: The proportion of respondents who feel safe using non-SOV travel modes by 2021 to be equal or better than 96% for PT, 96% for carpooling, and 77% for cycling	**Targeted Outcome 5.3**: The proportion of respondents who feel safe using non-SOV travel modes by 2028 to be equal or better than 96% for PT, 96% for carpooling, and 77% for cycling	**Targeted Outcome 5.3**: The proportion of respondents who feel safe using non-SOV travel modes by 2048 to be equal or better than 96% for PT, 96% for carpooling, and 77% for cycling

USER DEMAND ON THE CHRISTCHURCH NORTHERN CORRIDOR

The design of the TDM interventions will rely heavily on the existing and future user demand along the Christchurch Northern Corridor and the potential or propensity for customers to change their travel behaviours. As such, a transport assessment has been undertaken to better understand the existing and future travel movements and the potential for change.

Transport models

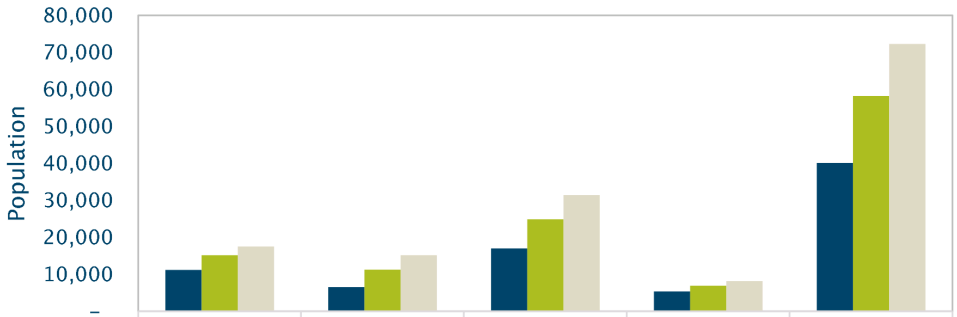
Travel demand forecasts have been developed by Flow Transportation Specialists utilising the latest version of the Christchurch Transport Model (CTM) and the Christchurch Assignment and Simulation Traffic (CAST) model. The CTM is a strategic transport model which develops travel demand forecasts by mode. The CAST model is a more detailed traffic model that takes initial inputs of traffic demands from the CTM, and it assigns those vehicles to the road network.

The study has used the latest versions of these models (V18), reflecting the latest land use forecasts. It is acknowledged that this is a recently updated version which has yet to be subject to peer review. The model uses 2013 as the base year, and forecast demands for this study have been assessed for 2028 and 2048. It is noted that 2038 forecasts are also available.

Transport models growth assumptions

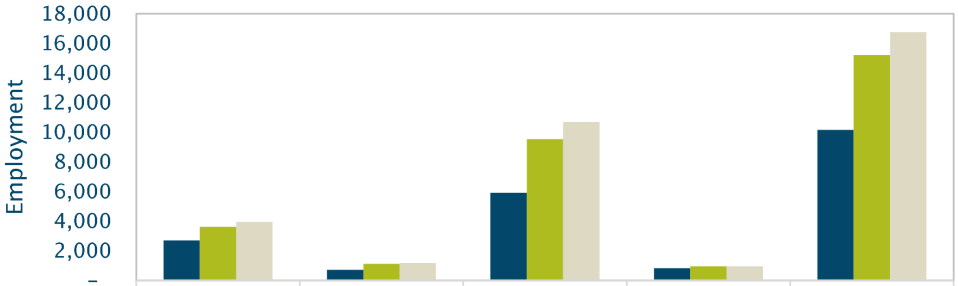
Figure 17 and Figure 18 outline the land use forecasts inputs from the CTM model.

Figure 17 Population forecast



	Kaiapoi	Woodend	Rangiora	Mandeville	Total
2013	11,180	6,580	16,990	5,340	40,100
2028	15,140	11,230	24,890	6,920	58,180
2048	17,520	15,180	31,410	8,130	72,240

Figure 18 Employment forecast assumptions



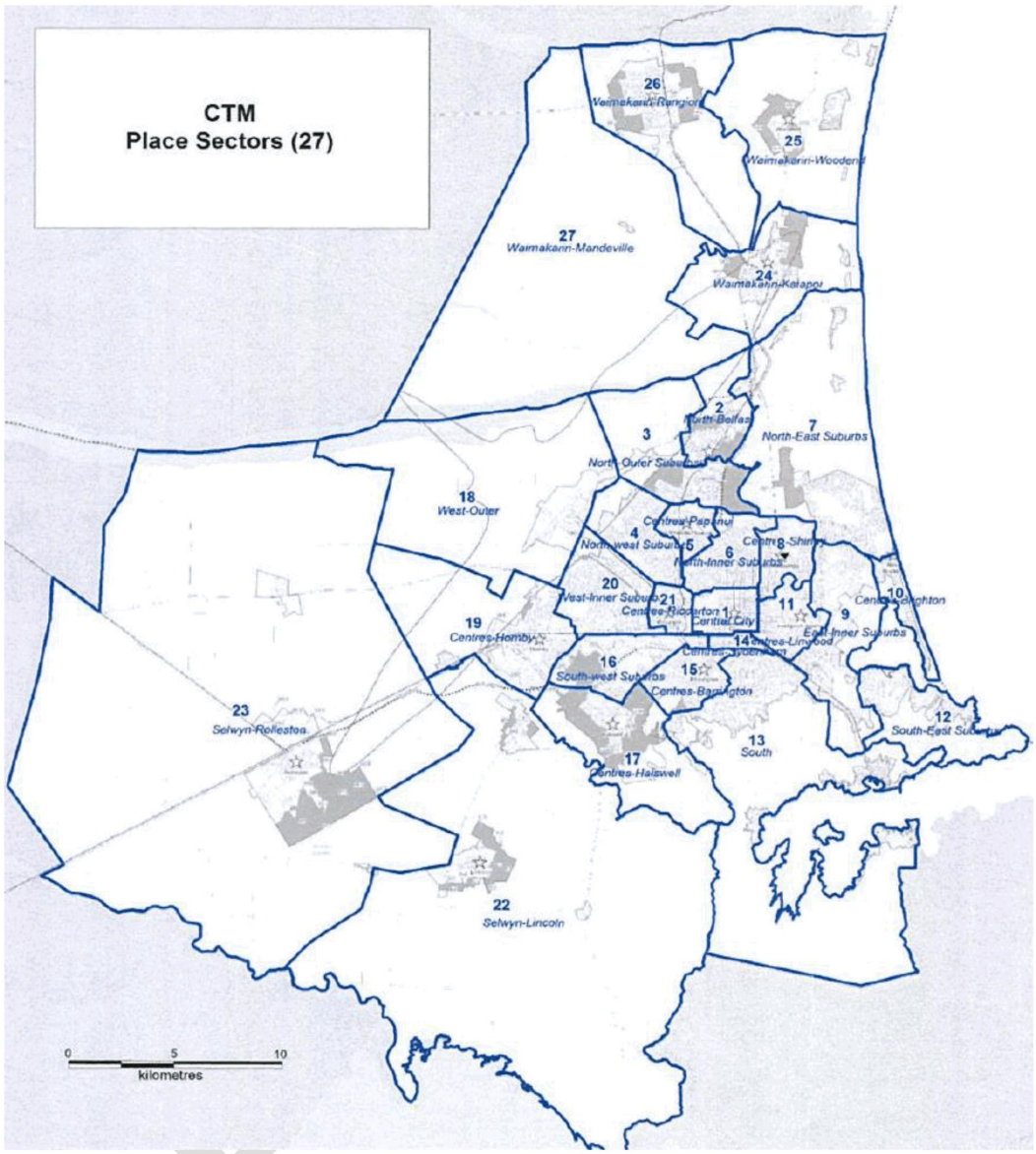
	Kaiapoi	Woodend	Rangiora	Mandeville	Total
2013	2,700	720	5,920	830	10,160
2028	3,610	1,110	9,540	960	15,210
2048	3,940	1,170	10,690	960	16,760

The figures above indicate an increase in the total population from around 40,000 in 2013 to over 72,000 in 2048; an increase of about 80%. Employment is predicted to increase from over 10,000 to almost 17,000; an increase of 65%. The result of a disproportionate number of population to employment growth indicates there will be increased people movement demand into Christchurch City faster than population growth.

Transport model: origin – destination patterns

Demands from the CTM are regularly aggregated into 27 sectors as shown in Figure 19. This study focuses on travel movements of residents living in the Waimakariri District (sectors 24 to 27).

Figure 19 Map of the 27 CTM sectors

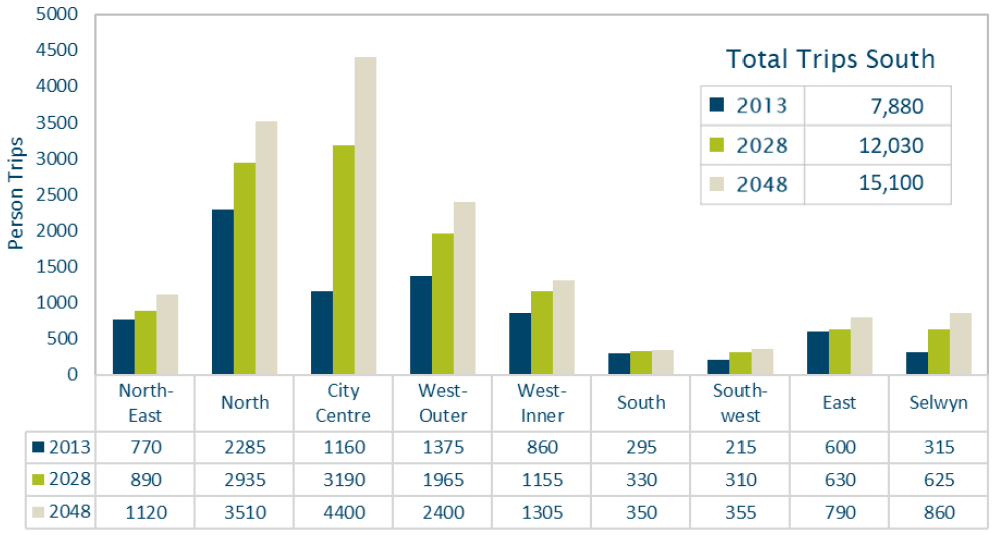


The two largest destinations from Waimakariri District by 2048 will be the Northern Sector and the City Centre Sector as shown in

Figure 20 below[7]. These two destinations also attract the greatest growth in demand from Waimakariri District. By 2048 over 50% of all Waimakariri District southbound trips will be to the North and City Centre Sectors indicating a need for the Christchurch Northern Corridor improvements and supporting TDM measures.

[7] See Appendix C for detailed origin – destination data

Figure 20 Total person trips travelling south from Waimakariri by destination (morning peak period, 0700-0900)



	North-East	North	City Centre	West-Outer	West-Inner	South	South-west	East	Selwyn
2013	770	2285	1160	1375	860	295	215	600	315
2028	890	2935	3190	1965	1155	330	310	630	625
2048	1120	3510	4400	2400	1305	350	355	790	860

It is noted that the majority of trips still start and end within the Waimakariri District itself. Rangiora is the number one destination for residents originating from Woodend and Mandeville and is the second key destination (after the city centre) for residents of Kaiapoi[8].

This indicates that of the 27 sectors modelled, the City Centre and Rangiora are the two most popular destinations for people living in the Waimakariri District. The northern sectors also prove to be a key destination for residents travelling south.

The HOV lane over the Waimakariri River and encouraging greater uptake of non-single occupant vehicles is essential given the forecast growth in the Waimakariri District and demand for travel to Christchurch areas. Without greater uptake of non-single occupant vehicles it is expected that the corridor will exceed capacity at the Waimakariri Bridge a couple of years after opening. The growth projections also mean that the capacity shortfall will get significantly worse over time without a shift away from SOV's.

In order to better inform the design and implementation of the supporting TDM measures, the following analysis provides an overview of the primary destinations for people travelling south from Waimakariri District to three key destination areas in 2048, based on the CTM forecasts:

- North of QE2 Drive
- South of QE2 Drive
- Christchurch City and sectors immediately to the north and south of Christchurch City

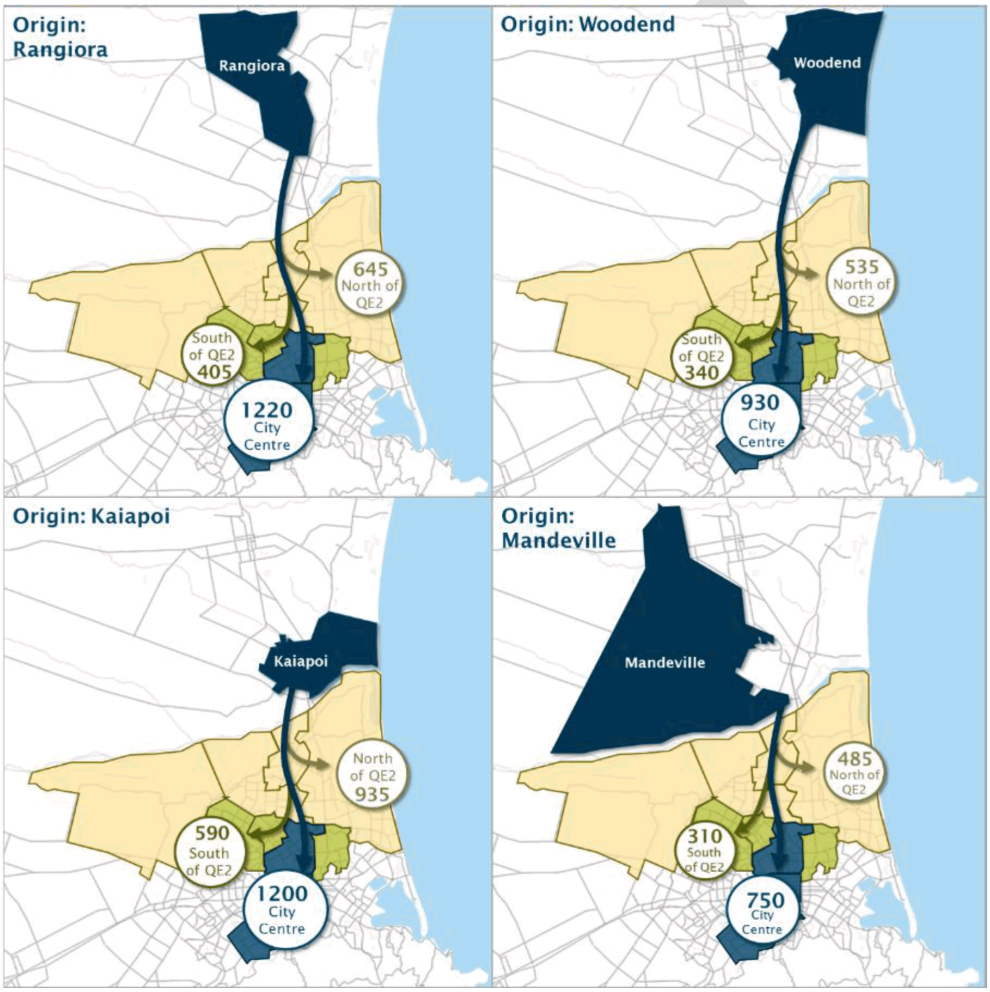
By 2048, 15,030 people are predicted to travel south over the Waimakariri Bridge during the AM (2 hour) peak period. Over one third of these trips (5,475) are predicted to continue south of QE2 Drive and into the Central City (see Figure 21).

[8] This excludes trips which start and end in the same sector

Figure 21 and Figure 22 below outlines the total number of AM peak person trips predicted to travel to each designated area for 2028 and 2048 (note that 2028 values are the closest predicted values to the time of opening based on CTM modelling forecasts). The figure highlights that Rangiora has the largest number of trips heading to the Central City. Kaiapoi, however, has the largest number of total trips heading south, with a more even distribution of trips heading to each of the three destinations.

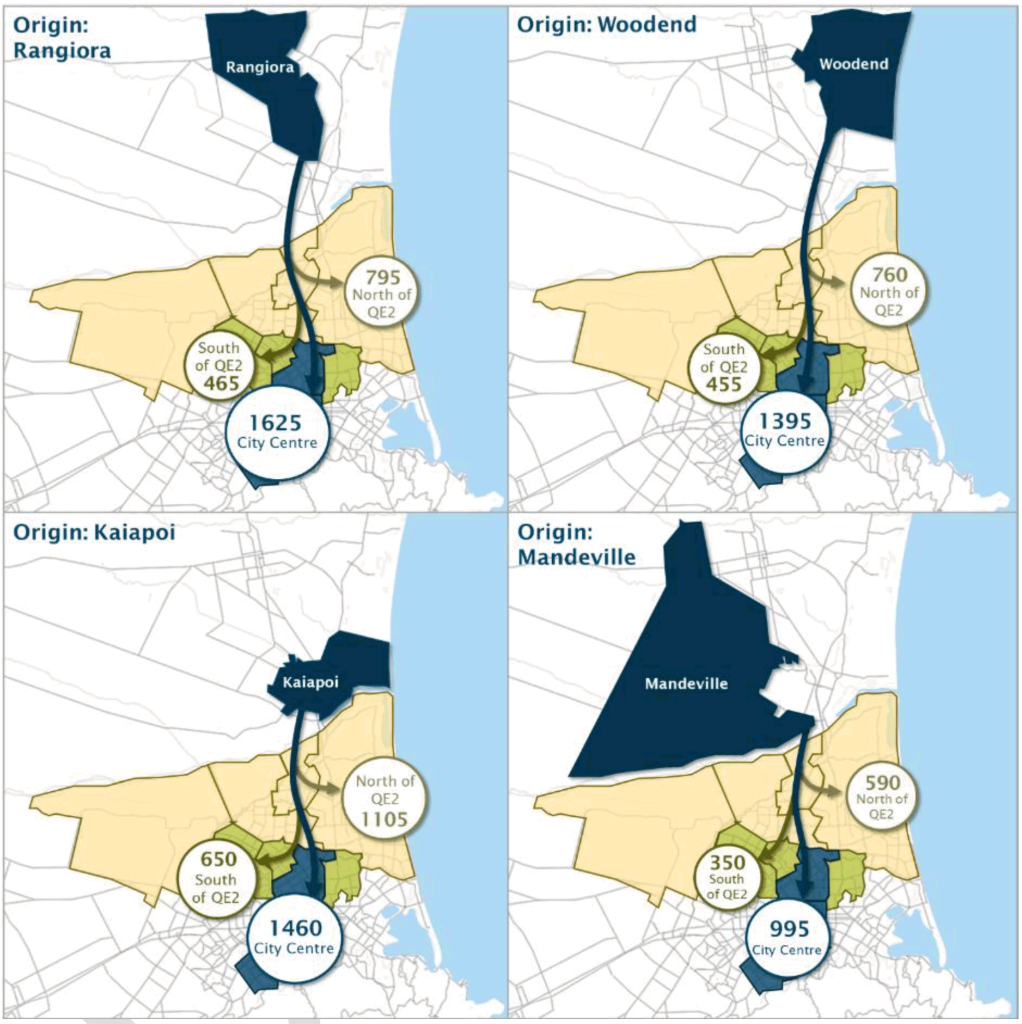
This data supports the proposal to retain the existing Blue Line and 95 services from Waimakariri District as they will likely continue to serve the existing demand for destinations within the northern sector (Main North Road, Belfast, Northlands, and Papanui Road).

Figure 21 Origin – destination maps (2028 AM peak person trips, 0700–0900)[9]



[9] Note the city centre figures shown include CTM sector 1 (Christchurch Central) as well as CTM sector 6 immediately north of the city centre and CTM sectors 14 and 15 immediately south of the city centre

Figure 22 Origin – destination maps (2048 AM peak person trips, 0700–0900)[10]



Origin – destination patterns and behaviour change opportunities

Traffic flow predictions have been analysed for the morning peak hour in 2028 and 2048, from the CAST model. Forecast flows have been provided for three time periods within the morning peak period: 0700–0730, 0730–0800, and for 0800–0900.

Information collated during the preparation of the Waimakariri Connectivity SSBC demonstrated that the highest flows occur at the early part of the morning peak period. The CAST model reflects this situation, meaning that this report has focussed on the period 0700–0730 although all flows are provided in terms of vehicles/hour and persons/hour (i.e. not over 30 minutes).

[10] Note the city centre figures shown include CTM sector 1 (Christchurch Central) as well as CTM sector 6 immediately north of the city centre and CTM sectors 14 and 15 immediately south of the city centre

2021 Forecasts

To better understand the potential for behaviour change in the short term, traffic demands have been analysed for the year 2021 after the opening of the Christchurch Northern Corridor in mid-2020. The 2028 forecasts have been reduced back to approximate 2021 value on the basis of a factor of 0.93 (i.e. reflecting 1% growth per year). This has been the growth rate over the Waimakariri Bridge over the last few years, according to data on the NZ Transport Agency website. This method was considered preferable to the option of extrapolating a 2018 base model to 2021 values, as the 2018 models do not include the Christchurch Northern Corridor project.

The CAST model currently codes the lanes along the Northern Corridor as general traffic lanes, without the provision of an HOV lane. In order to assess the likely traffic conditions along the route with HOV lanes, 15% of the vehicles in the 2021 forecasts have been assumed to be HOV's (based on existing vehicle occupancy rates identified in the Waimakariri Connectivity SSBC).

The SOV flows have then been compared against the capacity of the general traffic lanes, on the basis of a capacity of 1,800 vehicles per hour, per lane along the State Highway[11]. A capacity of 2,000 vehicles/hour is often assumed for the capacity of a motorway lane, but the lower value of 1,800 vehicles/hour is considered to be more appropriate for an area with merging and weaving manoeuvres.

The analysis indicates that congestion for SOV's is anticipated at a number of locations along the route. It is recognised that the first (northernmost) "pinch point" will likely limit the rate of flow that can reach subsequent "pinch points" downstream. Taking this into consideration and adjusting the traffic flows to take account of the proportion of vehicles joining and exiting the route (for example exiting to reach the Western Belfast Bypass), the following reduced arrival flows have been forecasted and are summarised in Figure 23.

It is noted that the SOV flow south of the Belfast on ramp is predicted to be the same as that to the north of the on ramp. This assumes that if the SOV lane to the north of the on ramp is running at 100% capacity, then no additional traffic will be able to pass through the section to the south of the on ramp.

In addition the congestion further north will "shield" congestion on Cranford Street. In particular, we note that the CAST model is predicting quite low flows on Cranford Street, south of Innes Road. The model includes the proposed additional lane for through traffic, at the Innes Road intersection, but Cranford Street then narrows back to one southbound through lane south of the intersection (in the model, as is currently proposed, without the supporting TDM measures).

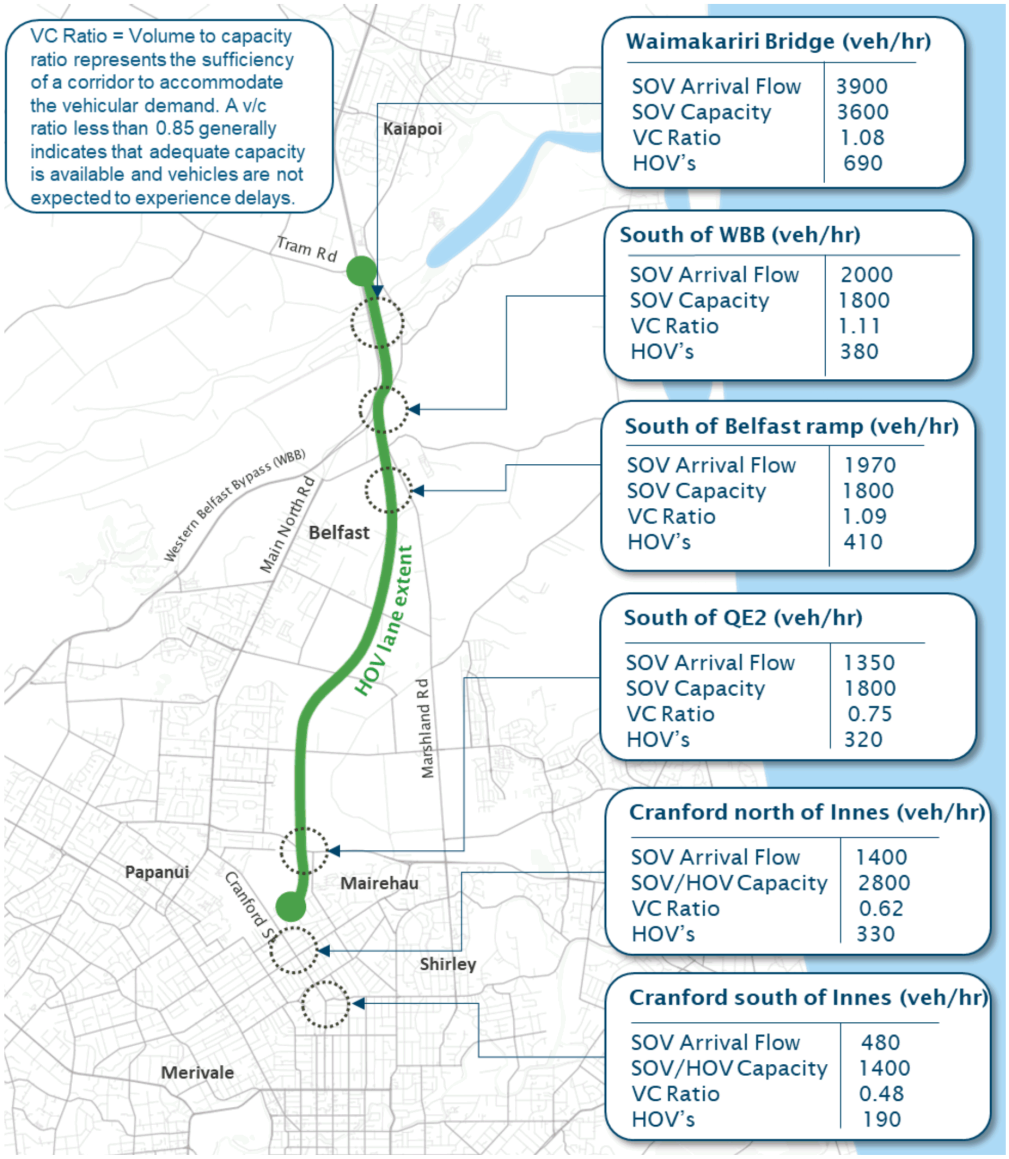
It appears that the model is reassigning traffic away from this route, as significant volumes of southbound traffic on Cranford Street are predicted to turn left or right at Innes Road. This reasonably reflects the scenario tested in the CAST model, with general traffic lanes along the Christchurch Northern Corridor able to deliver higher volumes of traffic to Cranford Street.

However, if the HOV lane is provided along the Christchurch Northern Corridor next to a general traffic lane, then the arrival flow reaching Cranford Street will be reduced. As such, some traffic would probably reassign back onto Cranford Street, south of Innes Road, under

[11] As per lane configuration shown in Figure 6 (Waimakariri Connectivity SSBC Recommended Option)

the HOV scenario. As such the flows currently forecast for Cranford Street, south of Innes Road should be viewed with caution.

Figure 23 Traffic forecasts 2021 AM peak (vehicles per hour, arrival flows)



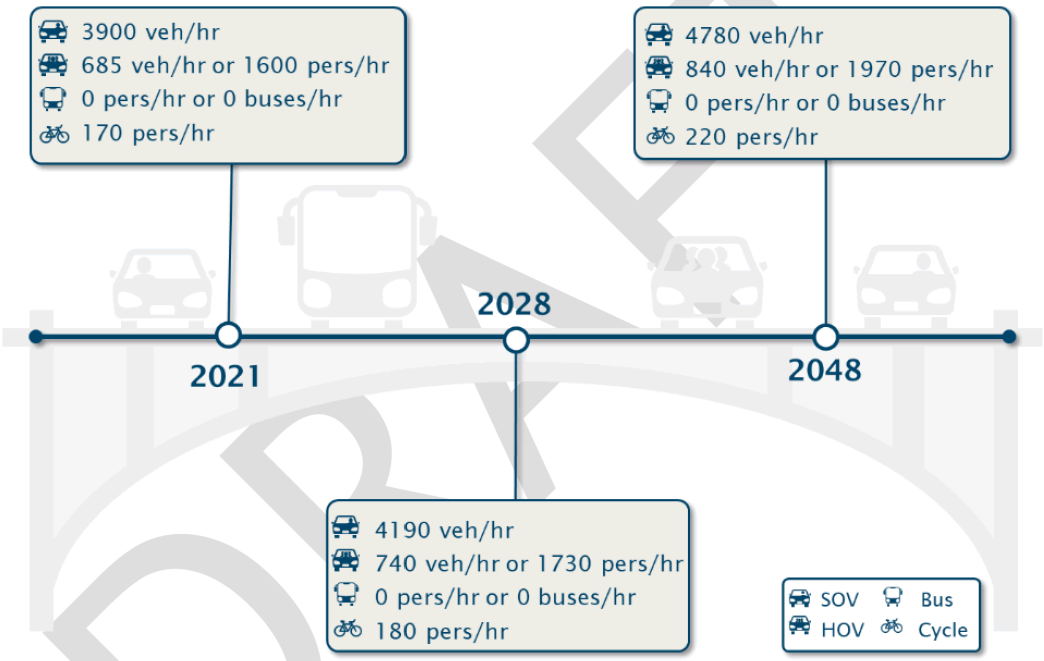
2028 and 2048 Forecasts

The same methodology used for 2021 has also been used for the years 2028 and 2048, with forecast demands converted to arrival flows. The volume to capacity (v/c) ratios are quite high at some locations, and the analysis was re-run on the basis that some mode change may occur in response to the anticipated levels of congestion for SOV's. This has been undertaken using an assumption that the v/c ratios will not exceed 1.1 (110%).

A v/c ratio of 100% represents the theoretical capacity of a lane, and a v/c of 110% indicates quite severe congestion. With the HOV lane likely to be operating well within capacity, it is likely that some of the excess demand will transfer to other modes. Without the project this transfer is assumed be to HOV's[12], while with the project the transfer is assumed to be to bus and HOVs, with some change to cycle. A detailed summary of the methodology applied to allocate demand is summarised at Appendix C.

Figure 24 set out the traffic flows and person trips forecast across the Waimakariri Bridge, without TDM measures in place, noting that this is the point where the highest volumes are observed in both the 2028 and 2048 scenarios.

Figure 24 Traffic and person allocation across the Waimakariri Bridge AM peak (one hour) without supporting TDM measures



The people movements summarised in Figure 24 have been converted to mode share proportions as shown in Table 5.

Table 5 Mode share across the Waimakariri Bridge AM peak, without supporting TDM measures (one hour, rounded)

	2021	2028	2048
SOV	69%	69%	69%
Rideshare (T2/T3)	28%	28%	28%
Public transport	0%	0%	0%
Cycling	3%	3%	3%

[12] HOV vehicle numbers have been derived on the assumption that two thirds of the vehicles will have two occupants, with one third having three occupants. This gives an average occupancy of 2.33.

TRAVEL DEMAND MANAGEMENT MEASURES

The Waimakariri Connections SSBC recognises that the provision of a southbound HOV lane alone will not result in the level of behaviour change required to achieve the Investment Objectives and outcomes outlined in the previous section. It also identifies critical TDM elements considered necessary for the success of the HOV lane project includes:

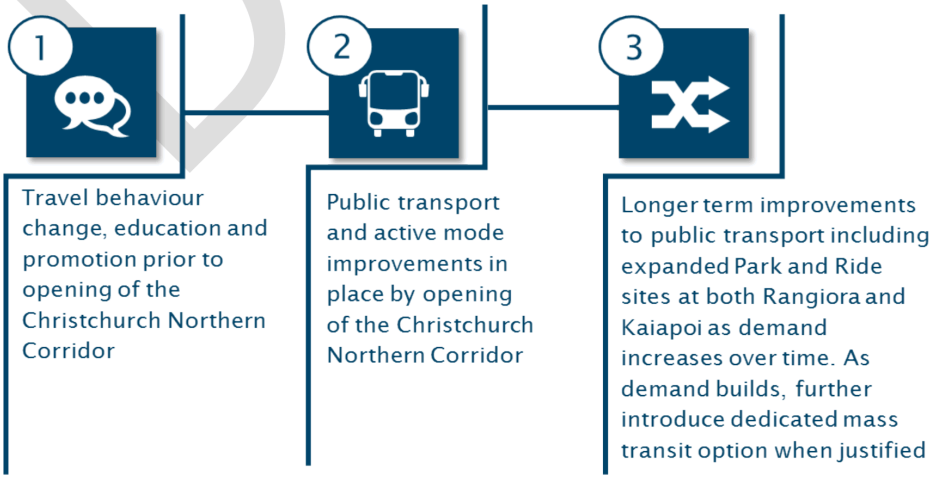
- Marketing and communications
- Park and Ride facilities
- Mobility as a Service (MaaS) software
- Express public transport services
- Ongoing customer insights to refine the TDM measures over time
- Education campaign
- Travel planning
- Training and education

Recommended programme

The recommended TDM supporting measures have been developed based on an understanding of the customer insights and technical analysis of forecast demand. The programme incorporates a mix of both infrastructure and non-infrastructure improvements. It is proposed that the integrated and complementary supporting TDM measures will be delivered using a phased approach. An assessment of the relative contribution of the recommended programme towards the Investment Objectives is provided in Table 10 in the Recommended Option Assessment section of this report.

Immediately prior to the opening of the Christchurch Northern Corridor education and travel planning initiatives will be delivered to northern commuters (early 2020), followed by the launch of improved public transport services and interim Park and Ride sites upon opening of the corridor (mid-2020). This project has also investigated longer term measures such as more permanent and larger scale Park and Ride facilities (up to 2048). The phased approach is summarised in Figure 25.

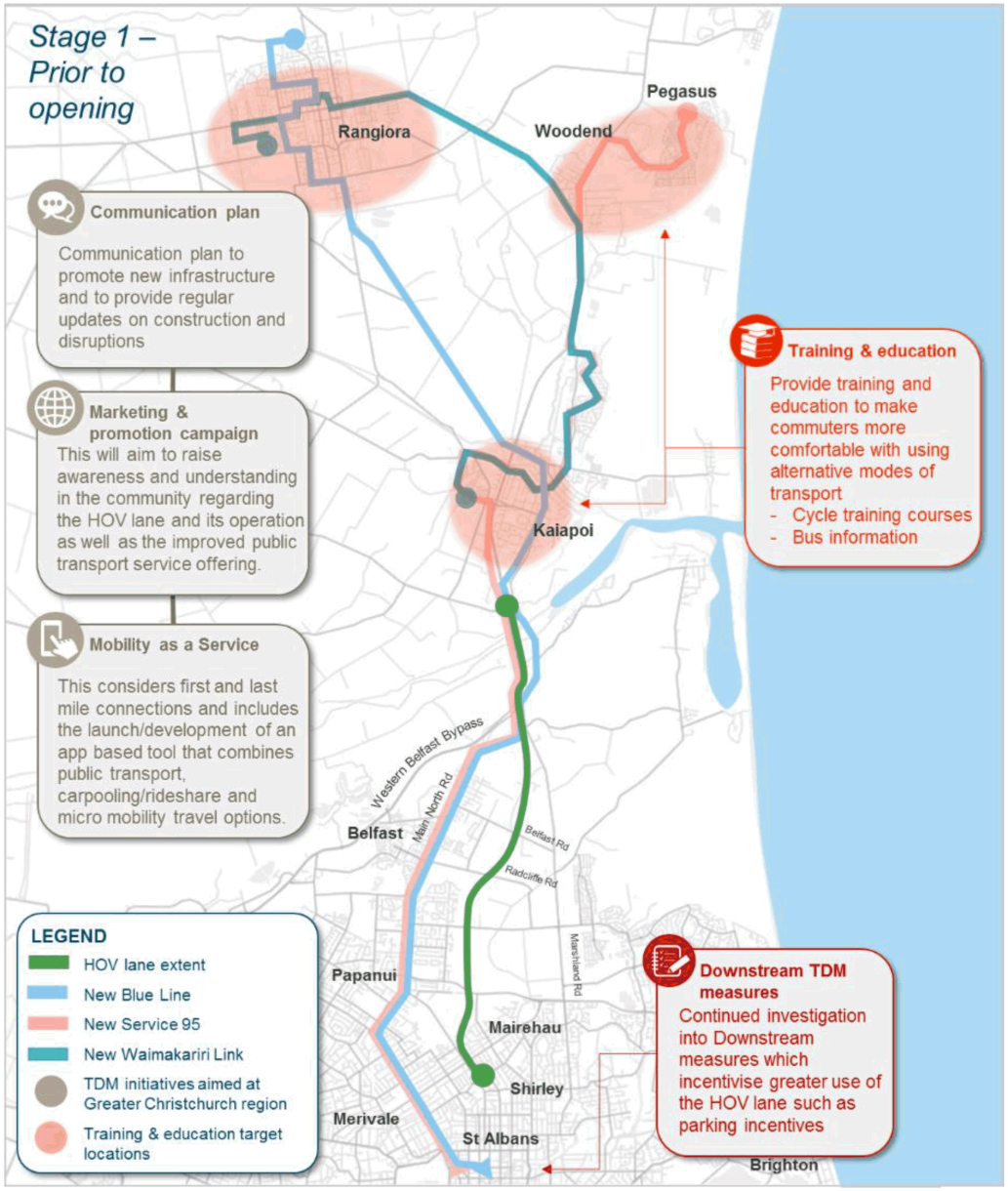
Figure 25 Overview of phased implementation of TDM measures



Prior to opening of the Christchurch Northern Corridor (early 2020)

Immediately prior to the opening of the Christchurch Northern Corridor several travel planning initiatives will be undertaken to promote, educate and incentivise use of non-single occupant modes of transport. These are summarised in Figure 26.

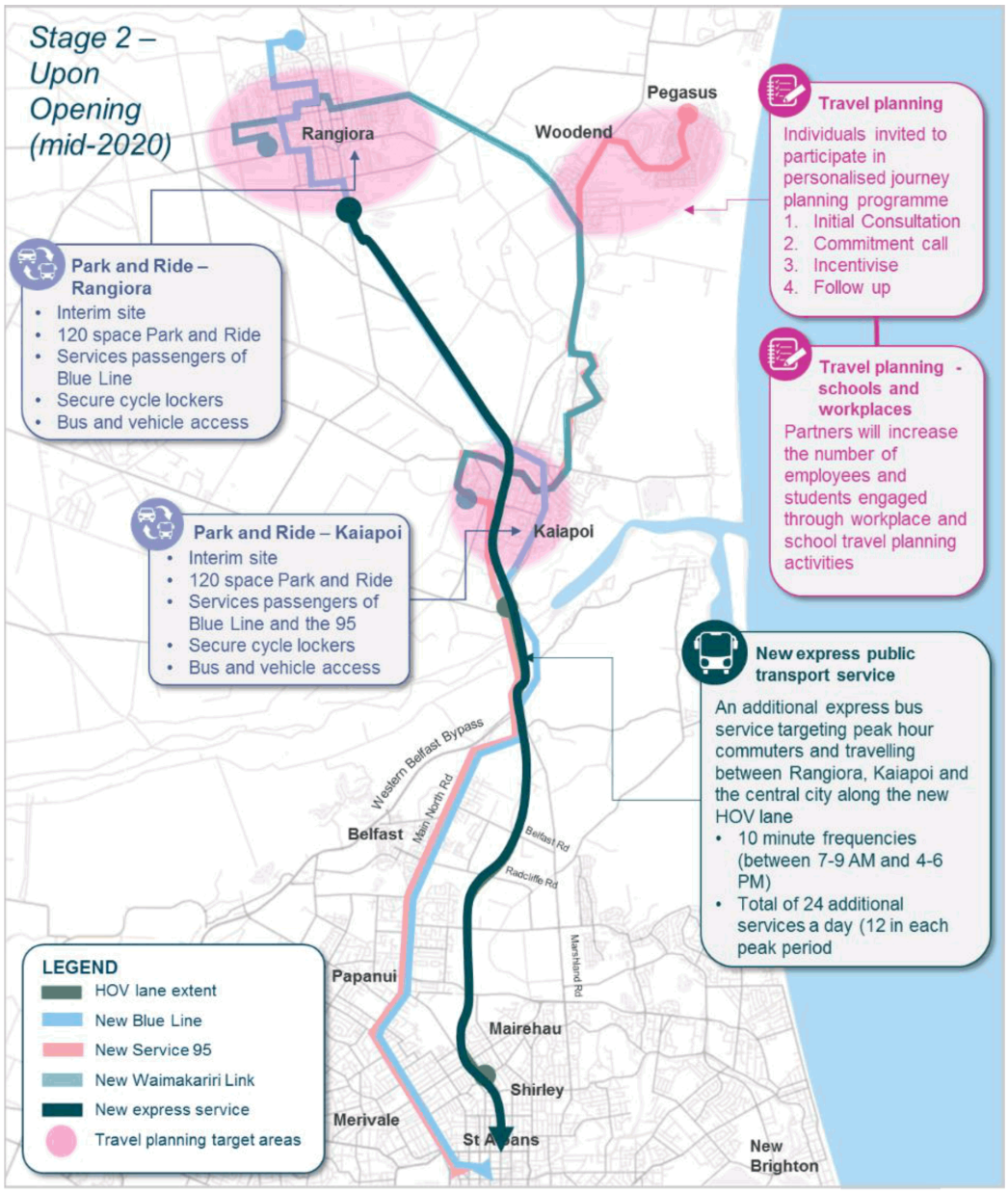
Figure 26 Stage 1 TDM Measures (prior to opening)



Upon opening of the Christchurch Northern Corridor (mid 2020)

Upon opening of the Christchurch Northern Corridor an improved public transport service offering will be provided, two interim Park and Ride sites will become operational and a personalised journey planning project will be launched targeting northern commuters. Given the forecast demands it is proposed that there is an express bus every 10 minutes from opening (6 buses per hour or 12 in each two hour peak period). A summary of the TDM measures upon opening is summarised in Figure 27.

Figure 27 Stage 2 TDM Measures (upon opening of HOV lane mid-2020)



A community-based personalised journey planning programme that encourages residents who currently commute by SOV from Rangiora or Kaiapoi to Christchurch City will be undertaken. The initiative will engage with households (door to door) in the targeted communities, and commuters will be encouraged to sign up to participate in the behaviour-change programme that includes advice, incentives and follow-up. Auckland Transport currently have a similar programme that is successful at promoting new service offerings and increase the mode share of non-SOV modes.

It is also proposed that the partners increase the number of employees and students engaged through workplace and school travel planning activities. Each workplace and school is offered a range of incentives and supporting materials to encourage alternative modes of transport, and the option to develop a tailored site-specific travel plan.

An improved public transport service offering is proposed to be provided targeting peak hour commuters who travel between Rangiora and Kaiapoi to the Central City, including the frequency and number of buses. A new express service is proposed to operate from opening (mid 2020) and will run every 10 minutes between 7am and 9am, and 4pm and 6pm, between Rangiora and Kaiapoi offering a non-stop service to the Central City[13]. This service route is proposed to operate via the HOV lane and Cranford Street, Sherborne Street, Bealey Avenue and Manchester Street terminating/originating at the Central City Bus Interchange.

It is proposed that these 24 additional peak services will be in addition to the existing Blue Line and 95 service provision that will continue to operate to service destinations in the northern suburbs of Christchurch City[14]. The existing all day services (Blue Line and 95 service) will provide off peak connections to the Park and Ride sites (detailed below) outside of the AM and PM two hour peak periods (7-9 am and 4-6pm).

In recognition of the rural nature of the Waimakariri District and to target the highest amount of SOV commuters, it is proposed that two interim Park and Ride sites are delivered to maximise the catchment of the public transport enhancements. Park and Ride in appropriate locations is an important part of increasing the use of public transport. Park and Ride facilities are most suitable in outer urban areas where access to public transport via walking, cycling or feeder bus services is less viable, and land is less cost compared to inner urban areas.

Interim Park and Ride facilities are proposed at Rangiora and Kaiapoi that could be constructed in a relatively short timeframe and could be operational by mid-2020. An initial concept of potential Park and Ride sites has been developed to inform the feasibility and cost assumptions in this report.

An interim Park and Ride site could consist of a sealed carpark with lighting and provision of approximately 120 carparks. The facility could include a sheltered waiting area to accommodate approximately 20 people, plus potential secure bike parking enabling people to bike to the Park and Ride facility and then utilise public transport services. Where possible interim sites would be chosen that allow for the utilisation of existing infrastructure.

Prior to identification and confirmation of preferred locations, further investigation is required to determine access, convenience and functionality, in order to optimise their potential. Poor site selection has the potential to reduce the uptake of the Park and Ride

[13] Further consultation on hours of express service operation to be undertaken in the pre-implementation phase
[14] Regional Public Transport Plan service types can be viewed here: https://ecan.govt.nz/your-region/plans-strategies-and-bylaws/canterbury-transport-plans/ (pages 38 and 39)

provision. Further investigations could include negotiating with land owners and assessing ground conditions, and other planning and construction considerations.

Interim Park and Ride sites at Rangiora and Kaiapoi

This investment case recommends that two interim 120 space Park and Ride facilities proceed to pre-implementation; one in Rangiora and a second in Kaiapoi. These would service passengers of the Blue Line and the proposed new peak hour express services to Christchurch. These sites would also facilitate rideshare users.

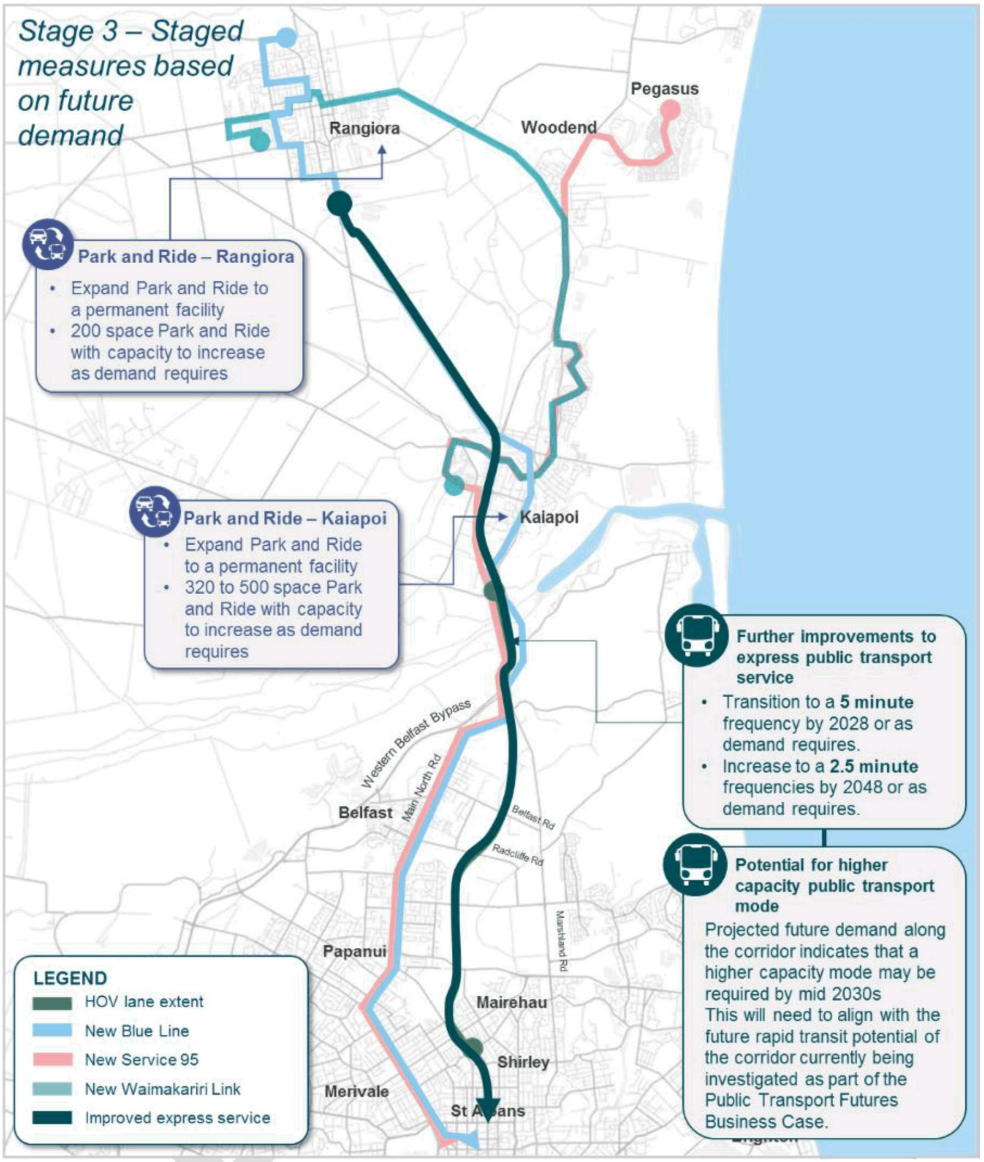
The Park and Ride facilities are proposed to provide access to a high frequency public transport service every 10 mins from opening year. A feasibility design has been developed for an interim site and is shown in Appendix D.

Longer term TDM measures (up to 2048)

To respond to the growth forecast in the Waimakariri District over the next 30 years, future public transport service upgrades are likely to be required enabling higher frequency bus services in the peak hour[15]. Further improvements are also likely to be required to meet demand for the two Park and Ride sites at Rangiora and Kaiapoi making these sites more permanent. The long term TDM measures have been summarise in Figure 28.

[15] Longer term public transport improvements to be identified through the Public Transport Futures Business Case.

Figure 28 Stage 3 TDM Measures (staged measures based on future demand)



For the purpose of allocating demand to public transport a range of scenarios have been considered. Public transport will need to take up an increasing share of demand as the capacity available for SOV's is constrained. The following bus frequencies have been assumed on the Waimakariri Bridge:

- 10 minute frequency in 2021
- 5 minute frequency in 2028
- 2.5 minute frequency by 2048.

It has been assumed that each bus would carry on average 45 people (noting that Greater Christchurch is currently served by a mix of 40 and 50 seat buses). Should demand for

public transport near capacity then higher frequency services may be required ahead of the assumed frequencies outlined in this report

Should the level of public transport demand reach the need for a bus every 2.5 minutes then it may be more appropriate for this demand to be serviced by a form of mass rapid transit as opposed to bus services. With a frequency of equal or greater than a bus every 2.5 minutes, dedicated corridors would be required due to the number of services operating. A parallel business case is currently investigating mass rapid transit options for Greater Christchurch, including servicing the Waimakariri District and northern suburbs of Christchurch City over the next 30 years.

The proposed HOV lane is considered to be compatible with the plans for mass rapid transit in Greater Christchurch as outlined in the Future Public Transport Business Case. The HOV lane will facilitate the movement of express (limited stop) public transport services in the short to medium term, whilst mass rapid transit is more likely to connect the communities between Waimakariri District and Christchurch City with frequent stops in the longer term.

Mass rapid transit is also a way to stimulate land use around public transport hubs, whereas the HOV lane acts more as a measure to mitigate the effects of land use growth in outer urban areas.

Increased frequencies and/or larger buses could be an alternative response to meet future increases in public transport demand over time.

DOWNSTREAM TDM MEASURES

Cranford Street and Sherborne Street

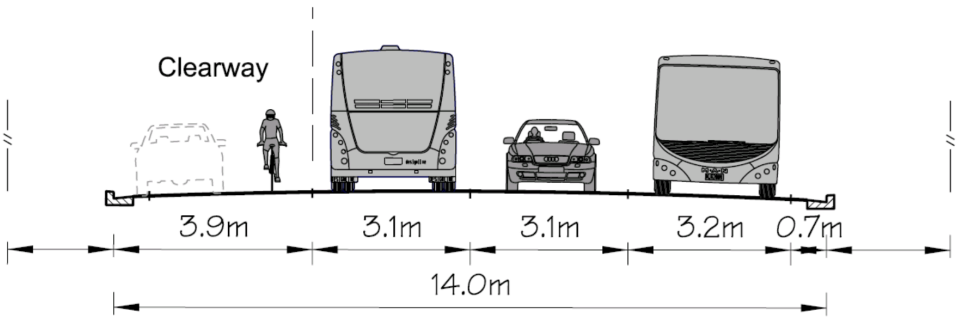
The Downstream Effect Management Plan (DEMP) has identified peak hour clearways on Cranford Street as part of the recommended option to mitigate additional vehicles in the area once the Christchurch Northern Corridor becomes operational. The DEMP also recommends that HOV lanes be investigated on Cranford Street and Sherborne Street to Bealey Avenue.

At the time of drafting this report Christchurch City Council is currently seeking public feedback on the recommendations detailed in the draft DEMP. Consultation is due to close on 15th April 2019.

This TDM funding application has not undertaken a detailed assessment of potential HOV lanes on these downstream arterial routes. However in calculating the likely benefits of the TDM measures it has been assumed that a southbound HOV lane would be in place from the Tram Road southbound on ramp to Bealey Avenue to provide the maximum benefits for end to end customers travelling between Waimakariri District and the Central City.

A preliminary investigation suggests that it would be feasible to operate a southbound HOV lane on these corridors based on the cross-section provided in Figure 29[16].

Figure 29 Potential cross section of Cranford Street with HOV lanes



The corridor from Innes Road to Bealey Avenue has a typical boundary width of 20 metres, which with the indicative cross-section of 14 metre, does not allow for off-line bus stops or on road cycle lanes. There is also no allowance in the cross-section, or available space, for the provision of separate right turn facilities, meaning the through movements (SOV) lane will be held back by vehicles turning right from the through lane.

To date there has been minimal investigation or design in to a clearway/HOV lane, with indicative only estimates developed as follows:

[16] Concept option developed by Christchurch City Council as at April 2019

- Low estimate: $5.2m – assumes approximately 10% kerb and channel replacement, minor improvements to the side road intersections and signalised intersections, plus a reconfiguration of the Edgeware Road signalised intersection.

- High estimate $21.5m – assumes reconstruction from boundary to boundary, including more substantial intersection upgrades to side roads and reconfiguration of signalised intersections. Assumes reshaping of and surfacing of the existing pavement only.

It is recognised that there are several "pinch points" along the route that would likely require widening and upgrades, particularly at the following intersections:

- Cranford Street / Westminster Street
- Cranford Street / Warrington Street
- Cranford Street / Edgeware Road
- Sherborne Street / Bealey Avenue

These "pinch points" are caused by the need to accommodate multiple turning movements at these intersections which would be constrained with the addition of an HOV lane. The predominant issue being the absence of a separate right turn lane, assuming SOV's are unable to utilise the HOV at intersection approaches unless turning left. The implications of providing inline bus stops to service local bus services also needs to be considered as it would not be possible to pick up and drop off passengers without impeding either the HOV or SOV lane.

Further detailed assessments would be required to understand the likely demand for the HOV lanes on Cranford Street and Sherborne Street, to consider the optimal design solution (HOV lane allocation – near side or far side), and to mitigate or minimise any negative safety implications.

Central City

Central City parking provision is a key factor when considering travel behaviour change. It is important to recognise that Christchurch is currently transitioning from recovery to regeneration following the Canterbury earthquake sequence. It is therefore important that any measures related to the management of parking in the Central City reflect wider social and economic benefits as well as potential transport and travel behaviour change benefits.

Investigation of a potential incentive based parking approach to encourage the use of HOV's could be undertaken by Christchurch City Council. This could include providing dedicated parking for HOV's in Council owned parking buildings. A similar approach has been adopted in Auckland where priority parking is available for vehicles with two or more occupants at several Council owned car parks.

Northbound HOV lane provision

This report has recommended TDM measures to support the proposed southbound HOV lane on the Christchurch Northern Corridor. Given the lower levels of demand for northbound trips in the AM peak a northbound HOV lane has not been investigated through this project.

During the PM peak period there could be additional benefits to HOV users if a northbound HOV lane was provided for the return trip from the Central City to Waimakariri District.

It has been identified that further detailed assessment is required for HOV lane provision for northbound travel from Bealey Avenue to Tram Road. An addendum to this TDM funding application is to be prepared incorporating the outputs from the model update which includes the proposed clearway/HOV lanes. It is proposed the following technical work streams are progressed within this addendum:

- A transport assessment of end-to-end journeys northbound in the PM peak
- Assess the provision of a northbound HOV lane from Bealey Avenue to Tram Road and its intersection impacts
- Concept design and safety considerations
- Assess against the investment objectives and performance measures to ensure alignment
- Economic assessment

It is also proposed this addendum, subject to partner agreement, will provide further drawings which shows a level of detail regarding the Park & Ride sites proposed for Rangiora and Kaiapoi.

Several HOV lanes have been introduced in Auckland in recent years and many operate in both the AM and PM peak period to improve travel time reliability for HOV's and public transport and to constrain SOV capacity. This indicates that further investigation of a northbound HOV should be undertaken to understand if the demand levels forecast would result in benefits to HOV users in both the morning and afternoon commute.

Cycling

For the purpose of this study cycling mode share has been assumed to be a nominal 4%. However it is recognised that the mode share of cycling could be higher depending on uptake of the new cycleway being constructed alongside the Christchurch Northern Corridor and the use of e-bikes which increase the average distances travelled by bike.

The cycleway will connect to local cycle routes in Waimakariri District and with the Papanui Parallel in Christchurch City, providing a connection to the Central City for cycle commuters. Advances in technology and the recent uptake in e-bikes could also contribute to a higher mode share for cycling, due to the increased range for cycle trips and the provision of dedicated cycle infrastructure.

In developing the concept Park and Ride sites, both the interim and expanded sites have been designed to facilitate park and cycle trips. The sites will provide good access to the cycle network. Commuters could also drive and place their bike on a bus to reach a wider range of destination and to provide first/last mile connections.

The travel planning initiatives and marketing and education campaign will promote the new Christchurch Northern Corridor and the use of multi-modal travel options, including cycling for part or all of the journey.

RECOMMENDED OPTION ASSESSMENT

Performance

Due to the increased population growth in the Waimakariri District and northern areas of Christchurch, travel demands are forecast to increase over time. The traffic assessment shows that without supporting TDM measures the additional capacity at the Waimakariri Bridge will be exceeded within a few years of opening.

Table 6 and Table 7 demonstrate how the proposed HOV lane and TDM measures are expected to reduce the number of vehicles that will be entering the Central City from the north. The tables also show how the recommended programme meets expected future demands by moving more people in fewer vehicles. This aligns with the policy direction as outlined in An Accessible City of reducing car dependency and increasing the use of non-SOV modes.

Table 6 Total trips from Waimakariri District to Central City (AM peak period) without and with TDM measures – person trips by mode

	2021			2028			2048		
	Car	PT	Cycle	Car	PT	Cycle	Car	PT	Cycle
Without TDM	2,815	60	90	3,030	65	95	4,190	80	130
With TDM	2,300	545	115	2,025	1,040	130	2,100	2,020	275

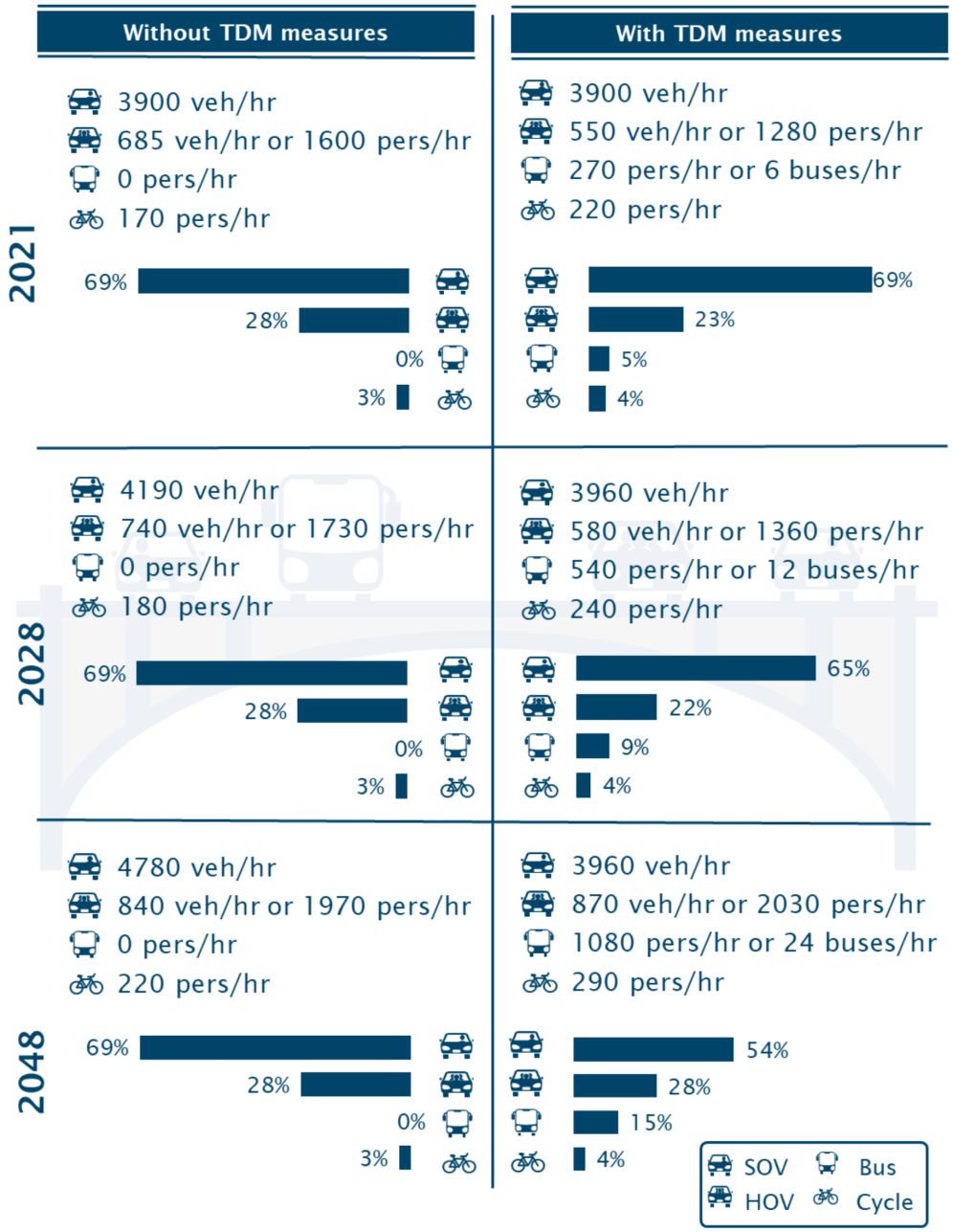
Table 7 Number of cars entering the Central City from Waimakariri District (AM peak period) with and without TDM measures – number of cars

	2021	2028	2048
Without the HOV lane and supporting TDM	2,290	2,525	3,495
With the HOV lane and supporting TDM	1,975	1,730	1,695

Figure 30 provides a detailed comparison of traffic volumes and the resulting mode share for each of the modelled timeframes (2021, 2028 and 2048) at the Waimakariri Bridge. The figure highlights that by 2048, the TDM measures are likely to encourage a 15% public transport mode share, a 17% reduction in SOV's and a slight increase in cycling.

Furthermore, by 2048 the single HOV/bus lane is predicted to take around 3,100 people per hour, which is substantial and well in excess of either a general traffic lane (with a capacity of approximately 2,150 people per hour), or a lane for SOV's (approximately 1,800 people per hour).

Figure 30 Traffic volumes and mode share with and without TDM measures



Travel time savings

The user demand data suggests that without any mode change there will be congestion at several points along the corridor in the future. This is expected to lead to travel time savings along the route for HOV's as follows:

- The Waimakariri Connectivity SSBC indicates that the HOV lane proposed in that study will offer savings of up to 4.7 minutes (relative to SOV's)

- It is currently assumed that two southbound general traffic lanes will be provided through the Cranford Street/Innes Road intersection. SIDRA tests have been carried out, considering one of these lanes as HOV only. This indicates additional travel time of two minutes for SOV's, but a benefit of almost one minute for HOV's based on the 2028 CAST forecast flows.

- The CAST model generally assumes one mid-block lane per direction along Cranford Street south of Innes Road. Forecast travel times have been taken from the 2028 model for each time period, indicating that the southbound travel time in the single lane in the morning peak is around 2.5 minutes longer that the minimum forecast time in either direction (in any modelled period).

  This could be considered to be the travel time difference between a congested SOV lane and an uncongested HOV lane. However it is noted that the SATURN model indicates that the route will be operating very close to capacity and SATURN tends to give satisfactory travel times until conditions reach full capacity, so we expect the above comparison to be overly conservative (i.e. underestimating congested travel times). As a result an additional two minutes of travel time savings have been assumed.

The above gives a total travel time saving for HOV's (over SOV's) of approximately 12 minutes (i.e. 4.7 + 3 + 2.5 + 2 minutes).

To encourage behaviour change away from SOV's it will be important that alternative modes are more attractive in terms of relative travel time and travel time reliability. An assessment of forecast travel time and costs (converted to time[17]) has been undertaken to consider the relative attractiveness of the various travel modes. Two scenarios have been considered:

- A short term scenario with no parking costs within the Central City, although a reasonable walk time to the final destination is assumed for those without on-site parking at their destination. A bus frequency of a bus every 10 minutes is assumed.

- A longer term scenario with the introduction of nominal parking costs, along with greater bus frequencies of a bus every 2.5 minutes. Additional congestion is assumed for SOVs, due to traffic growth, with this then giving greater time savings for (free flowing) HOVs and buses. It is noted that the forecast growth in total car trips between 2021 and 2048 is close to 25%, without mode change, but the volume of SOVs is assumed then to be capped, due the significant congestion for SOVs that would be encountered if mode change does not happen.

[17] Assumptions provided in Technical Note at Appendix C

The results of this analysis are provided in Table 8 and Table 9.

Table 8 Short term scenario (with all times and costs in minutes)

	SOV (PARK)	SOV (OFF-SITE PARK	HOV FROM HOME	RIDESHARE	BUS	PARK AND RIDE
Travel time SOV's	46	46	-	-	-	-
Travel time HOV's	-	-	34	34	34	34
First leg	0	0	0	5	5	5
Final leg	0	10	10	5	5	5
Transfer time	0	0	0	6	10	10
Transfer penalty	0	0	0	5	5	5
PT fare	0	0	0	0	14.1	14.1
Vehicle operating cost	9.5	9.5	4.7	0	0	0
Parking cost	0	0	0	0	0	0
Travel time increase (stops)	0	0	0	0	2	2
Total	**55.5**	**65.5**	**48.5**	**55**	**75**	**75**

Table 9 Long term scenario (with all times and costs in minutes)

	SOV (PARK)	SOV (OFF-SITE PARK	HOV FROM HOME	RIDESHARE	BUS	PARK AND RIDE
Travel time SOV's	49	49	-	-	-	-
Travel time HOV's	-	-	34	34	34	34
First leg	0	0	0	5	5	5
Final leg	0	5	5	5	5	5
Transfer time	0	0	0	2	2.5	2.5
Transfer penalty	0	0	0	5	5	5
PT fare	0	0	0	0	14.1	14.1
Vehicle operating cost	9.5	9.5	4.7	0	0	0
Parking cost	0	18.3	9.1	0	0	0
Travel time increase (stops)	0	0	0	0	2	2
Total	**58.5**	**81.5**	**53**	**51**	**68**	**68**

The tables above indicates that, in the short term, HOV and ride share trips will be attractive, as they are quicker than travel by SOV if the SOV driver does not have on-site parking at the destination. However it indicates that bus travel (including park and ride) may not be attractive for many people, in the short term, due to the adverse effects of transfers and stops.

Table 9 indicates that, in the longer term, HOV and ride share trips will be very attractive, being significantly quicker than travel by SOV particularly if the SOV driver does not have on-site parking at the destination. It also indicates that with higher bus frequencies and greater travel time benefits (relative to SOVs), bus travel (including park and ride) will also be attractive for many people.

The above analysis considers only two scenarios. Clearly there could be a wide range of other scenarios, different permutations of trip types, or different times for persons with differing origins or destinations. Furthermore, differing levels of mode change (leading to changes in vehicles in the HOV lane and in the SOV lane) will change the relative travel time benefit. However, the above analysis is deemed to be considered in explaining the relative attraction of the various mode combinations.

Outcomes

The implementation of the TDM supporting measures will deliver wider improvements to the Greater Christchurch transport system including:

- Enabling and supporting growth
- Improving travel choice
- Travel time reliability and access by non-SOV modes
- Safety, health and the environment
- Value for money

Increasing the uptake of walking, cycling, public transport and ridesharing will help provide a more balanced transport system, and provides opportunities to optimise and extend the lifecycle of current and future assets and services.

If the Greater Christchurch partners can extract more value from existing investments and services through TDM, then it is expected the partners will be able to achieve the following benefits:

One connected transport system

- A balanced solution to support and enable significant future growth within urban areas that maximises return on investment in significant transport projects such as the Christchurch Northern Corridor. Optimal operation of the transport system that benefits all users, including the movement of freight and also provides an opportunity to improve asset utilisation.

People-centred services

- Improve knowledge and uptake of alternative modes of transport and drive the change from a reliance on SOV's to other forms of mobility, improving amenity, reducing travel times, increasing vehicle occupancy and reducing the negative externalities of high SOV use.
- Overcome the information disconnect and perceptions between customers and service providers, improving accessibility for communities including the elderly, mobility impaired and tourists.

Based on the assessments undertaken to date and the assumptions detailed in this report, the recommended TDM measures (from opening) are forecast to deliver the following transport outcomes as in Table 10.

Table 10 Expected outcomes

Investment Objective	Investment KPI	Measure	Baseline	Target Outcome
Investment Objective 1: Increase the people moving capacity when the HOV lane is operational	**KPI / Measure 1.1:** Decrease in percentage of SOV mode split in AM peak:	Across the Waimakariri River (SH1 Bridge southbound)	85%	69% SOV mode split by March 2021 across the Waimakariri River (SH1 Bridge southbound)
		At Cranford/Innes intersection (southbound)		62% SOV mode split by March 2021 south of QE2 (southbound)
	KPI / Measure 1.2: Increase in percentage of HOV mode split in AM peak:	Across the Waimakariri River (SH1 Bridge southbound)	15%	27% HOV mode split by March 2021 across the Waimakariri River (SH1 Bridge southbound)*
		At Cranford/Innes intersection (southbound)		34% HOV mode split by March 2021 at Cranford/Innes intersection (southbound)
	KPI / Measure 1.3: Increase in average vehicle occupancy in AM peak:	Across the Waimakariri River (SH1 Bridge southbound)	1.15	1.3 average vehicle occupancy by March 2021 across the Waimakariri River (SH1 Bridge southbound)
		At Cranford/Innes intersection (southbound)		1.4 average vehicle occupancy by March 2021 at Cranford/Innes intersection (southbound)
Investment Objective 2: Trip reliability for non-SOV vehicles between Tram Road and Bealey Avenue when the HOV lane is operational	**KPI / Measure 2.1:** Reduce/ maintain peak travel time variability between Tram Rd and Bealey Ave for each priority mode:	HOV – reduce annual avg. travel time variability	80 seconds	Achieve annual average travel time variability within 1 minute for HOV's (along extent of priority lane) by March 2021
		PT – reduce annual avg. travel time variability		Achieve annual average travel time variability within 1 minute for PT by March 2021
Investment Objective 3: Improve the attractiveness of high occupancy	**KPI / Measure 3.1:** Reduce the travel time of HOV's comparable to SOV's in the AM	Tram Rd and Bealey Av	Same as SOV	HOV 10 minutes quicker by March 2021 for AM peak trips between Tram Rd and Bealey Ave

vehicle travel when the HOV lane is operational	peak for trips between:	Tram Rd and Cranford/Innes intersection		HOV 6 minutes quicker by March 2021 for AM peak trips between Tram Rd and Cranford/Innes intersection
	KPI / Measure 3.2: Reduce the travel time difference between public transport and SOV's in the AM peak for trips between:	Tram Road and Bealey Avenue	Same as SOV	PT trips between Tram Road and Bealey Avenue to be at least 8 minutes quicker than SOV by March 2021
		Tram Road to Cranford/Innes		PT trips between Tram Road and Cranford/Innes to be at least 6 minutes quicker than SOV by March 2021
Investment Objective 4: Minimise downstream impact consistent with the draft DEMP requirements	**KPI / Measure 4.1:** Limit the number of additional vehicles on Cranford St prior to the Innes Rd intersection		1,000	No more than 1,800 vehicles per hour on Cranford St (prior to Innes Rd intersection) by March 2021
Investment Objective 5: Improve safety outcomes for all customers	**KPI / Measure 5.1:** Minimise the severity and number of accidents on the northern corridor by maintaining the KiwiRAP star rating and the personal risk rating		5 star rating, personal risk rating low	Maintain 5 star safety rating and a personal risk rating of low on the northern corridor
	KPI / Measure 5.2: Reduce the number of active mode accidents between Tram Rd and Bealey Ave as a proportion of mode share (5 year)		9 (last 5 years)	No more than 9 active mode accidents between Tram Rd and Bealey Ave by March 2026
	KPI / Measure 5.3: Increase the proportion of respondents to an annual survey who perceive non-SOV modes to be safe		96% for PT, 96% for carpooling, and 77% for cycling	The proportion of respondents who feel safe using non-SOV travel modes by 2021 to be equal or better than 96% for PT, 96% for carpooling, and 77% for cycling

Table 10 demonstrates how the recommended TDM measures deliver well against the Investment Objectives and target outcomes identified for this project. The measures provide for the forecast growth north of the Waimakariri Bridge and allow for a phased approach to scale the TDM measures over time.

Next steps

It is recognised that additional transport assessments, technical investigations and design work is required prior to the implementation of the supporting TDM measures identified in this report.

If the recommended TDM measures required by mid-2020 are approved and the funding secured, the next steps for the implementation of the TDM measures includes:

- NZ Transport Agency, Waimakariri District Council, Christchurch City Council and Environment Canterbury (supporting TDM measures)
    - Work collaboratively to consider the 'end to end' journey experience for customers through the design and development of the TDM measures
    - Implement the TDM measures required prior to and upon opening of the Christchurch Northern Corridor.

Assumptions

This report identifies the TDM measures required to support the proposed HOV response for this corridor and has been considered alongside the wider Waimakariri Connectivity SSBC and DEMP south of the corridor to provide an integrated transport system response.

This report has been developed on the basis that the preferred solution for this part of the transport system includes a southbound HOV lane as shown in the recommended option of the Waimakariri Connectivity SSBC.

It is also important to note that consideration has been given to mitigating the potential downstream effects of the Christchurch Northern Corridor and to increase the impact of the HOV solution. This includes identifying potential downstream TDM measures that might be required to achieve the wider project outcomes.

The project has also been cognisant of parallel work streams that are currently underway in the Greater Christchurch area that may have an impact of the ability to achieve the target outcomes proposed for travel demand. This includes the Public Transport Futures Programme Business Case which identifies the need to investigate potential mass transit connecting the northern areas of Christchurch with the Central City in the next 30 years and the Draft Our Space (2018: Settlement Pattern Update) that outlines the agreed spatial plan for the Greater Christchurch area up to 2048.

It is recognised that additional transport assessments, technical investigations and design work is required prior to the implementation of the supporting TDM measures identified and assessed in this report.

change.org

Recipient: Christchurch City Council

Letter: Greetings,

We are opposed to the "Proposed changes to Cranford Street and the surrounding area", specifically the changes to Berwick and Warrington Streets, Barbadoes and Madras Streets, and demand other options are explored.

Why are Christchurch residents having to be disadvantaged by traffic from North Canterbury being forced down our roads? These are people from a different district that don't pay rates here, but the residents and business' in St Albans, Mairehau and Edgeware are paying the costs socially and financially to accommodate these people so they can get to or from the City a few minutes faster.

Some of our concerns are:
1. Lack of consultation by CCC with the community.
2. No other route options apparent or offered.
3. Lack of public transport or ride-sharing initiatives to reduce single car commuting thereby reducing traffic volumes.
4. An increase of traffic originating from districts outside of the city, yet our community residents will pay the costs socially and financially for this urban sprawl/satellite city trend.
5. Various area specific problems along the proposed routes to name just a few:
3 sets of traffic lights within 3 residential blocks (Cranford /Berwick, Warrington/Madras, Warrington/Barbadoes)
The loss of street parking for all people using St Albans park and club facilities thereon (Bowling and Croquet Clubs).
The unspecified loss of street parking in the future. (Berwick, Warrington, Barbadoes and Madras)
The increased danger of our local roads for children, and older residents to access shops, schools and parks.
The already voiced concerns of local businesses in the area.
We are opposed to these proposed road changes and demand other options be explored and presented for consultation.

Cranford Street – Downstream Effects Management Plan

Consultation Analysis

May 2019

Comment was sought on the Cranford Street Downstream Effects Management Plan between Monday 11 March 2019 and Monday 15 April 2019.

Council Staff delivered the consultation document to 6350 properties and posted to 1880 absentee landowners. An email was sent to 101 key stakeholders and all submitters from the previous engagement in 2018 were also advised we were now seeking feedback on the draft plan.

Information was available on the Have Your Say web site, Council Staff ran a Newsline story and three Facebook posts were shared with the St Albans Community Group. The Facebook posts generated very little engagement. However, we had 1823 views on our Have Your Say web page and 185 views of the Newsline article.

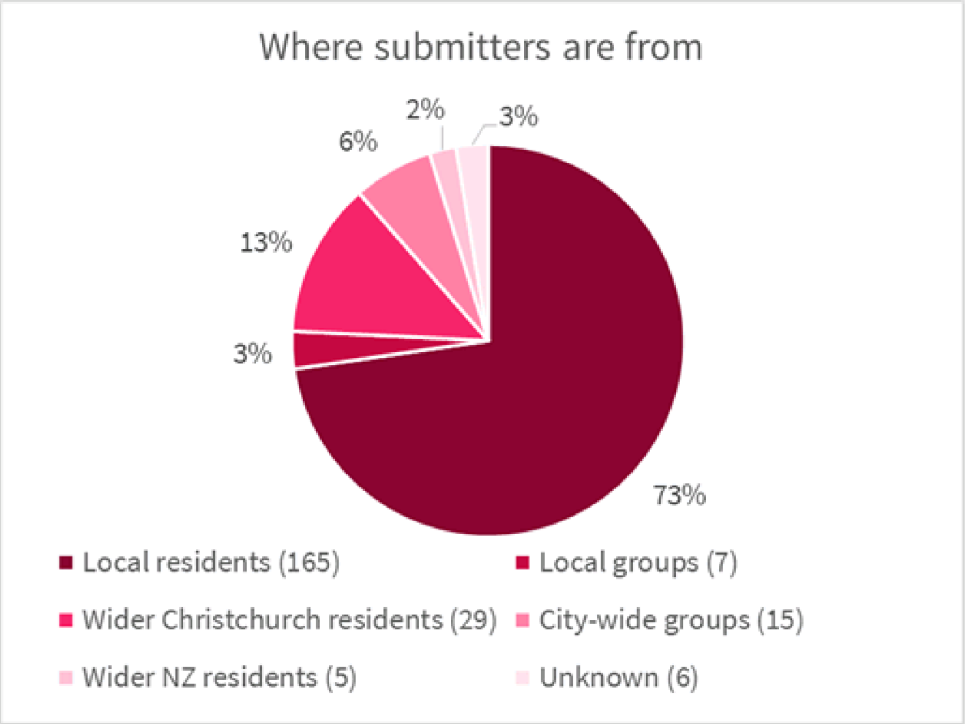
Four drop-in sessions for the community to discuss the plan and ask the project team any questions prior to providing their feedback were held. Representatives of the St Albans Residents Association also set up an information stand at these sessions and spoke to the residents about their alternative Community Plan. Overall these sessions were attended by approximately 60 people.

We received 227 submissions from this engagement including feedback from the following organisations and businesses:

- Board of Trustees - St Albans School
- Governors Bay Community Association
- Businesses – corner Edgeware Road/Barbadoes Street
- St Albans Residents Association
- Go Cycle Christchurch
- Generation Zero Christchurch
- Environment Canterbury Public Transport
- Duncan Webb, MP for Christchurch Central
- Our Vets – St Albans (National Veterinary Care Ltd)
- Board of Trustees – Paparoa Street School
- SPOKES Canterbury
- Kiwione Investment Trust
- Rutland Street Church
- Kidds Cakes and Bakery
- Ministry of Awesome
- Board of Trustees – Mairehau Primary School
- Belfast Area Residents Association

- Edgeware Croquet Club
- Environmental Noise Analysis & Advice Service
- Shirley Optometrists
- Peter Timbs Meats Ltd
- A Graeme Grafton Property Trust

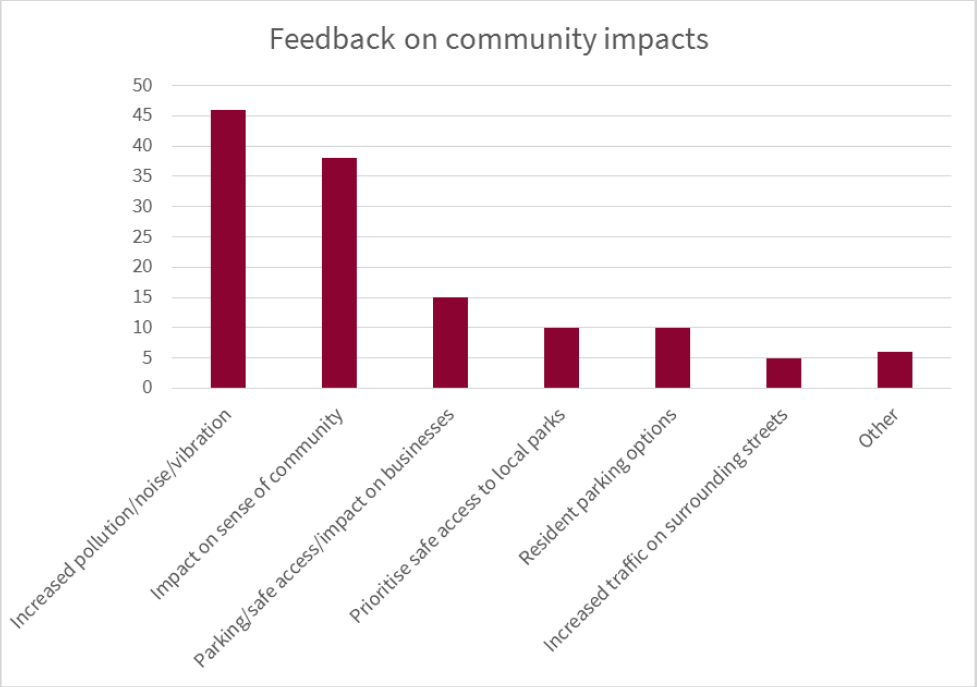
Where our submitters are from



The analysis has been divided into six categories:

- Feedback on community impacts
- Support for non-car transport
- Plan specific feedback
- Community plan
- Working with strategic partners
- General feedback

1. Feedback on community impacts



We received the largest number of submissions in this category (46 submissions) related to concerns about the increase in air pollution, noise and vibration and the detrimental impact this will have on residents while also reducing their quality of life.

"Is premised on outdated (20th thinking around transport planning with its car-centric approach. Such an approach is no longer feasible or sustainable given the need to consider environmental factors and climate change in any socially responsible urban planning for the future." (Submission #23483)

The underlying theme that was evident throughout a large number of submissions was the strong sense of community, the ability to move safely around their community and concerns that this project will create a division in the community. This sense of community led to "protection of the existing community" being the basis of many comments and themes throughout the analysis.

"*The plan should not focus on cars it should focus on moving people through an established community where residents make their homes and conduct their lives, go shopping, play, exercise and meet up together.*

The DEMP does not deliver on the CCC's community outcomes. It does not contribute to a strong St Albans community, it severs it. It does not contribute to a healthy community, it pollutes and disturbs it. It does not contribute to a liveable community, it disconnects us and it doesn't contribute to a prosperous city as it is not a modern solution to building the city's infrastructure." (Submission #23479)

Safe access to local parks, especially St Albans Park and Malvern Park, and the key shopping areas (Edgeware Village, Cranford/Wesminster shops, Barbadoes/Warrington shops, and Barbadoes/Edgeware shops) was also considered a key important issue. All these facilities are key community focal areas and the proposed increase in traffic puts safe access to these areas at risk.

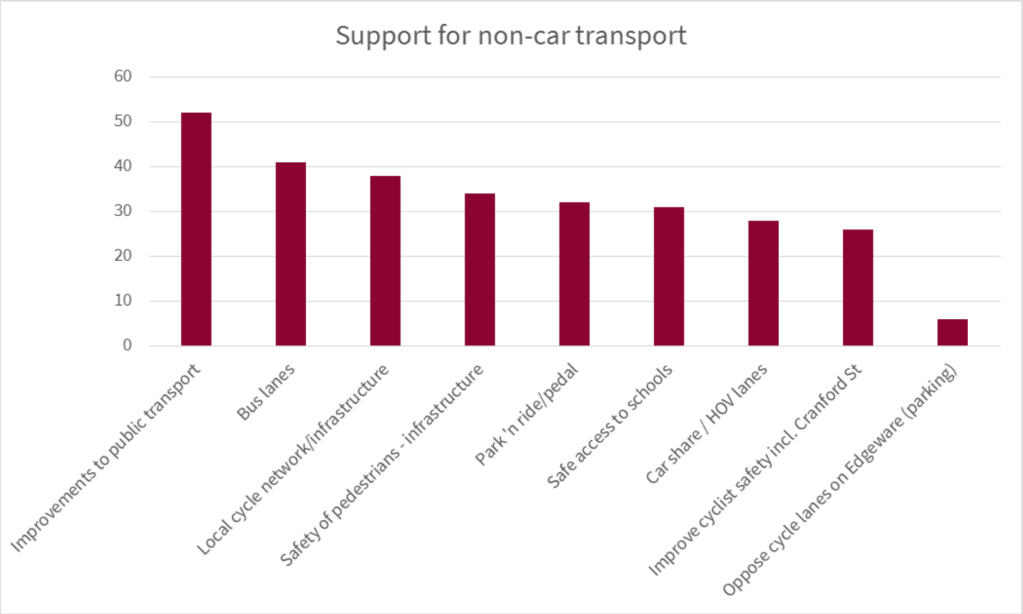
Many submitters wanted the ability for all of the community to be able to continue to access these areas safely, whether as a pedestrian, cyclist or driving.

Both the local business owners and residents say that parking around the commercial areas is very important. Submitters told us that any changes made need to ensure minimum on-street parking loss.

Safe access to parks was also considered to be of high importance and this needs to be addressed prior to the opening of the CNC as the majority of the community using the parks are children.

Other concerns raised were related to the potential for a negative impact on property values and safety of residents living on Cranford Street entering and exiting their driveways.

2. Support for non-car transport



We received overwhelming feedback regarding this project being an opportunity for Council/ECAN/Waimakariri District Council/NZTA to work together to improve the public transport network between North Canterbury and Christchurch CBD (52 submissions). Support for bus lanes featured strongly in the comments (41 submissions) and bus lanes were also a key element of the alternative plan proposed by Axel Wilke (submissions related to the alternative plan are discussed separately). Submitters recognised that in order for bus lanes to work there needs to be improved bus services, including reliability and increased frequency.

"The plan fails to attract people to use public transport. Funding needs to be redirected to regional council to increase the frequency and number of buses. There needs to be permanent bus lanes on the Northern Arterial. If the free central city shuttles are reinstated this would further encourage people to leave cars behind while promoting economic activity within the CBD". (Submission #23356)

Cycle safety and the support for a local cycleway network also generated a large amount of feedback (64 submissions), including cycle safety on Cranford Street. Connections to Papanui Parallel Major Cycle Route was also an important consideration when developing secondary cycle routes. To support the use of the new cycleway connections, many submitters suggested investigating opportunities for "park 'n' pedal" to provide an alternative option for commuters from the north of the city.

"*We also request consideration be given to the provision of shared paths in other local streets, in particular Tomes St and/or Paparoa St, to connect to the Papanui Parallel and support our desire to provide safe travel routes for our children and their families" (Submission #23449).*

· Build local cycle networks in the north east from Cranford St to the coast

· Create a major north south cycle priority route to serve the north east

· Create more cycle access points along the N Motorway Ext cycle way" (Submission #23444)

Many submitters raised concerns about the ability for cyclists, even confident cyclists, to travel safely on Cranford Street due to the width of the road and the possibility of an additional lane whether it be clearways, HOV lanes or bus lanes. While other cycle routes would be developed, a number of submissions indicated that the ability to travel by bike on Cranford Street would be so unsafe that cyclists would not use it.

"The introduction of peak period clearways along Cranford Street down to Berwick Street and possibly other clearways further south makes such routes less safe for cycling, especially during the peak periods. It is not possible to rectify this without widening the road designation and purchasing additional land. Hence the recommended option is to direct cyclists onto other routes.

This is completely unacceptable. Cyclists have a legal right to use Cranford St. Council either legally bans them or provides safe cycling facilities for them. In the days and age of Vision Zero and a climbing NZ road toll it is intolerable for Council to consider implementing measures which are unsafe." (Submission #22498)

Feedback on pedestrian safety was similar to that relating to cycle safety. Both these themes supported the community concerns regarding the ability for the community to move through their community safely. With a number of schools, local commercial centres, and parks which generate high pedestrian movements for a wide sector of the community, the ability to walk to these places was considered very important.

The ability for local children to access their school safely was another key issue, whether it was by cycle, or walking. There are a number of major intersections and busy roads for young children to navigate. We received feedback from St Albans School, Paparoa Street School and Mairehau Primary School, all highlighting the safety of their children getting to and from school. Many submitters said that pedestrian and cycle safety should be addressed and mitigated before the CNC opens to ensure that the children are safe travelling to school with the proposed increased traffic.

"The safety of our St Albans children is in jeopardy. An increase in traffic WILL lead to a pedestrian crossing the road to be seriously injured. The Cranford/Westminster Street intersection is already a dangerous intersection with people running red lights through being in a rush and not paying

attention. This will only be more dangerous with an increase in congestion, impatience and inattention that comes with congestion". (Submission #23311)

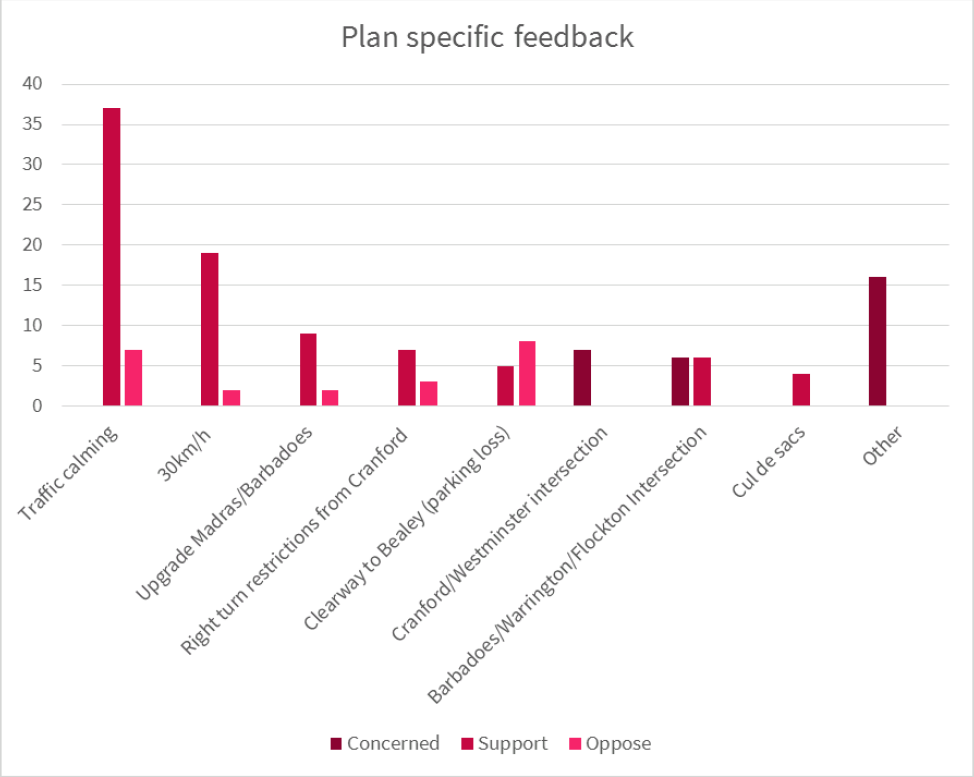
"We would like to see specific details around safe crossing options for Cranford Street including but not limited to, the consideration of an elevated pedestrian crossing, pedestrian refuges in the centre of the road and longer pedestrian cross signals that are further separated from red light runners during peak school commute times. These crossing options should be regularly spread along Cranford Street to reduce the temptation to cross at uncontrolled points and yet work in concert with traffic flows to help ensure compliance and limit frustration.

All pedestrian crossing points should also take into account the current prevalence of scooters as a primary means of transport for school age children and that many accompanying whanau push toddlers and babies in push chairs and buggies". (Submission #24054)

To support the safety of pedestrians and cyclists, and to assist with the ability for the community to move around their neighbourhood, submitters feedback wanted the team to investigate options that can be implemented to support car sharing, eg HOV lanes to help reduce the number of vehicles that will travel on the CNC. This also would assist with the significant concern within the community of the increase in noise, vibration and pollution by helping to keep vehicles numbers down.

"The Plan seems to be concentrating on getting cars through St. Albans/Mairehau/Edgeware rather than looking at how larger volumes of people (rather than the cars, most of which will be single occupancy) can be moved from the motorway to the CBD at minimal impact to these suburbs. It seems unfair for these suburbs to be taking the impact of the extra congestion when the additional people moving through are not residents of those suburbs; rather they are from satellite towns outside of the main Christchurch area. ". (Submission #23129)

3. Plan specific feedback



Feedback received regarding traffic calming tended to be street specific. Many residents wanted traffic calming measures to be implemented prior to the opening of the CNC. Motorists taking short cuts is already happening on a number of streets around the Cranford Street area and submitters anticipate that this will only get worse if not mitigated before CNC opens. Residents of the side streets were concerned that their current amenity and environment will be compromised and it is important that there is consistent and ongoing monitoring and any impacts are mitigated. Again safety of the community was raised with increased traffic and the speed of vehicles short cutting through the residential areas. Cul-de-sacs were seen as an option for some of the side streets adjoining Cranford Street to stop any traffic short cutting off Cranford Street.

"I strongly support the proposed arterial / distributor / collector improvements and local street traffic calming projects to manage the downstream effects of the northern corridor. Based on the traffic report I understand that some local roads (including Malvern and Roosevelt Streets) are expected to see a traffic increase in excess of 30% without the measures proposed in the transport management plan - this is unacceptable. Although alternative modes and more car-pooling can reduce traffic volumes, the traffic report states that volumes coming off the CNC from these, at least initially, are likely to be relatively small (effective measures might result in up to 10% reduction in traffic volumes). As such, I consider that other measures such as those proposed in the transport management plan will still be required". (Submission #23410)

A small number of submitters did not support traffic calming as this could impact on local residents moving throughout the area.

- *"Traffic calming measures dont always work.*
- *Traffic calming measures are a hindrance to residents access to properties.*
- *More obstacles on the roads, makes the roads more dangerous people become more aggressive, frustrated, agitated on community streets" (Submission #23446)*

There was general support for a 30 km/h speed reduction within the community (19 submissions) to support the traffic calming options. The speed reduction will improve safety and discourage drivers from selecting alternative short cut routes.

"I support the reduction of the speed limit to 30km/hr as outlined in the DEMP. Council should be reducing the speed limit to 30km/hr across all local roads and neighbourhoods in Christchurch, as this fits with the aspirations for more livable neighbourhoods as outlined in the Greater Christchurch Partnership Our Space plan, the central Government's Vision Zero policy and the desire to encourage mode shifts from private vehicles to public and active transport." (Submission #23425)

A number of submitters did not support the clearway option on Cranford Street through to Bealey Avenue, or as an option for Barbadoes Street or Madras Street. The main concerns raised in relation to this option was the loss of on-street parking and the introduction of right hand turn restrictions. There is high density housing on Sherborne Street, Barbadoes Street and Madras Street and these streets are heavily parked out with residents parking as there is very little, if any, available off-street parking. Clearways would also impact on parking for businesses, although clearways normally operate only during am and pm peak periods (2-3 hours).

"Clearway cause issues because a lot of resident's park on the streets as the majority of St Albans is either Medium Density or Transitional to Medium Density and thus we have a lot of people whom have to park on the street. The business need parking outside the place of their business else they will lose all their customer. We have already seen the impact on a business in Barbadoes Street as a result of just a bus stop going in, just imagine the impact on all the business around this area if all on street parking is lost." (Submission #23401)

Cranford Street/Westminster Street intersection was identified as dangerous. This intersection is also used as a pedestrian route through to St Albans School for a number of their students and there is currently a full-time crossing worker located here both before and after school. For a number of years this intersection has caused concerns in regards to student safety and this needs to be addressed before the CNC opens, according to submitters. Vehicle turning manoeuvres and space for parking for the local businesses is also of high concern at this intersection.

The other major intersection that received specific feedback was Barbadoes Street/Warrington Street/Flockton Street intersection. Submitters identified that traffic lights at this intersection would make it safer but needed to work in with vehicle movements into and out of Flockton Street.

4. Community Plan

A community plan was produced by Axel Wilke on behalf of the St Albans Residents Association.

https://talkingtransport.com/2019/03/17/can-the-plan/

The plan focuses on three components:

1. *High frequency bus route from Rangiora and Kaiapoi to the city via the Northern Arterial and Manchester Street, complementing the much slower bus route from Pegasus that uses Main North and Papanui Roads.*
2. *Provision of bus priority measures. Permanent (24/7) bus lanes are proposed form north of the Waimakariri to Edgeware Road rather than the proposed short high-occupancy morning peak lane on the existing Northern Motorway. A further priority component is for restricting north-south movement on Manchester Street across Bealey Avenue to buses only; this is so that other traffic is deterred from using this corridor and there would thus be no further need for any priority measures on this corridor.*
3. *This entails parking management. Free all-day parking for commuters on roads is abundant in most of Christchurch. The closest free central city parking is just 430m from the centre of Cathedral Square. Free all day parking needs to go if we want to see behaviour change. Parking around areas that create high-parking demand should be charged for (with residents given the option of a paid-for permit) and this should apply around the central city, Riccarton mall, the University, Northlands Mall etc. The paid area for the central city needs to extend to the four avenues at a minimum. Park & Ride (P&R) north of the Waimakariri could also be considered and that should ideally be established where it can, in the further, continue to be used when we reintroduce passenger rail services. P&R charges should be set so that the income pays for land purchase and the operation of those facilities.*

The plan was shared throughout the community by the St Albans Residents Association through their Facebook page, web page, newsletter, public meeting and representatives also had an information stand at each of our drop in sessions. Signage and information flyers were also displayed throughout the neighbourhood.


CCC Lets
REDUCE
TRAFFIC
We want a
people first
plan
CAN
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St Albans
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CAN
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HAVE YOUR
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SEE THE
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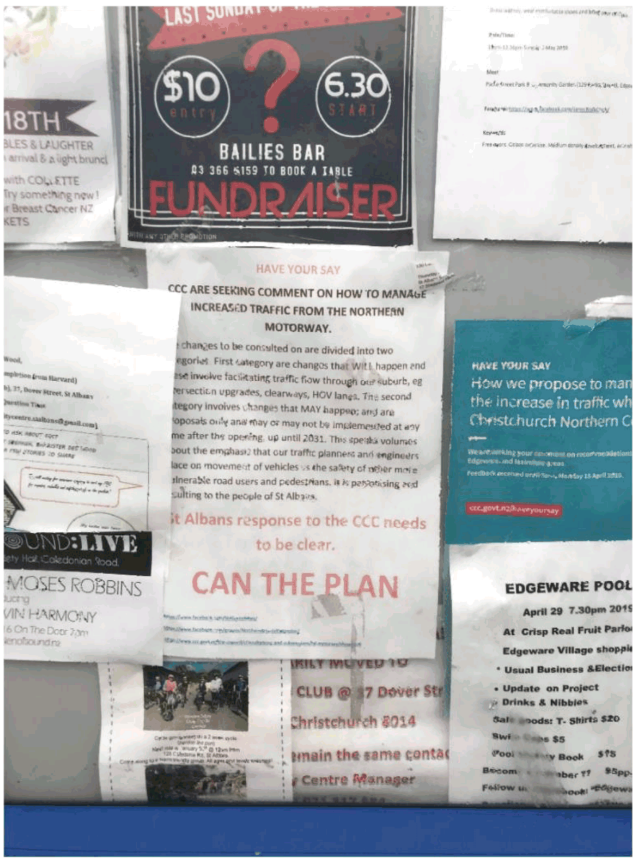
FACE BOOK
CAN the PLAN



We received 55 submissions from the community who either contributed via an email link set up by St Albans Residents Association, specifically mentioned the Community Plan in their submission or who provided the link to the plan within their comments. There was strong support from the community for us to "Can the Plan" and to start again with a new plan and put the community first.

The project team met with representatives of the Residents Association several times throughout the consultation process to discuss their proposal and share information.

5. Working with strategic partners

We received 13 submissions regarding Council needing to work collaboratively with its partners, ECAN, NZTA and Waimakariri District Council. This also was strongly reflected in the Community Plan presented by St Albans Residents Association. For the downstream public transport options, park & ride, car share and to help with the overall reduction in single occupancy vehicles travelling into the CBD, it is imperative that these organisations work collaboratively towards a positive solution.

6. General feedback

We received general feedback that did not fit into the scope of this project but has been taken into consideration by the project team. The three major issues that we received comments on were:

- Support of light rail (20 submissions)
- Reduction in free parking within the CBD (14 submissions) – this was also a key component of the Community Plan (55 submissions)
- Put a toll at the city boundary (7 submissions)

Other issues raised were around speeding vehicles, look at upgrading Hills Road and Marshland Road and concerns around the timing of works with necessary infrastructure being in place before the opening of the CNC.

7. Summary of matters raised as a result of community engagement

Item	***Response***

Strong emphasis on reducing single occupancy vehicle trips and overall number of vehicle trips from the north travelling through St Albans.	- *The Downstream Effects Management Plan recommends that Council should investigate adding additional peak hour capacity to the main arterial roads south of Innes Road to reduce rat-running through the local road network.*
	- *This additional capacity could include additional lanes at traffic signals, peak hour tidal clearways and clearways that are restricted to buses and other high occupancy vehicles.*
	- *However, High Occupancy Vehicle lanes will not increase capacity of general traffic on main arterial roads and can lead to:*
	  - *Rat-running on local streets.*
	  - *Vehicles diverting to Main North/Papanui Road and Rutland Street, which are principal bus and cycling corridors.*

More emphasis needs to go on getting people onto buses (public transport) rather than using private motor vehicles. Request for 24-7 bus lanes on Cranford Street.	- *The Downstream Effects Management Plan supports wider Travel Demand Management measures.* - *Traffic analysis completed as part of the plan shows the Christchurch Northern Corridor, along with proposed peak hour clearways, will likely reduce traffic levels on Main North Road/Papanui Road corridor and supports public transport improvements.* - *Through monitoring, the proposed clearway can be adjusted as a managed lane to encourage more car sharing per vehicle (High Occupancy Vehicles) along with express buses and eventually this managed lane could be re-designated as a bus lane.* - *There are concerns that the immediate installation of permanent bus lanes on Cranford Street will:* - *Push traffic back onto Main North Road and Rutland Street impacting on safe and efficient bus and cycle usage of these routes.*

	- *Lead to increased rat-running on local streets in St Albans.* - *The negative impacts associated with bus lanes would be considerably greater than with High Occupancy Vehicle lanes.* - *Compared to permanent bus lanes on Cranford Street, the managed lane allows a flexibility to timely implement other Travel Demand Mangement measures and encourage mode shift.*

Transport partners (e.g. Christchurch City Council and New Zealand Transport Agency) need to do work together to change travel behaviour (e.g. look at parking controls in Central City and allo-cating road space to buses). The focus should be on moving people not vehicles.	- *Since September 2018, a Programme Steering Group comprising members from Christchurch City Council, New Zealand Transport Agency, Environment Canterbury and Waimakariri District Council has been established to lead the following key studies along the Northern Corridor:*
	  - *Christchurch Northern Corridor High Occupancy Vehicle Lane Business Case (New Zealand Transport Agency lead).*
	  - *Travel Demand Management (Northern Package) Study (New Zealand Transport Agency lead).*
	  - *Public Transport Business Case (Environment Canterbury lead).*
	  - *Downstream Effects Management Plan (Christchurch City Council lead).*
	
	- *Measures that are being investigated include:*
	  - *A peak-hour southbound High Occupancy Vehicle lane on the Christchurch Northern Corridor.*
	  - *Interim Park 'n Ride sites in Kaiapoi and Rangiora.*
	  - *Investigations into measures which incentivise greater use of High Occupancy Vehicle lane such as parking incentives.*
	  - *New express bus service between Rangiora, Kaiapoi and the central city along the new High Occupancy Vehicle lane.*
	  - *A marketing and promotional campaign to raise the awareness and understanding of the High Occupancy Vehicle lane and the improved public transport offering.*
	  - *Launch/development of an app based tool that combines public transport, carpooling/car -sharing and micro-mobility options.*
	  - *Training and education – cycle training courses & bus information.*
	  - *Personalised travel planning.*
	- *However, the Greater Christchurch Partners need to consider the impacts these measures could have in the Central City, on*

	retail businesses, and on parking outside residential properties before implementing. - *The recommendations in the Downstream Effects Management Plan do not preclude the provision of High Occupancy Vehicles and bus-lanes in the future.*

Not enough measures around walking, cycling and public transport to be introduced before the Christchurch Northern Corridor opens. Most of the changes appear to come later after traffic volumes have increased and should be in place before Christchurch Northern Corridor opens (Stage 1 improvements).	- *The Stage 1 proposals improve safety and access for these modes. For example:*
	  - *The implementation of a High Occupancy Vehicle lane will assist less congestion on Public Transport and MCR (Major Cycle Route) corridors which will ultimately improve safety, journey times and trip reliability for buses and cycling.*
	  - *The traffic signals at Warrington/Forfar Streets and Warrington/Barbadoes Streets intersections will improve access and safety for pedestrians and cyclists crossing Warrington Street and using St Albans Park.*
	  - *Signage and marking of an alternative north-south cycling route through quiet local streets to the east of Cranford Street. This could be done relatively quickly and be in place before the Christchurch Northern Corridor opens.*

Confusion around the type of cycling facilities to be installed as part of secondary cycle routes network. Are they to be separated cycle lanes?	- *The Downstream Effects Management Plan recommends the installation of secondary cycleways.* - *These cycleways will not include separators like those provided on the Major Cycle Routes (e.g. Papanui Parallel). These cycleways will consist of painted cycle lanes and bicycle greenways (i.e. use of quiet streets).* - *Any proposed cycleway will be consulted on with the community.*
Lack of safe cycling facilities on Cranford/Sherborne Streets during clearway operation.	- *The Downstream Effects Management Plan encourages Council to investigate how a consistent level of service throughout the Cranford Street Corridor can be provided to cyclists during clearway operation.* - *The Downstream Effects Management Plan includes a number of recommendations to encourage cyclists away from the Cranford/Sherborne street corridor and onto the Papanui Parallel and other quieter routes.*

Concerns around staging of traffic calming on various streets and concerns on the time it might take to implement measures to address rat-running that does occur after the Christchurch Northern Corridor opens.	- *The Downstream Effects Management Plan recommends that Council should carry out vehicle monitoring before the Christchurch Northern Corridor is opened.*
	- *Vehicle monitoring will be collected to establish baseline data which will be used:*
	  - *To confirm the validity of the traffic modelling.*
	  - *As part of the ongoing monitoring of each street in relation to the impact of the Christchurch Northern Corridor.*

	- *The Downstream Effects Management Plan allows Council to implement traffic calming on streets that have not been identified in the plan that have been found to have 30% plus increase in traffic compared with pre- Christchurch Northern Corridor.* - *The Downstream Effects Management Plan recommends that Council should look to implement improvements as early as possible on streets with a 30% plus increase compared with pre- Christchurch Northern Corridor.* - *Temporary measures (or rapid implementation measures) are an option to reduce rat-running on some streets, especially if the effects are well over 30%. For example, use of temporary islands and hit posts to ban some turning movements.*

Right turn movements during clearway operation (e.g. into new play-centres on Cranford Street) will impact on capacity of two-lane clearway operation.	- *Right turns on the proposed clearways can reduce the capacity of the road, however it has limited effect on the capacity of the road if opposing flow (non-peak direction) is low as the right turning vehicle can make this manoeuvre quickly.*
	- *The recommendations in the Downstream Effects Management Plan propose:*
	  - *Right turning restrictions at side-roads.*
	  - *The provision of right turn bays at most traffic signals allowing traffic to turn right safely.*

Concerns around peak period prohibition of car parking for clearways on roads with high kerbside parking demand.	- *As with all large-scale roading projects, Council will carry out parking surveys and look at managing parking demand by different users (e.g. local resident, commuters and short duration parking near shops).*
Why the DEMP does not consider the downstream effects of Christchurch Northern Corridor on Innes Road and McFaddens/ Mays/ Normans corridors, given Innes Road is already heavily congested in peak periods.	- *The traffic analysis completed as part of the Downstream Effects Management Plan indicates that traffic levels on Innes Road will not be affected due to the Christchurch Northern Corridor and is not considered as part of the study.* - *Congestion can be addressed as part of the operational or capital improvements through the Council's Long Term Plan.*
Will there be monitoring of air, noise and vibration from traffic before and after the Christchurch Northern Corridor opens.	- *Council will monitor air, noise and vibration before the Christchurch Northern Corridor opens to establish baselines.* - *It also recommends that Council monitors annually or biennially so that any impacts of the additional traffic can be assessed.*

	- *The recommended locations to carry out this monitoring are at:*
	  - *Cranford Street north of McFaddens Road*
	  - *Cranford Street north of Berwick Street*
	  - *Berwick Street immediately east of Cranford Street*
	  - *Madras Street north of Edgeware Road*
	  - *Barbadoes Street north of Edgeware Road*

Concerns around pedestrian safety of children in the proximity of schools.	- *The Downstream Effects Management Plan has identified pedestrian safety concerns on Cranford Street between the Westminster and Berwick Street intersections. It recommends Council improve both intersections considering pedestrian safety. It also recommends to monitor and investigate an additional signalised crossing facility on Cranford Street, if required in front of English Park.* - *The Downstream Effects Management Plan also suggests to lower the speed limit on Cranford Street at school peak hour to further improve pedestrian safety.* - *It is currently proposed that these measures will be implemented as part of a package of works on Cranford Street.*

Requests to install tolls on the Waimakariri Bridge (SH1) to reduce number of cars travelling into Christchurch (as a traffic demand management measure).	- *Tolls:*
	  - *Current New Zealand legislation does not permit existing roads to be tolled. Tolls can only be applied to new roads where suitable alternative routes are available. This option was not investigated as part of the Christchurch Northern Corridor and is not part of the existing Designation Conditions.*
	  - *Changes would be required to the Designation Conditions and associated conditions for the Northern Arterial, Northern Arterial Extension and Cranford Street upgrade.*
	  - *If Council were to implement tolling on the Northern Arterial Extension, then the alternative available transport route would be through the Christchurch Northern Corridor /Queen Elizabeth II Drive interchange. This interchange has not been designed to cater for the likely additional traffic and will require significant changes which is not part of the existing Alliance design.*
	  - *Additionally, the likely re-routing will significantly impact the operation of Main North Road and Cranford Street north of the roundabout.*
	- *Congestion Charging:*
	  - *Similar to the road tolling option, congestion charging has not been investigated as part of the*

	Christchurch Northern Corridor and does not form part of the existing Designation Conditions.
	- *Best practice recommends the following factors to be investigated prior to making a decision on congestion charging –*
	  o *Political position.*
	  o *Well planned public relations campaigns.*
	  o *Single empowered agency.*
	  o *Public recognition of need.*
	  o *Ring fencing of revenues.*
	  o *Proven technology.*
	  o *Lengthy development.*
	  o *Clear business case.*
	- *This option is not currently considered as part of the northern package Travel Demand Management study that was recently completed by the New Zealand Transport Agency.*
	- *While implementation of such a measure will require ministerial and wider public approval, there is limited information to evaluate the likely impact of such a significant Travel Demand Management measure.*

STAGE 1	
Stage 1A - Recommendations required in order to meet the designation conditions prior to the opening of the Christchurch Northern Corridor: These recommendations are categorised as: - Major Road Upgrades - Traffic Calming - Monitoring	
Major Road (MR) Upgrades:	
MR1 (Cranford Street Clearways)	Peak Period Clearways along Cranford Street from Innes Road to Berwick Street.
MR2 (Westminster/ Cranford Intersection)	Upgrades to Westminster Street /Cranford Street Intersections.
MR3 (Berwick/ Warrington Upgrades)	Upgrading of Berwick Street /Cranford Street signalised intersection and signalisation of the Forfar Street /Warrington Street and Barbadoes Street /Warrington Street Intersections.
MR4 (South Berwick Upgrades)	Downstream of Berwick Street arterial upgrade option that comes out of the scoping study.
MR5 (high occupancy vehicle lanes on Cranford-Sherborne)	Investigate extending the southern high occupancy vehicle lanes on the Christchurch Northern Corridor through to Bealey Avenue and installing a northbound high occupancy vehicle lane.
Traffic Calming (TC) Measures:	
TC1	Mersey and Berwick Streets (Innes Road to Forfar Street)
TC2	Knowles Street
TC 3	Weston Road
TC 4	McFaddens Road
TC7	Malvern Street (left in left out at Cranford St intersection)
TC8	Dee Street (left in left out at Cranford St intersection)
Vehicle Monitoring:	
Before the Christchurch Northern Corridor is opened, Vehicle Monitoring will be collected to establish baseline data which will be used: - To confirm the validity of the traffic modelling. - As part of the ongoing monitoring of each street in relation to the impact of the Christchurch Northern Corridor.	
Main Roads	- Traffic counts be collected at over 50 locations with a high potential for rat-running prior to and within 3 months of Christchurch Northern Corridor opening. - Ongoing annual or biannual monitoring of the streets that are expected to carry most of the additional traffic. - Other streets to be monitored if adverse effects are reported (e.g. an increase in rat-running or speeding).
Local Roads	

Stage 1B – Further recommendations to be carried out prior to the opening of the Christchurch Northern Corridor - Identify and implemented any quick wins where possible before the Christchurch Northern Corridor opens. - Studies should commence in Stage 1 and be completed early on in Stage 2.	
Environmental Monitoring:	
Vehicle emission Noise Vibration impacts	Annual or biennial measurements through to the end of the Commissioning Period at: - Cranford Street north of McFaddens Road - Cranford Street north of Berwick Street - Berwick Street immediately east of Cranford Street - Madras Street north of Edgeware Road - Barbadoes Street north of Edgeware Road
Safe System Community Areas (SSCA):	
SSCA 1 to 9	Introduce nine 30km/h (or 40km/h) reduced speed limit areas through the downstream local road network
Safe Access to Schools (AS):	
AS1 – Safe Access Across Cranford Street	This study will look at a range of options, including a new mid-block signalised crossing across Cranford Street near the English Park Carpark entrance.
AS2 – Interim Improvements on Cranford Street	Between Cranford/Westminster and Berwick/Cranford Intersections and recommended to be carried out with these intersection upgrades as a suite of works. Council to implement measures to increase the safety of pedestrians crossing Cranford Street. These could include lowering speed limits at school peak hour and improved pedestrian crossing facilities.
Safe Cycling Routes (SC):	
SC1 (Cycle Wayfinding Signage)	Development of and implementation of a wayfinding signage plan that directs cyclists at the northern end of Cranford Street (at McFaddens Road) and southern end of Cranford Street to safer cycling routes.
SC2 (McFaddens Road Secondary Cycle Corridor)	Undertake a route study of a cycling route both west (towards the Papanui Parallel) and east (towards new north south route) on McFaddens Road.
SC3 (Westminster/ Courtenay Secondary Cycle Corridor)	Undertake a route study of a cycling route both west and east of Cranford Street.
SC4 (Edgeware Road Secondary Cycle Corridor)	Undertake a route study of a cycling route both west and east of Cranford Street.*
SC5 (North- South Secondary Cycle Corridor)	Undertake a route study of an alternative north-south cycle route through traffic calmed streets to the east of Cranford Street.

STAGE 2	
Stage 2A - Recommendations to be carried out within the first three years of opening of the Christchurch Northern Corridor in order to meet the designation conditions - subject to confirmation through traffic monitoring.	
Vehicle Monitoring:	
- Traffic counts undertaken within 3 months of the CNC opening on: • All key local routes that are expected to be impacted by rat-running traffic. • Where there have been a number of public complaints about rat-running. - Those streets that have a greater than 30% increase in traffic volumes will be included in the traffic calming street list for Stage 2 (even if not currently on the lists below). - Where large increases occur, temporary works may be implemented ahead of more permanent upgrades.	
Traffic Calming (TC) Measures:	
Introduce traffic calming where expected increases in traffic volumes are validated by the monitoring data.	
TC9	Roosevelt Avenue
TC12	Caledonian Road
TC13	Edgware Road (Village)*
TC14	Manchester Street
TC15	Westminster Street/ Courtenay Street
Stage 2B - Further recommendations to be carried out within the first three years of opening of the Christchurch Northern Corridor	
Safe Access to Schools (AS):	
AS1	Safe Access Across Cranford Street: Implement any options identified in this study such as a new mid-block signalised crossing across Cranford Street near the English Park Carpark entrance.
Safe Cycling Routes (SC):	
Implementation of Secondary Cycling Routes:	
SC2	McFaddens Road Secondary Cycle Corridor: - West (towards the Papanui Parallel) - East (towards new north south route) on McFaddens Road.
SC3	Westminster/Courtenay Secondary Cycle Corridor: - Both west and east of Cranford Street.
SC4	Edgeware Road Secondary Cycle Corridor: - Both west and east of Cranford Street.*
SC5	North-South Secondary Cycle Corridor – Alternative north-south cycle route through traffic calmed streets to the east of Cranford Street.
Access to Parks (AP):	
AP1	(St Albans Park Access Plan) – Development of a plan that will look at access to the park by pedestrians (of different abilities), cyclists, and motorists.

AP2	(Malvern/Rugby Park Access Plan) – Development of a plan that will look at access to the park by pedestrians (of different abilities), cyclists, and motorists.
Implement any quick wins that come out of the plan within Stage 2.	
Access to Commercial Centres (AC):	
Undertake the following studies that will consider safe access to this activity centre by pedestrians, cyclists, and motorists:	
AC1	Westminster/ Cranford Local Activity Centre Transport Study
AC2	Barbadoes/ Warrington Local Activity Centre Transport Study
AC3	Barbadoes/ Edgeware Local Activity Centre Transport Study*
AC4	Rutland Street Local Activity Centre Transport Study
Undertake the following studies which will focus on safe access by pedestrians along the route and crossing the route especially for vulnerable road users:	
AC5	Westminster/ Courtenay Corridor Study (Rutland to Forfar)
AC6	Edgware Corridor Study (Springfield to Barbadoes) –
Implement any quick wins that come out of the studies in Stage 2.	
Environmental Monitoring:	
Vehicle emission Noise Vibration impacts	Annual or biennial measurements through to the end of the Commissioning Period at: - Cranford Street north of McFaddens Road - Cranford Street north of Berwick Street - Berwick Street immediately east of Cranford Street - Madras Street north of Edgeware Road - Barbadoes Street north of Edgeware Road

STAGE 3	
Stage 3A – *Recommendations to be carried out before the end of the Commissioning Period of the Christchurch Northern Corridor in order to meet the designation conditions - subject to confirmation through traffic monitoring.*	
Monitoring	
Vehicle Monitoring:	
- Traffic counts to be continued until the end of the commissioning period on: • All key local routes that are expected to be impacted by rat-running traffic. • Where there have been a number of public complaints about rat-running. - Where large increases occur, temporary works may be implemented ahead of more permanent upgrades. - Those streets that have a greater than 30% increase in traffic volumes will be included in the traffic calming street list for Stage 3 (even if not currently on the lists below). - An indication of Stage 3 improvement projects is provided below. This list will need to be reviewed and where necessary revised once the actual impacts of the Christchurch Northern Corridor traffic is known from the monitoring.	
Traffic Calming (TC) Measures:	
Introduce traffic calming only where monitoring indicates high levels of rat-running are occurring (may include additional streets)	
TC5	McFaddens Road, Knowles Street, Weston Road (east Cranford)
TC6	Jameson Street
TC10	Forfar Street
TC11	Flockton Street
TC16	Severn Street
TC17	Thames Street
TC 18	Aylesford Street
TC19	Kensington Avenue
TC 20	Philpotts Road
TC 21	Francis Avenue
Stage 3B – *Recommendations that could be undertaken any time between the opening of the CNC and the end of the Commissioning Period*	
Safe Cycling Routes (SC):	
Monitor and upgrade routes as required.	
Access to Parks (AP):	
Implementation of the access plan as required to address access issues.	
AP1	St Albans Park Access Plan
AP2	Malvern/Rugby Park Access Plan
Access to Commercial Centres (AC):	
Implement study recommendations	
AC1	Westminster/ Cranford Local Activity Centre Transport Study
AC2	Barbadoes/ Warrington Local Activity Centre Transport Study

AC3	Barbadoes/ Edgeware Local Activity Centre Transport Study*
AC4	Rutland Street Local Activity Centre Transport Study
AC5	Westminster/ Courtenay Corridor Study (Rutland to Forfar)
AC6	Edgeware Corridor Study (Springfield to Barbadoes)*
Environmental Monitoring:	
Vehicle emission Noise Vibration impacts	Annual or biennial measurements through to the end of the Commissioning Period at: - Cranford Street north of McFaddens Road - Cranford Street north of Berwick Street - Berwick Street immediately east of Cranford Street - Madras Street north of Edgeware Road - Barbadoes Street north of Edgeware Road
* Council staff to work collaboratively with the Edgeware Village Master Plan project team	