Programme Business Case

Christchurch City Council's Transport System

26 January 2017

Final Version

The Case for Change – Programme Business Case

Christchurch City Council

NZ TRANSPORT AGENCY WAKA KOTAHI

New Zealand Government

Contents

Note: Appendices provided under separate cover

This document should be read in conjunction with the CCC Asset Management Plan, which provides comprehensive guidance on how the transport system will be maintained and renewed.

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4	06.12.2016	Draft for Executive Leadership Team approval and NZTA review
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EXECUTIVE SUMMARY

The Christchurch City Council (CCC) network Programme Business Case (PBC) is an evidence based living document that guides the direction for future investment in transport improvement projects.

The PBC recommends a suite of transport interventions (walking, cycling, public transport and local roads) that help Christchurch transition from recovery to regeneration, building upon past successes, and enabling the city to meet new and emerging challenges.

The PBC follows on from the Strategic Case (adopted in June 2016) which outlined problems facing the network (safety, travel time reliability/localised congestion, road condition and network continuity) and the benefits of addressing them. The evidence base from the Strategic Case has been reviewed and updated to reflect the latest data and to capture stakeholder input. Further analysis of the problems has been undertaken to identify the particular locations on the transport network where these problems are most prevalent. This work has reconfirmed the scale and significance of the problems effecting the operation of the transport system.

The process of developing the PBC has taken a One Network approach and engaged with a wide set of stakeholders, including the NZ Transport Agency, Environment Canterbury, Selwyn and Waimakariri districts, Canterbury District Health Board and transport operators and interest groups.

The CCC PBC is part of a wider One Network approach which involves all the Urban Development Strategy partners. CCC is working closely with the partners to keep the dialogue open for integration and alignment as different aspects of the network progress through business cases.

Three investment objectives were agreed and applied to the development of the PBC:

- Improve the convenience and connectivity of walking, cycling and public transport to increase the use of these modes by 2027.
- Reduce transport related fatalities and serious injuries by 5% per annum (5 year rolling average)[1].
- Improve journey time reliability on key corridors by 2027.

A total of seven potential programme options were developed and assessed against their ability to address the problems and achieve the objectives. One programme focus has emerged as the most effective. This programme is a mixed one which focuses on improving the convenience and connectivity of walking, cycling and public transport, whilst addressing specific high risk safety and reliability problems identified on the CCC transport network.

The recommended strategic programme focus has the following principles:

- Commitment to completing all current projects or programmes where construction has started or contracts have been agreed.
- A focus on all possible measures to improve the efficiency of the public transport network.
- Support to enable active modes (walking and cycling), as well as practical travel demand management tools to encourage the use of these modes and change behaviour.
- Assessing and as appropriate addressing locations with high levels of safety risk.
- Taking all possible measures to improve journey time reliability (for all modes), including investigating a range of traffic management measures and behaviour change initiatives.

[1] This is an existing CCC performance measure/target.

The recommended programme performs well against all the investment objectives, and has strong alignment to relevant national, regional and local plans and strategies, including CCC's Community Outcomes and existing programmes of work such as An Accessible City. The recommended programme has been assessed using the latest NZTA Assessment Framework criteria. An assessment profile of H/M (strategic fit and effectiveness) has been determined for the recommended programme. It has not been possible to produce an indicative benefit cost ratio due to the scale and scope of this PBC. It is anticipated that efficiency will be assessed during subsequent phases as more detailed estimates of the costs and benefits can be determined.

The PBC has two key purposes: it has been used to identify which areas of the network should be progressed first, by focusing on areas that have the greatest potential to improve convenience and connectivity of walking, cycling and public transport and meet the investment objectives and; it sets a framework for how the problems on the network will be addressed by focusing on improving active and public transport choices and ensuring a safer and more reliable network.

Through the recommended programme it will be easier for people to get to, and move around the city whether by public transport, motor vehicle, cycle or on foot. Journeys will be more enjoyable and there will be improved travel time reliability and a safer network.

The first phase clusters are located adjacent to the south and west of the Central City, along with individual high safety or high delay intersections and a citywide travel demand management programme. The second phase would address remaining clusters adjacent to the Central City as well as Key Activity Centres, followed by key gateway routes. As each of these areas are examined further a multimodal approach will be applied, so that problems relating to safety, active and public transport are integrated and addressed.

The PBC evidence suggests that perceptions and human behaviour are a key cause of many of the problems identified on the transport network. A citywide travel demand management programme will be progressed to help achieve the investment objectives and address these problems.

The PBC is a key stage in developing the Council's transport investment programme for the Long Term Plan. However, the next steps in the Business Case process (mid-2017) will see the high level programme applied in practical terms, identifying projects and programmes of work that can be consulted on through the Long Term Plan consultation. The next step is integrating the PBC with other transport activities and business cases such as An Accessible City, Major Cycleways, Asset Management Plan, and the State Highway Business Cases.

Further work is required to refine the PBC to provide further information and an assessment of the efficiency of the priority, first phase clusters, outliers and travel demand management programme, as per the supporting scoping document.

A summary of the key information contained within this PBC is provided on the next page.

Strategic Case

Need to Invest

Evidence suggests there are specific safety, journey time reliability, network continuity, congestion and road condition problems.

The root cause of these problems is related to post-earthquake damage, future population changes and the way people choose to travel (private car).

Strategic Context

Christchurch City Council (CCC) is responsible for all of the city's transport services (excluding State Highways, the rail network and public transport operations), including local roads, footpaths, public transport, walking and cycling infrastructure and parking.

The vision of the Christchurch Transport Strategic Plan (2012) is "To keep Christchurch moving forward by providing transport choices to connect people and places".

This Programme Business Case (PBC) is consistent with relevant national, regional and local strategies, and a one network approach has been adopted to develop this PBC document.

Investment Objectives and Case for Change

Objective 1:	***Reduce transport related fatalities and serious injuries by 5% per annum.***
Existing arrangements	*Intersections, vulnerable users and driver distraction are key safety risk areas as stated in the Road Safety Action Plan.*
SMART	▪ *Focus on users, factors and locations.* ▪ *Measured through CAS and reported annually (Road Safety Action Plan).* ▪ *Existing target, 5 year rolling average.* ▪ *Evidenced in the SC and PBC.* ▪ *Annual improvements sought.*

Objective 2:	***Improve journey time reliability on key corridors by 2027.***
Existing arrangements	*Journey time variance is highlighted as a problem on certain corridors in the PBC, leading to 'pinch points' on the network.*
SMART	▪ *Focus: core PT and arterial corridors.* ▪ *Currently measured by CTOC.* ▪ *Reliability not faster travel times.* ▪ *Evidenced in the SC and PBC.* ▪ *Incremental improvements as corridors improved, target 2027.*

Objective 3:	***Improve the convenience and connectivity of walking, cycling and public transport to increase the use of these modes by 2027.***
Existing arrangements	*The convenience of the private motor vehicle and lack of continuity of bus and cycle lanes means it is difficult to get more people to walk, cycle or use the bus.*
SMART	▪ *Mode specific targets exist in the An Accessible City Plan.* ▪ *Household travel survey and census.* ▪ *Priority goal for CCC.* ▪ *Key theme in the SC and PBC and high priority in strategic documents.* ▪ *Incremental improvement sought, target 2027.*

Economic Case

Programme Option Identification and Assessment Analysis

Programme Options		Programme 1 Safety, safety, safety	Programme 2 Reliable journeys	Programme 3 Convenience and connectivity	Programme 4 Prioritised activities	Programme 5 Mixed with a safety focus	Programme 6 Mixed with a reliability focus	Programme 7 Mixed with a convenience and connectivity focus
Objective 1	Reduce transport related fatalities and serious injuries by 5% per annum (5 year rolling average).	4	1	2	2	5	3	4
Objective 2	Improve journey time reliability on key corridors by 2027.	1	4	3	3	2	5	4
Objective 3	Improve the convenience and connectivity of walking, cycling and public transport to increase the use of these modes by 2027.	2	1	4	3	3	2	5
Total		7	6	9	8	10	10	13

The recommended programme is Programme 7. The principle of the mixed programme with a convenience and connectivity focus is to address the problems associated with the way people choose to travel (predominantly by private vehicle) by improving the convenience and connectivity of walking, cycling and public transport. This programme will also address safety and reliability problems identified through the Strategic Case and best achieves the three investment objectives.

The recommended programme has been supported by a variety of stakeholders, including key Urban Development Strategy partners.

Financial Case

Elements of the recommended programme will be eligible for funding under standard arrangements between CCC and NZTA. Funding arrangements and costs will be refined following the completion of Point of Entry documents and subsequent work.

The affordability of the programme cannot be confirmed until the development of further work has been completed, alongside agreement on levels of funding for transport activities in the 2018-2028 Long Term Plan and the outcome of the Regional Land Transport Plan (RLTP) and 2018-2021 National Land Transport Programme/Fund (NLTP/NLTF).

Commercial Case

The recommended programme will be efficient and fundable through the National Land Transport Fund and CCC Long Term Plan. Implementation will be phased over the 10 year Long Term Plan period so that priority packages can be triggered first within affordable funding scenarios. Affordability will need to be confirmed through individual components of the programme.

The recommended programme has been assessed using the latest NZTA Assessment Framework criteria. An assessment profile of H/M has been determined for the recommended programme (strategic fit and effectiveness).

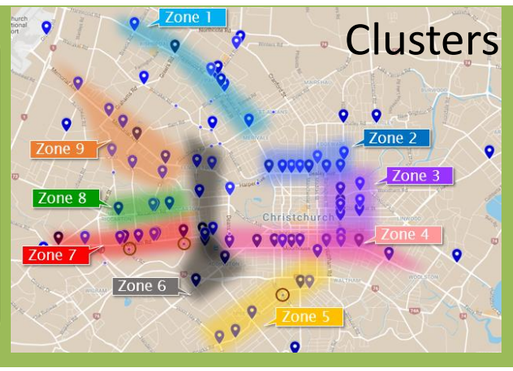
Management Case: Phasing

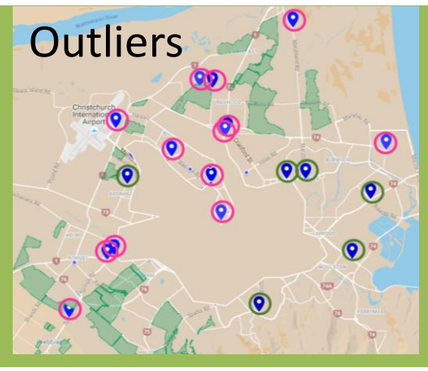
Phase One:

- *Zone 4 - Pink*
- *Zone 6 - Grey*
- *Green circled intersections*
- *Travel Demand Management*

Subsequent Phases:

- *Zone 3 – Magenta*
- *Zone 2 - Blue*
- *Zone 1 – Teal*
- *Zone 8 - Green*
- *Zone 5 – Yellow*
- *Zone 7 - Red*
- *Zone 9 - Orange*
- *Pink circled intersections*





Achievability: A governance structure has been agreed and implemented that includes a technical working group, a project steering group and a senior management project liaison group, consisting of staff from CCC, NZTA and Environment Canterbury .

The purpose of the groups is to oversee the development and ongoing delivery of business cases in the Christchurch area.

The UDS transport group will continue to be briefed and updated on a monthly basis.

1. PART A - STRATEGIC CASE

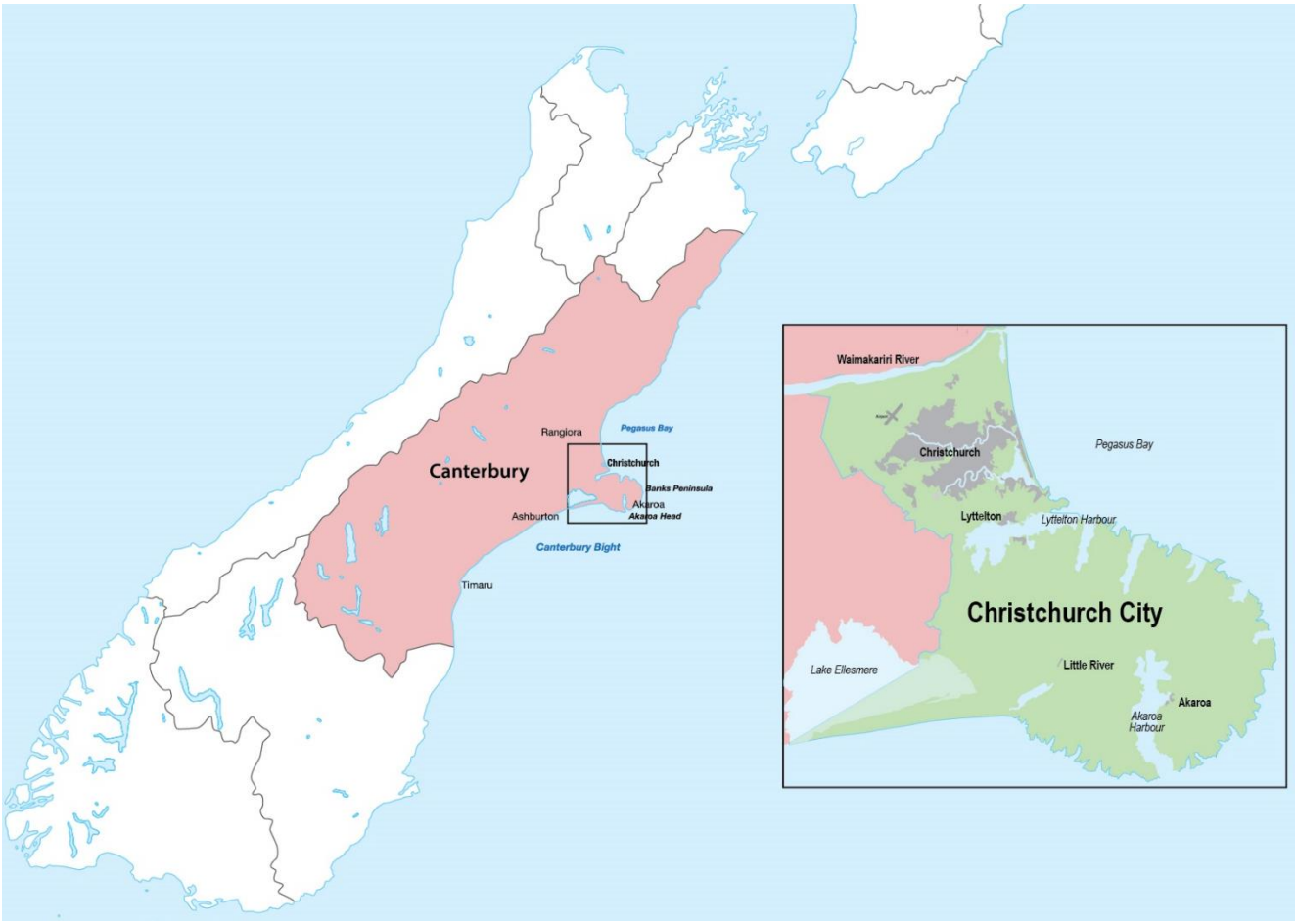
Introduction

The Programme Business Case (PBC) is used as the basis for seeking early approval to commence a recommended programme of work and to review the ongoing viability of the programme. The purpose of the strategic case is to determine whether there is a compelling case for investment.

This report builds on work reported in two previous documents: the *CCC Strategic Assessment* (February 2016) and the *Christchurch City Council (CCC) Case for Change – Strategic Case* (June 2016)[2]. This PBC also aims to enhance and complement the delivery of outcomes from current funded work streams, such as the An Accessible City and Major Cycleway programmes. The report has been prepared in accordance with the principles outlined in the NZ Transport Agency (NZTA) Business Case Approach guidelines and has been independently peer reviewed.

This PBC confirms that the problems identified in the *Strategic Case* are valid and critical. There is a need to plan appropriate responses to manage specific safety, travel time reliability/congestion, network continuity and road condition problems that are affecting the operation of the CCC transport system. The study area for this PBC is the CCC boundary as shown in Figure 1.

Figure 1: Christchurch Transport PBC Study Area



[2] Strategic Assessment and Strategic Case can be viewed at: http://www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/strategies/transport-strategic-plan-2012/

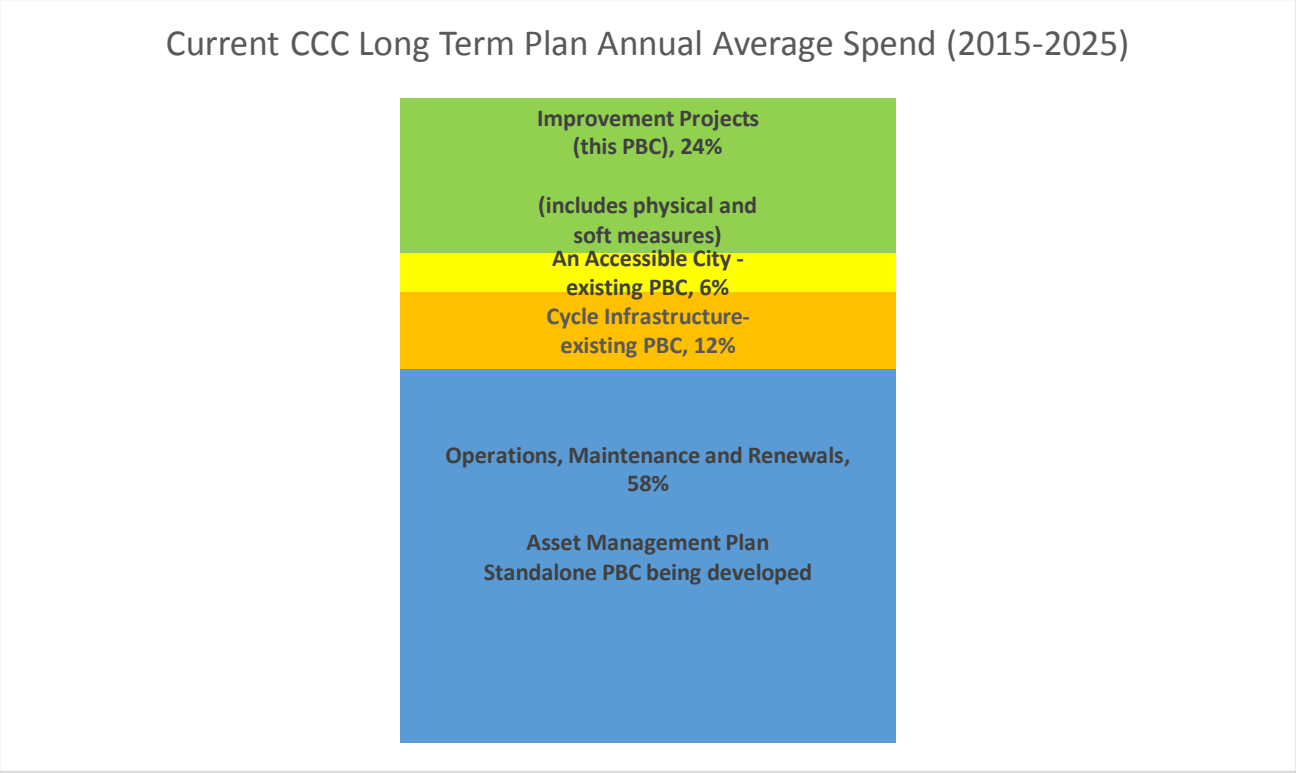
Programme Business Case Scope

This CCC citywide PBC is intended to inform the development of the next CCC Long Term Plan (2018-2028) and is anticipated to take effect from mid-2018, and provide a longer term outcome focussed programme. The unique post-earthquake environment (as a result of the Canterbury earthquakes) means a significant amount of investment is still required to assist with the ongoing repair and recovery of transport infrastructure as a result of earthquake related damage. Christchurch is unique in this regard when compared against other major centres in New Zealand.

Figure 2 illustrates the proportion of CCC investment (at the current time) that is allocated towards improvement projects (this PBC) in relation to wider CCC transport investment, including committed projects and programmes. Council spends on average $30 million a year on improvements to the transport network (based on annual average over current ten year LTP period).

This current PBC forms part of a wider suite of documents that together will help shape the 2018-2028 CCC Long Term Plan. An indicative Long Term Plan process (for transport activities) with timeframes is provided at **Appendix A**. The Asset Management Plan is currently CCC's largest transport spend and a standalone PBC is currently under development, which also links to the Strategic Case (June 2016). A draft programme of activities (year 1-3 of the 2018 Long Term Plan for maintenance and renewals) is expected to be available by April 2017. It is expected that this PBC and the Asset Management Plan will be integrated in early 2017 and used to formulate the draft Long Term Plan and wider RLTP and NLTP (see **Appendix A** for process, timeframes and proposed approach to integration).

Figure 2: Approximate Proportions of Existing Council Transport Investment[i]

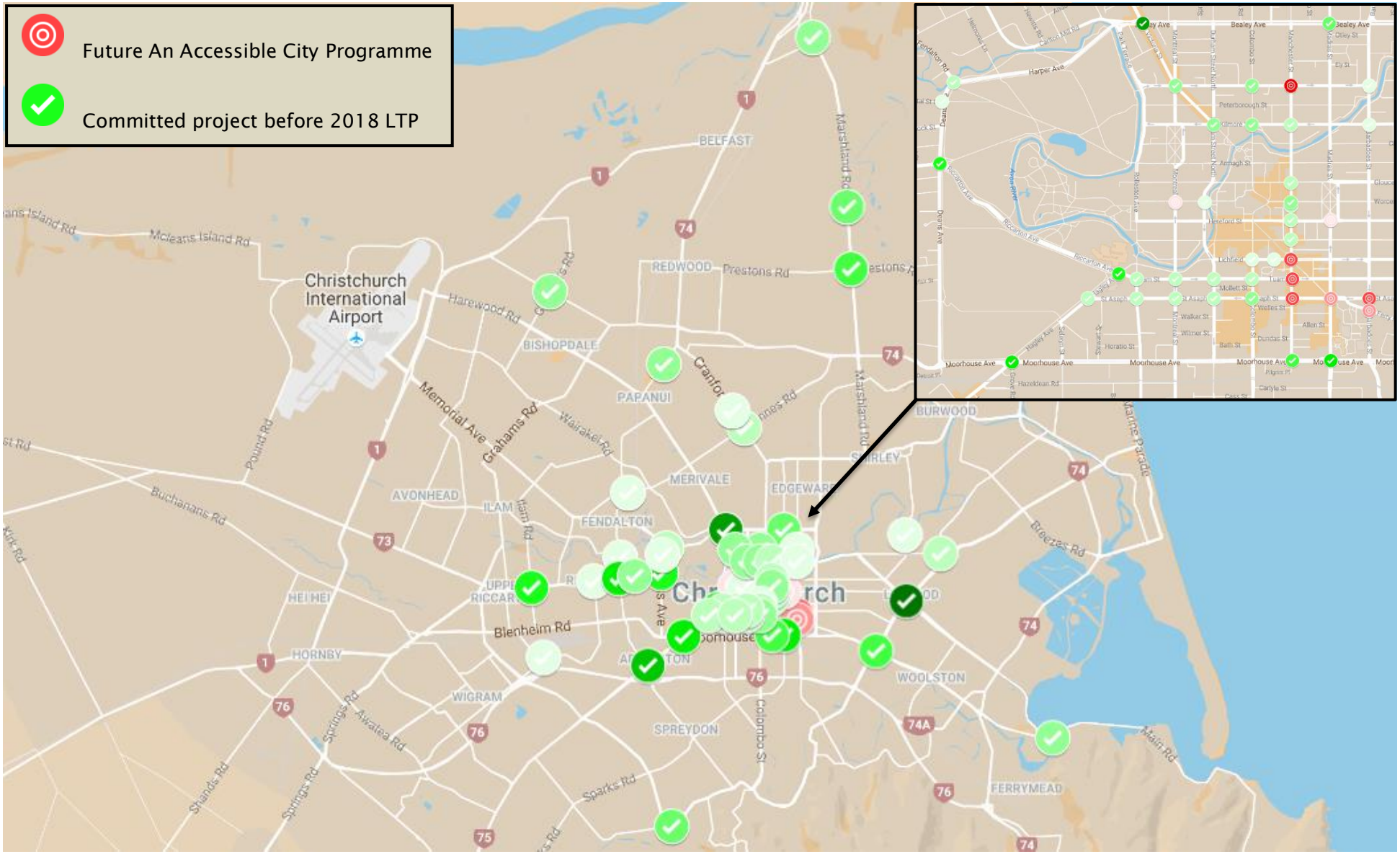


This PBC provides a robust, ten year view of infrastructure and operational requirements for Christchurch and enables the city to begin re-shaping investment towards achieving the outcomes detailed within this report. This PBC also reinforces the Christchurch Transport Strategic Plan (CTSP, 2012), which details the transport actions and vision for the city that are required to create a transport system to support growth and community aspirations during the next 30 years (2012-2041).

A Strategic Assessment and Strategic Case proceed this PBC and reconfirm that the CTSP remains current and valid in terms of addressing the key challenges facing the transport system in Christchurch. Over the next year the CTSP is being updated to incorporate long term (30 year) scenario testing to better understand the future needs and potential impacts of growth, technological disruption, and public transport investment. This will determine future investment packages that best achieve the outcomes of the CTSP. This work will be used to inform the development of Council's next Infrastructure Strategy.

As part of the transitional nature of this work it is important to recognise that this PBC is intended to influence future works as part of the 2018-2028 CCC Long Term Plan. Therefore, existing projects or programmes being delivered by CCC (prior to adoption of the 2018 LTP) are assumed to be unaffected by this PBC. An overview of existing transport improvement projects is provided in Figure 3. It is however noted that the citywide analysis undertaken as part of this PBC has highlighted that many existing projects and programmes are addressing many of the problems identified on the transport system. In addition, many of the locations identified through this PBC were already programmed in the current LTP, but may now be brought forward as a result of this work, depending on availability of funding. It is anticipated that the scope of this PBC could change to incorporate future Central City and cycling projects as council moves through its LTP cycles.

Figure 3: Existing Committed Projects and An Accessible City Projects (Current CCC Long Term Plan – completed prior to 2018)



Geographic Context

Christchurch is located on the east coast of New Zealand's South Island. The city is situated between the fertile Canterbury Plains and the South Pacific Ocean, overlooked by the Port Hills and the Southern Alps. The area addressed by this PBC is the CCC local authority boundary, which is bounded by the Waimakariri River to the north and includes Banks Peninsula to the south-east of the City.

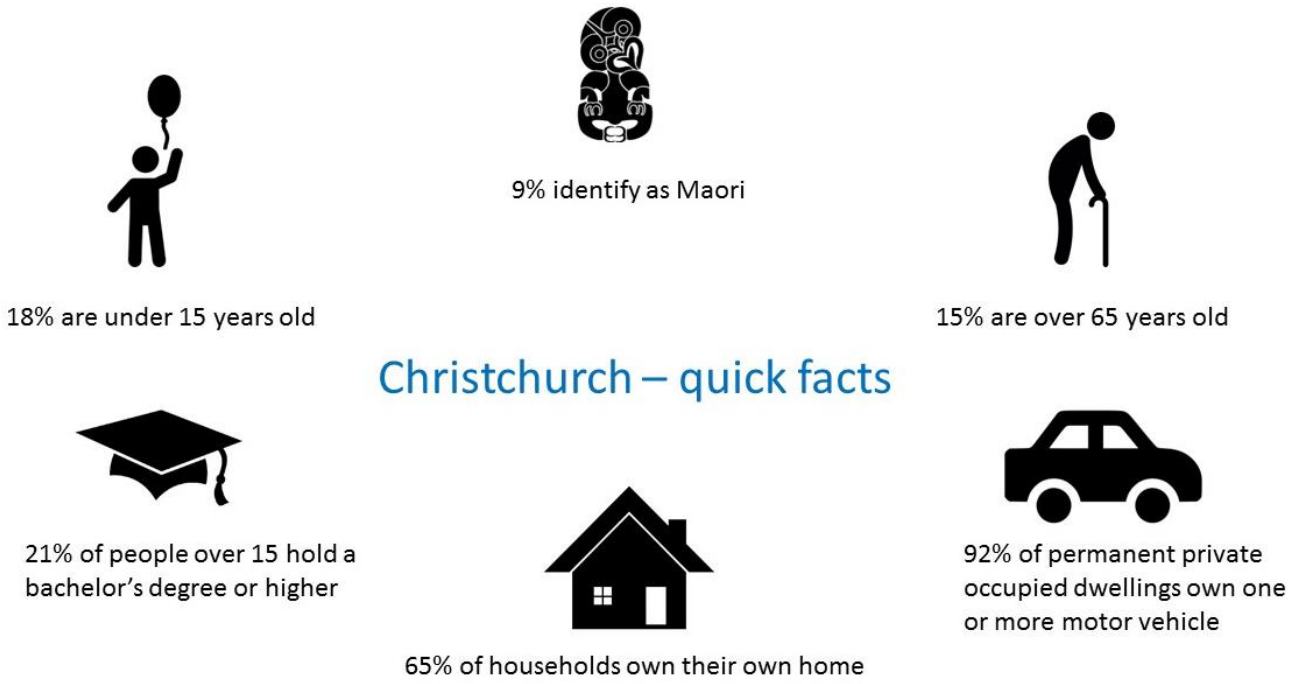
Christchurch is bounded to the north by the Waimakariri District and to the west by the Selwyn District. The city is located within the Canterbury region, New Zealand's largest region by area, which is administered by the Canterbury Regional Council (Environment Canterbury). Christchurch accounts for 63.6 percent of the total regional population and is the main urban centre of New Zealand's South Island[ii].

Social Context

Christchurch has a rich history; people have inhabited the area for over 40 generations (c.800-1000 years) attracted by the abundant natural resources. Ngai Tahu is the largest tribe (iwi) in the South Island, comprised of a number of related sub-tribes (hapu) and extended families.

Like many developed countries globally, the population of Christchurch is ageing. The large number of people born in the years following the Second World War (baby boomers) are now entering retirement age. Christchurch is home to 377,000 people (about 8.5 percent of New Zealand's population) and is the largest city in the South Island[iii]. The population of Greater Christchurch grew from 414,000 in 2006 to 428,000 in 2013 and based on a medium growth projection is expected to reach 566,900 by 2043[iv]. The projected population growth in the Greater Christchurch area will increase demand on the transport system in terms of domestic freight growth and people movements.

Figure 4: Census (2013) Quick Facts



Economic Context

Transport plays a key role as enabler for each sector of the regional economy. Economic activity is a driver of demand in the Christchurch transport system, whether it be for the local, regional, inter-regional or international movement of people and goods. Christchurch is crucial to the economic output of the Canterbury region and New Zealand. Nearly 70 percent of the region's economic output comes from activities which occur within the city boundary[v].

The city is also a major transport hub, with a 24 hour international airport, and a port that handles over $5 billion of exports per year. Christchurch is also a manufacturing hub, with particular strengths in machinery and equipment manufacturing and chemicals, minerals and metal manufacturing.

The city is the tourism gateway to the South Island and home to a tertiary hospital, two universities and seven Crown Research Institutes. Greater Christchurch's normal economic activity is currently swollen by the $40 billion (2015) earthquake reconstruction funding that will extend into the 2020's[vi].

Local Transport Context

The CCC transport system consists of multi-modal networks which enable people and goods to travel throughout the city and wider Canterbury region effectively, efficiently and safely. At the regional level, the transport system helps to support the region's economic output, which includes connecting businesses and producers to international markets via major air and sea ports. At the local level the transport system connects businesses, communities, families and friends with customers, services, employment and leisure.

Following the Canterbury earthquakes, there has been a significant increase in cross boundary trips to the Selwyn and Waimakariri districts, with more people choosing to live in these districts and commute or travel into Christchurch for work, education, leisure or to access key services. On Census day 2013, there was a 32.2 percent increase in the number of people commuting into Christchurch City to work from Hurunui District, Waimakariri District, Selwyn District, and Ashburton District compared to 2006 (5,640 additional people, from 17,526 people in 2006 to 23,166 people in 2013)[vii].

CCC is responsible for operating, maintaining and improving the local transport system. In doing so, CCC works closely with New Zealand Transport Agency (NZTA), KiwiRail, New Zealand Police, Environment Canterbury (ECan), neighbouring district councils and partners to ensure the Greater Christchurch transport system is operated and developed following a one network approach.

The city's road network is characterised by arterial routes which form predominantly radial spokes from the Central City. The spokes are supported by informal inner (Four Avenues) and outer ring roads. The city's road network is further supported by the State Highway network which is managed by NZTA and links Christchurch with neighbouring districts and the rest of the South Island.

The movement of freight plays a critical role for the Christchurch economy, ensuring that goods reach domestic and international markets, and vice versa, ensuring that domestic and international goods reach Christchurch. Road freight provides a flexible and dependable benefit to freight operators and receivers; $18.9bn (31.6%) of freight is moved by road in Greater Christchurch. It is crucial that CCC's local road network supports the movement of freight in and around the city.

CCC is undertaking an ongoing freight management workstream that is intended to improve the efficiency of freight movement by defining and protecting freight routes and managing freight in local areas. To do this, the CCC Freight Management Action Plan has been developed to identify

Christchurch's key freight issues and set out a range of priority actions that CCC and partners will focus on to address these problems.

Rail transport in Christchurch consists of two main railway lines carrying largely long-haul freight, as well as two long-distance passenger trains. The Main North Line runs from Christchurch along the east coast and through Kaikoura and Blenheim to Picton, connecting with ferries from Picton to Wellington[3]. The Main South Line runs from Lyttelton through Christchurch and along the east coast of the South Island to Invercargill via Dunedin. Passenger services operate primarily as scenic visitor experiences between Greymouth and Christchurch and seasonally between Picton and Christchurch.

Christchurch has an extensive bus network with routes serving most parts of the city and satellite towns. Public transport facilities and infrastructure are provided by CCC, however, the local bus service (Metro) is managed by Environment Canterbury. Nationally Christchurch has been known as New Zealand's cycling city, with eight percent of commuters cycling. The Central City has flat terrain and CCC is currently developing 13 Major Cycleway Routes and a series of local cycle connections across the city with an aim to increase cycling mode share further.

The Canterbury Earthquakes

The Canterbury earthquake sequence that began on 4th September 2010 contained four main earthquakes and thousands of aftershocks. The second 6.3 magnitude earthquake of 22nd February 2011, centred just east of the city, was one of New Zealand's worst natural disasters. One hundred and eighty five people were killed and alongside the tragic loss of life, more than 8,000 households were permanently displaced by land damage, 90 percent of residential properties were damaged in some way and 80 percent of buildings in the Central Business District had to be demolished[viii].

The earthquakes affected the suitability of some existing urban areas to continue to be used for residential, community and business purposes. The residential Red Zone includes land that is so badly damaged by the earthquakes it is unlikely it will be rebuilt on. About 13,500 residents left the Christchurch City area since the earthquakes and the temporary closure of the Central City immediately following the earthquakes affected over 6,000 businesses. Many affected residents and businesses relocated either within the city or to neighbouring districts, altering travel patterns and traffic volumes on parts of the network. As the Central City rebuild progresses there is a need to be cognisant of changing travel patterns.

The impacts of the 2010/11 earthquake sequence continue to be observed across the city and it is anticipated that the shape of urban Christchurch will continue to change during the ongoing recovery period, particularly over the next 10-15 years. The condition of the roading network and corresponding levels of service have been severely impacted by the earthquakes, with the majority of damage in Lyttelton and the eastern suburbs of the urban area of Christchurch.

Approximately 1,000 kilometres (45 percent) of Christchurch's roading network sustained significant damage in the earthquakes, requiring some 50,000 repairs[ix]. Stronger Christchurch Infrastructure Rebuild Team (SCIRT) was responsible for repairing earthquake damaged infrastructure, and has repaired urgent issues. However, there are many assets still requiring remediation over the next 30 years to bring the network back to a state comparable to pre-earthquake levels.

[3] Note: see below impact of the recent Kaikoura earthquake sequence.

The Kaikoura Earthquake

At the time of writing a significant earthquake event in the Kaikoura area has caused long term disruption to regional rail and road connections (affecting SH1 and the main trunk line - rail). The magnitude 7.8 earthquake occurred on 14th November 2016, centred 15 kilometres north-east of Culverden, 60 kilometres south-west of Kaikoura and 95 kilometres from Christchurch. The earthquake was widely felt across the South Island and lower half of the North Island.

Following the earthquake, many roads in the area were closed due to slips and damage to bridges, including State Highway 1 between Seddon and Cheviot and the inland Kaikoura Road. The Main North Line railway also suffered severe damage due to the earthquake. The NZTA have indicated that State Highway 1 is likely to take months to repair, whilst repairs to the rail network, a key freight connection between Wellington and Christchurch, will likely take more than a year to repair.

The Kaikoura earthquake has the potential to change the nature of freight movements in the South Island until major roading and rail infrastructure is repaired. A greater number of freight movements are now likely to be made via coastal shipping between Wellington and Lyttelton Port in Christchurch.

One Network Approach

This PBC considers problems and intervention scenarios across land uses, roads, public transport, walking and cycling networks within the CCC study area. While the focus of this report is on the transport system within CCC's control, it is important that this is considered within the broader inter-regional context, particularly the linkages between Christchurch and the wider South Island. A one network summary is provided at the end of each chapter to summarise the synergies between the CCC PBC, An Accessible City and several State Highway business cases currently under development in the Christchurch area.

CCC has been coordinating with other agencies, both directly through business cases and through the Regional Land Transport Plan to ensure consistency and coordination of interventions to achieve one network outcomes. The PBC has been prepared with input from a wide set of stakeholders, overseen by the Urban Development Strategy (UDS) Transport Group.

The UDS partnership was established in 2004 to address the challenges posed by the urban growth demands of Greater Christchurch, including coordinating transport and infrastructure delivery and the need for collaborative sub-regional leadership. The UDS partnership is made up of the three territorial authorities (Christchurch City, Selwyn and Waimakariri districts), the Canterbury Regional Council (Environment Canterbury) and local Maori leadership. It is supported by the NZTA, the Canterbury District Health Board and Regenerate Christchurch (a Government/CCC regeneration partnership).

CCC is responsible for all of the city's transport services, from local roads and footpaths, to public transport, walking and cycling infrastructure. Other transport infrastructure and planning falls under regional or national governance, such as public transport operations, regional planning, State Highways or the rail network.

CCC note and support initiatives currently underway to strengthen the strategic connections across the South Island. The Christchurch Roads of National Significance (RoNS) programme is underway in Christchurch and scheduled for completion by 2020. The RoNS will introduce significant journey time reliability and safety improvements on State Highway 1, State Highway 74 and State Highway 76.

In addition to the UDS Transport Group, CCC and NZTA have established a governance structure that consists of a technical working group, a steering group and senior management liaison group to oversee the development of the various transport business cases underway in the Christchurch area.

These groups will play an important role over the next phase of the business case development (early 2017) to help work towards a one network approach of the various PBC's. Further details regarding the governance structure are provided in section 7 as part of the Management Case.

2. PARTNERS AND STAKEHOLDERS

Stakeholder Overview

This PBC has been developed with involvement from CCC, NZTA, ECan and wider stakeholders. A governance structure (see Section 7) has also been established to enable technical and management collaboration, coordination and integration between agencies currently developing transport business cases in the Christchurch area.

Christchurch City Council

Christchurch City Council (CCC) is the asset owner and is responsible for undertaking the PBC. All of the CCC transport system was considered through the development of this PBC. CCC is also the majority funder of the local transport network.

NZ Transport Agency

The NZ Transport Agency (NZTA) is a project partner and potential funder. NZTA is responsible for planning, improving and managing the State Highway network. NZTA also invests in some activities on local roads and public transport through the National Land Transport Fund.

Environment Canterbury

Environment Canterbury (ECan) is a project partner. ECan is the regional council for the Canterbury region, the largest region in New Zealand. ECan provides an important role as the lead agency for regional transport planning and provision of public transport services.

While formal stakeholder engagement has been undertaken through the PBC development, UDS partners were informally consulted through monthly briefings as part of the UDS Transport Group. Key feedback from these discussions has been considered though the development of the PBC. Wider stakeholders who participated in the development of this PBC are summarised in Table 1.

Table 1: Stakeholders who participated in the CCC PBC

Stakeholders	
▪ CCC Community Board Chairs	▪ Selwyn District Council
▪ Waimakariri District Council	▪ Canterbury District Health Board
▪ Lyttelton Port Company Limited	▪ Christchurch International Airport Limited
▪ KiwiRail	▪ Ngāi Tahu
▪ NZ Police	▪ Automobile Association
▪ Spokes	▪ Road Transport Association
▪ Living Streets	▪ Christchurch Development Corporation
▪ Age Concern	▪ NZ Trucking Association

Understanding Stakeholder' Needs

Stakeholder engagement for the PBC was undertaken in in two key stages of the process: endorsement of the problems identified through the Strategic Case; and feedback on the recommended programme.

Problem Statements and Stakeholder Insights

A workshop with stakeholders was held on 15th August 2016, to brief stakeholders on the work to date (Strategic Assessment and Strategic Case) and to help capture stakeholder insights. The workshop helped to re-confirm the problem statements identified in the Strategic Case.

Key findings include:

"The things I like most about transport in Christchurch"

Strong support for cycling was evident across the majority of responses, particularly calls for the continued delivery of safe separated cycleways. Many respondents noted the city's flat topography, climate, and size make it ideal to get around by bike. Public transport coverage was commended, although reliability was recognised as a limitation. Low levels of congestion in comparison to other major New Zealand cities was also cited as a positive by one respondent.

"My biggest frustration with getting around Christchurch"

Congestion and travel time reliability were amongst the biggest frustrations respondents' expressed, although many noted this was limited to peak hours and certain routes. The second biggest frustration was linked to network continuity, with many respondents noting the lack of safe cycleways, end of trip facilities and bus priority making these modes less attractive that the private car.

"Suggestions to make Christchurch an even better place to live, work and visit…"

Providing viable transport choices, repairing footpaths and land use and transport integration were the key themes when respondents were asked how to make the city an even better place to live, work and visit. Accessibility to key destinations and services by all modes was a prevalent theme and linked to transport choices and reliability of alternatives to the private car.

"Most important priorities"

Safety was identified as the highest priority by respondents, followed by travel time reliability, road condition and network continuity. Congestion was ranked as the lowest priority by respondents out of the 5 key themes identified through the Strategic Case.

"What future challenges should we consider when addressing these issues?"

Behaviour change was highlighted by many respondents as a key requirement in order to achieve modal shift and wider outcomes. Respondents also recognised an ageing and growing population, climate change and land use and transport integration as key considerations when investigating solutions.

Figure 5: Photos from Stakeholder Workshop

Feedback on the Recommended Programme

Stakeholder engagement on the recommended programme was undertaken through one on one conversations. Due to the complexity of the PBC this was seen as the best approach to seeking feedback from stakeholders on what has emerged from the PBC.

At the one on one meetings, the UDS Transport Group and wider stakeholders were formally invited to discuss the programme options developed by the project team and to comment on the draft programme option assessment scoring.

Letters were sent to stakeholders with the offer to participate in a one on one meeting. While no interest was received from interest groups for involvement at this stage, UDS partners were consulted and provided supportive feedback as summarised below:

NZ Transport Agency (NZTA)

As a major funder of the CCC transport system, and responsible for the State Highway network that forms an important part of the Christchurch transport network, NZTA is seeking an integrated approach to the development of the various transport network business cases that are currently being developed in the Christchurch area.

Neighbouring Council's

The two neighbouring districts, Selwyn District Council and Waimakariri District Council were both supportive of the recommended approach for investment in the PBC.

Environment Canterbury (ECan)

While ECan did not express an interest in participating in the one on one discussions, CCC has worked closely with ECan on the development of the Regional Land Transport Plan investment objectives which are encompassing of the recommended programme and have briefed ECan staff regularly on progress with the CCC PBC through the monthly UDS Transport Group meetings.

Lyttelton Port Company (LPC)

LPC is supportive of the recommended programme noting that they understand it is a key outcome for the city as a whole. Their key concern is reducing congestion on Brougham Street, which is a key transport corridor to and from the port for freight.

Christchurch International Airport Limited (CIAL)

CIAL noted that they support the recommended programme to achieve the city's overall outcomes. Their key areas of focus relate to State Highway 1 and connections to and from the airport site. CIAL also have future campus development plans that they will be progressing through separate conversations with CCC and NZTA.

Canterbury District Health Board (CDHB)

CDHB is supportive of the recommended programme noting the focus on active travel and health. CDHB's key concern is providing safe, convenient and affordable transport options for patients, patient's families and friends and staff to and from hospitals, especially the Central City hospital. Given the limited amount of parking available at the Central City hospital, CDHB is particularly supportive of mode shift.

3. OUTLINING THE NEED FOR INVESTMENT

Confirming the Need for Investment

A series of facilitated investment logic mapping (ILM) workshops were held on 17th and 18th February 2016 with stakeholders to identify and agree a common understanding of the key problems and the benefits sought by addressing them. ILM participants identified and agreed 13 problem statements (see **Appendix B** for full ILM's), which have been grouped into four critical transport challenges:

…specific safety, travel time reliability/congestion, network continuity and road condition problems are affecting the operation of the CCC transport system.

The cause of these problems were suggested as being post-earthquake and predicted future population changes, the way people choose to travel (predominantly by single occupant private vehicle), the location and type of infrastructure and post-earthquake damage to the local road network.

Following the workshops, data collection and supporting evidence was collated to provide greater clarity around the scale and significance of the problems. There have been no substantive changes since the *Strategic Case* was approved in June 2016 that affect the problems or required benefits. The data provided in the *Strategic Case* has been updated to reflect the latest available data.

The following section provides an updated overview of the evidence that supports the scale and significance of the problems identified in the *Strategic Case*. Note: road condition evidence will be further explored as part of the CCC Asset Management Plan (separate PBC).

Specific Safety Problems[4]

Intersections

Between 2011 and 2015, 53 percent of reported crashes in Christchurch occurred at intersections (5,424 crashes), with 49 percent of all fatal and serious crashes also occurring at intersections (449 people). In Christchurch, 92 percent of the crashes that occurred at intersections were at urban intersections; 40 percent at traffic signal controlled intersections, 34 percent at give way controlled intersections and 26 percent at other (stop or uncontrolled) intersections. Red light running was identified as a factor in 564 reported crashes at urban traffic signals (28 percent)[x].

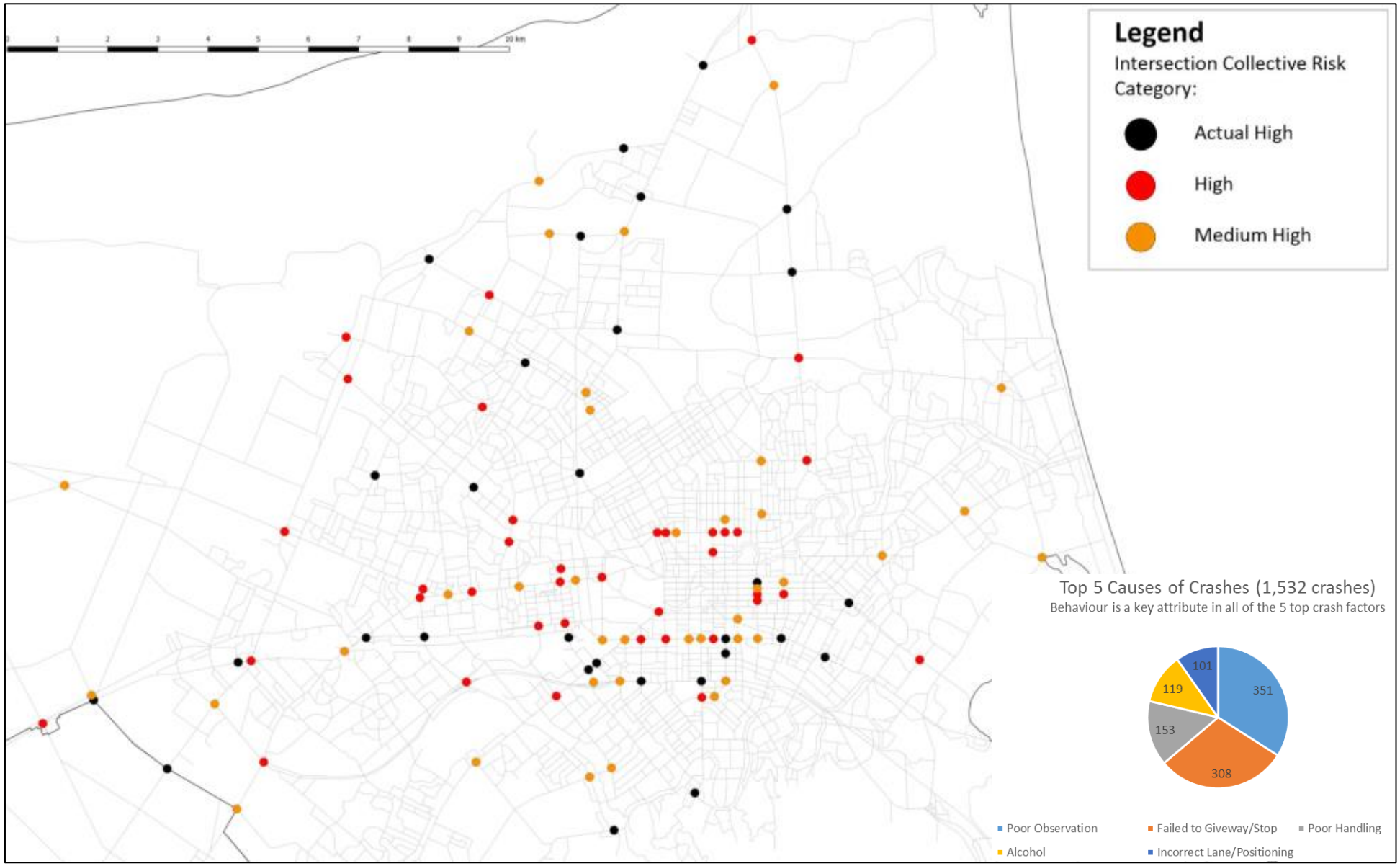
Vulnerable Users (Pedestrians and Cyclists)

Between 2011 and 2015, 20 percent of the injured road users in Christchurch were cyclists (181 people). Cyclists across all age groups were casualties and in total there were 653 injury and 99 non-injury cycle crashes reported. Analysis shows 97 percent of cyclist crashes were on urban roads, with 63 percent of these at intersections and 37 percent at mid-block locations. Poor observation and failure to give way were the main crash factors[xi].

Over the same period, 15 percent of people killed or seriously injured in road crashes in Christchurch were pedestrians (142 people, 9 deaths). In total there were 390 injury and 32 non-injury crashes involving pedestrians, with 98 percent occurring on urban roads at intersections (40 percent) and at mid-block locations (60 percent)[xii].

[4] Since the Strategic Case an updated Road Safety Action Plan has been developed for Christchurch to cover the period 2011 – 2015 (previous data 2010 – 2014). The evidence in this PBC reflects the latest statistics.

Figure 6: Intersection Safety (Collective Risk – Urban KiwiRAP 2016 – data from 2010-2014)[xiii]



Travel Time Reliability and Localised Congestion

Journey time reliability is important for residents and businesses who want to have confidence in the transport system. Consistent, reliable travel times for daily journeys contribute to an efficient and enjoyable travel experience. It is difficult for a user of the transport system to make an informed decision on modal choice for a particular journey when travel times vary greatly from day to day. This also causes disruption for freight operators, particularly just-in-time deliveries and manufacturers.

As traffic volumes have shifted due to post-earthquake land use changes and growth in population, the freedom to travel at a desired speed has become increasingly impeded by other vehicles on certain parts of the transport system at certain times of the day.

The impact of peak hour congestion is constraining the ability of the transport system to move people and goods efficiently. The private vehicle is the dominant mode of transport in Christchurch, as highlighted by the city's high private vehicle mode share for journeys to work (83 percent in the Christchurch metro urban area)[xiv]. The reliance on the private vehicle is considered to be the most significant cause of local pinch points and poor journey time reliability.

The corridors with the highest saturation capacity are predominantly situated to the north and west of the Central City around the urban fringe. This reflects the changing land use patterns, post-earthquake, which has seen many residents and businesses relocate to neighbouring Waimakariri or Selwyn Districts or to the periphery of the CCC boundary.

The Christchurch Transport Operations Centre undertakes monthly reporting of key route travel time performance measures. Figure 7 illustrates the average travel time and travel time variance for both general traffic and public transport, by time of day. The data illustrates that travel time variability for general traffic varies between 6 and 19 percent (4 to 14 minutes) over the past 12 months and public transport travel times vary between 10 and 20 percent (6 to 14 minutes) over the same period. The data shows that travel times for buses are more variable than general traffic over the past three months.

Figure 7: Average Travel Time and Travel Time Variance (CTOC, September 2016 – graphs below are based on the average travel time and variance across multiple strategic corridors – see CTOC report for further details)[xv]

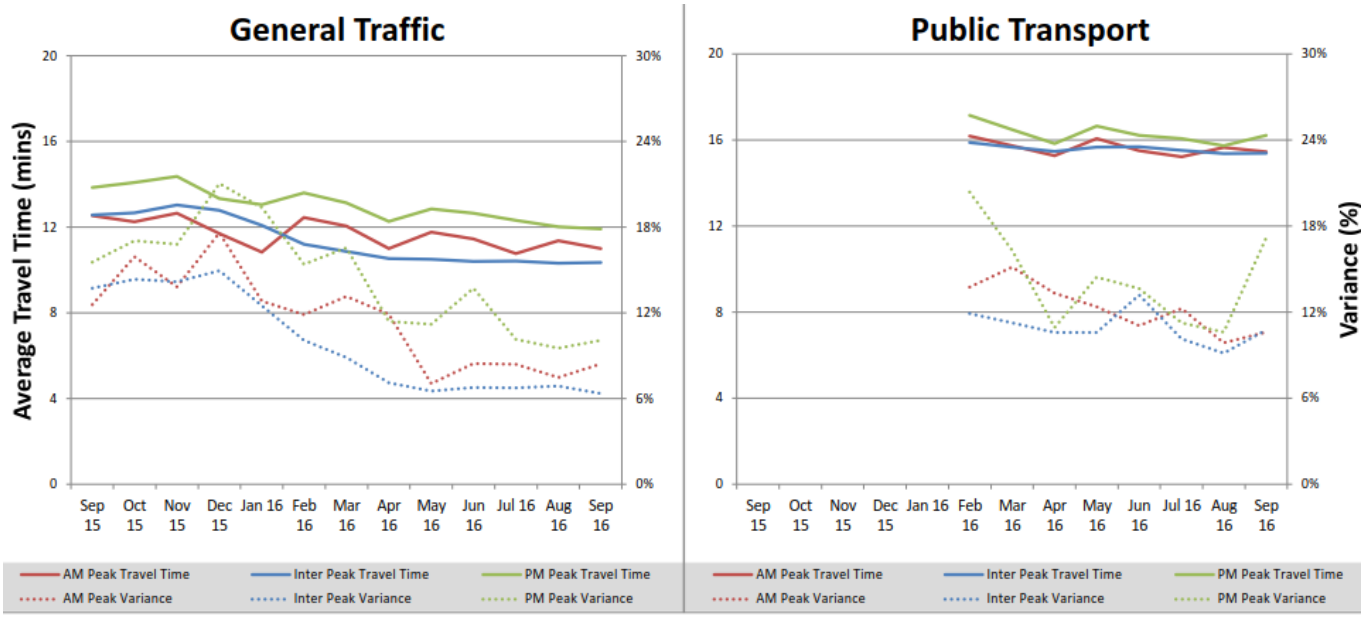
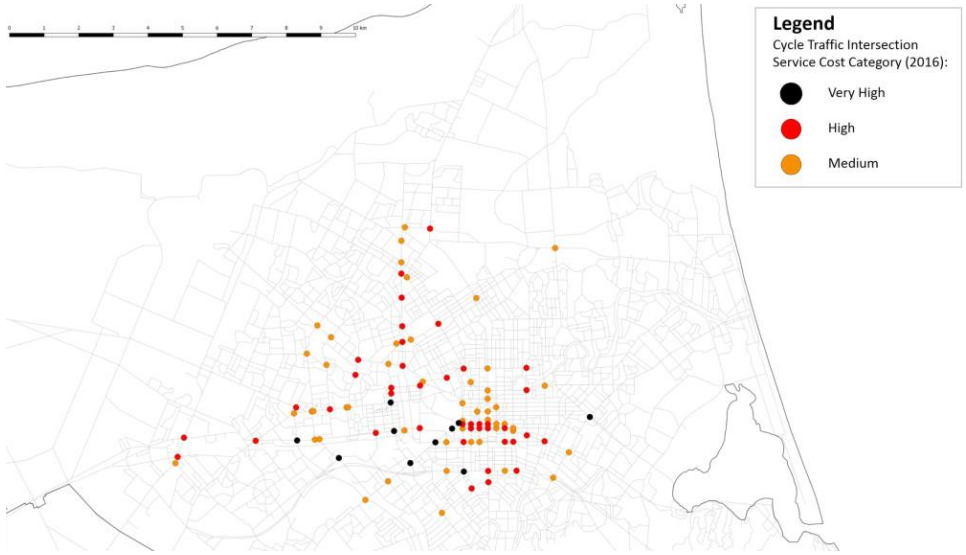
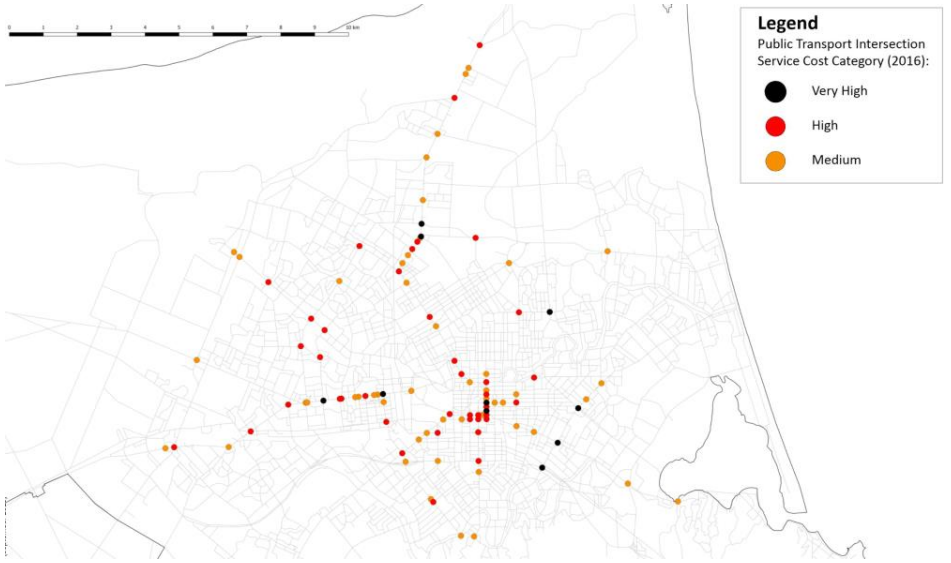


Figure 8: Intersection Service Cost (delay cost) by Mode (Network Management Plan - 2016)[xvi]

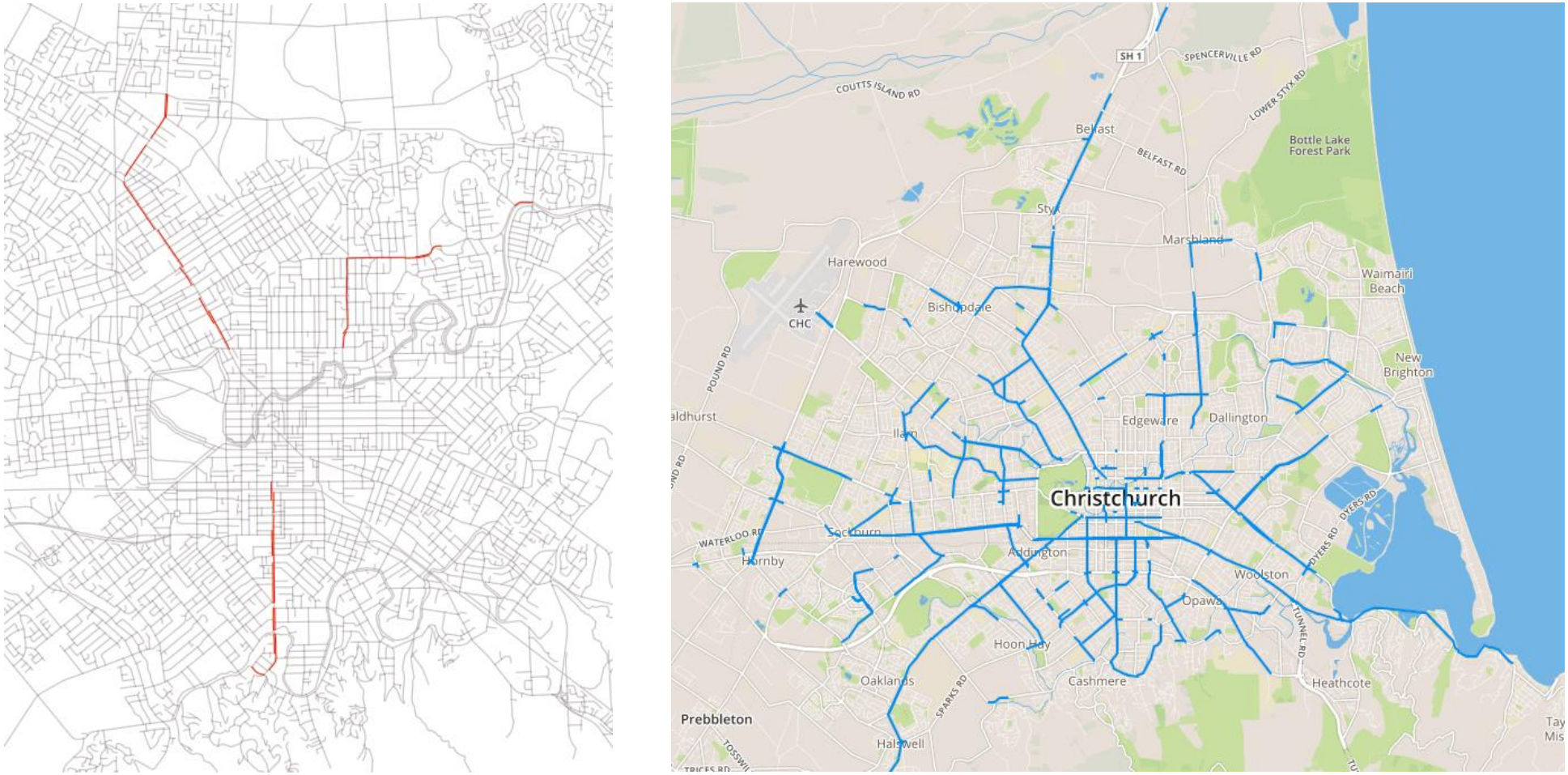




Network Continuity

Issues such as growth (population and land use), the cost of public transport versus private vehicle travel, social attitudes to private vehicle use and the lack of dedicated bus or cycle infrastructure in Christchurch (illustrated in Figure 9) are all contributing factors to localised congestion. Figure 9 also illustrates the disjointed nature of existing bus priority and cycle infrastructure, with a number of critical missing links.

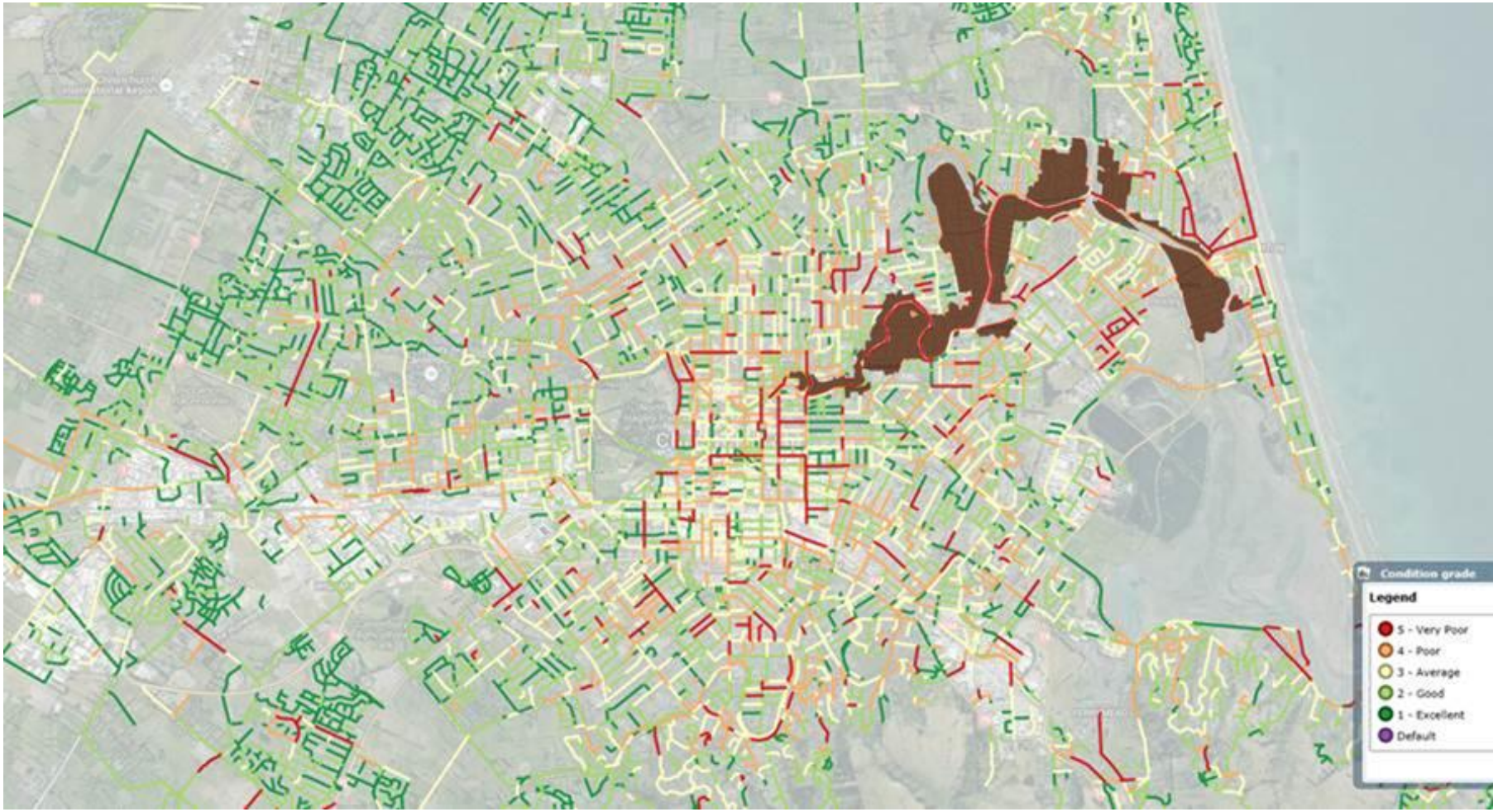
Figure 9: Current Dedicated Bus Lanes (left – shown in red) and Existing Cycle Lanes (right – shown in blue)[xvii]



Road Condition

Approximately 1,000 kilometres (45 percent) of Christchurch's road network sustained significant damage in the earthquakes, requiring some 50,000 repairs. Current road conditions are shown in Figure 10. Estimates suggest that it will take 30 years before the whole network is returned to a reasonable level of service[xviii].

Figure 10: Current Road Condition Grade (snapshot, 2016 – includes illustration of Red Zone areas – shown as dark brown shaded areas)[xix]



Network Analysis

The Strategic Case concluded that there are specific safety, travel time reliability, congestion, network continuity and road condition problems affecting the operation of the CCC transport system. Further analysis helps to quantify the scale and location of these problems. It is envisaged that this analysis will be able to be repeated to identify problems beyond 2021 when the next Long Term Plan is developed and there is more certainty about future growth patterns and advances in transport technology.

Citywide analysis has been undertaken by an independent consultant (GHD) and sub-consultants Quality Transport Planning (QTP) to identify parts of the network (using available datasets) where the problems are deemed to be significant enough to warrant further investigation. A greater level of technical transport evidence and the methodology adopted to undertake this analysis is provided in the full GHD report at **Appendix C**.

The report provides independent, impartial analysis, including sources of data, severity of problems, root causes and consequences on a more detailed geographic level. A total of 228 problem locations were identified by GHD and are summarised in full at **Appendix D**.

The report recognises that the root cause of many of the problems identified relate to human behaviour and the way people use the network. Many of the safety problems identified are due to human factors, travel time reliability and localised congestion is closely associated with the way people choose to travel and the availability of safe and attractive alternatives to the private car.

Data Filtering

The network analysis undertaken by GHD adopted a one network approach, meaning that problems and locations were identified regardless of the asset owner or organisation responsible for addressing the problems. Several of the locations identified by GHD are currently being addressed through existing projects and ongoing programmes of work.

The following locations were identified by GHD that are either being dealt with by existing projects or programmes or are being addressed by partner organisations in coordination with CCC

- 60 locations have been identified where the CCC local road network meets NZTA State Highways. CCC has shared the GHD analysis with NZTA and is working in partnership to identify opportunities to address these problems through the next phases of the CCC business case in conjunction with the State Highway business cases that are in progress.

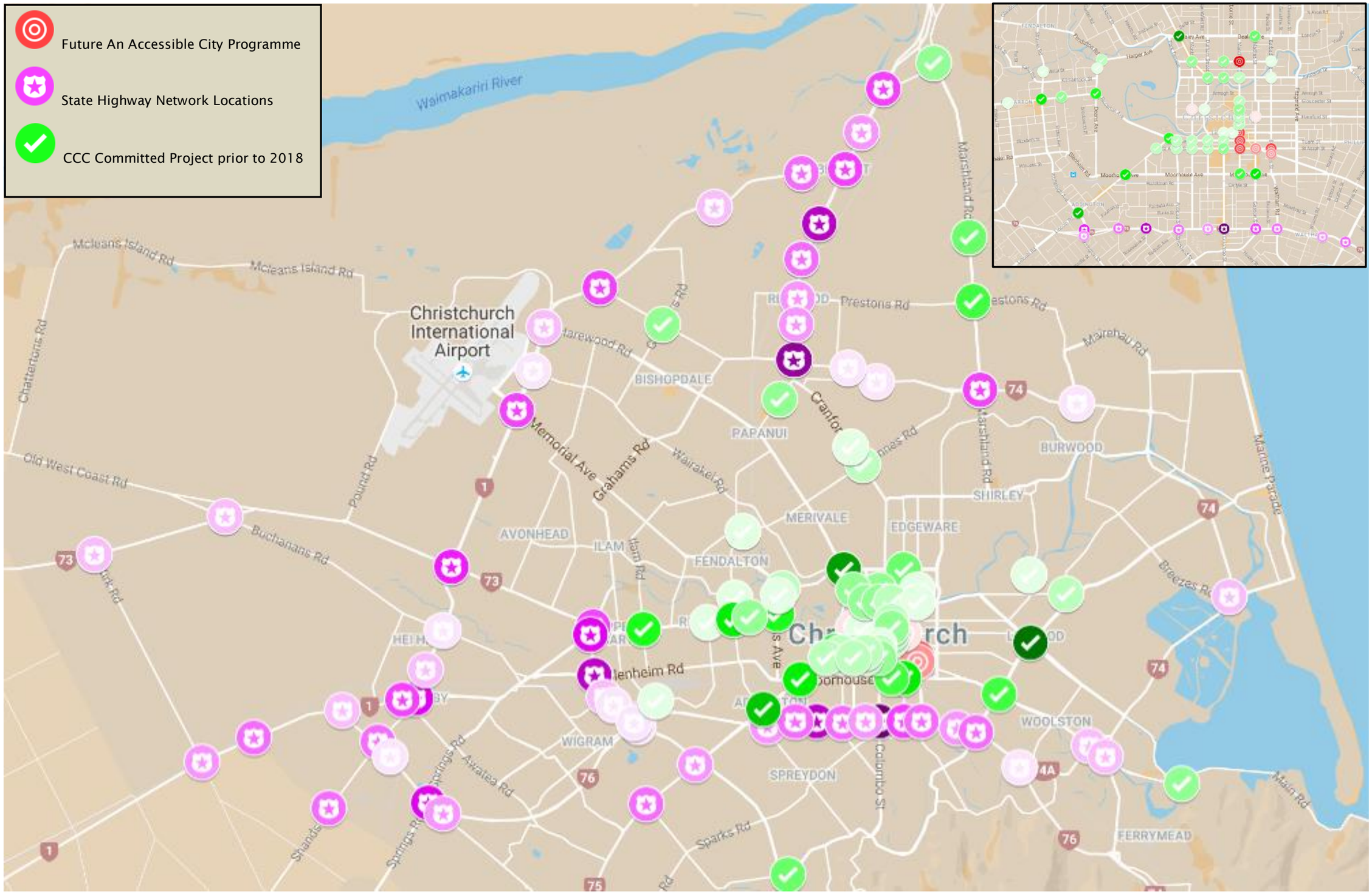
- 3 locations have been identified that relate to the operation of the current bus network, which CCC has discussed with ECan and will be considered as part of the next public transport network review.

- 50 locations have been identified that are currently being addressed through the first three years of the existing CCC Long Term Plan (2015-2025).

- 35 locations have been identified that are currently being addressed through the An Accessible City (AAC) programme. Locations identified inside the Four Avenues will continue to be progressed though the ongoing AAC Programme Business Case.

The data filtering results in 80 intersections identified by GHD being progressed through this PBC along with several corridor wide locations.

Figure 11: Locations Identified by GHD that are Classified as CCC Committed or Locations Identified on the State Highway Network



Benefits of Addressing the Problems

The potential benefits of successfully investing to address the problems were identified during the Strategic Case workshops. The full Investment Logic Maps are provided at **Appendix B**.

Table 2: Benefits of Investment and Key Performance Indicators (Strategic Case – June 2016)

Portfolios	Benefits	Key Performance Indicators
Safety	Benefit one: A safer network (60%) Benefit two: Improved take-up of modes other than the private car (40%)	▪ Reduced collective risk (crash density) ▪ Reduced personal risk (crash rate) ▪ Crashes by cause and severity ▪ Reduction in deaths and serious injuries ▪ Difference between safe speed and actual speed ▪ Improved public awareness of travel choice ▪ Safety of cycling - perceived and actuals
Network Performance and Capability	Benefit one: A prosperous, vibrant and liveable community across the city (65%) Benefit two: Transport system that enables social, cultural and economic activity (35%)	▪ Mode share ▪ Journey time reliability ▪ Customer experience ▪ Network condition (road, cycling, public transport, walking) ▪ Cater for an ageing population ▪ Modal choice to access key destinations ▪ Spatial coverage (public transport, cycling networks)
Environment	Benefit one: Transport system contributes to an environment that promotes sustainable recovery of social, cultural and economic activity (60%) Benefit two: Quality of life for the community across the city (40%)	▪ Social cohesion ▪ Resource consumption ▪ Amenity value ▪ Biodiversity ▪ Water quality ▪ Pollution
Health	Benefit one: Reduction in the cost of health care (70%) Benefit two: Transport system that enables social, cultural and economic activity (30%)	▪ Injury and risk to public health minimised ▪ Reduced social isolation for vulnerable groups

The estimated timeframes for accruing these benefits will be detailed, once phasing and interventions are developed. It is likely that as the programme is implemented, over the ten year period of the Long Term Plan, the benefits will be realised on an incremental basis.

Critical Success Factors

Critical success factors are the attributes essential to the successful delivery of the programme, against which the available programme options are assessed. Alongside the assessment against critical success factors is the assessment of how well a programme option meets the projects investment objectives and benefits criteria. The following critical success factors and investment objectives have been agreed by key stakeholders and are the attributes essential to the successful delivery of this PBC.

Table 3: Critical Success Factors

Generic Critical Success Factors	Broad Description
Strategic fit and business needs	How well the option meets the agreed investment objectives, business needs and service requirements, and integrates with other strategies or programmes.
Value for money	How well the option optimises value for money.
Capacity and capability	How well the option matches the ability of Council to deliver the required services, projects or programmes.
Deliverability	How well the option is likely to be delivered given the organisation and communities' ability to respond to the changes required, and matches the level of available skills required for successful delivery. In addition, collaboration between the various agencies developing business cases in Christchurch will be critical to ensure the recommended programme achieves one network outcomes.

Investment Objectives

A facilitated workshop was held on 20th June 2016 with CCC staff to develop investment objectives based on the problem statements and benefits identified in the *Strategic Case*. These investment objectives were subsequently refined by the UDS Transport Group at a meeting on 16th August 2016. The three agreed investment objectives are as follows:

- Reduce transport related fatalities and serious injuries by 5% per annum (5 year rolling average)[5].
- Improve journey time reliability on key corridors by 2027.
- Improve the convenience and connectivity of walking, cycling and public transport to increase the use of these modes by 2027.

CCC and ECan are currently undertaking work to develop key performance indicators and targets related to public transport reliability. In addition, CCC is currently developing a cycle count programme to monitor the mode share of cycling and establish a robust baseline. It is anticipated that the output of these ongoing work streams will enable specific targets to be applied to the second and third investment objectives once targets are agreed and finalised.

A key investment principle was agreed by stakeholders and relates to the way CCC plans, operates and delivers transport activities from an environmental, cultural and social perspective:

- Create opportunities for environmental improvement and social cohesion by improving environmental, cultural and community outcomes.

The key investment principle reflects the nature of the work CCC undertakes and enables projects to be considered that do not necessarily have a direct transport outcome. The rationale for including a key investment principle focussed on health and the environment was to ensure all of the problems identified in the *Strategic Case* were captured in the PBC. It was agreed that this objective relates to the way CCC responds to problems rather than a standalone investment objective or driver for change.

A description of each investment objective is provided at **Appendix E**.

[5] This is an existing CCC performance measure/target.

Issues and Constraints

An uncertainty log has been prepared for the CCC PBC and is summarised in Table 4. These high level uncertainties relate to the development and assessment of programme options.

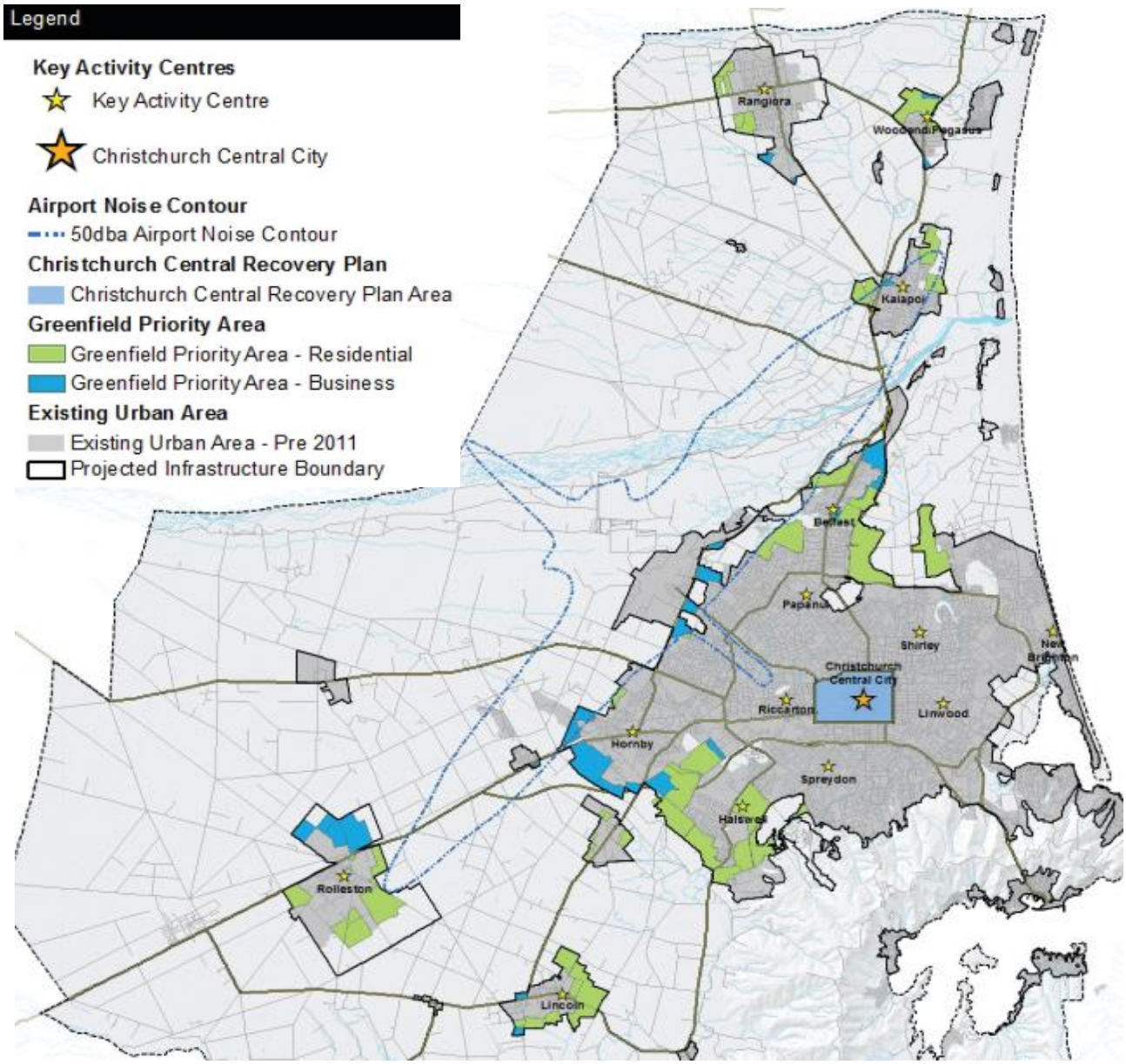
Table 4: Uncertainty Log

Factor	Timeframe	Uncertainty	Impact	Comments
Factors affecting demand				
Residential growth	2016-2027	Near certain	Medium	Canterbury earthquakes caused disruption to business and residential areas. A number of greenfield sites were released for development post-earthquakes and are likely to be developed over the next 10-15 years, which will impact travel patterns.
Employment growth	2016-2027	Near certain	Medium	
Central city rebuild	2016-2027	Near certain	Medium	An additional 18,000 employees are about to move into the central city, which will impact travel patterns.
Technological advances	2020+	Possible	Medium	Enhanced travel information and driverless vehicles are currently been tested and could change the way people travel/choose to travel.
Factors affecting supply				
RONS Northern Corridor	2016-2020	Certain	Medium	New four lane motorway, upgrade of QE2 Drive, Cranford Street to four lanes and off road pedestrian and cycle facilities.
RONS Western corridor	Currently being constructed	Certain	Medium	Four laning existing corridor and new section to bypass Belfast.
RONS Southern Corridor	Stage 1 completed 2012. Stage 2 design phase	Certain	Medium	New motorway from Addington to Robinsons Road and four laning Main South Road.
Bus network	Unclear	Possible	High	Environment Canterbury undertaking network review as part of the RPTP.
Capacity thresholds	n/a	Near certain	High	The Network Management Plan has assumed capacity thresholds and modal priority of corridors.
Factors affecting cost				
Programme costing	n/a	More than likely	High	Expenditure assumed based on previous LTP average ($30m p.a)

Accommodating Growth

The impact of land use changes and development is a key challenge in the Greater Christchurch area. Through the Land Use Recovery Plan and Canterbury Regional Policy Statement, CCC and the Government are working together to ensure suitable land supply is available for residential and commercial development. Figure 12 shows the Greater Christchurch settlement pattern through to 2028[xx], which emphasises the intention to consolidate and intensify urban areas. Within Christchurch City, land for housing and business is mainly located in the north and southwest areas, as well as the repopulation of the Central City.

Figure 12: The Greater Christchurch Settlement Pattern to 2028 (Map A, Chapter 6, CRPS)



This PBC has modelled the current state of the transport network and indicated a recommended programme focus. CCC has also undertaken separate transport analysis through a Northern Christchurch Transport Needs Review and South West Area Transport Needs Review to identify potential transport needs in these areas. CCC note that ongoing monitoring and additional works are likely to be required to supplement this PBC to accommodate and mitigate the impact of proposed land use changes and development, particularly as a result of the north and southwest growth areas.

One Network Approach – Outlining the Need for Investment

Whilst the three key accountable organisations (CCC, NZTA, ECan) have different statutory roles and functions the identification of investment objectives captured in other Christchurch business cases are broadly aligned as demonstrated in Table 5. Some of these business cases have not yet been completed therefore specific objectives are yet to be agreed, particularly the NZTA SH1 and SH76 PBC.

Table 5: Greater Christchurch Business Cases – Objective Alignment[6]

Business Case	Investment Objectives
CCC Citywide PBC	▪ Improve the convenience and connectivity of walking, cycling and public transport to increase the use of these modes by 2027 ▪ Reduce transport related fatalities and serious injuries by 5% per annum ▪ Improve journey time reliability on key corridors by 2027
NZTA SH1 and SH71 PBC (Belfast to Ashley River)	▪ Reduce deaths and serious injuries from xx to xx by 20xx ▪ Reduce travel time variability on SH1 between Woodend and Belfast during the morning peak from xx in 2015 to xx by 20xx ▪ Improve pedestrian level of service from xx to xx at key locations by 20xx
NZTA SH1and SH73 PBC (Belfast to Selwyn River on SH1 and Darfield to Christchurch Southern Motorway SH73)	▪ Improve safety on SH1 and SH73 and the adjacent transport networks ▪ Reduce delays on, and increase the reliability of SH1 between Belfast and the Selwyn River, and SH73 from Darfield to the CSM and the adjacent transport network ▪ Enhance local accessibility onto, off and across SH1 and SH73
NZTA SH76 PBC (Brougham Street)	▪ Improve safety on SH76 and the adjoining local transport network ▪ Future proof the reliability and performance of SH76 and adjoining transport network for planned growth ▪ Maintain and improve current levels of service for accessibility across SH76
ECan Regional Land Transport Plan PBC **(Problem area themes - work in progress)**	▪ Unreliable journey times and localised congestion ▪ Severance and lack of modal choice ▪ Transport safety due to driver behaviour and road design ▪ Road conditions due to changing land use and traffic patterns

Table 5 demonstrates that the ongoing business cases in the Greater Christchurch area are broadly centred on achieving three key outcomes of transport safety, maintaining/improving journey time reliability and improving connectivity/accessibility/reducing community severance. The CCC PBC has developed a specific investment objective targeting improvements to convenience and connectivity, in terms of getting more people walking, cycling and using public transport, whereas, the emerging NZTA PBC's have developed an investment objective focussed on accessibility/severance, with mode shift identified as a potential response to travel time reliability problems.

[6] Draft investment objectives for NZTA and ECan reflect current drafts as of November 2016 - subject to change.

4. PART B - DEVELOPING THE PROGRAMME

Programme Context

This section records how the interventions as well as the long-list and short-list programme options were developed and agreed through a robust analysis of the alternatives and options.

Alternatives and Options

A series of facilitated internal workshops were held to generate a wide range of possible interventions (alternatives) that might be able to address at least one of the problems identified in the *Strategic Case*. The brief for the workshops was that ideas should be put forward without pre-judgement of their merit, which helped ensure a wide set of potential interventions were created for consideration. Following the internal workshops the individual interventions were grouped into broader themes (options).

Interventions were sought which fit into three areas: might **change demand** (reduce or slow the problem), **increase productivity** (make better use of the existing system), and/or **increase supply** (provide extra capacity to treat or fix the problem). The full long list of potential intervention themes considered is provided at **Appendix F**.

At a second facilitated internal workshop on 27th September 2016 the intervention themes were endorsed, added to, and assessed in terms of practicability and achievability. Some of the intervention themes generated were not pursued further as they were identified at the workshop as being unlikely to contribute to resolving the problems, and/or unlikely to generate the intended benefits, and/or beyond the scope and influence of this PBC.

Short List Interventions

The potential short list of intervention themes agreed by internal workshop participants are:

Complete existing commitments (projects where construction has started): Workshop participants acknowledged that the current Long Term Plan (2015-2025) is a statutory document and this PBC represents a new approach to planning and prioritising transport investment. During this transition period it was accepted that where works have started or are legally required, these should continue.

Public transport improvements (e.g. priority measures, improved facilities, more services): It was recognised that in order to achieve an increase in public transport mode share and address problems related to travel time reliability and localised congestion, improvements/investment is required to make public transport services more efficient and attractive to encourage greater use.

Traffic management changes (e.g. additional traffic management, optimisation, and road capacity): This PBC acknowledges that due to the significant growth anticipated there is likely to be requirements to upgrade existing roading networks (to improve Levels of Service) to accommodate growth and to achieve reliability and mode shift (objectives 2 and 3).

Travel demand management (e.g. behaviour change education, pricing, and travel plans): Workshop participants acknowledged that the network analysis suggests many of the problems captured through this PBC relate to human behaviour. It was therefore considered that in many cases TDM activities might best address many of the problems and contribute towards all three investment objectives.

Enhance pedestrian facilities (e.g. more footpaths, pedestrian crossings, and improved amenity): To achieve the investment objective related to mode shift (objective 3) workshop participants noted a need to improve the safety of vulnerable users (including pedestrians – objective 1) and provide an attractive pedestrian environment.

Lower road safety risk (e.g. intersection improvements, lower speed limits, education): To meet objective 1 and reduce the number of deaths and serious injuries as a result of crashes, participants acknowledged that a mix of physical and soft measures will be required.

Enhance cycle network facilities (e.g. more cycle ways/lanes, cycle priority, cycle parking): To achieve the investment objective related to mode shift (objective 3) workshop participants noted a need to improve the safety of vulnerable users (including cyclists – objective 1) and provide an attractive environment to encourage interested but concerned people to cycle more often.

In addition to the intervention themes identified to address the specific problems identified on the network, the stakeholder group recognised the need for several citywide supporting initiatives. These are detailed within the recommended programme overview along with further rationale for their inclusion (Section 5). The intervention themes that were not pursued further are detailed below, along with rationale for their exclusion at the current time.

Reliance on technology: Workshop participants recognised that it is possible that over time developments in technology may alter the way people travel and use the transport system. However, participants agreed that potential technologies such as personal rapid transit and driverless cars are likely to be beyond the control of CCC and unlikely to happen within the immediate planning horizon.

Land use changes: The land use change interventions centred on a more centralised/residential and employment intensification model and encouraging mixed use developments. This intervention theme has been deemed outside of the scope of this business case as well as duplicating adopted Council policy through the District Plan. The PBC should be cognisant of land use patterns and identify ways of achieving better land use and transport integration, consistent with the recently adopted Christchurch District Plan provisions.

Road expansion: The workshop considered a roading expansion intervention theme that consisted of dramatically expanding roading capacity. This intervention theme was not pursued as participants acknowledged that whilst some additional localised road capacity might be required (as captured in the traffic management theme), large scale roading expansion would likely induce demand, be contrary to CCC's strategic direction and was considered unlikely to address the identified problems.

Renewals: Workshop participants acknowledged that maintenance and renewal projects will be considered through the Asset Management Plan and therefore are outside the scope of this PBC (see **Appendix A** for details of how integration of this PBC and the Asset Management Plan will be achieved).

Rapid public transport: Work is being progressed as part of a Greater Christchurch Future Public Transport Business Case, which will take a longer term view of the future or public transport. Therefore, this intervention theme was deemed outside the scope of this PBC.

Programme Options Development – Investing in Outcomes

Seven programme options were generated by internal stakeholders at a facilitated workshop held on 27th September 2016. Table 6 provides an overview of the programme options that were developed by the workshop participants (**red** = not included in programme option, **dark green** = highest priority/emphasis and **green** = secondary focus). Each programme is described further below Table 6.

It was not considered appropriate to include a Do Nothing programme option as a comparator as CCC has a legal obligation to produce a Long Term Plan that includes a programme of continuous improvement projects. A Do Minimum (business as usual) programme option was considered as a comparator, this is reflected by programme option 4.

Table 6: Programme Options Summary

PROGRAMME OPTIONS		INTERVENTION THEMES						
		Commitments	Public Transport	Traffic Management	Travel Demand Management	Pedestrian Facilities	Lower Road Safety Risks	Cycle Network Facilities
1	Safety, safety, safety							
2	Reliable journeys							
3	Convenience and connectivity							
4	Prioritised activities (traditional approach)							
5	Mixed with a safety focus							
6	Mixed with a reliability focus							
7	Mixed with a convenience and connectivity focus							

Programme 1: Safety, safety, safety

This programme aims to invest in lowering safety risks. The focus of the programme interventions is pedestrian facilities, lower road safety risks and cycle facilities.

Programme 2: Reliable journeys

This programme aims to invest primarily in efficiency activities. The focus of the programme interventions is traffic management and travel demand management.

Programme 3: Convenience and connectivity

This programme invests primarily in walking, cycling and public transport. The primary focus of the programme interventions is public transport, pedestrian facilities and cycle facilities. A secondary focus is travel demand management interventions.

Programme 4: Prioritised activities

This programme aims to invest equally in safety, reliability and convenience and connectivity activities, therefore, all strategic interventions would be delivered equally.

This reflects the current approach and is considered a Do Minimum (business as usual) option.

Programme 5: Mixed with a safety focus

This is a mixed programme that aims to invest in safety, reliability and convenience and connectivity, but unlike Programme 4 not all of the outcomes would be pursued equally, there will be a greater focus on safety.

- Primary focus: Pedestrian facilities, lower road safety risks and cycle facilities
- Secondary focus: Public transport, traffic management and travel demand management

Programme 6: Mixed with a reliability focus

This is a mixed programme that aims to invest in safety, reliability and convenience and connectivity, but unlike Programme 4 not all would be pursued equally, there will be a greater focus on reliability.

- Primary focus: Traffic management, travel demand management
- Secondary focus: Public transport, pedestrian facilities, lower road safety risks and cycle facilities

Programme 7: Mixed with a convenience and connectivity focus

This is a mixed programme that aims to invest in safety, reliability and convenience and connectivity, but unlike Programme 4 not all would be pursued equally, there will be a greater focus on convenience and connectivity.

- Primary focus: Public transport, travel demand management, pedestrian facilities and cycle facilities
- Secondary focus of the programme: Traffic management, lower road safety risks

Programme Options Assessment

The seven programmes (Table 6) have been assessed against the three investment objectives to identify a recommended programme option to progress and assess further. A summary of the assessment of all seven programme options is provided at Table 7.

Each of the seven programmes (see Table 6) were assessed against the investment objectives and assigned a score between 1 and 5, with 1 indicating low or poor fit and 5 representing a high level of fit. The highest scoring programme is identified as the recommended programme option to progress to further analysis. The rationale for the scoring is provided below Table 7.

It is important to note that the programme assessment is a qualitative assessment only based on internal and external stakeholder's knowledge (each of which have their own subjective options). It was not possible to provide a quantitative analysis of the long list programme options at the PBC level.

Stakeholders and investment partners were invited to comment and input into the long list programme option assessment. Several stakeholders declined this invitation to discuss the programme options, however all stakeholders have continued to receive regular project updates and CCC is keen to continue to work closely with stakeholders as this PBC develops.

Table 7: Long List Programme Options Assessment

Programme Options		Programme 1	Programme 2	Programme 3	Programme 4	Programme 5	Programme 6	Programme 7
		Safety, safety, safety	Reliable journeys	Convenience and connectivity	Prioritised activities	Mixed with a safety focus	Mixed with a reliability focus	Mixed with a convenience and connectivity focus
Objective 1	Reduce transport related fatalities and serious injuries by 5% per annum (5 year rolling average).	4	1	2	2	5	3	4
Objective 1 Justification Current state: 2011-2015 56 fatal and 790 serious crashes, $981.66 million in social costs. High number of vulnerable users and driver behaviour related crashes.		Assumed large improvement with focus on safety initiatives, and vulnerable users. Behaviour (TDM) key factor in safety not addressed.	Lower safety risk not addressed, secondary TDM and traffic management measures unlikely to meet 5% per annum target.	Better than programme 2 as addressing vulnerable users with a TDM element, but lower safety risk not addressed	Equal funding means target unlikely to be addressed quickly.	As per programme 1 but with a greater focus on alternative interventions.	As per programme 2, but with a minor emphasis on safety and vulnerable users.	As per programme 3, but includes safety risk and medium focus on vulnerable users and behaviour.
Objective 2	Improve journey time reliability on key corridors by 2027.	1	4	3	3	2	5	4
Objective 2 Justification Current state: Christchurch Transport Operations Centre monthly reporting of journey times on key corridors shows the current journey time variance for general traffic is between 6 and 20%, for public transport the variance is between 10 and 20%.		A safer network alone is unlikely to have an impact on reliability by 2027.	Unlikely to significantly improve reliability without addressing alternative modes.	Likely to be improvement in reliability through investment in alternative modes, however, no traffic management focus.	Equal funding means target unlikely to be addressed quickly, but target is 2027.	As per programme 1 but with a greater focus on alternative interventions	As per programme 2, but with a minor focus on alternative modes.	As per programme 3, but with minor focus on traffic management interventions.
Objective 3	Improve the convenience and connectivity of walking, cycling and public transport to increase the use of these modes by 2027.	2	1	4	3	3	2	5
Objective 3 Justification Current state: 2013 census data indicates current proportion of journeys to work by public transport are 3%, walking 6% and cycling 8%, compared to 83% by private motor vehicle. Also 50% of journeys in Christchurch are under 5km so could be made by public transport, walking or cycling.		Investment in active modes likely to increase use, but lack of public transport focus or TDM to encourage use.	Lack of investment in active modes or public transport, TDM alone unlikely to encourage use of these modes.	Investment in active modes and public transport likely to increase use, however, safety risk not addressed, which is a key barrier.	Equal funding means target unlikely to be addressed quickly, but target is 2027.	As per programme 1 but with a greater focus on alternative interventions.	As per programme 2, but with minor focus on alternative modes.	Focus on alternative modes likely to increase mode shift, as well as minor focus on lower safety risk and traffic management.
Total		**7**	**6**	**9**	**8**	**10**	**10**	**13**

Programme Assessment Rationale (highest score = best)

Programme 1: Safety, safety, safety (score 7)

This programme will likely see a large improvement in safety (objective 1). However, is unlikely to have an impact on reliability (objective 2). Safety improvements may see some increase in walking and cycling, but it is unlikely to increase public transport use (objective 3).

Programme 2: Reliable journeys (score 6)

In the short term this programme could see some improvement in reliability and safety at specific locations where traffic management improvements are undertaken. However, in the long term, these improvements are likely to induce traffic, which could degrade reliability and increase the crash rate (objectives 1 and 2). Investing in travel demand management alone (without specific improvements to infrastructure to encourage walking, cycling and public transport) is unlikely to sufficiently encourage the use of these modes to achieve objective 3.

Programme 3: Convenience and connectivity (score 9)

This programme invests in both improvements in infrastructure to encourage walking, cycling and public transport and travel demand management. The programme does not address safety risk, however, which is a key barrier to increasing walking and cycling mode share, so it is unlikely to achieve objective 3. Investment in alternative modes is likely to help reliability through reduced traffic demand on the network, however, there is no traffic management focus to address localised reliability hotspots (objective 2). In addition, safety improvements are also not specifically addressed (objective 1 and 3).

Programme 4: Prioritised activities (score 8)

Equal funding means that the budget is split and there is no specific focus in any one outcome area to sufficiently achieve an objective. This programme could risk being a 'jack of all trades, master of none'. There is also a risk that equally focusing on each outcome could undermine all of the objectives. For example improving reliability by providing additional road capacity could induce traffic that undermines encouraging walking, cycling and public transport. Likewise improving safety by providing additional traffic management measures could reduce reliability.

Programme 5: Mixed with a safety focus (score 10)

There will likely be safety improvements (objective 1), but a secondary focus on reliability, and convenience and connectivity are unlikely to be sufficient to achieve objectives 2 and 3.

Programme 6: Mixed with a reliability focus (score 10)

There will likely be an improvement in reliability and safety in the short term. However, a secondary focus on convenience and connectivity is unlikely to be sufficient to counter the induced traffic demand as a result of the primary improvements in reliability.

Programme 7: Mixed with a convenience and connectivity focus (score 13)

There will likely be an increase in walking, cycling and public transport (objective 3). Greater use of these modes will help improve reliability, through reduced traffic demand (objective 2). This programme also has a secondary focus to address localised reliability and safety hotspots, which may help to reduce crashes (objective 1 and 2). It is also recognised that behaviour is a key cause of many safety problems in Christchurch, therefore the travel demand management element of this programme is also likely to contribute to the safety objective and reduce the number of deaths and serious injuries (objective 1).

5. RECOMMENDED PROGRAMME

Programme Overview

The recommended programme for the CCC PBC is Programme 7. The aim of the mixed programme with a convenience and connectivity focus is to address the problems associated with the way people choose to travel (predominantly by private vehicle), by improving the convenience and connectivity of walking, cycling and public transport, this also requires CCC to address the key safety and reliability problems identified through the GHD network analysis.

Convenience and connectivity means it will be easier for people to get to, and move around the city whether by public transport, motor vehicle, cycle or on foot. Journeys will be more enjoyable and there will be improved travel time reliability and a safer network. The recommended programme sets the direction and intent of future transport projects and requires a strong commitment to enabling and influencing travel behaviour. In the short term this means prioritising efforts towards:

- Commitment to completing all current projects or programmes where construction has started or contracts have been agreed.
- A focus on all possible measures to improve the efficiency of the public transport network.
- Support to enable active modes (walking and cycling), as well as practical travel demand management tools to encourage the use of these modes and change behaviour.
- Assessing and as appropriate addressing locations with high levels of safety risk.
- Taking all possible measures to improve journey time reliability (for all modes), including investigating in a range of traffic management measures and behaviour change initiatives.

The recommended programme aligns with the council's key transport Community Outcome of "an increased proportion of journeys made by active travel and public transport". It also delivers on the strategic direction of the Christchurch Transport Strategic Plan (2012) and the outcomes of the 'An Accessible City' chapter of the Christchurch Central Recovery Plan (2013) and the Major Cycle Routes.

An Accessible City is a programme of improvements to the transport system in the Central City, in particular An Accessible City aims to achieve a threefold increase in walking, cycling and public transport use by 2041. Programme 7 has strong alignment to the AAC programme, with both programmes seeking to support the economic, social and environmental regeneration of the city by focusing on improving the convenience and connectivity of walking, cycling and public transport.

In addition, both programmes aim to make the city's transport network easier, safer and more reliable for pedestrians, cyclists and public transport users, as well as those driving to access key destinations. Programme 7 also builds on the An Accessible City improvements to the transport network within the Central City, by initially focusing on improving areas adjacent the Central City, and then connections to Key Activity Centres and along key strategic corridors.

The Major Cycle Routes (MCR) business case proposes 13 new cycle routes to be built in Christchurch over the next seven years providing direct routes to make it more attractive for people to cycle to their destination. Programme 7 and the MCR's share common objectives of improving safety, and providing direct routes to make it more attractive for people to cycle to their destination.

The Greater Christchurch Urban Development Strategy has set a strategic goal of an efficient, reliable, safe and resilient transport system for people and businesses that reduces dependency on private motor vehicles, promotes active and public transport, and improves accessibility for all people. Programme 7's focus aligns with this strategic goal by improving the convenience and connectivity of walking, cycling and public transport, which will promote active and public transport, reduce dependency on private motor vehicles, and improve accessibility for all.

The vision of the Christchurch Transport Strategic Plan is to keep Christchurch moving forward by providing transport choices to connect people and places. Programme 7 supports this by providing more viable transport choices though improving the convenience and connectivity of walking, cycling and public transport.

Committed Projects

This PBC represents a significant shift in the way programmes are developed to inform the CCC Long Term Plan. However, it is recognised that CCC is in a transitional phase, and several committed projects and programmes (detailed within the existing 2015-2025 Long Term Plan), developed prior to the Business Case Approach will continue to be progressed through the next Long Term Plan (2018-2028).

Committed projects include:

- Already contractually committed or will be contractually committed prior to the 2018 Long Term Plan (e.g. Major Cycleway Routes with supporting local connectors, An Accessible City and current roading projects).
- Programmes that are classified as minor works/improvements where a business case is not required as per NZTA guidelines and where it is difficult or illogical to avoid the expenditure (e.g. school crossing equipment, speed zone signs, bus stop installation, community board initiatives).
- Projects that are legally required due to planning requirements (e.g. Cranford Street – Roads of National Significance (RoNS) downstream improvements). Projects in the current CCC Long Term Plan (2015-2025) that are dependencies for potential future RoNS programmes (where State Highway business cases are currently being drafted) have been placed in a holding pen until the State Highway business cases have been completed and the impacts on the local transport network are understood.

Recommended Programme Discussion

This section provides an overview of how CCC has prioritised the phasing of packages (locations, corridors and clusters) to progress to further investigation. To meet CCC requirements and produce an indication of priorities for the next CCC Long Term Plan 2018-2028, the recommended programme (programme 7) has been used to prioritise the locations on the transport network where the most significant impact could be made (identifying locations which have the best strategic fit).

CCC developed an assessment tool to determine how significant the problems are at each location. The tool assigns a numerical score based on the evidence captured by GHD (safety, delay and accessibility severity) and further strategic criteria developed by CCC (which reflect the three investment objectives and function of each location). The benefit of the tool is that it is based on available evidence, reducing the risk of subjective scoring.

To provide appropriate weighting to the recommended programme an additional point is assigned to a location if it is: situated on a major arterial, core public transport route, major cycle route; has multiple problems that need to be addressed; or is located within a walkable centre catchment (identified as a district or neighbourhood centre in the CCC District Plan).

The strategic fit criteria is summarised in Table 8 and the methodology is detailed in full at **Appendix G**. The safety and delay data is scored based on the severity of the problem at the specific location (based on GHD analysis), with very high severity locations scoring four points (for delay or safety), high severity three points, medium severity two points and low severity scoring one point. The connectivity and reliability objectives were scored based on a binary yes/no query, with yes attributes assigned an additional one point.

Table 8: CCC Assessment Tool (Example screenshot)

CCC Strategic Fit Assessment								
Location	Reduction of transport related fatalities and serious injuries	Improve Journey time on key corridors by 2027			Improve convenience and connectivity of walking, cycling and public transport to increase these modes by 2027			**Total Strategic Fit Score**
	Safety severity **(1 - 4)**	Delay cost (all modes) **(1 - 4)**	Major arterial **0/1**	Core PT route **0/1**	Major cycle route **0/1**	Multiple problems **0/1**	Walkable centre **0/1**	
Byron St / Gasson St	**VH (4)**	**L (1)**	**No (0)**	**No (0)**	**No (0)**	**Yes (1)**	**No (0)**	**6** (out of possible 13)
Smith Rd / Johns Rd	**VH (4)**	**H (3)**	**No (0)**	**Yes (1)**	**Yes (1)**	**Yes (1)**	**No (0)**	**10** (out of possible 13)

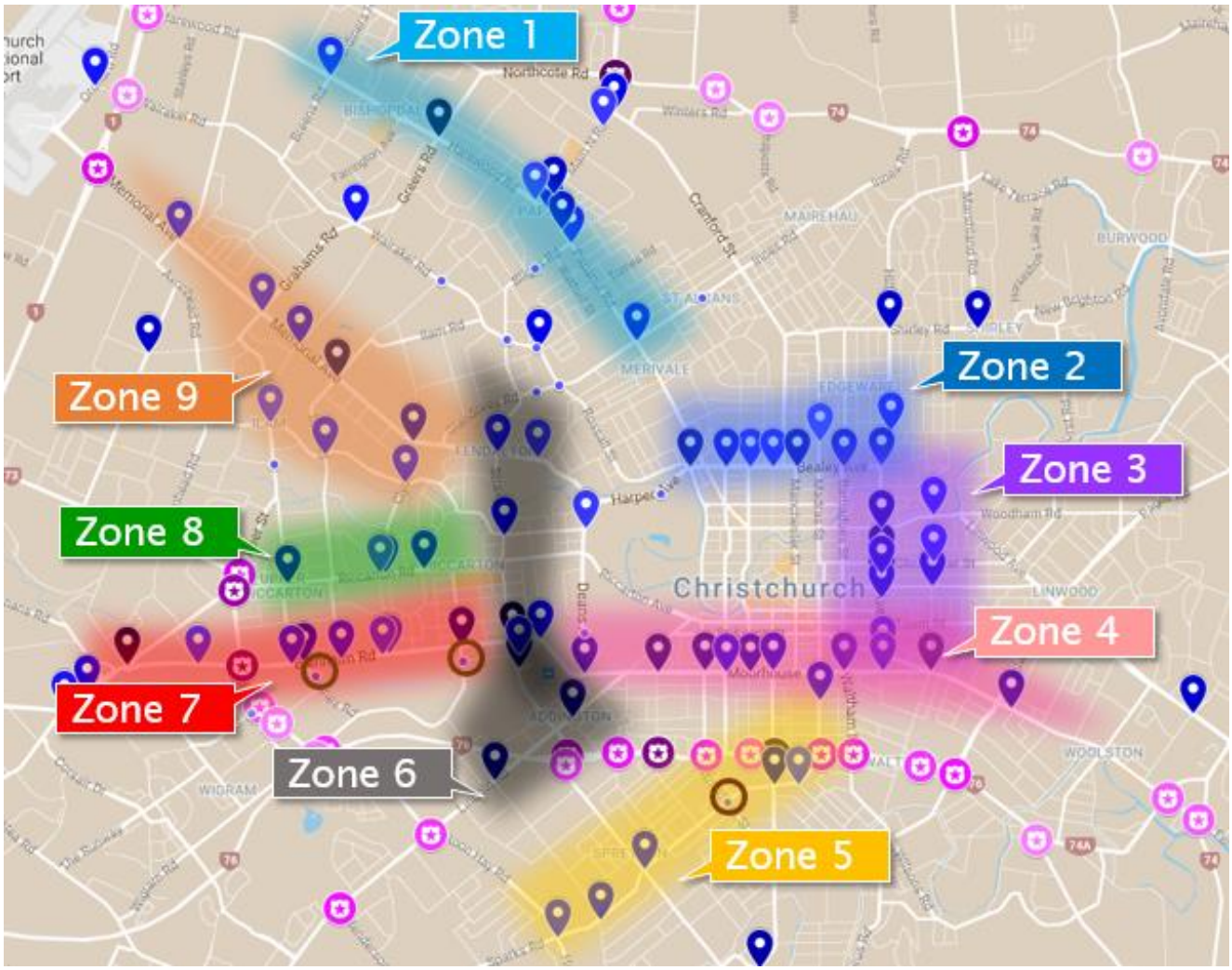
Each location and its attributes were entered into the assessment tool to provide an initial ranking of the locations with the highest strategic fit score (based on CCC methodology described above). A separate assessment of strategic fit for the recommended programme has been undertaken as part of the NZTA Investment Assessment Profile as detailed under the heading 'Assessment Profile'.

The output of the CCC assessment tool (a ranked list of locations based on strategic fit) was displayed in an interactive map to enable the project team to visualise the geographical spread of the locations (identified by their significance). The mapping tool also enabled the project team to spatially identify locations, corridors and clusters of strong strategic fit. This was subsequently used to help identify which locations, corridors or clusters to prioritise first for implementation. The mapping tool can be viewed at: https://goo.gl/HKOy31

The methodology and rationale used to cluster certain locations is provided at **Appendix H**. The clustering has been undertaken following a logical, evidence based approach that offers economic benefits in planning and delivery, versus the current 'spot fix' approach.

A total of nine clusters have emerged from the spatial analysis with an additional six high priority and thirteen medium priority outlier locations also identified. These are illustrated in Figure 13 and Figure 14. **Appendix I** has a detailed description of each cluster/location.

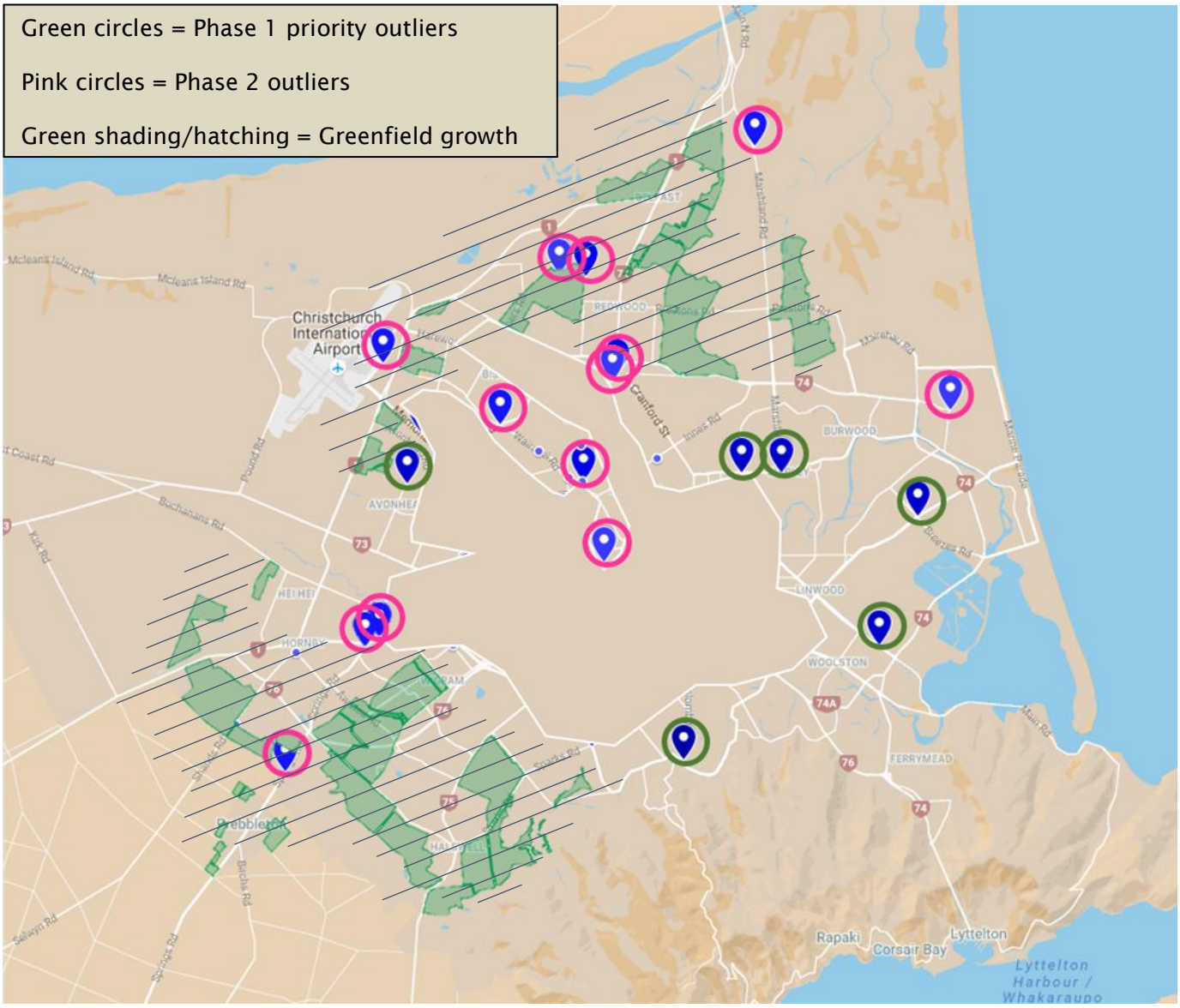
Figure 13: Notional Clustering of Top Strategic Fit Locations (identified State Highway locations shown in pink)



The nine clusters capture 73 of the 91 top (strategic fit score of three or higher) locations identified on the CCC network, with an additional 3 low scoring locations also picked up within the clusters (denoted by the orange circles within Zone 5 and Zone 7).

Many of the clusters highlighted in Figure 13 also contain corridors that were identified by the GHD analysis as having a high or very high overall collective safety risk rating, or as areas which experience public transport delays or have been identified as having a high latent demand for cycling, as summarised in **Appendix I**.

Figure 14: Isolated Outlier Intersections and Greenfield Development Sites/Expected Growth



Note: the green circles denote the locations with a strategic fit score of six and above and the pink circles denote a strategic fit score of between three and five. A combination of the clusters and the outliers approach picks up 89 percent of the total problem locations identified on the CCC network.

The remaining 11 percent of locations, not identified in the maps above are those which scored a strategic fit score of 1 or 2 and are not located within a cluster. These locations are not deemed significant enough at the current time to warrant further investigation, however, they will continue to be monitored and will be reconsidered if circumstances change.

The network analysis suggests that many of the problems identified relate to human behaviour and the way people use the network (predominantly by private motor vehicle). Therefore it is possible that some of the problems identified in the clusters or outlier locations could be resolved through a citywide travel demand management programme, with activities targeted at changing behaviour and influencing travel choices. It is therefore recommended that a citywide travel demand management programme is further developed.

Programme Implementation Strategy

The locations and clusters identified above are likely to be investigated and addressed at different times over the next ten year period depending on available funding. The clusters are illustrated based on where the problems occur, however, further investigation may identify that the cause of the problem is "downstream or upstream" on other parts of the network, or that the problem is best addressed at a citywide level (such as a road safety campaign) or in collaboration with other stakeholders. Therefore, the clustering may not reflect exactly where specific improvements on the network are required, it instead identifies parts of the city where further investigation is recommended.

In addition, 60 locations have been identified through the GHD network analysis where the CCC local road network meets NZTA State Highways (as detailed within section 3). CCC has shared the GHD analysis with NZTA and is working in partnership to identify opportunities to address these problems.

It is considered that the phasing of priority packages will be triggered based on a strategic "top down" evaluation against the key outcomes sought, within affordable funding scenarios. This approach is considered to be the most logical and is consistent with the principals adopted to phase the AAC projects. The following priorities and phases have been developed beginning with a focus on access to the Central City and then moving outward to Key Activity Centres and finally to key gateways.

The rationale for focusing on Central City access and moving outward is supported by the AAC PBC, which anticipates 65,000 jobs will be located within the Central City by 2041. In addition, CCC hopes to achieve a significant increase in the number of people living within the Central City over the next decade (20,000 people by 2024). The phasing is also intended to achieve value for money by leveraging off the $263m AAC investment and enabling greater links to Key Activity Centres in subsequent phases.

Evidence within this PBC suggests that surrounding links to the Central City and human behaviour currently pose a barrier to achieving key strategic outcomes. Phase 1 also provides an opportunity to build on the momentum of the AAC and the Major Cycle Routes programmes.

Table 9: Indicative Phasing of Packages (see Appendix I for detailed cluster or isolated location descriptions)

Phase	Clusters	Isolated Locations (intersections)
Access to the central city	▪ Zone 4 (Moorhouse Av area) ▪ Zone 6 (Whiteleigh Av area) ▪ Citywide Travel Demand Management Programme	▪ Cashmere, Centaurus Rd, Colombo St, Dyers Pass ▪ Hills Rd, Shirley Rd and Warrington St ▪ Linwood Av and St Johns St ▪ Merrin St and Withells Rd ▪ Breezes Rd and Pages Rd ▪ Marshland Rd, New Brighton Rd and Shirley Rd
Access to key activity centres	▪ Zone 3 (Fitzgerald Av area) ▪ Zone 2 (Bealey Av area) ▪ Zone 1 (Papanui Rd area) ▪ Zone 5 (Milton St area) ▪ Zone 8 (Riccarton Rd area)	▪ Cavendish Rd and Styx Mill Rd ▪ Cranford St and Main North Rd ▪ Green Lane, Main South Rd and Symes Rd ▪ Normans Rd, Strowan Rd and Wairakei Rd ▪ Marshs Rd and Springs Rd ▪ Orchard Rd and Wairakei Rd ▪ Grahams Rd and Wairakei Rd ▪ Main South Rd and Springs Rd ▪ Guthries Rd and Marshland Rd ▪ Deans Av and Kilmarnock St ▪ Main North Rd and Vagues Rd ▪ Highsted Rd and Styx Mill Rd ▪ Bower Av, Rookwood Av and Travis Rd
Gateways	▪ Zone 9 (Memorial Av area) ▪ Zone 7 (Blenheim Rd area)	

Phase 1

The inner clusters identified in Phase 1 are a programme of works with the primary aim of improving the convenience and connectivity of walking, cycling and public transport routes adjacent to the Central City. This phase also seeks to support the successful activation of Anchor Projects and the revitalisation and reoccupation of the Central City through a citywide travel demand management programme. Phase 1 has strong alignment to the ongoing An Accessible City (AAC) business case activities and will contribute to the AAC target of a threefold increase in walking, cycling and public transport trips to the Central City by 2041.

Phase 1 is also closely aligned to the Greater Christchurch Urban Development Strategy, which aims to achieve high quality social outcomes by reducing vehicle trips and pressure on main roads by maximising public transport, walking and cycling potential and ensuring central Christchurch becomes a thriving living environment. It is anticipated that safety and reliability outcomes for all users will also be targeted through Phase 1 projects.

While almost all problem locations are picked up as part of the identified clusters, there are also half a dozen individual locations outside of the clusters that will also be addressed as part of Phase 1. Although they do not have direct links with the Central City, they have been identified as having close strategic alignment with the objectives of this PBC. The majority of the individual locations identified in Phase 1 seek to address high and very high safety problems. The remaining locations that fall outside of the clusters will be reviewed and addressed as part of subsequent phases.

Phase 2

Phase 2 is a programme of work that primarily aims to improve the convenience and connectivity of walking, cycling and public transport routes that connect/serve Key Activity Centres across the major suburban centres of the city. The Phase 2 projects will build on the Phase 1 work and provide safe, efficient and reliable connections between Key Activity Centres and the Central City. By integrating the proposed Phase 1 projects with the wider networks captured in Phase 2, it is more likely that the desired outcomes of AAC, and the recommended programme within this PBC will be achieved.

In addition, Phase 2 is supported by the Urban Development Strategy, which aims to reduce traffic generation between Key Activity Centres and the Central City to achieve maximum local economic benefits and social cohesion. The Strategy notes that cyclists, pedestrians and passenger transport account for a significant number of trips in and between urban centres. These modes are healthy, cheap and environmentally sustainable and need ongoing and significant improvement and integration.

Phase 3

The clusters identified in Phase 3 are identified as key gateways to the city and link the wider State Highway network with both key activity centres and the Central City. Projects in Phase 3 will focus more on efficiency around these key vehicle routes and support neighbouring residential and employment areas (such as the airport and industrial sites around Hornby and Blenheim areas). Phase 3 is supported by the Urban Development Strategy, which seeks to maintain and develop key corridors and transport networks across Greater Christchurch to connect markets, transport hubs and communities.

Ongoing Development and Constrained Funding

Further work is proposed to be undertaken to refine this PBC and develop a more detailed programme of activities for the Phase 1 clusters (zones 4 and 6), the six priority outlier intersections and a citywide travel demand management programme. This further work has been detailed and scoped in a standalone document and is further detailed under the heading Next Steps within Section 7.

As the CCC network continues to evolve, travel patterns remain unstable (post-earthquake) and land use changes are occurring rapidly, it is logical to only focus on immediate priorities, which is why a phased approach to further work and implementation is proposed.

This PBC will be treated as a living document and should circumstances change then the indicative phasing detailed in Table 9 will be reviewed. In addition, there is further opportunity to amend the phasing of priority packages through both CCC's Annual Plan and Long Term Plan mechanisms and following more extensive public consultation and consideration by Councillors as part of the 2018-2028 Long Term Plan process.

CCC and NZTA intend to develop and deliver an integrated, one network approach for planning, funding and delivering transport improvements in Christchurch. This PBC has identified and phased packages for consideration based on both the nature of the problems and an assessment against the recommended programme outcomes.

CCC and NZTA have also established a governance structure that consists of a technical working group, a steering group and senior management liaison group to oversee the development of the various transport business cases underway in the Christchurch area. These groups will play an important role over the next phase of the business case development (early 2017) to help work towards a one network approach of the various PBC's.

There could be an opportunity for NZTA and CCC to identify locations that require immediate remediation (to achieve the wider one network objectives) despite the constrained Council funding environment and could therefore be considered as part of alternative funding arrangements or could influence CCC funding priorities (this will be explored as part of the further work to develop and refine Phase 1 activities as part of this PBC).

Indicative Strategic Interventions

The notional interventions in Programme 7 that might increase the use of walking, cycling and public transport modes will be investigated further, alongside interventions that aim to mitigate safety problems and improve journey time reliability. Notional strategic interventions have been allocated to each location identified through the network analysis based on the methodology provided at **Appendix J**. A map illustrating this information can be viewed at: https://goo.gl/QPYfwm. It is anticipated that location specific interventions and optimal solutions/packages will be explored in detail through further work.

As demonstrated by the intervention map and an understanding of the cause of many of the problems (behaviour), there are some interventions that are better considered on a citywide basis. This includes interventions such as travel demand management, which CCC and the UDS are committed to progressing. These are proven to contribute to addressing many of the citywide problems on the network (safety, delay and encouraging the use of alternative modes) and CCC will progress travel demand management as a standalone programme of work.

Recommended Programme Benefits

The recommended programme is expected to deliver substantially better outcomes against the key investment objectives of safety, reliability and travel choice, when compared to alternative programme options or the current plan. In combination, these benefits will make a positive contribution to regional and national outcomes, including economic growth and productivity. These include:

Travel Time Benefits

Achieved through providing more efficient, effective and safe alternatives to private vehicle travel to encourage greater use of walking, cycling and public transport. Encouraging a more even modal split distribution by encouraging existing drivers to use alternative, fast, safe, reliable modes is likely to improve travel times for freight and vehicles which continue to use the roading network.

Travel Time Reliability Improvements

Achieved through reducing the variability of travel time for freight, general traffic and on core public transport routes. Currently many of the core bus services have to navigate parts of the route with congested general traffic, particularly at peak times, the introduction of measures such as bus priority and behaviour change campaigns are likely to reduce bus travel times and improve the attractiveness of public transport. Currently many core bus routes do not have dedicated bus priority measures, which means many services are affected by congestion and delay to some degree.

This approach also frees up capacity on existing roading corridors which reduces customer frustration and means that people can arrive on time, and not have to attempt to build in an allowance for unknown travel time variance on a day-by-day basis. An equally important improvement is generated for people who use safe and dedicated cycle routes as a means of getting around the city, which is likely to further free up capacity on congested arterial corridors between the Central City and Key Activity Centres.

Public Transport User Benefits

The attractiveness of bus services will be improved by achieving the two benefits above. In addition, as part of the minor works programme, a much higher quality waiting environment at bus shelters as well as wayfinding and place based initiatives will help to improve the customer experience.

Environmental Benefits

Whilst these benefits are difficult to quantify at the PBC phase, it is likely that there will be a reduction in air pollutants, carbon and noise emissions due to the switch from cars to more people walking, cycling and using public transport. There could also be some modest benefits to freight vehicles, general traffic and buses as a result of enabling more free flow conditions as opposed to stop-start.

Health Benefits

More people walking, cycling and using public transport has associated health benefits as a result of increased levels of physical activity. Improvements to road safety will also help to reduce the social cost of crashes. Active modes are also recognised as having wider health and wellbeing benefits.

Asset Lifecycle Improvements

Reducing the use of the road network could have modest benefits in relation to the asset lifecycle and the maintenance period due to reduced wear, tear and deterioration.

Wider Economic Benefits

Wider economic benefits are likely to be achieved due to agglomeration effects. One of the benefits of the integrated programme approach adopted in this PBC to addressing multiple problems (causes), is the ability to deliver responses that address the multiple problems identified through the *Strategic Case* and this subsequent PBC. The benefits identified are likely to be realised gradually as changes are implemented and problems addressed across the CCC transport network.

In addition, the Strategic Case has identified influencing human behaviour as one of the most critical factors in achieving the outcomes outlined through the investment objectives, due to behaviour being a key contributing factor in many of the problems identified. Studies show that changing attitudes and behaviour is a gradual process, which is why the benefits are unlikely to be realised immediately after the changes are implemented, but instead over time.

Programme Risk

As with any investment programme, particularly over a longer time period, there are risks and uncertainties that need to be considered. Some can be reduced during the subsequent phases of the Business Case Approach, others are inherent and will need to be managed up to programme implementation. The specific risks and uncertainties identified at this stage include:

Technical

It is possible that before all elements of the PBC have been investigated and commissioned, technologies may be available that either change the demand for travel or provide a wider range of interventions and solutions. It is recommended that this PBC is reviewed and updated on a regular basis to ensure technological developments are considered.

Operational

The transport network is an unstable and dynamic system that is constantly changing, there is a risk that the transport modelling undertaken to inform the evidence base for the identification of network problems may not reflect actual operational performance.

To mitigate this risk, a sense check has been undertaken by CCC staff who have detailed knowledge of the operational characteristics of the network.

Financial

The availability of funding for the recommended programme will be influenced by political decisions made outside of the Business Case Approach such as the NLTP/NLTF, RLTP and CCC LTP. However, the recommended programme presents a compelling evidence based investment story to enable these financial decisions and trade-offs to be considered.

It is recognised that in order to achieve the benefits of the recommended programme there is a need for greater investment to be made in public transport and active modes, particularly to meet the mode shift targets outlined in AAC and captured in investment objective 3[7].

There is limited funding available to implement this PBC in the short term, due to a large number of existing commitment projects in the early years of the next LTP (2018-2028). Further work will be undertaken to develop the Phase 1 clusters, outliers and travel demand management programme to refine the costs and benefits of addressing the problems identified and enable more robust funding conversations as part of the LTP process and with key partners.

[7] Work is being progressed as part of a Greater Christchurch Future Public Transport Business Case, which will take a longer term view of the future or public transport.

Stakeholder/Public

The recommended programme places an emphasis on public transport, walking and cycling, which could be viewed as anti-motor vehicle by some people. Historically, the level of resistance to measures such as car parking displacement has been high. It will be important that community engagement is ongoing and effective in describing the wider benefits of the recommended programme.

Economy

The recommended programme is aimed at achieving national, regional and local economic goals. Significant changes to population forecasts or key industries may impact the phasing of the recommended programme. The PBC will be reviewed on a regular basis to ensure economic developments are considered in the assessment of potential strategic responses.

Land Use

Post-earthquake, Greenfield development land was released without the requirement for sequencing. This has resulted in large areas of Greenfield land for development. In addition, the recent adoption of the Christchurch District Plan has provided further certainty of future land use patterns. However, opportunities to better integrate the timing of land use and transport investment should be considered.

Assessment Profile

The recommended programme has been assessed using the NZTA Investment Assessment Framework criteria. An assessment profile of H/H has been determined for the recommended programme. It has not been possible to assess the efficiency of the recommended programme through a Benefit Cost Ratio (BCR) at this stage due to the scale and nature of this PBC. Further work to refine and develop the Phase 1 clusters, outliers and travel demand management programme will enable robust BCR's to be developed for each of these programmes of work.

Strategic Fit of the Problem, Issue or Opportunity

The transport planning activity class has been used as the basis for this assessment as the recommended programme covers multiple activity classes. The recommended programme aligns very well with the strategies and priorities of the three investment partner organisations as reflected by the consistent investment objectives across the different business cases that are under development.

The PBC also aligns with the existing CCC vision and goals as summarised in the Christchurch Transport Strategic Plan (2012) and the council's priority goals and Community Outcomes. The assessment tool used to determine the priority and timing of interventions also demonstrates a strong strategic fit.

Effectiveness of the Proposed Solution - M

Outcomes focussed - H

- The PBC has identified specific problems and the potential benefits from addressing these.
- Alternative programmes have been developed and tested against their ability to deliver the three investment objectives and address the problems identified in the *Strategic Case*.

Integrated - H

- The recommended programme has been developed and endorsed by stakeholders (and will be further consulted on through the draft CCC 2018-2028 Long Term Plan).

- The coordinated approach with relevant stakeholders including UDS Partners will assist the business case to continue to develop consistently with partners planning and business case development.
- The recommended programme aligns with current and future transport plans, whilst accommodating different needs across modes.

Correctly scoped - H

- The recommended programme has a high level of alignment with national, regional and local transport strategies, including the Christchurch Transport Strategic Plan and the Community Outcome of an increased proportion of journeys made by active travel and public transport.
- The whole of network approach has ensured a network wide perspective has been taken to programme development, which mitigates the spatial impact (upstream/downstream effects) and mitigates the impacts on wider networks e.g. the State Highway network.

Affordable – M (based on progressing Phase 1 within current funding scenario)

- The recommended programme will be efficient and fundable through the NLTF.
- Implementation will be staged over ten years of the Long Term Plan period so that priority packages can be triggered first within affordable funding scenarios.
- Affordability will be re-confirmed through the inclusion of individual components of the programme in the 2018-2021 NLTP.

Timely – M

- The recommended programme has been selected as it delivers the benefits and best achieves the three key performance indicators in a timely manner.
- The Long Term Plan spans a ten year horizon, however, it is intended that the initial priority packages will be progressed.
- Further work, including scenario testing will be undertaken to test the longer term impact of the recommended programme and emerging strategic focus.

Provides confidence - M

- All known future risks for achieving the outcomes and managing cost risks have been documented.
- These will be continually assessed as individual components of the programme progress.
- The PBC is based on a sound evidence base that clearly demonstrates the problems, benefits and justification for the selection of the recommended programme.
- Further confidence will be achieved through integration of the various Christchurch business cases.
- The recommended programme provides certainty to future planning and programme development.

Economic Efficiency of the Proposed Solution

An indicative benefit cost ratio (BCR) has not been prepared for this PBC. BCR's will be developed as part of further work to develop the Zone 4 and 6 clusters, the six high priority outliers and the citywide travel demand management programme as detailed in Section 7, to enable value for money investment decisions to be made.

One Network Approach – Recommended Programme

The CCC PBC has been undertaken in parallel with a number of State Highway PBC's in the Greater Christchurch area (State Highway 1, State Highway 74 and State Highway 76). This has been of benefit to both work streams as it has enabled the sharing of information and analysis, as well as a one network approach to be reflected in the problem identification and the setting of investment objectives.

NZTA is currently investigating preferred ways to improve the safety and network performance of several State Highway corridors and the adjoining transport network. At the time of writing, NZTA has not yet determined or communicated a recommended programme/s.

The various PBC's being developed in the Christchurch area recognise that problems exist on both the local and State Highway network that impact the city. In addition, there is recognition that safety and reliability are key investment objectives. There is also strong consensus that ongoing collaboration will be important as the various business cases progress.

The CCC PBC has developed a specific investment objective targeting improvements to convenience and connectivity, in terms of getting more people walking, cycling and using public transport, whereas, the emerging NZTA PBC's have developed an investment objective focussed on accessibility/severance, with mode shift (more people walking, cycling and using public transport) identified as a potential response to travel time reliability problems.

CCC intend to work closely with NZTA and wider stakeholders to progress the recommended programme. The recently established NZTA/CCC governance structure that consists of a technical working group, a steering group and senior management liaison group will oversee the development of the various transport business cases underway in the Christchurch area.

These groups will play an important role over the next phase of the business case development (early 2017) to help work towards a one network approach of the various PBC's. Further details regarding the governance structure are provided in section 7 as part of the Management Case.

The timing of the CCC PBC has been determined by the need to meet statutory requirements associated with the development of the 2018-2028 Long Term Plan. The NZTA PBC's in progress are not expected to be completed until mid-2017. The one network story will take shape as business cases progress, with the assistance of the governance structure that has recently been adopted.

6. PROGRAMME FINANCIAL CASE

Funding Arrangements

It is expected that elements of the recommended programme will be funded under standard arrangements between the NZTA and CCC. The exception may be activities or projects which do not meet NZTA funding criteria, which could be considered for council funding without subsidy from NZTA.

A range of procurement and financing options will be considered including public private partnerships and traditional procurement. Funding arrangements and costs will be refined following the completion of further work and discussions with NZTA. In addition, wider public consultation and elected member discussions will be undertaken as part of the CCC Long Term Plan (2018-2028) process.

Affordability

The affordability of the programme cannot be confirmed until the development of further work has been completed, alongside the agreement on levels of funding for transport activities in the 2018-2028 Long Term Plan and until the GPS has determined the size of future output classes. It also depends on the outcome of the Regional Land Transport Plan (RLTP) and National Land Transport Programme/ National Land Transport Fund (NLTP/NLTF).

It is considered that the recommended programme will be efficient and fundable through the NLTF. Implementation would be staged over the ten year Long Term Plan period so that priority packages can be triggered first within affordable funding scenarios. Affordability will need to be confirmed through the inclusion of individual components of the programme in the 2018-2021 NLTP.

7. PART C - DELIVERY AND MONITORING

Management Case

The senior responsible owners for the CCC PBC are Richard Osborne (Head of Planning and Strategic Transport, CCC) and Chris Gregory (Head of Transport, CCC). Overall governance of the CCC PBC is provided through a series of internal and external steering groups as follows:

Technical Working Group

- Chair: Markus Benter-Lynch – Coffey Projects
- CCC: Andrew Smith, David Falconer, Mike Jacobson, Tim Cheesebrough, Adam Taylor, Paul Burden
- NZTA: Mike Blyleven, Haroun Turay and Caroline Hutchison
- ECan: Shannon Boorer (or alternative)

Overview: CCC, ECan and NZTA aim to have collaborative weekly conversations during development of the suite of business cases to facilitate the one network approach. The group aims to discuss and address as far as possible any issues that arise through the different business cases. Issues and gaps that are not easily sorted will be escalated to the Steering Group. The scope of work for this technical group is focused on the following:

- CCC Transport System Business Case
- State Highway Business Cases
    - State Highway 76 (SH73-74 including Brougham St)
    - State Highway 1 (Belfast – Selwyn River) & 73 (SH76 –Darfield)
    - State Highway 71 & 1 (Belfast – Ashley River)

Project Steering Group

- CCC: Richard Osborne, Lynette Ellis, Rae-Anne Kurucz
- NZTA: Steve Higgs, Mike Blyleven, Caroline Hutchison
- ECan: Len Fleete

Overview: A joint working group of team leaders/managers that meets fortnightly to manage the alignment of business cases, address issues raised through the Technical Working Group and encourage a one network approach.

NZTA/CCC Liaison Meeting Group

- CCC: Brendan Anstiss, Dave Adamson, Chris Gregory, Richard Osborne
- NZTA: Jim Harland, Michael Aitken, Colin Knaggs, Steve Higgs

Overview: A senior management forum that meets on a monthly basis to provide updates on the various business cases and to discuss any matters of disagreement or risk that are unresolved and raised through the Technical and Project Steering Group meetings.

Programme Implementation

The recommended programme will be developed through further work as per the supporting scoping document. The recommended programme will need to be progressively delivered through infrastructure investment, policies and other activities over the next ten years.

Benefit Realisation

This section provides an overview of the data collection that CCC is proposing to undertake to monitor the impact of the PBC. It is proposed that a more detailed and site specific benefit realisation plan will be developed and submitted at subsequent phases of the Business Case Approach.

Accurately understanding what is being achieved by the CCC programme will help to guide the appropriate scope of future CCC projects, as well as provide assurance to NZTA that the National Land Transport Programme investment is providing value, in terms of contributing to targeted performance measures. It is intended that the benefits realisation work will provide technical advice and information to the joint CCC/NZTA business case project governance groups on matters of travel choice, transport safety and journey time reliability.

At a minimum, the NZTA performance measures outlined in Table 10 are proposed to be monitored.

Table 10: Proposed Monitoring Measures

Outcome Class	Investment Benefit	Measure	Description
Network Performance and Capability	Throughput – increase / maintain	Traffic - throughput	Number of pedestrians, cyclists and motor vehicles by vehicle class
	Increase cycle/public transport mode share	Traffic – mode share	As above expressed as percentage
		People – throughput	Number of pedestrians, cyclists, public transport boarding's, and motor vehicles TIMES average number of people per vehicle
		People – mode share	As above expressed as percentage
	Reliability motor vehicles and public transport– increase / maintain	Travel time reliability – motor vehicles	Coefficient of variation; standard deviation of travel time DIVIDED by average minutes travel time
		Punctuality – public transport	Percentage of scheduled service trips between 59 seconds before and 4 minutes 59 seconds after the scheduled departure time
	Travel time – decrease / maintain	Travel time	Average travel time in minutes
Safety	Safety – improve / maintain	Deaths and serious injuries	Number of deaths and serious injuries
		Crashes by severity	Number of crashes by severity
Environment	Amenity value – increase / maintain	Amenity value – built environment	tbc – potential use of annual community perception surveys

Ongoing Stakeholder Engagement Plan

The wider stakeholder group (interest groups) as well as elected members (Councillors and Community Boards) and the UDS Transport Group partners will continue to be involved in the further development of the recommended programme.

Consultation and engagement will be aligned with statutory processes as part of public consultation strategies associated with the 2018-2028 CCC draft Long Term Plan process. The stakeholders have been identified based on the practical and technical details of the range of issues, interactions and alternatives/options that may be considered in subsequent phases of the CCC business case.

Where possible, consultation with local businesses and communities will be aligned with wider NZTA consultation on the various State Highway business cases. It is suggested that a joint stakeholder plan is developed to ensure these relationships are appropriately managed, communication and messaging is consistent.

Stakeholders will be managed through the Programme Manager, with support from NZTA and CCC's communication teams, who will assist with organisation and preparation for stakeholder engagement. A Stakeholder Engagement and Communications Plan will be developed to address the specific details for each stakeholder, including key contact person and approach for engagement.

Professional Engagement Process and Peer Review

An independent review team has participated and overseen the development of this PBC as detailed in Table 11. The challenge team has extensive industry experience of business case development and assessment. The challenge team provided advice and regular reviews throughout the development of the CCC PBC and participated in monthly meetings with the CCC project team via teleconference.

The agendas and minutes from the challenge team meetings are provided at **Appendix K**.

Table 11: Challenge Team Membership

Organisation	Challenge Team
NZTA	▪ Rosalie Orr – Principal Investment Advisor ▪ Caroline Hutchison – Principal Planning Advisor
GHD	▪ David Rolland – Executive Transport Consultant ▪ Tim Eldridge – Principal Consultant, Infrastructure Advisory ▪ Les Dowdle – Executive Advisor, Infrastructure Investment
Davies-Howard Group	▪ Stephen Davies-Howard – Director of Davies-Howard Group

A peer review of the PBC has been carried out by GHD. Overall, the review confirmed that the intent and principles of the NZTA Business Case have been correctly followed in the development of this PBC. See summary of the peer review findings at **Appendix L**.

Next Steps

The CCC PBC seeks support from decision-makers and investors to commence further work. A supporting scoping document has been produced to progress the Phase 1 clusters (zones 4 and 6), six priority outliers and a travel demand management programme. Further applications and phases are anticipated to be progressed over time, within affordable funding.

The recommended programme is not an investment programme, as individual projects or activities still need to be developed and will still need to go through statutory processes to proceed (e.g. NLTP, RLTP, and LTP). However, it provides an indication of the broad location, type and quantum of investment that is likely to be required to address the transport problems identified through the *Strategic Case*.

Whilst the full recommended programme represents a potentially large investment over a ten year period, the approach adopted to clustering locations, tackling multiple problems through a single business case, aligning implementation with wider programmes (such as maintenance and renewal programmes), and phasing of implementation represents better value for money solution than existing practices.

Although the CCC Long Term Plan covers a ten year planning horizon, it is refreshed and reviewed through the Annual Plan process and is reconsidered every three years. CCC is keen that this PBC is considered as a living document that can be updated and refreshed as assumptions or significant changes occur (such as the location and scale of housing and employment growth or the timing and impact of technological change or increases in available funding), which could significantly alter the strategic direction or timing of implementation/further development of subsequent phases.

Successful delivery of this programme will involve ongoing collaboration with project partners throughout the life of the programme, to ensure a one network approach is adopted that maximises value for money and best achieves the outcomes identified by all partner agencies. The governance structure in place (as outlined in Section 7) will help to enable successful delivery.

Recommendations

The CCC citywide PBC has undertaken a review of the key transport problems, challenges and opportunities related to the Christchurch transport system.

Programme 7 was deemed the best programme in terms of addressing the three investment objectives The aim of the programme is to have a mix of interventions with a convenience and connectivity focus to address the problems associated with the way people to choose to travel (predominantly by private vehicle), by improving the convenience and connectivity of walking, cycling and public transport.

This PBC will be refined through the development of further work, with an immediate focus on Phase 1 priorities as outlined in the supporting scoping document.

It is recommended that:

i. CCC Executive Leadership Team endorse and approve the PBC

ii. NZTA note support for the PBC and its ongoing development

iii. CCC progress further work within existing funding arrangements as per the supporting scoping document. Further applications and phases to follow (linked to this overarching document)

GLOSSARY

Active Modes – Transport modes that rely on human power, primarily walking and cycling.

An Accessible City (AAC) – An Accessible City refers to the transport chapter of the Christchurch Central Recovery Plan.

Benefit Cost Ratio (BCR) – Benefit Cost Ratio is the present value of net benefits divided by the present value of net costs.

Better Business Case - Transport Agency approach to guide planning, investment and project development processes. It is a principles-based approach that links strategy to outcomes.

Christchurch City Council (CCC) - Christchurch City Council is the local government authority for Christchurch.

Canterbury District Health Board (CDHB) – Canterbury District Health Board is the Christchurch based hospital and healthcare provider for the Canterbury region.

Christchurch Transport Strategic Plan (CTSP) - The Christchurch Transport Strategic Plan is a 30 year vision for transport within the city and was adopted by the Council in late 2012.

Deaths and Serious Injuries (DSi's) – Deaths and Serious injuries is a standard metric for recording and reporting road safety statistics.

Environment Canterbury (ECan) - Environment Canterbury is the regional council for Canterbury, the largest region in the South Island.

Horizontal Infrastructure - Roads, footpaths, underground pipes and bridges.

Indicative Business Case (IBC) – The Indicative Business Case further develops and tests specific activities identified in a Programme Business Case.

Investment Logic Mapping (ILM): A technique to test and confirm the proposed rationale for a proposed investment.

Key Performance Indicators (KPI's) – A key performance indicator is a type of performance measurement that helps evaluate success of a project or programme.

Local Government New Zealand (LGNZ) - Local Government New Zealand is the Local Government Association of New Zealand, they represent the interests of local government bodies.

Local Roads – Roads operated by territorial local authorities.

Long Term Plan (LTP) – The Long Term Plan is a statutory Council document outlining the long term vision (ten years).

Mode – A categorisation of transport methods, e.g. private motor vehicle, walking, cycling, public transport.

Multi-Criteria Analysis (MCA) – Multi-Criteria Analysis is a decision making process that explicitly considers multiple criteria in decision making environments.

National Land Transport Fund (NLTF) – The dedicated part of the Crown Bank Account into which land transport revenue is paid.

National Land Transport Programme (NLTP) – The mechanism through which NZTA allocated funds for land transport infrastructure and services.

New Zealand Transport Agency (NZTA) - The New Zealand Transport Agency is a New Zealand Crown entity tasked with managing the State Highway network and allocating funding through the National Land Transport Fund.

One Network Approach - the concept of planning the entire transport network for all modes in a connected, multi-agency manner.

One Network Road Classification (ONRC) – A road classification system to provide a nationally consistent framework for determining road function, future levels of service, the appropriate maintenance levels and improvement priorities.

Overarching Strategic Assessment - high level review of the transport challenges facing the Christchurch transport system to reconfirm the issues identified in the CTSP (November 2015).

Programme Business Case (PBC) – The Programme Business Case phase is where an in depth understanding of the problems, opportunities and constraints are summarised and an optimal mix of alternatives and options are assessed to determine a recommended way forward.

Problem Statement - a description of the issue(s) that need(s) to be addressed (cause and effects).

Regional Land Transport Plan (RLTP) – The Regional Land Transport Plan is a statutory document which sets the strategic direction for land transport within the region over a 30 year period.

Regional Transport Committee (RTC) – A committee of Environment Canterbury responsible for the preparation and approval of the Regional Land Transport Plan.

Roads of National Significance (RoNS) – A group of State Highway projects commenced in 2009 to address Government priorities for the State Highway system within, or close to, New Zealand's five largest population centres.

SMART Objectives - specific, measurable, attributable, relevant and timed investment objectives.

State Highway - a strategically important road managed by the **NZTA**.

Strategic Case - a more detailed review of the key challenges and drivers for change (this document).

Strategic Network – A network of routes that has been defined as having strategic significance at a regional level.

Strategic Response - High level interventions that might be progressed in order to address the problem and deliver the anticipated benefits.

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[iii] Christchurch Central Recovery Plan, CERA, CCDU, CCC, Ngai Tahu, 2012, page 3

[iv] Resilient Greater Christchurch Plan, UDS Partners, 2016, page 33

[v] Christchurch Central Recovery Plan, CERA, CCDU, CCC, Ngai Tahu, 2012, page 15

[vi] Resilient Greater Christchurch Plan, UDS Partners, 2016, page 19

[vii] www.stats.govt.nz/Census/2013-census/profile-and-summary-reports/quickstats-about-greater-chch/work.aspx

[viii] Resilient Greater Christchurch Plan, UDS Partners, 2016, page 10

[ix] Christchurch City Council Infrastructure Strategy, July 2015, page 34

[x] Urban KiwiRAP Risk Mapping, Christchurch, Abley Transportation Consultation, January 2016

[xi] Christchurch City Council Road Safety Action Plan, June 2016, page 4

[xii] Christchurch City Council Road Safety Action Plan, June 2016, pages 15 and 16

[xiii] Urban KiwiRAP Risk Mapping, Christchurch, Abley Transportation Consultation, January 2016

[xiv] New Zealand Household Travel Survey (www.nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE7432)

[xv] Christchurch Transport Operations Centre – monthly report, September 2016

[xvi] Christchurch Network Management Plan – supplied by QTP, September 2016

[xvii] Christchurch City Council GIS database 2016

[xviii] Christchurch City Council Infrastructure Strategy, July 2015, page 34

[xix] Christchurch City Council RAMM database 2016

[xx] Map A, Chapter 6, Christchurch Regional Policy Statement