

Asset Management Plan Summary

Transport

Asset management plans

Together, our 14 asset management plans present a detailed description of all the things – roads, cycleways, footpaths, pipes, buildings, vehicles, parks and so on – that the Christchurch City Council owns, across all areas of work, and how these ‘assets’ are planned, managed, operated and funded.

All our assets, collectively worth \$16.8 billion, belong to ratepayers and are managed and operated on their behalf. Ensuring our assets are appropriate for the city’s needs

enables us to deliver the services that make Christchurch and Banks Peninsula a great place to live, work and visit.

Asset management plans are technical documents. The summary documents give an overview of how we manage our assets through their lifecycles to ensure we deliver services in cost-effective ways.

For the first time, we have published these documents online as part of our commitment to transparency.

What we do



We are responsible for the city’s transport infrastructure and assets.



We provide and operate traffic lights and cameras, signage, street lights, parking facilities, traffic systems and services, and tram and bus infrastructure.



We plan, build, operate and maintain the city’s transport network of roads, footpaths, bridges and cycleways.



It’s also our responsibility to maintain street drainage, retaining walls, street trees and landscaping, and to ensure graffiti and dumped rubbish are removed.

Our investment horizon is 30 years. Our assets are managed in line with our 30-year Infrastructure Strategy, our 10-year Long Term Plan and other corporate plans and policy documents.

Why we do it

Our aim is to ensure Christchurch has a safe and well-balanced transport system so that it’s easy for residents and visitors to get around. Our transport system also needs to provide for the efficient movement of services and freight.



Where we've come from

Parts of the city's transport network were significantly damaged in the Canterbury earthquakes of 2010 and 2011. The network was further disrupted by the need to repair and/or replace earthquake-damaged and/or ageing underground infrastructure. This has delayed the return to smooth roads and footpaths, which surveys have consistently shown is a significant cause of resident dissatisfaction.



Our assets

We own, plan and manage the city's local road network that supports all transport activities. We manage \$4 billion of assets on behalf of the community (asset book value and replacement cost at 30 June 2019).

Asset category	Quantity	Replacement cost (30/06/2019)
Carriageways	2,179 km sealed 324 km unsealed	\$1,677,704,088
Road drainage	3,593 km kerb & channel 34,195 sumps & associated pipes	\$681,649,840
Bridges and Structures	353 roads bridges & 116 foot bridges 103 culverts, 1 ford & 2 underpasses 1,611 retaining walls 113 gantries, guardrails and railings	\$511,554,455
Footpaths and Cycleways	2,582km footpaths 225 km cycle lanes 115km shared paths	\$456,083,629
Other assets	Including road lighting, traffic systems and services, road landscapes and street trees, bus, tram, parking assets and street furniture	\$608,740,188
Total		\$3,935,732,200

Our issues and risks

In this asset management plan summary we provide a snapshot of the very high risks recorded for Transport.

Our network is vulnerable to a wide range of risks, from issues such as climate change through to inherent operational risks, such as not complying with a resource consent. These are all outlined in the asset management plan, along with the mitigations we've planned.

Risk	Description of risk	Risk Rating
Asset Failure	Transport asset/s or core service could fail	Very high
Transport Safety	The risk of a death or serious injury on the transport network	
Emissions	<p>Council has declared a "Climate Emergency" and set targets for Christchurch to become 100% Carbon neutral by 2045 and 50% interim reduction by 2030. The best approach to achieve those targets either through more tree planting or emission reduction by various sectors is being investigated. Achieving the aspirational targets is beyond the transport unit's level of influence and will require a coordination among a large number of influencing factors including but not limited to:</p> <ul style="list-style-type: none"> • Central Government to practically encourage intensification, stop the import of fossil-fuel cars, set high tax on fuel sales and invest heavily in alternative modes of transport • Council to deprioritise car use through road capacity and speed reduction, parking limitation and aggressive pricing and meanwhile invest heavily in alternative modes of transport • Community to buy into the "Climate Emergency" requirements and accept the fact that a considerable behaviour change is required which will include living in much denser residential areas and shifting to active, public or electric modes of transport <p>Obviously lack of any of the above elements could end into failure in achieving the targets and considerable environmental costs for the current and future generations.</p>	
Budget Overrun	Overspend on operational budgets will have an impact on rates	High
Pandemics	COVID 19 showed that Council's revenues can get greatly uncertain at least in the short term. Similar incidences in the future can have implications for the funding of transport services and projects	
Poor Delivery	Projects not delivered to expected timeframes, quality or to budget	
Health and Safety	Staff, Contractors and others working with the Council do not comply with the Health and Safety at Work Act to adequately (so far as reasonably practicable) protect their health and safety (including wellbeing)	
Natural Hazards	Earthquakes, storms, flooding, tsunamis, sea level rise and other natural hazards pose a risk to the transport network and service Council provides	



What it costs

Our budget for the activity that uses these assets in Year 1 of the LTP is \$257.76 million (total activity net cost of service plus capital spend for 21/22), with the net operational expenditure projected at \$110.76 million (net cost of service) and capital expenditure at \$136 million (total capital spend). Tables for each area of spending are included in our activity plan.

How we're funded

We receive a mix of Council funding (from rates, fees and charges) and Central Government funding, mainly from Waka Kotahi, the NZ Transport Agency.

How it's delivered

Delivery is via a combination of Council staff and tendered contracts with private providers.

Staff deliver:

- Organisational management, asset management, asset planning, traffic planning and management, public space management, education and communications
- Street-space enforcement

Contractors deliver:

- Maintenance and construction

Our key service delivery partners are:

- Waka Kotahi NZ Transport Agency
- Environment Canterbury (ECan)
- Roding Efficiency Group
- Greater Christchurch Partnership

Our functions and services

We apply engineering, financial and management practices to achieve the agreed level of service, for the most cost-effective expenditure. This means optimising investment and outcomes within the constraints of finance, service levels and resources.

Managing our assets involves spending considerable amounts of public money, so it's vital that staff ensure they are doing the right thing, at the right time and for the right price.

While managing our assets to meet agreed levels of service, financial prudence demands that we optimise asset lifecycle costs, so our management planning also aligns to the stages of an asset's lifecycle. Our renewals programme considers the condition of assets, not just their age.

Asset maturity assessment

The maturity assessment for our assets shows we are performing at an 'enterprising' level. The score rose from 62 percent to 70 percent in the past three years, with the target being 85 percent. More detailed information about this is included in our asset management plan.

Looking ahead

Climate change

As well as continuing to bring our assets up to an acceptable level of service, we need to focus on the role of transport in reducing carbon emissions and mitigating the effects of climate change.

Christchurch is a coastal city and climate change will have a significant impact, especially in the coastal areas.

We are likely to see more regular coastal inundation and/or accelerated erosion. Key decisions will need to be made on adapting to climate change where possible and, in some areas, managing a retreat from the coast.

A strategy will be needed for transport assets, either to protect them from storm surges or to accept a reduced level of service leading into a managed retreat.

If there is a one metre rise in sea level, about 110 kilometres of the road network will be at risk of inundation. These assets are valued at \$65.6 million. We have started assessing the risks involved in our Climate Change Risk Assessment.

Council has declared a climate change emergency and committed to reducing carbon emissions to net zero by 2045.

We know that 53 percent of carbon emissions in Christchurch comes from the transport sector and 36 percent of that is from road transport.

How we manage our assets can influence emission levels. We have invested in LED lighting, which will significantly reduce the amount of energy consumed in keeping the city's streets lit at night.

Another critical body of work will be network management. In particular, we will need to give priority to low or no-emissions forms of transport – active, electric and public transport modes.

COVID-19

The emergence of COVID-19 this year has affected work across Council.

One consequence is the uncertainty around funding.

We have been fortunate to secure Government funding for 'shovel ready' projects and there is work across the city that has been escalated using this temporary stream of funding.

Continuous improvement

We have a strong commitment to continuous improvement.

This means planning to ensure the highest priority improvement items are delivered first and that future delivery costs are well understood and that sufficient funding is allocated.

Transport Asset Management Plan

FINAL – 9 July 2021

Table of contents

Transport Asset Management Plan	1
1 Executive Summary	3
1.1 Asset Management	3
1.2 Key Issues.....	5
1.3 Financial Outlook	5
1.4 COVID-19.....	6
1.5 Risk Management.....	7
1.6 Plan Improvement Programme.....	8
2 Introduction	9
2.1 Background.....	9
2.2 Scope of the Assets and Services Covered.....	9
2.3 Relationship with other plans.....	10
2.4 Context of transport in Greater Christchurch....	11
2.5 Strategic Alignment.....	12
2.6 Delivering on Council’s Strategic Framework	13
2.7 AMP Development Process.....	15
2.8 Navigating the AMP.....	15
3 The Services we provide	16
3.1 Level of Service Drivers.....	16
3.2 Defining and Measuring Levels of Service	22
4 Demand for our Services.....	25
4.1 Demand Drivers.....	25
4.2 Demand Forecasts.....	33
4.3 Impact of Changing Demand on Existing Assets	45
4.4 Demand Management Plan	46
4.5 Demand Related Projects and Programmes.....	49
5 Managing Risk and Investing in Resilience	50
5.1 Council’s Approach.....	50
5.2 Investing in Resilience	51
5.3 Managing Risks.....	56
6 How we Deliver our Services	59
6.1 Historical Context.....	59
6.2 Business Structure.....	60
6.3 Key Service Delivery Partners	61
6.4 Business Strategies.....	62
6.5 Business Reviews Undertaken	63
6.6 Significant changes planned for the activity.....	63
7 Portfolio Lifecycle Management Plan	64
7.1 Asset Lifecycle Approach	64
7.2 Our Asset Portfolio	64
7.3 Asset and Network Planning	70
7.4 Asset Creation (Design and Build) and Acquisition	71
7.5 Operations and Maintenance	73
7.6 Renewals.....	74
7.7 Asset Disposal.....	75
7.8 Mitigation and adaptation to the effects of climate change	76
8 Lifecycle Management Plans	77
8.1 Carriageway.....	77
8.2 Drainage	88
8.3 Footpaths	97
8.4 Structures.....	104
8.5 Street Lighting	115
8.6 Traffic Systems	123
8.7 Traffic Services.....	131
8.8 Street Trees and Landscapes.....	135
8.9 Cycleways.....	141
8.10 Public Transport	145
8.11 Parking	149
9 Financial projections and trends.....	154
9.1 Key Assumptions	154
9.2 Operating Forecasts.....	155
9.3 Input Data Confidence Levels.....	159
9.4 Valuation and Depreciation	160
10 Continuous Improvement.....	161
10.1 Current Asset Management Practice.....	161
10.2 Improvement Plan 2018.....	162
10.3 Improvement Plan 2021.....	162
10.4 Resourcing the improvement programme.....	164
10.5 Funding the Improvement Programme	164
10.6 Monitoring and review	164

1 Executive Summary

1.1 Asset Management

Asset Management ensures that acceptable levels of service are provided in the most cost-effective manner to achieve the strategic objectives and community outcomes set by the Christchurch City Council (Council). Asset Management is 'knowing' about assets, what they are, where they are, what condition they are in, and what level of service is expected of them. From a planning perspective Council needs to know how they are performing such that works can be programmed and future budgets forecast.

This Transport Asset Management Plan, in support of Council's Long Term Plan for the period 2021-31, is for Council's transport network assets as outlined in the Table below. State Highways within the Council's territorial area are the responsibility of Waka Kotahi New Zealand Transport Agency and as such are not included in our Portfolio.

The investment horizon for the Asset Management Plan is 30 years, which is consistent with Council's Infrastructure Strategy. This Asset Management Plan has been prepared using industry guidance and contributes to the suite of advice for Councillors to make decisions that affect the community. It has also been prepared at a time when Christchurch and the rest of New Zealand and the world are managing the COVID-19 crisis. While the Council is still considering its medium and long-term response to the crisis, it is clear that it will have a significant financial impact on the organisation and fiscal prudence needs to permeate our Asset Management practices.

Asset Category	Description	Measure	Quantity	Replacement Cost (\$'000)	Optimised Depreciated Replacement Cost (\$'000)	Annual Depreciation Expense (\$'000)
Carriageways	Sealed	km	2,179	\$1,677,704	\$986,359	\$21,520
	Unsealed	km	324			
Road Drainage	Kerb & channel	km	3,593	\$681,650	\$371,377	\$7,820
	Sumps & associated pipes	each	34,195			
Footpaths		km	2,582	\$456,084	\$255,516	\$9,616
Bridges & Structures	Road bridges	each	353	\$511,554	\$197,468	\$8,471
	Foot bridges	each	116			
	Culverts, fords & underpasses	each	106			
	Retaining walls	each	1,611			
	Gantries	each	113			
	Guardrails, railings	each	n/a			
Cycleways	Cycle lanes	km	225	(value included with Carriageways and Footpaths)		
	Shared paths	km	115			
Other Assets	Including road lighting, traffic systems and services, road landscapes, bus, tram and parking assets.	n/a	n/a	\$608,740	\$341,522	\$13,495
Total				\$3,935,732	\$2,152,242	\$60,922

Table 1-1: Council Transport Network Asset Portfolio Summary (values based on 2019 valuation report)

Underpinning Council’s Transport Asset Management approach are the three new service outcome pillars that are underpinned by affordability. These pillars are outlined in the following Table.

Safety	The network and our services are safe for all users and we actively seek to reduce deaths and serious injuries – to meet the challenging Vision Zero targets of a 40 % reduction in fatal and serious injuries for Christchurch roads in the next decade
Access	the network enables active and connected communities through providing transport choice for all
Environment	the environment is enhanced and projects proposed aim to meet the challenge of climate change – achieved through measures to reduce the need for motorised travel and to encourage more self-contained, sustainable and resilient communities
Affordability	solutions proposed that are affordable and sustainable

Table 1-2: Transport service outcome pillars

To assist with achieving the three outcome pillars, a Tactical Asset Management Approach (Table 1-3) sits at the heart of our new Asset Management Plan.

Approach	<u>Details</u>
Reduce	<ul style="list-style-type: none"> • Reduce overall need / demand for travel. • Plan and manage future growth projections in a sustainable way. • Improve integration of land use and transport assets / network. • Support increased integration, self-containment and resilience of our communities.
Manage	<ul style="list-style-type: none"> • Make the best use of existing transport assets and networks.
Invest	<ul style="list-style-type: none"> • Add or re-shape existing networks / assets only when Reduce / Manage options have been exhausted. • Use better business case approach. • Demonstrate the shift towards alternate modes (e.g. cycling, walking, public transport). • Demonstrate connection to improving levels of service.

Table 1-3: Tactical Asset Management approach

1.2 Key Issues

Christchurch City Council’s levels of service for transport and roading services combine customer satisfaction and technical performance measures. These measures range from high-level outcomes directly associated with delivery of Council’s community outcomes and strategic priorities to what is delivered on the ground. A gap analysis undertaken as part of preparing this document has identified which levels of service required additional investment for the target outcomes to be met. The four levels of service that have the greatest improvement required to achieve the target level of service are outlined in Table 1-4 with the details of what is required and how it will be achieved.

#	Issue	What’s required	How it is to be achieved
1	Low Customer Satisfaction rating	Reduce backlog of maintenance and renewal issues`	Increase the quantity of maintenance and renewal work
2	Road safety Level of Service is not being met	Increase priority of road safety	Targeted road safety interventions
3	Insufficient opportunities and choice of non-car modes of travel	Improve the integration of land use and transport planning and services	Continue to invest in cycling and public transport infrastructure
4	Reduce car travel on our networks		

Table 1-4: Levels of service GAP Analysis identified that require additional investment to meet target outcomes

1.3 Financial Outlook

Below is a high-level summary of the proposed 30-year expenditure for the transport portfolio, including capital expenditure (CAPEX), operational expenditure (OPEX) and depreciation. This has been prepared using the best available information to date, including historical trends back to 2008. This financial expenditure profile takes into account:

- the services we provide and the demand for those services, and
- the lifecycle of the asset and the proposed lifecycle management plan.

The financial forecast assumes growth predictions occur as per those outlined in this document, the smoothing of costs has not been undertaken and all budgets are in FY2022 dollars with no inflation allowance.

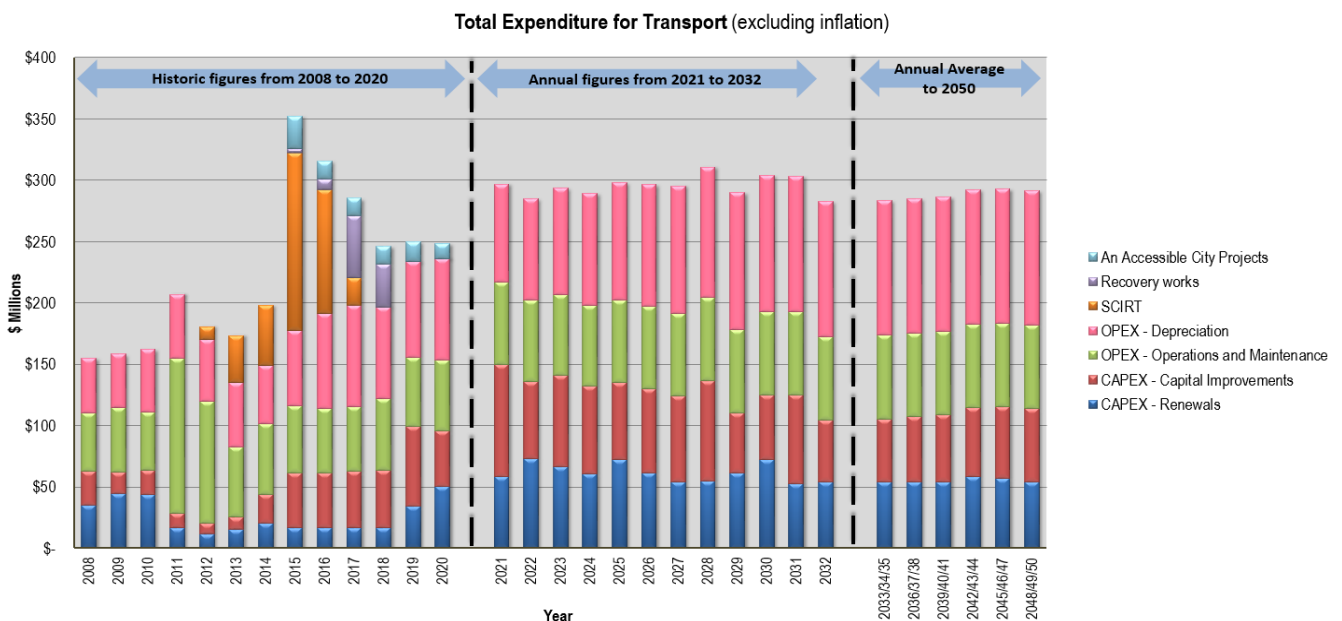


Figure 1-1: Transport Total Expenditure

1.4 COVID-19

New Zealand and the world are still coming to grips with managing COVID-19 and all that it impacts. The impacts are multi-faceted and far reaching and it is now very clear that the impact of this pandemic will continue to impact our communities and economy for many years to come. While we have a better understanding of COVID-19 impacts now compared to 12 months ago, there are still many gaps in our understanding that will require time for information to become available and questions to be answered.

Early forecasting advice from economic commentators (e.g. the Treasury, ChristchurchNZ, financial institutions) signalled significant economic impacts locally, nationally and internationally. This advice was updated regularly and changed over time (the Treasury's early economic scenarios released on 14 April 2020 cautioned that economic impacts are "*highly uncertain*"). That certainly proved to be the case. To date we know that due to COVID-19 there has been:

- a reduction in public transport patronage and a subsequent increase in people using private vehicles and other modes;
- an initial focus on infrastructure that supports COVID-19 economic recovery, delivers, and supports the remaining post-earthquake central city anchor and regeneration projects;
- early priorities also include temporary re-allocation of road space to support physical distancing post-COVID;
- progress of 'shovel ready' infrastructure projects identified as part of central government stimulus package; and
- completion of committed projects citywide.

Looking forward there are a number of issues that Council will need to manage that may increase financial pressure on Council budgets. These include:

- in the short-term (now in 2021 and LTP years 1-3) :
 - possible delays in scheduled capital programme works;
 - potential issues with workforce availability / contractor viability following lifting of restrictions;
 - uncertainty about materials supply;
 - changing priorities for work programming and methodologies (e.g. accommodating the norm of physical distancing); and
 - opportunities for bringing forward 'shovel ready' work and potential changing travel patterns and demands (increased walking and cycling).
- in the medium term (LTP years 4-6):
 - possible re-prioritisation of capital works programme and changed programme priorities.
- in the longer term (LTP years 6 – onwards):
 - uncertain at this stage, but a potential bow-wave effect of deferred operational spend due to the above factors.

1.5 Risk Management

Council’s corporate approach to managing risk is defined in its Risk Policy and assessment framework. The framework provides a means for consistently identifying, recording and assessing risks such that risk mitigations can be prioritised across Council. The very high and high rated strategic risks identified in relation to this Asset Management Plan include:

Risk	Description of Risk	Risk Rating
Asset Failure	Transport asset/s or core service could fail	Very High
Transport Safety	A death or serious injury occurs on the transport network	
Emissions	<p>Council has declared a ‘Climate Emergency’ and set targets for Christchurch to become 100% Carbon neutral by 2045 and 50% interim reduction by 2030. The best approach to achieve those targets either through more tree planting or emission reduction by various sectors is being investigated. Achieving the aspirational targets is beyond the transport unit’s level of influence and will require a coordination among a large number of influencing factors including but not limited to:</p> <ul style="list-style-type: none"> • Central Government to practically encourage intensification, stop the import of fossil fuel cars, set high tax on fuel sales and invest heavily in alternative modes of transport; • Council to deprioritise car use through road capacity and speed reduction, parking limitation and aggressive pricing and meanwhile invest heavily in alternative modes of transport; • Community to buy into the ‘Climate Emergency’ requirements and accept the fact that a considerable behaviour change is required which will include living in much denser residential areas and shifting to active, public or electric modes of transport. <p>Lack of any of the above elements could end in failure to achieve the targets and considerable environmental costs for the current and future generations.</p>	
Budget Overrun	Overspend on operational budgets will have an adverse impact on rates	High
Pandemics	COVID-19 showed that Council’s revenues can become uncertain, at least in the short term. Similar incidences in the future could have implications for the funding of transport services and projects	
Poor Delivery	Projects not delivered to expected timeframes, quality or to budget	
Health and Safety	Staff, contractors and others working with the Council do not comply with the Health and Safety at Work Act to adequately (so far as reasonably practicable) protect their health and safety (including wellbeing)	
Natural Hazards	Earthquakes, storms, flooding, tsunamis, sea level rise and other natural hazards pose a risk to the transport network and to the service Council provides	

Table 1-5: Strategic Risks

1.6 Plan Improvement Programme

The Transport Unit has a strong commitment to the continual improvement of Asset Management. In November 2017 an Asset Management Maturity Assessment was completed by an independent consultant. The model utilised for the assessment aligned with the Asset Management Standard ISO55000/01:2015. This assessment was the basis for developing an Improvement Roadmap, a prioritised list of improvement projects to be completed between January 2018 and June 2020.

The consultant completed a re-assessment in March 2020 to determine what improvements had been achieved to date, a summary of these findings is presented in the Figure below.

Overall, the Unit achieved a maturity rating of **70**, putting it at the middle of the 'Enterprising' band in terms of Asset Management maturity. This represents an increase in overall maturity from 62 in 2017. An appropriate overall level of maturity for Transport would be around **85**, which would put the Transport Unit at the lower end of the excelling band.

Significant improvement was observed in the areas of strategic context, business process and financial management. For information systems, the gap in maturity has increased (current score regressed from 2017 review) mainly due to some issues identified with systems integration, and the continued reliance on off-line copies of data rather than real-time data integration.

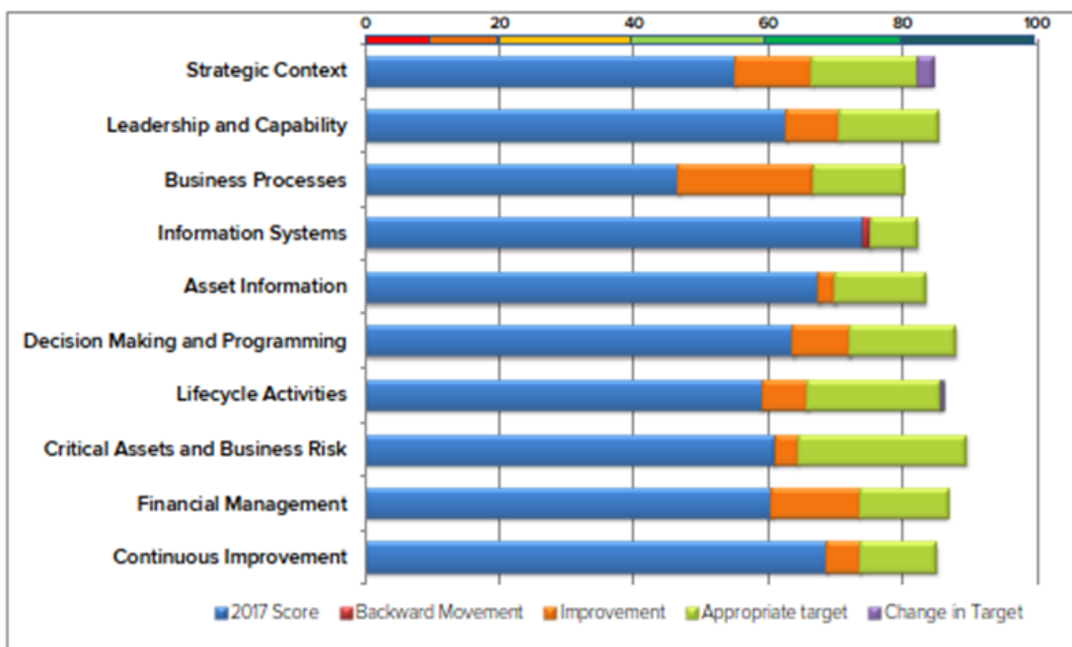


Figure 1-2: Asset maturity re-assessment (March 2020) summary of findings

Moving forward the Transport Unit acknowledges the need to continue to focus efforts to further transform Asset Management practices over the next 2-3 years to an appropriate level of capability.

Future improvement projects are outlined in more detail in Section 10. The most significant are:

- alignment with 2021 Government Policy Statement on Land Transport;
- knowledge transfer from experienced Asset Management practitioners;
- One Network Framework implementation and alignment; and
- improve the understanding of transport asset risks.

2 Introduction

2.1 Background

This Asset Management Plan is the basis for transport activity planning. The purpose of this Plan is to demonstrate responsive management of assets (and services provided from the assets), compliance with regulatory requirements, and to communicate funding needed to provide the required levels of service set by Council within its Long Term Plan for the coming plan period, but within a 30-year planning horizon.

The 10-year objective of Asset Management is to: *'Deliver the required level of service to existing and future customers in the most cost-effective way.'*

In this context the specific objectives for this Asset Management Plan are to:

- define the services to be provided, the service standards that Council aims to achieve, and the measures used to monitor the performance of the activities undertaken by the Transport Unit and the Council as a whole;
- translate Council's Community Outcomes and Strategic Priorities into actions for the Transport Unit. The Plan identifies forward works programmes based on strategic outcomes sought around three new transport 'Pillars' of Safety and Access, Environment, with a foundation of Affordability. It also outlines financial forecasts required to meet agreed service levels and account for anticipated population growth;
- demonstrate responsible management of the transport infrastructure and services for which Council is responsible, ensuring that public funds deliver cost-effective services to meet customer expectations;
- document current Asset Management practices used by Council based on clear evidence as part of a sustainable and optimised lifecycle management strategy for transport infrastructure, and identify actions planned to enhance management performance;
- maximise alignment with Council, Regional and Government Strategies, Policies and Plans that effect the management of transport infrastructure and services;
- comply with the requirements of relevant legislation.

The key outputs of this Asset Management Plan are included in the 2021-2031 Long Term Plan process, which will be the subject of a public consultative process. The intention of this AMP is to set out how Council manages transport assets and services in a way that is appropriate for a readership including elected members of the Council, executive management, interest groups and key stakeholders, along with all members of the community.

This AMP covers a period of 30 years commencing 1 July 2021. Operational, maintenance and renewal programmes for the first 3 years are generally well defined with reasonable certainty of being implemented to budget as planned. Beyond this period, work programmes are generally based on projected trends and demands for the Long Term Plan period (to 2032), and where there is necessarily less certainty with respect to scope, timing and costs of the projects. All expenditure forecasts are based on unit costs as at 1 July 2020 with no allowance for inflation.

2.2 Scope of the Assets and Services Covered

In Scope	Out of Scope
All transport related assets	Public transport services
Operational activities including education, and enforcement	Bus Interchange and suburban interchange facilities (off street)
	Included in Corporate Accommodation AMP
	Off street car parking facilities

Table 2-1: Scope of Asset Management Plan

2.3 Relationship with other plans

Many of the assets planning activities undertaken by Council are applied to all infrastructure assets. For this reason, Council has developed Asset Management Plans in two parts. A Strategic Asset Management Plan (SAMP) document, which provides an overview of Asset Management planning at the Council, and an Asset Management Plan document for each asset group, which describes the assets and how the principles contained within the SAMP are applied to the management of the assets.

Figure 2-1 depicts the relationship between the various processes and levels of planning within the Council required to deliver on Council's vision and goals.

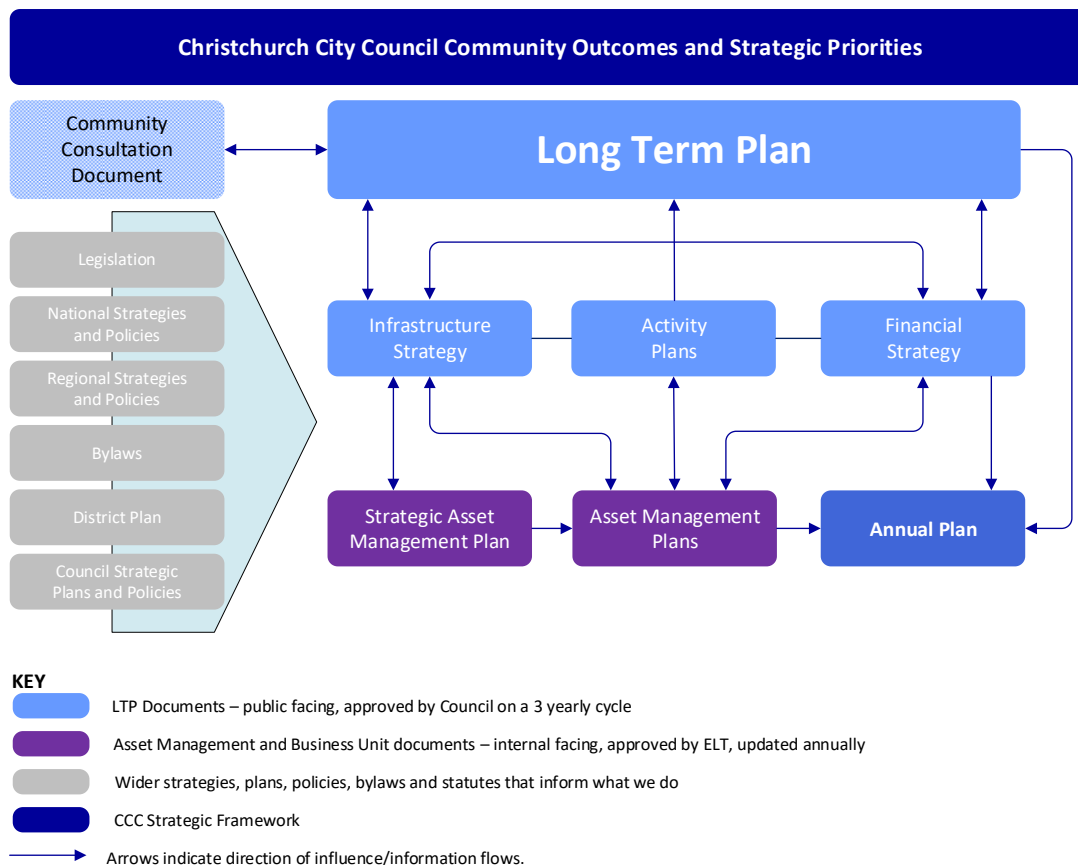


Figure 2-1: Council's Planning Framework

The SAMP provides an overview of the linkages between asset management planning and the other business processes of Council, such as strategic planning, risk management, financial management and compliance.

The SAMP also describes the linkages between Asset Management Plans and other corporate plans and documents. In addition to these corporate documents, the following documents are specifically relevant to this Asset Management Plan:

- Government Policy Statement on Land Transport (2021)
- One Network Road Framework (Classification)
- Arataki, Waka Kotahi NZ Transport Agency 10 year view.
- Canterbury Regional Land Transport Plan 2018 and National Land Transport Programme 2018
- Christchurch Transport Strategic Plan (CTSP) 2012 (currently under review)
- Greater Christchurch Transport Statement (2012)
- An Accessible City (the transport chapter of the Christchurch Central Recovery Plan) (2013)
- Vision Zero (the national 10 year road safety strategy)

Alignment with these documents is explored in more detail in Section 3.1.

2.4 Context of transport in Greater Christchurch

Transport provides essential infrastructure and services that shape our urban form, affects our environmental, economic and social wellbeing and is a key determinant of the liveability of a city. While at its core our business is about moving people, goods and services by road, rail, bus, cycle or foot, it is important that we think about our transport network in broader terms, such as how it meets the needs of our communities, the impact on our environment and the economy of our immediate and wider region.

As the major urban centre of not only Canterbury but the entire South Island, Christchurch and its transport infrastructure is pivotal to the economic vitality and competitive advantage of the entire area. Our community, economy and environment are reliant on high quality, resilient and well-maintained transport infrastructure. The network also provides the access to New Zealand’s second largest international airport connecting us all with international partners and markets.

Today’s transport infrastructure needs to enable increased modal choice that supports community resilience and contributes to Council and national climate change goals over the coming critical decade. In residential and key activity centre settings, the place function of streets is increasingly recognised as a key determinant of liveability and vitality providing new challenges as to how to better balance both the movement and place functions of many streets. The aging population in Christchurch requires that we need to work harder to ensure our transport systems are future proofed to meet their needs and to maintain equity of access for all.

As well as supporting the community, Council has a role to play supporting the economy and local business. This includes providing for safe customer access, facilitating freight movements and future proofing travel opportunities. Further to this, utility operators have specific access rights to the transport corridor and the requirements which Council is obliged to meet. The proposed investment profile for the transport network aligns with Council’s strategic framework and the Christchurch Strategic Transport Plan. In partnership with Waka Kotahi NZ Transport Agency and Environment Canterbury, Council is also delivering the key actions of the post–earthquakes Greater Christchurch Transport Statement of 2012. Furthermore, it supports national policies such as the Government Policy Statement on Land Transport, the National and Regional Land Transport Plans, the One Network Road Framework (Classification) and Vision Zero, the Government’s ambitious road safety strategy for the coming decade.

The newly derived key service pillars for all our transport assets and services are outlined below, and underpin all the planning and work that is undertaken on the transport network.

Safety	The network and our services are safe for all users and we actively seek to reduce deaths and serious injuries – to at least meet the challenging Vision Zero targets of a 40 % reduction in fatal and serious injuries for Christchurch roads in the next decade
Access	The network enables active and connected communities through providing transport choice for all
Environment	The environment is enhanced and projects proposed aim to meet the challenge of climate change – achieved through measures to reduce the need for motorised travel and to encourage more self-contained, sustainable and resilient communities
Affordability	Solutions proposed that are affordable and sustainable

Table 2-2: Transport service outcome pillars

2.5 Strategic Alignment

In developing this Asset Management Plan, consideration has been given to aligning with a number of national, regional and local priorities for transport investment and network development. The Council was involved in the development of the One Network Road Classification system (now the One Network Framework) and its setting of nationally consistent functional criteria. These principles very closely align with Council's citywide Christchurch Transport Strategic Plan for the period to 2041, and An Accessible City – the transport chapter of the Christchurch Central Recovery Plan. These plans are already fundamentally re-shaping our priorities and programmes for the delivery of transport networks, around the principles of better linking land use and transport planning as well as investing in significant improvements to improve travel choice opportunities.

This new “shape” of transport networks and services will have a fundamental effect on how we best manage and maintain our road and transport networks going forward - and with greater acknowledgement of the wide range of functions and services we expect our networks to support. For example, the Ministry of Transport outcomes framework places much more emphasis on transport's ability to directly influence better outcomes for community liveability and wellbeing. The increasing place or functionality of local roads, the need to deliver improved services for public transport, cycling and pedestrians and acknowledging the critical role in supporting resilience and economic prosperity, heavily influence this new Transport Asset Management Plan.

A review of relevant national and regional policy documents has demonstrated the strong strategic fit of the Asset Management Plan in achieving the wider strategic outcomes and visions. Key themes repeated in each document include the need to better manage motorised travel demand on our networks, optimise the existing transport network assets to maximise their value, and to prioritise measures to improve safety, liveability and wellbeing. These can be found in Section 3.2.3.

2.6 Delivering on Council’s Strategic Framework

2.6.1 Alignment of Outcomes, Priorities and Activity Objectives

Council’s strategic framework of Community Outcomes and Strategic Priorities, and their general implications for activities are presented in Council’s Strategic Asset Management Plan. The table below summarises key responses by transport activity to contribute to these community outcomes and strategic priorities.

	Community Outcomes	How the Activity affects the Community Outcome
Primary Outcome 1	A well-connected and accessible City promoting active and public transport	<ul style="list-style-type: none"> Acting to reduce travel demands across the network, especially for single occupancy vehicles or trips. Enabling a range of travel choices for everyone to access key destinations. Delivering street improvements such as those delivered in the central city. Integrating land use planning and transport improvement projects. Enabling self-contained and more resilient communities, by ensuring a wider range of essential daily services are accessible by non-car modes.
Primary Outcome 2	Modern and robust city infrastructure and facilities network	<ul style="list-style-type: none"> Providing/maintaining a network of infrastructure for all. Journey times that are predictable for all, including freight. Bus lanes and traffic signal priority helps make bus journey times more reliable. Major Cycleway links to shops, workplaces, schools and essential daily services.
Primary Outcome 3	Safe and healthy communities	<ul style="list-style-type: none"> Reducing the risk of injury by providing cycleways, safe crossings, reducing speeds, or operating traffic signals to protect all users. Increasing priority towards our city-wide safety engineering and safe system programmes. Maintaining the condition of our roads and making it clear which movement mode has priority through well-designed roads. Providing safe access to schools and within residential neighbourhoods. Journeys are safe for all road users is an important outcome for all trips. Ensuring pedestrian facilities increasingly support access for people with mobility impairments. Capturing pollutants before they enter waterways such as use of rain gardens.
Secondary Outcome	Sustainable use of resources	<ul style="list-style-type: none"> Using recycled materials in our road construction. Enabling new technology such as e-scooters and readily available electric vehicle charging for an evolving NZ fleet. Minimising waste.
Secondary Outcome	A vibrant central city	<ul style="list-style-type: none"> Prioritising delivery of transport projects and programmes that support the completion of remaining key anchor projects, notably the Metro Sports Facility, Canterbury Multi Use Arena, Performing Arts Precinct and Health Precinct. Prioritising the completion of key cycleway connections between the central city and the city-wide Major Cycleways Network.
Secondary Outcome	Great place for people, business and investment	<ul style="list-style-type: none"> Continuing to work closely with the Greater Christchurch Partnership and Waka Kotahi NZ Transport Agency to complete the series of improvements to the strategic state highway network within the city. Working closely with Environment Canterbury and Waka Kotahi NZ Transport Agency to develop a robust public transport futures business case for Greater Christchurch.

Table 2-3: Alignment of Outcomes, Priorities and Activity Objectives

2.6.2 Activity Responses to Strategic Priorities

Council has confirmed the following strategic priorities requiring specific focus for the next LTP. In response to these priorities, this AMP includes a number of responses as tabulated below. These are explored further in Sections 7 and 8.

Strategic Priorities	How this activity supports progress of each strategic priority
Enabling active citizenship and connected communities	<ul style="list-style-type: none"> ▪ Transport connects us all and supports where people live, work and play. ▪ Transport provides access for all to key services and to take part in everyday life, through the provision of safe, accessible and affordable networks and services. ▪ Consultation is undertaken on all major projects as well as our transport policies, strategies and programmes, to understand local views and to help tailor projects to reflect local needs.
Meeting the challenge of climate change through every means available	<ul style="list-style-type: none"> ▪ Reducing the need to travel, supporting local accessibility to essential daily needs and changing the way we travel away from a dominant reliance on the private car. ▪ Investing in initiatives to promote zero emission vehicles, to reduce reliance on fossil fuels, through programmes such as electric vehicle charging in Council buildings and support for shared fleets. ▪ Undertaking further analysis on the impact of rising groundwater and sea level rise to better understand the future impact on the transport network. ▪ Undertaking further analysis of transport’s carbon footprint to inform future projects.
Ensuring a high quality drinking water supply that is safe and sustainable	<ul style="list-style-type: none"> ▪ Run-off of pollutants from roads and vehicle brakes and tyres impacts the health of waterways. Further analysis is required to better understand the issues and develop sustainable solutions. ▪ Continue to prioritise sustainable solutions to urban drainage, including rain gardens, swales and the maintenance of these, along with changes in the way we travel to improve the quality of waterways.
Accelerating the momentum the city needs	<ul style="list-style-type: none"> ▪ Continue to prioritise public transport, particularly on core and city-connector routes to provide equitable access to opportunities. ▪ Continue to prioritise transport projects in the central city that support the completion of key earthquake recovery anchor projects. ▪ Continue to invest in improving central city streets for all users, and especially those enabling seamless connections to citywide networks. ▪ Continue to develop and implement a new road classification system consistent with the national One Network Framework, to better balance both the movement and place functions of each section of road. ▪ Continue to develop a citywide network of cycleways, to make it easier, safer and fun to cycle.
Ensuring rates are affordable and sustainable	<ul style="list-style-type: none"> ▪ Focus on works that are right place, right treatment, right time - best for all of Christchurch approach. ▪ Continue to assess the impacts of COVID-19 on our programmes and resources going forward.

Table 2-4: Contribution of the Activity to the Strategic Priorities

2.7 AMP Development Process

This Asset Management Plan review was carried out during 2019 by asset managers, led by the Asset Management Unit and covering all Council Asset Management Plans. The broad timeline is shown in the Figure below.

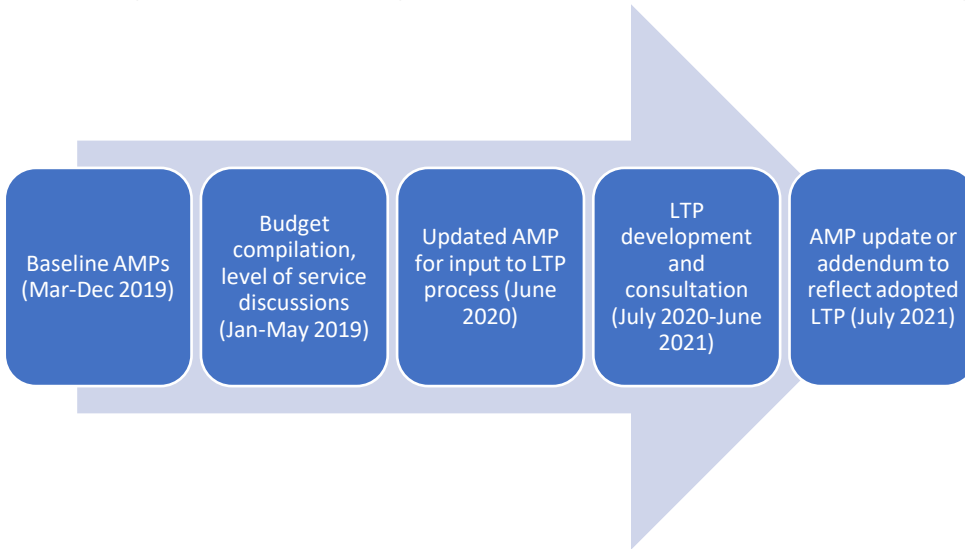


Figure 2-2: AMP Development Timeline

This Asset Management Plan has been prepared as a team effort by staff dedicated to and trained in Asset Management planning. This team has been supervised and the Plan internally reviewed by professional Council staff having over ten years' experience in preparing Asset Management Plans, with guidance from an external asset management specialist.

2.8 Navigating the AMP

The Asset Management Plan follows the general format recommended in Section 4.2.6 of the International Infrastructure Management Manual. It comprises a series of logical steps that sequentially and collectively build the framework for sustainable Asset Management for the activity it serves.

Key elements of the Plan are:

- Levels of service – specifies the services and levels of service to be provided by the organisation;
- Future demand – how this will impact on future service delivery and how this is to be met;
- Life cycle management – how Council will manage its existing and future assets to provide defined levels of service;
- Financial summary – what funds are required to provide the defined services;
- Asset Management improvement plan – the current and desired state of Asset Management practices and how the plan will be monitored to ensure it is meeting organisation's objectives.

3 The Services we provide

This section outlines the drivers for the level of service requirements, sets out the proposed levels of service and performance measures, provides information on how Council has been performing in recent years against those requirements and identifies projects and programmes aimed at addressing any level of service gaps*.

*Levels of service gaps are where performance results achieved are consistently different from performance targets.

3.1 Level of Service Drivers

3.1.1 Customers and Stakeholders

Understanding service expectations from customers and stakeholders helps to inform what is important to customers and therefore what aspects of performance should be measured.

Category	Customer Groups	Specific Needs / Wants
Governance	Elected Representatives, Councillors & Community Boards	Cooperation, information and compliance. Setting of Community Outcomes and Strategic Priorities that require responsive Levels of Service to meet
Transport network users	Residents Business / Commercial (incl. freight) Visitors Non-resident workers	Access to all properties at all times, including emergency vehicles Safe efficient and affordable network and network services, commensurate with a major metropolitan area Available transport choices that maximise access opportunities and equity Efficient goods to market, including from outside of Christchurch Polite & helpful customer service representatives Seamless transitions between neighbouring road controlling authorities
Key external stakeholder groups	Regulators – Canterbury Regional Council (ECan), Waka Kotahi NZ Transport Agency Ministry of Transport	Cooperation, information and compliance Safety, economic efficiency Sound long term planning Compliance with plans, policies, standards, and consents
	Central Government Office of the Auditor General Ministry of Health, Ministry for the Environment Department of Conservation	Viable local authorities in the long term Asset planning which enables sustainable community outcomes Confidence in Council’s management of the assets
	Greater Christchurch Partnership Selwyn District Council Waimakariri District Council Canterbury District Health Board Ōtākaro Ltd (the Crown’s Development Agency) Christchurch International Airport Ltd Lyttelton Port of Christchurch Waka Kotahi NZ Transport Agency (as state highway controlling authority)	Liaison Cooperation over mutually beneficial programmes, policies and strategies Clear and open lines of communication Consistent standards across boundaries Early warning of changes to needs and systems
Affected parties	Contractors and Professional Consultants	Clarity around standards of workmanship Fair and open competition for their services Consistent visibility of work pipeline for resource planning
	Land Developers	Capacity for new development. Fair and reasonable charges
	Planners	Clear, uniformly applied rules and procedures
	Tangata whenua	Recognition of special status. Consultation on issues with cultural aspects or environmental impacts. Sensitivity to concerns with overflows to rivers and discharge of wastewater to water bodies
	Community and Public Health (Canterbury District Health Board & ACC)	Protect public health Partnership over matters with public health outcomes – e.g. road safety and active travel programmes
	Special Interest Groups Community Groups	Inclusion in decision making – the need to be heard, set fair & reasonable charges, flexibility
Environmental and recreation interest groups including Fish and Game	Appropriate inclusion in decision making – the need to be heard Cooperation, early warning of changes to needs and systems	

Utilities	Emergency Services Three Waters Electricity Telecommunications Gas and fuel	Safe and ready access to all land uses, meeting emergency services' essential needs Cooperation and partnership over mutually shared outcomes – e.g. road safety campaigns, promotions and policy
------------------	-----------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Table 3-1: Customer Groups

3.1.2 Legislation/Regulation

Alongside customer expectations, we consider legislation, regulation and standards that impose level of service standards for Transport. These are summarised in the table below.

Legislation / Regulation	Impacts on Levels of Service
Local Government Act	Sets in place Level of Service framework.
Land Transport Act	Outlines basic requirement for transport network and users e.g. licensing.
Land Transport Management Act	More focused on the 'how' than the other Acts, so more directly related to Levels of Service.
Utilities Access Act	This defines rights of other parties.

Table 3-2: Legislative and Regulatory Level of Service Drivers

The Local Government Act sets out a framework by which Local Authorities are to govern. There are a number of sections that pertain to roads and transport, and these have been amended over the years (1974 to present) to reflect the views of society as to how they wish this process to work.

Council is responsible for the assets that they own and operate on behalf of the Community. Council is obligated to agree what Levels of Service will be delivered to ratepayers, and this discussion is undertaken via consultation with the community as part of the Long Term Plan process.

Land Transport Management Act 2013 (LTMA)

The LTMA establishes Waka Kotahi NZ Transport Agency as the Crown's funding agency and as the manager of the state highway network; containing particular requirements for consulting on the Regional Land Transport Plan prior to its adoption by the Regional Land Transport Committee. The Council is an Approved Organisation under the terms of this Act.

In particular, to be eligible for financial assistance from Central Government for its transport network the Council needs to provide details of its programmes for inclusion in the Regional Land Transport Plan, and meet certain criteria. Note that the Council also carries-out activities on the network that do not receive financial assistance from the Crown and are therefore not subject to the LTMA.

The LTMA repealed and replaced the Transit New Zealand Act 1989. The LTMA was amended in August 2008 altering the way the National Land Transport Programme is prepared, and changing the way direction is given to the Council on some transport matters.

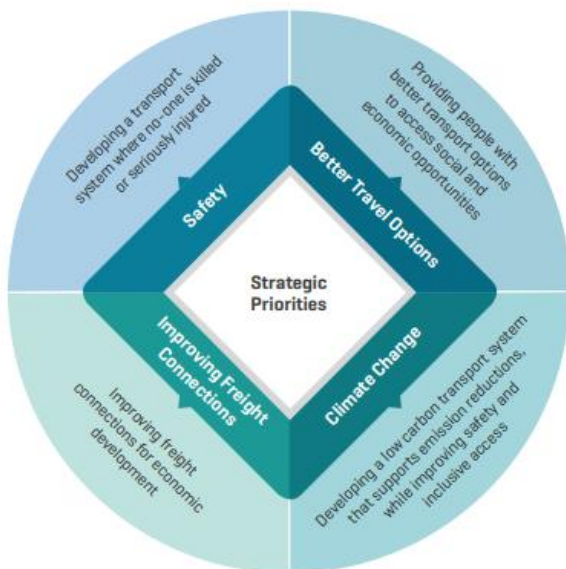
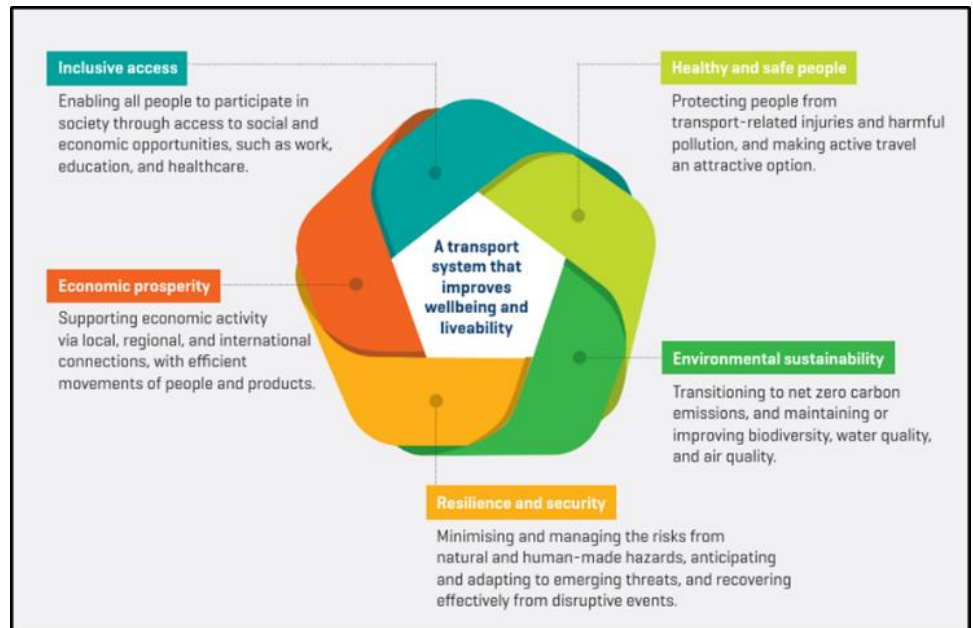
The Land Transport Management Amendment Act came into effect on 13 June 2013, amending the 2003 LTMA, and repealing the Public Transport Management Act 2008, carrying over its relevant provisions. Three areas are covered by the amendment; simplifying the planning and funding framework of the LTMA; simplifying the process for approving toll road schemes and managing public-private partnerships; and establishing a new framework for planning and contracting public transport services, known as the Public Transport Operating Model. This allows long-term partnering arrangements to be built between regional councils and transport operators.

3.1.3 Government Policy

Government Policy Statement on Land Transport (GPS 2021)

The purpose of the transport system is to improve people’s wellbeing, and the liveability of places. It does this by contributing to five key outcomes, identified in the Ministry of Transport’s Transport Outcomes Framework.

The Government Policy Statement on Land Transport (GPS) 2021 sets out the government’s priorities for expenditure from the National Land Transport Fund (NLTF) over the next 10 years.



The Government has identified four strategic priorities for land transport investment to best contribute to improving our communities’ wellbeing and liveability. These include

- safety
- better travel options
- improving freight connections
- climate change

These build on the strategic priorities set in the 2018 GPS.

Government’s priorities include a land transport system that addresses current and future demand for access to economic and social opportunities and a land transport system that provides appropriate customer levels of service.

A key objective of this Asset Management Plan is to enable ongoing sound investment in network maintenance, renewals and improvements, and to ensure it provides the appropriate customer levels of service. These were intended to improve the consistency effectiveness and therefore the value of investment in the maintenance, operations and renewal of roading assets nationwide. This Asset Management Plan fully accords with those outcomes. Specifically, recent planning and investment decisions across greater Christchurch have been embedded in the Council’s Long Term Plan, future public transport programme business case, and city-wide Transport Programme Business Case. These demonstrate very clearly Council’s desire to transform public transport and active travel opportunities, and ensure best use of existing and any additional roading assets to maximise value-for-money from expenditure.

3.1.4 Waka Kotahi, NZ Transport Agency

One Network Framework (Road Classification)

The national One Network Framework (ONF) (formally known as the One Network Road Classification ONRC) is a classification system dividing New Zealand’s state highway and local roads networks into six nationally agreed categories of road, based on a series of factors including how busy they are, their strategic functionality, whether they connect important destinations, their importance in network resilience terms, and their primary mode(s) of usage. Through its ongoing development, it also increasingly seeks to reflect both the movement and place-making functionality of streets in urban, peri-urban and rural settings, as well as better reflecting the important public transport, walking and cycling functionality of some streets and routes.

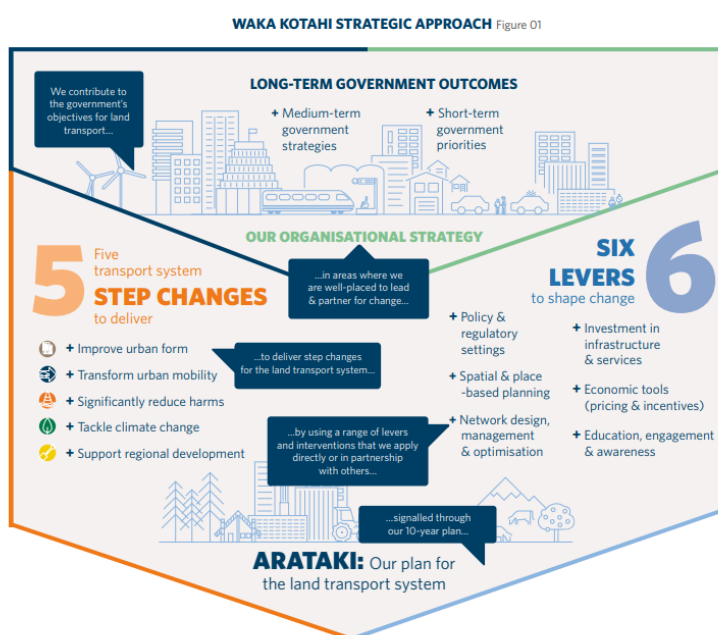
Classification of New Zealand's roads using the ONRC was initially completed in 2013. The ONRC is the primary tool developed through the national Roads Efficiency Group (REG) to enable operational and culture change in road activity management nationwide. It facilitates a customer-focused, business case approach to budget bids for the National Land Transport Programme.

Using the ONF, local authorities and Waka Kotahi NZ Transport Agency can compare the state of roads across the country and then direct investment where it is needed most. Road users will in time see an increase in the quality of some classes of roads, and a decrease in others that may have been over-specified in the past. Overall, New Zealanders will increasingly get the right level of investment in road infrastructure where it is needed, determined by a robust, impartial, nationally consistent tool – the ONF. Inconsistent changes of service levels of road networks across territorial and road controlling authority boundaries will therefore diminish in time.

Council contributed through the Local Government Association, to the development of the current ONF system and the resulting customer levels of service, and therefore is confident its principles are fully reflected in the Christchurch Transport Strategic Plan, An Accessible City (the Central City Recovery Plan’s transport chapter) and this Asset Management Plan for 2021-31. The ONF is therefore the primary tool to enable operational and culture change in road activity management nationwide. It facilitates a customer-focused, consistent business case approach to investment decisions informing the National Land Transport Programme. This Asset Management Plan uses the ONF/ ONRC classification system, (to which Council’s functional classification via the District Plan is closely calibrated), in order to influence these investment decisions.

Arataki (Waka Kotahi NZ Transport Agency)

Arataki is a ten-year view from Waka Kotahi NZ Transport Agency, of what is needed to deliver on the government’s current priorities and long-term objectives for the land transport system.



Arataki Version 1 was released for feedback in December 2019.

Arataki Version 1.1 represents our best understanding of the land transport system and reflects publicly available material as at mid-March 2020. Furthermore it recognises the significant potential impact of the COVID-19 pandemic, but does not consider in detail the nature, scale and location of these impacts, or include details of potential economic stimulus packages to support New Zealand businesses and communities post lock-down.

This will be part of Arataki Version 2 which will be developed to assess the impacts of COVID-19 on the land transport system and identify the post-COVID opportunities over the next ten years.

Arataki will continue to evolve over time to reflect changing circumstances, priorities and new information. The Government Policy Statement on Land Transport (GPS) continues to provide the strategic direction for the National Land Transport Programme (NLTP). The role of Arataki is to help meet today's priorities in a way that is informed by the objectives and needs of the system over the longer term. Both will therefore continue to influence the Council's Transport Asset Management Plan.

3.1.5 Regional Priorities

Canterbury Regional Policy Statement (2013 – revised February 2017)

The Regional Policy Statement (RPS) states, “An efficient transport system is vital to the economic prosperity of the Canterbury region, and to the well-being of its people and communities”. The RPS contains a range of relevant policies and directives, including:

- a safe, efficient and effective transport system to meet local, regional, inter-regional and national needs for transport which promotes the use of transport modes which have low adverse effects;
- a transport system that avoids or mitigates adverse effects on the environment, including on sensitive activities and considers transport programmes under the Land Transport Management Act 2003 (LTMA) that promote better design and integration between land use and transport.

Canterbury Regional Land Transport Plan (RLTP)

The Canterbury RLTP (2015 and updated in 2018) is the statutory document under the Land Transport Management Act that sets out the region's challenges and priorities. The six key priority issues for the region are:

- Travel time reliability;
- Accessibility – travel choice;
- Condition and suitability of assets;
- Safety;
- Resilience;
- Environmental impact.

While five of these priorities influence planning processes, those relating to Condition and suitability of assets (themselves influenced by the One Network Framework / Classification System and customer levels of service), Safety, Environmental impact and Resilience have the most significant influence over this Plan. A key outcome noted in the RLTP that is relevant, is to ensure all roads comply with One Network Road Classification (now One Network Framework) performance measures.

Canterbury Regional Public Transport Plan (RPTP)

The Canterbury RPTP (2018) is a statutory plan that sets out the region's public transport network and policies that Environment Canterbury, in partnership with local councils in Greater Christchurch and Timaru, propose to fund and operate. The plan, for the first time, sets a new long-term vision for public transport in Greater Christchurch. The top priorities, over the next ten years, are:

- improving our environment - increase the number of people using public transport and reduce the carbon footprint of public transport by shifting to zero emission vehicles;
- growing patronage - greater priority on high demand routes and a high-quality travel experience. As the population grows, rapid transit may be added to improve travel times along key corridors to and from the city;
- accessibility - provide more frequent public transport services so that more people can get to workplaces, shopping, education and recreation within 30 minutes;
- innovation - trial and introduce new transport and technology initiatives with lower environmental impacts, greater safety and lower costs;
- affordability - expand the network at a rate the community can afford, with cost effective new services and infrastructure that is financially sustainable for ratepayers and funding agencies.

The RPTP proposes to add four new high frequency lines and to increase the services on five existing high frequency (Core Route) lines - the Orbiter, Orange, Blue, Yellow and Purple lines. A business case for mass rapid transit (including rail feasibility options) is also underway with the aim to enable urban revitalisation and support our future land use development pattern.

3.1.6 Council Strategies

As outlined in Section 2.3, Council has a suite of documents that encompass the Strategic Framework's Community Outcomes.

Further to the Strategic Framework outlined in Chapter 2.4 there are further key documents that directly influence Transport Levels of Service and these are outlined below.

Infrastructure Strategy

The Infrastructure Strategy is one of several key components of the LTP 2021 -31. As a statutory document, it describes the significant infrastructure issues for Christchurch over the next 30 years, and identifies the principal options for managing these issues along with their implications.

The Strategy does not seek to replicate the detail in the Asset Management Plans, but does provide direction for this planning, as well as for activity planning, capital prioritisation and financial planning. The Strategy frames and guides the approach taken to developing our transport capital programme and operational decisions about maintenance of assets.

The six significant issues identified and addressed through this Strategy are:

- looking after our assets;
- responding to community needs and expectations, as we grow;
- adapting to climate change;
- reducing emissions;
- responding to changing regulatory and commercial environments;
- delivering within financial constraints.

A number of these significant issues have a very strong bearing on the shape and direction of this Transport Asset Management Plan and on the associated Transport Activity Plan as they support the Council's Long Term Plan 2021-31.

Christchurch Transport Strategic Plan (CTSP)

This non-statutory Plan of 2012 was produced post-earthquakes and set the direction over 30 years for Christchurch's local transport policy in relation to relevant statutory plans, in particular the Canterbury Regional Land Transport Strategy, Regional Policy Statement, Greater Christchurch Urban Development Strategy, Regional Public Transport Plan and the Greater Christchurch Transport Strategy (of 2012). Currently under review, it places a strong emphasis on travel choice by establishing coherent and connected networks for all transport modes over the next 30 years in support of improved travel choice throughout the city. To achieve the vision and address these challenges, the current CTSP focuses on four goals:

- improve access and choice - delivering resilient transport networks with an emphasis on efficient road use, public transport, walking and making Christchurch a cycle city. Introducing a new road classification that recognises both the road function and the environments each road passes through. Working with our transport partners to manage our existing road network more efficiently and cost effectively by adopting a "one network" approach;
- create safe, healthy and liveable communities - adopting a safer systems approach. Transport actions which support the recovery of the Central City, suburban centres and new growth areas. Strengthening the integration of land use and transport planning through District Plan changes;
- support economic vitality - developing local freight routes to improve access to Christchurch airport, Lyttelton Port and freight hubs. Parking and congestion management to support the growth of commercial centres;
- create opportunities for environmental enhancements - building green infrastructure and adapting to climate change and peak oil by encouraging new technology and infrastructure enhancements.

To successfully deliver each of the four goals, the draft CTSP identified a range of actions. These were seen to be phased over the next 30 years, moving from recovery phase (ongoing at the time of plan publication), through transition to

achieving the vision. Good progress has been made on implementing a number of the key actions and programmes promoted by the plan, and the current review explores the progress made and potential changes to activities and programmes going forward to reflect Council’s new Strategic Framework, the Infrastructure Strategy and the increasing challenges of climate change.

3.2 Defining and Measuring Levels of Service

3.2.1 Measuring our Levels of Service

Based on the Activity objectives defined in Section 2, the following Levels of Service objectives were defined in the 2021 LTP:

Level of Service Objective	
Safety	Our networks and services are safe.
Access	Our networks and services support access for all, provide travel choices and improve liveability.
Environment	Our networks and services are environmentally sustainable and resilient.

Table 3-3: Alignment of (Level of Service) objectives and performance measures

A key objective of Asset Management is to match customer expectations with the level of service requirements specific to the asset. Levels of service drive the creation, acquisition, maintenance, renewal, and disposal programmes based on life-cycle management philosophies. Customer needs and preferences used for the writing of this plan have been determined from the outcomes derived from the Annual Survey of Residents.

The table on the following page is based on the information found in the Transport Activity Management Plan.

3.2.2 How we are / should we be performing?

In the past various methods have been utilised to assess customer expectations for transport assets. They include;

- Outcomes derived from previous Asset Management Plans;
- Annual Residents opinion survey;
- Annual point of contact service satisfaction Residents survey;
- The Outputs and Standards Review;
- Surveys of performance outcomes;
- Surveys of levels of satisfaction for completed projects;
- An annual ‘cycling’ survey; and
- A price / quality and asset-focussed telephone survey to assess preparedness to pay for levels of service.

Historically the Price Quality Survey of ratepayers was carried out by Council in 2002 and 2005. This sought to establish affordable Levels of Service through a process of presenting a range of priced Levels of Service from which customers could choose. This information is now out-of-date and the views of the Community needs to be resurveyed.

Further to this a survey of Residents was conducted biannually for some years, with a wider range of questions that covered all of Council’s activities. The last of these was conducted in 2009.

In 2010 this survey was refined into the current Residents opinion survey, and has been conducted annually since that time. As the questions in this survey are predominantly general in their nature, additional ‘point of contact’ surveys have been conducted, focusing on specific services or user groups. However these are still high level questions that do not provide a direct link between level of service and Council spending.

Survey Question	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Satisfaction with the Condition of Christchurch Roads.	63	-	40	35	27	30	37	34	20	27
Satisfaction with the Condition of Christchurch Footpaths.	67	-	46	45	43	51	51	48	34	41

Level of Agreement – Christchurch is a Cycle-Friendly City.	-	-	-	42	26	37	53	56	51	64
Level of Agreement – Christchurch is a Walking-Friendly City.	-	-	-	81	77	82	84	81	76	85
Satisfaction with Ease of Use of Parking Meters.	56	-	65	62	50	54	51	48	39	49
Overall Satisfaction with Safety of Motor Vehicles in Parking Buildings.	81	-	-	-	-	-	47	51	48	59
Overall Satisfaction with Bus Stops and Bus Shelters.	70	-	60	67	54	60	72	73	70	71
Overall Satisfaction with Bus Exchange.	-	-	-	-	83	83	90	89	93	91

Table 3-4 Customer Survey Results

3.2.3 Performance Framework, 2021-2031

The Council’s Level of Service measures enable us to monitor and report against our outcomes and service performance. Please see **Section 5 Specify Levels of Service in the Transport Activity Plan**. Performance of Community (C) Levels of Service will be reported to the Council Finance and Performance Committee each month.

Activity Plans adopted for LTP 2021-31 can be accessed from the following link:

[Long Term Plan 2021-31 Activity Plans and Asset Management Plans : Christchurch City Council \(ccc.govt.nz\)](https://ccc.govt.nz/long-term-plan-2021-31-activity-plans-and-asset-management-plans)

Table 3.5 below shows the strategic linkages to other documents.

Strategic Linkage	CCC						Government		Ecan		NZTA		CCC			
	CCC Community Outcome Category (2020)	CCC Community Outcome (2020)	CCC Strategic Framework (2020)	CTSP Outcome 2012	Draft CTP (2019) Outcome	Transport Unit Goals	GPS 2018	Draft GPS 2021	Regional Land Transport Plan 2015-25	Regional Public Transport Plan 2018-28	ONRC Customer Outcome	Draft ONF Customer Outcome 2019	Corresponding NZTA Arataki (2019) Step Change	Corresponding NZTA Arataki (2019) - Draft Levels of Service	CCC 2018 LTP Transport Activities	Transport Service / Business Area
Strategic Linkage	Strong communities	Safe and healthy communities	Enabling active and connected communities to own their future	Create safe healthy and liveable communities	People	Safe, healthy communities	Safety	Safety	Supporting safe, healthy and connected communities	Innovation	Safety	Healthy and Safe	Significantly reduce harms	Safety – death and serious injuries Number of deaths and serious injuries	Journeys are safe	Operations Maintenance Improvements
	Liveable city	A well connected and accessible city	Enabling active and connected communities to own their own future	Improve access and choice	Place	Access and choice	Access	Better Travel Options	Supporting safe, healthy and connected communities	Accessibility	Accessibility	Inclusive Access	Improve urban form	Access – access to key economic and social destinations (all modes) Proportion of population living within travel threshold (15, 30, 45 mins) of work, education, health care, supermarkets by different modes (walking, cycling, public transport, private motor vehicle)	Customers have choice	Operations Maintenance Renewals Improvements
		Vibrant thriving central city, suburban and rural centres	Accelerating the momentum the city needs													
	Liveable city	Vibrant thriving central city, suburban and rural centres	Meeting the challenge of climate change through every means available	Improve access and choice	People	Access and choice	Environment	Climate Change	Supporting safe, healthy and connected communities	Growing patronage	Travel time certainty	Resilience and Security	Transform urban mobility	Spatial coverage: public transport resident population	Journey times are reliable	Operations Maintenance Renewals Improvements
														A well connected and accessible city		
		21st century garden city we are proud to live in	Traffic – mode share Number of pedestrians, cyclists and motor vehicles by vehicle class, expressed as percentages													
	Healthy environment	Sustainable use of resources	Meeting the challenge of climate change through every means available	Create opportunities for environmental enhancements	Planet	Environmental enhancement	Environment	Climate Change	Reducing environmental impact	Improving our environment	Resilience	Resilience and Security	Tackle climate change	Pollution and greenhouse gases – CO2 emissions Tonnes of CO2 equivalents emitted	Journey times are reliable	Operations Maintenance Renewals Improvements
									Improving resilience	Innovation				Resilience		
	Prosperous economy	Great place for people, business and investment	Ensuring rates are affordable and sustainable	Support economic vitality	Prosperity	Best use of every dollar spent	Value for money		Economic prosperity	Affordability		Economic Prosperity				Operations Maintenance Renewals Improvements
					People											
Prosperous economy	Equitable economy with broad-based prosperity	Ensuring rates are affordable and sustainable	Support economic vitality	People	Best use of every dollar spent	Value for money		Economic prosperity	Affordability		Economic Prosperity				Operations Maintenance Renewals Improvements	
																Modern and robust city infrastructure & facilities

Table 3-5 Strategic Linkages

4 Demand for our Services

This section provides details of growth and demand forecasts that affect the management, provision and utilisation of transport services and assets. New improvement works will also be based on the information outlined in this section.

4.1 Demand Drivers

4.1.1 Demographic Changes

Christchurch’s population was 380,200 in 2018¹ and is projected to grow rapidly to 459,100 by 2043² (Figure 4-1). This is a projected 21% growth over the 25-year period within assumed medium growth assumptions. As a result, the Christchurch urban area³ (larger than the city’s boundary) is set to become New Zealand’s second largest city by 2028⁴. The projected growth is however not equally distributed among age cohorts (Figure 4-2). While population of the under 40 years old cohort is expected to grow by only 5% and the 40 to 65 years old cohort by 14% over the period, the 65 years and over cohort is expected to grow by some 75%, which would comprise 23% of the entire population. The rapidly aging population will necessitate a different perspective on safety, and equitable access provisions for the city’s future transport network infrastructure.

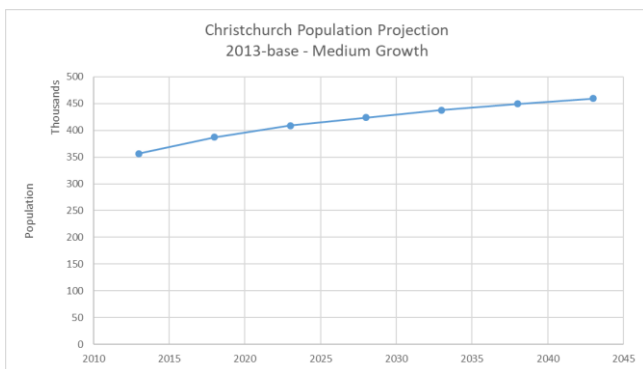


Figure 4-1. Christchurch City Population Projections

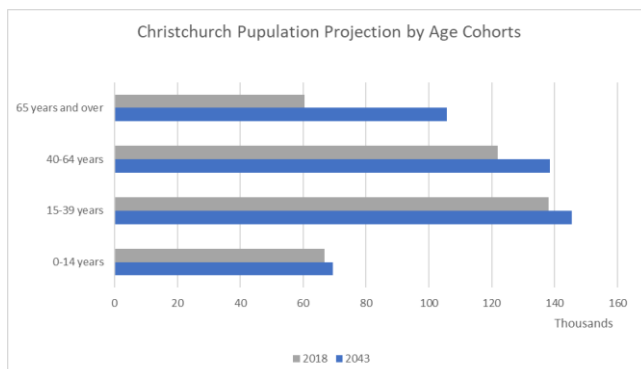


Figure 4-2. Christchurch City Population by Age Cohorts

Christchurch City's residential population growth is expected to mostly occur within the existing urban area. This is targeted to materialise mainly through intensification of the existing urban area and brownfield infill, including relatively high density central city residential developments. The intensification of central city residential development is as planned for through the post-earthquakes Christchurch Central Recovery Plan of 2012 and the transport chapter of that, 'An Accessible City' (2013).

In addition, there are further significant phases of residential greenfield development underway in the priority areas identified in the Land Use Recovery Plan (primarily to the South-west and North). Each of these is supported by the development of local neighbourhood and activity centre developments, increasing the range of essential daily services (food, health, education and employment) available to residents within a 15 minute or so journey from their home.

Urban intensification will have a mixed range of effects on transport access, safety and environment. It could, as intended, result in a welcome mode shift towards the active modes (primarily walking and cycling) and a reduced level of private car dependency to access the basic daily needs with positive safety and environmental effects. It may however also result in a higher number of conflicts between vehicles and vulnerable road users. Well planned transport networks supporting land

¹ Stats NZ - Subnational population estimates, 2018(base) - accessed on 7/8/2020
² Stats NZ - Subnational population projections, 2013(base)-2043 update – accessed on 7/8/2020
³ Urban commuter range covering Kaiapoi in north and Prebbleton and Port Hills in south
⁴ Urban area population projections, 2013(base)-2043 update – accessed on 7/8/2020

use development and enabling improved, safe and ready access by non-car modes to local daily needs, often in low speed neighbourhood environments, is therefore an essential aspect of Council's transport access and neighbourhood planning for the coming decades. Such changes, in supporting in turn a reduced reliance on car travel for shorter journeys should bring added advantages of more resilient local communities able to better cope with system and network "shocks", along with environmental improvements through reduced carbon emissions.

However, today, car travel is still the predominant mode of transport in Christchurch, according to the Life in Christchurch Survey 2019, with 96% of people reporting travelling by car in the last 12 months. However, 27% of people report travelling less by car as compared to the 12 months previously. This is a substantive shift in a relatively short time period. This is despite the fact that 57% of residents reported it easy to travel by cars in 2019, an 11% increase from the previous year. Meanwhile 42%, 27% and 14% of respondents respectively reported more often cycling, using public transport and walking, as compared to the previous 12 months. . More than 69% of respondents reported finding it overall easier to travel by these modes, which is an encouraging result given Council's enhanced emphasis on supporting the choice of these modes in recent years.

These trends show demonstrable progress is being made with the Council's accelerated investments in active transport and public transport infrastructure over the last decade. However, it is also very clear that much more needs to be done to attain a meaningful and permanent mode change and progress toward achieving local and national environmental targets. At the time of writing, it is also uncertain what the longer term effects of the COVID-19 emergency will have on the Christchurch community's travel behaviour.

4.1.2 Evolving Technology

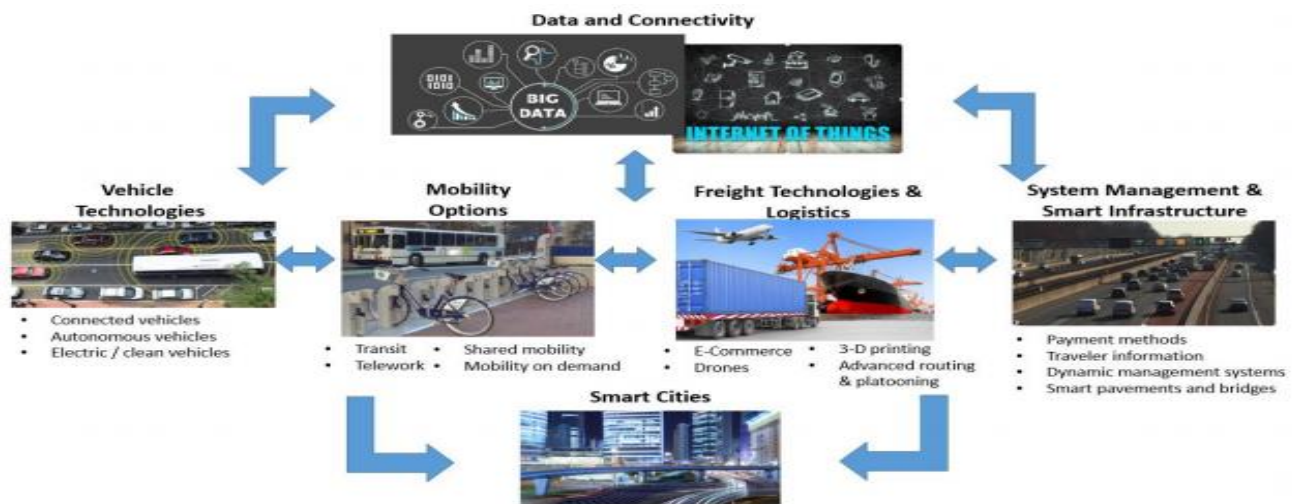
The pace of technological change, along with the scale of private sector investment entering the transportation and mobility sector is unprecedented. Meanwhile with further advancement in communication services, a growing trend of working, shopping and accessing remotely many day-to-day services is emerging globally. This may have been accelerated recently by the worldwide implications of the COVID-19 emergency, which remains ongoing at the time of writing. We have no clear idea at present what the longer term 'legacy' implications of this rapid change in increased tele and home working necessitated by the COVID-19 emergency will be.

Christchurch as a city of opportunity, openly welcomes trials and new ways of doing things, including travelling. Changes in transport technology and new business models will continue to be encouraged and embraced in Christchurch and in turn, this will influence how the public interact with our transport assets. The Christchurch personal travel landscape has changed appreciably since the last Asset Management Plan was prepared, with the rapid arrival and adoption of e-scooters on the city's streets. In the period October 2018 to July 2020 more than 1.75 million trips made by e-scooters, a new mode of travel yet to be fully embraced in a number of the world's major cities.

Five overarching technology trends have been identified as being particularly important to this Transport Asset Management Plan:

- increased widespread data and connectivity, and the further personalisation of travel choice, travel planning and mobility;
- advanced vehicle technologies, including connected vehicles (CVs), autonomous vehicles (AVs), electric vehicles (EVs) and alternative fuel vehicles (AFVs);
- adoption of new technology-enabled mobility options, including connections between public transport and shared mobility and vehicle fleets, and new forms of 'mobility as a service' (MaaS);
- developments in technologies affecting freight movement, logistics and tele-shopping, including new technologies for transporting consumer goods such as drones, as well as advancements in vehicle routing and efficiency.
- advances in transportation system management/operations, including mobile payment methods.

The pace of this change is rapid and exponential – to the extent that some of these technologies were not truly understood or even anticipated at the time of Council's publication of the Christchurch Transport Strategic Plan (CTSP) in 2012. For example, in 2015 Council decided to install a limited number of electric vehicle charging points for a small number of spaces on the opening of its replacement Lichfield Street parking building, and committed to 'future proof' the building for later electrification throughout. This was a first for a central city parking building. A mere five years later, a decision of this nature to embrace e-vehicle technology in a major new transport asset would hardly warrant debate.



4.1.3 Household Economy

Transport costs make up a sizable proportion of a typical NZ household budget, comprising the third largest cost behind housing and food. The latest figures from Statistics NZ show that from 2016 to 2019, national household expenditure on transport increased by nearly 14%, to \$216 a week and to \$205 in Canterbury. National and Canterbury average household income grew by 12% during the same period to \$2039 and \$2012 a week, respectively. The increased transport burden on the typical Canterbury household budget comes largely from the increased amount of driving, compared with residents in other large centres, as the bulk of these costs are on vehicles and fuel purchases. Household incomes have not kept pace with rising transport costs, placing an increasing financial burden on residents.

Christchurch residents' reliance on private vehicle travel therefore puts residents at a financial disadvantage relative to those that have better ready access to alternative modes, or are locally well-placed for essential daily services. Christchurch City with over 6,000 urban vehicle kilometres travelled per resident per annum has one of the highest rates of urban vehicle use in New Zealand based on 2016 data from Waka Kotahi NZ Transport Agency (Figure 4-3). An average Christchurch resident's annual kilometres travelled is 77% higher than that of a Wellington resident, where public transport trips are much more common.

Car reliance is driven by the need to access to goods, services and basic needs, including employment, education, food, health care and recreation. Reducing the need to make many of those local trips with a car through better co-location of residential areas and neighbourhood services that are accessible by non-car modes in around 15 to 20 minutes, is the most effective way to help our community reduce their car dependence. By supporting and promoting residential intensification within the CBD and around the key activity and neighbourhood centres across the city, many short distance daily journeys could be conveniently made without a need for a car trip. The added advantages will be more resilient and sustainable neighbourhoods benefitting from reduced traffic levels and the consequential environmental and climate benefits of reduced fuel use. The approach delivers more equitable neighbourhoods also, as individual households' budgets would benefit from reduced transport expenditure.

This concept has gained recognition worldwide in recent times as the '15 minute city', and to cater for remaining longer distance trips, co-investment can be directed towards improving public transport journey time reliability and attractiveness compared with the private car. The key objective for public transport services is for more business, employment, shopping, health and necessarily centralised services to be achievable within a 30 minute travel time from the city's major residential areas – existing and planned.

In summary, to make active and public transport more attractive and competitive it needs a step change in investment in services and infrastructure that need to happen in a meaningful way in this coming Long Term Plan period to 2031. Greater Wellington, for example, is spending nearly three times as much as Christchurch on Public Transport (Figure 4-4) and has an average annual boarding per resident of nearly three times as many people as that of Christchurch.

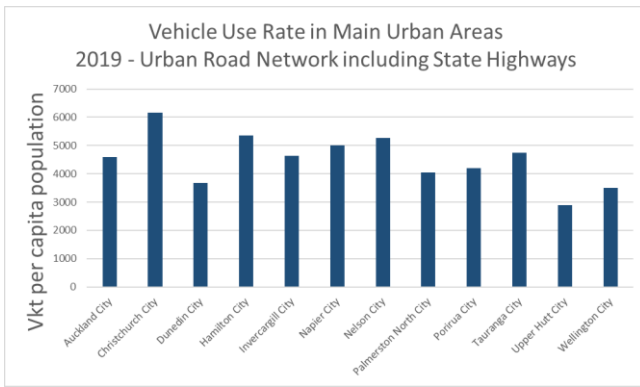


Figure 4-3. Vehicle rates in Main Urban Areas

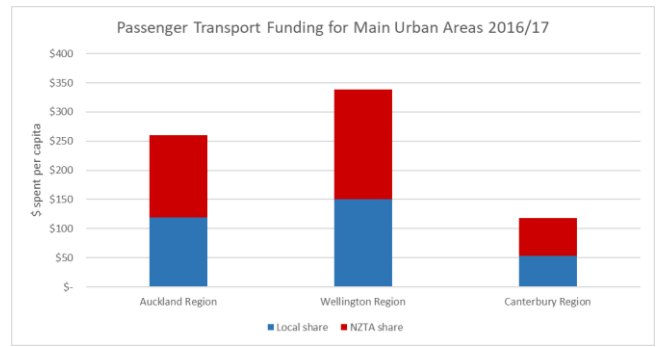


Figure 4-4. Passenger Transport Funding⁵

4.1.4 Employment transformation

In the coming decades, the employment landscape will also continue to shift in New Zealand’s urban areas. Total employment in Christchurch is forecast to grow by over 25% in the next 30 years to nearly 300,000 jobs. In terms of various employment types, as shown in Figure 4-5, employment in the construction sector, which is currently contributing to nearly 12% of the total employment, is forecast to decline by more than 45% with a net loss of nearly 13,000 jobs⁶. Meanwhile, in-line with the forecast aging population, health care and social assistance jobs are expected to substantially grow by nearly 80% with a net gain of nearly 22,000 jobs. Many of those jobs may well not be appropriate to adapt to remote or tele-working.

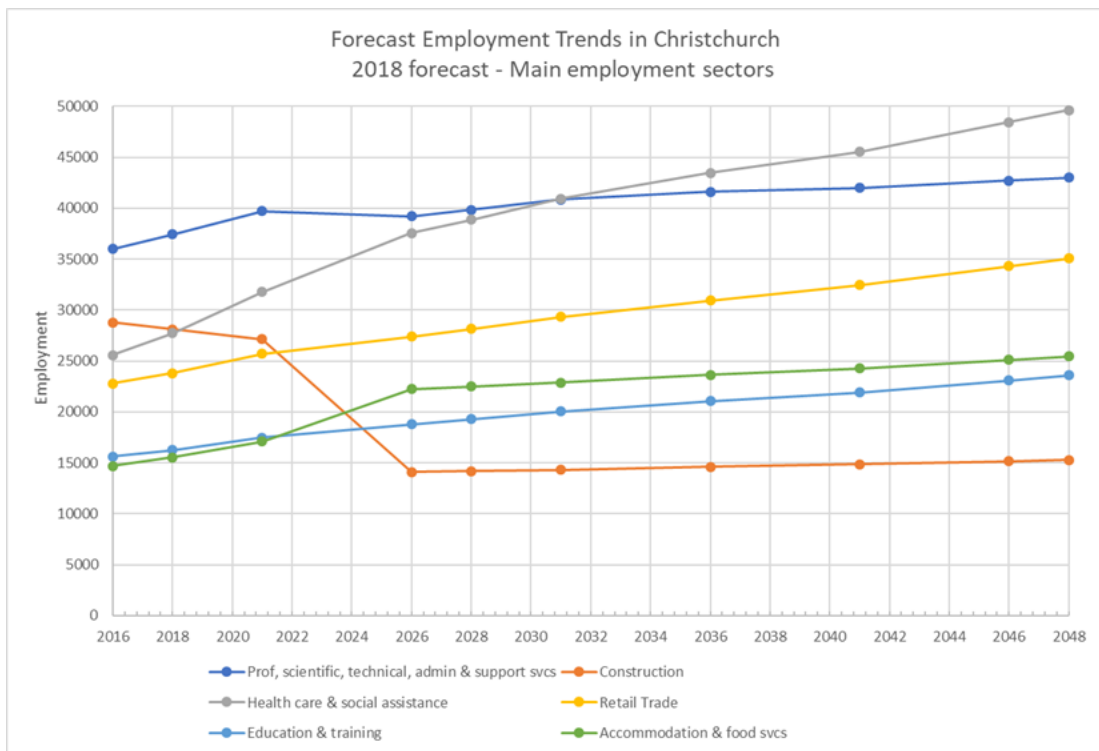


Figure 4-5. Forecast Employment Trends in Christchurch 2016-48

⁵ <https://www.nzta.govt.nz/assets/userfiles/transport-data/FundAllActivities.htm>

⁶ Market Economics - Greater Christchurch Urban Development Strategy Economic Futures Model

In early 2019, the Productivity Commission launched an inquiry into the impact of technological change and the future of work. Currently people are remaining in the workforce longer. Over the past 25 years, and prior to the COVID-19 emergency, the share of the adult population employed in the labour market has continued to increase. The composition of the workforce is also continuing to change. Female participation in the labour market is at an all-time high with women making up nearly half of the workforce. The workforce is also becoming more highly qualified. The share of the workforce with no qualification has continued to decline while those with a degree or higher increasing to nearly 27%.

The nature of the work performed in industries is also likely to continue to shift. With the rise of a productive, knowledge based economy, scientific, technical and professional services will increase. Conversely, the share of labourers and drivers within the mining, manufacturing, and construction sectors will decline. This may result in a lesser need for a freight network expansion. The growing remote working and micro-mobility could also reduce the need for commuter trips leading to a general plateauing or even reduction in the number of daily car trips.

Considering the evolving labour market, it is likely that that the infrastructure needs to service the workforce of tomorrow is not going to resemble the current needs. As cities move from being hubs of manufacturing to clusters of service economies, transport infrastructure will need to focus on efficiently moving people in dense urban areas. This will also impact the way we measure economic productivity as a customer service metric, as it shifts from a product movement focus to the economic performance of the workforce. It is therefore imperative to focus on optimising our networks for economic performance towards the needs of future.

As in other areas of this Asset Management Plan, at the time of writing it is highly uncertain what the short, medium and longer term effects of the COVID-19 pandemic and likely worldwide recession will be on the Christchurch employment picture. As a result, this Asset Management Plan will need to remain agile and adaptive to changes, but certainly have an increased focus on helping achieve more self- sustaining, resilient communities that have progressively reduced their dependency on daily car travel.

4.1.5 Transport Safety

The Council shares the Government’s vision of the Road to Zero national road strategy, with “a New Zealand where no one is killed or seriously injured in road crashes. This means that no death or serious injury while travelling on our roads is acceptable.” There is a primary duty of care for our local road network, to take all practical steps to prevent death and serious injuries. This entails Council looking at the implications of adopting a vision zero approach to targeting road casualty reduction on Christchurch’s roads and transport networks over the coming decades.

Contrary to recent national trends, the number of deaths and serious injuries (DSI) on Christchurch local roads has remained relatively stable over the last twenty years, with approximately 140 deaths and serious injuries (DSI) per year (Figure 4-6). The last five years’ (2015-19) totals are in fact below the average numbers, with around 130 DSI’s per year. Crash rates across the region are relatively modest compared to most other regions and close to the national average (Figure 4-7). Despite this position, these figures are still unacceptable considering the Vision Zero goal – which itself responds to the country’s very poor overall record when compared with crash rates in other comparable OECD nations.

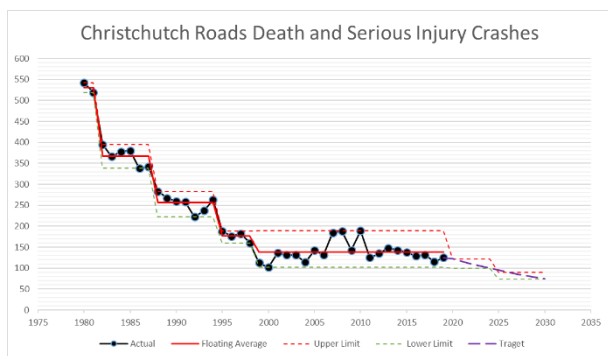


Figure 4-6. Christchurch DSI Crash History

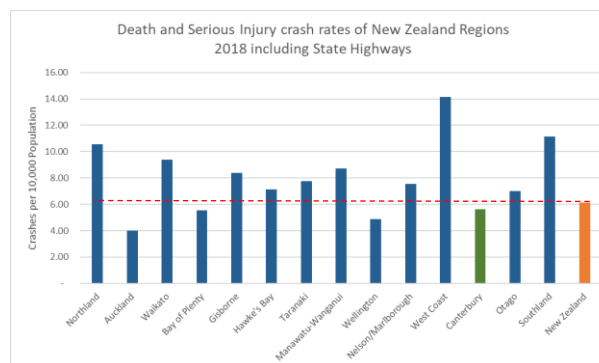


Figure 4-7. New Zealand Regions DSI Crash Rate

As Figure 4-6 shows, during the 1980’s and 1990’s there were significant improvements in road safety achieved on Christchurch roads. The early 1980’s typically had over 600 DSI’s per year, but this dropped to 400 during that decade, then

250 in the early 1990's, and finally settled at around 150 per annum by the late 1990's. This was mainly due to progressive advancements in car manufacturing standards, better driver education and licencing and more forgiving roading infrastructure. It has however remained broadly static since, when other countries with safe system strategies similar to the Government's new Vision Zero approach have seen substantive improvements in fatal and serious crash numbers.

A further 40% reduction in DSI crashes on Christchurch roads over the coming decade in-line with that targeted by the Road to Zero government strategy, would see a drop in DSI's from the current average of 130 to around 80 a year, a saving of around 50 deaths and serious injuries per annum. This is the primary transport safety level of service outcome Council is setting itself for this coming Long Term Plan period therefore. Towards that stretching but achievable goal, Christchurch City Council has been working collaboratively with Waka Kotahi NZ Transport Agency, to identify, investigate and prioritise the most effective strategies to tackling the most unsafe parts of the Christchurch local road network, and deploying the Agency's Risk Assessment Programme (KiwiRAP) methodology and Safe Network Programme (SNP) recommendations.

The KiwiRAP methodology provides a network-wide approach to identify and rate unsafe infrastructure, including intersections and mid-block sections, considering the crash history and characteristics of the road network in the city's urban and rural environments. The risk rating of Christchurch intersections for the period of 2015-19 is presented in Figure 4-8 provides a consistent framework for intervention selection based on the characteristics of the high risk locations and their identified risks through:

- Safe system transformation;
- Safer corridors;
- Safety management; and
- Safety maintenance.

The programme is currently funded and supported by a streamlined investment pathway to effectively mitigate the main causes of DSI crashes. The targeted reduction (which is one of the main transport safety targets in the Council's Activity Plan proposal for the Long Term Plan 2021-31), would drop the crash rate for the City from the current 3.2 DSI's per 10,000 population to 1.7, taking account of projected population growth. Achieving the target would require a progressive and intensive metropolitan safety programme to prioritise and address the existing and emerging infrastructure safety issues, supported by better driver education as well as a continued trend of improvement across New Zealand in vehicle qualities and safety features.

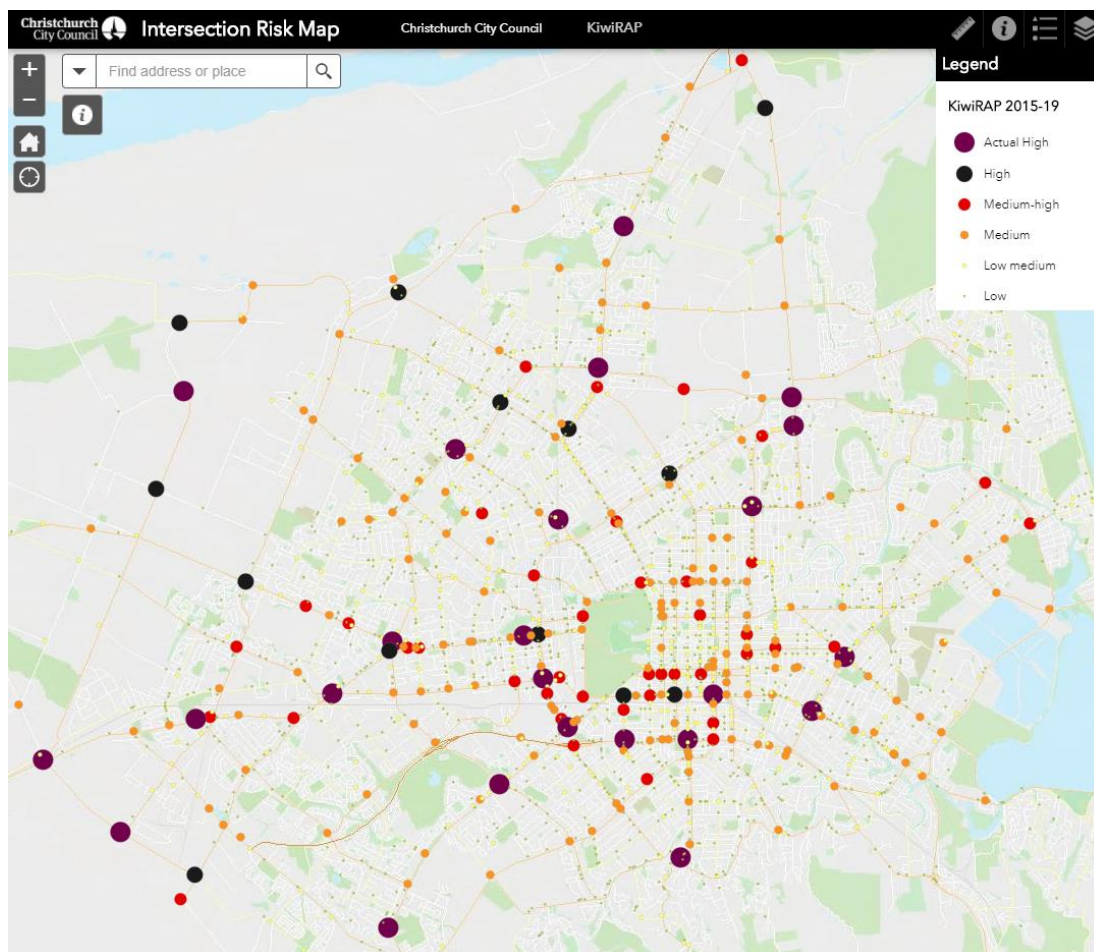


Figure 4-8. Christchurch Intersection Risk Ratings Map – KiwiRAP 2015-19

4.1.6 Access Requirements

Transport assets are essential to providing people with good access to employment, education, shopping, health services, recreation and entertainment. Some assets provide critical lifelines to health services, essential services and resilient alternative route options in times of emergency, plus help ensure primary goods can reach their market efficiently. At the same time, our transport assets provide the means by which different types of daily trips by different modes take place and goods and business services are brought to the international, national and local markets. The efficiency, quality and reliability of these assets in providing economic and social access and productivity is a key determinant of the customer levels of service we seek to achieve across our networks. Increasingly those desired customer levels of service are calibrated to meeting those of the national One Network Framework (Road Classification) – both for existing and proposed networks.

Apart from the internal transport demand drivers, the forecast growth in Lyttelton Port and Christchurch International Airport creates an external pressure on our combined transport assets shared with Waka Kotahi NZ Transport Agency. The forecast external demand drivers' growth are listed below.

Transport Demand Driver	2018	2051	% increase
Airport passengers	6.3 million	11.6 million (2040)	84%
Port containers (TEU) ⁷ – (Lower)	370,000	782,000 (2041)	211%
Port containers (TEU) – (Upper)	370,000	1,500,000 (2041)	405%

Table 4-1. External Transport Demand Drivers

⁷ <https://greaterchristchurch.org.nz/assets/Documents/greaterchristchurch/FreightInfrastructureStatementV2.pdf>

The One Network Framework (ONF) system is therefore the national 'yardstick' Council now consistently deploys in determining what the appropriate levels of service might be for each link in our transport networks, today and into the future. The ONF system takes into account the range of transport modes competing for the often constrained available space and their relative priorities considering the movement and place functionality of each link and corridor. It also helps begin to define an appropriate level of investment when there is a clear service gap between a desired level of service (existing or planned) and the current status of an asset. It is therefore the key determinant as to how those assets are efficiently managed in a consistent manner with other Road Controlling Authorities nationwide.

By maintaining and delivering the transport and roading infrastructure that provides for essential access requirements, supporting and encouraging better mode choices and responding properly to different types of transport demand, we can achieve a more balanced and transparent approach to setting appropriate transport levels of service. We have a clear focus on meeting our three transport outcome 'pillars' for the coming decade, of Safety, Environment and Access. We aim to achieve stretching but achievable targets over the next ten years, in substantially reducing death and serious injuries on our roads, reducing single occupancy car dependency and resulting carbon emissions on the road network, and in so doing, support more resilient, self-sufficient communities with affordable transport options.

Identification of the need for new infrastructure and access provisions is achieved through close collaboration with the Waka Kotahi NZ Transport Agency, Environment Canterbury, the Greater Christchurch Partnership and other important local stakeholders. Major investment decisions are guided by the development of sound business cases, again in partnership with those agencies. Major transport business cases include but are not limited to:

- The Public Transport Futures Business Case (Ongoing);
- The Major Cycleways Network and Connections Business Cases (Completed and Ongoing);
- An Accessible City Programme Business Case (Completed);
- The Christchurch Transport Business Case (Completed);
- Brougham-Moorhouse Business Case (Ongoing);
- Travel Demand Management Business Case (Completed).

As an example of the benefits of developing sound, pragmatic business cases to support our largest investment decisions, before Council started to deliver a network of Major Cycle Routes, many people did not realise that cycling was a viable transport option for them. Today we are seeing cycling trip rates increase significantly on completed corridors, sometimes ahead of projections, by providing customers with an increasing range of access, a high quality experience and a level of service they have only previously been accustomed to with other transport facilities.

4.1.7 Rising Costs of Building and Maintaining Assets

The initial capital construction investment is only a small proportion of the asset life cycle costs. Operational expenditure is the cost incurred directly from operating and maintaining assets, and is usually funded directly through rates rather than borrowing. Transport infrastructure assets are long-lived and maintenance-intensive, especially in New Zealand because of our climate and geology, and the way we have built our roads.

Managing operational expenditure requirements is not a new issue for Council nor for many other councils around New Zealand. Ageing assets and renewals were an issue identified in both our 2015 and 2018 infrastructure strategies, and remain a significant challenge in 2021. Deferral of renewals has the potential to create a bow wave of capital expenditure as the risk of ageing and/or earthquake-prone infrastructure failing compounds. It also increases operational expenditure as ageing assets require more maintenance to keep them functioning at an acceptable level of service until they are renewed.

Our asset base is increasing as the City's population and employment base grows, both through planned construction and gifting of assets. The operational expenditure associated with an increasing asset base is becoming increasingly less affordable as we take on a larger liability for maintenance.

The need to meet and manage community expectations of a growing asset base has been highlighted as a significant issue in the Council's Infrastructure Strategy. Concerns have been raised by the community that the standard of transport levels of service is not generally meeting their expectations. We regularly gather information about satisfaction with the condition of our assets, and significantly, only 24% of participants were satisfied or very satisfied with the condition of the roads.

Inflation costs for infrastructure are set to rise much faster than wages, putting further pressure on household rates. At the same time, there is a longstanding expectation from the community that rates increases should be minimised. Triangulating between these conflicting issues is therefore not simply a matter of affordability, as it is equally about demand management and the community’s willingness to pay.

Changing demographics will also have an impact on infrastructure. Significant work is currently taking place in the city to address immediate housing shortages and cater to the needs of a diverse population. In order to accommodate forecast population growth, significant increases in affordable housing are required. There has been significant greenfield growth post-earthquake and it can be expensive to service these areas with roading, public transport and other assets.

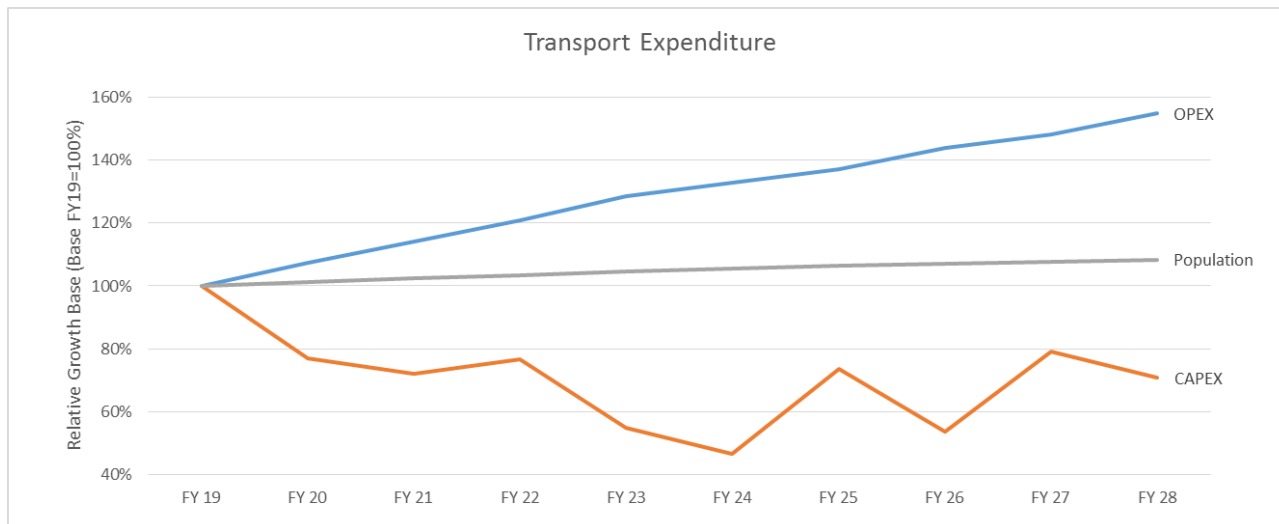


Figure 4-9. Relative growth in transport spending and population – LTP 2018-28

4.2 Demand Forecasts

The transport demand drivers outlined in Section 4.1 are expected to place unprecedented pressure in the coming decades on housing, employment and transport infrastructure across the city and sub-region. If the city continues to grow as expected and without addressing the need for much improved land use and transport integration across greater Christchurch, a failure to proactively tackle with our partners our current highly car-dependant travel behaviours, the inevitable travel growth and demand for road space will grow exponentially.

The Christchurch Transport Model (CTM), using the previously outlined population and employment growth scenario, combined with land use and network expansions and unchanged travel behaviour of high private vehicle usage, predicts that the traffic network particularly within and around the CBD would not be able to sustain the additional traffic volumes by 2038. This would mean more cars on the road, more economically debilitating network congestion spreading throughout typical weekdays, and an unsustainable level of demand on our roading and transport assets, all with their environmental, economic and quality of life consequences.

To tackle these issues and avoid these consequences, there are broadly two main options available:

Option	Objectives	Investment Focus	Outcome
Continue investing in general vehicle-led transport infrastructure improvements	<ul style="list-style-type: none"> - to provide more capacity for general vehicles - to tackle capacity bottlenecks for general traffic including additional road lanes and parking spaces 	<ul style="list-style-type: none"> - new road infrastructure - multiple-laning of existing roads where demand projections support - widening/upgrading existing roads/intersections to maintain or enhance capacity 	<ul style="list-style-type: none"> - continuing business as usual - high cost of implementation - increasing maintenance costs - urban sprawl - inability to meet environmental targets

<p>Transition to more proactive travel demand management, through targeted urban intensification and linked investment in alternative transport choices</p>	<ul style="list-style-type: none"> - to reduce the need for making car trips, especially for short distance trips - to provide active and public transport choices for longer distance trips as attractive alternatives to the car 	<ul style="list-style-type: none"> - incentivisation of urban intensification around key activity centres - new and improved active and public transport infrastructure including cycleways, bus and HOV lanes - to optimise the use of the existing transport network capacity - supporting self-contained, more resilient neighbourhoods 	<ul style="list-style-type: none"> - travel behaviour change required - more resilient local communities - lower comparative implementation costs - smaller increases in maintenance costs - reducing environmental impacts, especially CO2 emissions and air quality (particulates)
--------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Table 4-2. Demand Options

The high level strategic directions set out in the Christchurch Transport Strategic Plan and the Council’s Strategic Framework of community outcomes and strategic priorities, encourage active and public transport as the focus of the Christchurch City Council for transportation, roading and land use investments direction.

4.2.1 Light Vehicle Demand

The graphs of Figure 4-10 and Figure 4-11 below show the historic and forecast annual light vehicle vehicle-kilometre travelled (VKT) based on Waka Kotahi NZ Transport Agency’s surveys and the Christchurch Assignment and Simulation Transport (CAST) model v18 forecasts, respectively. There is a good consistency between the historic and forecast VKT’s on the Christchurch network, despite some minor differences between the inclusions and exclusions and assumptions. The actual data in general are somewhat higher (approximately 2%) given the actual data also include local short distance trips whereas the model only focuses on the longer distance strategic trips. Hence, the growth trends look consistent and similar between the two.

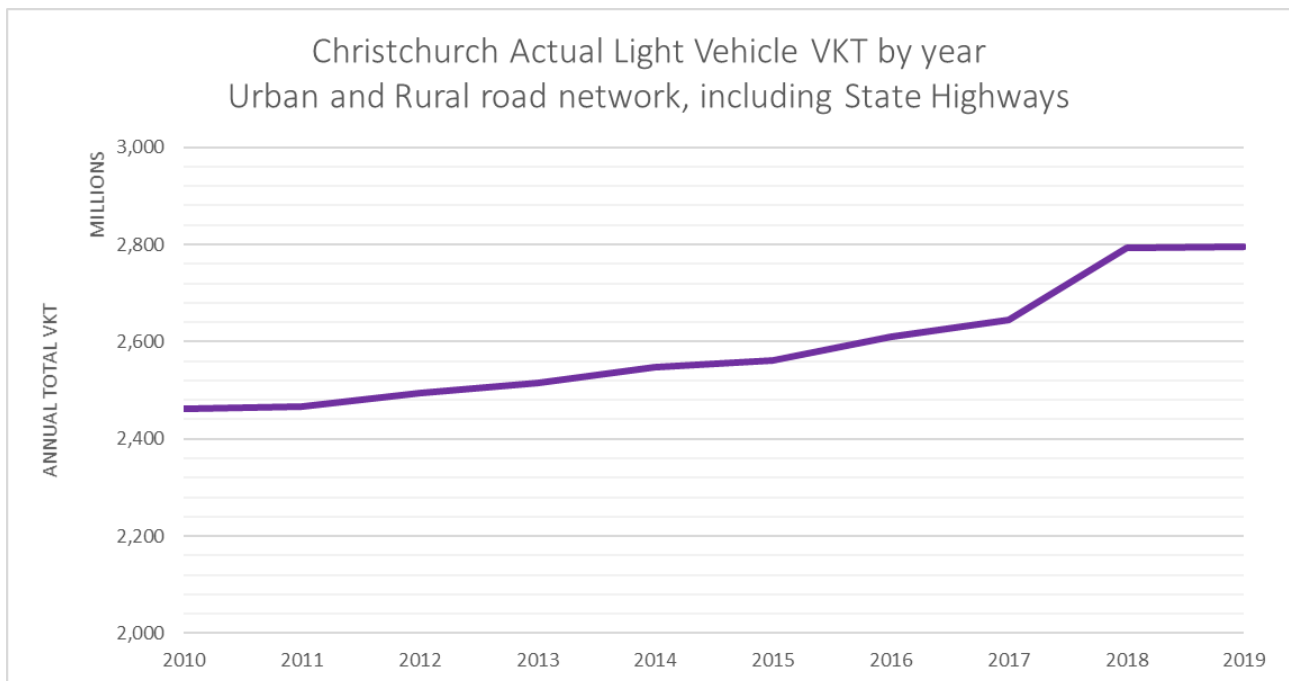


Figure 4-10. Historic Light Vehicle VKT’s

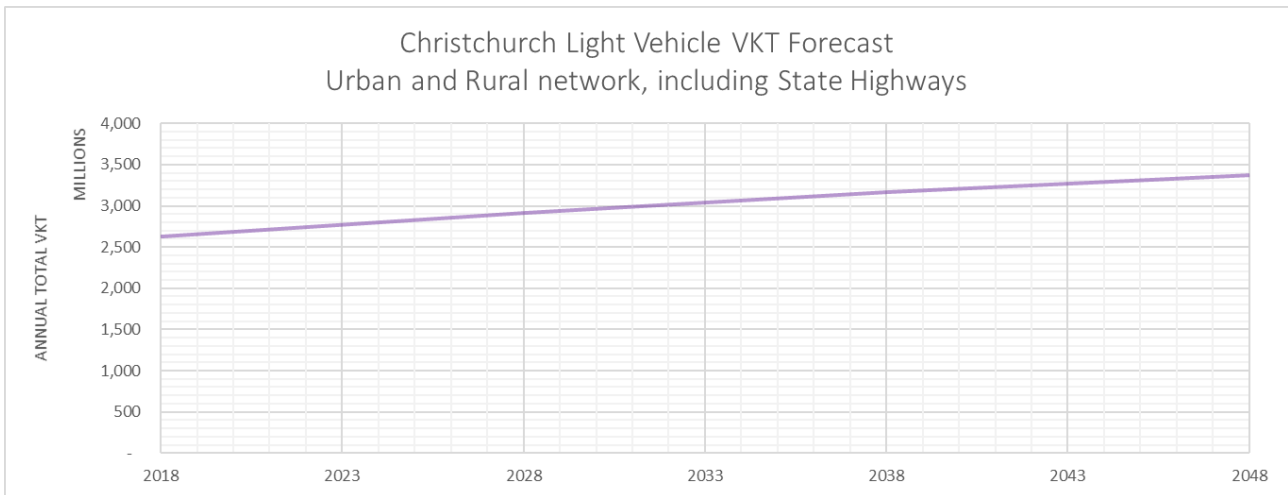


Figure 4-11. Forecast Light Vehicle VKT's

The historic data highlights an average 1.4% year on year growth in VKT's in the current decade. The model, based upon assuming little change in travel behaviour and mode choices along with the projected population / employment growth and materialisation of the planned land use and capital programme, predicts a similar 1.1% annual growth in VKT's in the next decade. The growth continues by a slight levelling out to 0.9% and 0.6% annual growth rates in the subsequent decades until 2048, adding up to nearly 30% cumulative growth over the period.

The decline in the forecast growth rates are in fact mostly influenced by the predicted growing congestion and the likely emergence of capacity shortage and bottlenecks across the network. If business as usual continues in providing for general traffic capacity, the forecast decline in growth in the following decades would not materialise which would entail further significant environmental impacts, maintenance costs and safety issues in the future. These costs are in addition to the capital investments required to deliver the needed extra capacity on the road network.

It is noted that, with the aftermath of the COVID-19 lock-down in early 2020 and the halt in international tourism and immigration influx, a short-term decline in light vehicle VKT's occurred. The decline is evident by the plummeting fuel sales in the month after the easing of lock-down in May and June 2020 as shown in Figure 4-12 below.

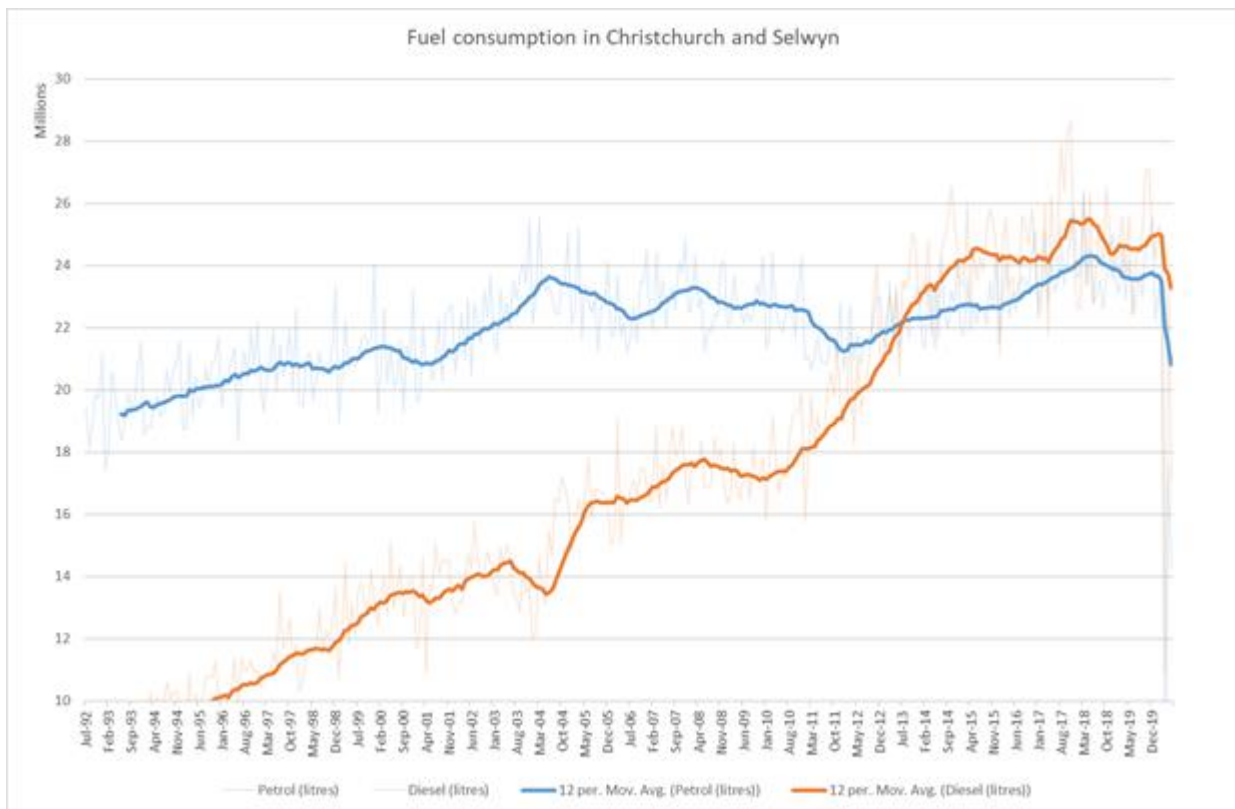


Figure 4-12. Historic fuel sales in Christchurch and Selwyn by type

The data suggest that:

- total fuel sales (Petrol + Diesel) in June 2020 was 31.3 million litres, 30% lower than June 2019 and the lowest it has been since 1997;
- total fuel sales (Petrol + Diesel) for the year 2019/20 was 529.3 million litres, 8.3% lower than 2018/19 and the lowest since 2012/13.

As evidenced by traffic levels as Christchurch returned to Levels 3, 2 and 1 however, these reductions may well be short lived, as early evidence suggests traffic levels largely returning to similar pre-COVID levels. At the time of writing, it is unclear whether there will be any medium to longer term legacy effects of the pandemic on the community’s travel behaviour and lifestyle choices.

4.2.2 Freight Demand

Major freight movements are carried by heavy freight vehicles and rail services throughout Christchurch. Rail services are governed by Kiwi Rail and Council has a limited role in the operation and function of those rail lines. However, functionality of the railway network and its interface with the roading network (state and local roads) will continue to be of considerable importance in terms of managing and delivering for the on-road freight transport demand and heavy vehicles.

The Greater Christchurch Transport Statement 2012 has forecast a two to four-fold increase in the freight volumes to/from Lyttelton Port between 2010 and 2041. The entire growth is not anticipated to be handled by on-road freight movements alone. The Lyttelton Port of Christchurch (LPC) desires to increase the proportion of freight by rail in future years, with a target of 40% by 2041 (from the current 20%). On this basis, the Greater Christchurch Freight Infrastructure Statement 2014 has projected the number of train movements around Christchurch to increase by over 50% over the same period.

The graph in Figure 4-13 below shows the current and projected train movements around Christchurch based on Greater Christchurch Freight Infrastructure Statement 2014 and annual heavy vehicle trips based on the Christchurch Assignment and Simulation Transport (CAST) model v18.

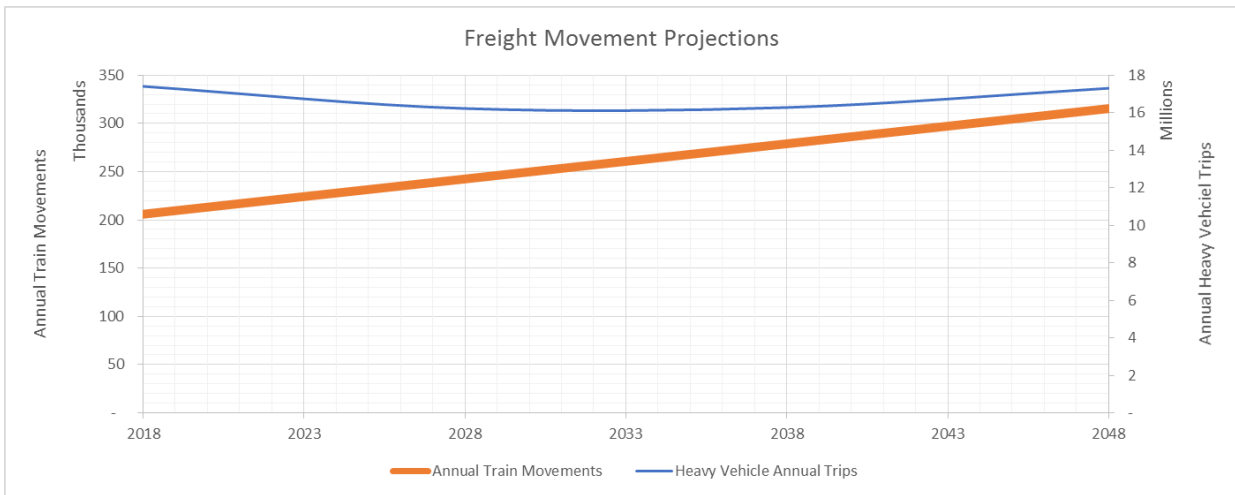


Figure 4-13. Current and Projected Freight Movements

The above graph indicates a relatively static projection for heavy vehicles trips for the period of 2018 to 2041, while train movements increase by more than 50% over the same period. The relatively static projection of the heavy vehicle trip number is mainly due to the combination of the projected higher capacities and more frequent train movements, gradually changing employment patterns and more direct land freight routes through the Christchurch Southern Motorway (CSM) and Christchurch Northern Corridor (CNC), both due to be completed in the early period of the new Long Term Plan

It should be noted however that the above projections are based on the lower projection for the Lyttelton Port container volumes. If the upper growth forecast for port volumes materialises, then there would be an additional pressure on the road network to cater for the extra heavy freight vehicles. The selection of the lower projection in the transport model is based on the historic performance and growth in the freight volumes at the port.

The graphs of Figure 4-14 and Figure 4-15 below show the historic and forecast annual heavy vehicle vehicle-kilometre travelled based on the Waka Kotahi NZ Transport Agency’s surveys and CAST model v18 forecast, respectively.

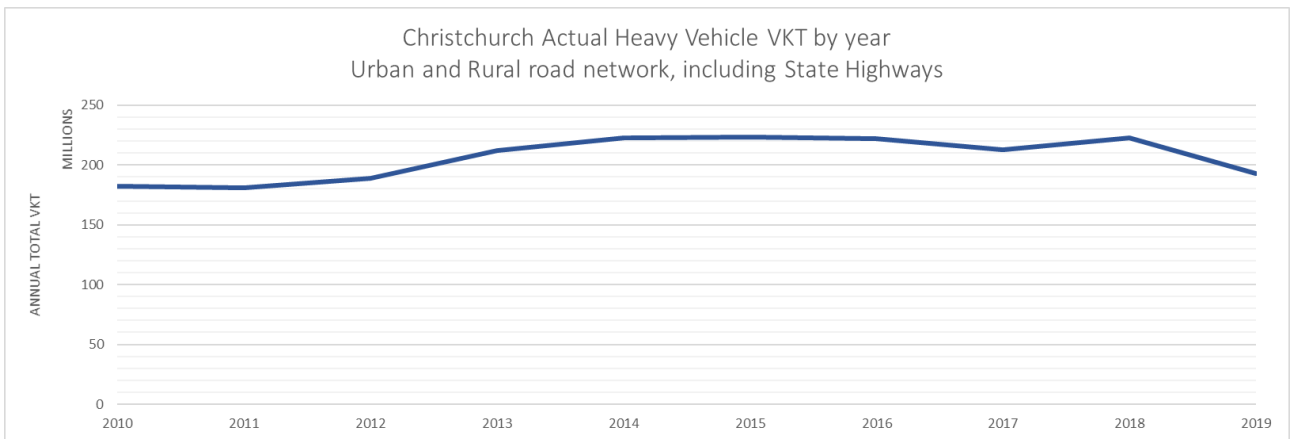


Figure 4-14. Historic Heavy Vehicle VKT’s

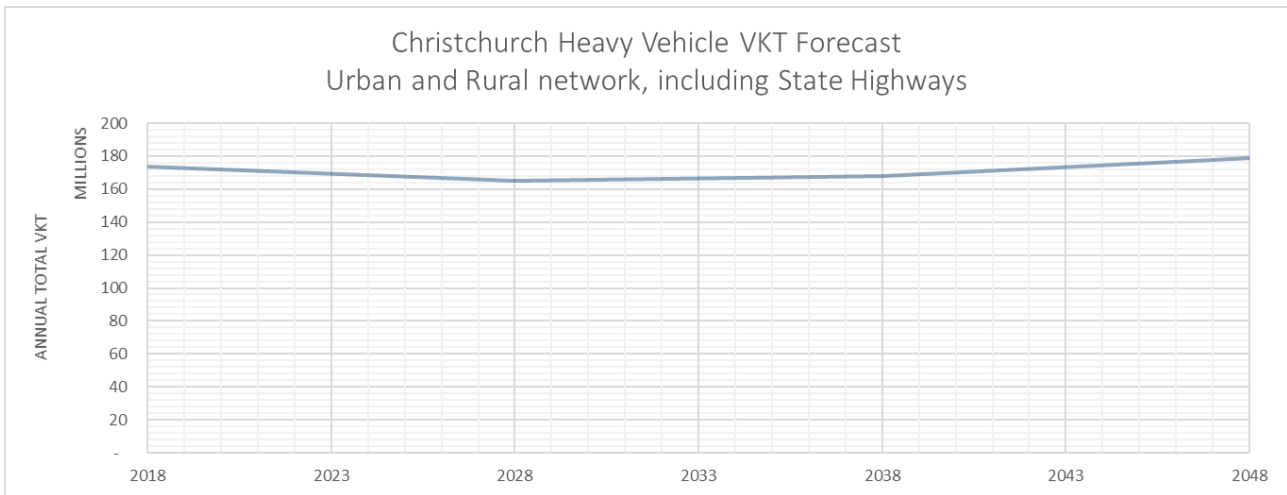


Figure 4-15. Forecast Heavy Vehicle VKT’s

Again there is an acceptable consistency between the historic and forecast VKT’s on Christchurch’s network. The last decade’s heavy vehicle VKT trends were largely static with only 5% growth over the entire period. The VKT’s grew aftermath of the 2011 earthquake during the recovery but generally declined since 2016.

The forecast heavy vehicle VKT’s indicate a similar declining pattern to continue until 2028 following by a modest growth beyond then until 2048. The 2048 VKT’s are however nearly the same as those of 2018. The trend suggests that demand for on-road freight is not likely to grow considerably if the aspired rail freight growth to the port materialises. The increased rail freight would however have some implications for level crossings interfaces across the city with the state highway and local road network, which should be taken into account.

4.2.3 Active Transport Demand

After the 2011 earthquake and the subsequent publication of the Christchurch Transport Strategic Plan (CCC, 2012) and An Accessible City (CERA, 2013), Council in partnership with the Crown and Waka Kotahi NZ Transport Agency has increasingly invested in active transport infrastructure including new Major Cycle Routes (MCR’s) and shared paths city-wide as well as similar networks and shared streets in the central city and through suburban master plans. As of June 2020, Council owned approximately 521 kilometres of formal active transport assets as presented in the table below.

Asset Type	Urban (kilometre)	Rural (kilometre)	Grand Total (kilometre)
Cycle Path	23		23
Shared Path	173	7	180
Cycle lane	294	8	302
Quiet Street	16		16
Grand Total	506	15	521

Table 4-2. Formal Active Transport Horizontal Assets – June 2020

These have been the first significant investments in non-car modes for many decades, and as global experience shows, making real changes to people’s travel behaviour requires substantial and sustained investment over many decades to deliver lasting change. Although the limited investment has itself slowed down due to budget constraints in recent years, a considerable uptake beyond the initial forecasts has been observed for both walking and cycling demand, both in the central city and associated with a number of critical Major Cycle Route connections. The graphs of Figure 4-16 and Figure 4-17 below show the growth trends over the last few years for the new cycling and walking infrastructures, respectively.

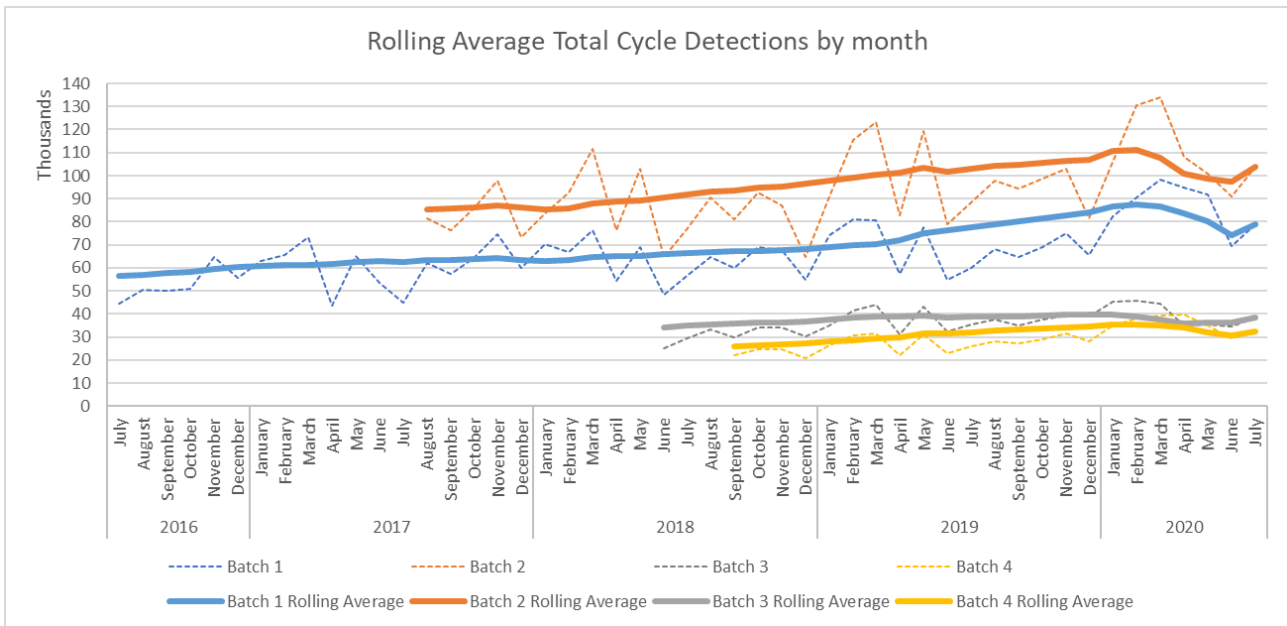


Figure 4-16. Cycling Growth Trends on Major Cycle Routes at 25 detection sites

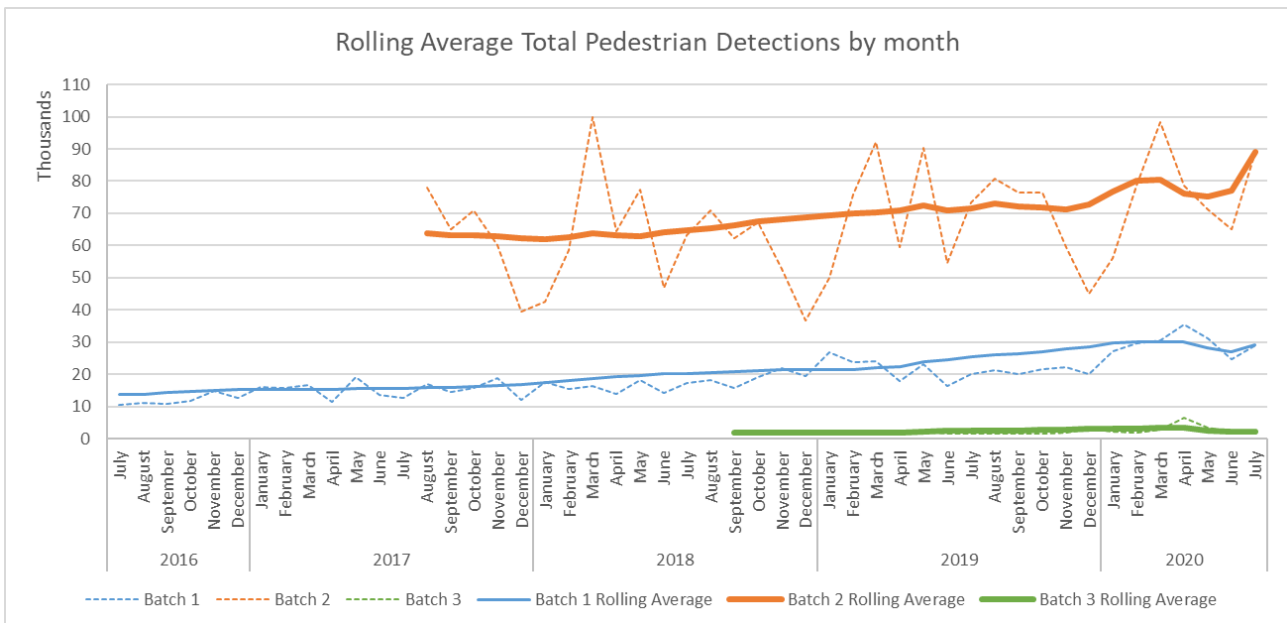


Figure 4-17. Walking Growth Trends on Major Cycle Routes (shared paths) at 8 detection sites

The two above Figures suggest that regardless of seasonal variabilities, both cycling and walking demands on the new infrastructures grew by nearly 15% in Financial Year 2020 (July to June), despite the lock-down effects. The total annual detections on the monitoring locations are listed in the Table below.

Financial Year	Total Cycle detections	Total Pedestrian detections
2016/17	1,938,000	921,000
2017/18	2,299,000	972,000
2018/19	2,620,000	1,041,000
2019/20	3,013,000	1,195,000

Table 4-3. Total annual detections on the walking/cycling monitoring locations

This highlights an early success story of an effective investment in active transport. This growth is on top of the increasing number of cyclists detected on the ‘base network’ of on-road cycling facilities. The Council’s traffic counting programme indicates a growing number of cyclists at major intersections throughout the city, accounting for approximately 10% annual growth since 2016.

The 2018 census indicates that 11,160 people stated cycling as their mode of transport to work on the census day. This accounts for 5.6% of all daily trips. The share has remained largely unchanged compared to the 2013 census, despite the fact that the absolute number of cyclists grew by nearly 14% over the period. This is due to the fact that cycling mode share is starting from a very low base and it requires more time to shift the overall mode share in the favour of active transport. Considering the significant difference between the rate of cycling and walking growth with vehicle use, a meaningful increase in the mode share would be quite likely, if the trends continue to grow with similar rates. It also demonstrates what many other countries and cities have learnt, that we need to remain consistent in progressively continuing to invest in increasing and improving our alternative active travel networks and the quality of facilities if this welcome early trend is to continue.

4.2.4 Public Transport Demand

In the beginning of the century, as exhibited in Figure 4-18 below, public transport boardings in Greater Christchurch experienced a period of average 5-6% annual growth and peaked to 17.2 million trips per year in 2010. In the aftermath of the 2010 and 2011 earthquakes which led to a significant disruptions in the services and the effective closure of the CBD and dispersal of key employment zones across the city, particularly to the west, the number of boardings plummeted by over 40% to nearly 11 million passengers losing nearly 6 million passengers in the year. This drop was mainly due to the post-earthquake shift of all activity away from the central city - the traditional focus of the bus network. Patterns of travel demand also changed in Greater Christchurch, as many people moved homes or work places, presenting a huge challenge for the public transport system to respond to and meet these new demands. Short-term changes were made to the system immediately after the earthquakes, including some service level reductions which followed a review of the public transport network in 2011-12, resulting in the current much changed network.⁸

The total number of boardings started recovering again and reached 14 million by 2013, but since then the overall growth has effectively plateaued with individual growth or decline occurring on particular routes. This stabilisation has occurred at a level well below the pre-earthquake peak of 17.2 million trips per year. Furthermore, in terms of mode share, public transport continues to decline, as the stabilisation of trip numbers has occurred while our population has been growing.

COVID-19 and lock-down in early 2020 has again had, and continues to have, a detrimental impact on the number of bus boardings, and caused a 2.5 million boarding reduction to a level similar to 2011. The number of boardings at the time of drafting this section (when Christchurch is in Covid-19 Level 1) have recovered to nearly 80% of the same months of the last year (2019), suggesting a longer recovery period and lower total boarding numbers for the year to the end of June 2021.

⁸ Canterbury Regional Public Transport Plan (RPTP) 2018-28

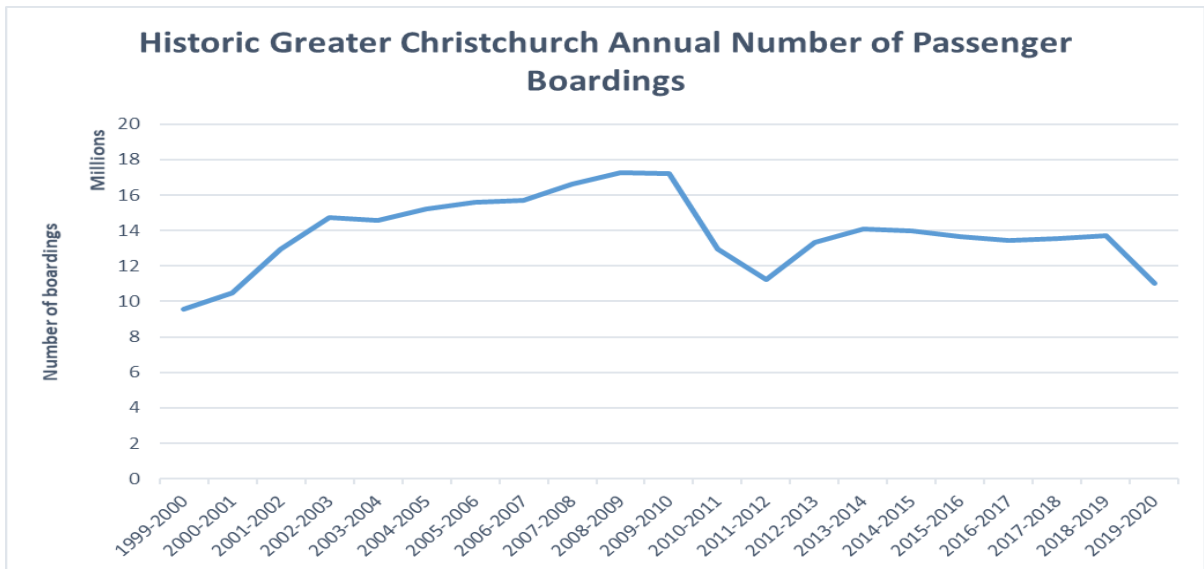
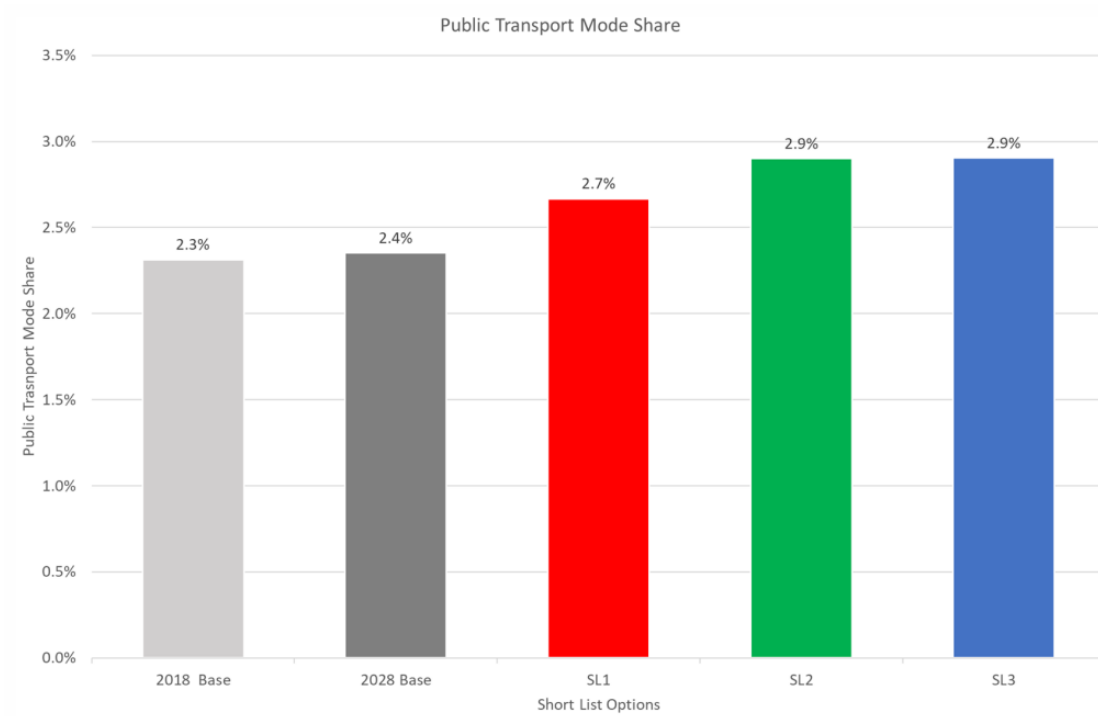


Figure 4-18. Public Transport Boardings Historic Trends

With regards to the future projections, the Public Transport Futures Business Case forecasts a 13% growth by 2028 in the Base model (no changes to the existing public transport provisions). The preferred scenario increases the 2028 forecast by another 13% (overall 28% growth compared to 2018 base to nearly 20 million trips a year). The scenario includes supply interventions for five core routes which includes enhanced frequencies in the higher density range, express services to Rangiora, Kaiapoi, Rolleston and Lincoln, and improved bus stop infrastructure and customer information.

Despite the forecast growth in demand and use by various scenarios until 2028, the public transport modes share is not expected to grow rapidly (Figure 4-19). The base 2028 scenario forecasts a 0.1% increase in mode shares from the current 2.3%, while the preferred scenario envisages a further 0.3% increase to 2.7%. This is mostly due to the forecast overall growth in the number of trips by other modes (particularly cars).



- SL1 Increases Total PT Trip by 7000 trips per day compared to 2028 Base, resulting in a 2.7% PT Mode Share
- SL2 Increases Total PT Trip by a further 5000 per day compared to SL1, resulting in a 2.9% PT Mode Share
- SL3 does not provide any further shift in number of public transport trips nor mode share than SL2

Figure 4-19. Public Transport Mode Share Forecast – PT Futures Business Case – June 2020

The main issues and opportunities with the public transport network as listed in the RPTP 2018-28 are as below:

- **The current public transport system can be unreliable and many journey times are not competitive with the private car.**

Current public transport journey times and reliability limit the attractiveness of public transport for customers. Comparative travel times within Greater Christchurch generally show that car travel is much faster than public transport. Figure 4-20 below exhibits Bus Stop Time Point Arrival Reliability⁹ over the 12-month period ending in July 2020.

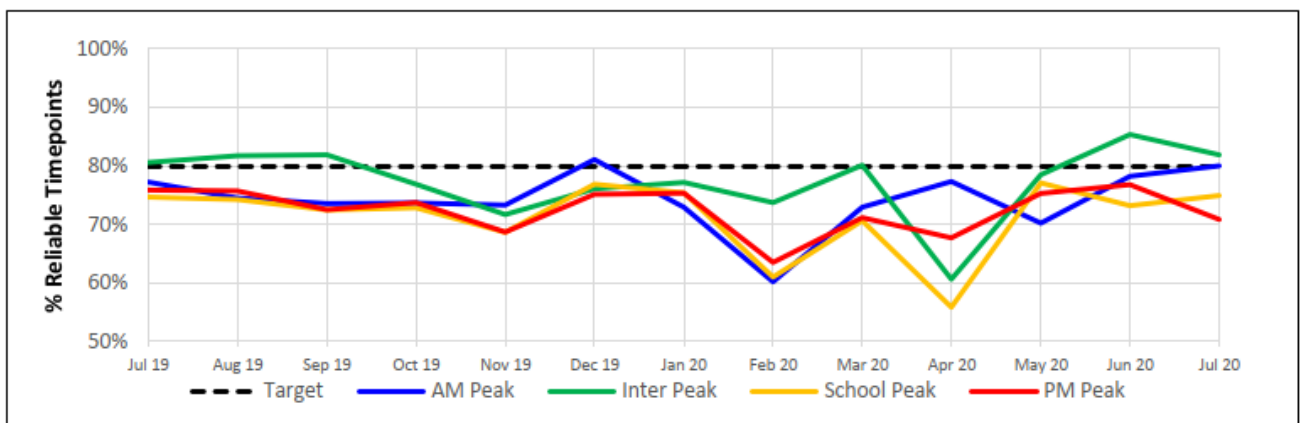


Figure 4-20. Bus Stop Time Point Arrival Reliability – Public Transport Dashboard – August 2020

⁹ Adherence to the time points as set out in the service schedules measured by GPS technology

In summary, nearly all of the average morning, evening and school peak hour bus services fail to meet the 80% reliability targets. The majority of the length of the public transport network is currently shared with general traffic and therefore buses are exposed to the same levels of congestion and delay as per general traffic. Bus travel times on corresponding route sections are, however, on average 20% to 40% (average 30%) longer than those of general traffic, due to the requirement for boarding / alighting manoeuvres. This is additional to the walking time to a bus stop, waiting time at the bus stop, travel time difference if buses are not taking the shortest path to the destination and walking time after the bus trip to the final destination. On some routes, passengers transfer between suburban and core services through suburban interchanges, adding further delays to some longer journeys. While not all of these travel time elements can be controlled by Council, the levels of service can be influenced by improving bus frequencies, travel times and reliabilities, some of which can be assisted by improved bus priority infrastructure.

Public transport priority measures, combined with frequent or rapid services, would help to improve journey time reliability on many key routes, so that public transport can become a viable transport option which provides access to opportunities for all. Key outcomes identified by the business case, are to increase the number of households able to access key activity centres, employment areas and the central city within a 30-minute public transport journey. Making public transport more competitive also contributes to managing traffic growth and reducing our reliance on single occupancy vehicles, particularly for longer journeys outside the local neighbourhood. The challenge is to improve the reliability of the current public transport system so that journey times are more competitive with the private car.

- **The current public transport system is not always well integrated with existing and planned land use in Greater Christchurch.**

Currently, Greater Christchurch is relatively low density, compared with other cities such as Auckland, Wellington, and Hamilton. Low density means that there are fewer people within walking distance of a public transport stop, thus reducing the patronage catchment of each stop, making it more difficult to operate an efficient public transport system. Since 2011, the majority of growth in the city and in greater Christchurch has been located in greenfield areas. These areas of new development are on the fringes of the city and serving them with public transport is difficult, as it takes time for new areas to be developed and have sufficient population to make public transport viable. Over the next 30 years, Greater Christchurch's population is expected to grow by about 150,000 people to 640,000. This growth means more people will be making more trips across our transport network to where they want to go. Designing a public transport system which better connects key activity centres will improve access and provide genuine transport choice, in turn creating a more liveable and inclusive city. The integration of public transport and land use planning is key to creating communities and a more liveable city. In particular, there may be an opportunity for rapid transit to support more compact urban growth and improve access to opportunities like employment, education and recreation. The challenge is to better integrate transport with existing and planned land use in Greater Christchurch.

- **There is a poor perception of the experience of using public transport in Greater Christchurch.**

The most prominent issue that deters the use of public transport, identified by current and potential customers, is that it does not get to places on time and that it is not a convenient use of commuting time. The challenge in partnership with Environment Canterbury and Waka Kotahi NZ Transport Agency, is to better understand existing and projected public transport customers' needs, and improve the overall experience of public transport in order to retain those existing users, and attract new users.

- **Transport contributes at least 19% to national greenhouse gas emissions. In Christchurch, transport contributes more than half (53%) of emissions and is a significant contributor to poor local air quality. The majority of transport emissions are a result of road transport and this represents a significant opportunity for reduction.**

Local and central government are committed to reducing the adverse effects of transport on the climate, local environment and public health. The government has committed to the Paris Agreement target of reducing greenhouse gas emissions to 30 percent below 2005 levels by 2030, and has introduced a bill proposing to make New Zealand net carbon neutral by 2050. The challenge is to better recognise the role of public transport, alongside active travel and better integrated land use and transport networks, in achieving these outcomes and targets by growing patronage, therefore helping reduce single occupancy vehicle use, and by transitioning to a zero emission vehicle public transport fleet.

- **Public transport affects all aspects of life that keep us well and healthy.**

Access to public transport services enables individuals to participate in employment, study, recreation and their community and helps provide access to food, services, friends and family. The use of public transport is also considered an active form of transport because it typically involves walking to and from bus stops. Being physically active reduces the risk of a number of health conditions. The challenge is to improve the overall health outcomes of our communities by enabling more people to access opportunities by using public transport.

4.2.5 Micro-mobility Demand

Publicly accessible micro-mobility in Christchurch is mainly represented by rental e-scooters. Rental e-scooters are a new feature to Christchurch introduced in October 2018. Figure 4-21 below shows the total monthly ridership data for the applicable period.

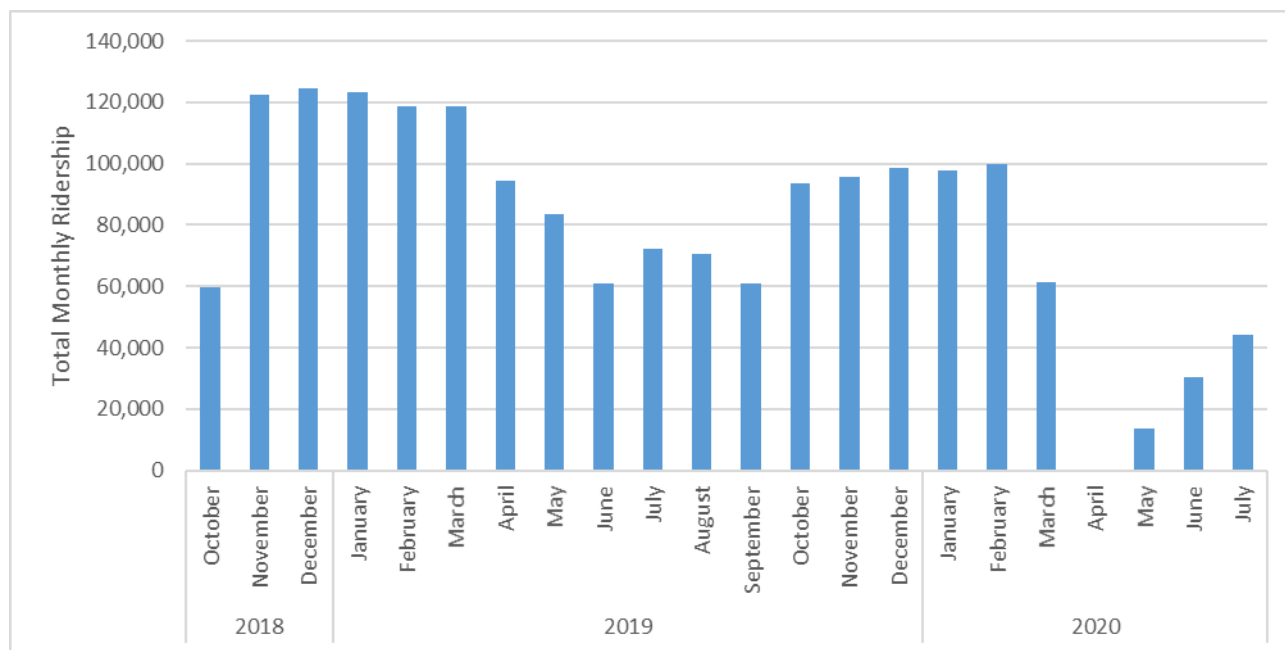


Figure 4-21. E-Scooter Monthly ridership data – August 2020

The existing data indicates that the available 700 e-scooters during the period of October 2018 to March 2019 catered for an average monthly ridership of approximately 120,000 rides (5.7 rides per vehicle per day). The ridership, however, declined by a sharp 50% drop over the following winter season of 2019 even though the available number of e-scooters increased to average 1,300 vehicles (out of 1,600 citywide cap). Demand recovered again in the next warm season but not to the same levels of the first year. Vanishing novelty and the growing market for privately owned e-scooters can be counted as the likely main contributing factors for the 20% drop. COVID-19 lock-down and subsequent border closure again had a substantial impact on the demand for rental e-scooters; hence the numbers seem to be recovering by a fast rate to those of the previous cold season.

In terms of their function in the larger transport network, rental e-scooters can enhance connectivity to the public transport network by offering an alternative for walking in the ‘last mile/first mile’ or extend the catchments of a public transport journeys to farther afield. They may also increase the range of walking trips and reducing car reliance for mid-length trips. It should, however, be noted that the highest average number of e-scooter rides for the entire city is circa 4,000 which is nearly 10% of daily public transport trips.

Hourly ridership patterns, as illustrated in Figure 4-22, and in particular the relatively low numbers of morning peak rides suggest that commuting to work/education purposes is only contributing to a fraction of the e-scooter demand.

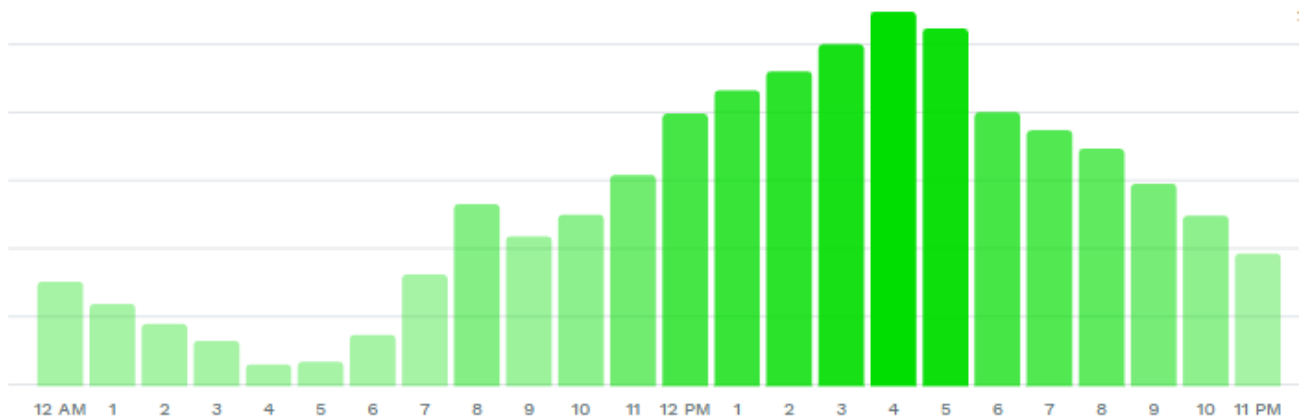


Figure 4-22. E-Scooter Hourly ridership data – August 2020

The hourly trends indicate that afternoon ridership is noticeably higher than that of morning. The average trip duration and distance are approximately 12 minutes and 1.5 km, respectively, which indicates a tendency toward usage for shorter trips. The geographical distribution of trips indicate a high concentration mainly within the boundaries of the CBD or to / from the educational centres e.g. the university.

The usage data suggest the rental e-scooters are not competing with other modes to cater for commuter trips. However, there has been a considerable uptake in the use of personal e-scooters as a commuting vehicle since the introduction of the rental e-scooters. Considering the convenience of making a trip with the e-scooters, the cost of every day hiring of the rental e-scooters soon justifies an investment into buying one if used for every day commuting purposes. Currently, very limited data is available on the trends of the number of privately owned e-scooters or their trip purposes. The trend, in general transport terms is a positive sign with more real trips being transitioned into urban micro mobility vehicles.

Urban micro mobility, being a new feature to urban public spaces world-wide, does not have an extensive policy background. Government is currently preparing the 'Accessible Streets' rules package which proposes a number of new rules to respond to the rise of micro-mobility devices like e-scooters as well as rule changes to improve the safety and efficiency of active transport modes and buses. The aim of the regulation package is to increase the safety and accessibility of our footpaths and streets, and encourage active modes of transport.

The consulted version of the Accessible Streets package proposes new rules that would require anyone riding a device on the footpath to give way to pedestrians, to not exceed a speed limit of 15km/h, and for the device to be no wider than 75cm. Other proposed changes include:

- allowing e-scooters to use cycle lanes and cycle paths;
- giving buses priority when existing bus stops on roads with a speed limit of 60km/h or less;
- clarifying road controlling authority powers in relation to parking on berms;
- categorising vehicles to reflect changes in technology; and,
- improving the safety of people walking, cycling and using micro mobility devices by making several Give Way rule changes.

Public consultation for the Accessible Streets rules package was hosted by Waka Kotahi NZ Transport Agency and closed on 20 May 2020.

Clarifications around rules and regulations associated with urban micro mobility vehicle is likely to encourage a wider extension nationwide. The proposed more permissive regulations to use footpath, cycleways and cycle lanes would also encourage less confident users and extension of the user catchment. It will also result in a higher utilisation of the Council's active transport assets.

4.3 Impact of Changing Demand on Existing Assets

As described above, in the medium to longer term, the utilisation of our transport network and roading assets is likely to change as a result of increasing demands, especially if they remain unchecked. The challenges of responding to community concerns about diminishing transport levels of service targets and performance, will be coupled with inevitably increased maintenance and renewal costs if those demands rise unchecked. These issues and the huge challenge of meeting the nation and Council's stretching climate change targets for the coming decades, will be the defining issues of the coming plan period.

In the short term, the national and global economic impacts of COVID-19 has seen a decline in employment, tourism and GDP, potentially leading to a lower demand for people and freight movement. This may cause a period of stable or even opposite trends in the utilisation measures. The real impacts and the length of COVID-19 recovery is still unknown but past experience with global economic downturns suggest a recovery to levels similar to pre-event. The rate of recovery is the greatest unknown at this time.

The need for an asset Demand Management Plan is therefore essential. At the same time, asset utilisation will need to be monitored more effectively so that emerging trends, issues and solutions can be identified to both respond to and influence demand changes.

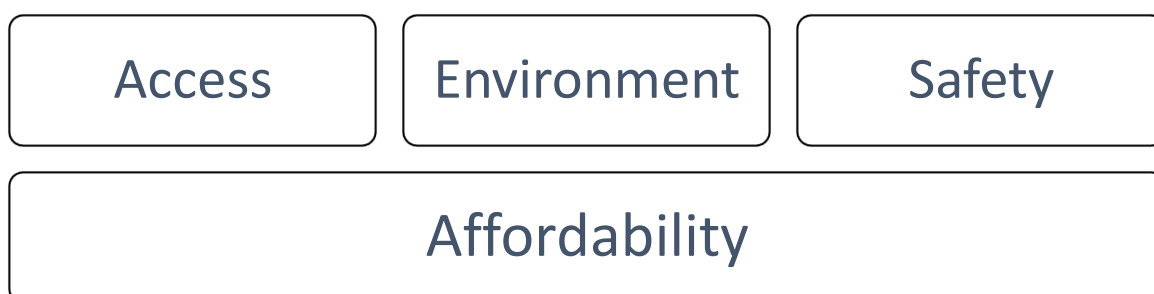
4.4 Demand Management Plan

The Council's strategic priorities (i.e. for the next three years) of increasing active, public and shared transport opportunities and use; climate change leadership; maximising opportunities to develop a vibrant, prosperous and sustainable 21st Century city; and safe and sustainable water supply and improved waterways, can each help to guide how we influence the demands on and manage our transport assets.

The key outcomes we are setting out to achieve in setting our Asset Management planning outputs are therefore:

- reducing the need to travel and car dependency through better integrated land use, transport and asset planning;
- moving more people in less vehicles;
- supporting more self-sufficient, resilient neighbourhoods where the need to travel by car for the daily essentials of food shopping, health, employment, education and recreation is much reduced;
- reducing the harm caused by vehicles in terms of road safety and environment;
- emphasising and supporting shared travel options and investing in comprehensive travel demand management services;
- seeking more sustainable and lower operating cost infrastructure (such as the switch to LED street lighting);
- utilising smart technology for travel choice management and asset planning and operations;
- improving the equity of the travel market by considering smarter revenue and demand management measures that deliver better outcomes for the community.

To incorporate the community outcomes and the above objectives into the Council's Capital Transport programme, the three below transport pillars have been identified:



The three transport pillars are gauged based on the foundation of Affordability (across all three) in order to maximise the benefit with the limited available budget. The entire transport capital programme, including various business cases, is therefore scored against the pillars and ranked according to their level of affordability.

To assist with achieving these goals, the following management approach to Asset Management Plan delivery is being developed:

REDUCE – the need for travel (i.e. reducing the underlying demand on transport assets), and ensuring future expected growth projections are planned for and managed in a sustainable way.

MANAGE – our existing assets to best effect, i.e. in terms of supporting mode shift, making best use of the existing transport assets and networks (e.g. guided by ONF, Network Management Plan etc.)

INVEST – in adding to or significantly re-shaping our existing networks of transport assets **ONLY** where we have explored Reduce and Manage responses, and have concluded fresh capital investment is fully justified (i.e. the business case process). This should also outline how the nature of future capital investment should shift away (*rapidly*) from new road building (i.e. beyond existing commitments) to enhanced capital investment in the alternative modes, i.e. public transport, cycling, walking, and streetscape enhancements. Again, this investment can be influenced by level of service gap analyses driven by the ONF system.

Opportunities identified to date for transport demand management are shown in the following Table.

Table 4-4: Demand Management Initiatives and Impacts

Current initiatives			
Initiative that influences demand	Effect of initiative on demand (↑, ↓, ↔)	Can this effect be quantified – what assumptions have we made about the effect of the initiative	Potential impact on asset planning (operation / maintenance / revenue / renewal / capex)
<p>Car Parking – Policies, Pricing and Supply</p> <p>Parking policies that seek to restrict long stay (commuter) parking in favour of short-stay shopper / visitor parking – and overall seeks to manage the supply of parking to off street purpose-built facilities</p>	<p>↔ to ↑ car demand, if pricing and supply is not deployed to restrict demand</p> <p>Potentially (if parking demand is not checked):</p> <p>↓ PT patronage, cycling</p>	<p>Forecast parking demand (from model) – this already assumes mode splits (3x PT, cycling, walking for central city by 2041) which we may not be currently tracking to.</p>	<p>Is linked to predicted general traffic flow projections city-wide out to 2031 / 2041. Well recognised that parking availability and pricing can influence general traffic demand- and so Council’s parking policies and pricing structures can be used to help manage down future general traffic growth.</p> <p>Affordable (low cost in comparison with other CBDs) public parking and some free on-street parking within 500m of the central city and around commercial centres.</p>
<p>Public transport priority lanes (e.g. current examples of Riccarton and Lincoln Road)</p>	<p>↓ car demand</p>	<p>City-wide PT corridors seek to support greater Christchurch wide PT patronage growth of 4X by 2050 – and 3x growth in central city by 2041 (from pre EQ levels).</p>	<p>Helps manage future general traffic growth pressures across network, but adds to PT infrastructure assets to be delivered, managed and maintained by Council.</p>
<p>Major cycleways</p>	<p>↓ car demand</p>	<p>City-wide major cycleways corridors seek to support city-wide uptake of cycling – and 3x growth in central city with connected networks by 2041 (from pre-EQ levels).</p>	<p>Helps manage future general traffic growth pressures across network, but adds to cycle route infrastructure assets to be delivered, managed and maintained by Council.</p>
<p>Central city transport improvements, public realm improvements and 30km/hr zone</p>	<p>↓ car demand</p> <p>Improvements makes walking and cycling feel safer and reduces car demand.</p> <p>Improved liveability of central city for increased residential population and density</p>	<p>Improvements have already reduced serious crashes on network and contributed to increases in walking and cycling activity.</p> <p>Helps achieve targeted increases in central city living (of 20000+ residents in next decade or so) – in turn reducing city wide transport growth pressures, by reducing travel demands.</p>	<p>Helps manage future general traffic growth pressures across network, by making central city more attractive to non-car modes. However, some streetscapes across central city require increased asset funding to maintain higher quality assets including features such as raingardens.</p>
<p>Central City workplace travel plan programme</p>	<p>↓ car demand</p>	<p>Early programmes with major central city employers are showing significant gains in non-car mode choices (i.e. PT and cycling especially).</p>	<p>Helps manage future general traffic growth pressures across network and does not directly add to asset management opex programme costs.</p>
<p>Network Management Plan (National Operating Framework)</p>	<p>↔ manages existing demand</p>	<p>Ensures both network operational and capex programmes are more accurately targeted at identified levels of genuine service gaps, and can be tuned to ensuring non car based modes are prioritised where appropriate.</p>	<p>Helps manage future general traffic growth pressures across network, and ensures scarce opex and capex asset management budgets are better directed to closing identified customer levels of service gaps, consistent with our strategies and plans.</p>
<p>Network management and corridor plans taking account of the one network approach</p>	<p>↔</p>	<p>Ensures both network operational and capex programmes are more accurately targeted at identified levels of genuine service gaps – and can be tuned to ensuring non car based modes are prioritised where appropriate.</p>	<p>Helps manage future general traffic growth pressures across network, and ensures scarce opex and capex asset management budgets are better directed to closing identified customer levels of service gaps, consistent with our strategies and plans.</p>
<p>Public realm and walking improvements (wider footpaths, crossings) integrated into other transport improvements</p>	<p>↓ car demand</p> <p>↑ Cycle usage and walking</p> <p>↑ Assists demographic changes of ageing population</p>	<p>Helps achieve targeted increases in central city living (of 20,000+ residents in next decade or so), in turn reducing city wide transport growth pressures, by reducing travel demands.</p>	<p>Capex and opex costs overall likely to be neutral in long run, instead that they are increasingly directed towards transport outcomes that better reflect Council’s transport priorities and desired community outcomes. Opex costs of improved streetscapes may be higher initially while limited number of applications restrict abilities to achieve economies of scale in opex programmes from different “shape” of transport assets.</p>

Future planned initiatives			
Initiative that influences demand	Effect of initiative on demand (↑, ↓, ↔)	Can this effect be quantified – what assumptions have we made about the effect of the initiative	Potential impact on asset planning (operation / maintenance / revenue / renewal / capex) etc.
<p>Increase on street parking management zones in the central city</p> <p>Increase paid parking areas around central city and key activity centres to better reflect the true cost of providing parking</p> <p>Prioritise shared parking, short stay parking and disincentivise commuter parking</p>	↓ car demand	Existing Council policies can be deployed in these areas to help achieve desired mode shares into central city (of 3x PT, cycling, walking from pre-EQ levels by 2041).	Is linked to predicted general traffic flow projections city-wide out to 2031 / 2041. Well recognised that parking availability and pricing can influence general traffic demand- and so Council's parking policies and pricing structures can be used to help manage down future general traffic growth. Removal of on street paid parking and adding extra will have both negative and positive effects on CCC's parking revenue.
Reduce number of Council owned parking assets	↔ car demand	Externalises the cost of providing parking – costs of parking are market led and therefore not subsidised by Council.	Potentially reduces ongoing opex and capex costs to Council associated with delivering and managing on and off-street parking infrastructure. Reducing the Council parking asset however does result in a long term reduction in Council parking revenues.
Rapid transit to north and south-west with supporting land use zoning changes	↓ car demand	Effect of rapid transit (as opposed to other bus-based solutions) to be assessed through future phases of Greater Christchurch Public Transport Business Case.	Potential costs in capex and opex terms are significant. Only further business case analyses will determine if they are economically viable, as "above line" costs to Council and strategic partners could be very high indeed.
High occupancy vehicle lanes	↓ reduce single occupancy vehicles	When carefully designed for key corridors and balanced with other infrastructure and network operational outcomes have been shown to achieve positive effects on mode choice and reductions in single occupancy vehicles	If full infrastructure capex and opex costs are accounted for at installation, remaining opex costs are associated with enforcement mechanisms. These can be offset / reduced by enforcement technology solutions at implementation.
Bus Priority lanes on core routes with high quality stops	↓ car demand ↑ PT patronage	Plenty of positive examples worldwide where quality public transport priority corridors act to reduce car commuting including single vehicle trips.	If full infrastructure capex and opex costs are accounted for at installation, remaining opex costs are associated with enforcement mechanisms. These can be offset by enforcement technology solutions (e.g. on board enforcement cameras) at implementation.
Traffic / emission charging zones	↓ car demand ↑ PT patronage ↑ Cycle usage and walking	International evidence that congestion and emission charging zones can be effective in both reducing vehicle numbers (incl. SOV), plus resulting emissions.	If full infrastructure capex and opex costs are accounted for at installation, remaining opex costs are associated with enforcement mechanisms. These are typically automated technology solutions. "User pays" principles can be deployed to design and manage systems.
City –wide travel behaviour change programme with focus on central city, northern corridor and south west corridor (where most residential and traffic growth is expected)	↓ car demand ↑ PT patronage ↑ Cycle usage and walking	Early programmes with major central city employers are showing significant gains in non- car mode choices (i.e. PT and cycling especially).	Helps manage future general traffic growth pressures across network and does not directly add to asset management opex programme costs.
Speed management city-wide (focus on schools, central city, key suburbs and residential neighbourhoods)	↔ car demand overall ↓ car demand associated with school travel – and if coupled with improved local neighbourhood accessibility ↑ Cycle usage and walking	Considerable international and growing NZ evidence of the benefits in mode shift terms of prioritising comprehensive speed management programmes – in both capex and opex (incl. enforcement) terms. Can be used to support self – contained neighbourhoods and "15 minute city" principles.	Capex and opex costs overall likely to be neutral – providing speed management is fully accounted for on capex and opex programming.
Smart networks and technology influence management of network including traffic signals, road condition, parking enforcement, road pricing to reduce opex	↔ car travel demand overall	Ensures both network operational and capex programmes are more accurately targeted through technology solutions, at identified levels of genuine service gaps – and can be tuned to ensuring non car based modes are prioritised.	Ensures both network operational and capex programmes are more accurately targeted at identified levels of genuine service gaps – and can be tuned to ensuring non car based modes are prioritised where appropriate. Helps manage future general traffic growth pressures across network – and ensures scarce opex and capex asset management budgets are better directed to closing identified customer levels of service gaps, consistent with our strategies and plans.
Micro-mobility and shared transport encouraged	↓ car demand ↑ walking ↑ public transport (if well integrated as first / last mile)	Emerging international evidence that micro-mobility and personalised journey planning can make positive contributions to reducing single vehicle occupancy – and enhancing non-motorised travel in city centres.	Capex and opex costs overall likely to be neutral in long run.

4.5 Demand Related Projects and Programmes

Infrastructure provides the foundation for achieving the vision and community outcomes. The proportion of funding out of the entire Transport Capital Programme which has been allocated to achieve each of the Community Outcomes and Levels of Service over the period of the Long Term Plan 2021-31 is illustrated in the Table below.

LOS Pillar	Funding Source	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	Total
Safety	Core	\$17,317,962	\$18,401,371	\$15,250,168	\$14,416,887	\$18,834,531	\$16,166,331	\$15,950,613	\$9,305,000	\$9,722,786	\$11,394,039	\$146,759,687
	CRAF	\$2,443,793	\$955,540	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$3,399,333
	Shovel Ready	\$-	\$334,737	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$334,737
Environment	Core	\$8,893,199	\$8,663,331	\$9,667,059	\$25,174,837	\$33,884,085	\$39,864,923	\$35,224,659	\$20,167,833	\$19,669,468	\$28,692,349	\$229,901,743
	Shovel Ready	\$24,847,078	\$27,036,385	\$28,622,795	\$2,791,761	\$-	\$-	\$-	\$-	\$-	\$-	\$83,298,019
Access	Core	\$71,567,825	\$67,260,801	\$69,895,785	\$83,928,399	\$72,288,630	\$69,030,913	\$73,199,446	\$94,171,506	\$95,642,592	\$84,969,513	\$781,955,410
	CRAF	\$10,167,254	\$6,375,028	\$6,283,173	\$6,174,153	\$5,000,000	\$-	\$-	\$-	\$-	\$-	\$33,999,608
	Global Settlement	\$370,000	\$2,832,977	\$2,000,000	\$1,507,694	\$-	\$-	\$-	\$-	\$-	\$-	\$6,710,671
	Shovel Ready	\$56,292	\$5,665,955	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$5,722,247
Grand Total		\$ 135,663,403	\$ 137,526,124	\$ 131,718,980	\$ 133,993,730	\$ 130,007,245	\$ 125,062,167	\$ 124,374,719	\$ 123,644,339	\$ 125,034,846	\$ 125,055,901	\$1,292,081,454

Table 4.5 – Transport Capital Budget Allocation

Targeted Plans and Strategies – the Council has adopted a range of activity or outcome focused plans and strategies that provide the detailed link between the high level community outcomes and strategic priorities and the work programmes the Council undertakes to deliver on these.

The new assets required to meet growth will be acquired free of cost from land developments and constructed/acquired by the Council. New assets constructed/acquired by the Council are discussed in Sections 7 and 8.

Acquiring these new assets will commit the Council to fund ongoing operations, maintenance and renewal costs for the period that the service provided from the assets is required. These future costs are identified and considered in developing forecasts of future operations, maintenance and renewal costs in Sections 7 and 8.

5 Managing Risk and Investing in Resilience

This section outlines Council’s approach to managing risk and investing in resilience. It includes responses by the activity to build resilience across a number of identified ‘disruptors’. A risk register and schedule of proposed risk mitigation actions are also included.

5.1 Council’s Approach

Investing in Resilience

The Resilience Greater Christchurch Plan (RGCP) provides a framework and multi-agency actions towards a more resilient City. All Council’s activities play a role in contributing to this RGCP by becoming more resilient to ‘disruptors’.

To build resilience in our asset networks, we need to firstly understand the potential disruptors and the impacts on our assets and services. These are outlined in Section 5.2.1.

Key projects or activities to improve resilience, that we have identified and defined sufficiently to be included in this Asset Management Plan programme, are included in Section 5.2.2.

Where further investigation is required to understand the impacts of disruptors and ways to be more resilient, opportunities are identified in Section 5.2.3.

Risk Management

Council’s corporate approach to managing risk is defined in its Risk Policy and assessment framework. The framework provides a means for consistently identifying, recording and assessing risks such that risk mitigations can be prioritised across Council. The risk management framework and application to Asset Management Plans is summarised in Section 4.3.3 of the SAMP.

Whilst the resilience programme focusses on the big, strategic challenges such as natural hazards and globalisation, Council’s risk register (recorded in Promapp) is also intended to be used to manage higher frequency, lower probability events. For example, while another major earthquake would have very high consequences for many of Council assets, lower consequence risks such as third-party damage may be so frequent as to also warrant attention.

In Section 5.3.1 we provide a snapshot of the highest risks recorded for this activity and in Section 5.3.2 summarise the major mitigation actions that have been included in this Asset Management Plan.

Resilience Definitions

Acute Shocks: Sudden, sharp events that threaten us e.g. the Canterbury earthquakes represent one of the most significant types of shock any place can endure.

Chronic stresses: Activity that weakens the fabric and functioning of a city on a day-to-day or cyclical basis.

Resilience is the capacity of individuals, communities, businesses, and systems to survive, adapt and grow, no matter what chronic stresses and acute shocks they experience. (*100 Resilient Cities*)

The Resilience Dividend: The practice of designing projects and policies to address multiple challenges at one time, improving services and/or saving resources i.e. the net social, economic and physical benefits achieved when designing initiatives and projects. (*100 Resilient Cities*).

Multiple Dividends accrue from investment in disaster risk reduction and can: (1) Avoid or minimise losses when disasters strike. (2) Stimulate economic activity in a zone as a result of reduced disaster risk; and (3) develop co-benefits, or uses, of a specific investment.

Absorption is the ability to absorb shocks or stresses without triggering non-linear, abrupt environmental change (in the wider sense of ‘environment’ not just the natural environment). *New Zealand Treasury Resilience and Future Wellbeing 2018*.

Adaptation changing something in order to make it suitable for a new use or situation. In a climate change context, the UN Development Program calls it a process by which strategies to moderate, cope with and take advantage of the consequences of climatic events are enhanced, developed, and implemented. (*Oxford Dictionary*).

Mitigation is the action of reducing or minimising the severity and seriousness of any harmful impact (*Oxford Dictionary*).

Resilient Qualities are the characteristics of resilient projects and systems. The 100 Resilient Cities define these characteristics as reflective, resourceful, robust, redundant, flexible, inclusive, and integrated.

5.2 Investing in Resilience

5.2.1 Understanding our Resilience Challenges

Section 4.3 of the SAMP detailed the ‘shocks and stresses’ (disruptors) that provide resilience challenges for Christchurch. The table below summarises how each of these has the potential to negatively impact our assets and services:

	Disruptors	Potential Impacts on our Assets and Services
Chronic Stressors	Climate Change	<p>This will have a significant impact on the City, particularly the coastal areas, with likely effects being more regular inundation or accelerated erosion. A key decision will be on adapting vs retreating for our coastal communities. For the transport network the routes and assets on the coast will need a strategy to either protect them from storm surges, or a decreased Level of Service before a managed retreat. Either way there will be a cost that rate payers need to cover.</p> <p>For a 1.0m sea level rise scenario, approximately 110km of the road network is at risk of inundation. These assets are valued at \$65.6 million. Council has started to assess the risks involved.</p> <p>From a contribution perspective 53% of carbon emissions in Christchurch City is from the transport sector: 36% from road transport. How we manage our assets can influence the level of emissions. For example LED lighting investment, but also network management and prioritising movement by other modes, shared transport, public and active transport.</p>
	Globalisation	Globalisation has an impact on transport. As goods and services are moved it will have an effect which parts of the city are busy. Council has already shared its network view via the Network Management Plan Model, which indicates what the primary networks are, which streets are suited for trucks, buses etc.
	Demographic Changes	Increasing population and demand for services with a reliance on private vehicle use. Increasing demand on the assets, reduces the life of the asset and results in unreliable journeys. Shifting demand for services away from the single occupancy vehicle, to meet a need for integrated land use and transport planning through zoning and investment in sustainable modes of transport.
	Population Health	Health, wellbeing and liveability. Shifting demand for services to have more benefit on these outcomes. For example Public health issues related to levels of inactivity and poor air quality as a result of NO2 and PM10 emissions (transport not the main contributor but a significant one). Asset Management to support Central city regeneration and increasing residential living.
	Housing and Social Inequity	The way fuel is taxed can be considered regressive as it will disproportionately impact low-income households who tend to have older, less fuel efficient cars. However, as car technology improves these costs will likely be reduced.
Acute Shocks	Seismicity	The 2010 and 2011 earthquakes showed that while road pavement may be resilient, bridges and retaining walls are the key lifelines for both people and utilities to cross the rivers in the region. A number of structures across the city and region are still vulnerable to earthquakes, and are likely to be damaged such that they are no longer useable. Going forward there will need to be a focus on ensuring that structures are appropriately resilient.
	Tsunami	Christchurch’s coastal community is susceptible to tsunami impact, however, the primary role of the transport network in this instance is to provide evacuation routes.
	Flooding	Parts of the Transport network are susceptible to flooding, particularly around the Avon and Heathcote Rivers.

Table 5-1: Potential Impacts of Resilience Disruptors

5.2.2 What transport actions are needed to reach zero net emissions?

Advocate for change:

- Increase carbon price and fully reflect this in fossil fuel costs (transparent market signals).
- Minimum emissions standards for all imported vehicles.
- Differential pricing for more polluting vehicles (rebate scheme to lower cost of more efficient and zero emission vehicles).
- Regional fuel tax to cross subsidise public transport, walking and cycling.
- Lower the age of fleet – vehicle retirement / recycling programme (promoting safer cars will do this).
- Waka Kotahi NZ Transport Agency to actually prioritise public and active transport investments.
- Incentives for zero emission vehicles and charging infrastructure.
- Nationwide behaviour change programme.
- Sustainable bio-fuel content in fuels (made from agricultural by-products and bio-wastes).

Reduce the need for travel

- Design neighbourhoods with local services and amenities (15-minute neighbourhoods).
- Design neighbourhoods and activity centres to enable public transport, walking and cycling.
- Focus new development within existing neighbourhoods, near amenity, around key activity centres and public transport routes.
- Encourage homes to have no car parking, for central city and activity centres.
- Digital connectivity - enable and encourage working from home and remote attendance of meetings / conferences, with improving quality of internet connections and online services etc.
- Encourage local / regional activities and holidays (limit long-haul flights).
- Measure to manage your personal, household, organisation travel including apps to help people understand their footprint.
- Tax incentives for company cars applied to cycles and bus travel (incentivise business).

Change the way we travel

Change behaviours:

- Travel demand management plans in all schools, large businesses and for all major events.
- Role model and showcase needed behaviours e.g. normalise public transport (away from 'loser cruiser', option of last resort) and normalise one car and no car households.
- Encourage climate smart driver behaviours – slow and smooth travel.
- Fly less – especially long-haul flights.
- Mobility as a service – seamless access to all modes and information.

Vehicle efficiency:

- Properly maintain vehicles and tyre pressure – prompts needed at petrol stations.
- Fleet management – green fleet approaches.
- Choose more efficient and safe vehicles (right choice app).
- Encourage dual occupancy and multiple tasks with each trip.

Zero emission transport:

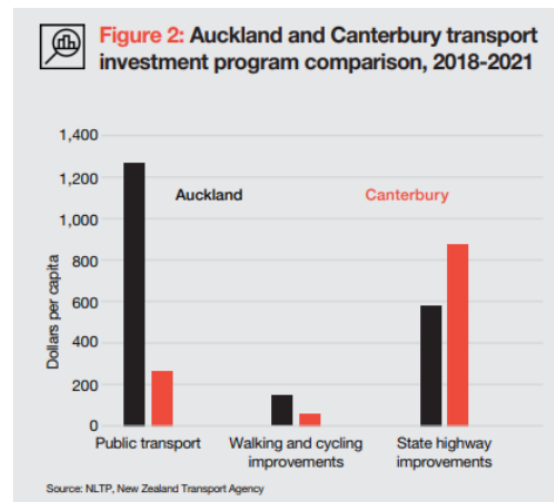
- Encourage cycle commuting – Bikewise Challenge, Biketober etc.
- Encourage uptake of zero emission vehicles – e.g. Take Charge Christchurch.
- Wide deployment of vehicle charging infrastructure.

Low carbon transport system:

- Measure to manage - understand whole of life greenhouse gas emissions (e.g. REGGE, plus other tools).
- Include cost of carbon within business case and decision making (e.g. ISCA or Green Roads).
- Encourage low carbon lifecycle - smart design, sustainable procurement, efficient construction and maintenance, recycling etc.
- Full deployment of LED street lighting.
- Moratorium on motorways (no new motorways unless they improve public transport and active travel).
- Actually prioritise walking, cycling and public transport – service and network enhancements.
- Free public transport - create a step change uptake of service (covered by regional fuel tax).
- Discourage vehicle use – parking charges, parking spaces, road layout, speed, road charges.
- Adopt “Streets for People” criteria / principles in the design and function of the network.
- Design standards require low carbon products, designs, construction and operations.
- Ability to innovate and adopt continual improvement.
- Extensive roadside tree planting.

What actions would make it worse?

- Build more motorways and wider roads to speed up traffic and allow more distant living and travel.
- Encourage housing in remote locations and daily commuting to Christchurch.
- Design new neighbourhoods with no local shops or services.
- Design all homes and development around vehicle parking.
- Offer free parking everywhere (central Christchurch parking cost estimate \$185 million per year).
- Build more car parking – on street, parking buildings and retail parking spaces.
- Encourage many short vehicle trips like school drop-offs and work commuting (70% of trips less than 2km and 60% less than 5km).
- Make it dangerous to walk and bike around the city (Christchurch 4th highest in New Zealand, 120 people per year, 40% cyclists yet only 4% of trips).
- Ignore emissions and climate change in decision making.
- Build shopping centres in remote locations with poor bus, walking and cycling options.
- Increase the cost of public transport (Christchurch lowest public funding in New Zealand).
- Limit public transport routes and times (Christchurch underinvestment in public transport).
- Reduce fuel costs.
- Allow cheap and polluting imported cars (reject rebate schemes, no emissions testing or standards).
- Make SUVs our most popular cars.
- Increase household expenditure on travel (increased 57% over the last decade).
- Normalise vehicle ownership (New Zealand third highest car ownership per capita in world).
- Don't let people know the true cost or impact of private vehicles or climate change.
- Teach youth how to drive, but not how to bike safely.
- Hold major events without travel planning.



Source: PwC [Spotlight on Christchurch](#)

5.2.3 Resilient Projects or Activities in this Plan

The following projects and programmes to build the resilience of our assets are already underway and/or are included in Council's Asset Management Plan programme. These projects will position Christchurch to be better prepared for, and more resilient to, the disruptions identified in the Resilient Greater Christchurch Plan as most likely to impact community wellbeing.

Table 5-2: An Accessible City

Project Description	The Recovery Plan supports the re-establishment of central Christchurch's function as the primary activity centre for greater Christchurch. Ensuring central Christchurch has reliable, safe and effective and efficient connections to the rest of Christchurch and Canterbury is vital for the recovery of the central city and of the wider region. Responds to the following shocks and stressors - Population health, demographic change, and post-earthquake recovery.
Scope and Expected Impact	The Canterbury Earthquake Recovery Act (CER Act) required Council to develop a draft Recovery Plan (Central City Plan) for the Central Business District (CBD) which was presented to the Minister for Canterbury Earthquake Recovery within nine months of the legislation being enacted. Share an Idea generated 106,000 ideas from the community for the redevelopment of the Central City following the devastating earthquakes. These ideas are reflected in the draft Central City Plan. The final draft Central City Plan documents developed by the Council informed and shaped the CCDU's Christchurch Central Recovery Plan.
The Case for Change	Christchurch Central City Recovery Plan https://www.ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/plans/central-city-recovery-plan/
The Resilience Dividend	The central city transport system will provide a range of travel options that are flexible and resilient, able to accommodate projected population growth as well as supporting growth in travel by public transport, walking and cycling.
Further Opportunities	Opportunities to future proof the system through the use of new and smart technologies will be explored.

Table 5-3: LED Street Lighting Upgrade

Project Description	Council are responsible for the management/operation of 39,500 council owned lights as part of the Christchurch street lighting network. Of these, 38,000 lights are associated with the road network. Council are now in the process of converting the remaining Waka Kotahi NZ Transport Agency subsidised non-LED lights (approximately 28,000) to LED lights.
Scope and Expected Impact	The principles used in delivery of the LED conversion is to minimise whole of life cost (including network connection costs) while achieving appropriate lighting levels and minimising impact on the environment and adjacent residents.
The Case for Change	The conversion of the existing street lighting network to LEDs provides an opportunity to make a significant reduction in energy consumption and CO ₂ emissions as well as the financial benefits due to reduced energy consumption and maintenance. This has significant economic, social and environmental consequences. As an example, street lighting is the second largest business activity in the Council in terms of energy use. The LED conversion project is strongly aligned to Council policy documents, schemes and plans.
The Resilience Dividend	The project will deliver the following benefits - 71% energy saving and 1,489 tonnes of CO ₂ saved.
Further Opportunities	A new maintenance contract has been let which started on 1 November 2018. This contract includes a planned maintenance programme where lights are cleaned and lamps replaced when they reach the end of their life. It also includes the delivery of the accelerated conversion to LED and renewals. This allows the maintenance and installation to be coordinated to maximise efficient use of resources.

5.2.4 Building the case for Resilience Investment - 2021 LTP and beyond

Often, we will need to do further work to build a case for future investment in resilience e.g. information/data, policy directions, guidelines, modelling, etc. These opportunities are the basis for a potential investigatory programme of work to inform the 2024 and 2027 LTP's and are summarised in the Table below.

Disruptor	Opportunities	Timeframe	Resources
Effects of Climate Change	As discussed in Section 5.2.1 approximately 110km of the road network is at risk of inundation for a 1.0m sea level rise scenario. To take this into account all assets that have useful lives greater than 20 years will have their intervention processes amended to incorporate specific site analysis e.g. for a bridge renewal the levels will need to be checked and future proofed. This is explored in further detail in Sections 7 and 8.	This will require further planning and will be incorporated into the 2024 LTP.	OPEX for planning works, and CAPEX for design and construction
Major seismic event e.g. the Alpine Fault 8 rupture scenario	Christchurch can prepare for this by putting in place a targeted strengthening programme for key bridges and retaining walls. This will add value by extending the life the structures and ensuring that they are more capable of handling earthquakes up to magnitude 8.	This work is being prepared as part of the 2021 Asset Management Plan. It will effectively be an option for acceleration of works.	OPEX for planning works, and CAPEX for design and construction
Continuing demographic change	As our population ages their travel choices will change and the services Council offer will need to adapt.	2024	OPEX
Societal habit change due to technology such as smart phones and the availability of information	Embracing this technology will help to reduce our operations costs around asset maintenance. However, the way in which these technologies evolve and how individuals use and adopt them is extremely unpredictable – and so our planning needs to be agile to continued change, rather than based upon the step-wise extension of current practices.	2027	OPEX and CAPEX
Micro-mobility as a service type offerings such as rental scooter (eg Lime)	Emerging international evidence that micro-mobility and personalised journey planning can make positive contributions to reducing single vehicle occupancy – and enhancing non-motorised travel in city centres.	2024	OPEX
Electric & Autonomous vehicles	As technology, shifts there will be a need to move to centralised control of general traffic, public transport and parking systems.	2030	OPEX and CAPEX

Table 5-4: Opportunities to Improve Resilience

5.3 Managing Risks

Council's approach to managing risk is detailed in its Risk Management Policy (including a risk assessment framework) which is summarised in Section 4.3 of the SAMP as a background to the content of this Section.

5.3.1 Strategic Risks

Business unit leads have the responsibility for identifying, recording and monitoring business risks using Promapp that are rated as high or very high. The reporting within Promapp ensures that there is visibility of the risks Council is managing. The Council risk framework sets out the levels at which residual risks are escalated, reported and governed.

The strategic risks identified in Promapp in relation to this activity include:

ID#	Description of Risk	Residual Risk Rating
R00558	Major infrastructure fails and causes network failure of core services.	Very High
R00222	Serious injury or fatality on the transport network.	Very High
	Post COVID-19 Council's revenue is uncertain, and this has implications for Transport services and projects. At the time of writing this document staff don't yet understand the full impacts of this. Hence it has been added as a very high risk rating.	Very High
	Staff, Contractors and others working with the Council do not comply with the Health and Safety act to adequately (so far as reasonably practicable) protect their health and safety (including wellbeing).	High
R00550	Project cost over-runs, non-delivery of capital projects and network inconsistency as a result of engagement with the Kiwi Rail network and organisation.	High
	Operational budgets will be overspent with an impact on rates.	High
	Council fails to deliver specific high profile capital projects within an acceptable margin of agreed/approved time, budget and scope.	High
R00272	Transport Programme is not delivered to the expected timeframes, quality and cost.	High
R00599	Project decisions are/or will be made with incomplete and insufficient asset condition information.	Medium
R00567	Council activities fail to comply with District Plan and/or conditions of approvals, licenses and consents (from regulatory bodies).	Medium
R00391	Third party funding for transport is not realised.	Low

Table 5-5: Business Risks included in Promapp

The full detail of these strategic risks can be found in Promapp, along with further explanation of the cause, consequence, treatments and signoffs. Here is the link to the register in Promapp <https://go.promapp.com/ccc/Risk/Register#>

5.3.2 Activity specific risks

ID #	Risk Area	Risk Description – cause and result	Inherent rating	Treatments in place	Residual rating
	Planning	Problems / issues / defects are not identified via Council processes e.g. routine condition inspections. Therefore they are responded to reactively at a later date.	High	Audits	Low
		Budget or time constraints do not allow for most appropriate intervention.	High	Prioritisation policy and process	Low
		Procurement process not understood	Medium	Specific support provided by Council Procurement Team	Low
	Management	Breach of consent	Medium	Active monitoring	Low
		Data management	Medium	Audits	Low
		Resourcing	Medium	Monthly management meeting	Low
		Decision making	Medium	Monthly management meeting	Low
	Delivery	Each project has a specific risk register. These are stored in TRIM and high and very high risks are raised with the Transport Management Team.	Medium	Active monitoring	Low
		Works not delivered on time	Medium	Monthly monitoring	Low
		Project not completed within budget	Medium	Monthly monitoring	Low
		Contractual dispute	Medium	Escalation processes	Low
	Physical	Member(s) of the public are harmed due to failure of the transport network e.g. a bridge collapses due to insufficient live load capacity, traffic signals fail.	Medium	Planning work incorporates condition and risk	Low
		Crash occurs	Medium	Safety programme	Low
		Sabotage or terrorism	Low	Security measures as appropriate	Low
		Natural hazards – earthquake, storm, flooding, tsunami, sea level rise etc.	High	Operational response	Low

Table 5-6: Activity specific risks and treatments

5.3.3 Risk Mitigation Strategies

Risk management is inherent in all of Council's Asset Management processes. Significant risk management strategies for this activity include:

- **Management escalation and review**

The Transport unit holds a monthly management meeting to review progress on operational activities, and intervene where required. In support of this a monthly steering group has been set up to provide governance on capital projects.

- **Asset Design and Delivery**

For Council delivered projects, all elements are designed and delivered in accordance with Council's Infrastructure Design Standards and Construction Standard Specification. These two documents set in place the expectations of fit for purpose design and construction practices. For example, this includes elements such as pavement design life, bridge importance level, and CPTED requirements.

During construction, quality assurance processes are in place to confirm that the works are built in accordance with expectations and are fit for purpose.

Furthermore assets designed and constructed by other parties that are intended to be vested to Council (e.g. subdivisions) are also required to comply with Council standards.

- **Business cases**

Programmes and projects are well planned and supported through robust business cases. This will allow clarity of decision making.

- **Asset acceptance processes**

Council has processes that cover the handover of assets from third party construction including Transport Steering Group sign off of as-built and safety audit data.

- **Insurance**

Funding for transport activities is sourced from rates, developer contributions (for growth projects), borrowing and (for qualifying expenditure) financial assistance from the National Land Transport Fund (NLTF) managed by Waka Kotahi NZ Transport Agency. On this basis only the major bridges are insured.

- **Business Continuity Plan (BCP)**

This document covers the roles, responsibilities, and procedures developed to enable the City to keep operating should key risks to the city's transport network eventuate. The BCPs are designed to enable the transport system to recover quickly post a disaster or a major incident, and enable the restoration of essential services to ratepayers in Christchurch as quickly as possible.

6 How we Deliver our Services

6.1 Historical Context

A fundamental role of local authorities is to supply core services that meet the needs of their communities. The specific services that are provided, and how they are provided, depend on the level of service required by the community.

Transportation services enable people to move beyond their property boundaries to access essential services and to interact with other people, as well as for the distribution of freight, goods and services. It is therefore generally regarded as one of the most essential services, and Council's role is to manage transport assets to provide safe, easy and comfortable use of the network. The road network corridor also provides access internally and to utility companies for power, telecommunications, water supply and waste disposal activities.

The rationale for Council ownership of roads includes statutory requirements to engage in roading activities contained in the Local Government Act 1974, the Resource Management Act 1991, the Local Government Act 2002, and the Land Transport Management Act 2003 and subsequent amendments.

The Christchurch City Council was established in 1862. Road boards, borough councils, county councils and district councils existed in the Greater Christchurch area. Many amalgamated with the city in 1903 and others in 1989. Banks Peninsula became part of Christchurch City in 2006.

The Council Archive holds records created by a number of these superseded entities.

<https://www.ccc.govt.nz/the-council/how-the-council-works/council-history/council-archives>

In 2006 the Banks Peninsula District Council and Christchurch City Council merged to become one council. For services apart from those delivered from service centres, the Council agreed to the levels of service being ring-fenced for five years from the date of reorganisation. In the interests of consistency and efficiency, the Council's intention was, over time, to align services with those it provides for city residents. The Council appreciated that situations would arise where exact mirroring of existing city services may be impractical or inefficient and in such cases the intention was to work with Banks Peninsula communities to develop mutually acceptable and practical outcomes.

6.2 Business Structure

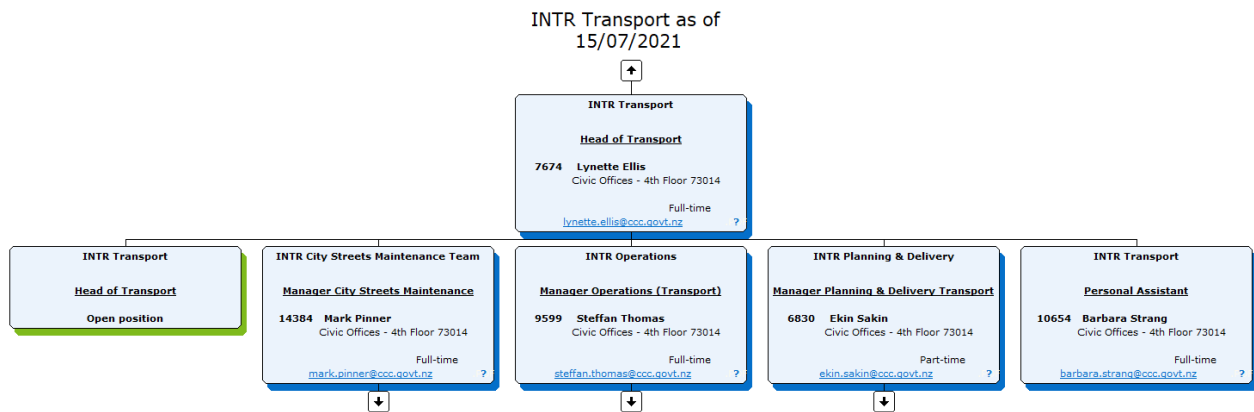


Figure 6-1: Transport Unit business structure

- **Funding**

Funding for transport activities comes primarily from three distinct sources:

- Christchurch City Council rates;
- National Land Transport fund administered by Waka Kotahi NZ Transport Agency; and
- Development Contributions.

Environment Canterbury (ECan) is funded through its own rating framework and the National Land Transport Fund. In addition, parking revenue is provided through user fees and there are a number of minor revenue streams; for example advertising, commercial rent and trenches fees.

- **Governance**

Governance of all transport activities currently resides with Christchurch City Council through its management structure. This is split into Strategic Planning that is the responsibility of the Strategy and Transformation Group and planning, operations, maintenance, project delivery and funding that are the responsibility of the City Services Group through the Transport Unit.

The only exceptions to this governance framework are:

- provision of Passenger Transport services that is the responsibility of ECan and co-ordinated through the Greater Christchurch Public Transport Joint Committee of which Council is a member.

- **Operations and Service delivery**

Operations and Service Delivery are a combination of in-house units and tendered contracts with private organisations:

- organisational management, asset management, asset planning, traffic planning and management, public space management, education and communications activities are all delivered internally;
- street space enforcement activities are delivered internally.;
- maintenance and construction activities are all delivered by contract with external private organisations.

6.3 Key Service Delivery Partners

Waka Kotahi NZ Transport Agency

As the agency for government funding of transport Waka Kotahi NZ Transport Agency manage and distribute the National Land Transport Fund (NLTF) in accordance with the Government Policy Statement (GPS) on a three-yearly cycle. Note that the National Land Transport Act outlines obligations for using National Land Transport funds

Further to this, Waka Kotahi NZ Transport Agency is the road controlling authority responsible for the State Highway network and they manage the development of standards to be used by the transport industry in the delivery of transport services and management of roading networks.

The Waka Kotahi NZ Transport Agency Planning and Investment Knowledge Base is a web-based manual providing a framework along with relevant policies and procedures.

Environment Canterbury (ECan)

ECan is responsible for co-ordination of transport planning at a regional level and management of the Regional Land Transport Plan. They are also responsible for delivery and operation of bus services; excluding the supporting infrastructure such as bus stops, bus lanes etc., which are a Council responsibility. ECan are funded from the National Land Transport Fund and Regional rates.

Roading Efficiency Group (REG)

The Road Efficiency Group (REG) is a collaborative initiative between Waka Kotahi NZ Transport Agency, Local Government New Zealand (LGNZ) and the Road Controlling Authorities (RCAs) of New Zealand. It was formed in 2012 as the authority to implement the recommendations of the broader Road Maintenance Task Force.

The REG partnership is focused on delivering change that will transform the transport sector as the New Zealand transport network transitions from private-vehicle/freight centric to a modern integrated system that includes all modes and available technologies and aligns the objectives of local, regional and central government.

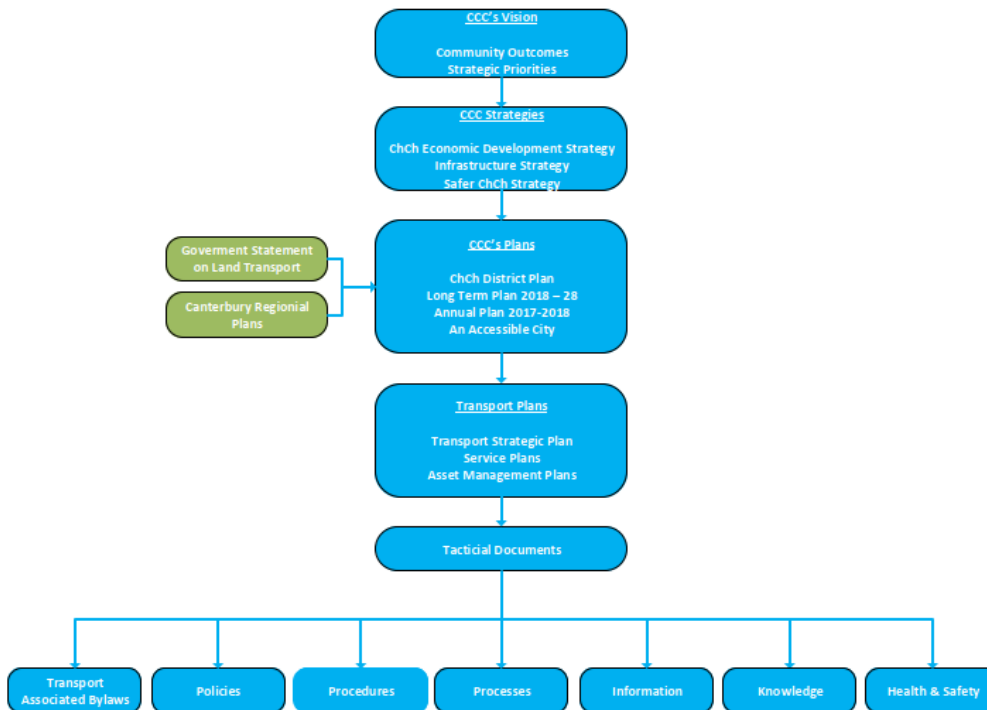
More recently REG have been responsible for the development and implementation of the One Network Road Classification (ONRC) system. ONRC specifies performance metrics and levels of service for each road classification to be utilised and managed by roading authorities across the country to bring national consistency.

Public Transport Joint Committee

The Greater Christchurch Public Transport Joint Committee was set up in 2016 to support increased collaboration and integrated decision making between Environment Canterbury, Christchurch City Council, Selwyn District Council and Waimakariri District Council. It aims to provide clear and decisive leadership with respect to the provision of public transport services and infrastructure in Greater Christchurch.

6.4 Business Strategies

The Transport Unit has a number of strategies that guide the work undertaken by staff. Further to these strategies there are a number of key tactics documents, which outline how these strategies will be implemented and managed. Below is a diagram outlining the relationship between these documents.



Included below is a summary of the most significant documents within this framework.

Policy	Advertising on Bus shelters policy (2000)	Kerb Parking Limit Lines (2010)	Road Stopping Policy
	Bus Stop Location (1999)	Living Streets Charter Policy	Street Lighting Policy
	Bus Passenger Shelters and Seats (1993)	Maintenance of private Rights of Way Policy (2002)	Structure on roads Policy
	Footpath Battens Policy	Pedestrian accessways closure Policy	Suburban Car Parking Policy (DRAFT)
	Footpath Berms Policy	Procurement Policy	Traffic management and road level classifications Policy
	Footpath extensions to expand cafes onto the roadway Policy	Public streets enclosures Policy and Fees charges	Tree Planting in Streets Policy
	Heavy Vehicle Parking in a Residential Area (2008)		Vehicle entrances and footpaths Policy
	Intersection Design for Persons with Disabilities		
Strategy	Christchurch Economic Development	Infrastructure Strategy	Safer Christchurch Strategy 2016-2021
			Sustainable Energy Strategy 2008-2018
			Transport Strategic Plan 2012-2042
Plans	Service Plan for Active Travel	Christchurch City Council Christchurch Central Parking Plan (2015)	Retaining Wall Repair and Replacement Programme (Plan)
	Service Plan for Parking		
	Service Plan for Public Transport Infrastructure	Christchurch City Road Safety Action Plan 2017/18 (Plan)	Footpath Resurfacing Programme 2017/18 (Plan)
	Service Plan for Traffic Safety and Efficiency	2018 Transport Asset Management Plan	LED Replacement Programme (Plan)
	Service Plan Roads and Footpaths	Regional Land Transport Plan (DRAFT)	Travel Demand Management & Road Safety Education Team Plan FY19

Figure 6-2: Transport Unit business framework and strategies

6.5 Business Reviews Undertaken

A service delivery review was undertaken in August 2017, to fulfil the requirements of Section 17A of the Local Government Act 2002.

The detailed analysis has concluded that the status quo remains the most effective way forward at this stage. Although the performance analysis outlines areas for improvement, changes in governance, funding or service delivery are not the best way forward. There are a number of key reasons including Waka Kotahi NZ Transport Agency restrictions and the large scale / urban fabric that we operate within, that impacts any potential scale savings through joining with other local authorities.

Recommended Option

Activity	Governance	Funding	Service Delivery
Management	CCC	CCC	CCC
Deliver subsidised roading	CCC	CCC	Other (Tendered contract)
Deliver non-subsidised roading	CCC	CCC	Other (Tendered contract)
Operations - Safety	CCC	CCC	CCC
Operations – Active Travel	CCC	CCC	CCC
Operations - Parking	CCC	CCC	CCC

Table 6-1: Transport Unit business review

6.6 Significant changes planned for the activity

There are no major changes planned at this stage

7 Portfolio Lifecycle Management Plan

The lifecycle management plans detail how the Council plans to manage the network of assets at the agreed levels of service (defined in Section 3) while optimising lifecycle costs.

Section 7 provides the lifecycle management information and strategies at a portfolio level. Section 8 provides this information at an asset class level.

7.1 Asset Lifecycle Approach

Council has established a lifecycle management framework, aligned to the *International Infrastructure Management Manual* as illustrated in Figure 7-1. Section 7 and 8 are structured to align to the lifecycle stages.

Asset Lifecycle Management

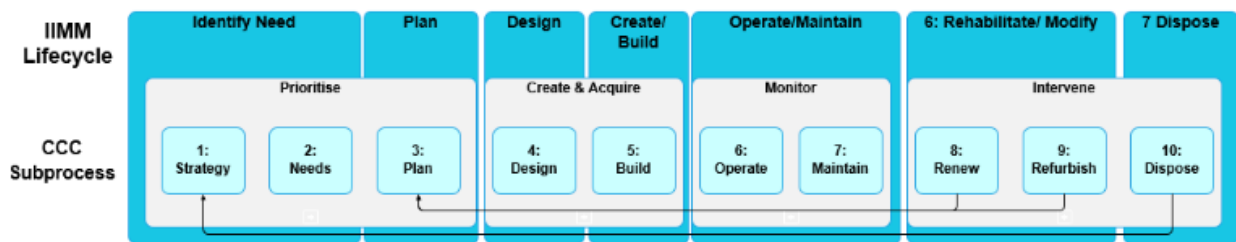


Figure 7-1: Asset Lifecycle Categories

7.2 Our Asset Portfolio

7.2.1 Location and Value

Council owns, plans and manages the 2,500 km local roading network that supports all transport activities. The assets covered by this Asset Management Plan are shown in the following Table along with quantity and value

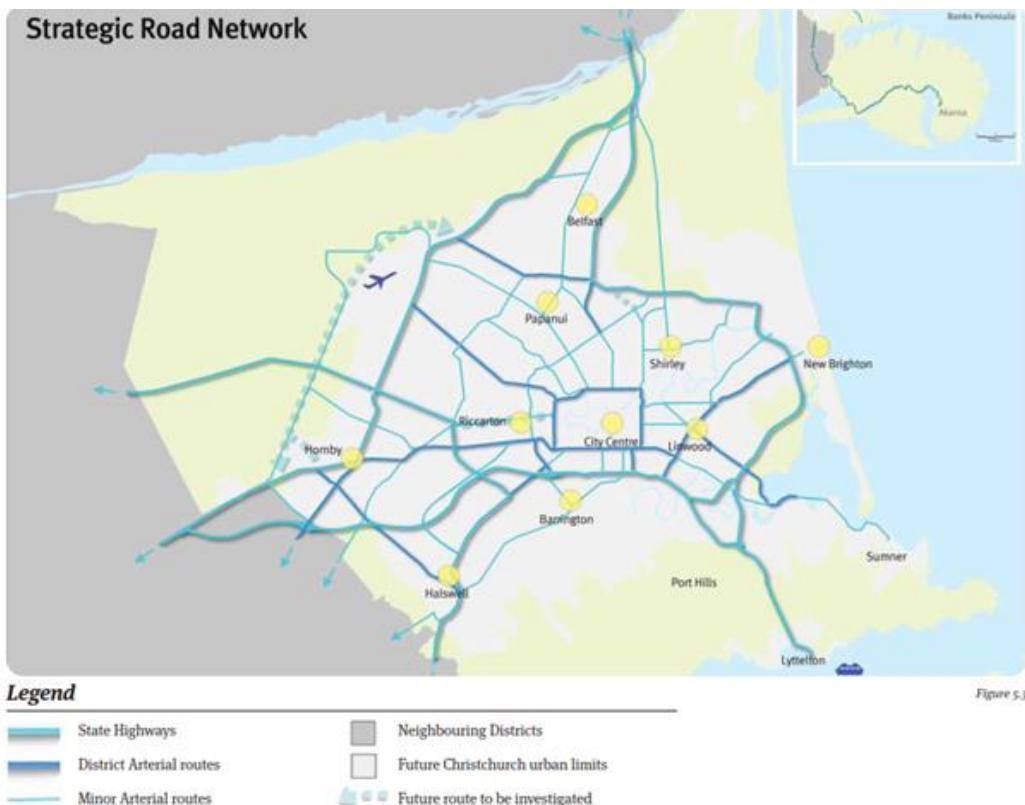


Figure 5.3

Asset Category	Quantity	Replacement Cost	Depreciated Replacement Cost	Annual Depreciation
Carriageways	2,178.8 km sealed 323.7 km unsealed	\$1,677,704,088	\$986,359,385	\$21,519,797
Road Drainage	3,593 km kerb & channel 34,195 sumps & associated pipes	\$681,649,840	\$371,377,145	\$7,820,342
Footpaths	2,581.7km	\$456,083,629	\$255,515,689	\$9,616,184
Bridges & Structures	353 roads bridges & 116 foot bridges 103 culverts, 1 ford & 2 underpasses 1,611 retaining walls Guardrails, railings and gantries	\$511,554,455	\$197,468,348	\$8,470,555
Road Lighting	38,145 lights & 20,327 poles.	\$110,001,791	\$59,284,959	\$3,491,850
Traffic Systems	348 signalised intersections 247 CCTV sites & X school speed zone sites	\$50,319,814	\$28,303,616	\$2,249,484
Traffic Services	55,979 signs & city wide marking.	\$40,242,885	\$16,090,682	\$2,001,019
Road Landscaping	65,720 trees Berms and 9,592 landscaped sites	\$363,217,388	\$206,605,539	\$4,412,457
Cycleways	225 km of on-road lanes 115 km of shared paths			
Bus	519 bus shelters, signs and furniture.	\$2,514,661	\$834,485	\$91,299
Tram	4km of tram line	\$32,793,774	\$27,679,190	\$488,258
Parking	1,200 on street metered spaces 437 parking meters.	\$9,649,875	\$2,723,888	\$761,072
Total		\$3,935,732,200	\$2,152,242,926	\$60,922,317

Table 7-1: Summary of Assets and Value (from 2019 Valuation Report)

7.2.2 Critical Assets

Critical assets are those whose failure would likely result in a significant disruption in service and financial, environment and/or social cost, and therefore warrant a higher level of asset management. The criteria used for assessing criticality for transport assets are as follows.

Risk evaluates events without focusing on the specific systems leading to the event. Analysing risk is important in order to prepare for, mitigate, or reduce the likelihood or impacts of events on a broader scale. Risk deals with both the probability of a failure and the severity of its effects. Criticality evaluates failure of a specific item within a larger system. It is a measure of how important an asset is to your level of service. It is rated against a number of weight categories in order to establish a criticality score. The more critical the asset, the more of an impact it will have if it fails. Establishing criticality allows attention and resources to be proactively allocated to the reliability and fault detection of critical systems or components. A critical asset may not be high risk if it's not likely to fail, and an asset that's highly likely to fail may not necessarily be critical.

- **Score of 5 - Critical**

A vital asset or route whose failure would have significant economic, and social impact or complete degradation of levels of service, to the city as a whole or to a significant lifeline route with no alternative, ensuring access or continuity of supply of essential services throughout the city during an unforeseen event.

- **Score of 4 - Essential**

A major asset or route whose failure would have a serious economic or social impact or complete degradation of levels of service to more than one ward, or is an alternative access path to significant lifeline facilities, ensuring access or continuity of supply of essential services to more than one ward during an unforeseen event.

- **Score of 3 - Important**

An important asset or route whose failure would have a major economic or social impact or serious degradation of levels of service to a ward, with degraded access or continuity of supply of essential services during an unforeseen event.

- **Score of 2 - General**

An asset or route whose failure would have some local economic or social impact, and some degradation of levels of service to a limited area, with no locally important lifeline facilities, and sufficient alternative routes to ensure access or continuity of supply of essential services during an unforeseen event.

- **Score of 1 - Minor**

An asset or route whose failure would have virtually no impact on local economic or social activity, and only minor degradation of levels of service if any, restricted to a single street or two. With no need for alternative routes to ensure access or continuity of supply of essential services during an unforeseen event.

Definitions mainly based on those in the Waka Kotahi NZ Transport Agency Criticality Review 20160923 RevB.

TRANSPORT CRITICALITY ASSESSMENT TOOL							
Route Name Road Name Start Point						End Point	Criticality
Parameter	Options	Consequence	Weighting	Score	Score		
ONRC Road Classification The onrc classifications take into account: Typical daily traffic, Heavy commercial vehicles, Buses Active modes, Linking places, Critical connectivity Freight tonnes and values at ports, Airport passenger numbers, Significant tourism destinations, Access to tertiary or regional	National (HV)	Equivalent to CCC Major Arterial	130	80	1. Critical		
	National	Equivalent to CCC Minor Arterial	100				
	Regional	Equivalent to CCC Main Distributor	80				
	Arterial	Equivalent to CCC Local Distributor	60				
	Pri Collector	Equivalent to CCC Collector	40				
Lifeline Access to Lifeline utilities: This would explicitly cover routes which are priority lifeline routes, or provide access to major lifeline facilities. Access to essential services: This would explicitly cover routes which provide access to essential services as identified by a given community or region. These may include hospitals and large age-care facilities, ambulance, fire, police and emergency ops centres, major utility control centres, welfare centres, key retail outlets – hardware stores, construction resources and supermarkets, schools and sector posts and major	4	>= 5 locally-significant utility assets, or >= 3 regionally-significant assets.	130	80	2. Essential		
	3	Three or four locally-significant utility assets, 1 or more regionally-significant assets	80				
	2	One or two locally-significant utility assets.	40				
	1	No significant utility assets.	0				
	4 Score >=6	For each Hospital and large aged-care facilities	Score 3			130	
3 Score 3 to 6	For each Ambulance, fire, police and emergency ops centres (& dialysis)	Score 2	100				
2 Score 1 to 3	For each Major utility control centres – Council, Telecom and Power	Score 0.5	60				
1 Score <1	For each Designated welfare centres	Score 0.25	20				
	For each Key retail outlets – hardware stores, construction resources (contractors) and supermarkets	Score 0.2	0				
	Priority 6 Schools and sector posts, major industry	Score 0.15	0				
		Total Score	0				
Other Bridges/Culverts (If more than 1 bridge on route, use lowest bridge score) Retaining Walls Alternative Routes	Critical	Bridge Criticality Tool score 1 or 2	70	40	3. Important		
	Essential	Bridge Criticality Tool score 3 or 4	50				
	Important	Bridge Criticality Tool score 5 or 6	40				
	General	Bridge Criticality Tool score 7 or 8	20				
	Minor	Bridge Criticality Tool score 9 or 10	0				
Other Subject Matter Expert Correction	Critical	Failure would result in route closure from both directions without a viable alternative route	70	40	4. General		
	Essential	Failure would result in route closure from both directions with a viable alternative route	50				
	Important	Failure would result in limited closure with significant delays	40				
	General	Failure would result in minor inconvenience and delays	20				
	Minor	Failure would cause insignificant inconvenience and delays	0				
Other Subject Matter Expert Correction	Critical	No viable alternative route exists, significant additional travel time and inconvenience	70	40	5. Minor		
	Essential	A viable alternative route of a similar road classification and criticality score exists	50				
	Important	Two or more viable alternative routes exist, near similar classification, possible restrictions	40				
	General	Two or more alternative routes exist with lower classifications, use of traffic restrictions	20				
	Minor	Multiply alternatives available, insignificant delays and inconvenience.	0				
OBJECTIVE SCORE				380			
Subject Matter Expert Correction				0			
TOTAL SCORE				380			

Figure 7-2: Transport Criticality Assessment Tool

7.2.3 Asset Data Confidence

Table 7-3 summarises the asset information available for transport assets both in terms of completeness (% of assets for which that data type is stored) and reliability (using the A-E grading below). Asset data is held in RAMM.

Confidence Grading				
Asset	Quantity	Unit Cost	Age/Life	Overall
Pavement Formation	B	B	B	B
Pavement Basecourse	B	B	B	B
Pavement Sub-base	B	B	B	B
Pavement Surface	A	B	B	B
Berms and Landscaping	B	C	D	C
Bridges and Bridge Culverts	B	B	C	B
Bus Furniture	C	C	B	C
Cameras	D	B	D-E	C
Drainage	C	C	D	C
Footpath	A-B	B	A	A-B
Litter Bins	D	D	E	D
Markings	B	B	D	B-C
Other Street Furniture	D	B	B	C
Other Transport Amenities	B	A	A	A-B
Parking Meters and Other Minor Structures	C	C	D-E	C-D
Railing	C	B	D	C
Retaining Wall	B	B	B	B
SW Channel	B	C	B	B
Sign	C	C	D	C
Street Light	C	C	D	C
Street Trees	B	C	D	C
Tram Assets	B	B	D	C
Traffic Signals	C	B	D	C

Table 7-2: Asset Data Confidence from 2019 Valuation

REG data confidence view

The One Network Road Classification (ONRC) was designed to standardise the performance of our roads throughout New Zealand, aiming to address historical inconsistencies, and promote economic growth.

This can only be achieved if all Road Controlling Authority (RCA) are monitoring and measuring their roads with the same tools and standards consistently over time.

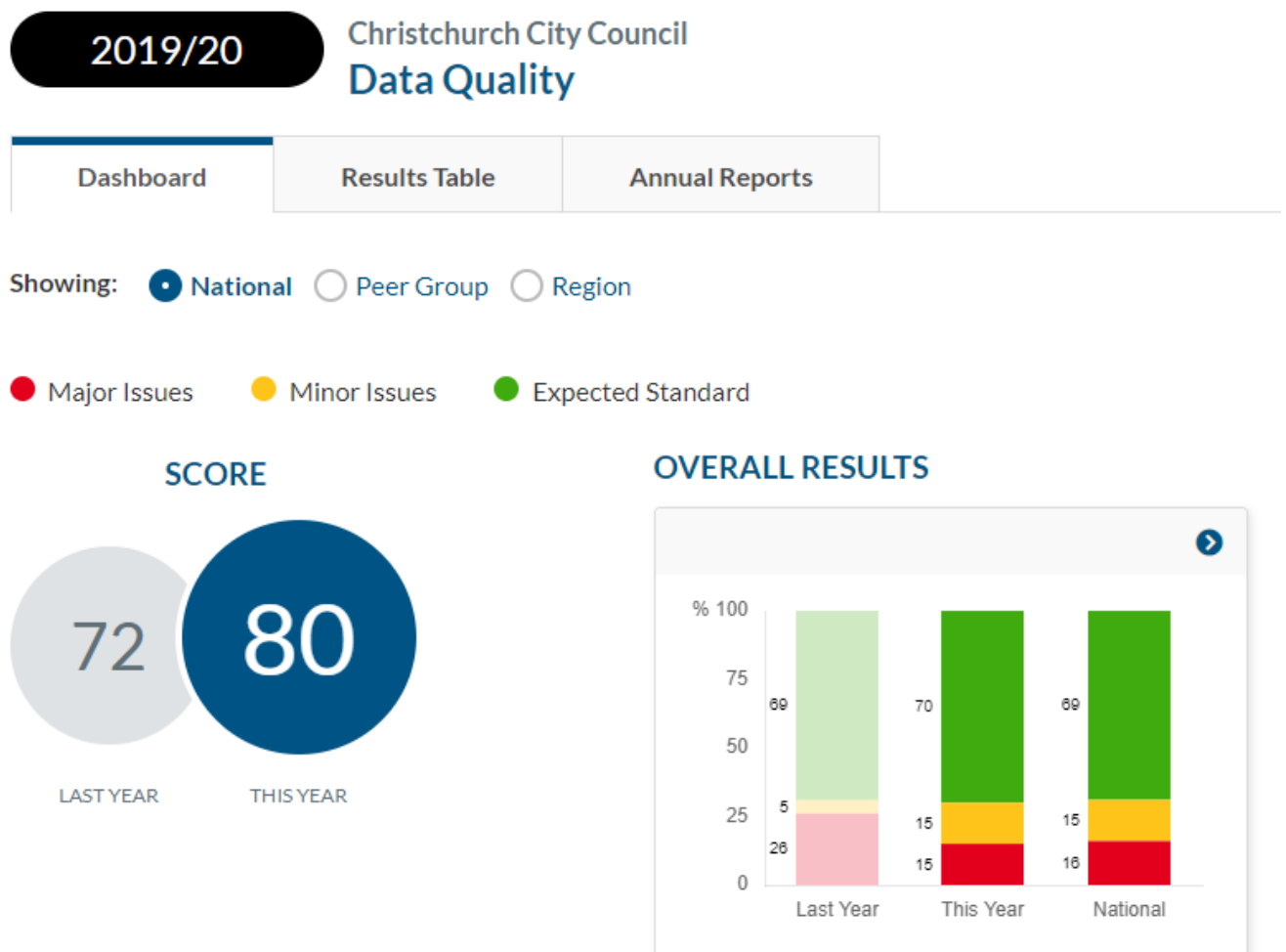
These performance measures support that consistency. They have been developed by subject experts from the Road Efficiency Group (REG) – a collaboration between Local Government New Zealand and Waka Kotahi NZ Transport Agency. When used with the ONRC Performance Measures Performance Measures Reporting Tool (ONRC PMRT), they are a significant resource to help asset managers better understand their network and tell their investment story.

Data is imported into the ONRC PMRT from RAMM by RCA administrators. Crash Analysis System must be updated before an import from RAMM. After an import administrators check for data validation messages and fix any issues in RAMM. Asset managers use the performance measures when developing their business cases for the Regional Land Transport Plan. Regional Champions and experts from REG are available to support you.

Asset managers should also read the ONRC Performance Measures General Guide, which provides strategic overview and context. Further guidance in the form of case studies will be provided for operational use of the ONRC, specific to the field operations and data management.

When using the performance measures, it is important to remember that while there is an element of compliance, they are intended to form the backbone of a thinking process.

The measures complement and interact with each other – you will find your investment story by considering the data across your network and in the national context, rather than focusing on individual performance measures in isolation.



7.3 Asset and Network Planning

7.3.1 Asset planning strategies

- Planning for the transport networks current and future state to 2048 with CTM and CAST transport models and recognising the Greater Christchurch transport area impact as well with Selwyn and Waimakariri District Councils;
- Developing business cases for all modes, general traffic, active modes walking and cycling and public transport under the umbrella of the Case for Change Business Case City Wide priority areas for general traffic safety and journey time reliability;
- Under the Christchurch Transport Strategic Plan and District Plan, planning for future land use growth and population in the city. Investigating and working with developers to service the needs of new neighbourhoods, along with planning for the downstream effects of new roads and major motorways of national significance and the impact effects on communities;
- Providing resource consent advice for new developments both land subdivision and other high trip generation developments, monitoring the network through the network management plan and models;
- Safety and corridor improvements planning within existing road spaces for all modes, to feed into the improvements capital programme for the Long Term Plans. Initiating capital projects through briefs based of planning and investigations, and support for schemes development;
- Plans and business cases for public transport infrastructure improvements including bus priority measures;
- Plans and business cases for cycle network routes to feed destination locations across the city. Manage traffic count data and economic appraisal of projects to support business cases for Waka Kotahi NZ Transport Agency funding;
- Providing policy advice for policies and bylaws including road stopping and structures on roads approvals.

Plan, Strategy, Model	Content	Next review
Christchurch Transport Strategic Plan	Strategic direction for all transport modes.	2020
Regional Land Transport Plan		December 2020
An Accessible City	Central city transport plan all modes	
Government Policy Statement on Land Transport	Guides the investment in transport	2020

Table 7-3: Asset Planning Strategies

7.4 Asset Creation (Design and Build) and Acquisition

7.4.1 Identifying and recording capital projects

New works are those works that create a new asset that did not previously exist or works which upgrade or improve an existing asset beyond its existing capacity. Assets may be developed by Council, by other agencies (Ōtākaro/ Waka Kotahi NZ Transport Agency), or by developers and then handed over on completion of the development. In this Asset Management Plan, a number of projects have been identified through consideration of:

- Level of Service requirements (Section 3);
- growth and demand requirements (Section 4);
- investment in network resilience (Section 5); and
- other asset planning initiatives described in Section 7.2.

7.4.2 Selection criteria

The asset creation plan covers new carriageway assets, or additional assets created through projects which upgrade or improve an existing road asset beyond its existing capacity or performance in response to changes in transport patterns, safety issues, or customer expectations. This includes additional capacity required as a result of changes to Levels of Service and changes to meet new demand (growth).

The types of projects which result in additional carriageway capacity include:

- road network improvements (designated and intersection widening and new major roads);
- new road construction; and
- bus priority.

Other projects which result in enhancements to the network and provide other benefits to road users, but do not necessarily increase capacity, include:

- safety works;
- neighbourhood improvement works;
- major amenity improvements;
- seal extensions; and
- seal widening.

Developers are also responsible for providing new assets through subdivisions (which do have a partial Council funding component to them).

7.4.3 Asset Design

The design phase is where a lot of value can be added to the project. The aim is to report whole-of life costing (CAPEX + OPEX) for the whole project when considering design options. We use today's dollars to report, for the purposes of simplicity.

Council's Infrastructure Design Standard (IDS) governs the standards to which assets are to be designed. This is available on the Council's external website.

7.4.4 Capital Investment Programme

The asset creation plan includes three main streams of asset procurement:

- Council-funded development of the road network is undertaken using funding streams associated with the project types as listed above. Major projects are often indicated in the City Plan where designations exist for land purchase for road widening and new construction;
- privately-funded new roads are those constructed as a result of sub-divisional development and are vested with Council and added to the network upon satisfactory completion. Enhancements to the existing road network directly connecting to new subdivisions can also occur where additional capacity is required; and
- Waka Kotahi NZ Transport Agency funded works – enhancements to the Council controlled road network intersecting with the state highway system can occur where the Waka Kotahi NZ Transport Agency (State Highway Division) initiates a project to improve the state highway. After completion of the Northern Bypass, CNC, CSM2, existing Waka Kotahi NZ Transport Agency roads that are no longer required for the State Highway network will be handed to Council as local authority roads.

New Project Prioritisation

Capital projects are prioritised using a multi criteria analysis (MCA). The highest ranking is given to projects necessary to provide legislative compliance and to maintain the agreed Level of Service delivered by infrastructural assets. Projects that provide for improved Level of Service or respond to growth are evaluated for their contribution to Council's Community Outcomes and the triple bottom line of economic, social and environmental factors. Applying weightings to the factors results in a ranking score.

The current funding system for road network improvements, safety works, and some neighbourhood improvement works is generally dependent on financial assistance from the Waka Kotahi NZ Transport Agency and funding criteria and prioritisation thresholds.

Management of Vested Assets

Developers are required to comply with Council design and construction standards. Both the Infrastructure Design Standards (IDS) and Construction Standard Specification (CSS) are available on the Council website. These set in place the requirements for design, materials and quality. Furthermore, they outline what As-built information is required by Council for handover.

This is administered by Council's Resource Consent team who represent the asset owners to ensure that the sub-division complies with Council Standards and the resource and building consent processes.

7.5 Operations and Maintenance

Council is responsible for delivering safe, sustainable and integrated traffic operations and systems in line with traffic standards and bylaws, to achieve a safer and optimised transport network. This is achieved through a wide range of projects including those related to minor safety improvements, intersection improvements, parking restrictions, public transport infrastructure, speed management road markings and signage. The teams also provide technical advice to other staff and business units, management, elected members and external partners and stakeholders. In addition, the team responds to customer queries and requests for service related to a variety of transport-related concerns, and frequently assist in the development and review of policies and bylaws directly and indirectly related to operation of the Council's transport network.

Further to the items above there are a number of specialist operational functions that Council is required to manage and deliver. These have generally been divided into the following teams to better manage resources:

Asset Protection – the key legal function is to act as Road Corridor Manager, which is a Council delegation. The duties are outlined below:

- ensure the Council complies with its statutory requirements around the Utilities Access Act 2010 and Local Government Act while working in the Legal Road;
- manage the protection of road assets in relation to road openings, vehicle crossings and other operations affecting the asset;
- manage the recovery of costs from damage to Council assets in legal road e.g. street lights hit by vehicles, Road assets damage by Contractors etc;
- receive and process notifications of proposed works in the road corridor e.g. Corridor Access Requests (CARs).

Parking and Enforcement - to enforce all parking & safety offences

Travel Education - develop and deliver road safety education and behaviour change programmes and promotions for road safety, active travel and travel planning

Real Time Operations – responsible for the day to day operational of the Council's signalised intersections

Temporary Traffic Management – responsible to reviewing and approving temporary traffic management plans

7.5.1 Maintenance

Road Maintenance is now delivered through four area contracts, (3 awarded in 2017, North, South and Central across the City, and 1 for Banks Peninsula, awarded in 2015).

Operation Performance Measures for the Routine works, with an at-risk payment mechanism, coupled with bespoke Key Performance Indicators (KPI) and/or Key Result Area (KRA) that link to a Performance Bonus and/or contract term, are in place to encourage the performance expected and the value gained. This assists with benchmarking of contractors and will also assist a greater understanding of potential focus areas for future contracts.

Council's own contract and field staff focus on proactive management of the network, and prioritising jobs according to the ONRC hierarchy. Customer and asset needs are balanced and addressed on a hierarchy and urgency basis. Make Safe/safety issues are attended to as soon as practicable, as are incidents that affect journey time efficiency.

The contractor prepares monthly and quarterly and annual programmes of work which are reviewed and approved by the Council's Pavement Engineers. The quality of each service, both lump and measure and value are audited/inspected using RAMM Tools, Pocket RAMM, as well as Data Warehouse reports where applicable. GPS tracking of all elements of cyclic work, including inspections, is a contract requirement. Re-work is programmed as are faults picked up on inspection of cyclic items, i.e. a failed pothole in an inspection will create a dispatch to repair it. Claims are sampled through the month and auto claims rules ensure maintenance costs flow automatically into the RAMM asset database. Rules which prevent incomplete work, duplicate work and specification/checklist are part of the overall system to ensure work is only paid for when the full service has been delivered.

7.6 Renewals

7.6.1 Portfolio Renewal Strategies

Renewal expenditure is major work which does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original or lesser required service potential. Renewals are to modern equivalent standards. Work over and above restoring an asset to original service potential is upgrade/expansion or new works expenditure.

Renewal expenditure is major work which restores an existing asset to its original capacity and/or condition. Renewals can entail either surfacing renewals alone, or full carriageway renewal including the pavement layers. In the Christchurch context carriageway renewals on local roads may entail a reduction in the carriageway width to allow the opportunity and space for better facilities for users other than motorised vehicles. Conversely, in order to cater for cyclist's needs many carriageways on major routes may be widened to allow on-road cycle lanes to be included.

The renewal strategy objectives are:

- to allow sustainability of the asset in an efficient and cost effective manner; and
- to attain nominated levels of improvements including better traffic management, optimisation of carriageway strength, and carriageway smoothing.

7.7 Asset Disposal

Disposal includes any activity associated with disposal of a decommissioned asset including sale, demolition or relocation. Any revenue gained from asset disposals is accommodated in the Council's LTP process.

The Council is not free to dispose of roading assets as it wishes. In most situations road stopping occurs after a land owner has requested that a section of unformed and unmaintained legal road be stopped. When the process is completed the resulting title/s are usually legally amalgamated with the title of the adjoining property.

Disposal Strategy – Uneconomic Roads

The Waka Kotahi NZ Transport Agency has made a formal policy determination on provision of financial support for 'uneconomic roading facilities'. This is detailed in its Planning, Programme and Funding Manual. The determination defines an uneconomic roading facility as one where the total cost of the proposed works per AADT is greater than or equal to \$8,000.

The Council has no expressed intentions or programme to dispose of low traffic volume roads or unformed and unmaintained legal roads (also called 'paper roads') unless requested to do so.

Unformed legal roads are not maintained by the Council for roading purposes. Some of these roads have been classified as limited maintenance roads, and receive only sufficient maintenance to keep them in a basic state given their low use. Others are used as walking tracks or cycle trails and are maintained as Greenspace assets.

Surplus Land

Land is usually declared surplus when land designated as legal road is not required for roading purposes now or in the future. This usually affects unformed legal roads.

The Council may consider a road's closure and disposal, where requested by an adjacent property owner who wishes to incorporate the road into their adjacent land title.

In some places there are land parcels that were intended to be roads when they were originally surveyed in the early days of European settlement, but were never formally declared to be roads or vested in the Council or the Crown as roads.

In these situations the Council may hold titles to these parcels as ordinary freehold (fee simple) land. Experience has shown that there can be significant problems and public concern with the status of these parcels of land which are often perceived as legal roads. This can affect land use planning and property access on the basis if there is potentially no legal road frontage available, for instance when a new residential subdivision is planned, or it serves a 'point of interest'. It can also complicate disposal procedures. The net effect is that extensive consultation is required, the results of which cannot always be assumed.

Leasing and 'Occupation' of Roads

Roads cannot be leased, however, the space under or above the road (boundary to boundary) can be. Although strictly not a disposal, this matter is discussed here because it does not logically fit anywhere else in this Plan. Often unformed legal roads in rural areas will be grazed and managed as part of the adjacent property, and few of these roads are subject to formal arrangements as to this use. Other areas of road reserve land are occupied by private persons or organisations under formal 'licence to occupy' agreements. The Council has a formal policy on licences to occupy roads which is termed 'Policy on Structures on Roads'.

7.8 Mitigation and adaptation to the effects of climate change

As mentioned earlier tackling climate change is a strategic priority for Council. Further to this, staff are developing a climate change strategy (which is in Draft at the time of writing this section of the Plan).

From a Transport portfolio perspective there are a number of issues, as have been explored in Section 5.

With regard to the lifecycle of the assets in the Transport portfolio there are a number of activities that Council will need to keep doing. These are required to meet levels of service, and keep the city operating. These include:

- operations;
- maintenance; and
- renewal of shorter life assets.

It is the staff view that assets with short lives (<20 years) will see their renewal processes less influenced by climate change than those with long lives (>20 years). For example: the average pavement surface life is 15 years, so on that basis the longer term impacts of climate change do not significantly influence 1-5 year renewals planning. Streets that are currently failing their Level of Service targets are all considered for inclusion in maintenance and renewal programmes.

Conversely the average life of a bridge is 75-100 years, which is well within the timescale that climate change impacts will have a significant effect. As such the planning of this type of work needs to take into account the physical location and the foreseeable risks that the asset will encounter over its life. If these risks cannot be managed adequately then the future of the project should be reconsidered.

In addition to this there are a number of activities that Council will need to carefully consider including:

- renewal of longer life assets;
- asset creation e.g. building new roads; and
- Carbon impact of projects.

Lastly there are a number of activities that Council should consider doing more including:

- reusing materials; and
- reducing the need to travel e.g. working from home.

Section 8 explores these concepts in more detail asset-by-asset.

8 Lifecycle Management Plans

8.1 Carriageway

8.1.1 Asset Inventory

Carriageways are built to provide for the effective and efficient movement of vehicles and people. Carriageways need to have a suitable all weather surface that is appropriate to its location, function and have a structure suitable for legal traffic loading requirements.

Council is responsible for managing Christchurch’s local road network, which includes 2,179 kilometres of sealed roads and 324 kilometres of unsealed roads. Carriageways in the city and Banks Peninsula vary from very old, lightly constructed carriageways, to more recent examples where pavement designs take account of present and future loadings from traffic.

Carriageway condition is related to the pavement structure of an individual street and its suitability for the loadings applied. The condition of the carriageway is rated on an annual basis, with physical faults recorded over a fixed statistically representative portion of the carriageway. Capturing a snapshot of condition is complex because of the constant wearing of carriageway surfaces.

The current condition of carriageways is assessed by a range of measures in conjunction with the RAMM system. These measures are categorised in two ways:

- surface condition – including skid resistance, scabbing, potholes, linear cracking, edge break, and drainage factors; and
- structural condition – including roughness, deflection, pavement depth, sub-grade type and strength, rutting & shoving and alligator cracking.

Historical pavement thickness data for the pavement layers is held as test-pit and bore-log information in RAMM. Reasonably reliable surfacing data from the 1960’s onwards has been loaded into RAMM after verification and review.

There are known material quality and thickness issues with carriageways constructed prior to the mid-1950’s and a significant length of (mainly pre-1950’s) carriageways are considered to be under-strength. A significant proportion of the Council’s network was constructed before 1950.

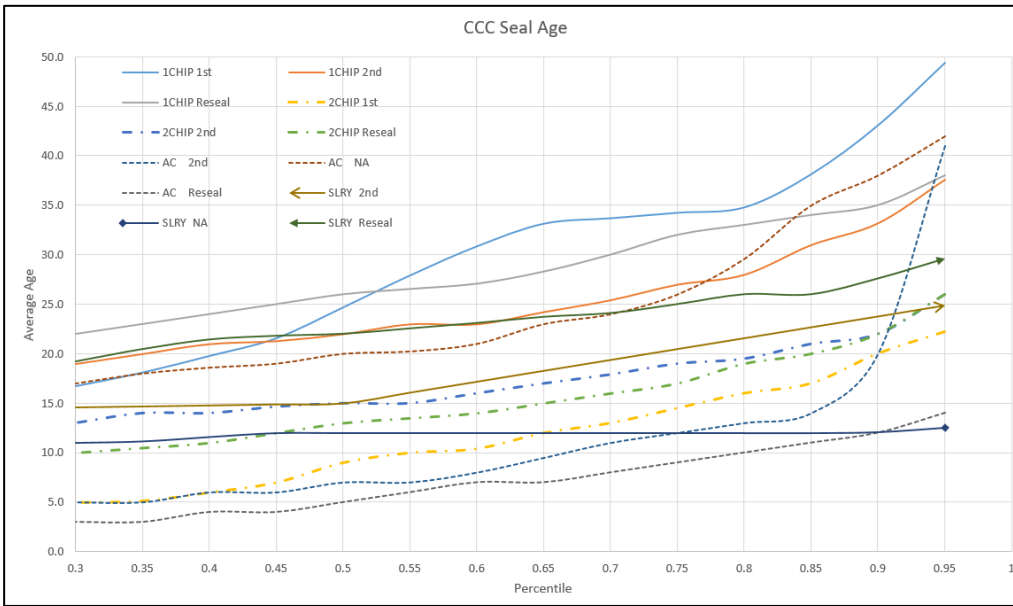
The carriageway structure can be separated into four main parts; the carriageway formation, the construction layers (sub-base and base course) and the surfacing layer.

An overview of carriageway assets is provided in the table below (as at February 2021). The type of surfacing used on the carriageway is generally dependent on the traffic volume and mix of traffic using the road. The table below outlines the distribution of surfacing types across the sealed road network.

Surfacing Type	Totals		Expected life Years	Quantity older than expected life Km
	Km	%		
Chipseal (1st coat)	93	4	5	56
Chipseal (2nd coat and reseal)	1,416	57	18	827
Asphaltic Concrete	581	23	15	110
Unsealed	324	13	3	NA
Slurry Seal	41	2	12	0
Concrete and Pavers	14	1	56	1
Emulsion Mix	2	<1		
Total	2,471			1,273.2

Table 8-1: Summary of Surfacing Type across portfolio

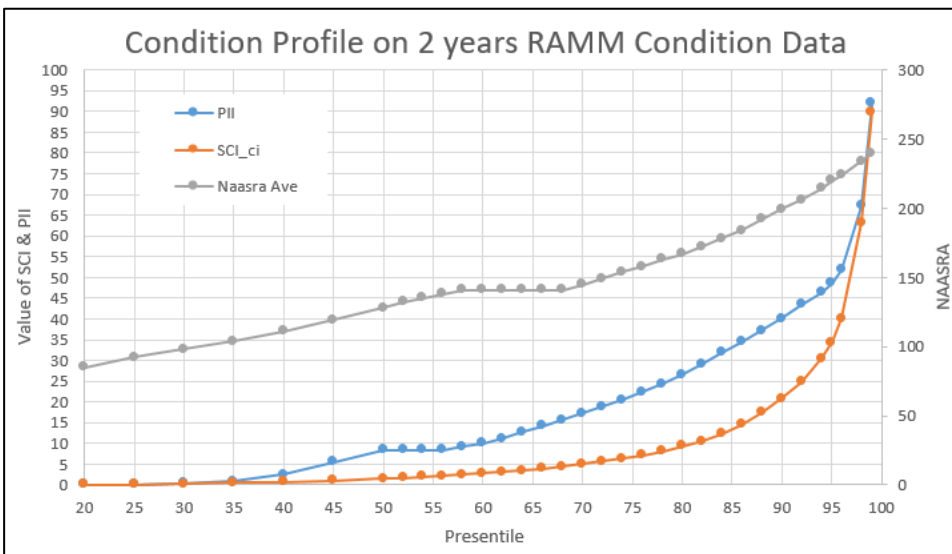
8.1.2 Asset Age



The graph to the left demonstrates the variability across the network by using a percentile view.

Figure 8-1: Variability of surfacing type by age

8.1.3 Asset Condition



The standard measure of road roughness was developed in 1969 by the National Association of Australian State Road Authorities and is known as the NAASRA count. Further to this, Council also considers surface and pavement condition indices, with 0 being a new pavement, and 100 being a failed one.

Figure 8-2: Roughness condition profile

8.1.4 Valuation Data

Asset valuations are established at 3-yearly intervals, and this was last undertaken in June 2019. For valuation purposes carriageway is split into four sub categories – pavement formation, subbase, basecourse and pavement surfacing.

Assets	Optimised Replacement Cost (ORC)	Optimised Depreciated Replacement Cost (ODRC)	Annual Depreciation (AD)
Pavement Formation	\$467,654,165	\$352,540,299	\$1,446,295
Pavement Subbase	\$298,535,772	\$233,554,877	\$823,952
Pavement Basecourse	\$664,510,569	\$303,463,513	\$8,022,087
Pavement Surface	\$247,003,582	\$96,800,696	\$11,227,463

Table 8-2: Asset valuation breakdown by pavement structural layer

8.1.5 Problems

The following problems have been identified relating to carriageways in Christchurch:

- post-earthquake, a number of carriageways in Christchurch were resurfaced. However, there is still a backlog of renewals (approximately 300km), and this has been exacerbated by an increase in pipe repairs and trenching;
- growth and new subdivisions are resulting in increased traffic volumes and heavy vehicle use in certain locations which is impacting the useful life of the carriageway and increasing maintenance costs;
- coal tar is still found in some areas which requires remediation works to mitigate environmental impacts;
- uncertainty determining and planning for the effects of climate change; and
- under strength pavements which need upgrading for resilience.

8.1.6 Benefits

Addressing these issues will help achieve Council’s strategic outcomes as shown in the table below.

Journeys are safe	Journeys are reliable	Customers have choice	Journeys are comfortable	Council is responsive to the needs of customers
Improved safety outcomes due to reduction in loss of control crashes, particularly on wet roads and improved safety for vulnerable road users.	Improved travel time reliability due to reduced maintenance and temporary speed reductions.	Improved carriageway smoothness could encourage increased cycling uptake and improve public transport ride experience	Maintain road condition to an appropriate national standard and improve resident satisfaction.	Improved carriageway condition will improve the perception that Christchurch is a cycle friendly city and reduce complaints.

Table 8-3: Alignment with strategic outcomes

8.1.7 Consequences of Not Addressing the Problems

Increased safety risk due to faults in the road carriageway, poor response to growth requirements, low customer satisfaction, deteriorating network that is below national peer group condition, and high maintenance and renewal costs over the expected life of the road carriageway.

8.1.8 Levels of Service

Carriageway condition contributes to a number of the ONRC performance measures and Council measures, the most relevant of these measures are listed below:

- 16.0.3, Improve resident satisfaction with road condition, measured via annual resident satisfaction survey;
- 16.0.1, Maintain roadway condition, to an appropriate national standard. The percentage of the sealed local road network that is resurfaced per year. *Note this is a Mandatory measure as per the 2010 amendment to the Local Government Act and the Department of Internal Affairs Non-Financial Performance Measures Rules 2013;*
- 16.0.2, Maintain roadway condition, to an appropriate national standard. Calculate the average quality of the sealed local road network, measured by smooth travel exposure (STE). *Note this is a mandatory measure as per the 2010 amendment to the Local Government Act and the Department of Internal Affairs Non-Financial Performance Measures Rules 2013;* and
- 16.0.19, Maintain roadway condition, to an appropriate national standard. The average roughness of the sealed road network measured (NAASRA roughness).

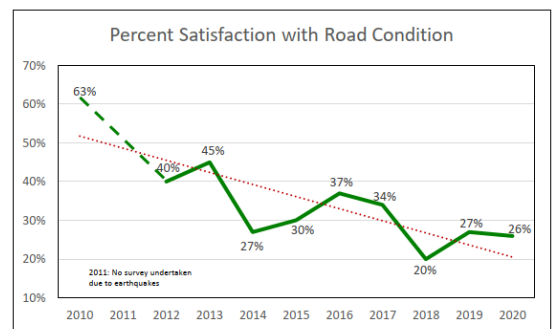
8.1.9 Gap Analysis

This section outlines how Council’s carriageway assets are currently performing against the key levels of service measures detailed above.

Customer satisfaction

As shown in Section 3.2.2, customer satisfaction with the state of Christchurch’s road is still very low, and has been declining following the Canterbury Earthquakes Sequence events of 2010 and 2011.

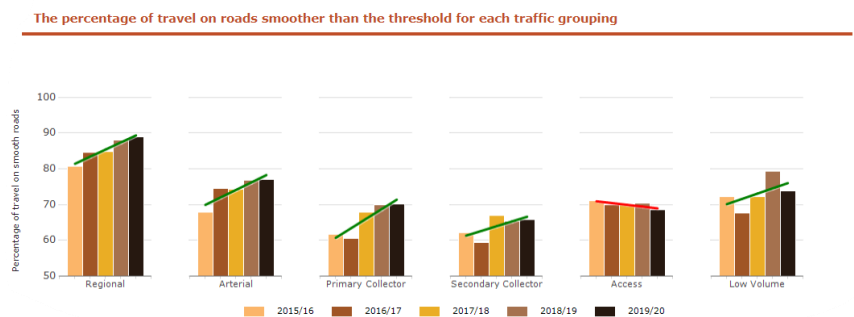
Figure 8-3: Customer satisfaction with road condition



Smooth travel exposure

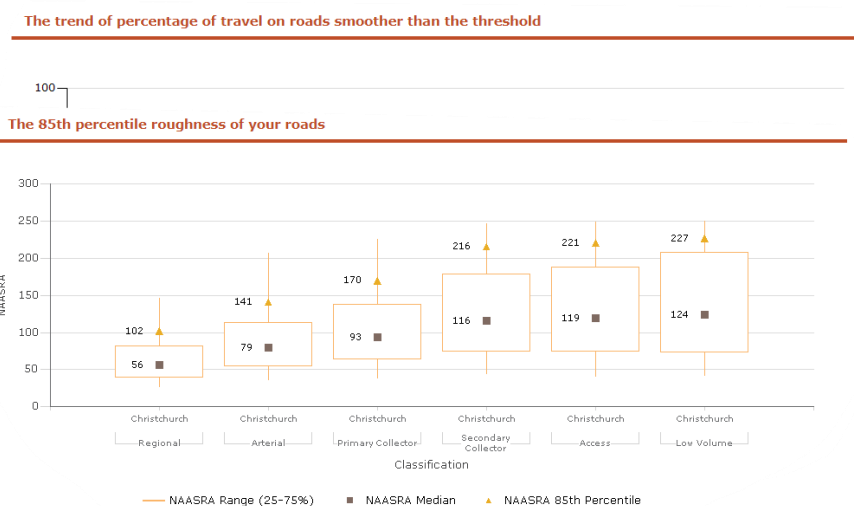
While Christchurch has been making improvements, as shown in the first graph, the current results are still poor when compared to the rest of the peer group. This suggests that further work is required, particularly in the arterial, collector and access classifications.

Figure 8-4: Proportion of travel over smooth threshold



Roughness

Current condition indicators and trends show earthquake effects are most noticeable in roughness and smooth travel exposure measures. The cause(s) of the other condition trends is less clear – rutting, shoving, potholes and patching are symptoms of deferred resurfacing due to asset age, but these trends may have been accelerated by the



earthquakes and subsequent trenching for buried services repair.

Figure 8-5: Roughness (85th percentile) by road type

The adjacent graph shows peak roughness percentage of network – metro peer group from ONRC reporting tool.

Figure 8-6: Peak Roughness by road type

This shows that Christchurch has the highest percentage of its network exceeding the 95 per cent threshold for roughness, when compared to its metro peer groups. This is true for both the rural and urban network, across most ONRC categories.



Figure 8-7: Roughness (85th percentile) by road type compared to other locations

8.1.10 Options to Address Gaps

Council has developed the following options to address the identified gaps in the network for its carriageway assets.

Options	Output	Benefit / Consequence
<p>Maintain current level of investment</p> <p>Keep the quantity of work static.</p>	Approximately 50-60km of works per year.	Not achieve any improvements to network condition. Likely reduction in customer satisfaction and higher costs in medium to long term as assets deteriorate, and the backlog will increase.
<p>Increase investment over time</p> <p>Incrementally increase spending over a 5 year period.</p>	Increase the programme over 5 years to achieve 120km per year.	Sustainable increase in quantity of work. Return network to appropriate state over 10 – 20 year period.
<p>Increase investment now</p> <p>Increase investment for the next 3 financial years.</p>	Increase the programme over 3 years to achieve 120km per year.	Concentrated effort to get assets back to appropriate standard. High level of capital outlay, and likely disruption to residents due to increased scale of works.
<p>Run to failure</p> <p>Don't plan to remediate assets until they have clearly broken.</p>	Don't plan for a stable quantity per year, wait for assets to break and respond accordingly.	Uncertainty of workload, and likely higher costs due to reactive nature of work.

Table 8-4: Option development

8.1.11 Recommended Option

There is still a significant backlog of work, and Council is consistently failing on its Level of Service measures. The only way to address this is to increase the quantity of work in the short term, and this will take increased budget.

On this basis Council recommends adopting the 'Increase investment now' option for the maintenance, operation and renewal of its carriageway assets, as it considers this the best option to deliver the strategic outcomes. This option aims to deliver ONRC fit-for-purpose Levels of Service, and plans to renew assets before they fail.

- **How is this option optimised and does it address the issues?**

Value for Money – Sealing is about preservation of the existing asset. Council and all road controlling authorities want to achieve a full economic life and this task protects the pavement and replenishes the usefulness of existing seal layers, reducing required maintenance. Providing a new surface is aligned to painting a house, it protects the current asset in an economical way to prevent deterioration rates and to secure an asset that is not 'new' but still fully functioning.

Whole of Life Costs – Sealing is thought to be an economical solution when combined with pre-seal repairs to ensure the pavement is expected to retain its strength. Whole of life was assessed against a target age of 14.5 years in Councils prioritisation process and maintenance costs by area were a factor. A full economic analysis is not undertaken prior to sealing every site but is considered when asphalt is to replace chip seal.

Life Cycle Management – In an ideal situation a carriageway will have a consistent pavement and will result in four plus seal lives. Given how Councils network has changed over the last 10 years this is no longer the case and each site needs to be considered independently.

8.1.12 Operations and Maintenance Plan

Routine maintenance involves reactive repairs carried out as a result of inspections or customer notification, or planned work (including preparation for reseals). As part of the contract and services that Council procures, routine services such as sweeping, drainage maintenance, litter collection, incident response, footpath and cycleway maintenance also fall under this activity.

Routine / general maintenance of roads includes the following work activities:

- repair of potholes, dig out repairs, surface defects, edge break, surface openings (trenches) and minor surface levelling;
- adjusting surface covers;
- maintenance of unsealed shoulders and metalling and grading of unsealed roads;
- frost and ice gritting / gritting for excess bitumen; and
- emergency works (including snow clearing and ice gritting).

Network change in recent years has been affected by the earthquakes, which aside from the significant quantity of utility repairs in the streets, have resulted in altered traffic patterns as pre-quake business and housing centres were relocated. A number of red zone roads are now closed by physical barrier, the remainder are open and being maintained at a minimal level of service.

Unsealed roads are graded to redistribute the wearing course and maintain a water-shedding gradient on the surface. Grading is carried out on a scheduled basis directed by the maintenance contract. The grading schedule is reviewed on a 5 yearly basis, and the most recent review was undertaken as part of retendering the Banks Peninsula area wide maintenance contract.

- **Roading Standards, Specifications and Materials**

To achieve consistency and quality of work, maintenance and renewal works comply with the following technical standards where appropriate:

- Waka Kotahi NZ Transport Agency approved specifications and Austroads - The Guide to the Structural Design of Road Pavements – New Zealand Supplement; and Sealed Local Roads Manual; and
- Council Civil Engineering Construction Standard Specification (CSS) - Parts 1, 2, 6, & 7: (General/materials, Earthworks, Roads, and Landscapes); and Council Infrastructure Design Standard (IDS).

Standards have been developed for planned and unplanned activity, detailing response times and surface level tolerances. For unplanned and / or emergency work requiring immediate response, agreed level of services have been agreed covering sump lid replacement, spillages, grit spreading, and similar safety-related works. Pothole repairs have a response time of 24 hours; with most other tasks able to be programmed over a longer period.

Maintenance Expenditure

Work Type	OPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Depreciation	30.5	32.5	34.9	38.2	39.9	43.3	46.4	49.7	52.3	54.8
Operations	12.1	12.2	12.2	12.2	12.3	12.3	12.3	12.3	12.3	12.3
Maintenance	10.7	11.0	11.1	11.2	11.3	11.3	11.3	11.4	11.4	11.5
Total	53.3	55.7	58.2	61.7	63.4	67.0	70.1	73.4	76.0	78.6

Table 8-5: Maintenance expenditure (OPEX) by work type

8.1.13 Renewals Plan

As outlined in Section 7 renewal expenditure is major work which restores an existing asset to its original capacity and/or condition. For the carriageway this can entail either surfacing renewals alone, or full carriageway renewal including the pavement layers. In the Christchurch context carriageway renewals on local roads may entail a reduction in the carriageway width to allow the opportunity and space for better facilities for users other than motorised vehicles. Conversely, in order to cater for cyclist’s needs many carriageways on major routes may be widened to allow on-road cycle lanes to be included. Pavement strengthening of under-strength carriageways is also included as part of the renewals programme in order to allow optimisation of the carriageway asset.

The renewal strategy objectives are:

- to allow sustainability of the asset in an efficient and cost effective manner; and
- to attain nominated levels of improvements including better traffic management, optimisation of carriageway strength, and carriageway smoothing.

Most full street renewal projects within the city are aligned with and selected as part of the kerb and channel renewal programme requirements. Some renewals work also occurs in conjunction with Road Network Improvements, Safety Works, and Neighbourhood Improvement Works.

Kerb and channel renewal projects are focussed on existing streets with kerbs and dished channels, and expenditure on carriageway renewals varies relative to the condition, strength, and geometry (particularly vertical) of existing carriageways adjacent to kerbs and channels being renewed. Road shoulder reconstruction, not full-width renewal, is considered as the first option and is the method used where all asset and user needs can be met using this technique.

- **Earthquake Legacy**

While much of the earthquake damage has been repaired under the Crown-Council Cost Share Agreement, condition modelling indicates that even with increased levels of OPEX and Renewals funding, it will take approximately 10 - 20 years to return the assets to a condition that is on-par with the national average. This will mean a serviceable network but with much lower levels of service within the timeframe of the 2021-2031 Long Term Plan.

A high proportion of the irregularities on the carriageway are related to trenching (both lateral and transverse), and there has been a focus in recent years on better control of utility installations. Trenching throughout the city causes both surfacing and structural distress – particularly where there are older pavements. This leads to surfacing and pavements not reaching their expected lives as the trenching activities effectively contribute to a ‘loss in expected life’.

- **Climate change / adaption considerations**

It is the staff view that assets with short lives (<20 years) will see their renewal processes less influenced in the near future by climate change than those with long lives (>20 years).

The average surface life is 15 years, so on that basis the longer term impacts of climate change do not significantly influence 1-5 year renewals planning. Streets that are currently failing their level of service targets are all considered for inclusion in maintenance and renewal programmes.

Note that if Council does choose to retreat from areas, it is likely that roads will be the last asset to be removed as access will need to be maintained to facilitate clearance works.

- **Second coat sealing**

New chipseals require second coat seals to maximise and achieve their useful and economic lives. A second coat seal is generally carried out in the year after the initial repair / rebuild. Further to this there is a significant need and quantity of second coat sealing work created by the earthquake repair and trenching works.

- **Surfacing Renewals**

The objective of resurfacing is to restore pavement water-proofing and skid resistance. Resurfacing techniques used are chip sealing, surfacing with thin asphaltic concrete, and slurry sealing. Surfacing material selection is dependent upon user needs as well as carriageway structural factors.

Surfacing renewals can avoid or delay more expensive pavement renewals or increasing maintenance costs.

- **Treatment selection**

There are three primary types of surfacing renewal:

- re-sealing – direct replacement of surfacing;
- re-metalling – restoration of wearing course for unsealed roads through addition of material; and
- smoothing – alleviating roughness via additional surfacing.

- **Prioritisation of works**

Prioritisation of surfaces for renewal focuses on six elements relating to the road surface that can be readily obtained from asset data such as:

- Condition Index (Index of surface defects);
- maintenance spend (maintenance \$ / km);
- seal requiring a 2nd coat;
- roughness; and
- age.

- **Pavement Layer Renewals**

The need for renewal of pavement layers is dependent upon the existing structural condition of the carriageway.

Methods of pavement renewal include:

- renew / rebuild / reconstruction – remove the existing basecourse, sub-base and deepen the formation into the subgrade and replace with new metal-course layers;
- structural strengthening – removal of surfacing and basecourse and reinstate with deeper layer of asphaltic concrete; and
- area-wide treatment – involves removing the existing surface and pavement layer. Stabilisation can be used to increase the strength of existing basecourse / sub-base materials by adding a stabiliser (hydrated lime, bitumen, or cement) and re-compacting. Other options include smaller scale excavation and replacement, granular overlay and asphaltic concrete strengthening overlay.

- **Coordination with other Projects, Programmes and Activities**

As carriageway renewal is a long term decision, the timing of works need to be coordinated with other construction activities to avoid rework and minimise the disruption to residents.

Council undertakes coordination discussions with the following work programmes:

- Transport;
- 3 Waters; and
- Other Utilities.

- **Renewal Recommendation**

The current rate of sealed surfacing renewal is approximately 60-80km per year, which has fluctuated since the earthquakes. It is recommended to increase the quantity resurfaced over the next 3 years to achieve 120km per year. This needs to be maintained over the medium term (15 years), by which time the network will be in a stable position.

The rate of pavement rehabilitation (or pavement layer renewal) has also fluctuated since the earthquakes. It is recommended to maintain the renewal rate at close to 15km per year for the next 10 years.

The two Tables below outline the recommended quantities of work by year, along with the corresponding capital expenditure required. The graphics on the next page project the impact of this over the longer term (20 years), along with the predicted impact on OPEX budgets and the resulting network condition.

Surface Type	Quantity (Km)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Chipseal	73.1	30.9	39.1	44.1	49.5	63.1	66.5	79.0	84.5	97.8
Asphalt	17.2	26.1	24.9	25.8	26.3	26.1	27.2	24.9	21.7	16.7
Rehabilitation	14.2	13.7	13.6	14.6	15.4	14.2	13.9	15.5	13.9	10.8
Unsealed										
Total	104.4	70.7	77.6	84.4	91.2	103.4	107.6	119.4	120.2	125.3

Table 8-6: Recommended work quantity by surface type

Work Type	CAPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total	33.72	31.89	28.51	30.76	33.37	26.38	26.12	27.31	28.18	27.46

Table 8-7: CAPEX budget for renewal work programme

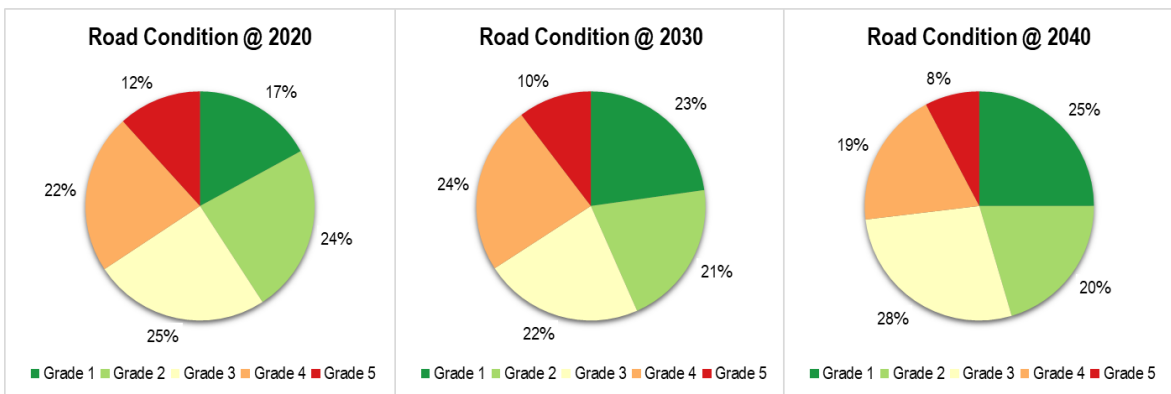
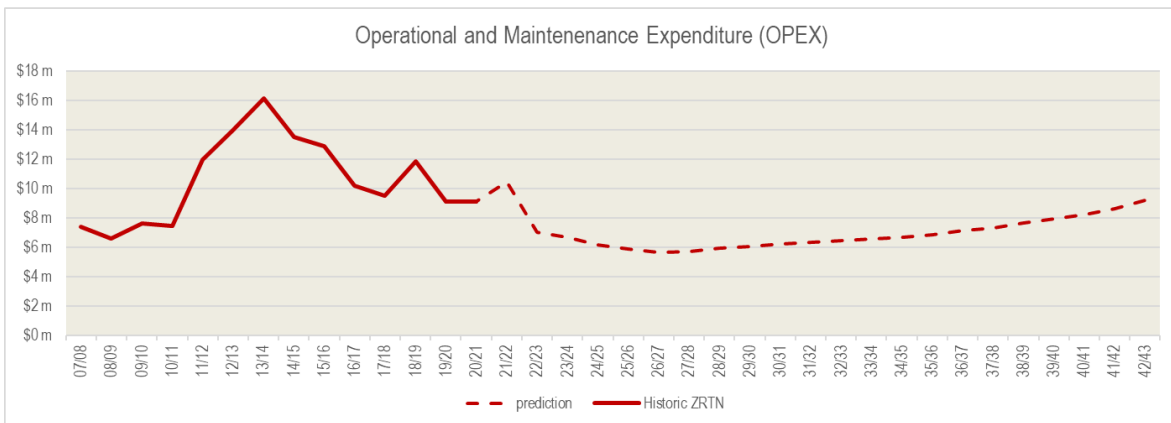
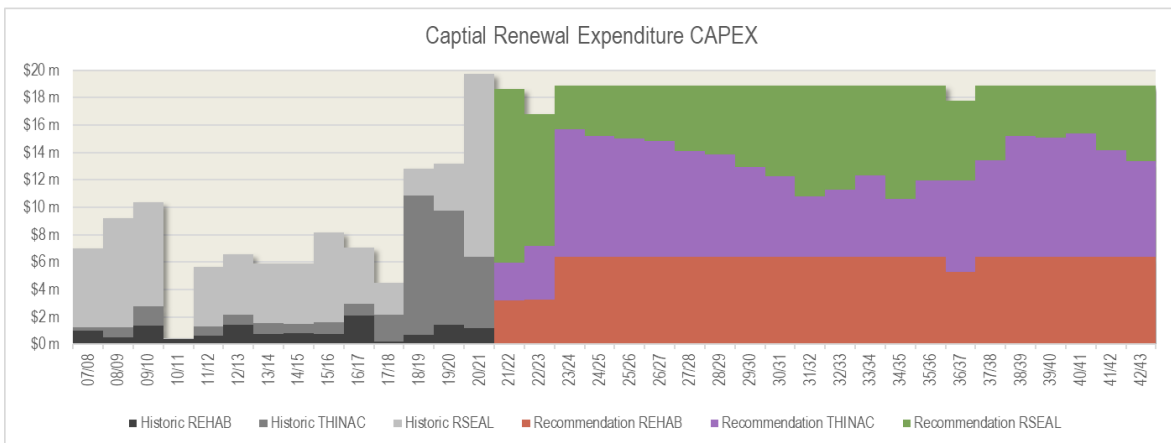
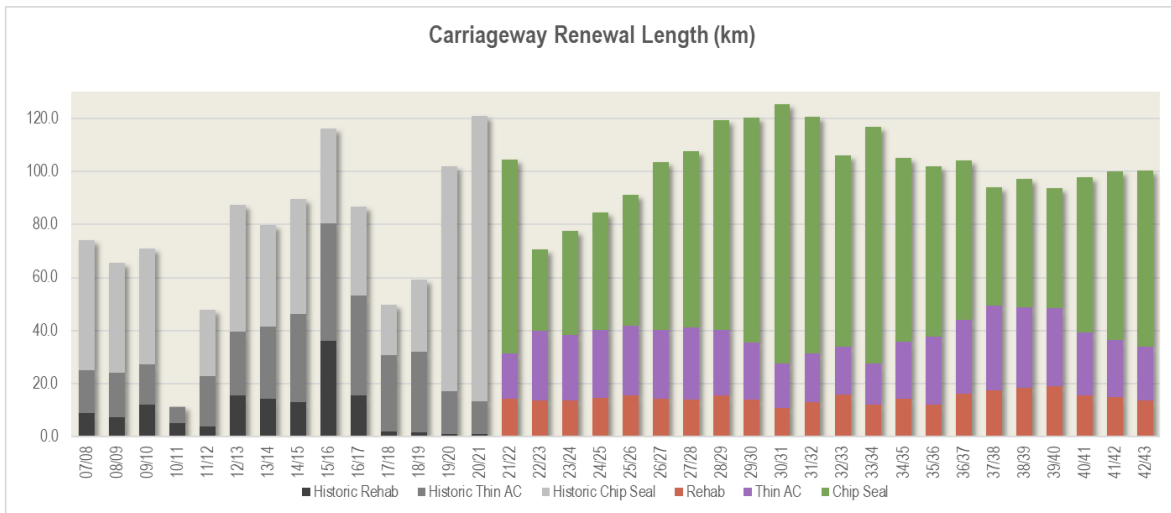


Figure 8-8: Impact of renewal work programme on network condition and OPEX - over 20 year period

8.1.14 Capital development plan

Capital development planning is explained in detail in Section 7.

The budgets allowed in the capital programme are summarised in Section 9.

8.1.15 Disposal Plan

Disposal of transport-related land is explained in detail in Section 7.

8.2 Drainage

8.2.1 Asset Inventory

Council is responsible for 3,593 kilometres of kerb and channel and 34,195 sumps and associated pipes. The purpose of drainage infrastructure is to provide sufficient carrying capacity for normal (i.e. 5 year recurrence interval) surface storm-water runoff from the carriageway, footpaths, berms, adjacent properties to an outfall point and to delineate the road edge for road users.

Kerb and channel assets form the bulk of the assets in the road drainage area, which also includes sumps and pipes/culverts with a diameter of less than 600 mm (note pipes/culverts with diameters over 600 mm are dealt with under the following Road Structures section). The lengths of the main kerb and channel types are held in the RAMM database (along with other drainage assets) on a street by street basis. A summary of road drainage assets is outlined in Table 8-8.

<u>Type</u>	<u>Totals</u>	<u>Expected life</u>	<u>Quantity older than expected life</u>
	<u>Km</u>	<u>Years</u>	<u>Km</u>
Kerb and flat channel	2,412	80	21
Kerb and deep dish channel	385	80	108
Mountable kerb	107	80	-
Kerb only	94	80	3
Other concrete / stone	194	80	-
Sumps	26,803 no	80	-
Small culverts (dia <600)	3,858 no	50	102 no

Table 8-8: Summary of road drainage assets

The current design philosophy allows for a 5 year return period rainfall event for stormwater design, meaning that any storm with rainfall intensities expected during a normal 5 year interval should create no more than minimal ponding into the road shoulders, and should not create any traffic safety issues. Due to Christchurch's flat topography, storms of greater intensity and duration will result in greater areas of roadway ponding, and the need for greater road-user care during and immediately following these storm events.

8.2.2 Asset Age

The general life expectancy of a concrete kerb is 80 years. Below is a table outlining the average age for the different types of kerb on the network.

Row Labels	swc_type	Sum of length_m	Average of age	Max of age
CO	Channel Only	293	3.91	5
DA	Dished Channel (Asphalt)	1,370	3.00	3
DC	Dished Channel (Concrete)	75,889	27.03	110
DCH	Dish Channel (Concrete Hand Poured)	425		
DS	Dished Channel (Sealed)	8,086	58.62	89
KC	Kerb Only (Concrete)	75,352	28.11	99
KCC	Kerb & Channel (Concrete)	2,464,806	32.06	110
KCF	Edge Kerb (Conc) - Flush with road	18,390	16.53	23
KCS	Kerb & Channel (Stone)	2,190	85.79	139
KDC	Kerb & Dished Channel (Concrete)	287,699	72.40	119
KDCC	Covered Kerb & Dish (Concrete)	9,444	76.41	89
KS	Kerb Only (Stone)	3,069	8.26	109
MKC	Mountable Kerb Only (Concrete)	116,365	20.96	84
MKCC	Mountable Kerb & Channel (Concrete)	2,003	9.26	38
OTHER	Other Type	185,354	52.50	119
SLTC	Slot Channel (Concrete)	1,409	25.92	90
SWCD	SWC (Deep, >200 Below Seal Edge)	71,357	17.85	50
SWCS	SWC (Shallow, <200 Below Seal Edge)	118,325	16.04	19
VC	V Channel	1,346	8.39	49
Grand Total		3,443,172	33.13	139

As at October 2019 approximately 135km of kerb and dish channel is beyond its expected life of 80 years. This is predominantly reflecting the remaining kerb and deep dish channel in older suburbs of the city.

Prior to the earthquakes these older kerbs were deemed obsolete due to safety and usability concerns and a street renewal programme was in place that focused on replacing these assets with new slip formed kerb and flat channel, along with renewing the other carriageway elements. This was an efficient way of renewing drainage features, footpaths, carriageway surfacing and pavement layers at one time.

Table 8-9: Life expectancy of range of kerb assets

8.2.3 Asset Condition

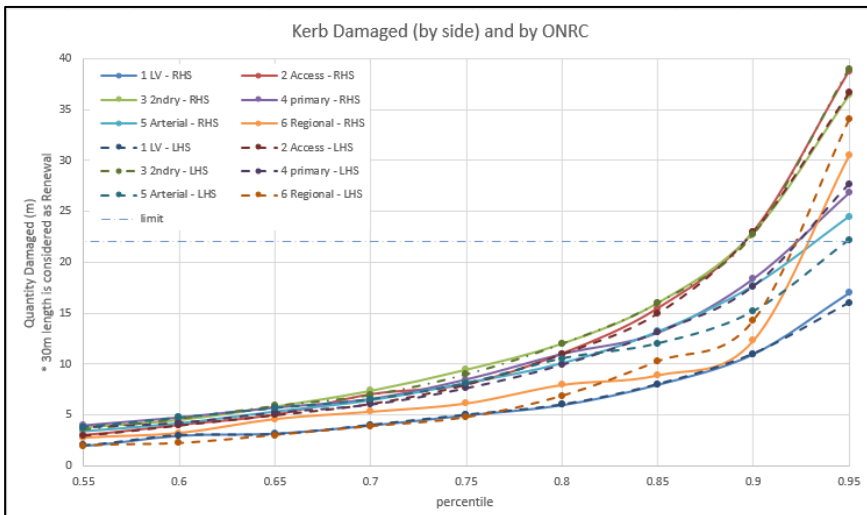


Figure 8-9: Kerb damage profile

Replacing kerb and flat channel can be undertaken in a targeted manner, however replacing older sections of deep dish is more problematic. To achieve appropriate falls the road crossfall may need to be re-graded or the piping for the street replaced.

8.2.4 Asset Valuation

Asset valuations are established at 3-yearly intervals and this was last undertaken in June 2019. For valuation purposes road drainage is split into two sub categories; kerb and channel and drainage as shown in the following table.

Assets	Optimised Replacement Cost (ORC)	Optimised Depreciated Replacement Cost (ODRC)	Annual Depreciation (AD)
Drainage	\$253,872,205	\$151,005,517	\$2,504,892
Kerb and Channel	\$427,777,635	\$220,371,628	\$5,315,450

Table 8-10: Road drainage asset valuations

8.2.5 Problems

The following problems have been identified relating to road drainage in Christchurch:

- Christchurch has areas of deep dish channel which is approaching the end of life and needs replacing before it deteriorates further and fails. There is currently a backlog of work, which will rise as the post-World War 2 assets approach end-of-life;
- transport functionality and safety are compromised when carriageways and pavements are adversely affected by stormwater run-off; and
- if peak stormwater flows increase in the future (for instance due to increased rainfall events caused by climate change) then the capacity of the stormwater reticulation network would need to be addressed.

8.2.6 Benefits

Addressing these issues will help achieve Council’s strategic outcomes as shown in Table 8-11.

Safety	Access	Environment	Affordability
Improve road safety, particularly during wet weather events	More people choose to travel by bike in wet weather events	Minimises risk of road closures and delays due to flooding	Reduce the number of customer service requests relating to kerb, channel and drainage/flooding

Table 8-11: Alignment with pillars

8.2.7 Consequences of Not Addressing the Problems

The specification applicable to kerb and channel construction and maintenance is the ‘Christchurch City Council Civil Engineering Construction Standard Specification (CSS) - Part 6: Roads’. The consequences and risk of lowering material quality requirements and/or design standards are:

- reduced safety - broken kerbs and channels create safety issues for road users;
- reduced reliability/lower level of service - additional surface flooding from changed design parameters related to storm recurrence intervals; risk of water ingress into carriageway layers; and
- loss of asset life - accelerated deterioration/reduced kerb and channel life from reduced concrete strength or reduced foundation strength requirements at the time of construction; or reduced maintenance.

8.2.8 Levels of Service

Road drainage contributes to a number of the Council’s Levels of Service, the most relevant of these measures are listed below:

- 10.5.1, Reduce deaths and serious injuries per capita for cyclists/pedestrians;
- 16.0.3, Resident satisfaction with road condition;
- 16.0.9, Resident satisfaction with footpath condition; and
- 16.0.10, Perception that Christchurch is a walking friendly city.

8.2.9 Gap Analysis

This section outlines how Council’s road drainage assets are currently performing against the key Levels of Service measures detailed above.

- **Safety**

While there is no direct correlation between the state of the kerb and accident statistics, kerbs can be a source of slips, trips and falls, particularly around high use areas such as malls, schools and retirement homes. On this basis the function of the street is taken into account when prioritising which streets to remediate. This is discussed further in Section 8.2.10.

- **Customer satisfaction**

As shown in Section 3.2.2 customer satisfaction with the state of Christchurch’s road is still very low, and has been declining following the 2010 and 2011 earthquake.

As the kerb is a prominent part of the road corridor it likely has an influencing factor on this result. Similarly the resident satisfaction with footpath condition is also low at 40% in the 2020 survey. Conversely 84% of surveyed residents feel that Christchurch is a walking friendly city.

So from a customer level of service perspective Council’s road drainage assets are performing adequately.

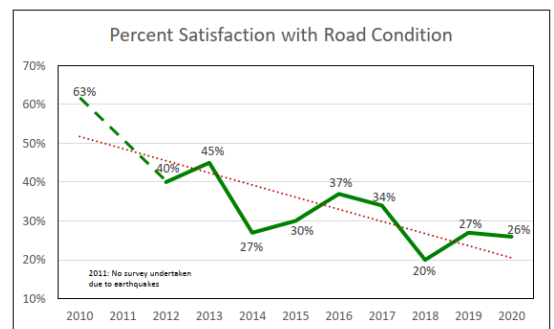


Figure 8-10: Customer satisfaction with condition

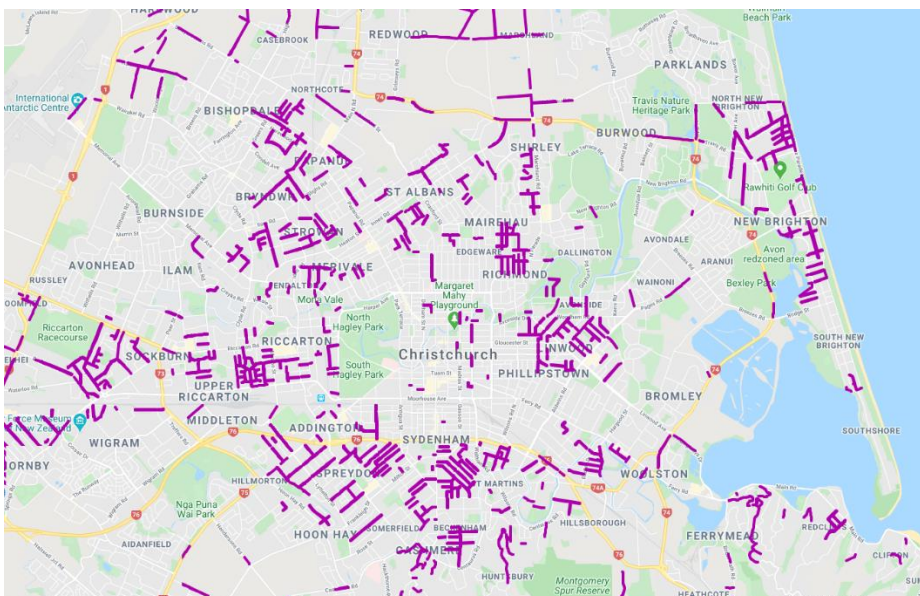


Figure 8-11: City streets with deep dish channel

8.2.10 Options to Address Gaps

Council has developed the following options to address the identified gaps in the network for its drainage and stormwater assets.

Options	Output	Benefit / Consequence
<p>Maintain current level of investment</p> <p>Keep the quantity of work static.</p>	Approximately 10km of works per year.	Not achieve any improvements to network condition. Likely reduction in customer satisfaction and higher costs in medium to long term as assets deteriorate.
<p>Increase investment over time</p> <p>Incrementally increase spending over a 5 year period.</p>	Ramp up the programme over 5 years to achieve 30km per year.	Sustainable increase in quantity of work. Return network to appropriate state over 10 – 20 year period.
<p>Increase Investment now</p> <p>Increase investment for the next 3 financial years.</p>	Deliver on the back log of works over the next 3 years.	Concentrated effort to get assets back to appropriate standard. High level of capital outlay, and likely disruption to residents due to increased scale of works.
<p>Run to failure</p> <p>Don't plan to remediate assets until they have clearly broken.</p>	Don't plan for a stable quantity per year, wait for assets to break and respond accordingly.	Uncertainty of workload, and likely higher costs due to reactive nature of work.

Table 8-12: Drainage and stormwater option development

8.2.11 Recommended Option

Council recommends adopting the increase investment over time option for the maintenance, operation and renewal of its drainage and stormwater assets, as it considers this the best option to deliver the strategic outcomes.

This option aims to deliver ONRC fit-for-purpose levels of service, and plans to renew assets before they fail.

- **How is this option optimised and does it address the issues?**

Value for Money – Council remains focused on renewing assets due to condition rather than age. That is why many of the older channels are still in place, they are still adequately performing their intended function.

Whole of Life Costs – this is assessed against the expected life of 80 years.

Life Cycle Management – while there are no immediate gaps in levels of service, a portion of these assets are at or past their useful lives. Council needs to spread this work over an appropriate period such that it is manageable.

8.2.12 Operations and Maintenance Plan

Operations and maintenance of the drainage assets includes:

- general kerb and channel repairs;
- side drain (water table) maintenance;

- street and sump cleaning;
- small diameter pipe repairs (including repair of stormwater pipes serving private properties); and
- emergency response works.

- **Standards and specifications**

The specification applicable to kerb and channel construction and maintenance is the 'Christchurch City Council Civil Engineering Construction Standard Specification (CSS) - Part 6: Roads'. The consequences and risk of lowering material quality requirements and/or design standards are:

- reduced safety - broken kerbs and channels create safety issues for road users;
- reduced reliability/lower level of service - additional surface flooding from changed design parameters related to storm recurrence intervals; risk of water ingress into carriageway layers; and
- loss of asset life - accelerated deterioration/reduced kerb and channel life from reduced concrete strength or reduced foundation strength requirements at the time of construction; or reduced maintenance.

- **Maintenance Strategy**

The strategy for the maintenance of the Council's road drainage assets involves regular condition inspections, and both planned and unplanned maintenance activities.

- **Condition Inspections**

The maintenance contractor is required to report any defects observed in day to day road maintenance activity. Formal condition assessments are undertaken on the whole network yearly in association with the RAMM condition rating survey. Operational activities such as street cleaning are audited to provide contract and Level of Service compliance.

- **Unplanned Maintenance**

Many defects related to road drainage assets are notified by the public, and a 24 hour call-out service is provided to attend to complaints. Repairs are carried out immediately where there is an issue of public safety (i.e. broken kerb) or where significant flooding problems exist. If the repair is not urgent the fault is added to the defects list for planned maintenance or renewal.

- **Planned Maintenance**

Repairs are programmed for defects identified during inspections and annual condition surveys where the defect has an effect on public safety, accelerated deterioration of the pavement, the flow of stormwater, and convenience for road users, pedestrians and / or property owners.

Routine maintenance includes sweeping / cleaning kerb and channel and ensuring the entranceways, exits and barrels of culverts are clear and free of obstructions.

All urban kerb and channel is swept regularly to keep it free of debris and reduce the probability of blockages during rain. The interval between sweeps varies, roughly in accordance with a roads hierarchy, but also depending on the traffic volumes, types of traffic and the adjacent land use.

Because the historic focus of renewals has been to reduce the overall length of kerb and deep dish channels, the previous maintenance strategy was to target maintenance expenditure at flat channels which are showing signs of premature failure. Maintenance activities include concrete repairs and side-drain maintenance.

Work Type	OPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Depreciation	9.1	9.4	9.8	10.1	10.7	11.1	11.5	11.9	12.1	12.5
Operations	2.7	2.8	2.7	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Maintenance	9.8	10.1	10.1	10.2	10.2	10.2	10.4	10.4	10.4	10.4
Total	21.7	22.2	22.7	23.1	23.6	24.1	24.6	25.1	25.3	25.7

Table 8-13: OPEX Expenditure including maintenance

8.2.13 Renewals Plan

In 2003 Council policy was established concerning the renewal of kerb & channel within a structured street renewal programme. Asset condition and function was a prime driver of this and as a result older deep dish channel around the city was targeted.

Prior to the earthquakes, the average renewal rate was 35km per year for kerb and dish channel.

Post-earthquake the street renewal programme has been refocused, and the kerb & deep dish channel elements are no longer considered obsolescent – all drainage assets will be treated based on condition.

Condition survey of the kerb and channel assets is undertaken on a yearly basis, as discussed previously. Historically the trends were reasonably linear, however following a change of consultants, recent survey results have varied significantly (which has highlighted some of the limitations with visual condition grading).

Kerb and channel renewal in Christchurch is typically carried out by way of street renewal projects. There are a number of reasons for this, primarily that in order to achieve alignments that conform to current standards, the changes typically require reconstruction of adjacent pavement and footways. These assets are often in need of renewal on their own merit, so street renewal is efficient from an asset management perspective.

Standalone kerb and channel renewal also occurs, however this typically involves shorter lengths as this work can be generally tied in with existing assets more easily. Because of the shorter lengths involved, much of this work is carried out as maintenance

The renewal plan for kerb and channel has been developed by creating a prioritized list of candidates and determining the schedule for when they can be delivered based on the available budgets. The budgets are defined as part councils of Long Term and Annual Plans.

- **Prioritisation Process**

The available data on streets assets and condition is compiled and weighted alongside other non-condition factors such as traffic, earthquake damage, earthquake repairs, % dish channel and whether previous design work has been completed.

The highest scoring streets and those with known issues highlighted by staff or residents are further assessed and prioritised for inclusion in a draft 10 year renewal program. There are approximately 65km of streets with scores that deem further investigation, and budget for approximately 20km of street renewal work in the next 10 years.

- **Renewals Recommendation**

The rate of kerb and channel replacement has been very low since the earthquakes.

It is recommended that the programme be incrementally increased over the next 10 years to achieve 30km of renewal per years, and then sustain this for the medium term (years 10-20).

Further to this, Council’s street renewal programme has similarly been low since 2010. It is recommended to incrementally increase this to 5km per year in the medium term.

Work Type	Quantity (Km)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Kerb and channel	10	15	20	25	25	30	30	30	30	30
Street renewal	1	1	1	1	1	1	1	1	1	1
Total	13	16	21	26	11	31	31	31	31	31

Work Type	CAPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total	6.29	5.60	3.07	4.41	5.60	7.96	9.21	4.92	7.66	4.70

Table 8-14: Proposed kerb and channel work programme and budget

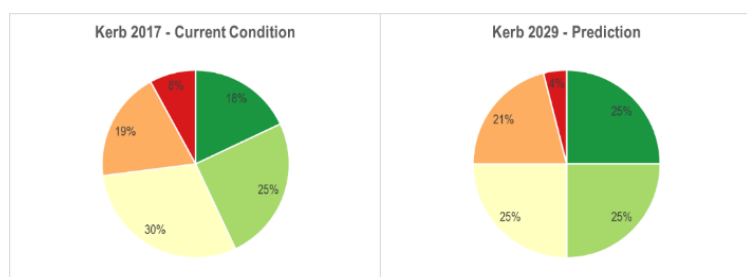


Figure 8-12: Comparison of kerb condition over time

8.2.14 Capital Development Plan

Kerb and channel assets may be added to the network to improve amenity, safety or enhance the level of service in streets which do not currently have them. Aside from new assets added in association with new carriageways, the provision of additional capacity is not currently a specific consideration.

New sections of kerb and channel are acquired as a result of:

- Council-funded extensions to the network where no kerb and channel previously existed; and extensions or additions to the network where the project is not renewal-related;
- Council construction of new kerb and channel in conjunction with road network extensions e.g. Road Network Improvements; in conjunction with Safety Works, Neighbourhood Improvement Works; and as New Construction – mostly on the urban fringe to link housing developments with the rest of the network; and
- New kerb and channel construction with subdivision development (constructed at the developer’s expense or with a part contribution from Council), and vested to the Council.

It is rare for these new assets to replace old ones due to condition.

The budgets allowed in the capital programme are summarised in Section 9.

8.2.15 Disposal Plan

Realignment of carriageways can create lengths of kerbs and channels surplus to current needs. While the kerb and channel may be removed and disposed of, the available space provides opportunities for other users of the road reserve e.g. for landscaping; and passive, cycle and pedestrian use. The RAMM database and asset register are updated to remove the redundant kerb and channel data.

Costs of disposal are included within the funding provided for the development of a new use, and therefore there is no budget allowed or required for the disposal of road drainage assets.

8.3 Footpaths

8.3.1 Asset Inventory

Council is responsible for managing 2,582 kilometres of footpath. Footpath assets include the sealed network providing pedestrian access to residential properties, industrial, commercial and recreational areas, and alongside state highways where applicable. The main physical parameters are width, alignment and material.

The width of footpaths is highly variable across the city, generally they are 1.65m wide in industrial areas, 1.8m wide in residential areas and 3.0m wide in the city centre and other urban areas. Traditionally footpaths were constructed against the kerb to ease access to parked vehicles and buses, with grass or grit in the area between the footpath and property boundary. There are more than 400 km of street with this configuration of footpath in Christchurch, mostly in conjunction with the old style kerb and deep dish channels.

A footpath is made up of its construction layers and a surfacing material. The standard footpath construction includes a 75 mm thick layer of metal course, which is increased at vehicle entrances. This construction layer has an expected life of 80 years, however in reality unless damaged by vehicles will achieve a near infinite life. Other than concrete (with an expected life of 80 years), a footpath's surface has an expected life of 25 years. Table 8-15 provides a summary of footpath assets by surface type.

Surface Type	Length (km)	Expected life	Quantity older than expected life
Asphaltic Concrete	2,627	25	300
Chipseal	30	10	30
Slurry Seal	1	10	1.2
Concrete	65	80	-
Interlocking Block (concrete pavers)	14	35	-
Metal (unsealed)	7	-	7
TOTAL	2,744		

Table 8-15: Summary of footpath assets by surface type (as at February 2021)

8.3.2 Asset Age

Asset age has a direct relation to condition, with assets older than their expected lives more likely to be in poor condition triggering maintenance or renewal works.

8.3.3 Asset Condition

The last full condition survey of the network was undertaken in 2017, the details are summarised in the Figure below.

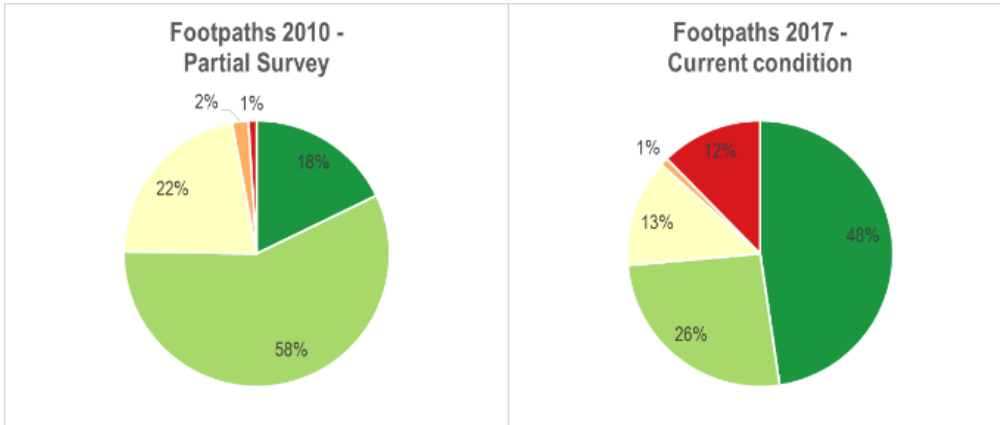


Figure 8-13: Comparison of footpath condition over time

Footpath condition data was loaded on August 2017 and provides a condition based on major and minor fault lengths. The data has been assessed using percentiles and has also been considered when aligned against maintenance dispatch records. Given the quantity of completed renewals and the change in condition it provides only a quick guide on where sections of path may be requiring attention.

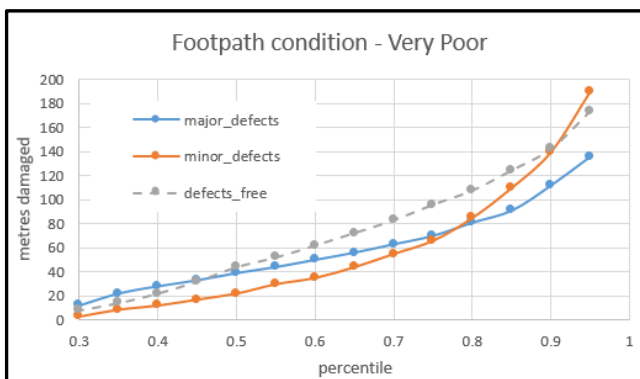


Figure 8-14: Analysis of footpath condition by defect

8.3.4 Asset Valuation

Asset valuations are established at 3-yearly intervals. The following asset

Assets	Optimised Replacement Cost (ORC)	Optimised Depreciated Replacement Cost (ODRC)	Annual Depreciation (AD)
Footpath [†]	\$456,083,629	\$255,515,689	\$9,616,184

Table 8-16: Footpath asset valuation data (from 2019 Valuation Report)

8.3.5 Problems

The following problems have been identified relating to footpaths in Christchurch:

- the risk of tripping, and wheelchairs tipping due to surface irregularities (such as potholes, puddles, tree roots, cracks and depressions) is often too high. Also poor visibility due to overgrown foliage often results in conflicts between pedestrians and vehicles at driveways;
- ease of use is seen as unsatisfactory due to surface irregularities and the existence of significant lengths of older surfaces, including chip seal surfacing;
- generally substandard appearance because of patching, trenching, deterioration, cracking, and other defects;
- footpaths are too narrow in some locations, which reduces the uptake of walking; and
- coal tar is still found in some areas. This requires remediation works to mitigate environmental factors.

8.3.6 Benefits

Addressing these issues will help achieve Council’s strategic outcomes as shown in Table 8-17.

Safety	Access	Affordability
Improve road safety, particularly for vulnerable users such as pedestrians and wheeled modes	Increase in trips by active modes and a decrease in private vehicle trips	Improved customer experience and resident satisfaction with footpath condition

Table 8-17: Alignment with strategic outcomes

8.3.7 Consequences of Not Addressing the Problems

Footpath and cycleway use will not increase and there will be an increasing risk of incidents causing serious injuries or deaths, due to infrastructure deterioration.

8.3.8 Levels of Service

Footpaths contribute to a number of the Council measures, the most relevant of these measures are listed below:

- 16.0.9, Resident satisfaction with footpath condition; and
- 16.0.10, Perception that Christchurch is a walking friendly city.

8.3.9 Gap Analysis

This section outlines how Council’s footpath assets are currently performing against the key levels of service measures detailed above.

- **Customer satisfaction**

Resident satisfaction with the condition of footpaths has been low following the Canterbury Earthquake Sequence in 2010 and 2011. It has fluctuated between 34 and 51%, and is currently at 40% from the 2020 survey. Conversely perception that Christchurch is a walking friendly city has remained high over this same period, and Council achieved 84% in the most recent survey.

Staff interpret this to mean that there are specific issues on the network that residents would like to see remediated, however these issues do not stop them using the footpath.

8.3.10 Options to Address Gaps

Council has developed the following options to address the identified gaps in the network for its footpath assets.

Options	Output	Benefit / Consequence
Maintain current level of investment Keep the quantity of work static.	Approximately 25km of works per year.	Not achieve any improvements to network condition. Likely reduction in customer satisfaction and higher costs in medium to long term as assets deteriorate.
Increase investment over time Incrementally increase spending over a 5 year period.	Ramp up the programme over 5 years to achieve 50km per year.	Sustainable increase in quantity of work. Return network to appropriate state over 10 – 20 year period.
Increase Investment now Increase investment for the next 3 financial years.	Deliver on the back log of works over the next 3 years.	Concentrated effort to get assets back to appropriate standard. High level of capital outlay, and likely disruption to residents due to increased scale of works.
Run to failure Don't plan to remediate assets until they have clearly broken.	Don't plan for a stable quantity per year, wait for assets to break and respond accordingly.	Uncertainty of workload, and likely higher costs due to reactive nature of work.

Table 8-18: Footpath investment option development

8.3.11 Recommended Option

Council recommends adopting the increase investment over time option for the maintenance, operation and renewal of its footpath assets, as it considers this the best option to deliver the strategic outcomes.

This option aims to deliver ONRC fit-for-purpose levels of service, and plans to renew assets before they fail.

- **How is this option optimised and does it address the issues?**

Value-for-Money - sealing footpaths in urban areas results in a durable asset that will last for many years. It solves a number of safety issues that arise when footpaths are not provided, and contributes significantly to Council's Community Outcomes.

Whole-of-Life Costs - this is assessed against an expected life of 25 years for asphalt footpaths, which form the majority of this asset group. As maintenance costs increase that is the right time to intervene and construct a new surface along a major section of the footpath.

Life Cycle Management - footpaths are renewed based on condition, and are prioritised based on their classification and function e.g. high use areas such as schools are prioritised ahead of small culs de sac.

8.3.12 Operations and Maintenance Plan

Historically footpath maintenance has been a reactive, ‘unplanned’ activity, which has proven to be the most cost effective maintenance method.

Most footpath defects are notified by the public, and the contract documents specify a 24 hour call-out service is provided to attend to safety-related problems. Maintenance needs are also identified from inspection surveys and observations made by staff in the course of their duties.

Typical work undertaken includes pothole repair, removal of tree roots, surface levelling/ smoothing, edge drainage improvements, seal edge alignment and trimming of vegetation.

There is no cyclic planned maintenance work carried out on a block-by-block basis, and no provision for maintenance contractor inspection and / or scheduling footpath maintenance work when scheduling other work on a road section.

All footpath activities must comply with ‘Christchurch City Council Construction Standard Specification (CSS) - Part 6: Roads’.

The recommended funding allocation for the next 10 year period is shown in the table below. Note this recommendation is based on the following assumptions:

- 1% growth in asset size per year;
- strategies to control third party damage - especially trenching damage - are effective; and
- there will be no significant changes in contract rates (above the rate of inflation) for maintenance work.

Maintenance Expenditure

Work Type	OPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Depreciation	15.2	15.8	16.3	16.9	17.5	17.8	18.0	18.3	15.7	11.1
Operations	2.7	2.7	2.7	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Maintenance	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Total	19.3	19.9	20.4	21.1	21.7	22.0	22.2	22.5	19.9	15.3

Table 8-19: OPEX expenditure including maintenance

8.3.13 Renewals Plan

Footpath renewal works include;

- surface renewals to provide a safe, smooth, waterproof surface; and
- full footpath reconstruction including layers - in association with street upgrading and / or kerb and channel renewal (footpath condition is not a significant driver in assessing these work priorities).

Renewal programmes are developed by initially inspecting footpaths prioritised by age, and assessing the footpath condition. Customer complaints also highlight footpaths with user issues and these areas are inspected.

Surfacing renewal programmes are developed based on performance, using the area of defects per kilometre of footpath as a measure. Defects are logged to record depressions, tripping hazards, potholes, failed areas and cracking and the total area of repairs required is calculated and the net present value (NPV) of repair is compared with the NPV of renewal.

Construction layer renewals are usually based on the condition of the adjacent kerb and channel or carriageway rather than the overall footpath condition. The footpaths reconstructed are typically some of the oldest in terms of original layer construction date. An exception might be where substandard 1950's and 1960's construction requires basecourse replacement rather than just resurfacing.

Renewal Quantities and Expenditure

Work Type	Quantity (Km)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Renewal	25	30	35	40	45	50	50	50	50	50
Total	25	30	35	40	45	50	50	50	50	50

Work Type	CAPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total	2.52	6.00	5.69	8.04	6.82	6.90	6.61	7.97	7.97	7.97

Table 8-20: Proposed footpath renewal work programme and budget

8.3.14 Capital Development Plan

This is outlined in detail in Section 7.

Footpaths are created and acquired as a result of:

- extensions constructed by the Council and prioritised through the CTSP, where no footpath previously existed;
- extensions constructed by Council as part of the road network improvements, safety works, and neighbourhood improvement works budget categories;
- new footpaths constructed in conjunction with subdivision development (at the developer's expense) then vested in the Council; and
- upgrading work to improve the level of service to meet the requirements of the CTSP to provide high quality walking networks around the central city and suburban centres.

Opportunities for new footpaths have generally been identified from requests from the public, Community Boards, or in conjunction with subdivision developments. The CTSP will provide a way of prioritising these requests to implement the plan for 'walkable centres'.

Projected growth for the 10 year period is expected to add 200 km of new footpaths (average 0.8% annual growth), based on costs of \$100 per lineal metre for Council-funded (brownfields) works, and \$60 per lineal metre for developer-funded (green fields) works.

It is assumed that the length of footpath lost through residential red zone clearance will roughly balance the new footpath created in the additional subdivisions created to house displaced residents.

The budgets allowed in the capital programme are summarised in Section 9.

8.3.15 Disposal Plan

Options for complete disposal are often limited by existing utility services but can include additional opportunities for landscaping, and passive, cycle or other use.

Realignment of footpaths in conjunction with carriageway and kerb and channel renewals can create lengths of footpath surplus to current needs. While the layers and surfacing may be removed and disposed of, the available space provides opportunities for other users of the road reserve. The RAMM database and asset register are updated to remove the redundant footpath data.

Costs of footpath disposal are included within the funding provided for the development of a new use, therefore no budget for the disposal of footpath assets has been allowed for in this Asset Management Plan.

8.4 Structures

8.4.1 Asset Inventory

This section covers the following assets:

- bridges, underpasses, culverts and fords – provided to allow vehicles, pedestrians and cyclists access across barriers such as waterways, railways and roads (note that culverts larger than 600 mm in diameter only are included in this section);
- retaining walls – provided as physical support to the road platform or to prevent erosion of the hillside onto the road (note that retaining walls not in transport corridors are included in the Parks, Marine Structures or 3 Waters Asset Management Plans);
- guardrails – provided to prevent vehicles straying off the road;
- handrails – provided to prevent pedestrian and cyclist injuries through falls; and
- gantries – which hold advance directional signage.

Council is responsible for managing 2,663 structures including 330 bridges, 98 culverts and 1, 611 retaining walls. The oldest road structure on record is a 156 year old masonry culvert. A significant programme of bridge renewals has been completed over recent years. This work has focussed on replacing timber bridges with concrete structures.

Data for transport bridges and structures owned by the Council are currently held in the RAMM database, with a breakdown shown in the following table, by use and construction material.

Structure Type	Concrete	Masonry	Steel	Timber	Cast iron	Aluminium	Total
Traffic bridges	157	3	65	50			275
Pedestrian/cycle bridges	24	1	2	27	1		55
Pedestrian/cycle Underpasses			1				1
Fords	1						1
Culverts over 600 mm diameter	79	6	12			1	98
Retaining Walls*							1,611
Guardrails	2		150	234			386

Handrails			119	17			136
Gantries			113				113
Total							2,663

Table 8-21: Summary of bridges and structures by type

Data on guardrails and handrails is known to be incomplete, and an item is included in the Improvement Plan to improve the Council records for these assets.

8.4.2 Asset Age

The known age of Council’s bridges, culverts and underpasses are illustrated in the graph below.

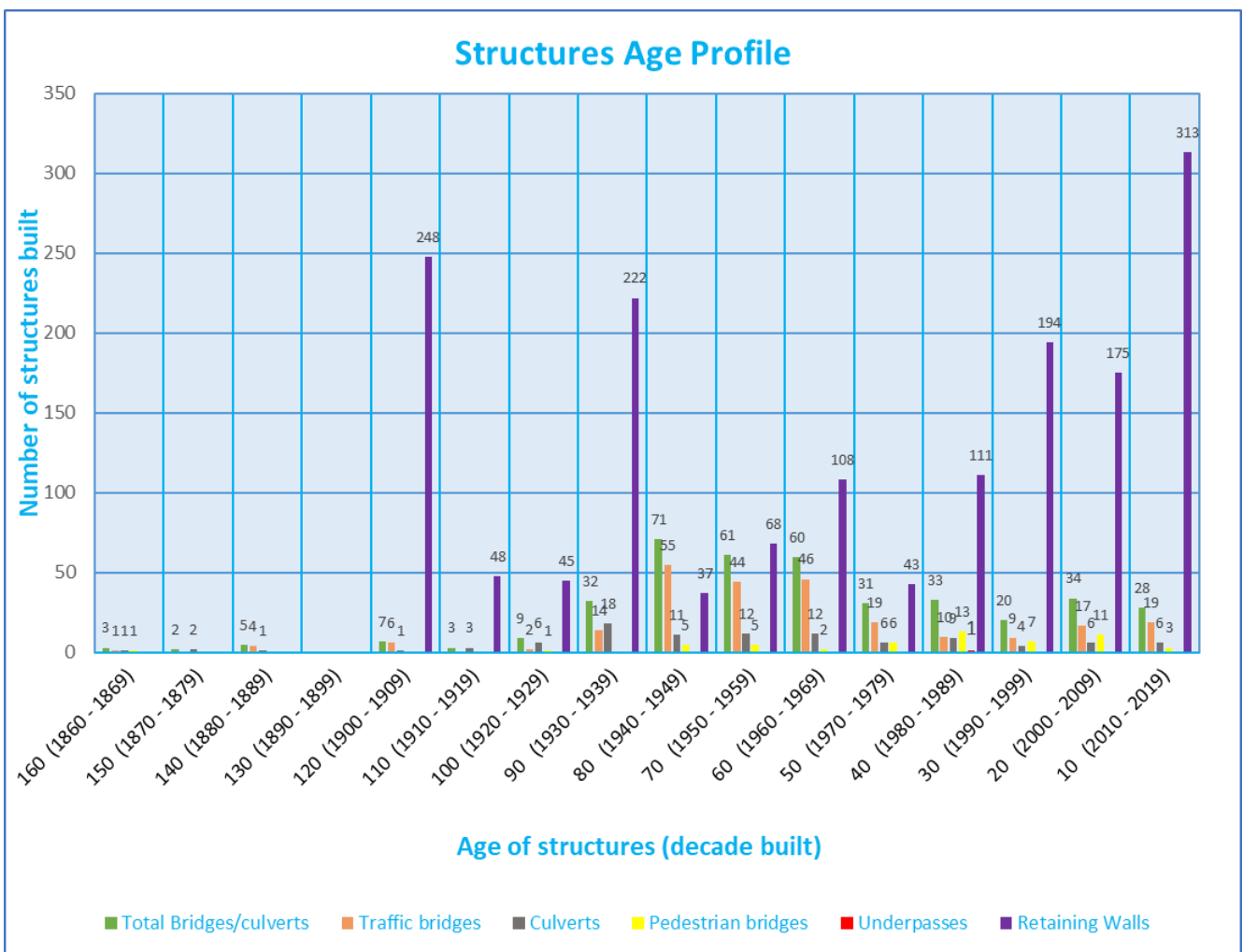


Figure 8-15: Age profile of transport structure assets

The expected life for timber structures is 75 years. Timber is a less durable material that suffers from rot and insect attack; natural defects such as cracking and splitting; and in the case of timber bridge decks surface abrasion at joints and top surfaces due to traffic use. For valuation purposes timber bridges are assumed to have an economic life of 75 years and concrete or steel bridges of 100 years.

For valuation purposes retaining walls are assumed to have an economic life of 100 years. Timber and concrete crib walls are likely to have shorter economic lives than poured concrete or rock facing walls. For valuation purposes culverts are assumed to have an economic life of 100 years.

The condition of the assets in this area has been dominated by earthquake effects as mentioned previously, and the restoration of these structures to pre-earthquake levels of service has been a dominant activity over the past six years.

8.4.3 Asset Condition

- **Bridges**

The earthquakes caused damage to many structures, with the priority for repair / rebuild is driven in part by the criticality of routes post-earthquake, which is dependent in turn on the identification of retreat and new development areas.

A number of earthquake damaged bridges were repaired or replaced by Stronger Christchurch Infrastructure Rebuild Team (SCIRT), but with SCIRT having been disestablished, bridge renewals are now being managed under Council’s bridge renewals programme. The current need for replacement has been determined by the ongoing structural inspection programme. This renewal programme is based on the:

- continuation of the Banks Peninsula timber bridge replacement programme;
- consideration of asset age and condition for non-earthquake damaged bridges; and
- need to maintain target levels of service

The proportions of bridges with their respective condition ratings are shown in the pie charts below.

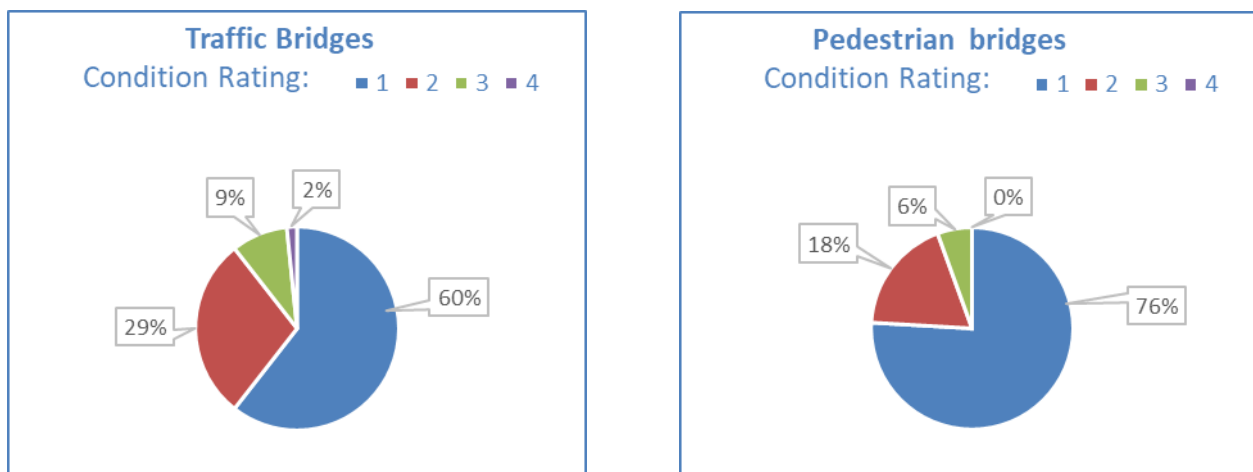


Figure 8-16: Condition rating of bridge assets

1 = Excellent (low priority remediation), 2 = Good, 3 = Average, 4 = Poor (high priority remediation)

- **Bridge live load capacity**

Design loadings have increased to suit as vehicle sizes and carrying capacity have increased through time. Table 8-22 below summarises the load capacity of the traffic bridges and culverts.

Load Capacity	Major Arterial	Minor Arterial	Collector	Local	TOTAL
Overload	-	-	2	-	-
Class 1	15	26	4	0	38
HPMV	2	1	1	4	8
Restricted	-	2	-	1	1
TOTAL	17	29	7	5	47

Table 8-22: Summary of bridge and culvert load capacity

Load capacity is not usually a limiting factor within the city as alternative routes are almost always available, although previously accepted alternative routes may no longer be appropriate in the central city due to post-earthquake changes to the CBD.

However, Waka Kotahi NZ Transport Agency are likely to require all unposted bridges to be HPMV capable. Therefore, in the absence of strengthening, our restricted bridges tally could increase. On the other hand, the restricted bridges tally is due to reduce by two with the imminent replacement of the old timber Poynder Avenue and Garden Road bridges.

- **Retaining walls**

A three-year inspection programme to inspect all retaining walls for which Council is responsible has been completed. The inspections record data including approximate age, wall material, structural type, dimensions, condition and defects.

Ongoing inspections are carried-out in accordance with the Waka Kotahi NZ Transport Agency **Bridges, geotechnical structures and other significant highway structures inspection policy (Waka Kotahi NZ Transport Agency S6: 2020)**

Rock retaining and facing walls, and timber and concrete crib walls have been damaged to varying degrees by the earthquakes. Council's asset register for retaining walls which was not complete at the time of the earthquakes is now complete for earthquake damaged walls.

There are some 140 damaged walls requiring repair or replacement in Lyttelton and on the Port Hills which are Council's responsibility. Apart from a few stone walls with minor damage, many of these damaged walls have been replaced with timber post and panel, concrete block or poured concrete structural walls.

Wall condition is expressed in terms of priority of remediation – high priority maintenance and renewals walls are inferred as being in poor condition – there are 108 walls in this category, with an estimated remediation cost of \$3,440,600.

Conversely, there are 584 low priority walls in good condition. Although these walls have an estimated remediation cost of \$3,771,500, this cost can be spread over at least 10 years.

- **Condition monitoring**

Prior to the earthquakes, full structural inspections of all bridges are undertaken on a six-year cycle, but are now carried out in one-year, two-year, three-year and six-year cycles, depending on their age, material type and condition. These inspections are carried out generally in accordance with the Waka Kotahi NZ Transport Agency S6:2020, taking into account user safety, structural integrity, defects and appearance.

Council also monitors slip sites, including drone topographical surveys, as a prelude to eventual site remediation in the form of a new retaining wall, or erosion protection structure, as appropriate. These site are now recorded in the RAMM database.

Inspections on retaining walls began in 2013 and there is currently a three-year programme to inspect all walls for which Council is responsible. An inspection regime going forward will need to be devised when the age, nature, locality and condition of all Council walls are established at the conclusion of this inspection programme.

Large culverts are now inspected together with bridges, taking into account user safety, structural integrity, defects and appearance. A three-year inspection programme for bridges and culverts is also currently underway.

There are currently no specific level of service measures relating to bridges and structures. However the Council has certain legal obligations as stipulated by Schedule 10 of the Local Government Act, and as owners of the structures in relation to the Building Act and the Building Code. As such Council is obligated to maintain structures such that they may be safely used for their intended purpose by members of the public. Council may choose to divest this obligation by closing or disposing of them through the available legal channels.

Further to this, there are a number of structural methods available to determine the performance of structures and these are discussed below.

8.4.4 Valuation Data

Asset valuations are established at 3-yearly intervals, this was last undertaken in June 2019. For valuation purposes bridges and structures are split into sub asset categories.

Assets	Optimised Replacement Cost (ORC)	Optimised Depreciated Replacement Cost (ODRC)	Annual Depreciation (AD)
Bridges and Culverts	\$263,311,286	\$112,578,134	\$2,604,740
Retaining Wall	\$240,687,305	\$82,041,323	\$5,660,034
Railings	\$7,555,864	\$2,848,891	\$205,781

Table 8-23: Bridge and structures asset valuation data (from 2019 Valuation Report)

8.4.5 Problems

The following problems have been identified relating to roading structures in Christchurch:

- the remaining useful life of some bridge assets is limited, particularly the timber transport bridges and footbridges, which has resulted in weight or speed restrictions been imposed on some of these assets due to deterioration of timber which reduces capacity;
- the non-compliant timber handrail on the Old Waimakariri River Bridge, which is on a bus route needs to be upgraded before there is a fatal penetration. In the meantime there are several non-fatal penetrations each year, which are expensive to repair;
- concrete retaining walls built in the 1960's are rapidly deteriorating and there are increased instances of the public reporting slumping and cracking;
- post-earthquake there is an increased level of risk of failure of certain retaining walls that exceeds the Council target for level of risk;
- many post-earthquake repairs to retaining walls were focussed on 'make safe' and further work is required to fully repair some assets; and
- at current funding levels and frequency of extreme weather events, slips that negatively affect road serviceability and safety are occurring at a faster rate than can be remediated with new structures.

8.4.6 Benefits

Addressing these issues will help achieve Council's strategic outcomes as shown in the table below.

Safety	Access	Environment	Affordability
Improved road structure condition will reduce the risk of failure and serious or fatal injury	Reduced instance of road closure or weight/speed restrictions	n/a	n/a

Table 8-24: Alignment with strategic outcomes

8.4.7 Consequences of Not Addressing the Problems

Increasing safety risks (due to load-bearing asset failure), negative impacts on economic productivity, low customer satisfaction, higher risk of network access restrictions, a deteriorating network, and high maintenance and renewal costs over the expected life of the assets.

In particular there is a current backlog of \$4m worth of un-remediated slips, requiring new retaining walls or geotechnical structures, and to this \$1.75m (about 5 walls) is currently being added each year, due to extreme weather events. In the absence of sufficient additional funding, the risk to the Council is exponentially increasing. Even with the coning off of slips, the unsupported face is still a higher risk than normal, and it should not be seen as more than a temporary response. This funding gap will be explored further over the next 3 year planning cycle.

8.4.8 Levels of Service

Roading structures contribute to a number of the Council measures, and ONRC performance measures the most relevant of these measures are listed below:

- 10.0.6 Reduce death and serious injury crashes on the network; and
- ONRC Accessibility CO1 – Proportion of the network not available to heavy vehicles.

8.4.9 Gap Analysis

This section outlines how Council’s roading structure assets are currently performing against the key Levels of Service measures detailed above.

- **ONRC Accessibility CO1** - proportion of the network not available to heavy vehicles.

Bridges with weight or width restrictions limit the types of vehicles that can use them. While this is less of an issue within the city limits (due to the high number of route options), it can be an issue for parts of the Banks Peninsula.

- **Compliance with the Building Code**

As a building owner Council is obliged to comply with the Building Act and the Building Code. Bridges and retaining walls in particular are a challenge as they are considered buildings under the Act and are used by the public on a regular basis.

Since the 2010 and 2011 earthquakes the Building Code requirements have become more onerous. Further to this Council has adopted policy such that all buildings meet 67% NBS.

It is worth noting that the Earthquake Prone Building provisions of the Building Act has a series of exclusions, however staff are of the view that the guidance and targets in the Act are relevant for all structures – owners have 2.5 years as of July 2017 to properly inspection their stock, then 7 years to rectify earthquake prone structures in the public realm, and a further 7 years for all other structures.

8.4.10 Options to Address Gaps

Council has developed the following options to address the identified gaps in the network for roading structure assets.

Options	Output	Benefit / Consequence
<p>Maintain current level of investment</p> <p>Keep the quantity of work static.</p>	Approximately 4 bridges and 4 retaining walls per year.	Not achieve any improvements to network condition. Likely reduction in customer satisfaction and higher costs in medium to long term as assets deteriorate.
<p>Increase investment over time</p> <p>Incrementally increase spending over a 5 year period.</p>	Ramp up the programme over 5 years to achieve 5 bridges and 10 retaining walls per year.	Sustainable increase in quantity of work. Return network to appropriate state over 10 – 20 year period.
<p>Increase investment now</p> <p>Increase investment for the next 3 financial years.</p>	Deliver on the back log of works over the next 3 years.	Concentrated effort to get assets back to appropriate standard. High level of capital outlay, and likely disruption to residents due to increased scale of works.
<p>Run to failure</p> <p>Don't plan to remediate assets until they have clearly broken.</p>	Don't plan for a stable quantity per year, wait for assets to break and respond accordingly.	Uncertainty of workload, and likely higher costs due to reactive nature of work.

Table 8-24: Option development

8.4.11 Recommended Option

Council recommends adopting the increase investment now option for the maintenance, operation and renewal of its roading structure assets, as it considers this the best option to deliver the strategic outcomes.

This option aims to deliver ONRC fit-for-purpose Levels of Service, and plans to renew assets before they fail.

A particular area of focus for increased investment is retaining walls, as the backlog and consequential risk is high for this part of a portfolio.

New retaining walls and geotechnical structures form part of the above and they are effectively component renewal of the road itself.

- **How is this option optimised and does it address the issues?**

Value for Money – where possible components of structures are renewed rather than the entire structure. This targeted use of money can extend the life of the structure and make the money go further. Also smaller scale works can be built faster and this reduces the disruption to road users.

Whole of Life Costs – this is assessed against an expected life of 50-100 years depending on the structure e.g. timber retaining walls are 50 years, concrete bridges are 100 years.

Life Cycle Management – like the other major transport assets, structures are renewed based on condition in accordance with the building code and the Waka Kotahi NZ Transport Agency Bridge Manual.

8.4.12 Operations and Maintenance Plan

Maintenance works are undertaken to provide for the safety of users, and protect the investment in bridges, culverts and retaining walls by maintaining the life of the structure, and minimise repair costs.

The types of maintenance work activity undertaken include:

- repairing structural defects (e.g. concrete spalling, corroded fastenings, rotten timber, scour around foundations), repairing / replacing damaged components (e.g. handrails and guard-rails), restoring protective coatings (e.g. painting);
 - maintaining drainage;
 - bridge, retaining wall and eroding slope condition is monitored by undertaking the following inspection programme, generally in accordance with the Waka Kotahi NZ Transport Agency Bridges, Geotechnical Structures and other Significant Highway Structures Inspection Policy (Waka Kotahi NZ Transport Agency S6;2020); and
 - ongoing superficial inspections coordinated with other routine maintenance work.
- **Inspections**
 - Comprehensive inspections are undertaken at specified regular intervals, supplemented by more frequent superficial inspections by experienced staff and, as necessary, after specific events such as earthquakes, severe floods and weather events, or instances of overloading.
 - General structural inspections are undertaken on a two year cycle, taking into account such factors as structural integrity, defects, safety and appearance. Exceptions are noted and photographed.
 - Periodic inspections in three year cycles for ‘mid-life’ structures, and principal inspections in six year cycles, also form part of the inspection programme, where appropriate.
 - Special inspections are undertaken to assess exceptions noted during the general inspections; and after specific events such as earthquakes, severe floods or instances of overloading.

Maintenance programmes are developed from the schedules of defects identified during the inspections. The intention is to adopt the most cost effective option where possible within the time and budget constraints.

Currently there is a significant maintenance backlog across Council transport structures, particularly retaining walls – with some 815 walls requiring work to the value of \$2,429,200.

8.4.13 Maintenance Expenditure

Work Type	OPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Depreciation	9.9	10.0	10.0	10.1	10.2	9.8	7.0	7.1	7.2	7.3
Operations	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Maintenance	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Total	11.7	11.7	11.8	11.8	11.9	11.5	8.7	8.8	8.9	9.0

Table 8-25: Structures OPEX expenditure including maintenance

8.4.14 Renewals Plan

Asset renewal in the bridges and structures activity is generally undertaken when a structure, or a significant component of a structure has reached the end of its economic life. Following the earthquakes, a number of significant bridges were repaired / replaced by SCIRT.

Some of the common types of renewal works undertaken include:

- replacement of an entire bridge, culvert or retaining wall; or replacement of individual components (e.g. timber bridge deck or piers);
- rehabilitation of structural components (restoring the integrity of structural components); and
- major retrofitting due to problems identified in conjunction with natural hazard studies.

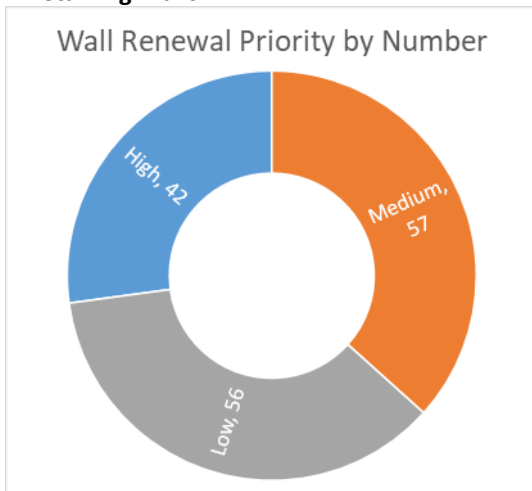
One of the issues in determining future funding needs is the requirement to address the rate of retrofitting of existing bridges in parallel with the major bridge renewal / replacement programme. Renewal and replacement needs are identified from the planned inspection programmes. Prioritisation of works and the selection of renewal options is made by the asset engineer on the basis of economic evaluations using the Waka Kotahi NZ Transport Agency criteria for bridges and culverts, with projects being justified when the future savings achieved by doing the work exceeds the cost of the work and meets current benefit / cost cut-off criteria.

The lowest cost option, considering all life-cycle costs, is selected except where funding limitations necessitate shorter term (lower cost) options for works that cannot be deferred.

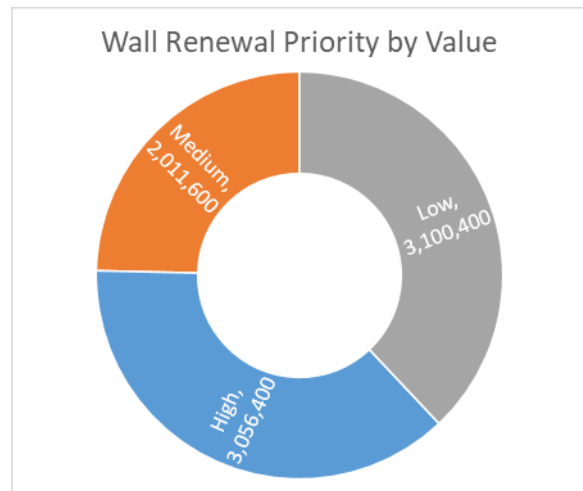
- **Bridges and culverts**

Relative remediation priorities for bridges and culverts, which relate generally to their condition, are shown in the Figure above.

- **Retaining Walls**



Total Renewal Numbers = 155 walls



Total Renewal Value = \$8,168,400

Figure 8-17: Retaining wall renewal priority

With a nominal current annual renewals budget of \$800,000 it would take 10 years to complete the current backlog of renewals work, and 8 years to complete the high and medium priority component, which is estimated to cost \$5,068,000. Recommended timeframes for various renewal work priorities, based on interpretation of Council risk policy, are as follows:

- High Complete within 1-2 years;
- Medium Complete within 2-5 years;
- Low Complete within 10 years, subject to engineer review and as resources permit.

To complete the high and medium priority renewals work within the maximum recommended 5 years, the annual renewals budget would need to increase to \$1.25 million, over that period. Completing it sooner would require a corresponding increase in annual funding.

Furthermore, there is no money currently budgeted for the retrofitting of walls that would come within the definition of Earthquake Prone Buildings (EPBs), if retaining walls were included within the definition.

A number of our stone facing walls are above footpaths and could be hazardous in earthquakes – the earthquake itself makes no distinction. In any case, it could be argued that these walls are not retaining walls, they are non-structural facings, and, as such, could come into the scope of the Earthquake Prone Building (EPB) regulation. Therefore it is recommended that in the interests of public safety, stone facing walls be treated as if they were potential EPBs.

There are 18 walls with heights $\geq 1.5\text{m}$ in the EPB category, with an estimated retrofitting cost of \$3,731,500. Completing this work within 7-15 years, i.e. an annual spend of \$248,800 - \$533,000, would be to a time scale that sits comfortably with legislative requirements.

Of the 815 walls requiring maintenance, valued at \$2,429,200, some 61.6%, or a value of \$1,496,400, is structural. This work could be capitalised because it extends the life of the wall.

Renewal Quantities and Expenditure

Work Type	Quantity									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Bridge renewal	6	6	5	5	5	5	5	5	5	5
Retaining wall renewal	8	10	10	10	10	10	10	10	10	10
New retaining walls, planned	4	4	4	4	3	3		2	2	2
New retaining walls, contingent	5	5	5	5	5	5	5	5	5	5
Guardrail renewal	4	4	4	4	6	6	6	2	2	2
Gantry Renewal	2	2	2	2	2	2	2	2	2	2
Total	29	31	30	30	31	31	28	30	30	30

Work Type	CAPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total	6.78	8.66	8.93	13.64	7.30	7.29	6.74	11.41	17.94	2.30

Table 8-26: Proposed retaining wall/guardrail/gantry renewal work programme and CAPEX budget

8.4.15 Capital Development Plan

The development and acquisition of bridges and structures is generally triggered through;

- construction of new bridges to allow land development or to achieve traffic efficiencies by providing links across significant features (waterways, railways, grade separation etc.);
- replacement of, or additions to, existing bridges to upgrade traffic capacity and / or load capacity;
- new retaining walls necessitated by the need to restore road functionality following natural weather events/climate change. Slips above and below roads, particularly those on the coastal fringe, are an increasing

challenge. There is currently a backlog of \$4 million worth of new construction required, and each year this figure escalates by an additional \$1.75 million. The alternative to underfunding this deficit is increased risk and a reduction in the level of service. Total annual new wall funding of \$2.0 million, for at least ten years, is required to address this;

- safety improvements requiring the addition of structural elements; and
- in addition, bridges are sometimes acquired through the subdivision process but this is relatively uncommon.

Developments are prioritised by considering the total benefits to road users and the land transport system using the economic evaluation procedures found in the Waka Kotahi NZ Transport Agency Economic Evaluation Manual.

The budgets allowed in the capital programme are summarised in Section 9.

8.4.16 Disposal Plan

Disposal activity for bridges and structures relates to the demolition of structures and sale of surplus materials. Some cost recovery may be possible from the recycling of timber components from timber bridges which are renewed with other materials.

It is not very often that a bridge or structure is removed without being replaced by the same or similar asset in the same or similar location. As such, in the majority of cases the costs of disposal are generally absorbed by the budget for the overall project. RAMM is updated to remove disposed assets from the database and new assets are added in line with data standards.

Therefore there is no budget allowed for disposal of bridges and structures assets.

8.5 Street Lighting

8.5.1 Asset Inventory

Council is responsible for managing 41,765 street lights and 25,521 poles¹⁰. There are an additional 1,700 (non-Transport Unit) lights connected to the street lighting network which are associated with Parks, Facilities and Social Housing. These assets include poles (where the electricity network is underground), outreach arms, light fittings, Central Management System (CMS) for controlling lights and some of the cable.

Detailed asset data relating to the road lighting system is stored in RAMM. Data is stored on an individual pole/light basis and includes condition grading data. The transport road lighting network consist of lights for roads including zebra crossings, cycle and pedestrian ways and decorative lighting. The purpose of street lighting differs according to the use of the space.:

- arterial and collector traffic routes - the objective is to provide a lighted environment that is conducive to the safe and comfortable movement of vehicular and pedestrian traffic at night and the discouragement of illegal acts, while protecting the integrity of the night time environment through control of light spill and glare;
- local (low volume) roads - the objective is to provide a level of light that is sufficient to allow pedestrians to orientate themselves, detect potential hazards and discourage fear of crime while protecting the integrity of the night time environment through control of light spill and glare;
- pedestrian areas (malls and Inner City) – to provide a level of light that promotes safe night time use of significant and popular areas.

¹⁰ As at February 2021

Light / lamp type	Quantity
LED	32,893
High pressure sodium	6,924
Fluorescent	1,160
Other	788

Table 8-27: Quantity of lighting assets (as at February 2021)

Asset valuations are established at 3-yearly intervals. For valuation purposes road lighting assets are split into sub-asset categories (pole, bracket / arm and light).

Assets	Optimised Replacement Cost (ORC)	Optimised Depreciated Replacement Cost (ODRC)	Annual Depreciation (AD)
Pole	\$54,121,943	\$30,565,615	\$1,333,459
Bracket / arm	\$20,019,764	\$12,347,006	\$497,138
Light	\$35,860,085	\$16,372,338	\$1,661,253
Total	\$110,001,791	\$59,284,959	\$3,491,850

Table 8-28: Lighting asset valuation data (from 2019 Valuation Report)

8.5.2 Problems

The following problems have been identified relating to street lighting in Christchurch:

- the current pole renewal programme is not keeping up with replacement of ‘poor’ and ‘very poor’ condition lighting poles and outreach arms which increases risk of significant failure or collapse. Some of this damage is due to slow deterioration of concrete poles due to minor cracking during the earthquakes;
- the streetlight network is prone to damage from car versus pole crashes adjacent to roads;
- substandard illumination on the road, particularly at intersections, can contribute to night-time crashes; and
- investment is required to complete the upgrade to more energy efficient LED lights, current lamps are becoming difficult to source and more expensive.

8.5.3 Benefits

Addressing these issues will help achieve Council’s strategic outcomes as shown in the table below.

Journeys are safe	Journeys are reliable	Customers have choice	Journeys are comfortable	Council is responsive to the needs of customers
Street lighting helps address the high number of fatal and serious crashes that occur at intersections in Christchurch	n/a	Street lighting helps encourage walking trips at night	Street lighting helps improve the perception that Christchurch is a walking friendly city	The conversion of the street light network to LEDs will reduce energy consumption and maintenance costs and aligns with climate change priorities

Table 8-29: Alignment with strategic outcomes

8.5.4 Consequences of Not Addressing the Problems

Poor lighting that is non-compliant with current lighting standards, increased risk of asset failures, reduce amenity value. These may contribute to night-time crashes and other issues.

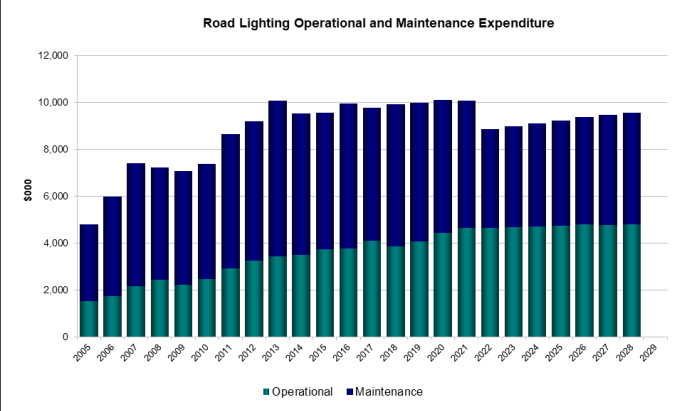
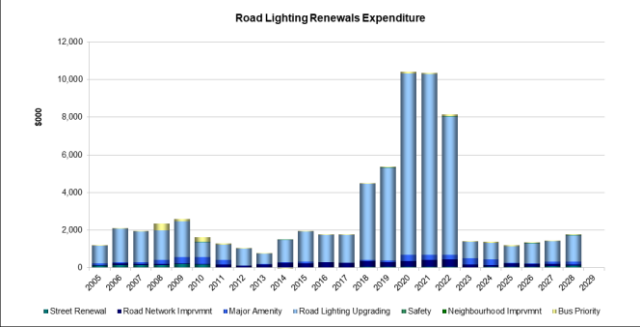
8.5.5 Levels of Service

Street lighting contributes to a number of the ONRC performance measures and Council measures, the most relevant of these measures are listed below:

- ONRC Safety TO5 – loss of driver control at night;
- ONRC Safety TO1 – crashes on poles;
- ONRC Safety TO9 – vulnerable users; and
- ONRC Cost efficiency CE5 – overall network cost.

8.5.6 Gap Analysis

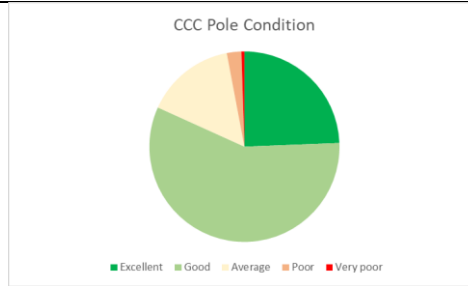
This section outlines how Council’s street lighting assets are currently performing against the key levels of service measures detailed above.

<p>ONRC Safety TO5 – Loss of driver control at night</p>	<p>A 2015 study in NZ showed the safety benefits of road lighting varies depending on crash type. Road lighting is not effective at reducing loss of control or cornering crash types.</p>
<p>ONRC Safety TO1 – Crashes on poles</p>	<p>A 2015 study in NZ showed the safety benefits of road lighting varies depending on crash type and is extremely effective for reducing collisions with pedestrians and obstructions, and highly effective for reducing manoeuvring and rear end crash types.</p>
<p>ONRC Safety TO9 – Vulnerable users</p>	<p>A 2015 study in NZ showed the safety benefits of road lighting varies depending on crash type and is extremely effective for reducing collisions with pedestrians and obstructions, and highly effective for reducing manoeuvring and rear end crash types.</p>
<p>ONRC Cost efficiency CE5 – Overall network cost</p>	<p>Graph of streetlight operational and maintenance spend</p>  <p>Graph of renewals spend</p> 
<p>CCC – Asset Condition</p> <p>Condition data is updated at each maintenance visit. Assessments consist of a visual inspection with assets being graded from 1 (excellent) to 5 (very poor). To minimise the risk of collapse or items falling, assets</p>	<p>Pie chart showing result of visual inspections – proportion of assets by condition grade</p>

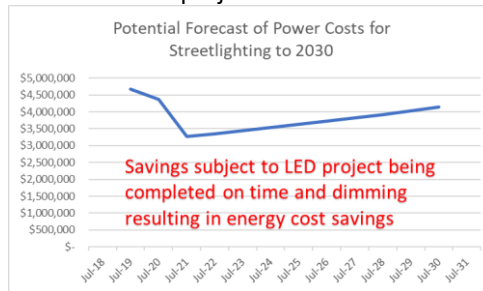
identified in category 4 or 5 are considered for renewal.

The condition data shows that most poles are in good or excellent condition. Grade 5 poles require urgent attention to prevent collapse. Grade 4 poles are targeted for renewal to prevent them becoming grade 5.

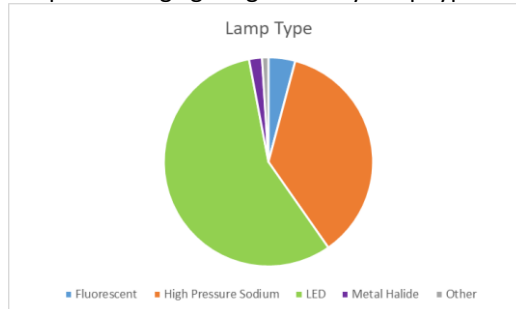
In 2012 all new luminaires were required to be LED type. LEDs offer significant power savings and reduced greenhouse gas emissions compared to the technologies previous used. The Accelerated LED Replacement Project which started late 2017 with a completion date of 30 June 2021. The project will replace all remaining old technology (e.g. high pressure sodium vapour, fluorescent etc) luminaires that qualify for Waka Kotahi NZ Transport Agency subsidy. At 25 August 2019 there were 39,411 Waka Kotahi NZ Transport Agency subsidised lights, 19,811 of which are LED. There are 1,183 non-subsidised Transport Unit lights and 1,700 lights associated with other Council Units.



Graph showing electricity cost. The drop is due to the current LED conversion project



Graph showing lighting assets by lamp type



Wider Considerations

Standard AS/NZS1158 Lighting for Roads and Public Spaces outlines requirements in relation to the road lighting activity. Waka Kotahi NZ Transport Agency M30 Specification and Guidelines for Road lighting Design provides further recommendations and guidance. The Council complies with these guidelines as a minimum.

In addition to these:

- Reliability is controlled by performance criteria stipulating that 99% of lights are required to be operating at all times, and that light output is maintained at or above the designed levels;
- Safety is considered in three categories: the standard of lighting provided, asset failure (e.g. pole collapse), and the location of poles to minimise the risk of injury from car accidents.

- Adverse effects from lighting is currently not measured at a network level but is considered and minimised during the design process of each lighting scheme; and
- Energy efficiency is an important indicator of capacity and performance. Electricity charges make up approximately 80% of the operational/maintenance costs each year. Upgrading the Council’s Waka Kotahi NZ Transport Agency subsidised lights to LED and introducing dimming during periods of low use of the roading network is expected to reduce energy consumption by approximately 69% and greenhouse gas emissions by 1,500 tonnes per year.
- Through the ongoing monitoring and improvement of the above measures, road lighting capacity and performance is optimised.

Table 8-30: Gap analysis and evidence base

8.5.7 Options to Address Gaps

Council has developed the following options to address the identified gaps in the network for its street lighting assets.

Options	Output	Benefit / Consequence
Status quo Make no changes to the current approach to street lighting maintenance and renewal.	Maintain and clean lights at regular intervals, and repair damage. Complete upgrade of Waka Kotahi NZ Transport Agency subsidised lights to LED by June 2021	High proportion of lights are operating, and damage / safety issues are addressed within appropriate timeframes. Majority of lights converted to LED reducing electricity consumption
Increase investment over time Pole Renewal	Increase pole renewal budget from FY 2024	Poles and outreach arms are safe and risk of failure or collapse is minimised.
Increase investment now Upgrade remaining council owned 'old technology' lights to LED.	Upgrade remaining Council owned street lights to LEDs between July 2021 and 2024.	Reduce electricity consumption of these lights. Reduced maintenance costs and eliminate supply issues relating to old technology lamps (likely to become more difficult and expensive as demand drops)
Run to failure Don't plan to remediate assets until they have clearly broken.	Don't plan for a stable quantity per year, wait for assets to break and respond accordingly.	Uncertainty of workload, and likely higher costs due to reactive nature of work.

Table 8-31: Street lighting option development

8.5.8 Recommended Option

Council recommends continuing with the 'increase investment now' and 'increase investment over time' options for the maintenance, operation and renewal of its street lighting assets, as it considers this the best option to deliver the strategic outcomes.

This option aims to deliver fit-for-purpose levels of service, and plans to renew assets before they fail and minimise operational costs.

8.5.9 Operations and Maintenance Plan

Procurement for electricity follows the MBIE process. Prices are peer reviewed by an external consultant to ensure the pricing represents best value. The current contract expires in September 2022. Approximately 40%, (this percentage will change as lights are upgraded to LED), of the total energy costs are fixed and therefore are not affected by reductions in energy consumption.

The Maintenance contract is performance based and key performance indicators manage contractor performance. A planned lamp replacement and cleaning programme ensures light output is maintained to the designed levels between renewal cycles. The current contract started in November 2018 and is a 3+1+1 year contract. The contract also included an option to deliver the LED renewal project which has been accepted.

Maintenance of lights includes:

- routine maintenance - keeping the lights operating at their required output, including, lamp replacement and cleaning, condition rating in conjunction with visits, maintaining asset data and systems. Many of the decorative lighting poles are painted which need repainting; and
- unscheduled maintenance – this is the reactive repair of faults and/or damage of lighting assets including accident damage and vandalism.

The business case accepted by Waka Kotahi NZ Transport Agency for the LED replacement project includes the installation of a Central Management System (CMS). The CMS will:

- turn lights on and off;
- enable dimming of lights when there is low use of the roads;
- send notifications of light failures and performance of the luminaire; and
- monitor electricity consumption.

This project will further reduce electricity consumption, and improve maintenance effectiveness, night time patrols to identify lamp failures will not be required for lights controlled by the CMS and lights will be repaired faster. Asset data will also be improved and will enable better information with regard to the operation of the lighting network to be provided to the community. To achieve these benefits for LEDs that have already been installed it will be necessary to fit controllers to the LED lights that were installed prior to the system being implemented. Where possible this improvement work will be done in conjunction with the luminaire cleaning cycle.

The LED renewal project is estimated to reduce electricity and maintenance costs by \$1.6 million per annum once the project is complete.

The network will continue to grow due to subdivisions, roading projects and other developments/ improvements which will result in slight annual increases to electricity and maintenance budgets.

8.5.10 Maintenance Expenditure

Work Type	OPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Depreciation	5.1	5.4	5.5	5.6	5.8	5.9	6.0	5.8	4.2	4.3
Operations	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Maintenance	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Energy	3.67	3.73	3.79	3.85	3.92	3.98	4.05	4.12	4.19	4.23
Total	9.7	10.0	10.2	10.4	10.6	10.8	11.0	10.9	9.3	9.5

Table 8-32: Street lighting OPEX expenditure including maintenance

8.5.11 Renewals Plan

Renewal projects may include upgrading to achieve the appropriate lighting standard. The strategy relating to the renewal of road light assets, or components of those assets, is to:

- replace faulty or damaged equipment that cannot be repaired because of obsolescence;
 - replace faulty or damaged equipment when replacement is more economic than repair, or the existing equipment does not meet the design / safety standards;
 - replace poles and arms that are in poor condition;
 - one-for-one replacement of all Waka Kotahi NZ Transport Agency subsidised lights with LED lights by June 2021. Remaining lights to be replaced by 2023; and
 - upgrade lighting assets in conjunction with roading projects and renewal programmes.
- **Pole and Arm Replacement**

Condition grade 4 and 5 poles identified during condition assessments are prioritised for replacement under this programme. They are usually concrete poles with signs of cracking or spalling, and steel poles that show signs of fatigue or significant corrosion. Replacement is generally carried out on a one-for-one basis.

- **Safety Improvements**

The lighting safety improvement programme identifies projects that need to be upgraded to a higher lighting standard or an additional light added to achieve compliance with the standards. These are usually on arterial or collector roads with medium to high traffic volumes, however the LED upgrade project has identified some locations that require additional lights due to very wide spacing between lights.

- **Conversion to Light Emitting Diodes (LED)**

The Council's role is to facilitate and implement action on energy efficiency, renewable energy, transport energy efficiency and security of energy supply.

Conversion of the existing Waka Kotahi NZ Transport Agency subsidised street lights to LEDs provides a significant reduction in electricity consumption and carbon emissions as well as financial benefits of reduced operational expenditure. Before this project was undertaken street lighting was the second largest business activity in the Council in terms of energy use and therefore carbon emissions footprint.

The project is a one-for-one replacement of existing lights and aims to maximise compliance with current standards.

The LED conversion project is strongly aligned to the following council policies documents, schemes and plans:

- Christchurch City Council Sustainability Policy (2008);
- Christchurch City Council Supply Chain Sustainability Policy (2003);
- Christchurch City Council Resource Efficiency & Greenhouse Gas Emission Policy (2017);
- Council energy management programme framework;
- Council emission management programme framework; and
- Council energy efficiency.

Council also has two priority goals related to climate leadership and maximising opportunities to develop a vibrant, prosperous, and sustainable 21st Century city which this proposal contributes towards.

Waka Kotahi NZ Transport Agency provided guidance on the benefits of changing to LED lighting including the use of a Central Management System (CMS). In March 2017 this was further reinforced with the increase of the Waka Kotahi NZ Transport Agency financial assistance rate (FAR) from 49% to 85% through to June 2018. The 85% FAR has been extended through to 30 June 2021. Further information relating to the LED upgrade project can be found at <https://ccc.govt.nz/transport/transport-projects/roads-and-underground-services/led-street-lighting>.

The LTP includes the costs to upgrade the remaining lights (Transport, Parks, Facilities and Social Housing) to LED with luminaire controllers and convert the LED lights that were installed prior to the introduction of the central management system. These lights were not part of the Waka Kotahi NZ Transport Agency subsidised project. This work is proposed to be completed in the first two years of this LTP period and will reduce Opex by \$140,000 per annum.

Renewals Quantity and Expenditure

Work Type	Quantity (Km)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Poles	324	322	490	490	490	490	478	468	468	468
Luminaires	1,111	898	100	100	200	300	500	500	1000	1100
Luminaire Controllers	5,000	4,042	0	0	0	0	0	0	0	0
Total	6,435	5,262	590	590	690	790	978	968	1468	1568

Work Type	CAPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total	10.66	1.71	2.74	2.16	2.88	2.14	2.31	2.71	2.86	2.65

Table 8-33: Proposed street lighting renewal work programme and CAPEX budget

8.5.12 Capital Development Plan

Road lighting is acquired or upgraded through:

- extensions constructed by Council where no road lighting previously existed;
- taking over new road lights installed with subdivision development (constructed at the developer's expense), or with roads handed back to council by Waka Kotahi NZ Transport Agency;
- street upgrading programmes (additional lights installed); and
- power underground conversion work.

From 2012 all new lights in the CCC area (including renewals and subdivisions projects) have been LED.

The budgets allowed in the capital programme are summarised in Section 9.

8.5.13 Disposal Plan

Disposal of road lighting, in this context, refers to removal of the capability or functions provided by the lighting, and not the removal of particular items and their replacement with others, or redevelopment of an installation at the end of its engineering life. The residential red zones will result in the disposal of the associated lighting, which will be managed and undertaken in conjunction with the retreat from these areas at the appropriate time.

8.6 Traffic Systems

Note that this section of the Asset Management Plan was developed by the Christchurch Transport Operations Centre (CTOC), which has been subsequently disestablished. Going forward, Council will need to undertake additional planning to better forecast the future requirements for these assets.

8.6.1 Asset Inventory

Intelligent Transport Systems (ITS) are the control, monitoring and detection devices that operate the road corridor in real-time to maintain optimal safety and efficiency. Asset types are varied to satisfy a number of functional needs, are generally electronic, involve complicated technologies, and require appropriately trained staff and suppliers to operate and maintain. Systems are well-established to cater for vehicular road users, however are increasingly also being used to support walking, cycling, public transport and active modes, alongside improving safety, information and supporting activation of public spaces. Transport technology is in a phase of rapid evolution and change is a constant factor.

Real TimeITS assets managed by RTO include:

- traffic signals - includes 276 intersection controllers and cabinets, 2,614 traffic signal poles, 263 overhead mast arms, 7,535 traffic signal lanterns, 2,721 pedestrian lanterns, 288 cycle lanterns, 238 illuminated signs, and several SCATS servers;
- CCTV systems – includes 464 Traffic cameras and associated systems & servers, and 150 Police ‘*Crime Cameras*’ and associated systems & servers. This latter system also supports the Council’s Parking Enforcement team manage Bus Lane enforcement;
- electronic road signage – includes 71 Variable Messaging Signs (VMS), and 126 electronic Speed Warning Signs near schools and accident-prone curves; and
- communication systems – includes fibre optic and copper cable networks, and 5 communication towers (25m) and the Mt Pleasant Tower for ‘air bridge’ radio communication links. Systems integrate with the Lyttelton Tunnel control centre, Waka Kotahi NZ Transport Agency regional office and WTOC.

The main functions of the ITS assets are to:

- operate the transport network in real-time. This includes both BAU operations and during incident response situations;
- optimise network performance in terms of safety and efficiency and in alignment with strategic plans. For example, by removing traffic conflicts at intersections thereby reducing the number of collisions, by prioritising modes such as Public Transport along designated routes, and by synchronising green signals along strategic and freight corridors;
- maintain or enhance journey time reliability 24 hours per day, 7 days per week, 365 days per year;
- support community safety and regulatory activities of the NZ Police and Council teams; and
- provide journey time and incident-related information to road users to enable informed travel choices to be made.

8.6.2 Valuation Data

Asset valuations are established at 3-yearly intervals and this was last undertaken in June 2019. For valuation purposes traffic systems is split into two sub categories as shown in the Table below.

Assets	Optimised Replacement Cost (ORC)	Optimised Depreciated Replacement Cost (ODRC)	Annual Depreciation (AD)
Cameras	\$1,985,015	\$532,155	\$187,667
Traffic Signals	\$48,334,799	\$27,771,461	\$2,061,817

Table 8-34 ITS asset valuation data (from 2019 Valuation Report)

8.6.3 Problems

The following problems have been identified relating to ITS systems in Christchurch:

- underground asset condition, particularly traffic signal ducts and cables, is largely unknown but expected to be generally in average condition. Many signals were installed decades ago when ducts were either not included or road widening has since occurred rendering ducts incomplete. Many ITS components have not been renewed since original installation date and are commonly beyond expected service life. Additionally, the 2011 Christchurch earthquakes damaged ducts and stretched cables, and are believed to have accelerated deterioration in asset condition;
- increasing frequency of traffic signal outages being caused by faulty cables with no spare cores, meaning that the intersection cannot be restored following an outage unless cable replacement is carried out. Approximately 42 intersections are overdue for recabling, however the historic renewals budget enables only two intersections per year to be completed. This rate is insufficient to maintain the asset base in line with scheduled renewals;
- a recent audit of controller cabinets identified a variety of non-compliances with the NZ Electrical Safety Regulations 2010 and AS/NZS 3000. Issues include cabinets that are old, rusty, with holes enabling water and vermin ingress, and non-compliant electrical wiring practices inside. These installations are deemed to be '*electrically unsafe*' under the regulation definition and pose risk to workers until issues are rectified. Approximately 16 cabinets require replacement and 224 require repair to internal electrical wiring and fittings to restore them to a state of compliance with the regulations;
- ITS asset numbers have increased over the years through capital projects without a corresponding increase in opex and renewals budgets. For example the number of signalised intersections has increased by 24% since 2010, however opex and renewals budgets have not changed. This misalignment is necessitating reduced or no maintenance activity on increasing numbers of assets;
- the new 5G communications systems being deployed by telecommunication providers is causing interference with the older (LTE) technology utilised on parts of the Council traffic signals network. The older technology also presents security, bandwidth capacity, and reliability issues;
- lack of an agreed Transport Technology Strategy / Roadmap across RCAs and partners. This is resulting in uncoordinated ITS development, adoption of diverse and sometimes non-integratable systems, stop-gap control solutions for the edge (field) devices, long-term resilience risk, and burden on staff to navigate in the absence of clear direction or strategic goals;
- reactive maintenance and asset replacement is undertaken on ITS assets due to vehicle-collisions damaging or destroying components such as poles and cabinets. Cost recovery is sought from responsible third-parties wherever practicable however full recovery is not possible, meaning that this cost erodes the budget available for planned renewals. In years with high accident numbers and/or lower than anticipated damage recoveries, planned renewal works become deferred;
- it is estimated that at least 41% of the ITS assets owned by Council are beyond their expected service life. Additionally, 63% of these have been assessed or estimated to be in poor condition; and

- overall, the number of assets reaching end-of-service-life or requiring urgent renewal due to operational failure is outpacing the budget available.

8.6.4 Benefits

Addressing these issues will help achieve Council’s strategic outcomes as shown in the following Table.

Journeys are safe	Journeys are reliable	Customers have choice	Journeys are comfortable	Council is responsive to the needs of customers
Intelligent Transport Systems (ITS) reduce death and serious injury crashes	ITS optimise performance of the network, provide priority for certain modes, and enable travellers to make informed decisions	Modal shift is encouraged through travel time comparison provided by variable message signs	CCTV and Speed Warning Signs improve safety and support Enforcement activities	Well managed ITS are responsive to changes in traffic demand, support incident response, and respond quickly to customer needs

Table 8-35: Alignment with strategic outcomes

8.6.5 Consequences of Not Addressing the Problems

The risk of not undertaking maintenance and asset renewal at end of service life or at time of operational failure is that ITS systems deactivate. The consequences for road user customers would be signalled intersections, speed warning signs and VMSs going into full blackout (non-functional). Non-functional devices substantially undermine the level of safety within the road corridor and extended outages would increase serious injury and death accident rates. Deactivation of CCTV and communication systems would compromise ability to optimise day-to-day network performance, to manage incident responses, to identify third parties who cause damage to infrastructure (for cost recovery purposes), and to support Police and Council enforcement activities.

Less visible consequences of not addressing the problems include increasing time and resources spent on ‘stopgap’ temporary solutions rather than proper resolution of issues, increasing reactive maintenance, increasing electrical safety risk, decreasing asset reliability, and diminishing ability to improve the systems, support innovation, and keep pace with technological change.

8.6.6 Levels of Service

ITS contribute to a number of the ONRC performance measures and Council measures, the most relevant of these measures are listed below:

- ONRC Travel time reliability CO1 – customer satisfaction;
- ONRC Safety TO6 – deaths and serious injuries at intersections.

8.6.7 Gap Analysis

This section outlines how Council’s traffic system assets are currently performing against the key Levels of Service measures detailed above.

<ul style="list-style-type: none"> ▪ ONRC Travel time reliability CO1 – Customer satisfaction <p>Travel Time is monitored through a network of Bluetooth sensors across 39 strategic routes, alongside public transport (bus) timepoint data provided by ECan.</p> <p>Refer to Traffic Dashboard.</p>	<p>Over the period March 2019 – March 2020, travel times for both general traffic and public transport remained broadly unchanged and under the LTP targets.</p> <p>Bus stop reliability increased by 5-10% over this period, though still falls short of the LTP target.</p>
<ul style="list-style-type: none"> ▪ ONRC Safety TO6 – Deaths and serious injuries at intersections 	<p>Crashes at intersection by road classification and crash severity</p>

Table 8-36: Traffic system Gap analysis and evidence base

8.6.8 Options to Address Gaps

Council has developed the following options to address the identified gaps in the network for its traffic system assets.

Options	Output	Benefit / Consequence
<p>Status quo</p> <p>Make no changes to the current approach to ITS maintenance and renewal.</p>	<p>Selective, and sub-good practice maintenance and renewals programmes.</p> <p>Elements that cannot be funded are left to run-to-fail.</p> <p>Reducing opportunities over time for system improvement, innovation, and keeping pace with technological change.</p>	<p>Increasing backlog of deferred renewals.</p> <p>Increasing risk of operational failures and inability to restore ITS functionality.</p> <p>Increasing risk of Electrical Safety Regulations and Health & Safety at Work Act non-compliance.</p> <p>Increasingly unreliable budget forecasts due to increasing reactive maintenance/renewals.</p> <p>ITS assets progressively become less responsive to the needs of customers.</p>
<p>Increase investment over time</p> <p>Increase maintenance and renewal budgets until the deferred renewals backlog has been cleared and a sustainable level of ongoing funding is confirmed.</p>	<p>In the short-term, still require a selective and sub-good practice maintenance and renewals programme approach, however this would reduce over time as a sustainable balance is reached.</p>	<p>Decreasing backlog of deferred renewals, and a progressive improvement in asset condition up to good-practice standards.</p> <p>Decreasing risk of operational failures and inability to restore functionality.</p> <p>Decreasing risk of Electrical Safety Regulations and Health and Safety at Work Act non-compliance.</p> <p>A sustainable level of ongoing investment identified.</p>
<p>Increase Investment now</p> <p>Increase maintenance budget to meet market prices.</p> <p>Increase renewals budget to address deferred renewals backlog, and keep up with scheduled renewal programme as assets reach end of service life.</p>	<p>Comprehensive and good practice maintenance and renewals asset management approach.</p>	<p>Assets maintained in line with industry standards.</p> <p>Backlog of deferred renewals rectified.</p> <p>Compliance with Electrical Safety Regulations and Health and Safety at Work Act.</p> <p>Reliable ITS assets and predictable budget requirements going forward.</p> <p>ITS assets responsive to customer needs.</p>

Table 8-37: Traffic system option development

8.6.9 Recommended Option

Council recommends adopting the *'Increase Investment Now'* option for the maintenance, operation and renewal of ITS assets, as it considers this the best option to deliver the strategic outcomes and to meet legislated worksite health and safety requirements.

This option aims to deliver ONRC fit-for-purpose Levels of Service, and to renew assets at end-of-service-life, before they fail and impact on operational and safety outcomes.

It has been assessed that 16 electrical cabinets require urgent replacement (renewal) and 224 require repair to comply with electrical safety regulations.

An investment increase is recommended to:

- address the backlog of deferred renewals;
- rectify electrical safety non-compliances;
- keep pace with the scheduled renewal programme going forward;
- reflect current maintenance market prices - that include additional costs to comply with the Health and Safety at Work Act 2015 (in particular, health and safety and temporary traffic management requirements); and
- accommodate additional OPEX cost imposed by recent signal installations.

8.6.10 Operations and Maintenance Plan

Maintenance work is undertaken to:

- clean, tighten, cycle, lubricate, test etc. electrical and mechanical ITS components to maintain operational functions;
- maintain the exterior of cabinets, poles, lanterns etc. for cleanliness, correct orientation and function; and
- repair faults as they occur to restore service.

Planned Maintenance

Planned maintenance includes:

- undertaking regular inspections to monitor asset condition and check for correct and safe operation of all components;
- taking routine maintenance on physical assets;
- replacing signal lamps at end-of-service-life; and
- undertaking checks and rectifying faults/failures via electronic systems (e.g. SCATS).

Unplanned maintenance

Unplanned maintenance includes:

- repair on demand and within specified response timeframes faulty, damaged, and vandalized equipment;
- correcting defects identified during routine inspections; and
- make safe any issues as a temporary solution prior to ordered works being carried-out.

All maintenance, repair and renewal is carried out in accordance with the Waka Kotahi NZ Transport Agency P43 Specification for Traffic Signals 2015 and the supplementary Regional Specifications.

The current traffic signals maintenance contract was let in 2013, is now substantially outdated, fails to support good asset management practices, and fails to adequately reflect current HSWA 2015 and temporary traffic management requirements. This contract is in the process of being re-tendered, with an expected increase in cost above previous levels.

8.6.11 Maintenance Expenditure

Work Type	OPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Depreciation	3.1	3.0	3.1	3.2	3.2	2.7	2.8	2.9	2.9	3.0
Operations	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Maintenance	3.0	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Total	9.9	9.0	9.1	9.2	9.2	8.8	8.9	9.0	9.1	9.1

Table 8-38: Traffic system OPEX expenditure including maintenance

8.6.12 Renewals Plan

The renewals strategy associated with ITS is primarily based on average component life expectancy. As budget permits, components are renewed with modern equivalent items when they reach the end of their economic and technological lives, thereby ensuring continuity of operational service and reducing future maintenance costs. An example of this is the replacement of Quartz Halogen (QH) lanterns with LED lanterns that have a substantially longer service life and lower power usage.

Alongside their age, components are prioritised with consideration of several other factors as outlined below.

Common ITS renewal works include:

- controllers – traffic signal controllers have an expected service life of 15 years based on *Austrroads* guidelines, 74 cabinets require renewal;
- lanterns – traffic signal lanterns at 66 of the Council signalised intersections are yet to be upgraded from QH to LED. QH lanterns are now old technology and are becoming difficult and expensive to source and maintain;
- cables – the condition of underground cables and ducts is largely unknown due to age, and the majority of sites are expected to be damaged to some degree from the 2011 Christchurch earthquakes and various roadworks after the original date of installation. Historically renewing cables at signalised intersections has been largely reactive and undertaken when substantial faults occur. A more proactive renewals approach would be preferred however this is currently limited by budget availability;
- cameras – cameras are scheduled for renewal when they are around seven years old, and this ITS asset component is generally being renewed per its programmed schedule;
- communications systems – components such as communications devices, network switches, routers, radio transmitters etc. are scheduled for renewal at end of expected service life. Opportunities to improve quality and reliability are generally enabled through external CAPEX projects; and
- wall screens (large monitors) within the operations control room located in the Civic building – these are an integral part of real time operations as clear visibility of the scene is required for both BAU and incident management situations. The existing monitors have exceeded their service life, and are insufficient in quantity to accommodate the increasing number of applications supporting operations. It is currently unclear where the cost of wall screen renewal lies internally (that is, is it an IMCT, Facilities or Transport cost).

Prioritisation Process

As above, significant quantities of ITS components are beyond their expected service life and could fail at any time. Alongside their age, components are prioritised with consideration of several other factors such as how critical the site is within the transport network (road classification/traffic volumes), the operating speed of traffic at the site, and any other identified concerns with component performance, predominantly identified through fault history and maintenance inspections.

The additional recent identification of electrical safety regulatory non-compliances, is currently forcing difficult decisions to be made between rectifying electrical safety issues or undertaking critical renewals at the highest risk (and sometimes already failing) intersections.

Historic budgets have been insufficient to keep pace with good-practise asset renewals, and further pressure now exists going forward to rectify the electrical safety non-compliances. This relative prioritisation is a work in progress for the 2020/21 financial year and beyond.

Prioritised renewals programmes will be delivered around available budget, however given that operational failures are likely to occur at other (unbudgeted) sites, unplanned reactive maintenance/renewal works are likely to be required to restore ITS functionality following operational failures. Some prioritised projects inevitably become deferred every year due to this. Reactive works on an aging asset base is not a good-practice approach for managing critical infrastructure long-term.

Work Type	CAPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total	3.86	4.38	4.86	5.98	6.12	4.58	3.53	2.51	2.53	2.51

Table 8-39: Proposed traffic system CAPEX budget

8.6.13 Capital Development Plan

New assets associated with the traffic systems activity are used to improve the capacity, performance and safety associated with the traffic network as well as meeting growth requirements. They tend to be closely linked to intersection upgrade projects and are often funded from outside the traffic systems budget as road network or safety improvement works. Projects may include the re-development of existing signalised intersections or the creation of new intersections.

For traffic systems new asset projects are based largely on traffic analysis techniques and modelling software. For traffic signals this equates to approximately 70 new signalised intersections in the next five years. The majority of these are associated with the Major Cycleways Project and ongoing rebuild works.

The budgets allowed in the capital programme are summarised in Section 9.

8.6.14 Disposal Plan

Disposal of ITS assets is generally undertaken during repair, maintenance, renewal or safety improvement projects. Specific costs have not been broken out to date. Wherever viable, ITS components are salvaged, refurbished, and held in storage for redeployment to another site while they still have functional value. The new Traffic Signals maintenance contract includes the requirement for compliance with Council disposal policies.

No disposal is planned at this time.

8.7 Traffic Services

Traffic services include traffic signs and sight rails, road markings, and traffic calming devices.

Traffic signs are provided to aid the safe and orderly movement of traffic. They may be:

- ‘regulatory’ (including speed limit and parking signs), that is, it instructs road users by requiring or prohibiting specified actions in using a road;
- ‘warning’, that is, it informs road users of hazards or of other features requiring a safe response on or near a road; and
- ‘advisory’, that is, it provides road users with information or guidance (including information about destinations, routes, amenities, distances, street name signs and place names).

Traffic calming devices are provided to control movement and/or speed of traffic. They include:

- splitter and pedestrian islands;
- roundabouts;
- road humps and platforms; and
- kerb build-outs and thresholds.

Key issues include:

- the increasing amount of road markings on the network and associated costs (e.g. flush medians, cycleways, raised reflectorized pavement markers and raised reflectorized kerb top markers);
- the need to improve destination signs to enhance navigation, comparable with best practice on the state highway network;
- the traffic management requirements for maintaining traffic calming devices;
- increasing amount of coloured surfaces for bus and cycle lanes; and
- maintaining reflectivity of regulatory and hazards signs and markings.

Sign Type	Totals	Expected life	Quantity older than expected life
	Quantity	Years	Km
Hazard marking	10,002	15	7,277
Information	3,077	15	1,618
Local authority	15,157	15	11,711
Permanent warning	7,484	15	4,057
Regulatory	13,010	15	5,782
Parking	11,224	15	4,848
Misc.	184	15	111
Total	60,138		

Table 8-40: Breakdown of traffic services assets

8.7.1 Asset Condition

Staff are currently gathering condition data associated with traffic services which is dependent on the type of asset.

The maintenance and renewal processes for road markings are primarily managed by age-profile rather than condition. Experience has shown that the visibility of markings deteriorates too much if the repainting cycle is 12 months or greater. The nine month repainting cycle adopted has proven to keep the markings at an acceptable standard, and it is recommended that this is maintained.

The contract for maintenance of traffic signs includes measures of condition and intervention points that lead to maintenance or replacement of substandard assets. It is inappropriate to use age as the only trigger for maintenance or replacement because the rate of deterioration of signs is governed largely by position, exposure to weather and vandalism.

The condition of traffic calming devices is determined in the course of routine road inspections by the maintenance contractor. Some devices are replaced early for reasons other than condition failure, for example intersection modifications and kerb and channel replacement.

8.7.2 Asset Performance

The performance of road markings relates to the quality of both materials and application as well as the accuracy of placement. Deterioration is caused primarily by traffic and environmental factors. There is no condition rating system for road markings. However, in the future, it may be appropriate to measure reflectivity to better quantify the visibility of markings, particularly on high traffic volume roads. The nine month repainting cycle is carried out to keep the markings at an acceptable standard.

Greater use is being made of reflective pavement markings on arterial routes because of superior performance and visibility.

The performance of traffic signs and traffic calming devices relates predominantly to the type of materials used.

This information has not been recorded or retained, so it is not possible to make comparisons and draw conclusions – this has been added to the improvement plan.

8.7.3 Valuation Data

Asset valuations are established at 3-yearly intervals, which was last undertaken in June 2019.

Asset Category	Quantity	Replacement Cost	Depreciated Replacement Cost	Annual Depreciation
Traffic Services	55,979 signs & city-wide marking.	\$40,242,885	\$16,090,682	\$2,001,019

Table 8-41: Traffic services asset valuation data (from 2019 Valuation Report)

8.7.4 Operations and Maintenance Plan

All road markings and traffic signs are maintained under contract. The remarking frequency for all roads is nine months.

Currently there are no planned inspections of signs and markings, to identify renewals. However, general roading inspections occur on an on-going basis and Council's contractor uses these to flag defects.

- **Planned Maintenance**

Repair options and priorities will be determined by considering the impact on:

- public/road user safety;

- traffic movements;
- minimising life cycle costs; and
- markings are renewed through the remarking programme which will continue at the current nine month cycle.

Unplanned Maintenance

- the maintenance contractor is required to repair on demand and within the following time frames, faulty or damaged signs and associated equipment;
- urgent maintenance – within two hours of receipt of instruction;
- normal maintenance – within seven days of receipt of instruction; and
- replacement of signs and fixings – with 20 days of receipt of instruction.

Maintenance Standards

Standards for signs, markings and traffic management devices are covered in the following Christchurch City Council documents:

- Code of practice for land and asset development;
- Construction Standard Specification; and
- Manual of Traffic Signs and Markings (MOTSAM).

8.7.5 Maintenance Expenditure

Work Type	OPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Depreciation	1.7	1.7	1.8	1.1	1.0	0.7	0.8	0.9	0.9	1.0
Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maintenance	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Total	5.2	5.3	5.3	4.7	4.5	4.3	4.4	4.4	4.5	4.6

Table 8-42: Traffic services OPEX expenditure including maintenance

8.7.6 Renewals Plan

Road marking renewals are driven largely by the nine-month cycle of remarking and to a lesser extent by road or surfacing renewal projects. In terms of traffic sign renewals, these are identified through the planned maintenance inspection programme based on condition and reflectivity. Other renewals are generated through accident damage and vandalism.

Traffic signs will be identified for renewal through the planned maintenance inspection programme based on condition and reflectivity. Directional/guide signs are currently replaced on a reactive basis. Some signs are regularly replaced under maintenance because of accidents and vandalism damage and therefore never reach the end of their useful life. Route safety inspections and public reporting processes also identify signs requiring renewal. Street name signs are being progressively upgraded to the white on blue format. Priorities are established on a condition basis street by street. The Waka Kotahi NZ Transport Agency street signs guidelines is being used to achieve uniformity over the network.

The development, management and maintenance associated with traffic calming assets falls under the umbrella of carriageways surfacing, kerb & channel and road landscaping, and so is not allowed for in the recommended traffic services budget.

Renewals Expenditure

Work Type	CAPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total	0.33	0.45	0.41	0.44	0.40	0.41	0.42	0.43	0.46	0.43

Table 8-43: Proposed traffic services CAPEX budget

8.7.7 Capital Development Plan

It is anticipated that the CTSP will provide guidance in terms of network development which will in turn provide the direction for Council's traffic services assets. Currently expectations around additional roading (and as a result marking, signs and calming devices) are not well understood. It is recommended that the CTSP and its relevant content guide appropriate new asset projections, and this is included in the improvement plan. New asset funding is based largely on indications of new roading to be constructed by Council, in association with road renewal projects, subdivision developments and funding-requirements from previous years.

The budgets allowed in the capital programme are summarised in Section 9.

8.7.8 Disposal Plan

Realignment of carriageways and kerb and channel renewals can make some of the traffic services redundant. While the signs, markings, or layers and surfacing may be removed and disposed of, the space made available provides opportunities for other users of the road reserve. Complete closure and demolition is expected to be rare and to occur only following public consultation. The RAMM database and asset register are updated to remove the redundant data.

The retirement of red zone land in the eastern suburbs will result in the removal of some traffic services assets, but the scope of this is not yet fully understood. Costs associated with disposal are generally included within the funding provided for the development of a new use of that space, and so no allowance has been made for the disposal of traffic service assets within this AMP.

8.8 Street Trees and Landscapes

Trees and gardens make an important contribution to the health and wellbeing of Christchurch's residents and to the Garden City image through the quality of the city's landscape. Trees and gardens play a vital environmental, heritage, financial, social and cultural role. They have an important contribution to make in the sustainable management of natural and physical resources.

Road landscape assets can be separated into three main categories:

- trees;
- gardens, hedges and natural areas; and
- turf (berm areas).

Trees

As at December 2019 the total number of trees currently recorded in the road corridor network is 66,511.

Ward	Count
AKAROA	149
BURWOOD	5,615
CASHMERE	4,138
CENTRAL	5,296
COASTAL	5,119
FENDALTON	4,398
HALSWELL	5,958
HAREWOOD	5,878
HEATHCOTE	4,222
HORNBY	1,961
INNES	4,022
LINWOOD	3,789
LYTTELTON	28
MT HERBERT	121
PAPANUI	4,130
RICCARTON	2,875
SPREYDON	3,121
WAIMAIRI	5,565
WAIREWA	126
Grand Total	66,511

Table 8-44: Number of street tree assets by Council Ward

Gardens, Hedges, Natural Areas

Council currently owns 368,000m² of amenity garden areas.

8.8.1 Asset Condition

Trees

It is estimated that 88% of street trees have been condition assessed.

Ward	Condition Grade						
	1 Excellent	2 Good	3 Average	4 Poor	5 Very Poor	Unknown	Total
AKAROA		2	41	14	2	90	149
BURWOOD		16	3,810	489	163	1,137	5,615
CASHMERE		78	3,187	666	102	105	4,138
CENTRAL		213	3,607	506	179	791	5,296
COASTAL		30	3,497	436	170	986	5,119
FENDALTON		5	3,733	315	114	231	4,398
HALSWELL		12	4,274	532	160	980	5,958
HAREWOOD		31	4,375	833	138	501	5,878
HEATHCOTE		12	2,796	670	203	541	4,222
HORNBY		17	1,358	290	33	263	1,961
INNES		4	2,992	458	139	429	4,022
LINWOOD	4	3	2,342	813	273	354	3,789
LYTTELTON		5	3	12	3	5	28
MT HERBERT		1	9	9	2	100	121
PAPANUI		5	3,149	474	129	373	4,130
RICCARTON		4	2,269	376	53	173	2,875
SPREYDON		14	2,306	307	63	431	3,121
WAIMAIRI		10	4,442	821	151	141	5,565
WAIREWA						126	126
Total	4	462	48,190	8,021	2,077	7,757	66,511
Percentage	-	1%	72%	12%	3%	12%	

Table 8-45: Street tree asset condition rating by Council Ward

Gardens, Hedges, Natural Areas

An area comprising 74,500m² has been assessed to-date with 15,500m² graded between 4-5 (needing renewal, 1 very good – 5 poor or empty). Council contractors are working to assess the rest of the asset base over the next 2 years.

Turf

There is no condition information available for turf at this point and there are no immediate plans to condition rate turf, except where residents request berm renovations.

8.8.2 Asset Performance

There are currently no specified Levels of Service for maintaining trees, gardens, hedges or turf such that they continue to contribute effectively to Community Outcomes.

Environmental measures

At present there is no system in place to measure the performance of trees or gardens towards the Community Outcomes. It is expected that capacity and performance of road landscapes will align closely with those developed for the Parks Unit approach to gardens and turf.

Overhead services

The Council has a statutory obligation under the Electricity (Hazards from Trees) Regulations 2003, to maintain its trees at a safe distance from electrical conductors. Achievement would require either the severe pruning or removal of several large trees (mostly Notable or Special Purpose (Road) Zone trees) where electrical conductors are in close proximity to, or in contact with, their branches.

Severe pruning would have a detrimental effect on the amenity that these trees provide, and would likely cause a negative reaction from residents. To attain full compliance without severe pruning or removal, alternative methods are required to be undertaken, including under grounding and aerial bundling of power lines. This will be addressed on a case-by-case basis.

The interim targets and timeframe to achieve 100% compliance are:

- 2016/17 – 96.5%
- 2020/21 – 97.5%
- 2030/31 – 100%

To achieve compliance for trees that do not require either severe pruning or removal, each tree that is in the vicinity of electrical conductors is surveyed annually and any maintenance required to keep them clear of the electrical conductors is undertaken. The number of trees requiring annual clearance is currently around 3,000. This figure will increase over time as smaller trees planted underneath electrical conductors mature.

8.8.3 Valuation Data

Asset valuations are established at 3-yearly intervals, this was last undertaken in June 2019.

Assets	Optimised Replacement Cost (ORC)	Optimised Depreciated Replacement Cost (ODRC)	Annual Depreciation (AD)
Street Trees*	\$153,756,925	\$73,557,749	\$1,794,201
Berms and Landscaping [†]	\$209,460,463	\$133,047,790	\$2,618,256

Table 8-46: Street trees and landscapes asset valuation data (from 2019 Valuation Report)

8.8.4 Operations and Maintenance Plan

Trees

For trees to remain structurally sound and healthy and able to contribute fully towards the Levels of Service, maintenance is undertaken to internationally recognised standards, practices and procedures.

There are two types of maintenance undertaken – planned and unplanned:

- **planned maintenance** of all applicable arboricultural activities is undertaken on a cyclic basis and may be seasonal. The cycle may be determined by the agreed Levels of Service or depending on the specific requirements of the tree(s). Programmed maintenance is undertaken to maintain safety for road users (including vehicles), adjacent residents, and an uninterrupted supply of electricity (overhead services clearance), as well as for the establishment of young trees; and
- **unplanned maintenance** is normally undertaken on single trees and is usually related to safety. It can involve one or more of the activities listed above under programmed maintenance.

All audits on the street tree maintenance Contractor’s quality assurance system are performed six monthly, as well as quality of work undertaken on a monthly basis.

Gardens, Hedges, Natural Areas, Turf

For gardens, hedges, natural areas and turf to remain healthy and able to contribute fully towards the levels of service, regular maintenance is required to recognised horticultural standards and industry guidelines or, where these do not exist, to industry best practice. Each garden, (with the exception of Annuals which are visited weekly), is visited once per month including in Spring and Autumn.

As with trees there are two types of maintenance undertaken –planned and unplanned.

Unplanned maintenance is undertaken by a dedicated, fully resourced unplanned maintenance team. It can include one or more of the activities listed above. A maintenance programme using only unplanned maintenance would result in gardens filled with dead, dying, or diseased and overgrown plants, weeds in large quantity and size, and litter.

Currently, all audits on the Road Landscape Contractor’s quality assurance system are performed by the Service Manager to the Maintenance of Road Landscapes Contract quarterly, as well as an external audit organised by the Contractor annually in October.

As well as unplanned response maintenance undertaken by arboricultural contractors, included are:

- overhead Low Voltage (LV) service clearance in urban areas - (noting that overhead service clearance in rural areas is undertaken by Orion NZ Ltd independent of Council); and
- some hazard mitigation of roadside and storm damaged trees in rural areas - (noting that road clearance of storm damaged trees and vegetation is undertaken by Roading Maintenance Contractors).

8.8.5 Maintenance Expenditure

Work Type	OPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Depreciation	3.2	3.3	3.2	3.3	3.3	3.3	3.3	3.4	3.3	3.3
Operations	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Maintenance	5.4	5.5	5.5	5.5	5.5	5.5	5.6	5.6	5.6	5.6
Total	8.8	8.9	8.9	8.9	9.0	9.0	9.1	9.1	9.1	9.1

Table 8-47: Street trees and landscapes OPEX expenditure including maintenance

8.8.6 Renewals Plan

Renewals are currently carried-out either reactively following identification, (by residents, Council staff or the Contractor), or as part of the programmed maintenance programme. Prioritisation is based on age, size, condition, generally trees condition rated 4 and 5.

Trees in excess of 6 metres height and with condition ratings of 4 or 5 are, or will, become hazardous if not renewed at the appropriate time. Monitoring and maintenance to keep them safe will need to be undertaken more frequently, depending on the risk of failure and the likely damage caused. Irrespective of size, unhealthy or poorly shaped trees are not fully contributing towards meeting the Community Outcomes and are also included as a priority.

Where renewals are considered as part of maintenance, the decision to renew is made by staff and the contractor under the Transport Unit's delegation. If there a significant number and/or size of trees in the street Residents and Community Boards will be advised when trees are to be renewed, why they are to be renewed, and what the replacement species will be.

Examples of priority other than condition based approach include renewal of trees in conflict with power lines, inappropriate species of tree where potential health & safety and trees damaging infrastructure.

Where renewals form part of a wider street upgrade, a decision is generally made at Community Board level. This may follow a public consultation exercise to gain resident input and support, along with a preferred species choice.

Replacement trees are a minimum of pb95/45 litre grade with larger grades planted where appropriate and available. Smaller grade trees are not preferred, as they are more susceptible to vandalism, have less established roots and smaller trunks and do not provide the same visual amenity provided by large grade trees.

Gardens, hedges, natural areas and turf look neglected and detract from area character, identity, and the Garden City Image if not renewed. Renewal of these areas is a staff decision. Replacement plants vary depending on plant availability, and turf is usually either by seed or by turves where appropriate (e.g. high profile sites).

There is no intention for programmed berm renewals or to condition rate turf (other than to prioritise berm renovation work).

Work Type	CAPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total	1.71	2.03	1.59	1.95	2.21	2.42	2.54	2.34	2.65	2.31

Table 8-48: Proposed street trees and landscapes CAPEX budget

8.8.7 Capital Development Plan

New road landscape assets are created as a result of subdivisions, road construction and improvement projects, footpath resurfacing and other Council projects. At present new trees are only provided in conjunction with other transport network improvements, with an emphasis on residential streets or through subdivision. With the exception of street improvements Council does not create new street gardens. As a result new assets are often funded through budget from other activities.

New street trees and other green assets are beneficial as they contribute to the Climate Smart Strategy (2010 - 2025) and the Open Space Strategy (2010 - 2040) through environmental, amenity and socio / economic factors. Therefore a case could be made for a programme of retrofitting arterial and collector routes to help achieve an effective canopy cover as well as making these routes more in keeping with the 'Garden City' image.

The issue with the supply of quality tree stock from commercial nurseries described above has resulted in frustration for developers as this is often not picked up until handover, and means that trees and plants with defects must be removed and replaced creating additional cost for them. Along with the recommendations above, the improvement plan includes informing developers that Council will only accept assets with a Condition Rating of Grade 1.

Most new street gardens are created through the subdivision process. This has led to inconsistency across Christchurch, with older areas having little or no street gardens and therefore less amenity and vegetative character and identity, while new areas are generally well provided for.

In addition approximately 10% of garden assets are located in streets where there is a limited viewing audience (i.e. cul-de-sac heads) in relation to the effort and expense of maintaining them.

The budgets allowed in the capital programme are summarised in Section 9.

8.8.8 Disposal Plan

Landscape assets and grassed areas are disposed of where other road related works lead to the alteration of alignments. Costs of disposal are generally absorbed by the budget for the project. The asset system is updated such that the disposed assets are removed from the database and new assets are added in line with data standards.

Trees can be disposed of where they are removed by either staff or Community Board decision, and not replaced. Staff decisions not to replace trees are based on either the appropriateness of the site or the adjacent resident not wishing the tree to be replaced. Community Board decisions not to replace trees are usually made at the request of residents.

8.9 Cycleways

The cycleway network is created to provide for the safety, travel efficiency and ease of use for cyclists; to encourage increasing levels of cycling. The routes need to be safe, comfortable and convenient, while providing adequate links from key trip origins to destinations within a coherent and attractive cycle network.

Cycleways are categorised into the facility types outlined below. In total there are approximately 340 km of cycleway city-wide.

Asset Type	Urban (km)	Rural (km)	Total (km)
Cycle lane	294.1	8.0	302.1
Cycle Path	22.7		22.7
Quiet Street	16.3		16.3
Shared Path	172.8	7.0	179.8
Total	505.9	15.0	520.9

Table 8-49: Breakdown of cycleways by facility

On-road marked and on-road separated cycleways:

- comprise of a dedicated lane on a sealed surface that is an extension of the carriageway;
- allow cyclists to ride side-by-side so that when overtaking another cyclist, a rider doesn't need to move into the traffic lane. Where adjacent to on-road vehicle parking the width allows cyclists to avoid 'dooring'; and
- are usually constructed in pairs (one on each side of the road) although separated cycle lanes may also be bi-directional on one side of the road only.

Shared (on-road) pathways:

- comprise of a pathway that is linked to the alignment of the carriageway; and
- are generally built for two-way cycle traffic and shared use with pedestrians.

Shared (off-road) pathways:

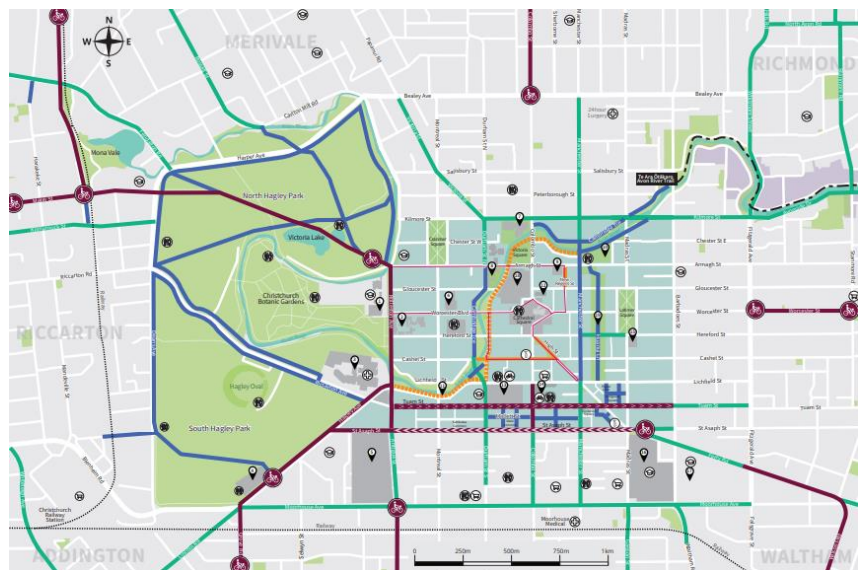
- comprise of a pathway that is not linked to the alignment of the carriageway (such as through a park); and
- are generally built for two-way cycle traffic and shared use with pedestrians, although separated cycle and pedestrian pathways are planned to be introduced on major cycle routes.

Cycle amenity:

- comprise of cycle parking facilities; and
- cycle crossing facilities, such as bicycle call buttons and lights at signalised intersections.

The facilities under the cycling section of the Asset Management Plan are made up of a number of assets, which in many cases are maintained and discussed under different sections of this Plan. The figure below highlights the key associated assets and where they are discussed and allowed for within this lifecycle management section of the Asset Management Plan.

Various maps of the cycle network can be found on the Council website, such as the map to the right.



Further to this, a public booklet is printed each year. <https://ccc.govt.nz/assets/Documents/Transport/Cycling/map/A2-Bike-Easy-Guide-and-Map-Sept-2019-WEB.pdf>

8.9.1 Asset Condition

Off-road cycleway condition was measured as part of the footpath condition survey. Most off-road cycleways have base layers that are less than 30 years old and are therefore not likely to need renewal for at least 50 years. As with footpaths, renewal of the metal course layers is usually driven by damage from vehicles, machinery or tree roots.

Staff undertake audits of the routes and currently the network is generally in a good condition, and is not affecting performance.

For on-road facilities, surfacing and pavement strength requirements and conditions are related to motorised vehicular use and are discussed in the carriageways section of this document.

8.9.2 Asset Performance

The performance of the cycling facilities pre-earthquakes can be measured by proportion of all trips made by cycling using the relevant Level of Service for cycling. This indicator was performing well against Auckland and Wellington benchmarks, and was generally trending upwards. This indicates that the Council's cycling facilities were performing well pre-earthquakes.

Post-earthquakes this metric has not been re-measured, and so the current performance of the cycling facilities is difficult to judge. However, the Christchurch Transport Strategic Plan (CTSP) cycle network and the Council commitment of funding within the capital budget give a strong signal that provision for cycling will sharply increase. Although there have not been any specific kilometre targets identified for the development of the cycleway network, this gives confidence that cycling levels will increase with particular concentration on the major cycle routes.

8.9.3 Valuation Data

For valuation purposes, on-street cycleways are included within the carriageway and traffic services figures. Off-road cycleways are included within the footpath figures.

8.9.4 Operations and Maintenance Plan

Cycleway maintenance has generally been a reactive activity only. Resources are therefore targeted to those areas initiated by customer contacts, rather than through a regular maintenance cycle. Maintenance needs are also identified from inspection surveys and observations made by staff in the course of their duties. A 24 hour call-out service is provided to attend to safety-related problems.

Typical work undertaken includes sweeping of spillages and debris, pothole repair, removal of tree roots, surface levelling/smoothing, edge drainage improvements, seal edge alignment and trimming of vegetation.

It is essential that a planned maintenance process is introduced that is targeted at appropriate Level of Service for each level of cycleway hierarchy in the CTSP; this is included in the improvement plan.

8.9.5 Maintenance Expenditure

Work Type	OPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Depreciation	0.2	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Operations	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Maintenance	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total	0.8	0.9	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1

Table 8-50: Cycleways OPEX budget including maintenance

8.9.6 Renewals Plan

As with the valuation, on-street cycleways are included within the carriageway and traffic services figures. Off-road cycleways are included within the footpath figures.

Work Type	CAPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total	5.25	3.16	3.19	3.20	0.38	0.38	0.39	0.44	0.44	0.44

Table 8-51: Proposed cycleways CAPEX budget

8.9.7 Capital Development Plan

New cycleways are acquired as a result of:

- extensions to the network constructed by Council as part of the major cycleways programme, road network improvements, safety works, and neighbourhood improvement works;
- subdivision developments which are then vested to the Council; and
- upgrading work to improve the Level of Service e.g. from metal surface to AC.

Opportunities for new cycleways are generally identified periodically through a network implementation priority process, which considers usage / demand (latent and actual), safety levels, growth potential and Levels of Service and presents this to the Council. It is anticipated this process will be attuned to the CTSP.

As indicated earlier, the Council has included funding for the development of 13 major cycleway projects between 2014 and 2022, and this is reflected in the recommended budget. Beyond 2022 it is assumed that no further investment will be made, however this assumption should be reviewed once the current planned works are completed and in use.

The budgets allowed in the capital programme are summarised in Section 9.

8.9.8 Disposal Plan

Realignment of carriageways, and kerb and channel renewals, can make parts of existing on-road cycleways surplus to current needs. While the markings, or layers and surfacing, may be removed and disposed of, the space made available provides opportunities for other users of the road reserve.

Off-road cycleways may no longer be required through reduced use caused by demographic changes or other changes in the road and cycling networks. However, these cycle paths are also likely to be used by pedestrians and therefore complete closure and demolition is expected to be rare.

The costs of cycleway disposal are included within the funding provided for the development of a new use of that space, and therefore no budget is allowed for this work in this Asset Management Plan.

8.10 Public Transport

The purpose of public passenger transport infrastructure assets is to provide and maintain the infrastructure for the safety, ease of use and comfort of public passenger transport users.

The City vision for public passenger transport is to provide 'a well-connected and accessible city promoting active and public transport'.

Council is the organisation responsible for planning, providing and maintaining on-street public transport infrastructure, which meet the needs of passengers, bus operators and Environment Canterbury who is responsible for the Metro bus services. In addition to the Council's governance structure, the Greater Christchurch Public Transport Joint Committee brings together all parties including the Council neighbouring local authorities and Environment Canterbury to coordinate the delivery of the public transport services and infrastructure. Assets included are:

- bus stop signs and markings;
- coloured bus priority lanes;
- Bus Interchange facilities;
- shelters and seats; and
- Real Time information system.

The table below indicates the quantity of public transport assets as at December 2017.

Asset description	Asset description sub-	Unit	Quantity
Operative bus stops		each	1,850
Bus stop signs		each	1,850
Bus stop posts		each (estimate)	9,25
Bus stop line markings		kilometre (estimate, provision estimate per marked bus stop: 26 metres)	24,050
Bus Passenger Shelters (Note: each shelter also has a seat)	CCC owned	each	289
	Adshel NZ Ltd owned	each	230
	Total	each	519
Seats (standalone)		each	549
Real Time Information	Bus Finder type	each	431
	Display type	each	33
Rubbish bin		each	210
Tactile pavers		metres (provision estimate per bus stop: 2m * 0.6m)	40.8
Passenger platform (footpath extension)	By front door	square metre (platform area estimate per bus stop: 3m *2m)	9,774
Tram lines and poles			
Trams stops and shelters			

Table 8-52: Breakdown of public transport assets

8.10.1 Asset Condition

Very few new bus passenger shelters have been installed since 2015. Between 2015 and 2017, the passenger waiting infrastructure associated with bus stops made redundant due to the 2015 bus network change, have been relocated to other bus stops around the city. Passenger waiting infrastructure from redundant stock has now been mostly exhausted. This means most bus passenger shelters installed from 2018 onwards will be from new stock.

Over time there has been variation to the shelter type provided by the Council. The structural condition of these shelters is considered to be good. However, the visual condition of many Council shelters is poor. Where the visual condition is poor, remediation through painting, is needed to improve the look of the shelters. The Council aim to initiate a shelter painting renewal programme from financial year 2018/2019 onwards to address this issue.

Remediation of the bus stops generally covers marking the bus stops to the recommended dimensions, positioning of the bus stop sign and post, and the provision of passenger platforms.

The Council has a mixture of Real Time Information (RTI) stock at bus stops. The RTI stock predominantly comprises of small RTI units, called 'Bus Finders'. The RTI stock also includes larger units, which are referred to as 'displays'. The majority of the existing Bus Finder units are no longer a supported version of the technology, this means that a broken Bus Finder can be difficult and expensive to replace. A number of Bus Finders are located at infrequently used bus stops, where they

are of limited use. Given the prevalence of internet availability at people’s homes, destinations, and on smart phones, the Council and Environment Canterbury may in the future need to review the application of how RTI is deployed at bus stops.

Asset information relating to public transport infrastructure is held in RAMM.

8.10.2 Asset Performance

As highlighted in Section 8.7.1, there a number of issues and deficiencies concerning public transport infrastructure at bus stops, which were highlighted in a bus stop audit undertaken in 2015. Since the audit was undertaken, a prioritised work programme has commenced to address a number of the issues and deficiencies identified.

8.10.3 Valuation Data

Asset valuations are established at 3-yearly intervals, this was last undertaken in June 2019.

Asset Category	Quantity	Replacement Cost	Depreciated Replacement Cost	Annual Depreciation
Public transport	943 bus shelters, signs and furniture.	\$2,514,661	\$834,485	\$91,299

Table 8-53: Public transport asset valuation data (from 2019 Valuation Report)

8.10.4 Operation and Maintenance Plan

Bus passenger shelters and seats (excluding Adshel shelters) are maintained and cleaned under a contract managed by the Transport Unit. This includes non-routine maintenance of infrastructure assets. Signs and markings for passenger transport infrastructure maintained under the road markings and signs contract as described in Section 8.7 Traffic Services.

Maintenance of Adshel shelters is carried out by Adshel’s contractors at their expense.

The Council took over the Christchurch Bus Interchange facility in the 2019 financial year, however it is not included in the 2019 Valuation. For asset planning purposes, the facility is included in the Corporate Accommodation Asset Management Plan.

Maintenance Expenditure

Work Type	OPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Depreciation	2.0	2.2	2.0	2.1	2.3	2.4	2.6	2.9	3.2	3.7
Operations	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Maintenance	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Total	5.0	5.1	5.0	5.1	5.2	5.4	5.6	5.9	6.1	6.6

Table 8-54: Public transport OPEX budget including maintenance

8.10.5 Renewals Plan

The renewal plan is delivered in the following ways:

- Planned and unplanned operations and maintenance, which includes:
 - cleaning and regular maintenance of bus passenger shelters and seats;

- maintenance of bus stop line marking and signage;
 - repairing other bus stop furniture; and
 - monitoring of bus priority lanes.
- Replacement (renewal) of assets that have reached their end-of-life or are in substandard condition. This includes:
 - relocating/repairing/replacing old and damaged bus passenger shelters and seats;
 - remediation of bus stops; and
 - remediating footpaths where passengers wait for a bus.

Renewals Expenditure

Work Type	CAPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total	0.93	0.58	0.48	0.69	0.39	0.39	0.39	0.44	0.44	0.44

Table 8-55: Proposed public transport CAPEX budget

8.10.6 Capital Development Plan

The Council's role in providing good public transport infrastructure assets assists in the achievement of the wider goal to get more people choosing to travel by bus. Generally when that occurs the customer is satisfied with the public transport facilities provided.

Network improvements to make the service more attractive. This includes:

- construction of dedicated road improvements to provide passenger transport efficiency;
- construction of new facilities such as public transport interchanges; and
- installation of new bus shelters, bus stops, seats and associated infrastructure.

The budgets allowed in the capital programme are summarised in Section 9.

8.10.7 Disposal Plan

Relocation or disposal of public transport assets generally occurs when a bus service route is altered or is no longer necessary.

8.11 Parking

8.11.1 Asset Inventory

Council is responsible for managing and maintaining on-street car parking, two off-street car park buildings and associated assets such as 215 parking meters, pay stations, barrier arms, signage and fencing.

While the provision of parking and management of the associated equipment is the responsibility of the Transport and City Streets Unit through the Transport activity, the off-street parking buildings are different. They are owned by the Transport and City Streets Unit, however are managed by the Corporate Services Unit (CSU). For asset planning purposes, the off-street Carparking facilities are included in the Corporate Accommodation Asset Management Plan.

Due to the nature of the parking meters and the function that they serve, the meters are maintained to a high standard, such that their operational integrity is maintained. The majority of the meters (Metro meters) were installed in 2006 and have a life-expectancy of 10 years and are inspected on a regular basis, so are generally in a good condition. A recent upgrade of the electrical components of the parking meters has further extended their life-expectancy.

Given that the parking activity is concerned with the provision of a service that generates revenue, it has been relatively easy to measure capacity and performance based on information provided by the metro meters and the off-street parking facilities. Before 2008 the parking activity usually met its occupancy and revenue targets. In the 2008 and 2009 years however, occupancy was down. The parking activity utilises capacity and performance oriented targets in its horizon reporting facility as a means of measurement.

The total amount of parking available within the central city before the earthquakes as a proportion of the number of employees was very high by international standards at 87.5% (spaces per employee) – by comparison Auckland (70.3%), Hamilton (69.3%) and Wellington (54.8%) were well below this level.

In addition the total amount of parking provided in the central area of Christchurch has been greater than the demand for spaces over recent years. Pre-earthquake the occupancy of car parks was:

- On-street carparks 68%
- Off-street carparks 56%
- Weighted total 59%

The earthquakes resulted in much of the central city being closed. This has had continuing residual effects on the parking activity, including the ongoing failure to meet several financial targets. This has been further compounded by parking incentives offered by the Council. For example, the one hour free parking for on-street parks, and the two hour free parking for some of the parking areas created following building demolition.

Since the earthquakes the number and occupancy rates for central city metered on-street carparks has seen a reduction in occupancy rates compared with pre-earthquake figures.

‘Occupancy without avoidance’ refers to occupancy where the parking fee has been paid and the paid for time has not been exceeded.

8.11.2 Valuation Data

Asset valuations are established at 3-yearly intervals and this was last undertaken in June 2019, as shown in the table below.

Assets	Optimised Replacement Cost (ORC)	Optimised Depreciated Replacement Cost (ODRC)	Annual Depreciation (AD)
Parking Meters and Other Minor Structures [†]	\$9,649,875	\$2,723,888	\$761,072

Table 8-56: Parking asset valuation data (from 2019 Valuation Report)

8.11.3 Problems

The following problems have been identified relating to parking assets in Christchurch:

- parking meter vandalism and theft is an ongoing issue that results in unplanned maintenance or replacement of parking meters; and
- some of the Council’s physical meters are over 10 years old, however the electronics were upgraded a few years ago, which has extended their lifespan. There is no existing condition rating information. A programme of inspections and ongoing replacement of meters is required over time to ensure these assets remain in good working order.

8.11.4 Benefits

Addressing these issues will help achieve Council’s strategic outcomes as shown in Table 8-57 below.

Journeys are safe	Journeys are reliable	Customers have choice	Journeys are comfortable	Council is responsive to the needs of customers
n/a	n/a	End of trip facilities such as parking provide customers with access to employment, retail and other key activities	Parking occupancy signage and electronic payment improves the customer experience	Council has a number of spare meters for parts and replacement in stock to respond to failures or damage reported by customers

Table 8-57: Alignment with strategic outcomes

8.11.5 Consequences of Not Addressing the Problems

There is a risk of failure of parking meters and reduced revenue if the meters are not maintained and operational.

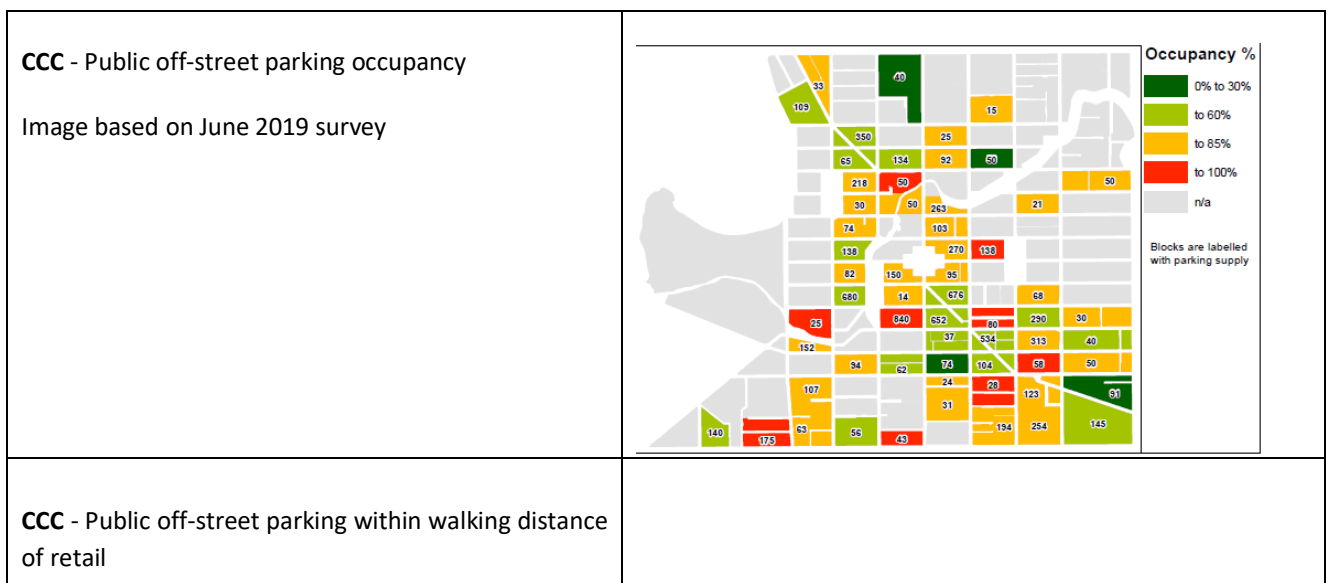
8.11.6 Levels of Service

Parking assets contributes to a number of Council measures, the most relevant of these measures are listed below:

- CCC – Public off-street parking occupancy (quarterly surveys undertaken for Central City);
- CCC – Public off-street parking within walking distance of retail; and
- CCC - Public on-street parking occupancy.

8.11.7 Gap Analysis

This section outlines how Council’s parking assets are currently performing against the key Levels of Service measures detailed above.



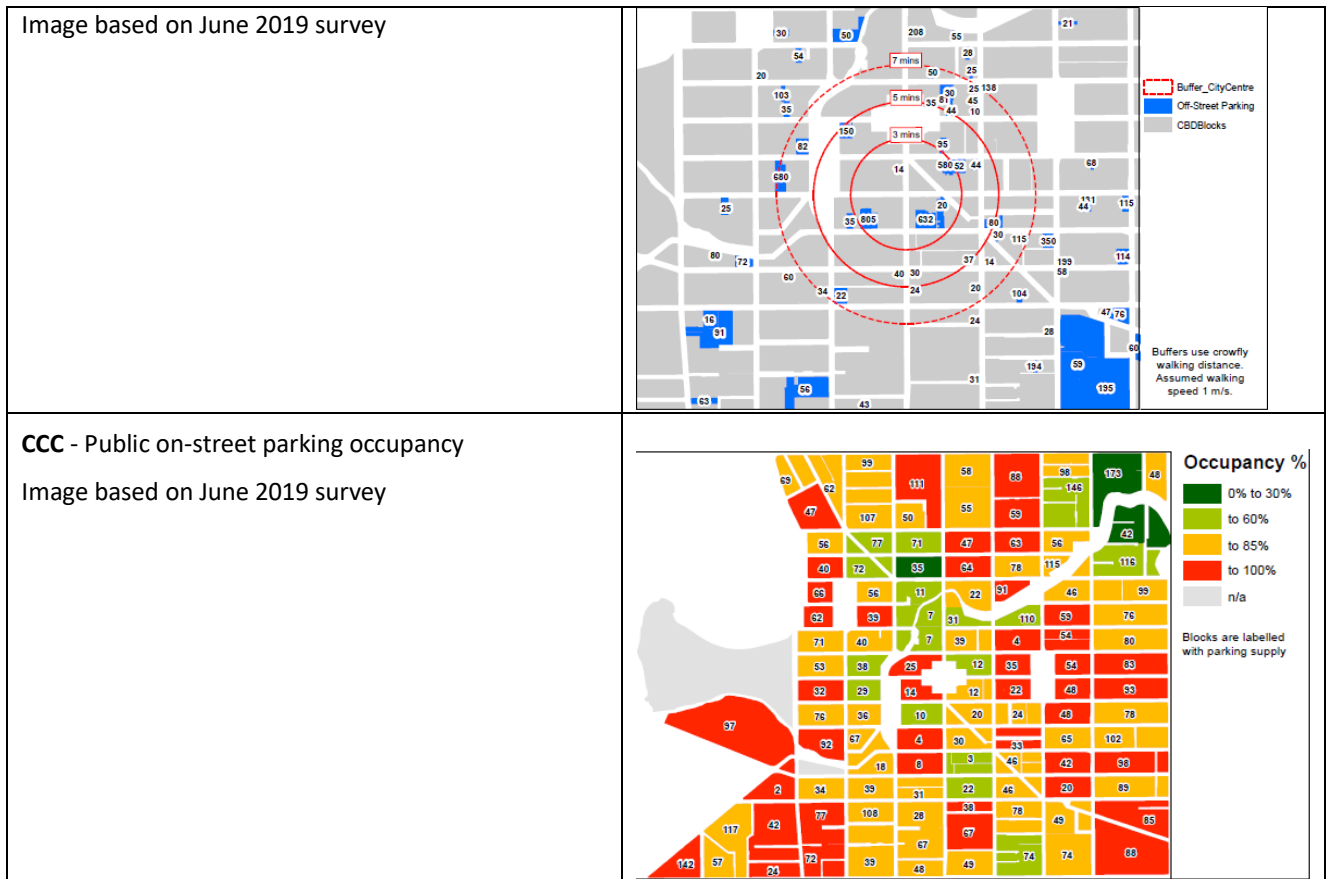


Figure 8-18: Gap analysis and evidence base

8.11.8 Options to Address Gaps

Council has developed the following options to address the identified gaps in the network for its parking assets:

Options	Output	Benefit / Consequence
<p>Maintain current level of investment</p> <p>Keep the quantity of work static.</p>	Maintain the current quantity of work per year.	Not achieve any improvements to network condition. Likely reduction in customer satisfaction and higher costs in medium to long term as assets deteriorate.
<p>Increase investment over time</p> <p>Incrementally increase spending over a 5 year period.</p>	Ramp up the programme over 5 years to achieve y per year.	Sustainable increase in quantity of work. Return network to appropriate state over 10 – 20 year period.
<p>Increase Investment now</p> <p>Increase investment for the next 3 financial years.</p>	Deliver on the back log of works over the next 3 years.	Concentrated effort to get assets back to appropriate standard. High level of capital outlay, and likely disruption to residents due to increased scale of works.

Run to failure Don't plan to remediate assets until they have clearly broken.	Don't plan for a stable quantity per year, wait for assets to break and respond accordingly.	Uncertainty of workload, and likely higher costs due to reactive nature of work.
-----------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------

Table 8-58: Option development

8.11.9 Recommended Option

Council recommends adopting the Maintain Current Level of Investment option for the maintenance, operation and renewal of its parking assets, as it considers this the best option to deliver the strategic outcomes.

This option aims to deliver ONRC fit-for-purpose Levels of Service, and plans to renew assets before they fail.

8.11.10 Operations and Maintenance Plan

The contractor, Integrated Technology Services Limited (ITS), is engaged to inspect the condition of the parking meters on a very regular basis (some meters daily), and supply the Council with a daily fault report indicating which meters, if any, require maintenance.

The Council owns a supply of spare meters and parts which are stored by the Contractor, and used for repair / replacement work when required. Meters are purchased as and when required, however Council has spare stock as many meters were removed post-earthquake and put into storage.

A significant portion of current investment in parking is to repair meters (preventative and reactive) due to vandalism and to collect cash (circa \$1m paid to contractor per year).

Maintenance Expenditure

Work Type	OPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Depreciation	0.7	0.9	0.9	1.1	1.3	1.4	1.4	1.5	1.5	1.6
Operations	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Maintenance	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Compliance	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Total	6.8	7.0	7.1	7.7	7.9	8.0	8.1	8.1	8.2	8.2

Table 8-59: Parking OPEX budget including maintenance

8.11.11 Renewals Plan

As detailed in Section 8.11.3 Problems, renewals of parking meters are not currently undertaken, but this is an area that will be progressed in future years as the majority of meters are now 10-12 years. We will start to plan for their failure and replacement now and proactively address before issues arise. In addition new technology will need to be factored into renewals.

Work Type	CAPEX Budget (\$M)									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Total	0.50	0.69	0.69	1.16	0.49	0.49	0.49	0.70	0.71	0.71

Table 8-60: Proposed parking CAPEX budget

8.11.12 Capital Development Plan

No new asset expenditure is forecast for parking infrastructure as it is assumed that any rebuild of parking buildings will not be covered under this Asset Management Plan.

8.11.13 Disposal Plan

The disposal process associated with the on-street parking activity will be driven by the phasing out of the Metro meters. As indicated earlier in this section, the meters have an expected useful life of 10-years which will expire in 2016. Given this relatively short life expectancy, it is easy to plan for and manage. This process is managed by ITS and overseen by Council staff.

With regard to the off-street parking activity, there is currently no identified disposal process or programme and it is unlikely that the removal of these meters will have a significant cost.

9 Financial projections and trends

This section outlines the long-term financial requirements for the Activity based on the long-term strategies and tactics described earlier in the Plan.

9.1 Key Assumptions

General assumptions in preparing this forecast include:

- no smoothing of costs has been undertaken;
- figures are based on FY2022 dollars with no inflation for future years;
- growth of the asset base is as predicted in Section 4; and
- growth of traffic volumes is also as predicted in Section 4.

Significant risks associated with these assumptions include:

- certain price fluctuations are out of Councils control, such as the cost of bitumen. This has an impact on the cost of certain types of work.

Impacts of COVID-19 – short and longer term

Ongoing forecasting advice from economic commentators (e.g. The Treasury, ChristchurchNZ, financial institutions) has signalled significant economic impacts locally, nationally and internationally. This advice has been updated regularly and is likely to change over time.

What does this mean for the Transport Unit?

- an initial focus on infrastructure that supports COVID-19 recovery and delivers the remaining post-earthquake anchor and regeneration projects (e.g. progress 'shovel ready' infrastructure projects identified as part of central government stimulus package and complete committed projects);
- short-term (now, and LTP years 1-3) - some delays in scheduled capital programme works, potential issues with workforce availability/contractor viability following lifting of restrictions; uncertainty about materials supplies; changing priorities for work programming (e.g. accommodating the norm of physical distancing); opportunities for bringing forward 'shovel ready' work; increased financial pressure on Council budgets;
- medium term (LTP years 4-6): - possible re-prioritisation of capital works programme; changed programme priorities (as above); continued financial pressure on Council budgets; and
- longer term (LTP years 6 – onwards) - uncertain at this stage; potential bow-wave effect of deferred operational spend due to above factors.

9.1.1 Significant Changes

The significant changes in expenditure are shown in Table 9-1.

Item	Movement	Rationale for change
Personnel	Increase	2% allowed to match standard contacts
Contracts	Increase	Match inflation
Materials	Increase	Predict issues with supply and sustainability of current practices. Council will need to adapt its standards and this will likely increase costs
Energy		
Others		Monitored and largely managed by reactive actions

Table 9-1: Activity Operating Costs – Significant Changes

9.2 Operating Forecasts

As outlined in Section 7.5 Council is responsible for delivering safe, sustainable and integrated traffic operations and systems in line with traffic standards and bylaws, to achieve a safer and optimised transport network.

Road Maintenance is now delivered through four area contracts (3 awarded in 2017, North, South and Central across the City, and 1 for Banks Peninsula, awarded in 2015).

9.2.1 Financial Projections

The operating forecast outlined below contains depreciation, operational costs and maintenance costs. Staff costs have been included under operations at this stage.

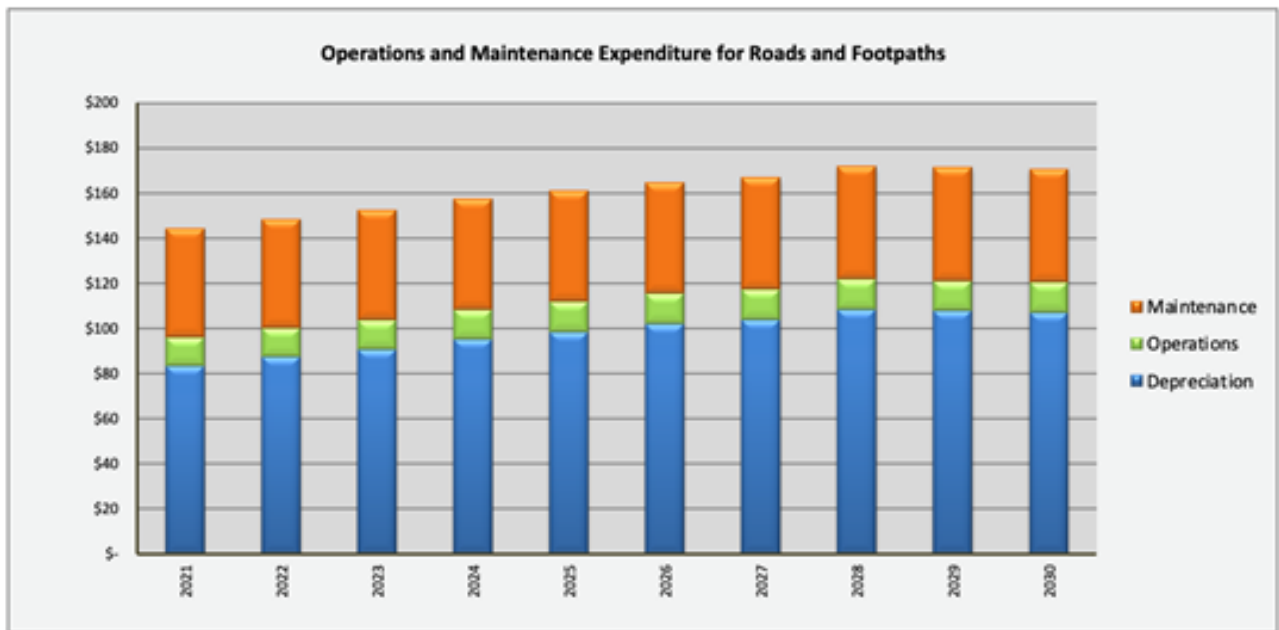


Figure 9.1: Operating forecast for the next 10 years.

9.2.2 Capital Forecasts

Renewal Forecasts

Renewal forecasts are outlined in Section 8 of this Asset Management Plan and are based on current condition assessment information. The renewals forecasts are summarised below.

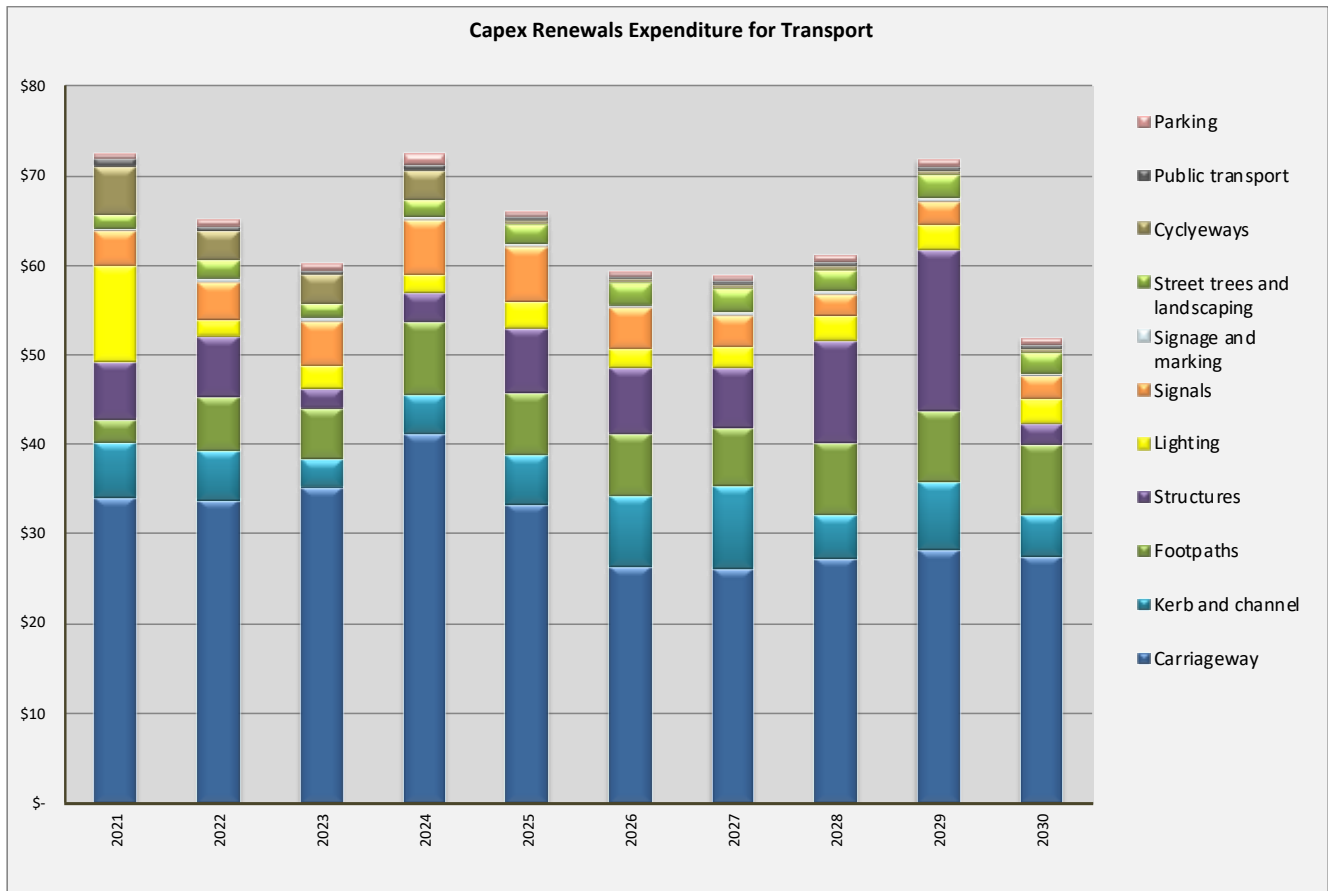


Figure 9-2: Capital renewal 10-year summary

The major renewals areas include:

- Carriageway;
- kerb and channel;
- footpaths;
- structures; and
- street lighting.

As outlined in Section 8 Lifecycle Management Plans, increased investment is recommended in the short term to rectify specific known issues. In the longer term, Council has an on-going requirement to maintain its asset base.

Capital Projects Expenditure

As outlined in Section 4.5 Council has adopted a range of activity or outcome focused plans and strategies that provide the detailed link between the high level community outcomes and strategic priorities and the work programmes the Council undertakes to deliver on these. For delivery purposes these are grouped as follows:

LoS Pillar	Programme
Safety	Core Safety
Access	An Accessible City
	Access
	Amenity
	Growth
Environment	Cycleways
	PT Improvements
	Shovel Ready
	CRAF

Table 9-2: Alignment between Pillars and Programmes

Capital improvement expenditure and programmes are detailed in the Transport Activity Plan which can be accessed through the following link.

[Long Term Plan 2021-31 Activity Plans and Asset Management Plans : Christchurch City Council \(ccc.govt.nz\)](https://ccc.govt.nz)

9.2.3 Revenue forecasts

The Local Government Act 2002 requires Council to adopt a Revenue and Financing Policy that sets out how operating and capital expenditure will be funded from available funding sources. It is an important policy, as it determines who pays for Council's services and how those services will be funded.

Council receive Transport related revenue from several operating streams. These are rates, borrowing and the National Land Transport Fund (NLTF) subsidy, via the National Land Transport Programme (NLTP) which Waka Kotahi NZ Transport Agency administer on behalf of the Government.

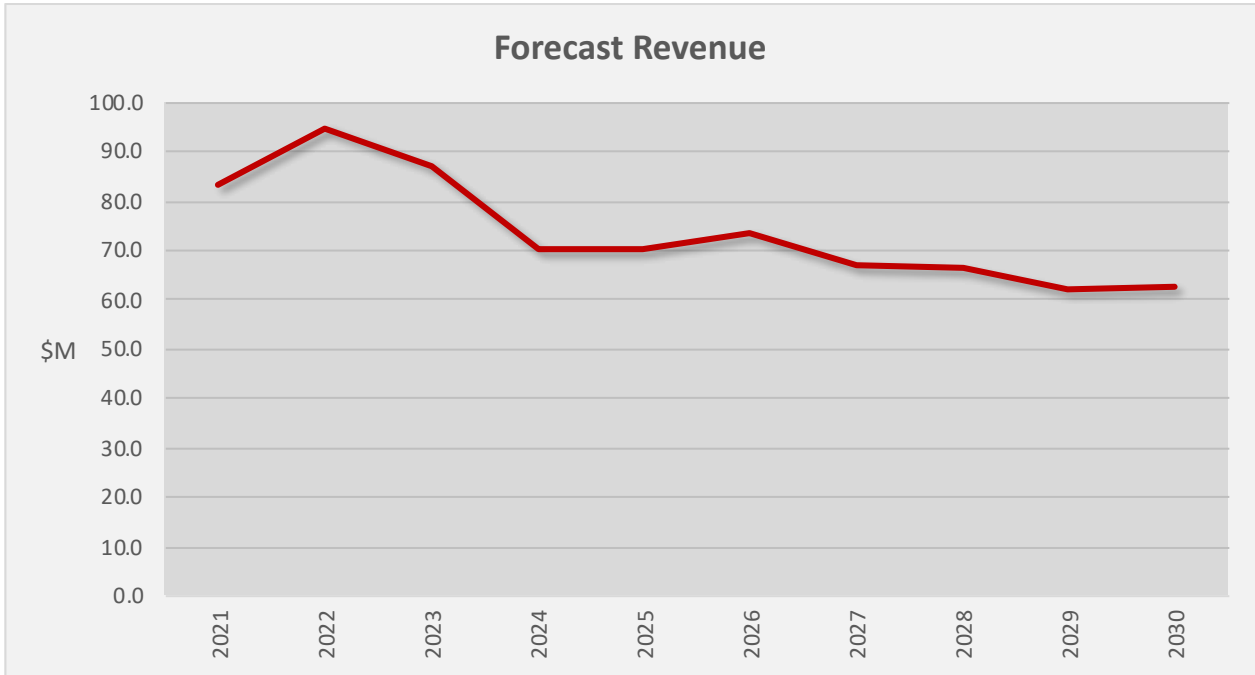


Figure 9-3: Forecast Revenue

9.3 Input Data Confidence Levels

The expenditure and valuations projections in this Asset Management Plan are based on best available data. Currency and accuracy of data is critical to effective asset and financial management. Data confidence (reliability of data) is assessed and classified on a 5 level scale as outlined in the Table below.

Data	Confidence Assessment	Comment
Demand drivers	B	Demand and growth are based on a regional model which has been peer reviewed
Growth projections	B	
Operations expenditures	B	
Maintenance expenditures	A	Well maintained
Projected Renewal - Asset values	B	Tested by valuer and external audit
- Asset residual values	B	
- Asset useful lives	B	
- Condition modelling	A	Undertaken by industry expert
- Network renewals	A	
- Defect repairs	B	
Upgrade/New expenditures	B	
Disposal expenditures	B	Low activity here

Table 9-6: Data Confidence Assessment for Data used in Asset Management Plan

Confidence Grade	Description
A Highly reliable	Data based on sound records, procedures, investigations and analysis, documented properly and recognised as the best method of assessment. Dataset is complete and estimated to be accurate $\pm 2\%$
B Reliable	Data based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings, for example some of the data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or some extrapolation. Dataset is complete and estimated to be accurate $\pm 10\%$
C Uncertain	Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolated from a limited sample for which grade A or B data are available. Dataset is substantially complete but up to 50% is extrapolated data and accuracy estimated $\pm 25\%$
D Very Uncertain	Data is based on unconfirmed verbal reports and/or cursory inspections and analysis. Dataset may not be fully complete and most data is estimated or extrapolated. Accuracy $\pm 40\%$
E Unknown	None or very little data held.

Table 9.7: Data Confidence Grading System

9.4 Valuation and Depreciation

9.4.1 Valuation Basis

Council values its assets on a 3 yearly basis. The most recent valuation for the Transport network was undertaken in June 2019. Below is a summary of the quantities and costs from the valuation.

Asset Category	Quantity	Replacement Cost	Depreciated Replacement Cost	Annual Depreciation
Carriageways	2,178.8 km sealed	\$1,677,704,088	\$986,359,385	\$21,519,797
	323.7 km unsealed			
Road Drainage	3,593 km kerb & channel	\$681,649,840	\$371,377,145	\$7,820,342
	34,195 sumps & associated pipes			
Footpaths	2,581.7km	\$456,083,629	\$255,515,689	\$9,616,184
Bridges & Structures	353 roads bridges & 116 foot bridges	\$511,554,455	\$197,468,348	\$8,470,555
	103 culverts, 1 ford & 2 underpasses			
	1,611 retaining walls			
	Guardrails, railings and gantries			
Road Lighting	38,145 lights & 20,327 poles.	\$110,001,791	\$59,284,959	\$3,491,850
Traffic Systems	348 signalised intersections	\$50,319,814	\$28,303,616	\$2,249,484
	247 CCTV sites & X school speed zone sites			
Traffic Services	55,979 signs & city wide marking.	\$40,242,885	\$16,090,682	\$2,001,019

Road Landscaping	65,720 trees	\$363,217,388	\$206,605,539	\$4,412,457
	Berms and 9,592 landscaped sites			
Cycleways	225 km of on-road lanes			
	115 km of shared paths			
Bus	519 bus shelters, signs and furniture.	\$2,514,661	\$834,485	\$91,299
Tram	4km of tram line	\$32,793,774	\$27,679,190	\$488,258
Parking	1,200 on street metered spaces	\$9,649,875	\$2,723,888	\$761,072
	437 parking meters.			
Total		\$3,935,732,200	\$2,152,242,926	\$60,922,317

Table 9-8: Transport asset valuation data (from 2019 Valuation Report)

10 Continuous Improvement

Council has made a strong commitment to improvement of Asset Management practices and seeks to further improve the approach. Council acknowledges the need to focus efforts to further Asset Management practices over the next 2-3 years to an appropriate level of capability.

In the improvement planning space the historic approach has been to have an improvement list for the Asset Management Plan. As a result this was quite a detailed technical plan, for specific staff. This led to difficulties with regard to operationally embedding change. For the 2018-21 LTP the improvement planning was elevated to be a tactical document. This meant that instead of focusing on one part of the business, it covered the whole Transport Unit.

To gain a helicopter view of the Transport improvement projects, an improvement roadmap was compiled to bring together all the prioritised projects set on a quarterly timeline that covered the periods January 2018 to June 2020.

The following section outlines the current view of the improvement actions, and their progress.

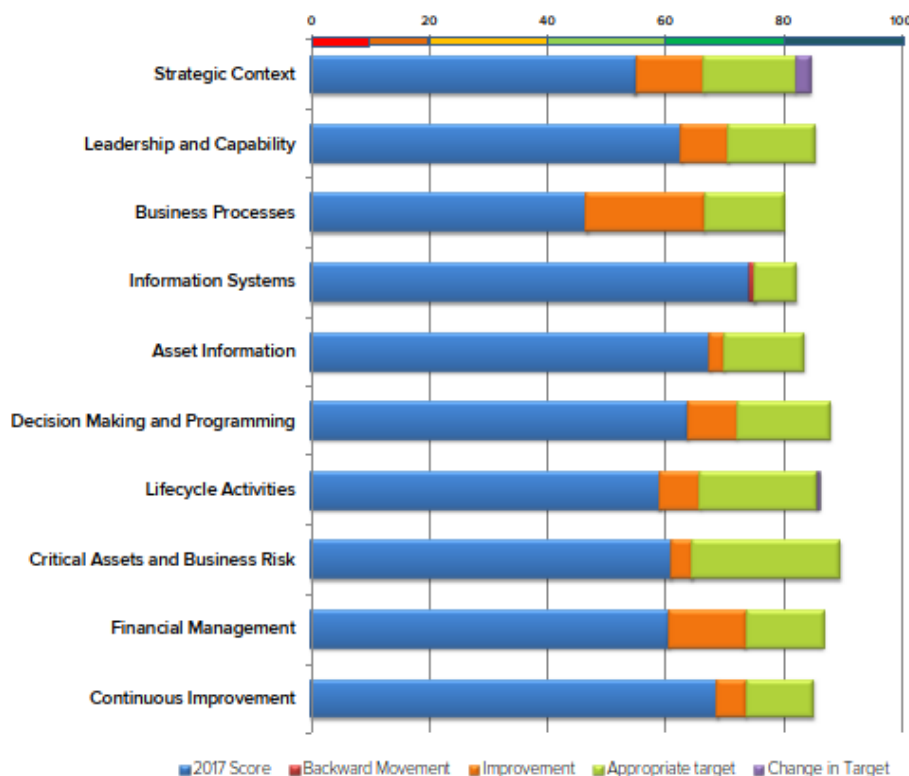
For further information on the wider Council Asset Management improvement process please refer to the Strategic Asset Management Plan.

10.1 Current Asset Management Practice

An independent assessment of current Asset Management practice was undertaken in November 2017. The assessment model utilised for this review was developed considering the requirements under the new Asset Management Standard ISO 55000/01, which was released in January 2015.

The baseline maturity assessment was predominantly achieved through onsite interviews, with a good cross-section of participants. Future maturity level was also set based on best appropriate practice and considering the agreed business drivers. Strength and opportunities for improvement are summarised alongside the results to acknowledge the baseline achievements.

Since then staff have been working-on the agreed improvements, and the Unit's maturity was re-assessed in March 2020. Here is a summary of the findings.



10.2 Improvement Plan 2018

The independent Asset Management Maturity Assessment process provided a sound basis for prioritising and monitoring improvements to current Asset Management practices.

Additional improvement items were identified during the maturity assessment and as part of this Asset Management Plan review. These items were added to the outstanding items from the 2018 Improvement Programme.

These projects focused specifically on the areas where the risk is most critical. To facilitate the practical implementation of the Improvement Programme, projects were designed to address several issues concurrently and be programmed to ensure a logical progression towards the three year target.

10.3 Improvement Plan 2021

In March 2020 staff undertook a reassessment of the Unit's maturity. The intention of this was to assist with the close-out of the 2018 programme, and finalise the action plan for the 2021 programme.

Outlined below are the projects that will make up the programme. This is shown in timeline form on the next page.

Targeted improvement projects

- Alignment with 2021 Government Policy Statement on Transport
- Knowledge transfer from experienced asset management practitioners
- Asset management competency framework
- Capture and share knowledge through case studies
- One Network Framework implementation
- Transport asset risk
- Next generation of maintenance contracts
- Response to water regulator
- Transport process continuous improvement

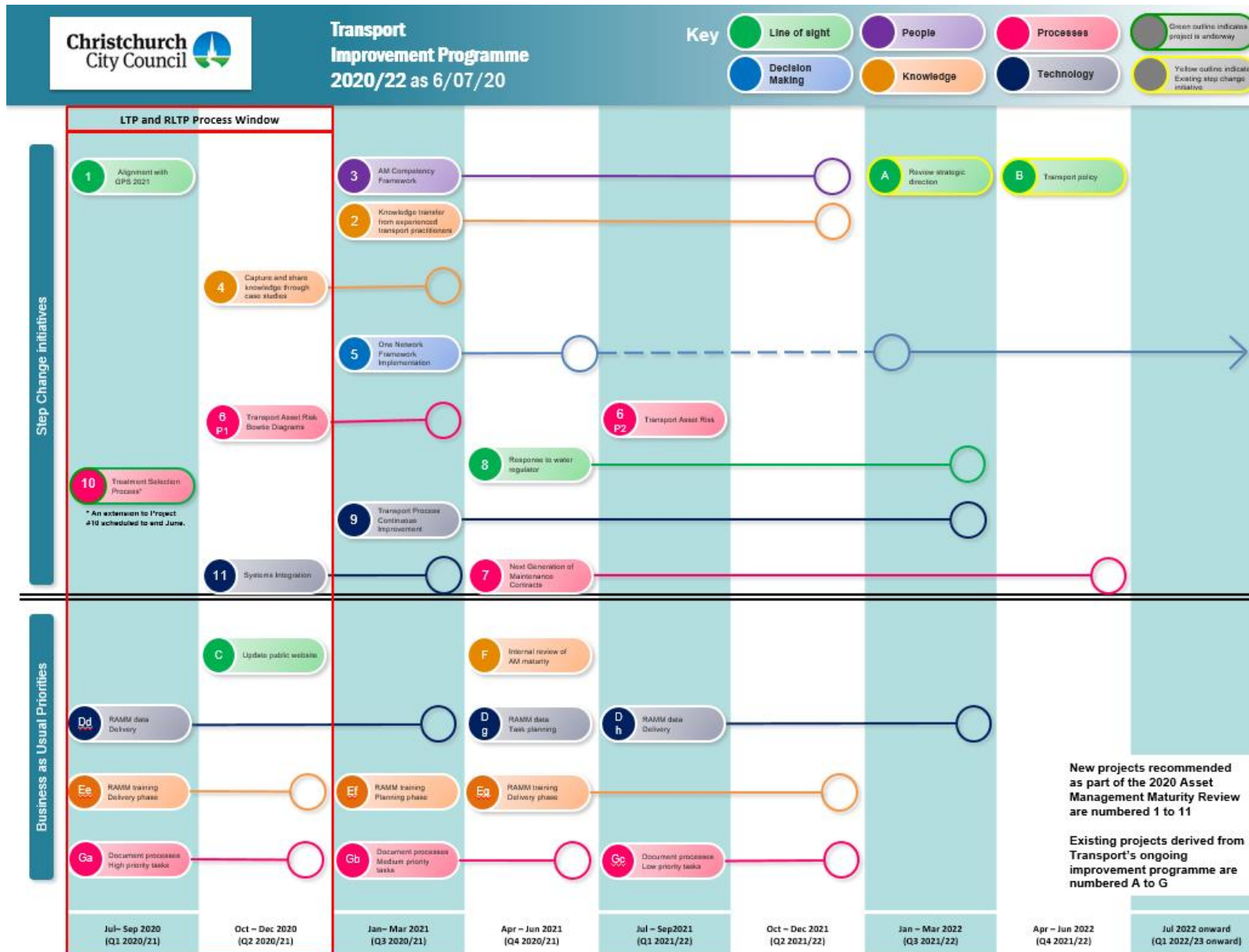


Figure 10-1: AM Improvement Programme Timeline

10.4 Resourcing the improvement programme

The activity requires resources and budget to deliver the Improvement Plan tasks. Consideration of existing workloads and other corporate priorities may require changes to the indicative completion dates shown in the improvement programme.

It is likely that across Council, a lack of resources will result in difficulty delivering all the improvement items. A prioritisation and costing exercise will be required to ensure the highest priority items are delivered first and that future delivery costs are understood, and sufficient budgets allocated within the LTP.

10.5 Funding the Improvement Programme

The 2018 programme was funded from existing internal budgets. To make this work within resource and time constraints, Business As Usual tasks and improvement tasks were prioritised and scheduled in such a way to make best use of the people resource and budget available.

Council also receives co-funding from Waka Kotahi NZ Transport Agency for planning, Asset Management and improvement works. The Improvement Plan is submitted to them as part of the 3 year funding cycle, and is a requirement.

For the 2021 programme the plan is to split the work into two primary groups. Firstly, those items that are continuous improvement to Business As Usual will be embedded into the respective team members work objectives (termed Personal Development Plan or PDP in Council). Secondly, items of work that are targeted improvement will be treated as specific projects over and above Business As Usual. These will need to be specifically resourced and funded accordingly.

10.6 Monitoring and review

The improvement programme progress will continue to be reported to the Transport Management Team on a monthly basis. This is the appropriate level of escalation to keep a good 'line of sight' on delivery, and provide direction if progress is slipping.

Further to this the same reporting will be submitted through to Council's Asset Management Governance Board.