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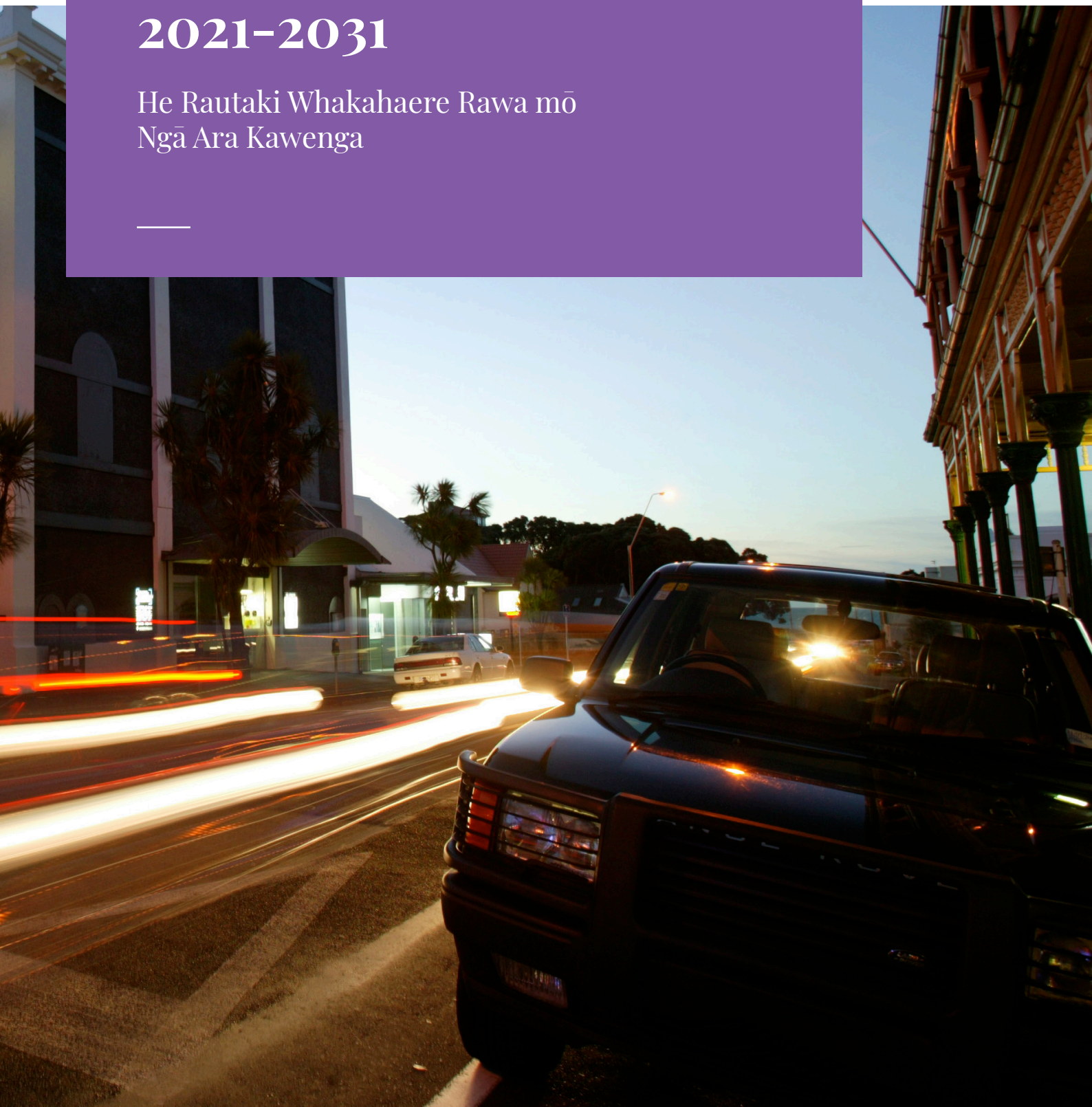
Te Kaunihera-ā-Rohe o Ngāmotu
New Plymouth District Council

Transportation Asset Management Plan 2021-2031

He Rautaki Whakahaere Rawa mō Ngā Ara Kawenga



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Executive Summary

This Transportation Asset Management Plan (AMP) outlines how New Plymouth District Council (NPDC or the Council) will deliver the services required for the New Plymouth district's (the district's) ratepayers and road users to go about everyday business and life.

The Transportation Network

The Council currently has 1,291km of sealed roads, with 961km of rural roads and 330km of urban streets. There are also 255 bridges, 527km of footpaths and 365 retaining walls in the district. These Transportation assets are contained in close to 220,218ha of road reserve across the district.

The replacement value of the Council's transportation assets is $1,771 million. These assets are depreciating at the rate of $11.8 million per annum.

Problem – Benefit statements

The reasons for investing in the transportation network are provided through the following problem and benefits statements. These statements were identified through the Investment Logic Mapping process (ILM) and Point of Entry discussion.

Problem statements	Benefit statements	Strategic response
Natural topography and layout of infrastructure makes it difficult to complete a trip using alternative transport modes, causing severance of the community and places the network at risk during a major event.	Improved network performance	**Change risk profile:** Accepting greater risk across the network based upon the One Network Road Classification (ONRC) road classification.
Not taking a "safe system" approach to a complex network has resulted in poor actual and perceived safety outcomes.	Improved safety outcomes	**Programme adjustment:** Continue driver behaviour change programme. Develop network wide safety auditing of high-risk trends. **Change risk profile:** Carry on implementing the Vision Zero Strategy.
Poor understanding of the value that our transport infrastructure provides for our community and regional economy has resulted in poorly targeted investment and missed economic opportunities	Improved economic outcomes	**Policy approach:** creating new and updating existing policies to support good asset management practices. **Programme adjustment:** Adjust activity work categories for good asset management practices. **Improve value for money:** Identify where the life of an asset can be extended at no or minimal extra cost. **Relationship approach:** Improve the relationship with Waka Kotahi (New Zealand (NZ) Transport Agency) and Councillors through more reliable data that provides better guidance for decision makers.
Infrastructure and societal habits encourage motor vehicle usage causing environmental damage, poor health outcomes and unattractive urban spaces.	Improved transport choices	**Policy approach:** Ensure any new policy encourages active modes of transport. **Programme adjustment:** Increased active transport mode share.

Levels of Service

Network Levels of Service were relatively stable from 2015-18, and since 2018 most activities have been maintained at existing Levels of Service. Resident satisfaction has remained high. The key issues are carried throughout this AMP and they are summarised as follows:

Integrated transport
Everyone should to be able to move safety throughout the district. To achieve this land development needs to be in line with Council strategy and a variety of travel options need to be available to everyone.

Safety
The number of fatal and serious crashes in the district has been increasing over the past five years. A number of road safety initiatives have been identified for the Arterial, Primary Collector and Secondary Collector roads, where the NPDC rate is higher than the Provincial Centres Peer Group (the Peer Group).

Structures
The condition of bridges and structures throughout the network has significantly deteriorated due to underinvestment in recent years. To ensure that the transportation network continues to operate safely we have identified a significant increase in funding for structures over the following 10 years.

Forestry
The anticipated increase in forestry traffic over the next 10 years will put a significant load onto the rural road network. The maintenance on these roads is likely to increase significantly and will require ongoing management. To accommodate this activity the costs associated with rural seal maintenance and rural unsealed road maintenance have been increased.

Pavement
The performance of Arterial roads is worsening and Collector roads is improving. The Council wants to maintain a higher Level of Service for higher classification and trafficked roads as this provides a greater benefit to a greater number of people.

1 Introduction

This Transportation AMP outlines how NPDC will contribute to the community outcomes and priorities identified in the 2021-2031 Long Term Plan (LTP or the 10 Year Plan). It sets out the rationale for investment in and activities on the Council's transportation network and how the Council will deliver the services required for the district's ratepayers and road users to go about everyday business and life.

This document follows Waka Kotahi's (NZ Transport Agency) Activity Management Planning[1] guidance, and therefore describes how the Council's Transportation Team will maintain, operate and plan for transportation activities. This approach helps NPDC and Waka Kotahi determine that the right work is being done at the right time and for the right reasons.

1.1 The New Plymouth District

The district is on the west coast of the North Island facing the Tasman Sea, north of the Stratford district and South Taranaki district, and south of the Waitomo district.

With an area of 2,324km^2, the district is the tenth largest district in NZ. It is made up of New Plymouth city (the city), the largest centre, and a number of surrounding settlements that support smaller communities and lifestyle living. The city is the focus for the Taranaki's (or the region's) economy, which is dominated by dairy farming, oil, natural gas and petrochemical exploration. The city is also the region's financial centre and home to Port Taranaki – the only deep-water port on the west coast of NZ.

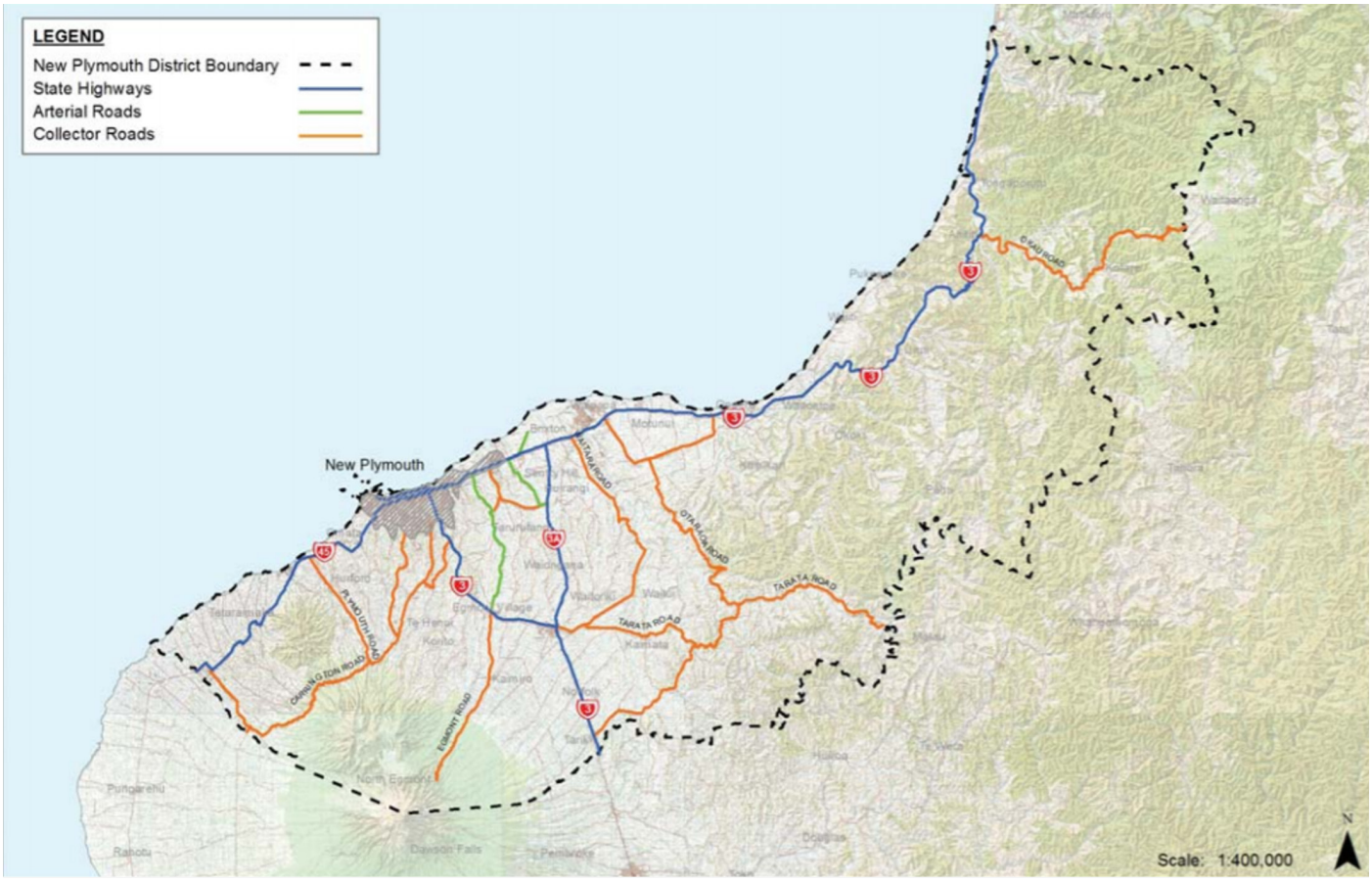
Lying 11km north of the city centre, New Plymouth Airport is an important regional airport in NZ. New Plymouth is recognised as the tourist hub of the region, which was named the second best region in the world to visit by Lonely Planet in 2017.

The district is currently experiencing high population growth and is expected to grow by 25% by 2051 (from 86,504 people in 2021 to 104,129 people in 2051). A significant proportion of those residents will be aged 65 years and over (from 19% (16,651) in 2021 to approximately 27% (28,256) in 2051). To support a vibrant and resilient district well into the future, it is important that infrastructure assets are managed both prudently and sustainably through future periods of growth and other pressures.

Figure 1 shows the road transportation network in the district.

[1] https://nzta.govt.nz/planning-and-investment/learning-and-resources/business-case-approach-guidance/how-to-use-the-business-case-approach/activity-management-plan-example-tool/

Figure 1: Map of the district's roading network



1.2 The Transportation Network

The transportation network is a key facilitator of journeys. It enables the movement of people and goods (via freight) to make national, regional and local road journeys effectively, efficiently and safely, which in turn helps support a thriving NZ. At a national level it connects New Plymouth to other cities, producers and markets, air and sea ports and supports NZ's global competitiveness. Locally, it connects businesses, communities, families and friends with customers, services, work, play and each other.

The forming, surfacing, sealing, grading of roads and road shoulders, along with traffic management and control devices, allows for safe, efficient and sustainable travel by motor vehicles, cyclists and pedestrians. Street lights are provided for the safety of all road users during night-time hours.

While there is a legal requirement, there is also a community expectation - demonstrated by consultation, complaints and requests - that the Council will ensure regulatory compliance to maintain a safe and healthy community and to ensure environmental standards are met.

This Transportation AMP covers the Council's transportation assets, including the following:

1. Pavements (includes Sealed and Unsealed, Arterial, Collector and Local roads)
The total length of the NPDC roading network is 1,285km as classified by the ONRC (see Section 1.6 below). This includes an additional 184km of road which is also maintained by the Council yet is unclassified (these are predominantly roads which lead into parks and reserves).

2. Structures (includes bridges, large culverts and retaining walls)
The Council owns a total of 170 bridges, 196 culverts (>3.4m2 cross sectional area) and 365 retaining walls in the transportation network. In addition, the Council has 100 stock underpasses (>3.4m2 cross sectional area) that are owned by others but pass under NPDC owned roads.

3. Stormwater drainage (includes kerb and channels, road culverts, surface water channels and berms)
Stormwater drainage assets consist of different types of open or piped facilities. The Council owns approximately 640km of kerbs and channels located predominantly in the urban area, and approximately 63km of culverts (with cross sectional area <3.4m2) predominately in the rural environment. Although kerbs and channels are almost exclusively located in the urban network, they are sometimes used as an alternative to water tables in the rural areas where verge space is restricted or to avoid cutting a batter.

4. Traffic services (includes traffic signals, street lights, traffic signs, traffic control devices, safety barriers and bus shelters)

These are summarised as follows:

- Traffic signs: 11,359 signs
- Road facilities: 4,695 edge marker posts (EMP) and 1,320 raised reflective pavement markers (RRPM).
- Traffic signals: 25 (urban) locations, six of which are NPDC's own installations and the remaining 19 are State Highway installations. The 19 sets managed on behalf of Waka Kotahi are located at intersections within the State Highway network.

- Street lighting: 8,652 lanterns and 3,927 poles in the district. Lighting for roads has three categories, namely carriageway, amenity and flag lighting. For safety reasons standalone lighting is usually on high poles.

5. Footpaths and cycleways (includes pedestrian access ways and road berms)
The Council owns 521km of footpaths, with a total surface area of approximately 860,000m2. This includes steps, crossings and berms related to footpaths. The majority of footpaths are constructed of concrete or seal, apart from in the New Plymouth Central Business District (CBD) where for a higher amenity value clay pavers, blue stone and interlocking blocks have been installed.

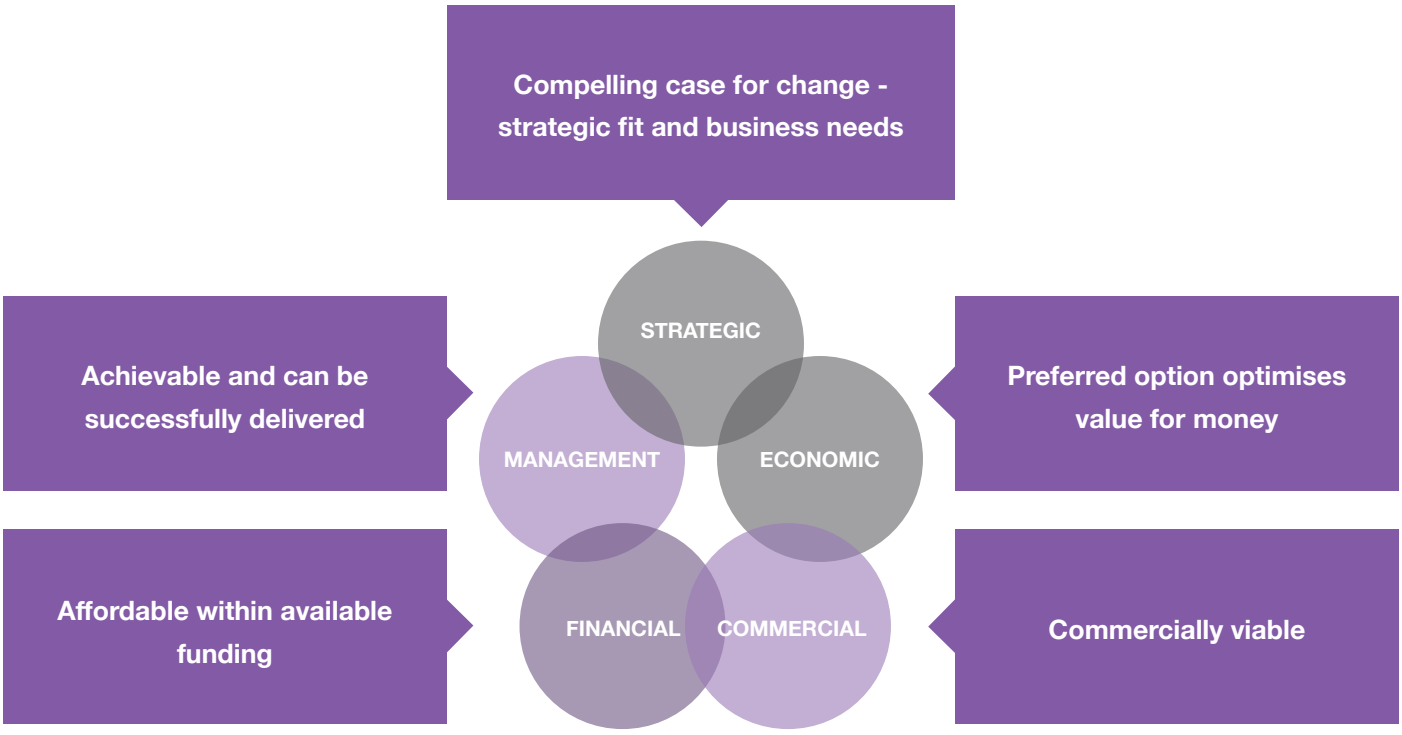
6. Environmental and emergency works (includes environmental protection activities and emergency response works).

1.3 Background

Previous transportation asset management planning approaches have generally focused on asset maintenance and asset improvement solutions. The disadvantage of this approach was the lack of a clear link to organisational priorities through the maintenance, renewal or improvement programme lifecycle and lack of consideration for strategic asset improvements. An AMP follows a business case approach that clearly defines the problems and contextual state of the district and understanding of the cause, and scale of benefits of addressing the problems. The AMP approach filters whether a problem is worth investing more time and resources going forward.

The business case approach is based on the Better Business Case[2] guidance prepared by the NZ Treasury as illustrated in **Figure 2.**

Figure 2: Ensuring strategic alignment: the business case approached aligned with NZ Treasury's Better Business Case guidance



The business case also seeks to make sure during the lifecycle of a programme that the reasons for doing it are still sound, and that it clearly links back to the organisation's infrastructure and other organisational priorities and issues, and delivers agreed Levels of Service.

[2] https://www.treasury.govt.nz/information-and-services/state-sector-leadership/investment-management/better-business-cases-bbc

1.3.1 Asset Management Plan Development

AMPs form the cornerstone of an effective asset management system. The ISO 55000 series of standards for asset management clearly defines the importance of AMPs: they provide the roadmap for achieving value from physical assets by optimising cost, risk and performance across the asset lifecycle.

AMPs define the implementation activities necessary to realise an organisation's activity management objectives which translate the strategic intent of the organisation. The relationship and interdependencies of asset management policy, strategy, objectives, and planning to achieve those objectives clearly demonstrates how important organisational alignment is to the creation of AMPs.

The Council implemented an Asset Management Policy in 2019 that provides a framework for consistent practise of asset management within the organisation. The outcomes targeted by the Asset Management Policy are:

"1. Our assets are resilient and continue to meet the needs of our community.

2. Ensuring that we maintain the condition of our infrastructure assets to make sure they perform as required.
3. Investing in infrastructure assets so we can service a growing number of residents and businesses to ensure the district remains an affordable and desirable place to live".

The Asset Management Policy is currently being updated in line with the Council's recently updated vision (see **Section 2: Strategic Case**).

The multidisciplinary Asset Management Steering Group (AMSG) is tasked with the delivery of the Asset Management Policy. The current focus of the AMSG is to review the Asset Management Policy and group terms of reference, develop and implement an overarching asset management framework and to drive asset management improvements into the organisation.

Substantial advancement has been made since the publication of the 2018-28 Transportation AMP in the way the Council's transportation assets are managed and maintained. For the 2021-31 Transportation AMP, the Council has taken a stronger strategic approach to asset management in response to shortcomings identified in a review of the 2018-2021 Transportation AMP and in recognition of the necessity to clearly convey to the Council's stakeholders the requirement for future investment.

1.4 Implementation of the Asset Management Plan

The Infrastructure Group is largely responsible for managing the resources to implement and deliver the activities included in the AMP.

The Infrastructure Manager is responsible for day-to-day operations, and maintenance, renewal and augmentation of the transportation systems in accordance with the LTP, Annual Plan and AMP. The Infrastructure Manager is also responsible for overall management of resources to achieve plans, including the balance of internal and contract resources.

The Transportation Manager is responsible for the delivery of day-to-day operations, and maintenance and renewals of the transportation network, including managing internal and contract resources. The Network Delivery Lead in the Transportation Team has a team of contract engineers responsible for coordinating and managing the internal and external resources required for delivery.

1.5 One Network Approach

Putting the customer at the heart of business has informed the adoption of a One Network Approach to the way the Council works with its partners to plan, maintain, operate and develop the transport system. The One Network Approach recognises that customers desire efficient journeys across the transport system, irrespective of which agency is responsible for that aspect of the journey.

1.6 One Network Road Classification

The Road Efficiency Group (REG) (a collaborative initiative between Waka Kotahi, Local Government NZ and Road Controlling Authorities (RCA) of NZ) developed the ONRC in 2014. The ONRC categorises roads into six functional categories (National, Arterial, Regional, Primary Collector, Secondary Collector and Access) based on the role they perform as part of an integrated national network, contributing to national, regional and local economies and social wellbeing. The classification helps Waka Kotahi and local government to plan, invest in, maintain and operate the road network in a more strategic, consistent and affordable way throughout the country.

The ONRC is currently being transformed into a framework to include walking, cycling and public transport infrastructure. This development is discussed in greater detail in **Section 2: Strategic Case** of this AMP.

1.7 Key Planning Assumptions and Limitations of this Asset Management Plan

This AMP has been prepared based on the following assumptions:

- Currently available information and data
- The population of the district will grow over the period 2021-2051
- An increase in 355 houses per annum in the first five years (2021-2025) and a growth of 383 houses per annum average in the second five years (2026-2031)
- Rates are expected to rise approximately 3 – 5% per year over the next 10 years
- Change impacts on weather events and sea level will exacerbate existing hazards

Assumptions made at a more detailed level are outlined in the relevant sections of this AMP.

1.8 Relationship with other Plans and Documents

AMPs are a key component of the strategic planning and management of the Council, with links into the areas illustrated in **Figure 4**.

Figure 4: Integrated planning framework and linkages

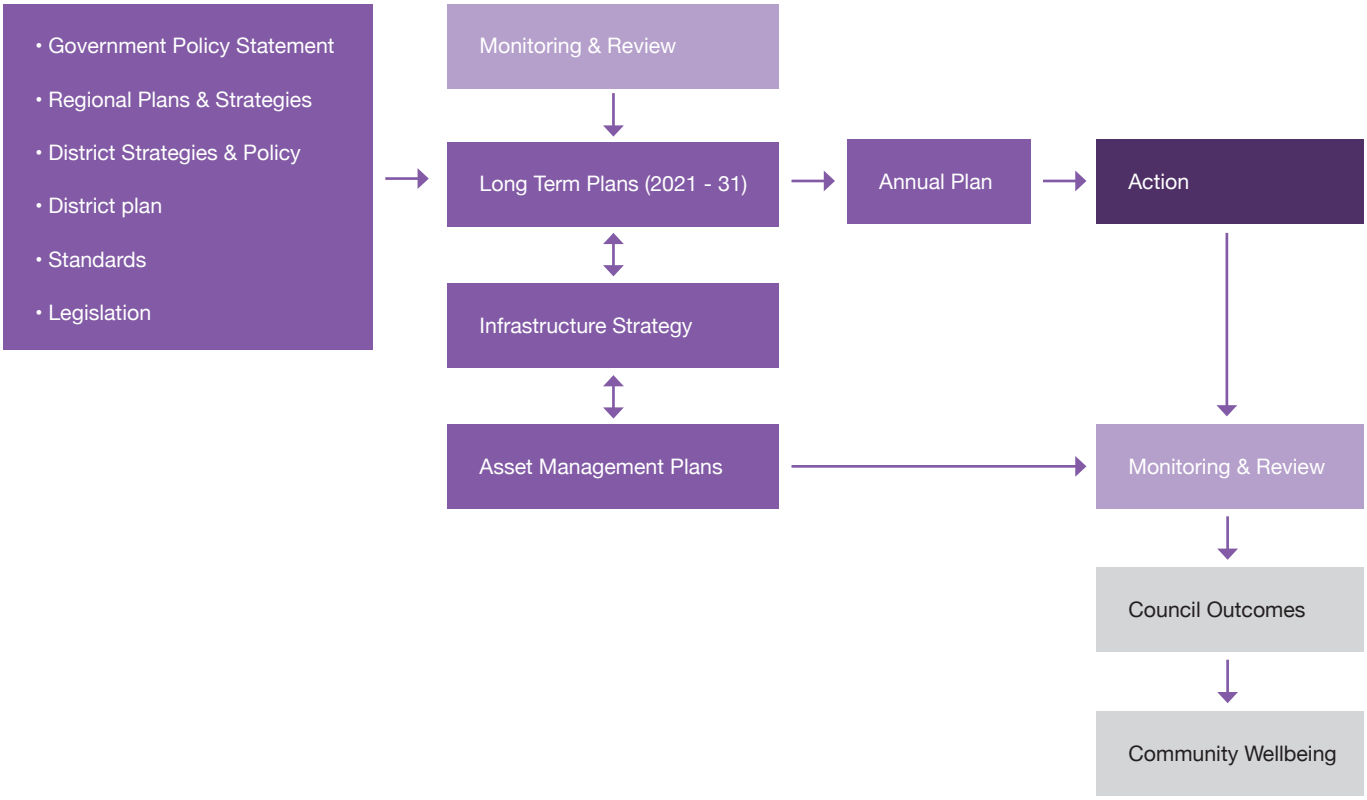


Table 1 shows the cyclic planning relationships between AMPs and plans, reports and other documents. Further information is provided in Section 2: Strategic Case of this AMP.

Plans/Documents	Description	Frequency
Government Policy Statement on land transport (GPSLT)	The GPSLT sets out the Government's priorities for expenditure from the National Land Transport Fund over the next 10 years.	The GPSLT is updated every three years. The 2021 GPSLT is available in draft format at present.
LTP	The LTP sets out the Council's agreed vision and outcomes for the district. The framework of the LTP is in line with the requirements of the Local Government Act 2002 (LGA). The LTP will assist the Council in promoting sustainable practices as well as assisting the community to determine over time what 'outcomes' could and should be, and links to the Council's vision.	The LTP is updated every three years and is currently being updated for issue later in 2021.
Annual Plan	The works identified in the AMP should automatically become the basis on which future Annual Plans are prepared.	Must be produced in the intervening years between LTPs as a reflection of the corresponding year of the 10 Year Plan. Every third year the Annual Plan is embedded in the LTP.
District Plan	The District Plan is the primary document that manages land use and development within NPDC's territorial boundary. It contains rules that relate to development or land use proposals.	As required under the Resource Management Act 1991 (RMA).
Contracts	The service levels, strategies and information requirements contained in the AMP become the basis for performance orientated contracts for service delivery.	As required.

Plans/Documents	Description	Frequency
Annual Report	The Annual Report is the mechanism to report back to the community, showing the Council's achievements against Annual Plan and LTP targets.	Must be produced every year to report progress against LTP outcomes and work programmes.
AMPs	Levels of Service, growth, risk, maintenance, renewal and development works and strategies are identified and budgeted for within AMPs. This information automatically feeds into the LTP.	

1.9 Scope of this Asset Management Plan

The scope of this AMP is detailed in **Figure 5** below.

Figure 5: Scope of this AMP

Executive summary	Summary of core components of all the sections below, which is separate for publication and distribution to elected representatives, the community and council staff.
Introduction	Overview of the area / region, brief statistics such as population, climate, employment and the economy. A snapshot of the transport activity is also summarised to provide the reader with a quick understanding of the extent of services provided.
Strategic Case	Outlines the vision, goals and objectives of the asset group. Corporate strategic initiatives and community outcomes are linked to demonstrate how the transport activity contributes, and the rationale for Council's involvement. Key business drivers, linkages to strategic documents, key partnerships and stakeholders are also covered in this section.
Customer Levels of Service	Levels of Service define the quality of the delivery of the transport activity against which service performance can be measured. Infrastructure planning enables the relationship between Levels of Service and the cost of the service (the price / quality relationship) to be determined. The relationship can then be evaluated in consultation with the community to determine the required Levels of Service minimum requirement that the customer is prepared to pay for. Service standards provide the basis for the lifecycle management strategies and work programmes.
Growth and Demand	This section sets out the strategy that the asset owner will adopt in relation to its infrastructure assets. The 'key demand drivers' that influence growth and demand are assessed in detail, as well as the impacts and management thereof, with a view to forward planning so that the needs of individuals, communities and the contribution to the wider region can be sustained.
Programme	This section describes the core business and key service providers and their roles and responsibilities in delivering services. The organisational structure that supports these services externally and internally is also detailed. An overview of expenditure and funding needs is also included to provide a snapshot of current and future needs.

Life Cycle Management

The Lifecycle section provides the broad strategies and work programmes required to achieve the goals and standards outlined in the AMP. This section presents the Life Cycle Management plan for each asset group, including the following: A detailed description of the assets in physical terms, key issues, Levels of Service and risks, operations, maintenance, renewal and development strategies.

Financials

The Projects and Financial Forecasts section outlines the short term (three year), medium term (five year) and long term (10 year) financial requirements for the operation, maintenance, renewal and capital needs for transport, based on long term strategies and Levels of Service outlined earlier in the AMP. Funding sources and potential issues are identified and key assumptions in preparing financial forecasts are noted. A summary of asset valuation by asset group is also outlined.

Business Processes and Risk Management

This section covers the key business processes in place that supports asset management and the strategic risk management implemented by the asset owner relevant to the transport activity. This includes an assessment of Information Technology (IT) and business systems, an overview of business continuity planning, emergency management and business risk associated with the ownership and management of the infrastructure assets.

The AMP is also assessed against the Office of the Auditor General's Criteria for advanced asset management (NZ) plus any relevant legislation or industry standards. The key to ongoing success is to plan, review and monitor the ongoing update of the AMP, including key milestones and responsibilities. How the organisation intends to do this is documented in this section.

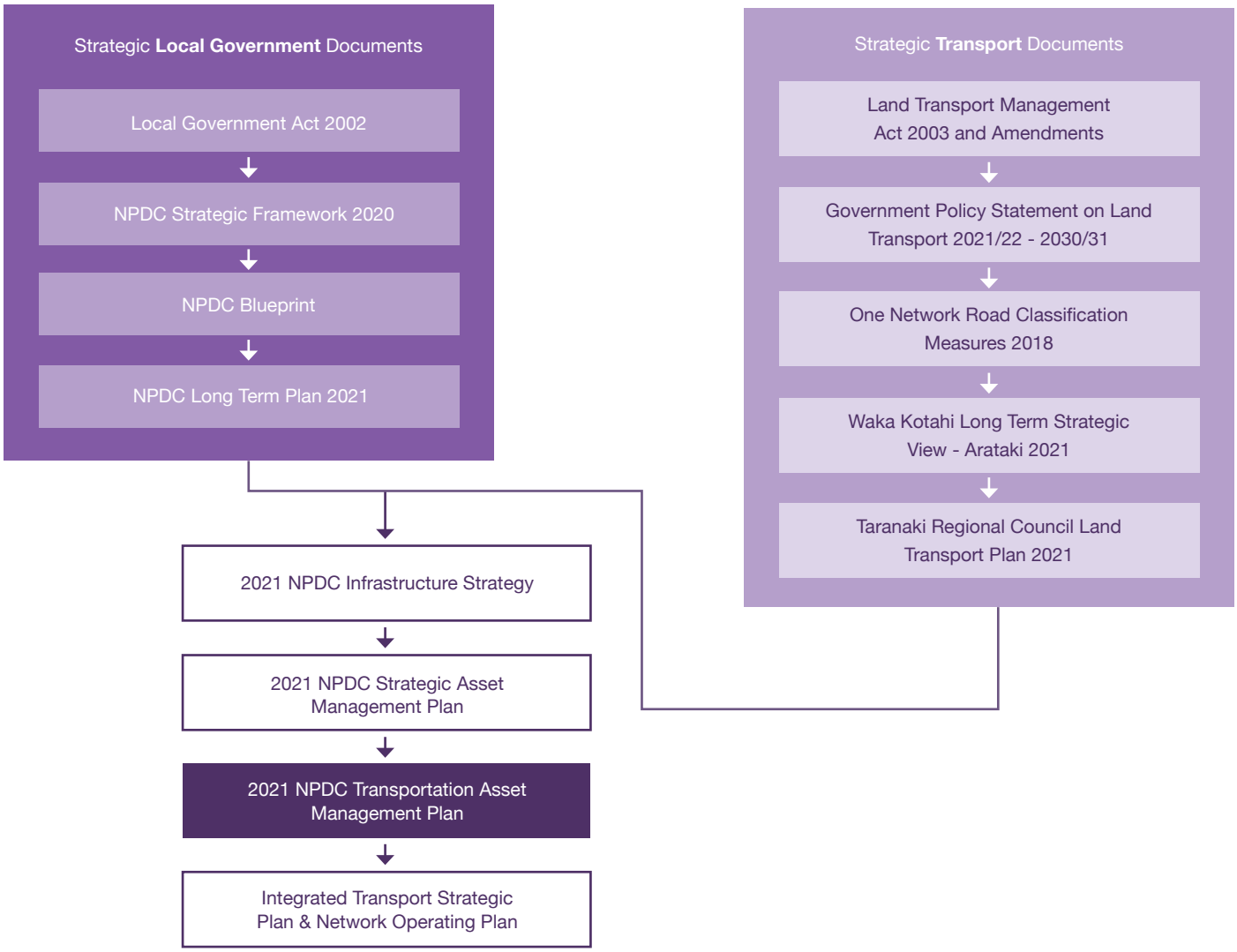
Improvement Plan

The Improvement Plan is integral to continually improving processes and practices to ensure the ongoing development of Asset Management practices towards an appropriately advanced level. It qualifies current business practice, identifies indicative timescales, priorities, and human and financial resources required, and measures progress toward an identified future position. A full gap analysis across the transportation activity has been undertaken, which targets and drives business improvement and therefore delivers goals and outcomes.

2 Strategic Case
2.1 Introduction

This section provides the strategic context for the transportation activity. It outlines the relevant legislative and strategic objectives, and the key partners and stakeholders for the transportation activity.
Figure 6 illustrates how strategic documents align for the transportation activity. In particular, it shows how the LGA and Land Transport Management Act 2003 (LTMA) align with the relevant strategic documents at the national, regional and local level that influence the development of the Transportation AMP, Levels of Service and the delivery of the transportation activity.

Figure 6: Strategic Alignment between national, regional and local documents



2.2 Strategic Transport Documents

2.2.1 Land Transport Management Act 2003 and Amendments

The LTMA sets out requirements and process for development of the Council's Land Transport Programme, provides a framework for receiving funding from Waka Kotahi and allows for the establishment of future toll roads under certain conditions. The LTMA also requires the Minister of Transport to issue a Government Policy Statement (see **Section 2.2.2**).

2.2.2 Government Policy Statement

The GPSLT 2021/22 – 2030/31 was published in September 2020 and outlines the Government's strategy for land transport investment through the National Land Transport Fund. It guides investment over the next 10 years and provides guidance to decision makers about where the Government will focus resources, consistent with the purpose of the LTMA. The GPSLT is issued by the Minister of Transport every three years and has recently been finalised following the public consultation period.

The GPSLT sets out four strategic priorities to guide investment as shown in **Figure 7**.

Figure 7: GPSLT strategic priorities for investment (Source: GPSLT)

These strategic priorities are underlined by the following key themes throughout the GPSLT:

- Mode neutral approach to transport planning and investment decisions
- Incorporating technology and innovation into the design and delivery of transport investment
- Integrating land use and transport planning

2.2.3 One Network Road Classification

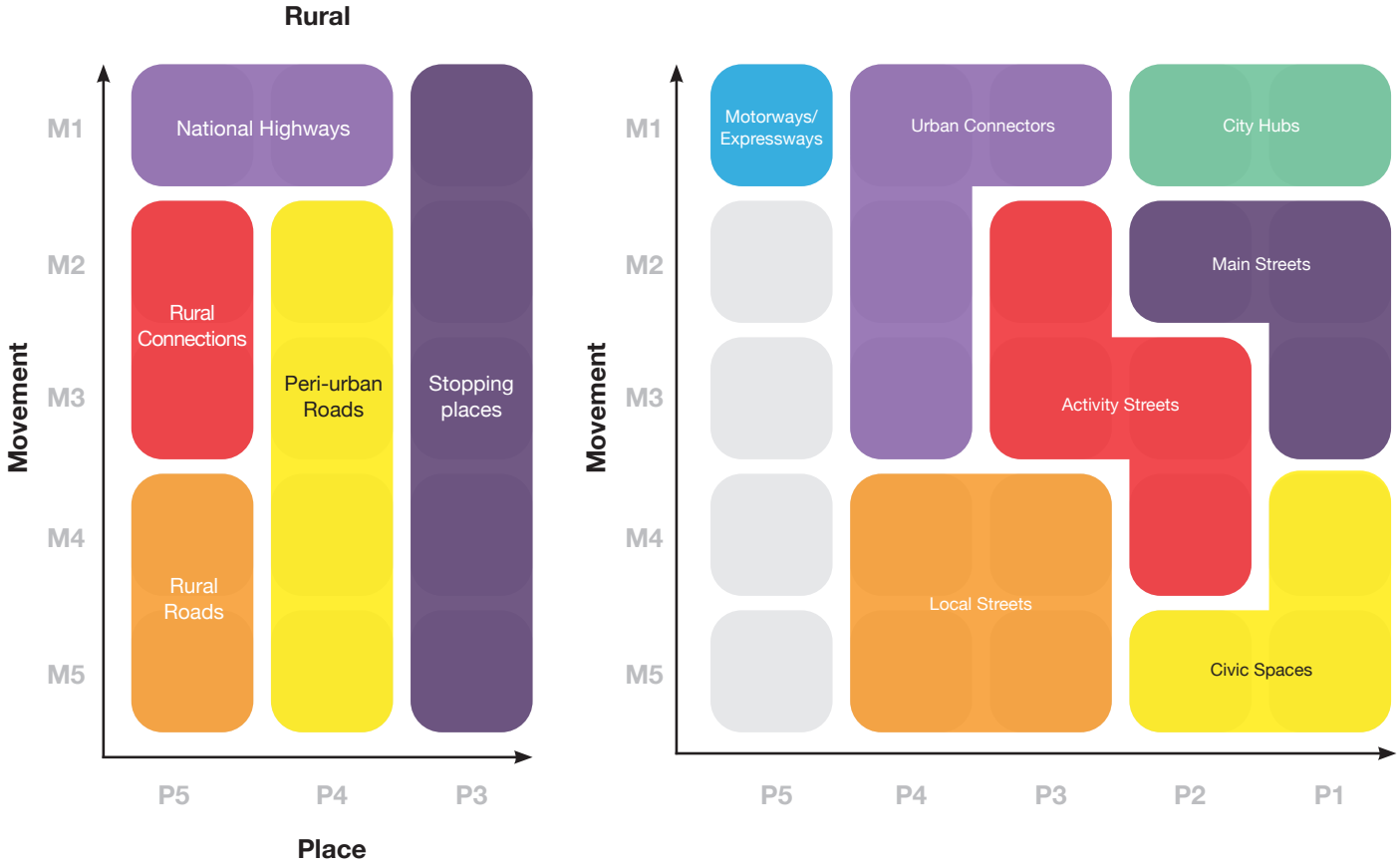
As noted in Section 1.6, in 2014 the ONRC was introduced in NZ to standardise a classification system that identifies the Level of Service, function and use of road networks and State Highways. The ONRC involves categorising six road categories based on the functions they perform as part of an integrated national network. This reflects a more customer focused approach to service delivery.

As part of the process of embedding the ONRC in the management of the district's roads, the way in which the Council has defined Levels of Service has changed. The ONRC framework defines six Customer Outcomes:

- Safety
- Resilience
- Amenity
- Accessibility
- Travel time reliability
- Cost efficiency

The ONRC is currently being enhanced to better include people that are walking, riding a bike or taking public transport. It will also reflect that transport corridors are not just for travelling through - they are also places where people stop, socialise, enjoy and do business. The ONRC has since evolved to become the One Network Framework (ONF) by Waka Kotahi. The new street families that align to the Movement and Place framework are shown in Figure 8.

Figure 8: Visualising street families

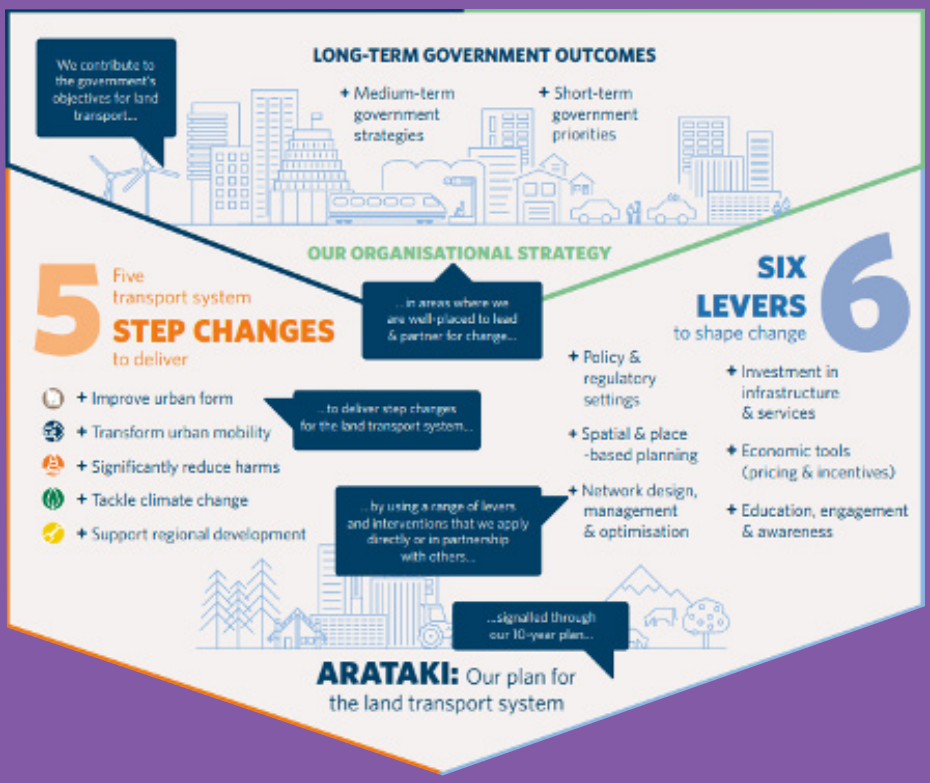


2.2.4 Waka Kotahi's Long Term Strategic View – Arataki 2021-2031

Arataki sets out Waka Kotahi's 10 year view of what is needed to deliver on the Government's current priorities and long term objectives for the land transport system. Arataki is made up of place-based summaries (one national, three pan-regional and 14 regional) that tell a land transport system story. These are framed by five step changes (improve urban form, transform urban mobility, significantly reduce harms, tackle climate change and support regional development) where the need for change has been identified. These step changes are in response to six key drivers that will shape the future of land transport (demographic change, climate change, technology, customer desire, changing economic structure and funding challenges). All of these inform what the Council needs to do across six levers (policy and regulation, spatial and place based planning, network design and optimisation, investment, economic tools, education), either directly or in partnership with others to deliver the Government's objectives for the land transport system.

Figure 9 shows Waka Kotahi's strategic approach.

Figure 9: Waka Kotahi Strategic Approach (source: Waka Kotahi Arataki Version 2)



At a glance the focus of Waka Kotahi in Taranaki is to help create a safer, more resilient transport system that supports economic and regional growth, encourages increased use of public transport, walking and cycling in New Plymouth across all transportation networks. Further information is provided in **Section 4: Growth and Demand** of this AMP.

Arataki Version 2 was released in August 2020 and considers the impacts of the COVID-19 pandemic over the next 10 years on the economic structure and demographic change, as these are two key drivers on the land transport system. Given the relative resilience of the Taranaki economy, no significant changes are expected in the nature, scale and location of transport demand over the medium to long term. The 10 year outlook remains largely unchanged.

2.2.5 Taranaki Regional Council Regional Land Transport Plan

NPDC has been working with Taranaki Regional Council (TRC) to develop the Regional Land Transport Plan (RLTP) for Taranaki 2021-2027. The vision of the document is:

"A vibrant, resilient and connected region, with safe roads and liveable places".

The six transportation focused strategic objectives are:

1. "Integrated – An integrated and collaborative approach to transport and land use planning that maximises transport effectiveness.

2. Enabling – An effective, efficient and resilient land transport system that enhances economic wellbeing, growth and productivity in the Taranaki region and beyond.

3. Safety – A safe transport network increasingly free of death and serious injury.

4. Accessible – A people-focused, multi-modal land transport system that caters for the different and changing needs of transport users, connects communities and enables participation.

5. Resilient and responsive – A land transport system that is robust, responsive to changing needs and resilient to external influences, including climate change.

6. Environmentally sustainable – An energy efficient and environmentally sustainable land transport system."

The headline targets that have been set for the next 10 years (to 2031) to focus on specific elements of the RLTP's 30 year Vision are:

- Improving safety – A reduction in deaths and serious injuries.

- Increasing mode shift – More trips made by walking, cycling and public transport throughout the region.

- Improving reliable connectivity – Less travel disruption for road traffic

A series of policies and measures (methods) have been identified by TRC to achieve the objectives identified above.

2.3 Strategic Local Government Documents

2.3.1 Local Government Act 2002 and Amendments

The LGA sets the statutory requirements for:

- Establishing minimum Levels of Service standards
- Frequency of reviewing Levels of service standards
- Degree of community consultation and level of information provided
- Mandatory performance measures for five infrastructure activities, including transportation
- Requirement to review the cost-effectiveness of the current arrangements for meeting needs of the community
- Identification of council outcomes and priorities for the district or region
- Frequency of the preparation and adoption of the LTP
- Mandatory preparation and adoption of a 30 year Infrastructure Strategy that underpins each LTP

The LGA brought about some significant changes to the way councils operate, with a focus on community consultation and participation and the promotion of social, economic, environmental and cultural wellbeing of communities in the present and in the future.

The enactment of the LGA Amendment Act 2010 has seen a focus towards improved transparency, accountability and financial management, with emphasis in Schedule 10 on financial reporting. Section 3 (1) of Schedule 10 requires that council's report in the LTP the capital expenditure (CAPEX) budgets to:

1. Meet additional demand for an activity

2. Improve the Level of Service

3. Replace existing assets

This has implications for asset management planning, which must address:

- Demand – In relation to estimated additional capacity and the associated costs and funding sources. **Section 4: Growth and Demand** of this AMP covers this in more detail.

- Levels of Service – Intended Levels of Service performance targets and other measures by which actual Levels of Service provision may be meaningfully

assessed, and the estimated costs of achieving and maintaining identified Levels of Service, including sources of funding. **Section 3: Levels of Service** of this AMP covers this in more detail.

- Renewals – Including maintenance renewal and upgrades. This is covered in considerable detail in **Section 6:** Lifecycle of this AMP.

The LGA Amendment Act 2014 requires the development of an Infrastructure Strategy to identify significant infrastructure issues for council's over a 30 year period, the principal options for managing those issues, and the implications of those options. AMPs provide key inputs into the LTP, supporting LTP functions and forecasts as well as providing certain information for the Infrastructure Strategy. Infrastructure assets not only provide an essential platform for economic advancement, but also increasingly deal with recreational, artistic and cultural pursuits to support the wellbeing of communities.

2.3.2 New Plymouth District Council's Strategic Framework 2020

The Council's Strategic Framework is set out below.
The **Vision** is a:

Sustainable lifestyle capital

The **Mission** statement is:

To provide our people with an innovative and resilient district that restores mauri, protects our environment and supports a successful economic transition, while providing quality infrastructure and leadership through operational excellence.

The **Goals** are:

Partnership
Strengthening a treaty based partnership with tangata whenua and building partnerships with not-for-profit, private enterprise, and government to improve outcomes for all.

Delivery
Understanding and balancing our people's needs and wants through prudent delivery of quality infrastructure and services.

Communities
Achieving wellbeing through a safe, creative and active community while embracing Te Ao Maori.

Sustainability
Nurturing our environment, mitigating our impact and adapting to climate change.

Prosperity
Growing a resilient, equitable and sustainable economy where people want to work, live, learn, play and invest across our district.

Four guiding drivers have been identified to guide the Asset Management and Network Planning Team and to prioritise investment in asset infrastructure over the 10 year period of the AMP. The four drivers have been translated into specific asset management objectives as detailed in **Figure 10**.

Figure 10: Guiding drivers and objectives for asset management

Taking care of what we have

Taking care of infrastructure assets means:

- We understand that asset data and evidence based decision making are critical to optimising costs and maximising the value our services bring to our customers
- We protect and enhance public health by providing quality services
- We own and operate infrastructure that is safe for our staff, suppliers and customers

Resilience and responding to climate change

Resilience of assets means:

- Our infrastructure protects and enhances our built environment and creates amenity value
- We provide reliable services and infrastructure that is resilient to natural hazards and adapts to climate change
- We provide system redundancy and emergency back up systems to our critical infrastructure

Planning for growth

Planning and providing for growth means:

- We work in partnership with Tangata Whenua when we plan for our infrastructure
- Our infrastructure is an enabler for economic activity and future growth
- We educate our community so they can make informed choices about how they use our services and manage demand on our infrastructure and services

Meeting the needs of our community and reducing our impact on the environment

Meeting the needs of our community and reducing our impact on the environment means:

- We manage the consumption of energy and associated greenhouse gas emissions to mitigate our impact on climate change.
- We protect and restore the health of our natural environment.
- We manage the use of resources in a sustainable way, minimising waste and seek out opportunities to use wastes as a resource to be reused or recycled

2.3.3 New Plymouth District Blueprint

The New Plymouth District Blueprint (the Blueprint) is a high level spatial plan for the district that supports and implements the Council vision and goals. It will help guide Council decision making to deliver more integrated social, economic and environmental outcomes for the community. The Blueprint is supported by eight key directions that will be the Council's focus for planning during the next 30 years. The directions are summarised below and provide a clear signal to other agencies, businesses, industries and the community on how the Council will focus its resources and deliver on the community outcomes. The key directions are:

- Environment – Enhance the natural environment with biodiversity links and clean waterways
- Communities – Strengthen and connect local communities
- Citizens – Enable engaged and resilient citizens
- Growth – Direct a cohesive growth strategy that strengthens the city and townships
- Industry – Strengthen and manage rural economy, industry, the port and the Airport
- Talent – Grow and diversify new economies that attract and retain entrepreneurs, talented workers and visitors
- Central City – Champion a thriving central city for all
- Destination – Become a world-class destination

2.3.4 New Plymouth District Council Long Term Plan 2021

Information for the LTP is provided in **Table 1** in **Section 1: Introduction** of this AMP and **Section 2.3.1** above.

2.4 Local Government Strategy Documents

2.4.1 New Plymouth District Council Infrastructure Strategy

NPDC's Infrastructure Strategy provides strategic direction for infrastructure assets. The Infrastructure Strategy identifies the significant infrastructure issues the district is likely to face over the next 30 years. The Infrastructure Strategy is not a 30 year budget. Rather, it takes a long term view of the infrastructure and services communities will need over time, and how the Council might provide them.

As well as identifying the key issues, the Infrastructure Strategy details the options for managing these issues and the implications of each of these options. The Infrastructure Strategy identifies the four guiding drivers (see **Section 2.3.2** above), which has led to the following General Infrastructure Problem Statements:

Taking care of what we have (renewals and maintenance)

1. The Council has not operated a comprehensive inspection and condition rating programme resulting in incomplete data and limited knowledge of the actual condition and rate of deterioration of assets and an increased likelihood of asset failures.

2. The Council has not understood the value of asset data and has not developed formal metadata standards to ensure the right data is recorded to support asset management decision making which has resulted in incomplete and inaccurate assets inventories which has in turn caused operational challenges including maintaining an inadequate spares inventory, increased risk of asset failure and an inability to accurately plan for future works.

3. There has been insufficient investment of resources to developing a fit for purpose programme of preventative maintenance schedules which has resulted in many items of plant and equipment receiving no routine servicing which has in turn increased the cost of reactive emergency repairs, voided equipment warranties, shortened the operating

lives of assets, increased the cost of the renewals programme, reduced system performance and increased health, safety and environmental risks.

4. Due to fiscal constraints the level of investment to replace assets was significantly reduced which has resulted in an overall deterioration in the condition of the network, increased risk of asset/system failure, increased reactive maintenance costs and increased risk of environmental damage.

Resilience and responding to climate change

1. When infrastructure has developed, there has been a lack of consideration for natural hazards and poorly defined resilience performance expectations which has resulted in vulnerable infrastructure being constructed in natural hazard zones and a vulnerable system that is linear in nature and has a high number of single-points-of-failure.

2. The Council has not developed and adopted a formal wastewater containment standard that clearly established a basis of design and performance expectations which has resulted in an inconsistent approach to infrastructure development, variable performance and peak capacity, increased risk of sewage overflow and challenges undertaking maintenance because of a lack of any shutdown strategies.

3. Natural topography and layout of infrastructure makes it difficult to complete a trip using alternative transport modes, causing severance of the community and places the network at risk during a major event.

Planning for growth (growth projects)

1. The district's population is growing; however, there is insufficient evidence based understanding of the infrastructure system's capacity and performance and an overreliance on the observational knowledge of field staff to inform future development decisions which has resulted in poor system performance, increased environmental risks, poorly informed investment decisions and barriers to land development.

2. Infrastructure and societal habits encourage motor vehicle usage causing environmental damage, poor health outcomes and unattractive urban spaces.

3. Poor understanding of the value that transport infrastructure provides for the community and regional economy has resulted in poorly targeted investment and missed economic opportunities.

4. The Council has not developed and adopted a fit for purpose regulatory approach to stormwater management that clearly establishes expectations. This has resulted in an inconsistent approach to infrastructure development, variable performance, increased risk of both nuisance and major flooding and environmental damage.

Meeting the needs of our community and reducing our impact on the environment (Levels of Service and Performance)

1. Poor system design, legacy performance issues and a lack of future development considerations, particularly

for older facilities has resulted in poor asset performance, higher operational cost, increased health and safety risks, a lack of capacity to accommodate future development, lack of contingency plans, increased risk of environmental harm and non-compliant with the Council's own bylaws.

2. The communities expectations have changed dramatically over time and what was once acceptable practice is no longer acceptable; however, key parts of the system pre-date Te Mana O Te Wai and were designed and built with little or no cultural consideration and have not been modernised to meet current expectations, as a result, parts of the system and the way it is designed to operate are considered culturally offensive.

3. The infrastructure system disconnects the community and industry from the impact of their consumption and they operate in a way that is energy intensive, consumes lots of chemicals and produces large volumes of waste which results in the consumption of natural resources and discharges to land, air and sea.

4. The Council does not comply with some of its legislative requirements which has resulted in increased health and safety risks, damage to the environment and potential enforcement action.

5. Taking a "safe system" approach to a complex transportation network has resulted in poor actual and perceived safety outcomes.

2.4.2 New Plymouth District Council Strategic Asset Management Plan

The Strategic Asset Management Plan is a high-level overview of the Council's asset management system, policy, plans, lifecycle management, data, improvement programme and risk management processes. It summarises the strategic approach for the significant activity areas, being Transportation, Parks and Open Spaces, Property, Stormwater and Flood Protection, Wastewater, Water Supply, and Waste Management and Minimisation, and describes the general principles that are applied to all types of assets.

2.4.3 New Plymouth District Council Transportation Asset Management Plan

Information for this Transportation AMP, including the different types of transportation assets are contained in **Section 1: Introduction**. The Transportation AMP has links to other AMPs, for example, the Stormwater and Flood Protection AMP, where the Transportation Team manages the assets above ground and the Three Waters Team manages the assets below ground.

2.4.4 Network Operating Plan and Integrated Transport Strategy

The Council has been working on two transport projects to determine how to plan and manage transport for the district over the short and long term periods. The short term planning has been captured in the New Plymouth Network Operating Plan and the long term planning has been captured in the New Plymouth Integrated Transport Strategy.

The Network Operating Plan is a multi-modal transport planning tool that helps to prioritise transport projects throughout the network. This project was recently completed and is one of the tools used to help prioritise transport projects over the next three years.

The Integrated Transport Strategy focuses on the implications of the district's growth and the strategic responses required to meet transport needs over the next 30 years. The project is ongoing; however, the ILM process undertaken at the start of the project has been used to inform the Level of Service measures in Section 3: Levels of Service of this AMP.

2.4.5 Linkages between National, Regional and Local Outcomes

The clear links between the GPS strategic priorities, ONRC customer outcomes, the RLTP and the Council's goals identified above are provided in **Table 2**.

Table 2: The linkages between national, regional and local objectives

GPSLT Strategic Priorities	ONRC Customer Outcomes	RLTP Objectives	Council Goals
Safety: Developing a transport system where no one is killed or seriously injured.	**Safety:** How road users experience the safety of the road.	**Safe:** A safe transport network increasingly free of death and serious injury	**Communities:** Achieving well-being through a safe, creative and active community while embracing Te Ao Maori.
Better travel options: Providing people with better transport options to access social and economic opportunities.	**Accessibility:** The ease with which people are able to reach key destinations and the transport networks available to them, including land use access and network connectivity. **Resilience:** The availability (and restoration) of service to users of each road when there is a weather or emergency event, whether there is an alternative route available and the information provided to the road user. **Amenity:** The level of comfort experienced by the road user and the aesthetic aspects of the road environment that impact on the travel experience of road users in the road corridor.	**Accessible:** A people-focused, multi-modal land transport system that caters for the different and changing needs of transport users, connects communities and enables participation. **Resilient and responsive:** A transport system that is robust, responsive to changing needs and resilient to external influences, including climate change **Integrated:** An integrated and collaborative approach to transport and land use planning that maximises transport effectiveness	**Delivery:** Understanding and balancing our people's needs and wants through prudent delivery of quality infrastructure and services. **Partnerships:** Strengthening a treaty based partnership with tangata whenua and building partnerships with not-for-profit, private enterprise, and government to improve outcomes for all.

GPSLT Strategic Priorities	ONRC Customer Outcomes	RLTP Objectives	Council Goals
Climate change: delivering a low carbon transport system that supports emissions reductions, while incorporating safety and inclusive access.		**Environmentally sustainable:** An energy efficient and environmentally sustainable land transport system.	**Sustainability:** Nurturing our environment, mitigating our impact and adapting to climate change**.**
Improving freight connections: Improving freight connections for economic development.	**Reliability:** The consistency of travel times that road users can expect. **Cost efficiency:** Value for money and whole of life cost will be optimised in the delivery of affordable customer Levels of Service.	**Enabling:** An effective, efficient, and resilient land transport system that enhances economic wellbeing, growth and productivity in the Taranaki region and beyond.	**Prosperity:** Growing a resilient, equitable and sustainable economy where people want to work, live, learn, play and invest across our district.

2.5 Other Key Legislation, Policy and Planning Documents

The following sections provide details for the relevant documents listed below:

- STATUTES

National standards, strategies and statements

- Regional infrastructure vision

- NPDC policies, standards, strategies and guidelines

2.5.1 Statutes

Resource Management Act 1991 and Amendments
The RMA is NZ's primary legislation dealing with the management of natural and physical resources. It provides a national framework to manage land, air, water and soil resources, the coast, subdivision and the control of pollution, contaminants and hazardous substances. In terms of transportation assets compliance with provisions of district and regional plans:

- Resource consents are obtained and / or renewed for all activities requiring a consent, including temporary activities
- All consent conditions are fulfilled and any monitoring is carried out

Civil Defence Emergency Management Act 2002 and Amendments
The Civil Defence Emergency Management Act 2002 requires councils to maintain and annually review emergency management plans that are accepted as being suitable by an independent review.

Building Act 2004 and Amendments
In NZ, the building of houses and other buildings is controlled by the Building Act 2004. It applies to the

construction of new buildings as well as the alteration and demolition of existing buildings.

Health and Safety at Work Act 2015 and Amendments
The objective of the Health and Safety at Work Act 2015 is to promote the prevention of harm to all people at work, and others in, or in the vicinity of, places of work. The Act applies to all NZ workplaces and places duties on employers, the self-employed, employees, principals and others who are in a position to manage or control hazards.

The emphasis of the law is on the systematic management of health and safety at work. It requires employers and others to maintain safe working environments, and implement sound practice.
It recognises that successful health and safety management is best achieved through good faith co-operation in the place of work and, in particular, through the input of those doing the work.

Transit New Zealand Act 1989 and Amendments
Primarily provides a legislative framework for Waka Kotahi, but also includes requirements for other RCA. Section 42H (6) requires district transportation programmes to be in keeping with the national land transport strategy and any relevant regional land transport strategy. Section 42H (7) requires the programme to implement the regional land transport strategy.

Land Transport Act 1998 and Amendments
Controls aspects of road and traffic operations and includes traffic regulations, bylaws, and enforcement.

Traffic Regulations 1976 and Land Transport (Road User) Rule 2004
This legislation details Road Rules and Regulations to be adhered to and monitored. This affects the operation and use of transportation assets e.g. signage, speed limits, parking restrictions, installation of traffic signals (if appropriate in the future), and school patrols.

Land Transport Rule - Setting of Speed Limits 2017
The Rule establishes a new speed setting mechanism that is focussed on assisting RCAs to set safe and appropriate speed limits, in particular in areas where there are high-benefit cost opportunities for the optimisation of safety and efficiency.

Public Works Act 1981 and Amendments
Public works often cannot be carried out without affecting private landowners and their interests in land. For these reasons the Crown has legislative powers to compulsorily acquire land for public works so that public works proposals are not unreasonably delayed. A basic principle of the Act is that no person shall be deprived of land without receiving fair compensation.

Hazardous Substances and New Organisms Act 1996 and Amendments
The Hazardous Substances and New Organisms (HSNO) Act was enacted in 1996 with the hazardous substances related provisions of the HSNO Act coming into force in July 2001. Territorial authorities have an enforcement role in the following areas:

- Premises not covered by the other enforcement agencies (e.g. private dwellings and public spaces)

- Dangerous goods licensing during the transitional period of the HSNO Act
- Enforcing the HSNO Act when enforcing the RMA
- Functions transferred by other enforcement agencies

Telecommunications Act 2001, Electricity Act 1992, Gas Act 1992, Railways Act 2005 and Amendments
Provide utility operators and others with powers to use road corridors.

2.5.2 National Standards, Statements and Strategies

Waka Kotahi's Standards

The Council refers to the relevant documents contained with Waka Kotahi's register of network standards and guidelines – 3 July 2020 (online: www.nzta.govt.nz/resources/nzta-register-network-standards-guidelines/). This document contains up-to-date standards and guidelines in current use throughout NZ, including international documents.

National Policy Statement on Urban Development

The National Policy Statement on Urban Development (NPS-UD) 2020 came into effect on 20 August 2020 and replaced the National Policy Statement on Urban Development Capacity 2016. With some areas of NZ growing quickly, this policy statement aims to support productive and well-functioning cities, with adequate opportunities for land to be developed to meet community business and housing needs.

The major policies in the NPS-UD will impact the transportation network through the following:

- Intensification – Council plans will need to enable greater height and density, particularly in areas of high demand and access
- Car parking – Councils will no longer be able to require developers to provide car parking through their district and city plans
- Responsiveness – Councils must consider private plan changes where they would add significantly to development capacity, good outcomes and are well connected by transport corridors
- Wider outcomes – Councils are directed to give greater consideration to ensuring that cities work for all people and communities. Particular focus is given to access, climate change and housing affordability.
- Strategic planning – Councils are required to work together, produce "Future Development Strategies", which set out the long term strategic vision for accommodating urban growth.
- Evidence and engagement – Councils must use a strong evidence base for their decision making and ensure they engage with Maori, developers and infrastructure providers.

National Policy Statement on Freshwater Management 2020

The National Policy Statement for Freshwater Management (Freshwater NPS) provides local authorities with an updated direction on how they should manage freshwater under the RMA. It came into force on 3 September 2020.

The major policies in the Freshwater NPS will impact the transportation network through the following:

- Construction and maintenance of infrastructure involving works in and around natural wetlands
- Reclamation of rivers

- Natural hazard works
- Works associated with natural wetland research and restoration
- Wetland utility structures
- Fish passage requirements

Road to Zero: New Zealand's Road Safety Strategy 2020-2030

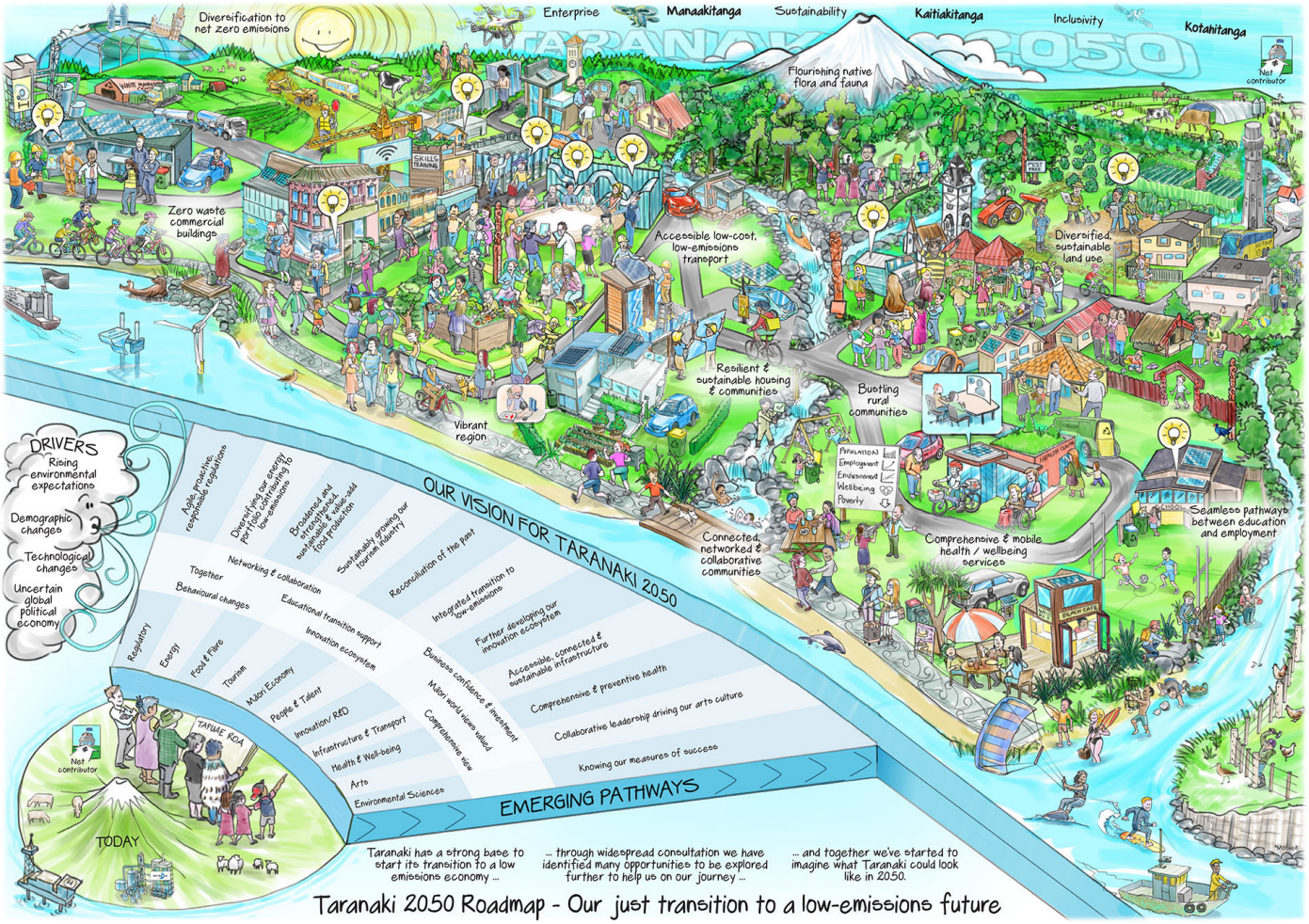
Road to Zero (the Vision Zero Strategy) articulates the Ministry of Transport's vision, guiding principles for how the road network is designed and how road safety decisions are made, as well as targets and outcomes for 2030. The Vision Zero Strategy sets out five areas for focus over the next decade, and a framework for NPDC will hold ourselves to account. The Vision, focus areas and principles are summarised in **Figure 11**.

2.5.3 Taranaki 2050 Infrastructure and Transport Transition Pathway Action Plan

Figure 11. The Vision Zero Strategy (source: Ministry of Transport, Road to Zero: New Zealand's Road Safety Strategy 2020-2030)

In August 2019, Venture Taranaki launched a co-designed Roadmap for how the region will transition to a low-emissions economy by 2050. A collaborative process has been used to further develop detailed actions across the 11 pathways the Roadmap identifies. One of these pathways is Infrastructure and Transport, as demonstrated in Figure 12.

Figure 12: Taranaki 2050 Roadmap



The Infrastructure and Transport Transition Pathway Action Plan describes the actions required to assist transport developments in Taranaki to achieve a low-emissions economy. It is primarily a record of an action framing process held with sector and regional participants in November 2019.

The 2050 Roadmap vision informed the development of an action statement at the Infrastructure and Transport workshops. This was:

"Taking a comprehensive view, design and invest in our entire infrastructure and transport ecosystems so they're integrated, affordable, resilient, sustainable (green), low emissions and inclusive for community well-being and commercial use by 2050. This will also provide meaningful and secure work, and community opportunities for generations to come".

When participants reviewed the action statement against where things were currently at, the following focus areas were apparent:

1. Uncertainty of what infrastructure will be needed in the future to support the new economy
2. Affordability of the large amount of infrastructure renewal
3. Future workforce gaps to build and maintain infrastructure
4. The transport and infrastructure's contribution to emissions and sustainability goals
5. The importance of narrowing the digital divide

Based on the focus areas described, the following nine actions have been identified in order to achieve the 2050 vision:

1. Scenario planning to support an Infrastructure Strategy
2. A Taranaki infrastructure strategy
3. Recruitment pathways
4. Workforce skills hub
5. Advise on Taranaki's 2021-2027 RLTP
6. Community education platform
7. Fully digitally connected Taranaki
8. Competent digital citizens
9. Maximising data and information sharing

2.5.4 New Plymouth District Council policies, standards, strategies and guidelines

Table 3 details NPDC's relevant policies, standards, strategies and guidelines.

Table 3: Relevant NPDC policies, standards, strategies and guidelines

Document Name	Year	Purpose
Policies and Plans		
District Tree Policy	2006	The purpose of this policy is to outline the Council mandate regarding the stewardship of its tree resource and to provide consistency in decision making on the management of trees and bush remnants on Council administered land.
Enforcement of Vehicle Safety Requirements Policy	2001	The purpose of this policy is to authorise the Council's enforcement officers to issue infringement notices for invalid vehicle warrants of fitness, certificates of fitness and vehicle registrations.
Maintenance and Management of Formed Roads Policy	2012	To clarify the location and extent of formed roads the Council maintains and manages within the district.
Procurement Policy	2019	The purpose of this policy is to provide guidance to suppliers and Council staff to achieve the outcomes of the LTP and vision for the future. This policy provides clear intentions to suppliers, contractors and the community on the key areas the Council will consider throughout the procurement process. This policy and the Council's procurement manual outline the strategic approach that the Council will take to planning, sourcing and managing its procurement activities. The Council is committed to negotiating with suppliers in a fair, open and transparent manner, while ensuring maximum value for the procurement of goods, works and services.

Document Name	Year	Purpose
Policies and Plans		
Provision of Parking Facility on Road Reserve Policy	2012	The Council receives requests from schools, sports clubs and other community organisations to provide parking facilities on road reserves. This policy clarifies the Council's position on providing such facilities.
Temporary Road Closure and Disruption to Traffic Policy and Guidelines	2012	The purpose of this policy is to provide guidelines on the application process and rules pertaining to the closure of roads. The policy focuses on the temporary closure of roads and/or disruption to traffic for events and does not replace any legal requirements/implications relating to this.
Advertising Signs on Reserves Policy	2012	This policy outlines when and where advertising signage is permitted on NPDC reserves.
Closed Circuit Television (CCTV) Policy	2012	This policy outlines how the Council operates CCTV on NPDC owned and administrated locations (managed through the Transportation Team).
Milk Tanker Entranceways Policy	1997	This policy sets out the construction standards and NPDC's contribution to milk tanker entranceways.
District Plan	Operative 2005. The current Proposed District Plan (2019) has recently completed the consultation exercises	The District Plan includes objectives, policies and rules that manage the adverse effects of activities on the environment with a focus on land use and subdivision activities.
Emergency management plans	Various	The emergency management plans set out the required actions for the Council teams to effectively mitigate, prepare for and respond to a major emergency involving the Council's operations and activities.

Document Name	Year	Purpose
Standards		
Land Development and Subdivision Infrastructure Standard (local Amendments Version 3)	2019	This is based on the NZS4404:2010 – Land Development and Subdivision Standard. It sets out the minimum standards of technical performance and quality for the subdivision and development of land and infrastructure.
National Code of Practice for Utility Operators' Access to Transport Corridors	2019	The code sets out the processes and procedures for utility operations to exercise their right to the road corridor for the placement, maintenance, improvement and removal or utility structures.
Code of Practice for Temporary Traffic Management	2020	This is Waka Kotahi's best practice guideline and statutory requirements for temporary traffic management in NZ.

Document Name	Year	Purpose
Strategies and Guidelines		
Austroads guidelines	Various	Austroads guides provide practical advice on the design, management and operation of road transport networks. The guidelines are funded by the Australian and NZ Governments and are continually updated based upon ongoing international and local research.
Accessibility Strategy	2009	This strategy sets out how the Council will contribute towards making the district more inclusive and accessible.
Art in Public Spaces Strategy	2008	The vision behind this strategy is for the district to be recognised nationally and internationally for excellence in public art. Art works in public places will be high quality public amenities that celebrate and enhance local culture, heritage and the environment.
Cycle Strategy	2007	This strategy sets priorities to plan, manage and promote cycling in the district. The goal is for New Plymouth to be “attractive and accessible for cycling for commuting and recreational journeys alike”.
Major Events Strategy	2010	This strategy is to ensure that the district’s limited resources are used as efficiently and effectively as possible to generate benefits for the community and those visiting the district.
New Plymouth Central Area Urban Design Framework	2013	This framework aims to better integrate, advise and direct the development of the Central Area in such a way as to achieve good urban design outcomes.
Parking Strategy	2013	The Council has prepared this strategy as a framework for how it will provide for and manage parking in the next 10 years.
New Plymouth Open Space, Sport and Recreation Strategy	2015	Sets the strategic direction for Council owned facilities, open spaces and features within them.

2.6 Partners and Key Stakeholders

The transportation services provided depend on the Levels of Service determined by the community. How the services are provided is determined by the Council in response to the requirements of both the key stakeholders and legislation. Key stakeholders are broadly defined as:

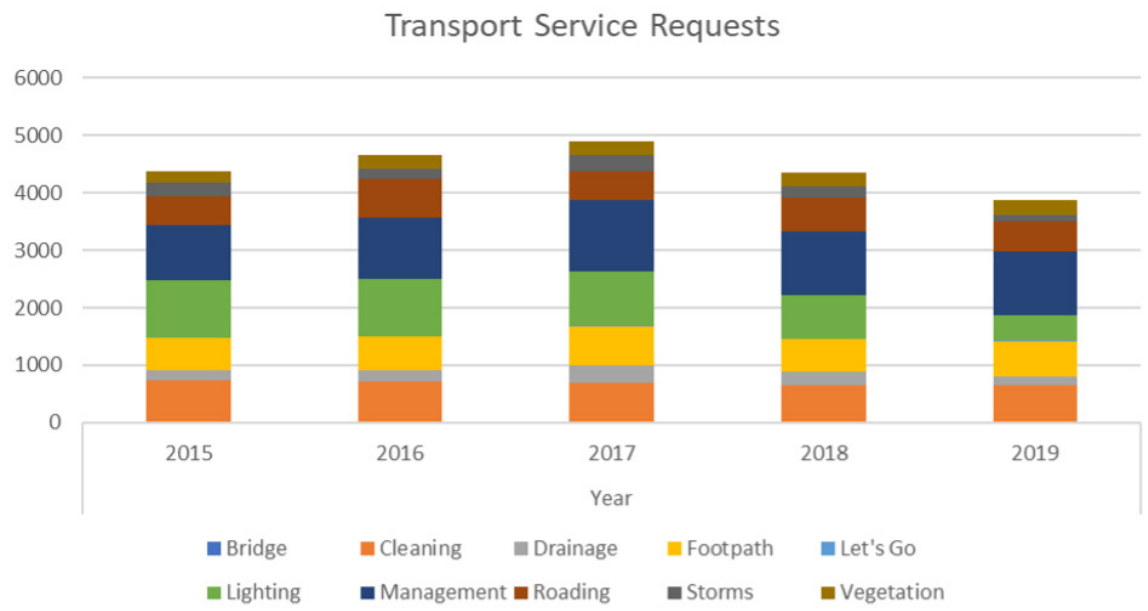
- Customers
- Elected members
- Other stakeholders (internal and external)

Customers

As part of the Council's systems thinking approach, all public calls to the Council regarding transportation are recorded and trends are monitored. A review of public calls and emails with respect to the transportation network in 2019 confirmed that the vision and core values remain current.

As the Council has improved its workflow and processes, the number of calls or emails on what matters to customers has shifted from efficient work practises and quality outcomes to timely intervention and informed customers. This reflects where effort has been placed in the past. **Figure 13** shows the types of calls received over the past five years.

Figure 13: Calls to NPDC for transport related service requests



The numbers of calls and emails are tracked, with an objective of reducing the number of calls over time and in a timely manner. A reducing trend indicates that the Council is delivering the vision and meeting core values. A reduction in the number of calls also assists to improve efficiency as work can be undertaken in a more coordinated, proactive manner rather than in a reactive manner.

The categories where the number of calls have significantly reduced are street lighting and storm events. The reduction in calls relating to street lighting is most likely due to the implementation of light-emitting diode (LED) street lighting in 2016. The reduction in calls due to storm events is in part due to fewer storm events in 2019 and a more resilient transportation network.

Elected Members

Elected members have a vital interest in transportation assets and represent the needs and views of the community. These are the Mayor, Councillors, Community Board and Committee Members.

Stakeholders - Internal

These are internal parties with an interest in the management of NPDC transportation assets:

- Staff from NPDC Transportation and Infrastructure Asset Management teams
- Regulatory and Customer Services
- Policy and Planning Officers
- Financial and Business Services staff
- Internal Auditors

Stakeholders – External

These are parties with an interest in the management of NPDC transportation assets, and include (but are not limited to):

- The community using the transportation network
- Iwi groups
- Waka Kotahi
- Ministry of Transport
- TRC
- Utility companies

3 Levels of Service

3.1 Introduction

Asset management planning enables the relationship between Levels of Service and the cost of the service (the price / quality relationship) to be determined. This relationship is then evaluated in consultation with the community to determine the Levels of Service they are prepared to pay for.

Levels of Service standards define the levels to which NPDC provides services to the community. Some standards are defined by industry guidelines (i.e. ONRC) and others are defined in conjunction with the community and key stakeholders. These standards (or Levels of Service) provide a basis for determining whether assets need to be constructed, replaced, remanufactured, or maintained and if they assist delivery of road transportation outcomes. Levels of Service enable the Council's performance to be measured and reported against.

This section defines the Levels of Service the Council delivers to its customers and the measures which are used to identify the Council's performance in delivering these. It also identifies how Levels of Service for transportation activities contribute to the GPSLT, ONRC, RLTP, Infrastructure Strategy and the Council's overarching goals, as well as details behind each of the Level of Service themes and where there are currently gaps in the knowledge of activities.

Figure 14 shows the high level strategic linkages for Levels of Service.

Figure 14: High level strategic linkages for Levels of service

Transportation Levels of Service measures are provided by Waka Kotahi. As part of the process of embedding the ONRC in the management of the district's roads, the way in which the Council has defined Levels of Service has changed.

Section 2.4.5 sets out the ONRC's six Customer Outcomes. The expected customer experience for each road classification is defined for each of these outcomes. The Council then defines the outputs necessary to ensure the customer experience on the NPDC transportation network is consistent with these expectations.

In summary, defined Levels of Service are used to:

- Inform customers of the proposed Level of Service
- Develop asset management strategies to deliver Levels of Service
- Measure performance against defined Levels of Service
- Identify the costs and benefits of services offered
- Enable customers to assess reliability, simplicity, quality, friendliness, and convenience to further streamline the process

In this context Levels of Service define the quality of delivery for a particular activity or service against which service performance can be measured.

3.2 New Plymouth's Problems and Opportunities

This section presents the investment story. It defines the problems and benefits of investment that were identified through the ILM process and Point of Entry discussion as described in the Strategic Asset Management Plan.

3.2.1 Investment Logic Mapping Process

ILM is a series of structured workshops that bring together key stakeholders to ensure that there is early agreement on problems, outcomes and benefits before any investment decisions are made or a specific solution is identified. This process puts an emphasis on gaining a clear understanding of the problem, the consequence of the problem and the desired benefits – before looking at possible solutions.

The output of an ILM is usually a one-page investment story that sets out the problems and benefits in straightforward language that all stakeholders can understand.

The ILM process was undertaken at the start of the Integrated Transport Strategy project. As outlined in **Section 2.4.4** of this AMP, the Integrated Transport Strategy began in 2019, with the aim of understanding the implications of the district's growth and the strategic responses required to meet transport needs over the next 30 years.

This project is building upon Keeping New Plymouth Moving and Growing Business Case (2016). Following this initial study, the GPSLT has shifted away from increasing capacity of roads to a more sustainable approach with a strong emphasis on mode shift. As a result, the Integrated Transport Strategy required a new ILM process.

3.2.2 Defining the Problems

The first step in the ILM process is to define the problems. The problems are the reasons that action needs to be considered at this time. It is couched in negative terms and each problem statement should capture the essence of what is broken and the consequence.

At the first workshop, the stakeholders identified a significant list of problems with the existing transportation network in the district. These problems covered all modes of transport, and were condensed into the following four problem statements:

1. **Natural topography and layout of infrastructure makes it difficult to complete a trip using alternative transport modes, causing severance of the community and places the network at risk during a major event.**

   The district is dissected by numerous river valleys resulting in undulating topography, which provides additional challenges for pedestrians and cyclists. Transport links are currently formed where there are bridges, thus channelling users to network pinch points. The CBD is separated from urban New Plymouth by State Highway 45 (SH45) (the one-way system), which carries a significant number of daily freight movements to and from Port Taranaki parallel to the waterfront. In this location, it forms a barrier for people walking or cycling from the outer suburbs to the waterfront, a key facility for people moving east-to-west on sustainable modes of transport.

2. **Not taking a "safe system" approach to a complex network has resulted in poor actual and perceived safety outcomes.**

   The number of serious and fatal crashes in the district has been increasing. Previously the focus has been on addressing specific crash types; however, it is now recognised that due to the random nature of the crashes in the district a safe system approach to address the complex network is required.

3. **Poor understanding of the value that our transport infrastructure provides for our community and regional economy has resulted in poorly targeted investment and missed economic opportunities.**

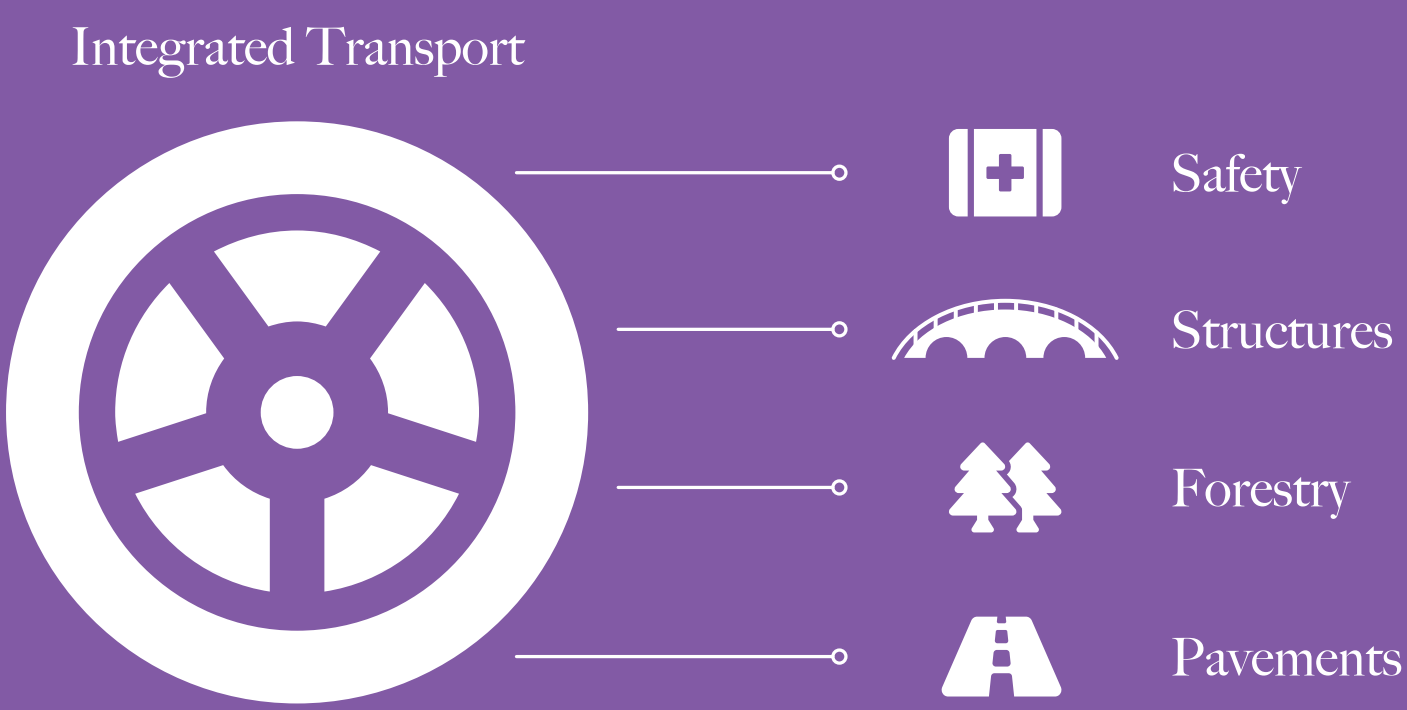
   The transportation network provides a vital link to significant industry across the region. An economic assessment of this industry was completed in 2019 and found that the investment required to maintain these links was not previously well understood and that NPDC is currently missing economic opportunities through deterioration of the network. Of particular concern is the condition of the bridge and structures throughout the network and the anticipated increase in forestry traffic over the next 10 years.

4. **Infrastructure and societal habits encourage motor vehicle usage causing environmental damage, poor health outcomes and unattractive urban spaces.**

   Public car parking is readily available, at a low cost (or free), throughout the city and town centres across the district which encourages the use of vehicles over more sustainable modes. The available public transport has a poor perception by some of the community. The freight network relies heavily upon the road network instead of the more sustainable rail network.

Across the four problems statements there is a lack of integrated transport planning to ensure that everyone can move safety throughout the district, and that all development is accessible by variety of transport options. Improving integrated transport is fundamental to the problems identified above. Figure 15 provides a summary of the key issues from the problem statements and these issues are discussed further in the AMP as funding is allocated to the major transportation projects over the next 10 years.

Figure 15: Key issues from the problem statements



The key issues are carried throughout this AMP and the details on them are summarised as follows:

	**Integrated transport** Everyone should to be able to move safety throughout the District. To achieve this land development needs to be in line with Council strategy and a variety of travel options needs to be available to everyone.
	**Safety** A safe system approach to road safety needs to be considered in all planned work
	**Structures** The condition of bridges and structures throughout the network has significantly deteriorated due to underinvestment in recent years.
	**Forestry** The anticipated increase in forestry traffic over the next 10 years will put a significant load onto the rural road network. The maintenance on these roads is likely to increase significantly and will require ongoing management.
	**Pavement** The performance of Arterial roads is worsening and the performance of Collector roads is currently improving. The Council wants to maintain a higher Level of Service for higher classification and trafficked roads as this provides a greater benefit to a greater number of people.

While the available evidence supports the problems identified, it is recognised that there are gaps in the evidence, particularly in relation to how the transportation network will perform with increasing growth traffic volumes and the potential impact on travel times. The evidence and gaps are addressed in **Section 3.3** below.

3.2.3 Identifying Benefits

With the problems defined the next workshop was held to identify the benefits of solving the problems. It is important that the potential benefits of successfully investing can be assessed and measured. They are needed to evaluate the success of addressing the issues or opportunities once an investment has been implemented. The benefit statements and reasoning for each benefit are as follows:

1. **Improved network performance**
   Ensuring the performance of the network for all modes of travel accommodates future growth was identified as a benefit.

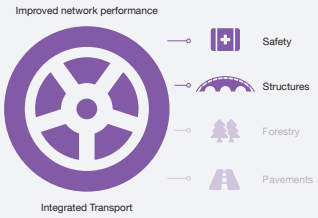
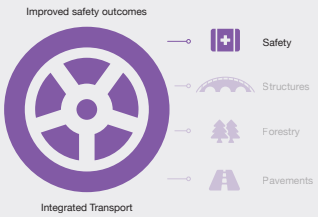
2. **Improved safety outcomes**
   New Plymouth's medium to high rate of deaths and serious injuries was identified as requiring immediate focus.

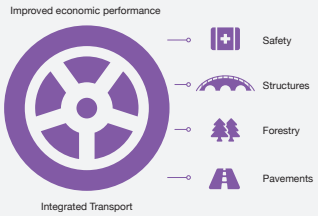
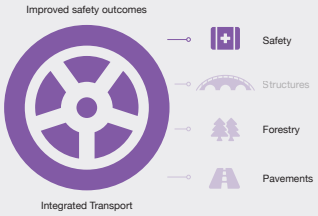
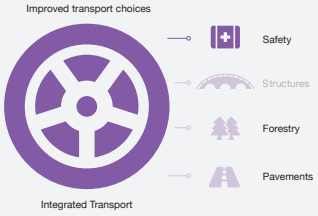
3. **Improved economic outcomes**
   It was agreed that the existing transportation network would stifle growth and limit private investment.

4. **Improved transport choices**
   A well-connected network has been identified as highly desirable strategic direction for the district.

The alignment of the identified problems and benefits is provided in **Table 4**.

Table 4: Integrated Transport Strtegy problem and benefit statements

Problem Statements	Benefit Statements	Strategic Response	Consequence of not adopting the recommended programme
Natural topography and layout of infrastructure makes it difficult to complete a trip using alternative transport modes, causing severance of the community and places the network at risk during a major event.		**Change risk profile:** Accepting greater risk across the network based upon the ONRC road classification.	Users of high volume roads will have a worse travel experience. The number of fatal and serious injury crashes will increase. Unplanned events will close more roads.
National Code of Practice for Utility Operators' Access to Transport Corridors		**Programme adjustment:** Continue driver behaviour change programme. Develop network wide safety auditing of high risk trends. **Change risk profile:** Carry on implementing the Vision Zero strategy.	The number of fatal and serious injury crashes will continue to increase.

Problem Statements	Benefit Statements	Strategic Response	Consequence of not adopting the recommended programme
Poor understanding of the value that our transport infrastructure provides for our community and regional economy has resulted in poorly targeted investment and missed economic opportunities.		**Change risk profile:** Accepting greater risk across the network based upon the ONRC road classification.	Users of high volume roads will have a worse travel experience. The number of fatal and serious injury crashes will increase. Unplanned events will close more roads.
National Code of Practice for Utility Operators' Access to Transport Corridors		**Policy approach:** creating new and updating existing policies to support good asset management practices. **Programme adjustment:** Adjust activity work categories for good asset management practices. **Improve value for money:** Identify where the life of an asset can be extended at no or minimal extra cost. **Relationship approach:** Improve the relationship with Waka Kotahi and Councillors through more reliable data that provides better guidance for decision makers.	This will lead to poor economic decisions and funding will not be available to operate, maintain and renew assets. Poor communication will result in decision makers rejecting applications, sub-optimal decision making and projects not proceeding.
Infrastructure and societal habits encourage motor vehicle usage causing environmental damage, poor health outcomes and unattractive urban spaces.		**Policy approach:** Ensure any new policy encourages active modes of transport. **Programme adjustment:** Increased active transport mode share.	An increase in motor vehicle usage, will result in poor health outcomes, no alignment with global and national environmental sustainability targets and unattractive urban spaces.

3.2.4 Strategic Alignment of Benefits

The problems and benefits identified in the ILM processes align strategically very well with the GPSLT. This alignment is evident in Table 5.

Table 5: Alignment of Strategic Case With GPSLT and the Integrated Transport Strategy benefits

GPSLT - Priorities	Integrated Transport Strategy - Benefits
• Safety • Better travel options • Climate change • Improving freight connections	• Improved safety outcomes • Improved economic outcomes • Improved transport choices • Improved network performance

3.2.5 Investment Key Performance Indicators and Measures

Following the ILM workshops Investment Key Performance Indicators (KPIs) and their measures were identified for each of the benefits. A number of these measures are the same as those identified in the 2021-2031 LTP. The specific KPIs that relate to the Integrated Transport Strategy ILM are provided in **Table 6**.

Table 6: Integrated Transport Strategy ILM summary

Benefits	Investment KPIs	Measures
Improved safety outcomes	Improved actual safety	Decrease in the number of deaths and serious injury crashes
	Improved safety perception	Improvement in user safety perception percentage rating obtained via survey
Improved economic outcomes	Transportation network supports future growth	Percentage of residents satisfied with the overall quality of the district's roads.
Improved transport choices	Increased use of alternative modes	Increase in modal share for alternative modes
	Improved community perception	Improvement in community satisfaction rating with alternative mode infrastructure servicing the district.
	Improved alternative mode infrastructure	Increase in length of alternative mode infrastructure available within the district.
Improved network performance	Improved network resilience	The percentage of the sealed local road network that is resurfaced.

3.2.6 New Plymouth District Council Service Level Targets and Performance

The Transportation Service draws on a number of performance measures defined by the Council and prescribed by the ONRC and the Department of Internal Affairs (DIA) non-financial performance measures in order to measure and manage the transportation service levels and standardise road network performance.

The performance targets have been grouped by theme, and align with the ONRC, for following areas:

1. **Safety:** How road users experience the safety of the road

2. **Resilience:** The availability and restoration of each road when there is a weather or emergency event, whether there is an alternative route available and the road user information provided

3. **Amenity:** The level of travel comfort experienced by the road user and the aesthetic aspects of the road environment (e.g. cleanliness, comfort/convenience, security) that impact on the travel experience of road users in the road corridor

4. **Accessibility and Sustainability:** The ease with which people are able to reach key destinations and the transport networks available to them, including land use access and network connectivity

Table 7 details the source of the performance measure and groups them into the service level themes above which have been defined to enable linkage between the Council's Levels of Service and those defined by the ONRC framework and DIA.

Any changes to the Level of Service KPIs needs to be approved by Councillor's through the official NPDC process. The Level of Service targets reported in **Table 7** have not changed from those reported in the 2018 - 2028 LTP.

Table 7: Level of Service Measures

Level of Service (NPDC provide)	No.	Performance Measure	Source
Safety [1] We provide a local roading network that is safe for all road users	1.	Number of fatal and serious injuries on the network[1]	ONRC
	2.	Number of fatal and serious injury crashes on the network[2]	DIA
	3.	Number of fatal and serious injuries to vulnerable users[1]	ONRC
Resilience [3] We appropriately maintain the district's sealed roads	4.	The minimum percentage of the sealed local road network that is resurfaced	DIA
Amenity [2] We provide good quality district roads [5] We respond to service requests in a timely manner	5.	Smooth Travel Exposure (STE) - roughness of the road (% of travel on sealed roads which are smoother than a defined threshold)[1]	ONRC and DIA
	6.	Sealed road peak roughness (National Association of Australian State Roading Authority (NAASRA) Threshold)[1]	ONRC
	7.	Sealed road average roughness[1]	NPDC
	8.	The percentage of customer service requests relating to roads and footpaths to which	DIA
		the territorial authority responds within the timeframe specified in the LTP[3]	

Actual (Financial Year 2019/20)	Target 2021/22	Target 2022/23	Target 2023/24	By 2030/31
27 no.	Reducing	Reducing	Reducing	16 no.
25 no.	Reducing	Reducing	Reducing	16 no.
12 no.	Reducing	Reducing	Reducing	7 no.
4.0%	4.0%	4.0%	4.0%	4.0%
Arterial: 72.4% Primary Collector: 88.3% Secondary Collector: 88.8% Access: 88.2% Low Volume: 92.9%	90±2%	90±2%	90±2%	90±2%
Urban Arterial: 134 no. Primary: 127 no. Secondary: 143 no. Access: 144 no. Low Volume: 148 no.	Urban Arterial: 130 no. Primary: 140 no. Secondary: 140 no. Access: 150 no. Low Volume: 170 no.			
Rural Primary: 96 no. Secondary: 121 no. Access: 139 no. Low Volume: 156 no.	Rural Primary: 120 no. Secondary: 130 no. Access: 150 no. Low Volume: 180 no.			
Average 105 no.	<110 no.	<110 no.	<110 no.	<110 no.
97.8%	95%	95%	95%	95%

Table 7: Level of Service Measures

Level of Service (NPDC provide)	No.	Performance Measure	Source
	9.	Percentage of residents satisfied with the overall quality of the district's roads[4]	NPDC
Accessibility and Sustainability 4] We provide a high quality and safe footpath network	10.	The percentage of residents satisfied with the quality and safety of the district's cycle network [4]	NPDC
[6] We provide a quality and safe cycle network	11.	The percentage of footpaths that meet the Levels of Service and service standards in current condition surveys, as set out in this AMP[5]	DIA
	12.	Proportion of network not available to Class 1 heavy vehicles and 50MAX vehicles	ONRC

1. ONRC Safety Customer Outcome 1. Data from Waka Kotahi's ONRC Performance Measures Reporting Tool as at 9/7/2020 for the 2018/19 financial year. Further details about STE are provided in Section 6: Lifecycle of this AMP.
2. Data from Waka Kotahi's Crash Analysis System 9/7/2020
3. Data from NPDC. Service request timeframes:
   - One day for an electrical fault with traffic signals, flooding, diesel spills, chemical spills or a slip to be cleared
   - Three days for street lighting faults and potholes
   - Five days for traffic counts, bus shelter repairs, road marking enquiries, culvert maintenance, rubbish bins, reinstatement of footpaths and debris in the roadside channel
   - Ten days for road surface faults, kerb and channel repairs, new kerb and channel, missing road signs and vegetation clearing
4. Data from Research First (RF) survey.
5. International Infrastructure Management Manual (IIMM) condition grading 1 to 2 are considered excellent and good condition. Unlike previous years where only a 10% representative sample of the network was rated, a full network condition rating was carried out in 2019. A complete network condition rating will be undertaken every five years (information about condition grading is located in Section 6: Lifecycle of this AMP).

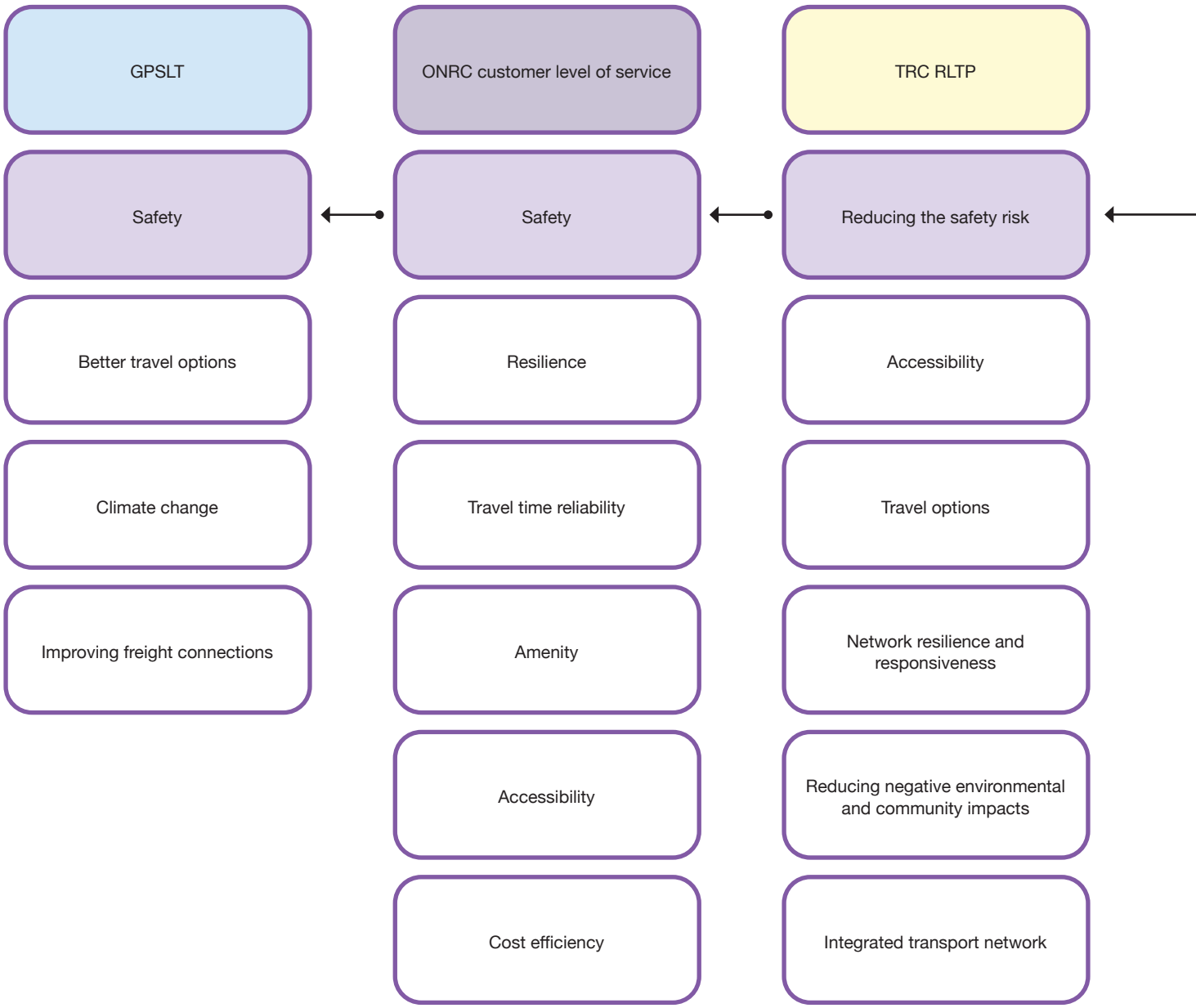
Actual (Financial Year 2019/20)	Target 2021/22	Target 2022/23	Target 2023/24	By 2030/31
78%	85%	85%	85%	85%
84%	85%	85%	85%	85%
88% Good or excellent 0.3% Failed	> 90% of footpath length surveyed in good or excellent condition. Less than 1% of footpath length failed.			
26%	25%	25%	25%	25%

3.2.7 Level of Service Summary

Figures 16 to 19 below show how the Levels of Service identified above are linked across national, regional and local levels.

Figure 16: Safety performance measures links to GPSLT, ONRC, TRC RLTP, Council goals and Levels of Service

Safety



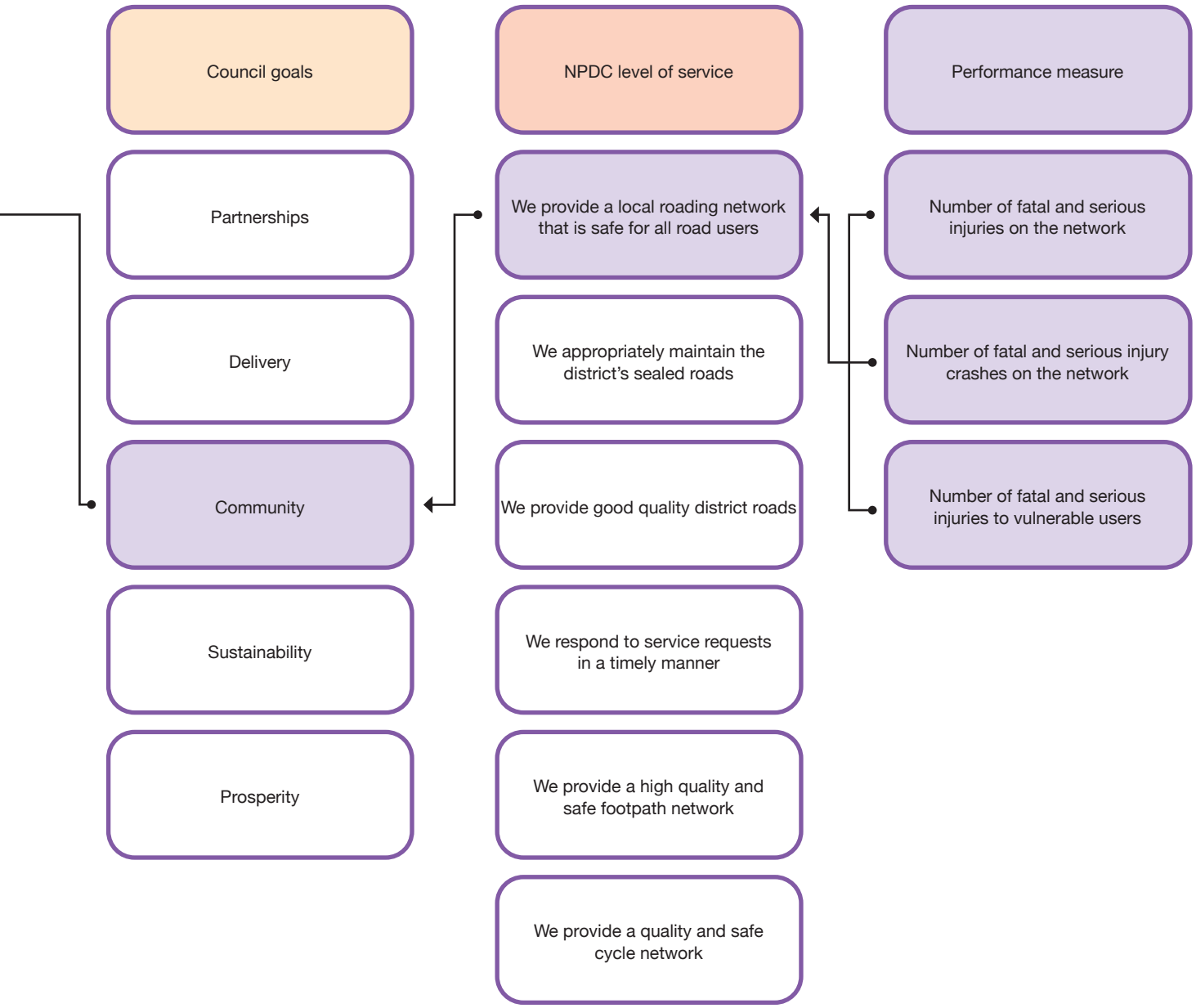
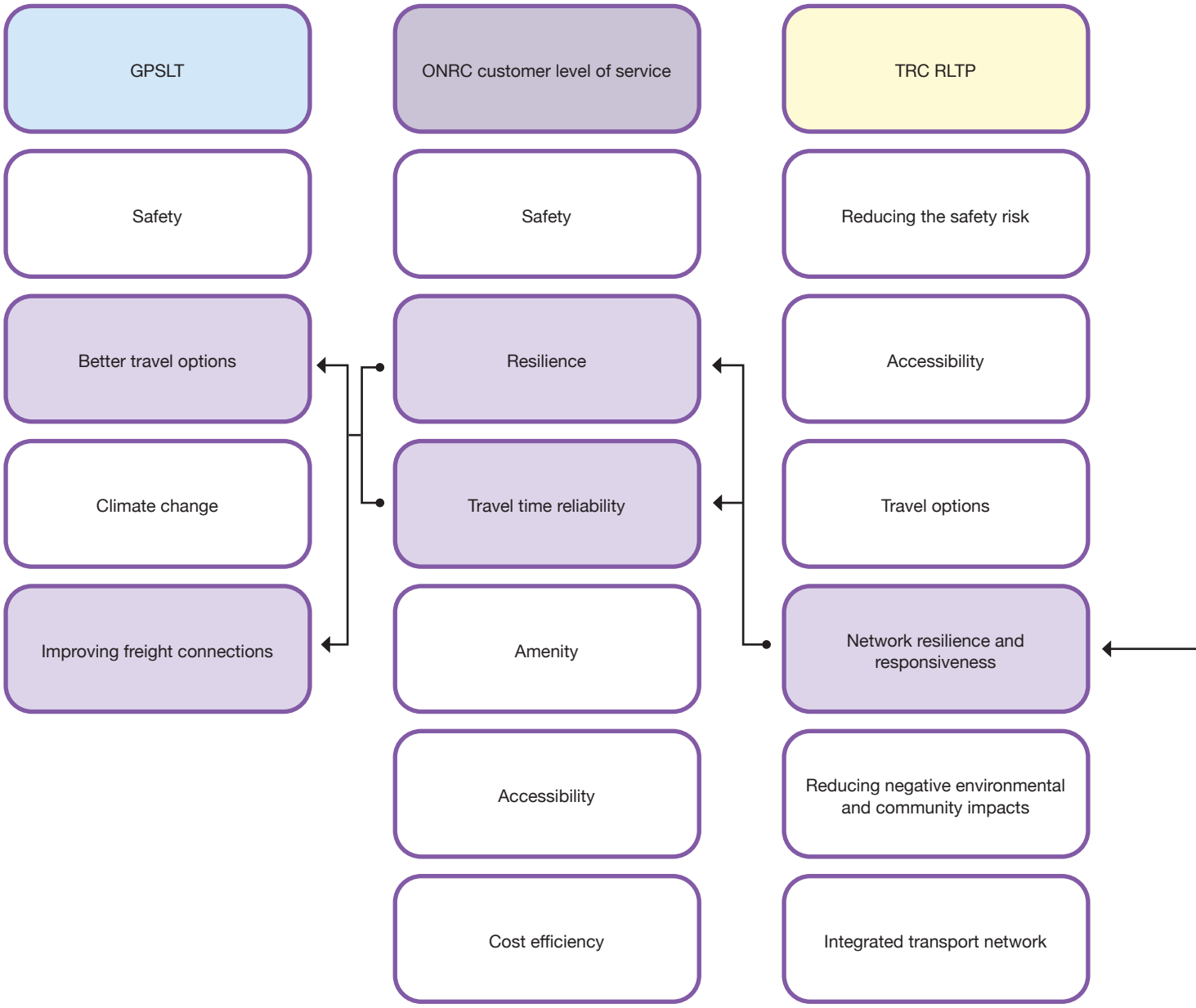

Council goals
Partnerships
Delivery
Community
Sustainability
Prosperity
NPDC level of service
We provide a local roading network that is safe for all road users
We appropriately maintain the district's sealed roads
We provide good quality district roads
We respond to service requests in a timely manner
We provide a high quality and safe footpath network
We provide a quality and safe cycle network
Performance measure
Number of fatal and serious injuries on the network
Number of fatal and serious injury crashes on the network
Number of fatal and serious injuries to vulnerable users

Figure 17: Resilience performance measures links to GPSLT, ONRC, TRC RLTP, Council goals and Levels of Service

Resilience



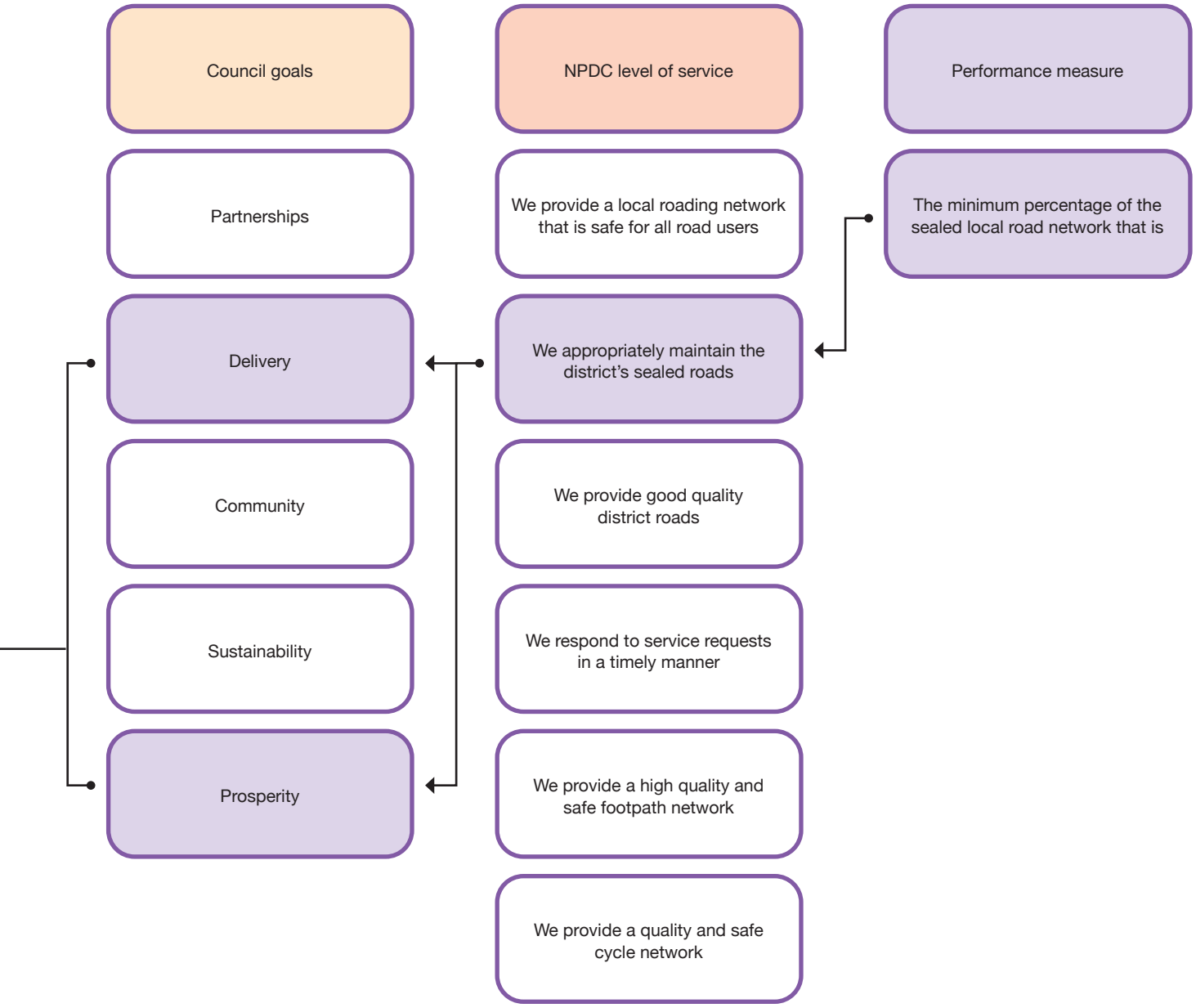
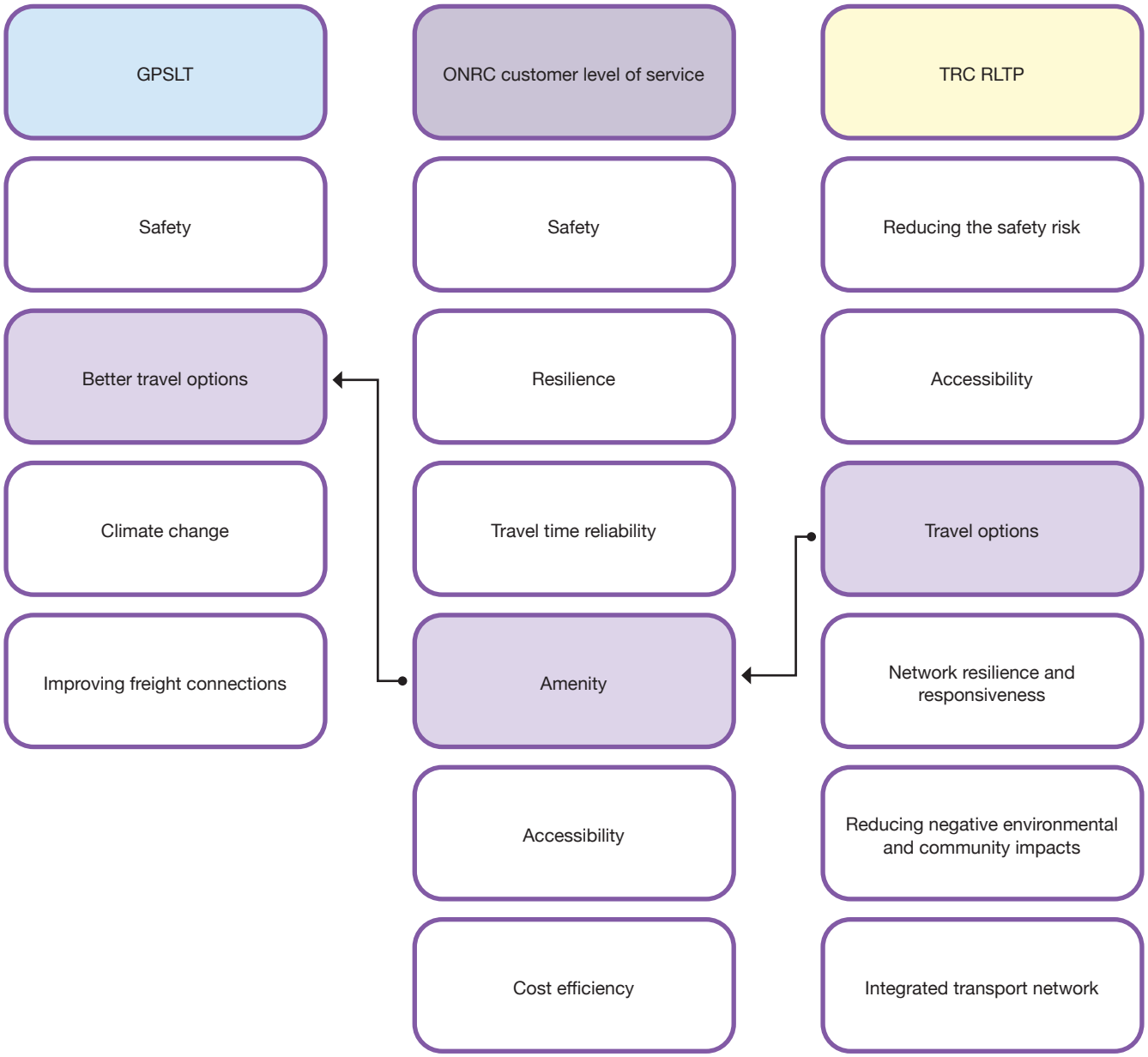

Council goals
NPDC level of service
Performance measure
Partnerships
We provide a local roading network that is safe for all road users
The minimum percentage of the sealed local road network that is
Delivery
We appropriately maintain the district's sealed roads
Community
We provide good quality district roads
Sustainability
We respond to service requests in a timely manner
Prosperity
We provide a high quality and safe footpath network
We provide a quality and safe cycle network

Figure 18: Amenity performance measures links to GPSLT, ONRC, TRC RLTP, Council goals and Levels of Service

Amenity



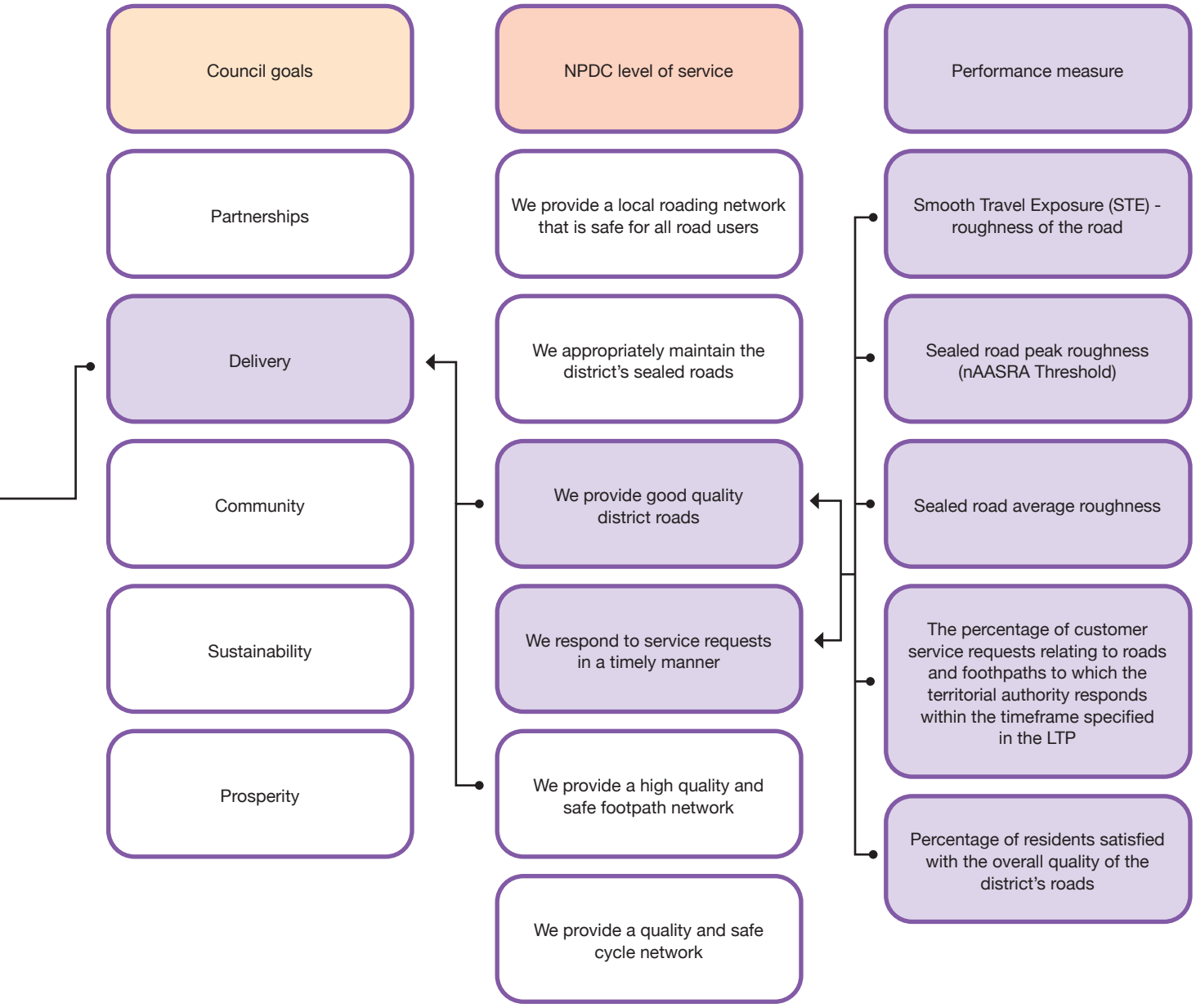
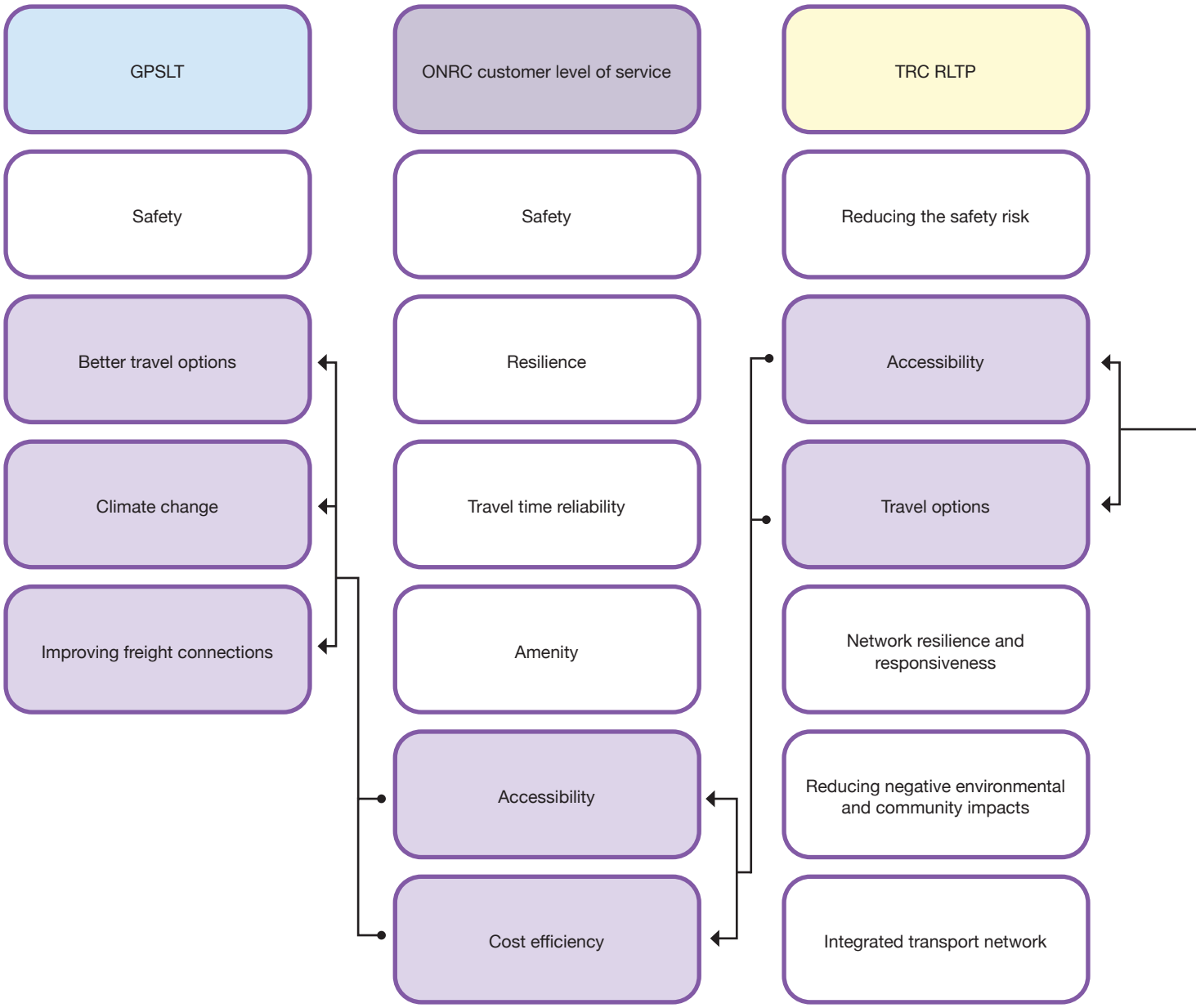
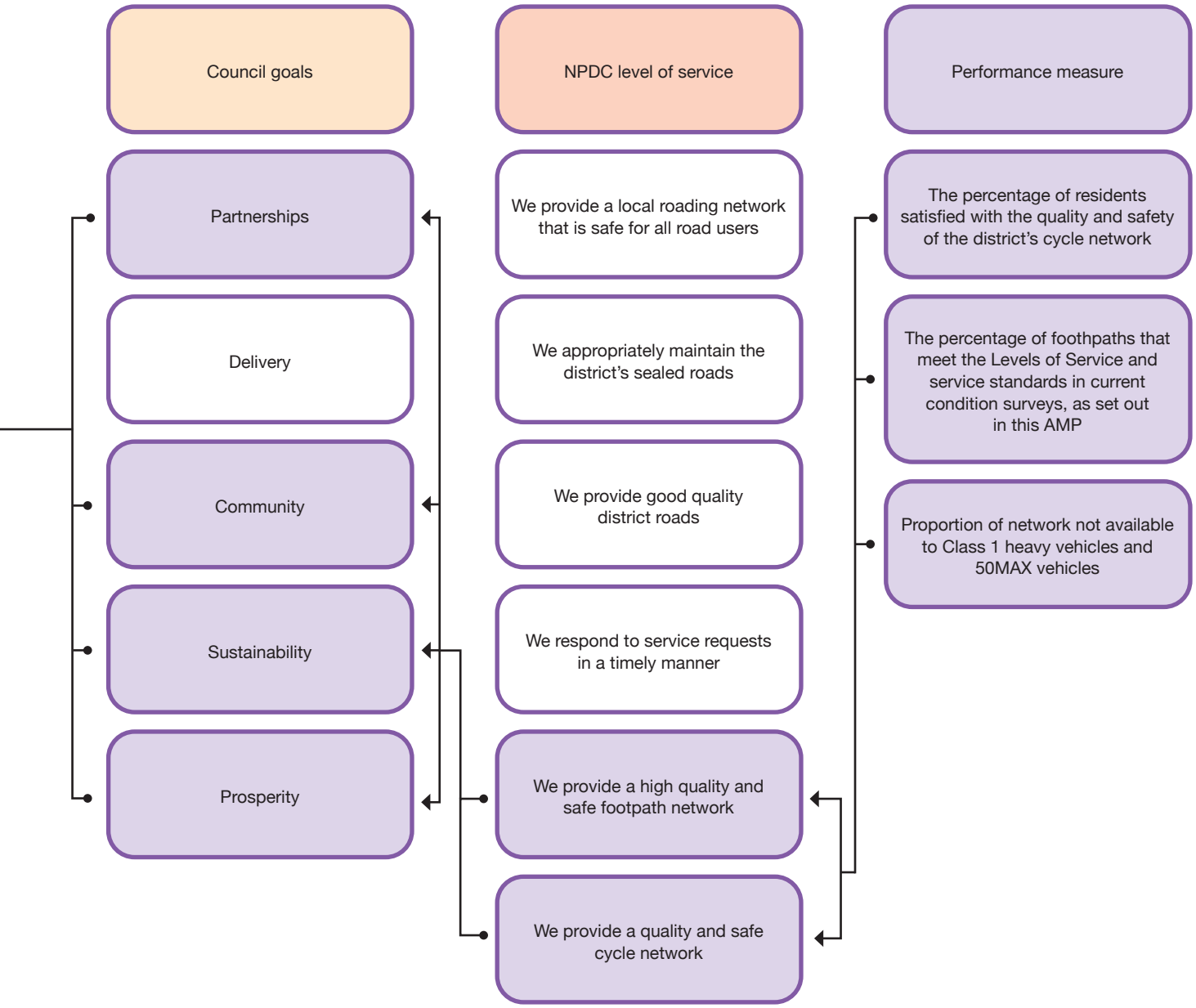

Council goals
Partnerships
Delivery
Community
Sustainability
Prosperity
NPDC level of service
We provide a local roading network that is safe for all road users
We appropriately maintain the district's sealed roads
We provide good quality district roads
We respond to service requests in a timely manner
We provide a high quality and safe footpath network
We provide a quality and safe cycle network
Performance measure
Smooth Travel Exposure (STE) - roughness of the road
Sealed road peak roughness (nAASRA Threshold)
Sealed road average roughness
The percentage of customer service requests relating to roads and foothpaths to which the territorial authority responds within the timeframe specified in the LTP
Percentage of residents satisfied with the overall quality of the district's roads

Figure 19: Accessibility and sustainability performance measures links to GPSLT, ONRC, TRC RLTP, Council goals and Levels of Service

Accessibility and Sustainability




Council goals
NPDC level of service
Performance measure
Partnerships
Delivery
Community
Sustainability
Prosperity
We provide a local roading network that is safe for all road users
We appropriately maintain the district's sealed roads
We provide good quality district roads
We respond to service requests in a timely manner
We provide a high quality and safe footpath network
We provide a quality and safe cycle network
The percentage of residents satisfied with the quality and safety of the district's cycle network
The percentage of foothpaths that meet the Levels of Service and service standards in current condition surveys, as set out in this AMP
Proportion of network not available to Class 1 heavy vehicles and 50MAX vehicles

3.3 Evidence Base and Gaps

3.3.1 Safety

Objective
The Council will provide a transportation network that is safe for all road users.

Current Performance
Key performance insights
The number of fatal and serious crashes on NPDC roads has been increasing over the last five years and these crash trends are shown in this section.

Crash data used for performance monitoring only includes crashes which result in fatalities or serious injury. Crash data from the full 2019/20 financial year was not available at the time of preparation of this document, so is not included in the assessments.

The number of crashes on the district's network which result in serious injuries or fatalities are typically too small when split by classification to develop a meaningful trend. The total number and percentage of total crashes provide a more useful analysis. Further detail of the current performance for each measure is outlined under the relevant heading below.

Number of fatal and serious injuries
The number of fatal and serious injuries sustained in crashes on the district's network over the last 10 years is provided in **Table 8**. This Level of Service measure is from the ONRC Safety Customer Outcome 1 measure. It should be noted that the number of fatal and serious injuries in a year is often higher than the number of fatal and serious injury crashes, as more than one person is sometimes injured in a single crash.

Reporting year	Arterial	Primary Collector	Secondary Collector	Access	Access (Low Volume)	Total
2009/10	5	4	5	5	1	20
2010/11	3	2	2			7
2011/12	2	9	6	2		19
2012/13	2	3	7	2	1	15
2013/14	2	4	5			11
2014/15	1	7	2	2	2	14
2015/16	5	3	10	1	1	20
2016/17	3	6	11	4		24
2017/18		10	6	1		17
2018/19	7	4	20	3	1	35
2019/20	2	7	13	4	2	28

The trend in fatal and serious injury crashes over the last 10 years as a percentage of the average indicates a declining trend (percentage change in Deaths and Serious Injuries (DSI) per year) for NPDC's Arterial and Secondary Collector roads. A worsening trend is evident for the Council's Collector roads. The total number of fatal and serious injuries for the most recent financial year is 28.

The Level of Service targets for all safety measures for the 2030/31 financial year are based upon the NZ Vision Zero Strategy. This states that NZ is aiming for a 40% reduction in fatal and serious crashes by 2030, and therefore this is NPDC's target.

Number of fatal and serious injury crashes

The number of fatal and serious injury crashes on the district's network over the last 10 years is provided in Table 9. This measure is from the DIA - Non-Financial Performance Measures Rules 2013, Performance measure one (road safety).

Table 9: Fatal and serious injury crashes

Reporting year	Fatal crashes	Serious crashes	Total fatal and serious injury crashes
2009/10	0	13	19
2010/11	0	7	7
2011/12	1	12	13
2012/13	1	12	13
2013/14	3	7	10
2014/15	3	9	12
2015/16	1	19	20
2016/17	0	23	23
2017/18	2	14	16
2018/19	3	27	30
2019/20	1	25	26

Table 10 shows an increasing trend in fatal and serious crashes on the districts roads.

Table 10: Change in Fatal and Serious crashes

	Year 2019/20		Year 2018/19		Year 2017/18		Year 2016/17		Year 2015/16	
	Total	Change	Total	Change	Total	Change	Total	Change	Total	Change
Fatal	1	-2	3	+1	2	+2	0	-1	1	-2
Serious	25	-2	27	+13	14	-11	23	+4	19	+10

There were 26 no. fatal and serious crashes in the 2019/20 year, which is less than the 2019/18 year (30 no.); however, this reduction is due to a significant reduction in traffic on the district's roads over April, May and June 2020 due to COVID-19. It is estimated that without this reduction in traffic the trend of fatal and serious crashes would have continued to increase.

Vulnerable users (pedestrians, cyclists and motorcyclists)

The vulnerable user crash data over the last five years is shown in **Table 11**. This Level of Service measure is from the ONRC Safety Technical Output 9 measure: Vulnerable users.

Table 11: Five-year vulnerable user crash data

DSI Counts	Bicycle Crashes	Pedestrian Crashes	Motorcycle & Moped Crashes	Total Vulnerable User Crashes	Percentage of DSI
2014/15	3	1	1	5	35.6%
2015/16	1	4	5	10	50.0%
2016/17	3	1	5	9	37.6%
2017/18	1	4	4	9	52.9%
2018/19	5	1	3	9	25.8%
2019/20	3	3	7	13	46.4%

The data indicates vulnerable user crashes have increased over the last five year period. In the most recent 12 month period the number of vulnerable user crashes as a percentage of the total DSI has increased to 46% of all DSI crashes. The number of vulnerable user crashes in the most recent 12 month period sits at the threshold of the Council's performance target for the coming financial year. To better understand if this crash rate is reflective of district growth in walking and cycling or worsening safety conditions, it is proposed that the pedestrian and cyclist count programme be improved. This initiative is included in the transportation improvement plan in **Section 9: Improvement Plan** of this AMP.

Excluded Performance Measures

The following performance measures are not included in the Level of Service Measures **Table 7** because trends are not clear due to the low number of crashes on the network. The network wide trends are instead captured in three safety measures in **Tables 9, 10 and 11**. The performance measures identified by the ONRC, but not reported on as a Level of Service measure, are discussed in detail below.

Collective risk (fatal and serious injury rate per kilometre)

The collective risk is the ONRC Safety Customer Outcome 2 measure. This measure has not been identified in the Level of Service **Table 7** as the data is already identified by the "*ONRC Safety Customer Outcome 1: the number of fatal and serious injuries on the network*". For completeness, the NPDC collective risk for each ONRC road category in the 2019/20 financial year is provided in **Table 12**.

Table 12: Collective risk for each ONRC category

Outcome measure	Arterial	Primary Collector	Secondary Collector	Access	Access (Low Volume)
Length of network (km)	15.5	76.8	345.1	532.5	315.9
Collective risk rating (10 years to 2019/20)	0.149	0.053	0.023	0.004	0.002
Compared to Provincial Centres Peer Group	0.102	0.041	0.017	0.006	0.003

The collective risk on Council's roads currently sits above the Peer Group for Arterial, Primary Collector and Secondary Collector roads. The district has a number of improvements planned to reverse this trend, which are outlined in Table 14.

Personal risk (fatal and serious injury rate by Traffic Volume)

The personal risk is the ONRC Safety Customer Outcome 3 measure. This measure has not been identified in the Level of Service table as the data is already identified by the "ONRC Safety Customer Outcome 1: the number of fatal and serious injuries on the network". For completeness, the NPDC personal risk for each ONRC road category is provided in Table 13.

Table 13: Personal risk rating for each ONRC road category (10 years to 2019/20)

	Arterial	Primary Collector	Secondary Collector	Access	Access (Low Volume)
NPDC	(Low Volume)	5.144	9.183	6.116	13.812
Provincial Centres Peer Group	4.461	5.426	7.771	8.901	14.994

The personal risk on Council's roads currently sits above the Peer Group for Arterial, Secondary Collector and Low Volume roads. The personal risk for these road categories follows the same trend as was found in the Collective risk **Table 12**. The district has a number of improvements planned to reverse this trend, which are outlined in **Table 14**.

Permanent hazards

The ONRC Safety Technical Output 1 measure is based on permanent hazards. The aim is for all permanent hazards to be marked consistently across NZ. Permanent hazards are marked so that road users are guided safely throughout the network. If they are not signed and / or marked there are significant risks to road users.

The condition of the permanent signage marking hazards has not been audited in the past and therefore data is not available on the condition of the district's signage. The improvements to permanent hazard signage and markings are outlined in **Table 14**.

Temporary hazards

The ONRC Safety Technical Output 2 measure, is based on temporary hazards. NPDC's Traffic Management Team manage any disruption to traffic as a result of construction and other operations. The Transportation Team process Traffic Management Plans (TMPs) and undertake a dedicated audit process whereby around 5% of TMPs received by the Council are audited each month. These audits include some sites that have been chosen at random as well as sites where a complaint has been made to the Council. The Council can receive TMPs for between 100 and 200 sites a month.

Due to the subjective nature of the traffic management auditing process, the audit pass to fail rate is not considered an appropriate measure of the quality of traffic management within the district; therefore, this technical output is not included as a measure of Level of Service.

Sight distance

The ONRC Safety Technical Output 3 measure, is a measure of the available sight distance at intersections. This technical output is not included as a measure of Level of Service as it is considered that the cost to audit this measure outweighs the benefits gained. The crash data has not identified vegetation, unauthorised signs or other items placed within the road reserve as a crash trend on the network.

Loss of control on wet roads

The ONRC Safety Technical Output 4 measure, is a measure of loss of control on wet roads. The highest number of reported serious injuries and fatalities (DSI) attributable to loss of control crashes on wet roads in any one year, over the last five year period was two crashes in the 2016/2017, 2017/18 and 2019/20 financial years. A total of two loss of control crashes occurred on wet roads over the most recent 12 month period. Due to the low number of loss of control on wet road crashes, this technical output has not been included as a performance measure.

Loss of driver control at night

The ONRC Safety Technical Output 5 measure, is a measure of loss of control crashes at night. The highest number of loss of driver control at night crashes, in any one year, over the last five year period, was four crashes

in the 2019/2020 financial year. Prior to 2019/2020 a maximum of three loss of driver control at night crash had occurred in any one year (2018/19 and 2017/18). Due to the low number of loss of control at night crashes, this technical output has not been included as a performance measure.

Intersections

The ONRC Safety Technical Output 6 measure, is a measure of fatal and serious injuries at intersections. The highest number of intersection crashes, in any one year, over the last five year period, was 18 crashes in the 2018/2019 financial year. The next highest number in any one year was 14 crashes which occurred in the 2019/2020 financial year. This technical output has not been included as a performance measure as there is no particular trend in the data and these crashes are already included in the total number of serious injury and fatal crashes.

Hazardous faults and cycle path faults

The ONRC Safety Technical Outputs 7 and 8 measure the maintenance related hazards on the road (Output 7) and cycle paths (Output 8) requiring evasive action by road users and cyclists (e.g. detritus, ponding water/ potholes). The community will typically remove detritus from the road network or phone in an issue to the Customer Service Team. When detritus needs to be removed, the contractor attends within half a day. NPDC believes this measure would not provide any benefit.

Roadside obstructions

The ONRC Safety Technical Output 10 measure, is a measure to ensure that roadside areas are maintained free from unauthorised obstructions and prevent new hazards from developing. This measure has been excluded as NPDC believes the cost of measuring this Level of Service outweighs the benefit provided.

User safety perception

The NPDC Integrated Transport Strategy measure "Improvement in user safety perception percentage rating obtained via survey" was identified to meet the KPI of improved safety perception. This data has not been collected yet but will be added to the RF survey for 2020.

Improvement Areas

Based on this evidence the district will focus on fatal and serious crashes on:

- Arterial and Collector routes
- Vulnerable users
- Speed management
- Temporary traffic management controls

The details of this proposed work is described below.

Temporary hazards

The standard of temporary TMPs submitted to NPDC has improved over the last three years through improved engagement and collaboration with contractors. This has resulted in significant improvement in the quality of temporary traffic management, with contractors willing to make the changes through a collaborative process. The audit process is very subjective and stands as a qualitative process rather than relating to numbers alone.

To encourage collaboration with contractor's and other approving authorities, the Traffic Management Coordinator for the district issues a newsletter once every two months which publishes news on the awards given to contractors for a high standard of Temporary Traffic Management (TTM) sites and highlights best practice TTM sites. This approach aligns with the Council's cultural shift to positive, purposeful decision making. Collaboration also exists between NPDC, South Taranaki District Council (STDC), Stratford District Council (SDC) and Waka Kotahi, with TTM sites from these RCA incorporated into the newsletter.

Permanent hazards and delineation

The district has recently begun to audit the condition and presence of EMP, edge lines and centre lines in accordance with Waka Kotahi's Guidelines for rural road marking and delineation: RTS 5, Tables 5.1 and 5.2. The first stage in the audit process has been to identify where EMPs, edge lines and centre lines should be provided in the rural area, and maps have been prepared to assist auditors throughout the network. The base maps are provided in the following **Figures 20, 21 and 22**, where red lines identify where the treatment should be applied for the full length and yellow lines represent roads where the treatment should be applied to isolated locations.

Figure 20: Edge Marker Posts (red line = full length of road, yellow line = isolated length of road)

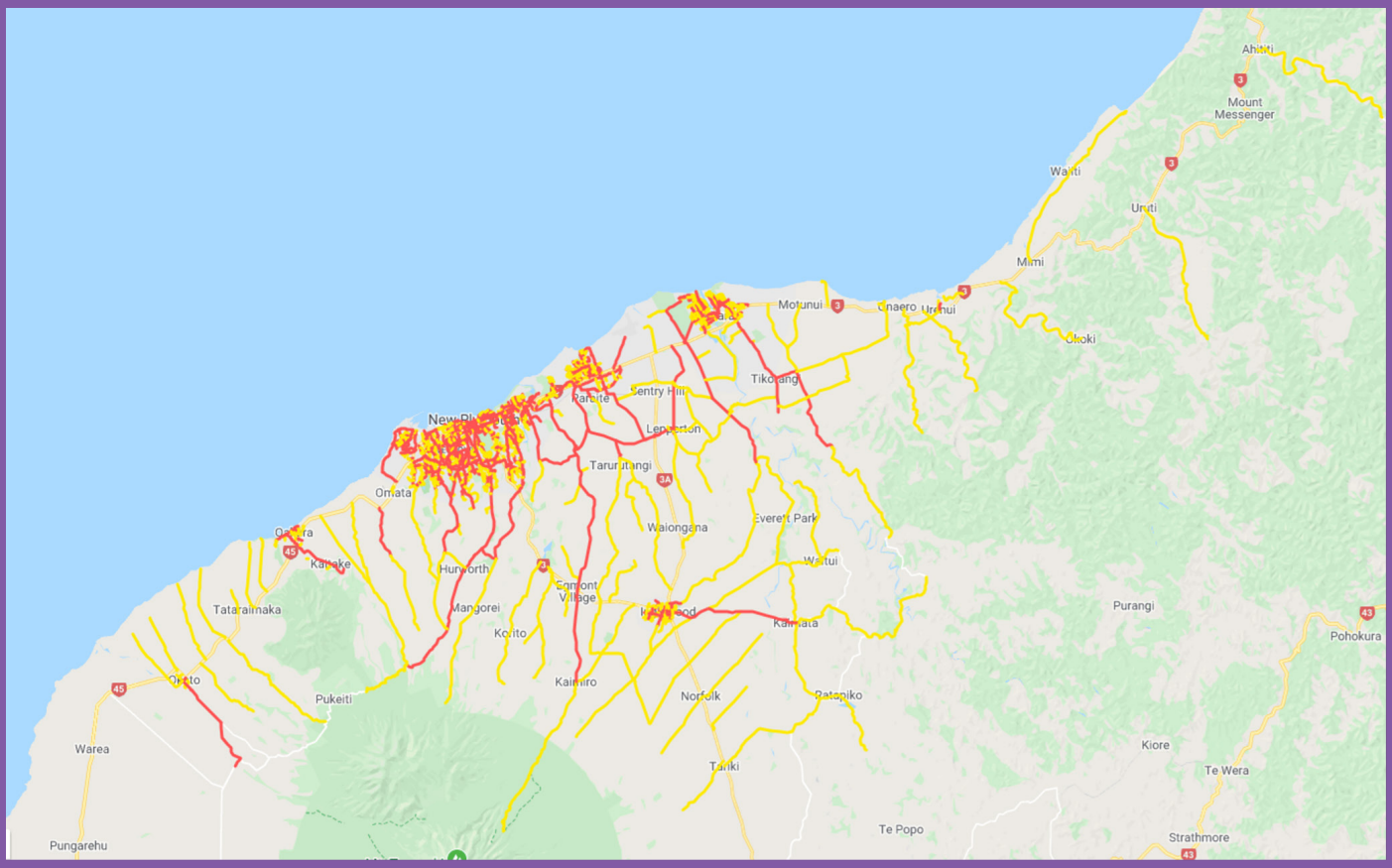


Figure 21: Edge Marker Posts (red line = full length of road, yellow line = isolated length of road

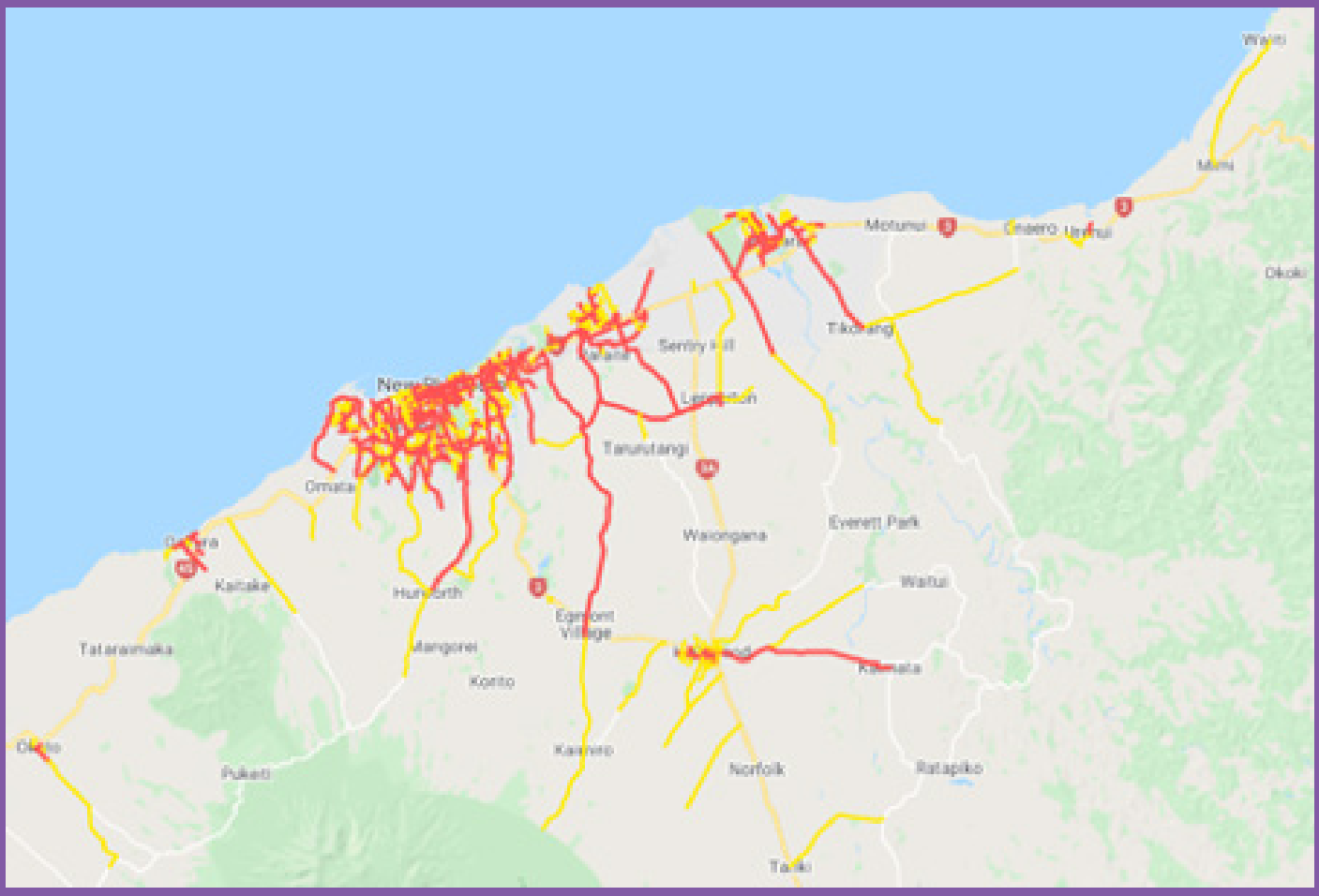
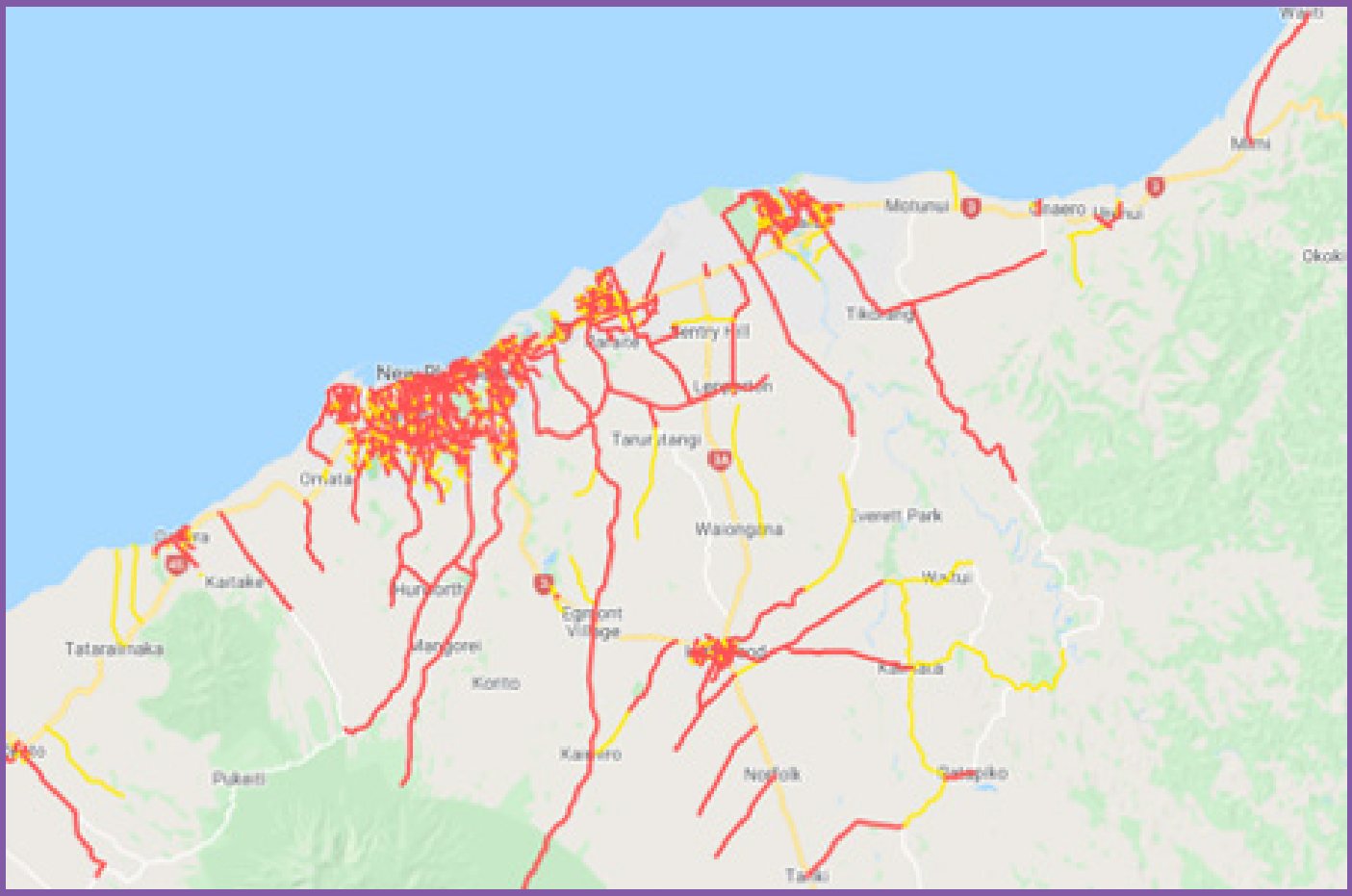


Figure 22: Centrelines (red line = full length of road, yellow line = isolated length of road)



Once the full network has been audited, NPDC will be able to understand its current performance and can then set targets for the 2024 Transportation AMP.

Street lighting

It is expected that street lighting will be provided and maintained in a consistent manner throughout the district. This aim of this is to support safe movement and provide personal security for all users of the transportation network.

The Council replaced all existing fluorescent, mercury vapour and high-pressure sodium (HPS) lights on the network with LED lights in the 2017 to 2019 period. The next step for improving street lighting is to review the condition of poles and where possible, move poles back from the vehicle travel lanes.

Safe road use

The Council supports and provides funding for Roadsafe Taranaki, in partnership with STDC and SDC to promote

road safety throughout the region. This education programme focusses on:

- Impaired and distracted driving
- Supporting Students Against Dangerous Driving (SADD) in Taranaki secondary schools
- Restraint and fatigue education
- Supporting community run driver licence programmes
- Walking and cycling safety, particularly around schools and school buses
- Helping promote safe speed and driving to the conditions

In addition to RoadSafe Taranaki, the Let's Go team at NPDC work with businesses and schools to improve road safety and encourage sustainable travel to and from schools or workplaces. Through this work there are ongoing improvements to footpaths, cycleways and pedestrian crossings to support vulnerable users.

Bridge inspections

All bridges are inspected and maintained to ensure that they are in an effective operating condition. Works are programmed under the existing bridge maintenance budgets, or when the Council becomes aware of damage that represents an immediate risk to road users. Inspections of all bridges are undertaken on a two yearly cycle, with in-depth inspections of bridges every six years. Barriers and railings on these bridges are inspected and programmed for repair as part of this activity.

Inspections of guardrails and barriers not on bridges is currently undertaken by Network Inspectors, but these inspections are not scheduled and do not review the structural integrity of barriers. Work to address this deficiency will be programmed and prioritised within the 2024-27 AMP cycle.

Road safety audits

The audit programme includes all minor safety improvements as well as significant changes to the road network. Changes to the network are due to a number a reasons including, new subdivisions, intersection priority change to accommodate development growth, safety improvements or programmed renewals resulting network changes.

Night-time network audits

A full audit of the transportation network at night-time is proposed to be undertaken between 2020 and 2021, to better understand the condition of the road network when it is dark. The current crash trends suggest that the existing permanent warning signage and markings throughout the network could be improved and therefore this audit schedule plans to identify where improvements are required.

Speed management

The existing speed limits throughout the road network have been assessed against the speed management framework. Ongoing work involves investigating reducing speed limits in the district's rural road network.

Planned improvements in the 10 Year Plan

The planned improvements align to address the integrated transport and safety key issues identified earlier in **Section 3.2.3** as detailed in **Table 14**.

Planned improvements in the 10 Year Plan
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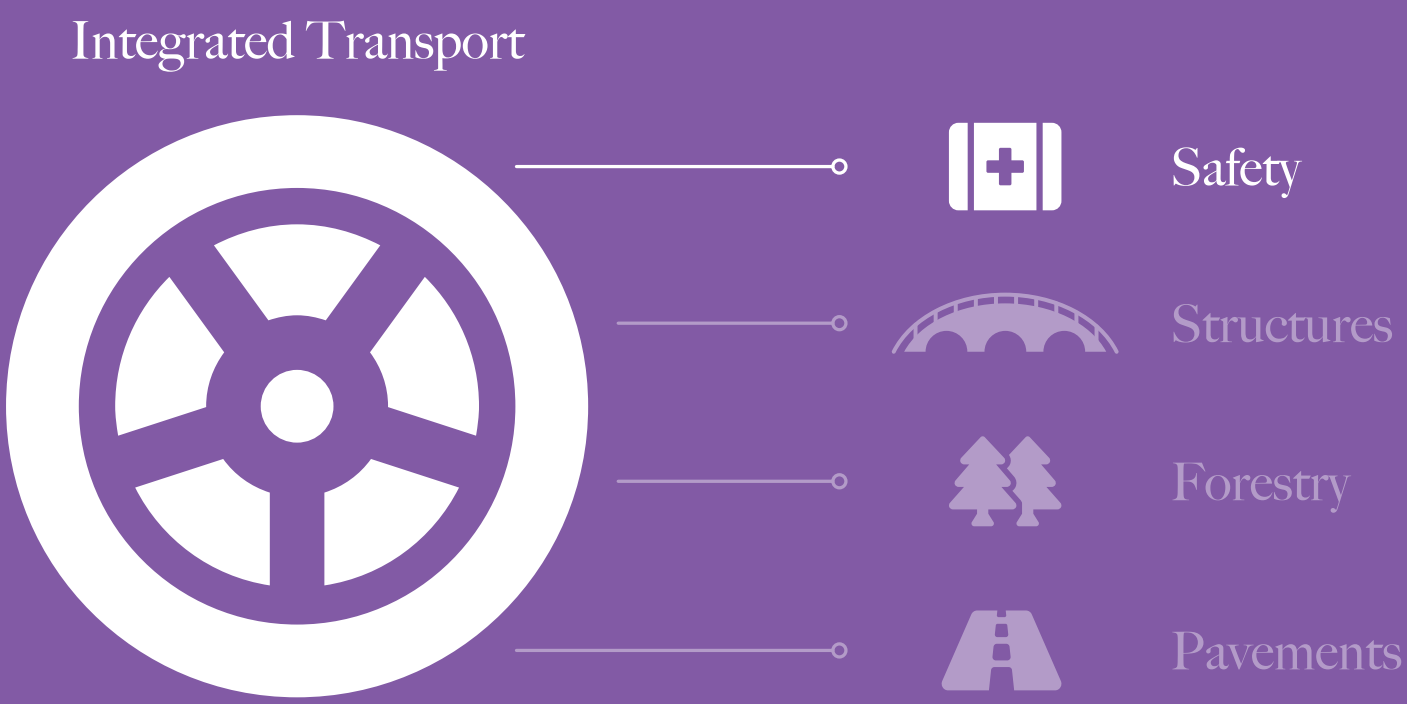


Table 14: Proposed investment on safety

Level of Service required or identified risk	Problem	Response	Proposed investment
Permanent hazards and delineation	Permanent hazards are not marked and signed in a consistent manner across the network.	NPDC to comply with national standards.	Increasing in auditing budget and increase in existing services investment.
TTM sites	While the standard for TTM sites is increasing, there is still further room for improvement.	Continue to work with contractors so they understand the critical actions required for the safe management of temporary hazards.	Maintain existing temporary traffic management investment.
Safe road use	Areas of concern have been identified in the crash data.	Continue with the Roadsafe Taranaki safety education and awareness program which targets identified areas of concern.	Maintain existing community road safety investment.
Guardrails and barriers	Guardrail and barriers inspections are not scheduled and do not review the structural integrity of barriers.	Work to address this deficiency will be programmed and prioritised within the 2024-27 AMP cycle.	Increase structures renewal program.
Street lighting	There are lighting poles in areas of the network that are in poor condition and could be a safety hazard to the community.	Replacement of lighting poles.	Reduction in street light energy and maintenance costs.
Vulnerable road user crashes	The number of vulnerable road user crashes is increasing; however, it is not clear if this is due to an increase in people walking and cycling or a worsening safety environment.	Extend the walking and cycling count programme to better understand the number of pedestrians and cyclists on the network.	Better count equipment and improvements to the count programme.

Level of Service required or identified risk	Problem	Response	Proposed investment
Fatal and serious crash investigation	The details on fatal and serious crashes are sometimes not well detailed in the Waka Kotahi Crash Analysis System (CAS) and network improvements are not identified as a result of these crashes	A safety engineer to attend all fatal and serious injury crashes to better understand the causes of these crashes.	Increase network management budget.
Collective risk rating on Arterial and Primary Collector roads	The collective risk rating on Arterial and Primary Collector roads is higher than other authorities in NPDC's Peer Group.	Safety audits will be undertaken on all Arterial and Primary Collector roads to identify if there is a network deficiency at this level.	Increase network management budget.

3.3.2 Resilience

Objective

The Council will appropriately maintain the district's sealed roads.

Current Performance

The percentage of the sealed local road network that is resurfaced.

This measure is from the DIA - Non-Financial Performance Measures Rules 2013, Performance measure 3 (maintenance of a sealed local road network). At present 4% of the sealed Local road network is resurfaced. NPDC has set a minimum target of 4% in the coming years.

Excluded Performance Measures

The following performance measures from the ONRC are not included in the Level of Service Measures **Table 7**, with the reasoning outlined below.

Number of journeys impacted by unplanned events

The ONRC Resilience Customer Outcome 1 measure, is the number of journeys impacted by unplanned events. Over the most recent 12 month period, the Council reported zero journeys impacted by unplanned events. 2018/19 was a low storm event year, which was reflected in the reduction in the number of storm complaints to the Council as shown in **Figure 23**.

Figure 23: Transport service requests, with requested related to storms circled in red

With no major unplanned events occurring, there were no recorded impacts to any journeys on the network. Over recent years the district has experienced very few unplanned events that impact journeys, and therefore the ONRC Level of Service measure is not included as a performance measure for NPDC.

Number of instances where road access is lost

The ONRC Resilience Customer Outcome 2 measure is the number of instances where road access is lost. This measure is directly related to the ONRC Resilience Customer Outcome 1 measure, and therefore is not included as a Performance Measure for NPDC.

Table 15 shows the stormwater protection levels required for different community assets. General standards are defined in the NZS4404:2010 – Land Development and Subdivision Standard, as amended by the local amendments.

Table 15: Stormwater protection levels required for different community assets

Asset Type	AEP (%)	Return Period (Years)
Building 1st floors	1	100
Road Culverts (urban)	10	10
Commercial/Industrial/Public Land	10	10
Road Culverts (rural)	2	50
Residential Land	20	5
Parks/Reserves/Sports Grounds	20	5
Bridges	1	100

Improvement Areas

Based on the evidence provided the Council will focus on:

• Forest haulage routes

• Replacement of one-lane bridges - two existing one-lane, two-way bridges in urban New Plymouth are proposed to be replaced in the next five years. The bridges are located on Junction Street and Huatoki Street, and the new bridges will improve the overall resilience of the network.

Planned Improvements in the 10 Year Plan

The planned improvements align to address the integrated transport, structures and pavement issues identified earlier, in **Section 3.2.3**, as detailed in **Table 16**.

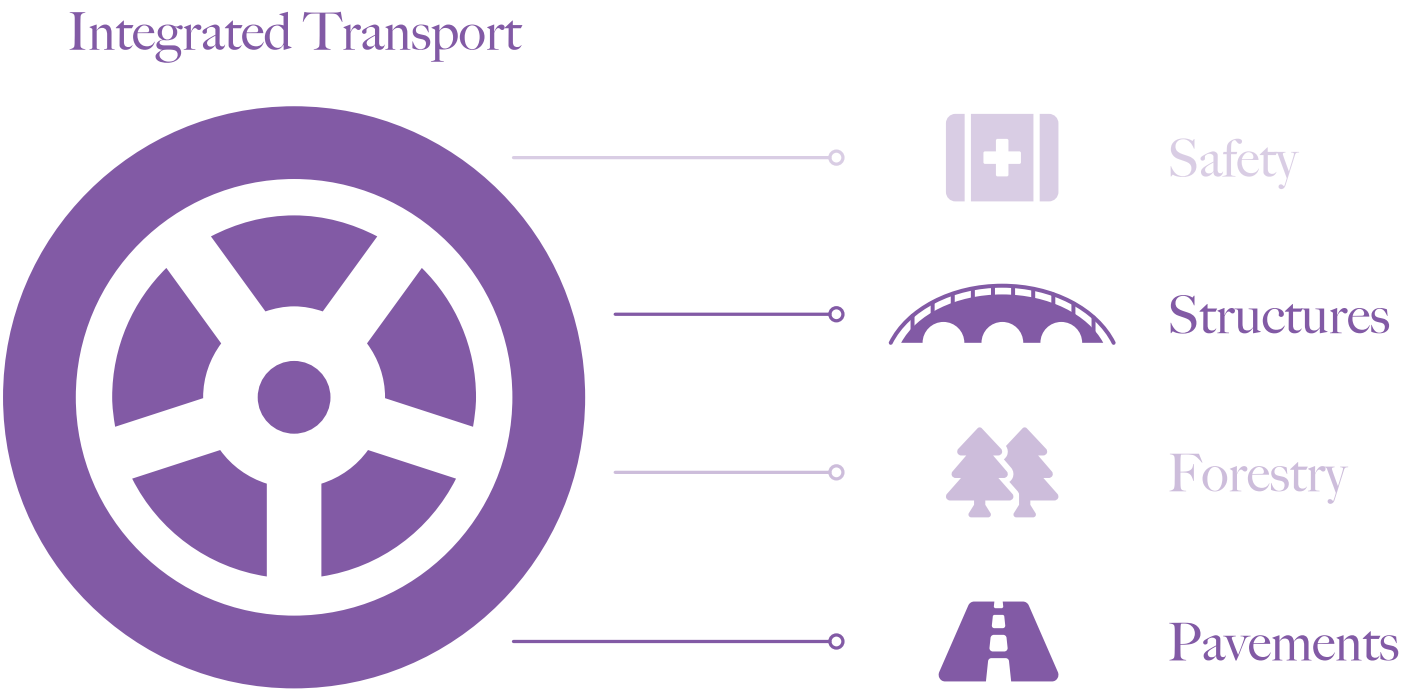


Table 16: Proposed investment on resilience

Level of Service required or identified risk	Problem	Response	Proposed investment
Bridges and Structures	A history of underspending in structures maintenance and structures component replacement has led to a bow wave of structures near end of life.	Target work around maintaining and renewing current assets to defer a large number of replacements.	Increase in bridges and structures investment.
Pavement and Surface	Previously resurfacing has been completed on 'birthday reseals' priority, rather than a condition priority. (The term 'birthday seal' refers to a seal being at its end of useful life, purely based on age as opposed to condition).	Adjustment of investment to resurfacing where needed to improve resilience of the network.	Similar level of investment; however, money will now be targeted to the higher ONRC classified roads.

3.3.3 Amenity

Objective

The Council will provide good quality district roads and respond to service requests in a timely manner.

Current Performance

Smooth Travel Exposure

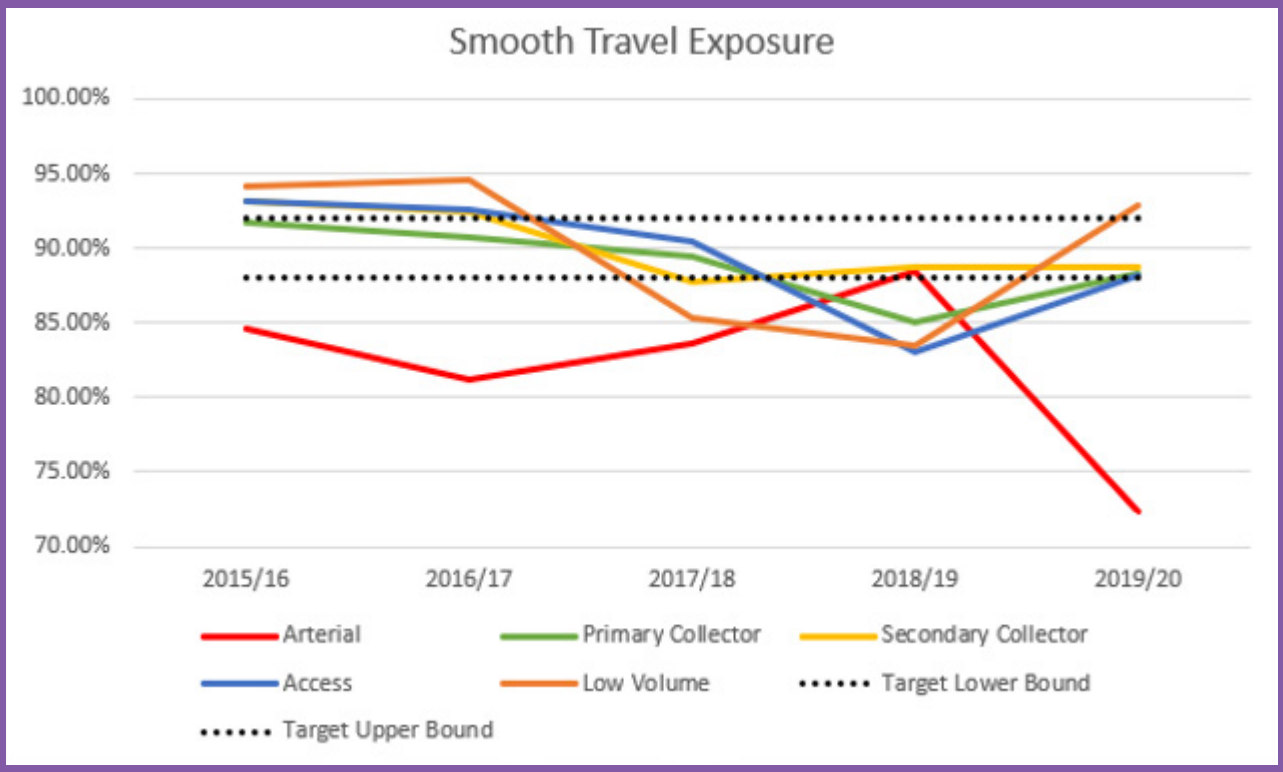
The ONRC Amenity Customer Outcome 1 measure, is a measure of STE roughness of the road (percentage of travel on sealed roads which are smoother than a defined threshold). This same measure is required by the DIA, Performance measure 2, defined as "the average quality of ride on a sealed local road network, measured by smooth travel exposure".

The STE on the district's roads, over the past five years is provided in **Table 17** and in **Figure 24** below.

Table 17: Smooth Travel Exposure, by ONRC classification for the past five years

Year	Arterial	Primary Collector	Secondary Collector	Access	Low Volume
2015/16	84.6%	91.8%	93.1%	93.1%	94.1%
2016/17	81.2%	90.7%	92.6%	92.5%	94.5%
2017/18	82.8%	89.2%	91.8%	90.7%	92.6%
2018/19	88.4%	84.6%	88.7%	83.2%	83.5%
2019/20	72.4%	88.3%	88.8%	88.2%	92.9%

Figure 24: Smooth Travel Exposure (combined for Urban and Rural Roads) for the district



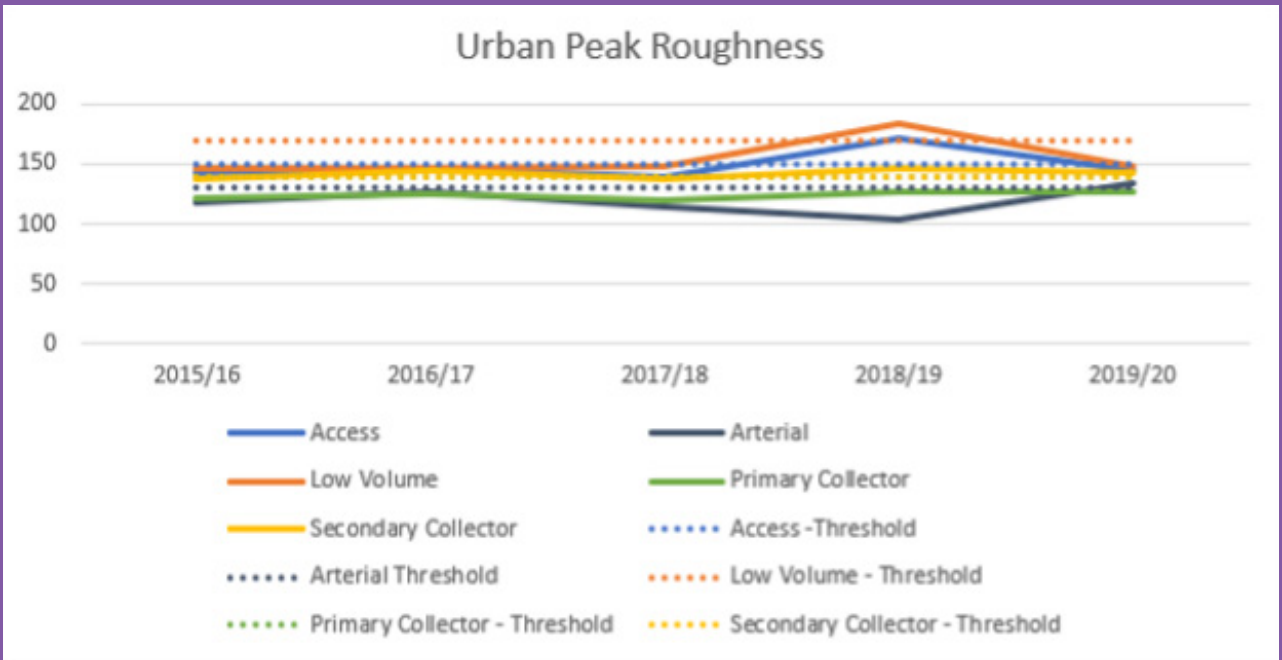
The percentage of travel on sealed roads which are smoother than a defined threshold (STE roughness) on the district's road network was decreasing until 2018/19 year. Over the most recent year (2019/20) the STE has increased on all roads except Arterial roads. The STE should increase as rehabilitation work is completed on the Arterial road network.

Peak roughness

The ONRC Amenity Customer Outcome 2 measure, is a measure of peak roughness based on a NAASRA score for each ONRC road classification, by rural and urban roads. The Peak Roughness on the district's roads for urban and rural roads are provided in **Figures 25 and 26**, respectively.

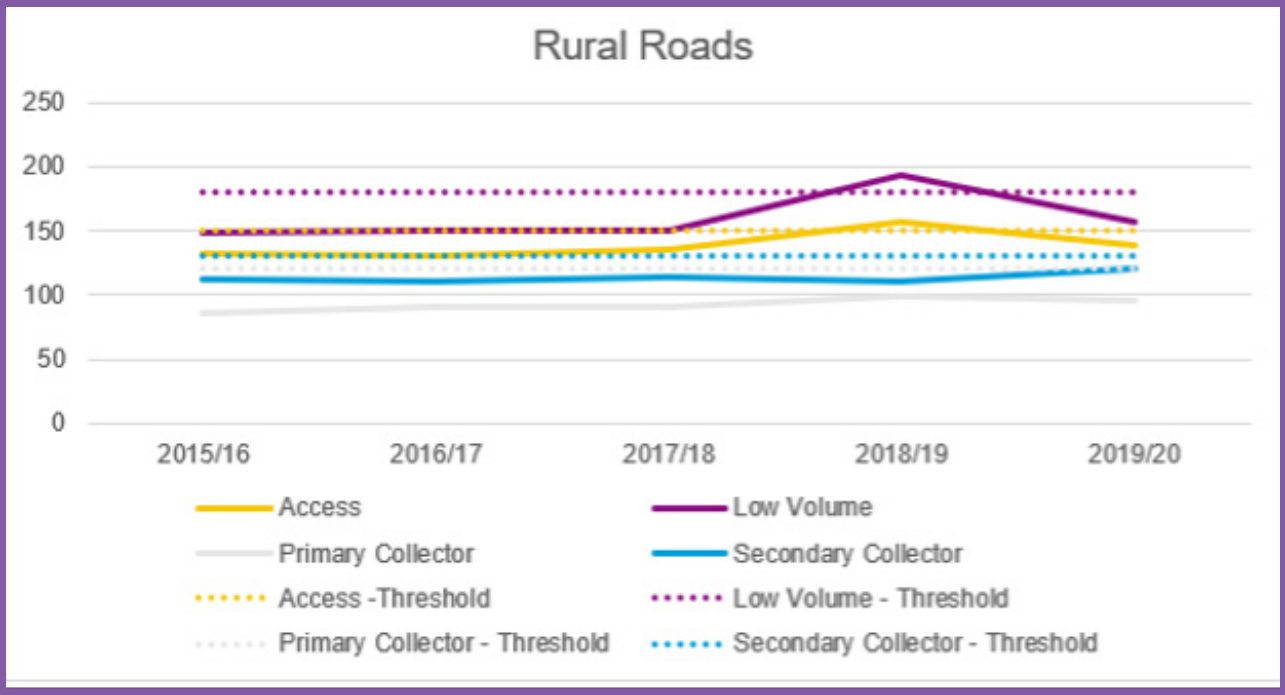
There is a notable trend in the following graphs where the data from the 2018/19 inspections does not fit the trends found in the other years. In 2018/19 the whole network was inspected rather than just a small percentage of the network. Based on this finding it is proposed that the total length of the Arterial and Collector network is inspected every year and the total length of all other roads is inspected every second year, from 2020/21 onwards. This change has been identified in the transportation improvement plan in **Section 9: Improvement Plan** of this AMP.

Figure 25: Urban Peak Roughness based on NAASRA value



As shown in **Figure 25**, the peak roughness on Arterial and Secondary Collector roads exceeds the threshold. The planned rehabilitation work on the Arterial network will reduce this level and improve the rating. With the exception of the Arterial road network all other road types have experienced an increase in peak roughness over the most recent 12 month period. Of these road types the Primary Collector roads experienced the sharpest increase in peak roughness on the urban network.

Figure 26: Rural Peak Roughness based on NAASRA value



The peak roughness for all rural road types are below the respective thresholds, and the peak roughness has increased on all road types over the most recent 12 month period. Low Volume roads experienced the sharpest increase in peak roughness on the rural network.

Average roughness

The ONRC Amenity Technical Output 1 measure, is a measure of average roughness based on a NAASRA score for each ONRC road classification, by rural and urban roads. The Average Roughness on the district's roads for urban and rural roads are provided in Figure 27 and Figure 28 respectively.

Figure 27: Urban Average Roughness based on NAASRA value

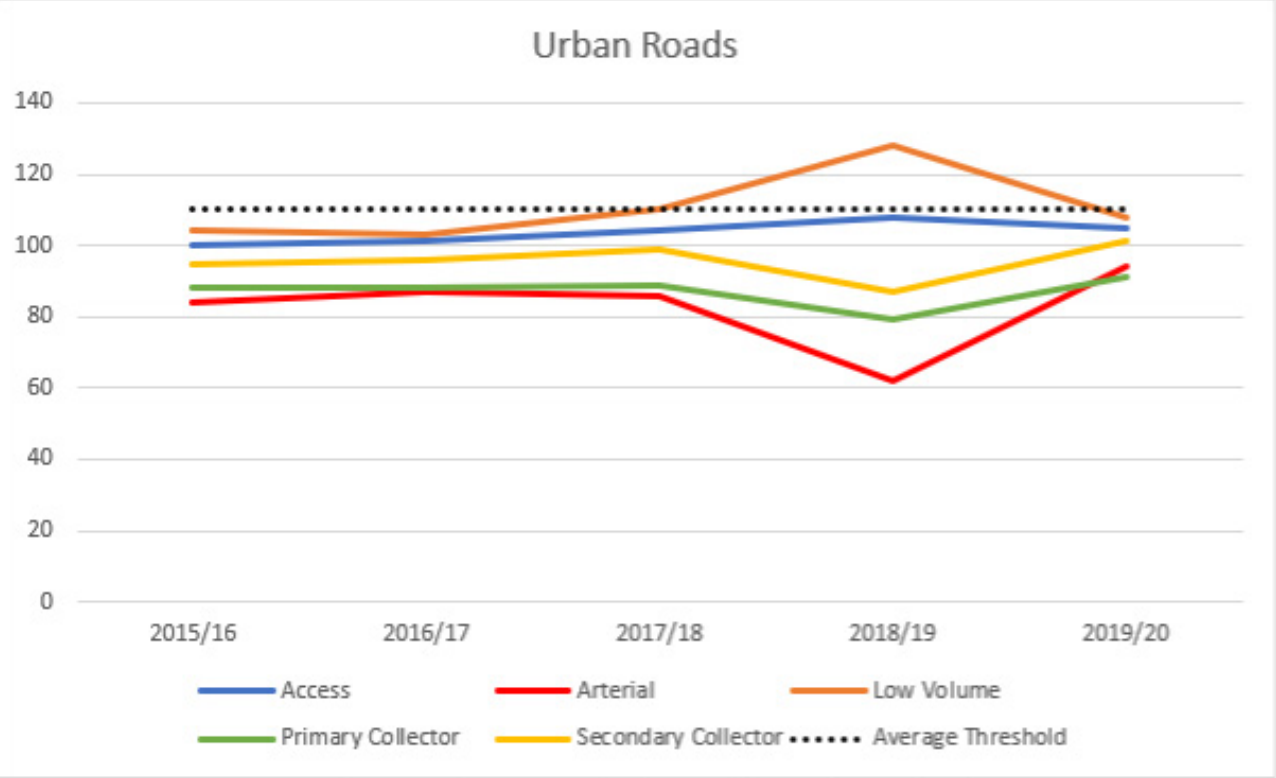
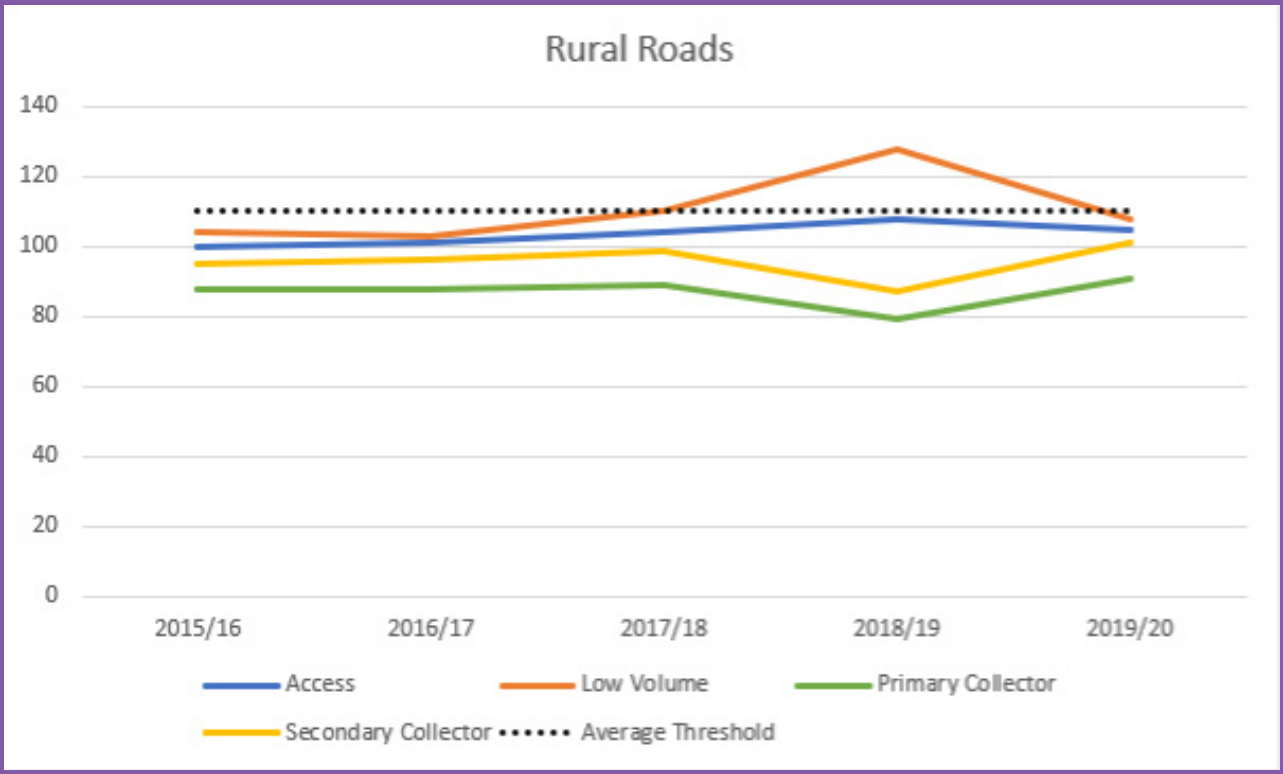


Figure 28: Rural average roughness based on NAASRA value



All urban and rural road types were less than the average threshold for roughness. This improvement has come about over the past 12 months and the Council will aim to continue this trend.

Response to customer service requests

The DIA - Non-Financial Performance Measures Rules 2013, performance measure 5 (response to service requests) identifies the percentage of customer service requests relating to roads and footpaths to which the Council responds within the timeframe specified in the LTP.

This data is collected by NPDC and analysed quarterly throughout the year. For the most recent 2019/20 year 97.8% of customer service requests were responded to within the specified timeframes. The number of transport related requests has remained fairly consistent over the previous five years. The target of 95% is currently met.

Percentage of residents satisfied with the overall quality of the district's roads

The annually commissioned RF survey provides the Council with an indication of the satisfaction levels of its residents across a number of areas. The most recent survey indicates the satisfaction with the quality of the district's roads differs across areas as shown in **Table 18**.

Table 18: Resident satisfaction with the quality of roads

Area	Percentage satisfaction with quality of roads
New Plymouth	81%
Inglewood	82%
Clifton	65%
Kaitake	74%
Waitara	69%
Overall	78%

The results of the survey indicate satisfaction with the quality of roads is relatively high for New Plymouth and Inglewood, with lower satisfaction in Clifton and Waitara. Overall, the customer level of satisfaction with the quality of the roads is below the target for the coming financial year, with an increase of 4% sought, this represents a modest increase in satisfaction across the district.

Excluded Performance Measures

The following performance measures from the ONRC are not included in the Level of Service Measures **Table 7**, with the reasoning outlined below.

Aesthetic faults

The ONRC amenity Level of Service 'Technical Output 2: aesthetic faults' has been excluded as NPDC believes the cost of measuring this Level of Service outweighs the benefit provided.

Planned Improvements in the 10 Year Plan

The planned improvements align to address the integrated transport and pavement issues identified earlier, in **Section 3.2.3**, and detailed in **Table 19**.

Integrated Transport

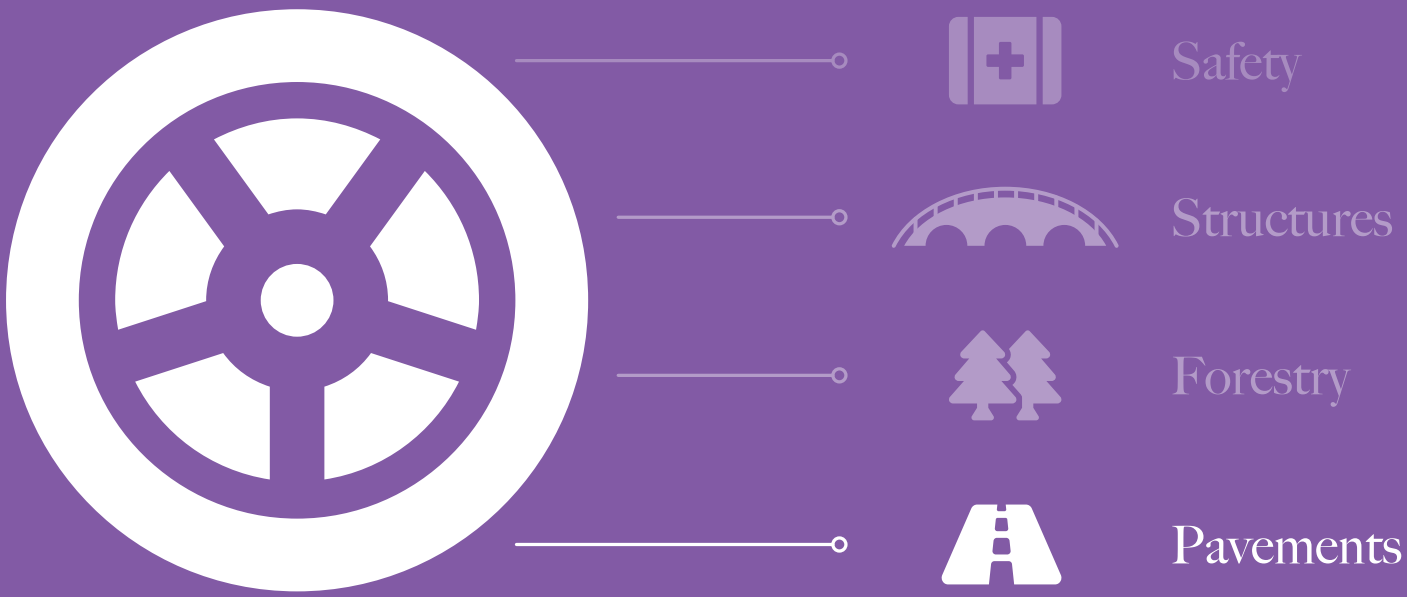


Table 19: Proposed investment on amenity

Level of Service required or identified risk	Problem	Response	Proposed investment
Pavement and Surface	A fiscal budget in pavement maintenance has resulted in a decrease in STE and an increase in peak and average road roughness, specifically on the Arterial network.	Target pavement rehabilitation on the Arterial network.	Increase in pavement rehabilitation renewals expenditure.
Network and Asset Management	Data quality is not at a level that brings confidence; therefore, there is some doubt about decisions made in the past on whether they had value for money.	Targeted improvements around data quality to allow for more informed decision making.	Increase in network and asset management expenditure.
Resident Satisfaction	The results of the RF survey showed comparatively low levels of satisfaction in Clifton and Waitara.	NPDC is in the process of upgrading the Waitara stormwater system, once this is completed, the roading network can be addressed. For the Clifton network, work will be completed around the delineation of the network and environmental work around waterways encroaching into carriageways.	An increase in budget for environmental maintenance and traffic service maintenance and renewals.
Roughness inspections	The roughness data from 2018/19 was generated through inspecting the total road network; however, it was not in line with the yearly trends, found through inspecting a small percentage of the network.	Inspect the total length of the Arterial and Collector road network every year, and all other roads every second year.	An increase in the pavement rehabilitation renewals expenditure.

3.3.4 Accessibility and Sustainability

Objective

The Council will provide high quality, safe footpath and cycle networks

Current Performance

The percentage of residents satisfied with the quality and safety of the district's cycle network.

Each year in the RF survey the Council records the percentage of residents satisfied with the quality and safety of the district's cycle network. For the most recent year (2019/20) it was found that 84% of residents were satisfied with the quality and safety of the cycle network. An increase of 1% is required to meet the target of 85% in the next financial year (2020/21).

The percentage of footpaths that meet the Levels of Service and service standards.

This measure is required by the DIA, Performance measure 4 (condition of footpaths within the local road network), and is defined as "*The percentage of footpaths within a territorial authority district that fall within the level of service or service standard for the condition of footpaths that is set out in the territorial authority's relevant document (activity management plan)*".

The most recent survey in 2019 found that 88% of footpaths were measured as good or excellent and only 0.3% failed. Footpath renewals will continue increase in the next three years with the target of achieving more than 90% of footpath length surveyed in good or excellent condition and less than 1% of footpath length failed.

Proportion of Network not available to Class 1 heavy vehicles and 50MAX vehicles

The ONRC Accessibility Customer Outcome 1 measure, is a measure of the proportion of the network not available to Class 1 heavy vehicles and 50MAX vehicles. At present, 26% of the network is not available to Class 1 heavy vehicles and 50MAX vehicles; however, the Council aims to reach a target of 25% through the replacement of the Junction Street and Huatoki Street bridges.

Excluded Performance Measures

The following performance measures from the ONRC are not included in the Level of Service Measures **Table 7**, with the reasoning outlined below.

Accessibility

The ONRC Accessibility Technical Output 1 measure, is a measure of how signage is fit for purpose in providing direction and guidance to road users. This measure has been excluded as NPDC believes the cost of measuring this Level of Service outweighs the benefit provided. It should be noted that significant improvements to the rural road network signage and markings are proposed through the permanent hazard and delineation network auditing.

Alternative mode share

The Integrated Transport Strategy measure "increase in modal share for alternative modes" was identified to meet the KPI of increased use of alternative modes. This measure will be monitored through the yearly bicycle cordon survey and the proposed improvements to the pedestrian counting programme. This data will be available for the 2024-27 Transportation AMP.

Community satisfaction with alternative mode infrastructure

The Integrated Transport Strategy measure "improvement in community satisfaction rating with alternative mode infrastructure servicing the district" was identified to meet the KPI of improved community perception. This measure will be monitored through the yearly RF community survey and the data will be available for the 2024-27 Transportation AMP.

Alternative mode infrastructure

The Integrated Transport Strategy measure "increase in modal share for alternative modes" was identified to meet the KPI of increased use of alternative modes. This measure will be monitored through the cycle network, footpath and shared pathway added to the Roading Asset Management and Maintenance (RAMM) database (see **Section 8: Business Processes and Risk Management**). This data will be available for the 2024-27 Transportation AMP.

Improvement Areas

Based on this evidence the Council will focus on the following projects:

- Implement an Integrated Transport Strategic Plan
- Unlock key strategic transportation nodes:
  - Waiwhakaiho River walking/cycling bridge (Vickers to Clemow)
  - Placemaking (CBD, Strandon Village, Westown Village, Bell Block Court, etc)
  - Coastal Pathway extensions (Paritutu to Waitara)
  - New Plymouth Central Bus Station (TRC)
- Taranaki Traverse
- Enable societal change to improve health and wellbeing:
  - Use of recycled materials (plastics, concrete, glass, etc)
  - Use of materials produced and applied with Lower Carbon Footprint (emulsion sealing)

The details of this proposed work is described below.

Planned Improvements in the 10 Year Plan

The planned improvements align to address the integrated transport and pavement issues identified earlier, in **Section 3.2.3** and detailed in **Table 20**.

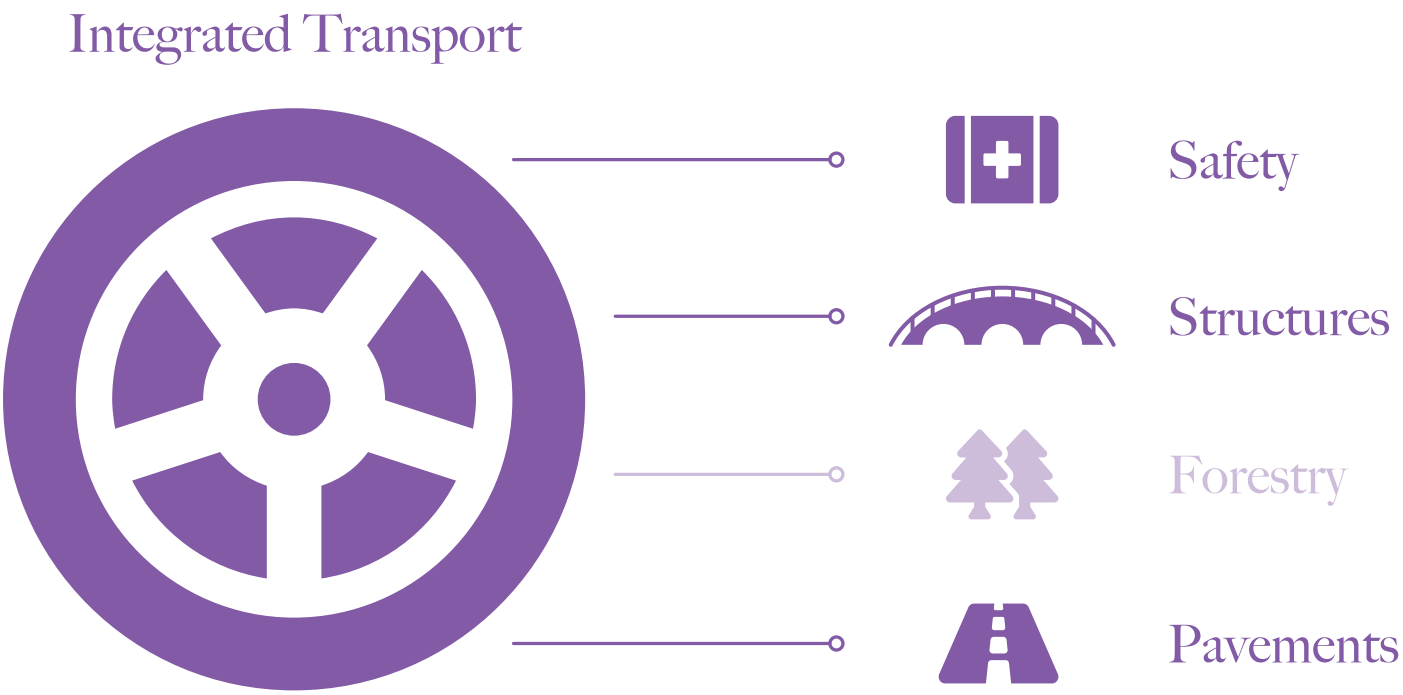

Integrated Transport
Safety
Structures
Forestry
Pavements

Table 20: Proposed investment in accessibility and sustainability

Level of Service required or identified risk	Problem	Response	Proposed investment
Integrated Transport Strategic Plan	The implications of the district's growth and the strategic responses required to meet transport needs over the next 30 years are not well understood.	A guiding document is required to understand resilience, safety, place making, sustainable transport and economic planning for the future.	Prepare an Integrated Transport Strategic Plan.
Strategic transportation nodes	Poor linkages between key transport nodes reduces the ability for people to move through the network by sustainable transport modes.	Continue to plan for and build the connecting routes to encourage greater use of sustainable transport.	• Waiwhakaiho River walking / cycling bridge. • Placemaking studies • Coastal Pathway extensions. • Second Waiwhakaiho bridge. • New Plymouth Central Bus Station.
Bridges and Structures	Some of the bridges on the network are limited to 50MAX vehicles, which affects the resilience of the network.	As bridges come up for replacement, the 50MAX limit should be addressed to see if a greater Level of Service is beneficial.	Increase in CAPEX to allow for greater resilience (should this be the desired outcome for that particular bridge).
Environmental Renewals	An increase in regulations set by TRC could lead to abatement notices should under spending continue in this area.	More work to be carried out in relation to resource consents, including works around fish passages and rip rap projects by waterways.	Increase in environmental renewal expenditure.
Pavement	The use of traditional pavement sealing materials have long lasting environmental impacts.	Enable societal change to improve health and wellbeing	• Use of recycled materials. • Use of materials produced and applied with Lower Carbon Footprint (emulsion sealing).

Level of Service required or identified risk	Problem	Response	Proposed investment
Alternative mode share	The Council has a poor understanding of the number of people walking and cycling. At present one cycling cordon survey is undertaken in February each year, and pedestrians are not regularly counted.	An understanding of pedestrians and cyclist on walkways, footpaths and cycle lanes is required in order to plan for future improvements, identify trends and encourage greater uptake in sustainable travel modes.	• In the yearly RF survey capture the community satisfaction rating with alternative mode infrastructure. • Undertake a systematic yearly pedestrian and cyclist count programme. • Monitor the length of new cycle network, footpath and shared pathway built each year. • Support the development of the Taranaki Traverse.

4 Growth and Demand

4.1 Introduction

Asset management planning relies on forecasts and the identification of other factors to understand the demand on the transportation network. There are a number of factors that influence customer demand on the transportation network and these have been grouped into the following areas:

- Population growth and decline
- Demographic change
- Change in land use
- Economic growth and Waka Kotahi's view (Arataki)
- Potential impacts of COVID-19
- Modal change
- Development of recreational areas
- Future customer expectations
- Traffic data and growth
- Investment and growth opportunities

This section describes the Council's growth forecasts, their impact on transportation network demand and how the Council proposes to deal with this impact.

The latest growth projections for the Council were developed in April 2020. The projections include resident population and household numbers for the region, comprising the New Plymouth, South Taranaki and Stratford districts. The projections cover the period 2018 to 2051 and are driven to a significant extent by economic as well as demographic factors.

The growth model was developed to use the projection of employment growth to inform the projection volumes of net migration and to ultimately derive the projected population and household numbers. As a result, the population projections for the district are essentially informed by the economic prospects of the region. The growth projection, namely housing capacity was also informed by analysis of NPDC's Proposed District Plan and discussions with NPDC staff, including a workshop.

The projections are based on the normal economic and demographic trends, though have factored in the potential implications of COVID-19 on the population and economy.

The medium growth scenario is typically used to reflect a stable or a steady increase in resident population. The medium growth scenario is considered most appropriate for the Council's long term planning.

4.2 Population Growth/Decline

Based on the growth projections, with a population of 86,504 in 2021, the district has approximately two thirds of the region's population. The projections indicate that under a medium growth scenario in the district, the population is expected to reach 104,129 in 2051. This means the district will grow by almost 25% by 2051 and will require an addition of approximately 10,290 houses. Previous projections for the district were for a static or declining population. The expected increase in population has required a significant shift in thinking and focus on long term planning.

In view of the LTP planning period, the district population is forecasted to grow by 7,200 people (8.3%) over the life of the 2021-2031 LTP (10 years). This will equate to a growth of approximately 355 houses per annum in the first five years and a growth of 383 house per annum (average) in the second five years.

The highest level of growth is projected to occur in New Plymouth in the eastern suburbs of Fitzroy, Glen Avon, Bell Block and the south-western suburb of Hurdon. Population decline is expected to occur in the rural areas around Inglewood (Everett Park and Mangaoraka) and south of Omata. This forecast aligns with the areas identified for growth in the Proposed District Plan, particularly Bell Block in the short term and Smart Road future growth area in the long term.

4.3 Demographic Change

The age profile within the district is changing over time. It is anticipated that there will be an increase in the number of people aged 65 and over, from 19% (16,651) of the total population in 2021, to approximately 27% (28,256) in 2051.

Forecasting indicates that the district will continue to experience a natural increase in population up to 2051 (the difference between births and deaths, i.e. the ability for the population to grow naturally), although the ageing population means the rate of natural increase will decline consistently over the 30 years from 2020. As net migration into NZ is projected to plateau in the coming years, and as the region is required to transition away from emissions intensive industries, net migration into the region is projected to decline gradually to levels below 700 individuals per annum from approximately 2,029.

This shift may bring an increased demand for infrastructure that is highly accessible and will likely mean a greater proportion of the population will be on a fixed income.

The Council has a dedicated ageing strategy which highlights the need to provide infrastructure and services that allow the safe and easy movement of ageing persons throughout the district. The strategy details the key actions the Council undertakes in ensuring an accessible network that caters for the elderly. These include:

- Forward planning to provide appropriate and accessible transportation access to parks and open spaces
- Infrastructure audits of roads, footpaths and crossings to determine their suitability for an ageing demographic
- The establishment of a transportation reference group to support the forward planning of transportation infrastructure
- Respond to and deliver infrastructure improvements that will support the mobility movement of ageing persons

4.4 Change in Land Use (e.g. Subdivision Development or Rural Land Use Changes)

The Proposed District Plan identifies the urban growth elements. NPDC recognises the importance of consolidating and directing the location of the growth of the district through managing subdivision and development in areas that are available or may be part of a future growth area. This promotes the sustainable management of the district's natural and physical resources.

A common theme of previous District Plan changes is the desire to change the zoning to cater for growth. These plan changes involved rezoning large areas of rural land to residential.

The Proposed District Plan defines development areas as areas which are suitable for urban growth purposes, where a Structure Plan applies. The Proposed District Plan states that a Structure Plan should address the need for the activity to provide "connected transport networks that allow ease of movement to, from and within the Development Area"[3]. The Future Urban Zone (FUZ) areas are those areas which have been identified as suitable for both business and residential urban growth. The FUZ provides the long term land supply for the district[4].

The District Growth Map (shown in **Figure 29**) provides an indication of the development land use changes set to occur in the district over the next 30 years and identifies the following areas for development:

- Undeveloped industrial land
  - Bell Block, south of State Highway 3 (SH3)

- Undeveloped residential land
  - Significant amount of land in:
    - Bell Block, north of SH3
    - Hurdon
    - Highlands Park

- Rezoned Residential areas
  - Small parcels of land accessed from Brooklands Road and Carrington Road
  - Spotswood
  - Westown

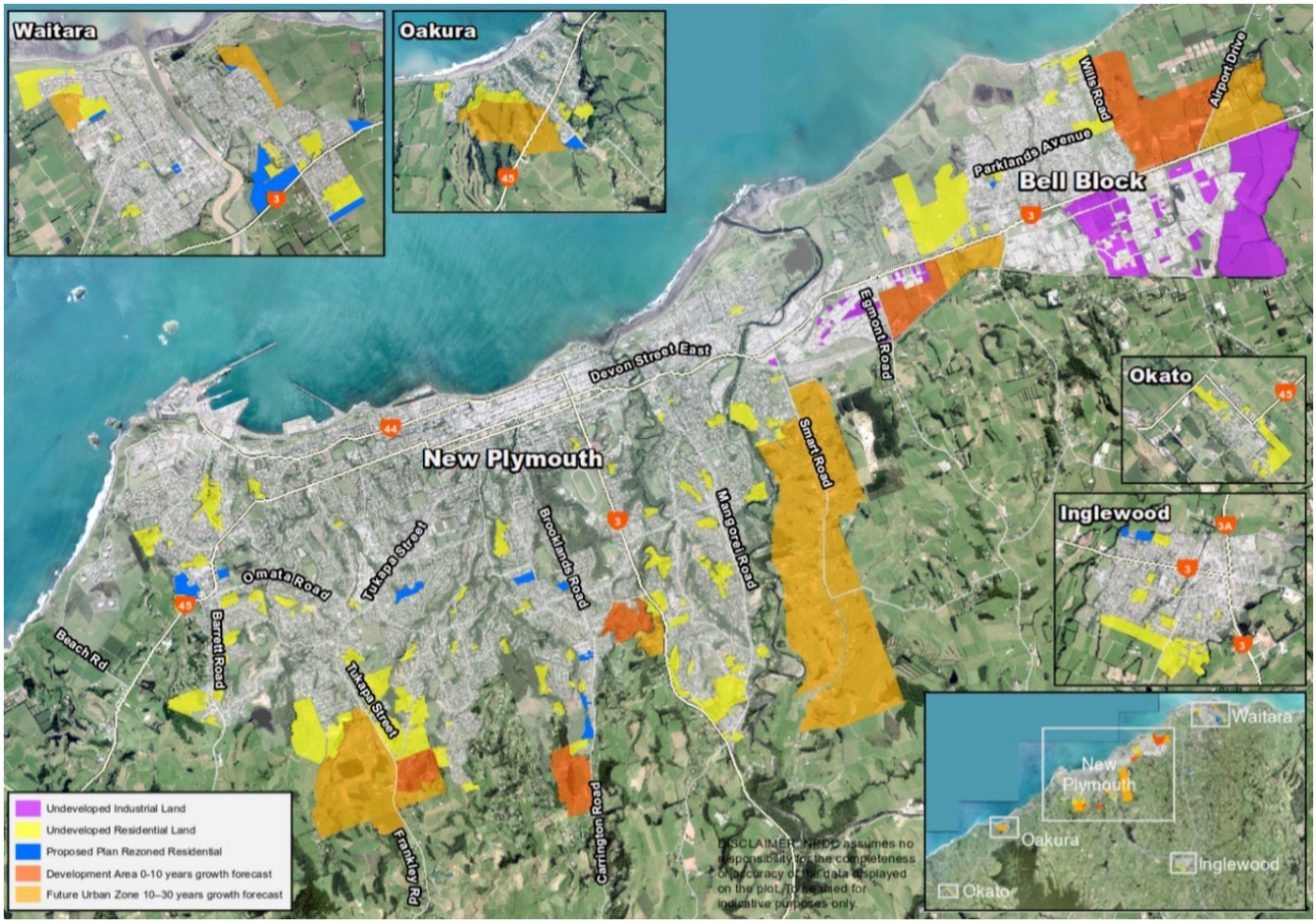
- Development Areas (0-10 years growth forecast)
  - Bell Block
  - Carrington Road
  - Junction Road
  - Hurdon

- FUZ (10-30 years growth forecast)
  - Smart Road
  - Frankley and Cowling Road
  - Bell Block
  - Oakura
  - Waitara

[3] Part 3: Development Areas, DEV1 – Bell Block Area Q Structure Plan Development Area (DEV1-P5.7b)

[4] Section 32 Report Future Urban Growth – Proposed District Plan

Figure 29: Growth Map (Source: ECM#8133381)



Significant development and land use change can impact the traffic make-up, patterns and volumes on the network. This can have implications for network performance, maintenance and management.

Based on the Development Areas identified in **Figure 29** a significant amount of greenfield residential development is to occur at the periphery of the existing residential areas. The Council recognises that it is less expensive for people to build in underdeveloped areas; however, this leads to more traffic using the Arterial road network and puts significant pressure on the State Highway network. Though it takes time to develop public transport networks and active mode connections, access improvements will be required.

Development around Bell Block will place pressure on the State Highway transport network, with significant amounts of residential and industrial development, resulting in higher traffic volumes on the State Highway

network. To accommodate the increase in traffic volumes a number of changes are currently planned for SH3 between Henwood Road in Bell Block and Princess Street in Waitara. This work incorporates wider safety improvements and is planned to be completed by the end of 2022.

The significant development of Smart Road for residential uses will result in greater traffic volumes through the signalised intersection of Smart Road and SH3. The transportation movements associated with this residential development will be investigated as part of the Integrated Transport Strategy.

Development on the western side of New Plymouth is more easily accommodated on the transportation network, with planned development on a smaller scale. Across the district, State Highway connection is important when considering the transport implications of any development, as in many areas the State Highway is the primary Arterial road.

Over and above the areas discussed above, the Proposed District Plan's Structure Plans provide specific guidance to developers in relation to road layout, connections, access and other infrastructure elements related to Development Areas. This allows areas to be planned with sufficient detail at an early stage to ensure that essential services, parks and reserves, and the transportation network achieve connectivity within the area and with the surrounding area in a cohesive manner.

4.5 Economic Growth and Waka Kotahi's View (Arataki)

4.5.1 Economic Growth

Driven by the oil and gas sector, the agriculture sector and the associated secondary industries, such as food processing and engineering, the region's economy is expected to grow at the same rate as the national economy over the next 10 years. Continued activity in the oil and gas and agriculture sectors will continue to place pressure on infrastructure such as Port Taranaki and the Airport. It will also continue to place pressure on the roading network that connects these sites with production sites.

A report on the economic value of the district's infrastructure assets was completed and published in September 2019. The report identified infrastructure investment as a key economic driver in the region. The report indicated the main production industries are directly dependent on districtwide transport infrastructure. Together the primary sector, road freight and logistics, and construction and engineering sectors generate about $2.6 billion a year in Gross Domestic Product (GDP) (approximately 68% of the district's total GDP) and employ more than half of the district's workers.

Based on the above, any economic growth in the road freight and logistics industries will increase pressure on the roading network, especially in industrial zones. To address these issues the Council will:

- Industrial zones and arterial roads - invest in pavement renewals to meet the expected growth
- Collaborate with Waka Kotahi to maximise value from projects on the State Highway network

4.5.2 Waka Kotahi's View (Arataki)

Waka Kotahi's Arataki[5] is outlined in **Section 2: Strategic Case** of this AMP. Taranaki's place-based summary[6] provides some insight into Waka Kotahi's view of the region's future demand, growth and direction as it relates to the land transport system. Understanding this view assists the Council in planning, managing and delivering a transportation activity that aligns with Waka Kotahi's priorities and responses, and enables a collaborative approach between the Council and Waka Kotahi in doing so. Whilst it is noted that the regional summary for Taranaki is concerned with the region as a whole and not the district alone, it provides insights into the region as viewed through a district lens as detailed in **Figure 30**.

[5] https://www.nzta.govt.nz/planning-and-investment/planning/arataki/

[6] 2021-2031 Regional Summary Taranaki – Version 1.1

Figure 30: Summary of Taranaki State Highway network

Travel management of growth

It is important that growth in housing and employment in and around New Plymouth, including new facilities like schools and healthcare, is managed in a way that reduces dependency of private vehicles and average journey length.

Climate change

Only a small proportion of Taranaki's road network is likely to be impacted by sea level rise resulting from climate change. However, networks in the north and east of the region are expected to come under increased pressure from storm intensity combined with relatively unstable terrain.

Road safety

While Taranaki has relatively low levels of total DSI crashes compared to other regions, the location of the crashes indicates increased risk on the networks in and around New Plymouth and Hāwera, SH3 between these two centres, and high-risk rural roads.

Economic performance

The region's economic performance is underpinned by two high-income, export-oriented sectors: dairy farming and processing, and the oil and gas industries. Both sectors have experienced relatively low commodity prices since 2014 and the region faces a challenge to diversify as part of the transition to a low-emissions economy.

Heavy vehicles

Currently heavy vehicles travel 75 million kilometres on Taranaki Roads every year, driven by the oil and gas, dairying and forestry sectors. This has a significant impact on local roads in particular.

Existing demand

New Plymouth's transport networks are generally well connected and fit for purpose, with capacity to accommodate projected traffic volumes in most areas. The key area of pressure on the transport system is the link between New Plymouth city centre and the residential and business growth areas to the east of the city (Bell Block).

Aging population

New Plymouth District will have a higher number of people aged 65 years and over, so ensuring good access for senior residents will be important to ensure they remain socially connected, active and able to participate in their communities.

Sustainable transport

Walking and cycling levels are above the national average supported by ongoing investment in infrastructure. Public transport services are limited and focused on access to essential services.

Employment trends

While employment in service industries is growing in the New Plymouth urban area, manufacturing continues to be important. Expanded forestry harvesting over the next decade will increase freight movement in the south and east of the region.

Forestry

Harvesting of forest blocks is forecast to peak over the next decade, increasing freight movements to Port Taranaki and placing pressure on the maintenance of road networks in the south and east of the region.

Transition 2050

Waka Kotahi will look for ways to support initiatives to diversify the region's economy as part of a transition to a low-missions economy.

In addressing the above points Waka Kotahi are focussing effort on the following areas in the region in the coming 10 years (2021-2031)[7]:

- Improving urban form:
  - Waka Kotahi will engage in planning processes to support a well-integrated and well-designed land use and transport system

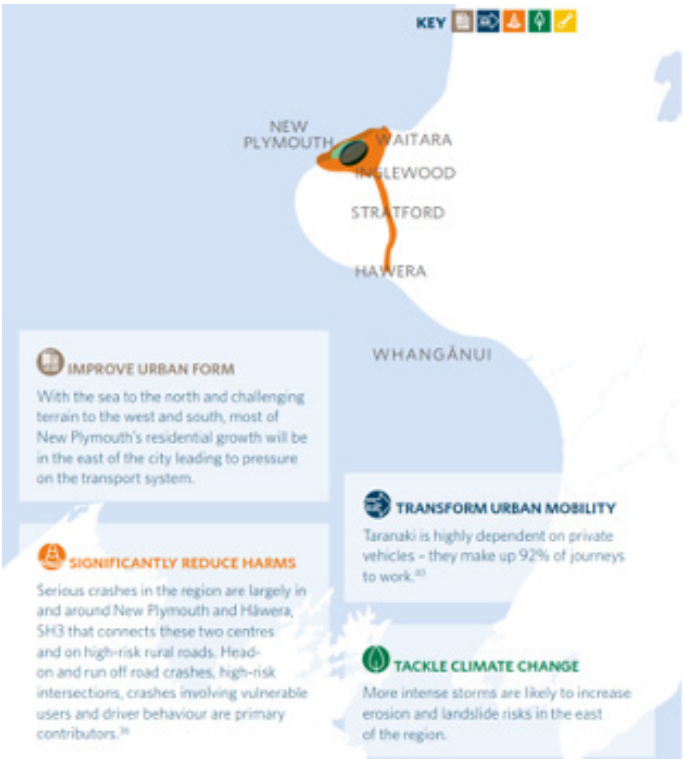
- Significantly reducing harms across safety and health:
  - Waka Kotahi will support implementation of the Vision Zero Strategy for NZ and deliver better health outcomes through initiatives that target step changes around urban form, increased access to public transport and active modes and efforts to reduce carbon emissions

- Transforming urban mobility:
  - Waka Kotahi will support improvements to walking and cycling networks, public transport services and the development of the New Plymouth Network Operating Framework

- Tackling climate change:
  - Waka Kotahi will engage in local planning processes to avoid development in increased risk areas, ensure urban form and transport planning supports reductions in emission, private vehicle travel and average trip length
  - Waka Kotahi will enable continuous improvement in network resilience through maintenance and renewals, and low cost / low risk investment

The reach of these focus areas is indicated in **Figure 31**.

Figure 31: Region step changes (source: Arataki 2021-31 Regional Summary Version 2)



[7] 2021-2031 Regional Summary Taranaki – Version 2 – Areas of Focus: Taranaki 2021-2031 – Waka Kotahi

4.6 Potential Impacts of COVID-19

The COVID-19 pandemic has the potential for wide ranging implications on the population and economy. The evolving nature of the pandemic brings about a significant amount of uncertainty with respect to its economic impact and the effect of this on the transportation activity.

The population and demographic projections for the district (see **Section 4.2 and 4.3** above) are based on the normal economic and demographic trends, though have factored in the potential implications of COVID-19 on the population and economy. It is also important to consider the implications of COVID-19 on the transportation activity.

As part of Arataki, as the COVID-19 pandemic has progressed Waka Kotahi has commissioned research into the potential impacts of COVID-19 based on the changing economic structure and demographic change in NZ. The analysis is focused on the impacts over the coming four year period, but also considers what will happen in 5-10 years' time. Alongside considering the wider implications, the research provides insight into the implications for land transport at a regional level[8]. The key insights from the research as they relate to the region include:

- Taranaki's economy is comparatively well placed to recover from the pandemic due to scale of the manufacturing, mining, healthcare and social assistance, and government services sectors
- These sectors are expected to recover in line with, or above, business as usual in the longer term. Significant levels of primary production are also expected to help mitigate the impacts of the economic slowdown on the region.
- The region has the lowest reliance on temporary migrant workers of any region in NZ (0.8% of regional labour force), so will not be unduly impacted by reductions in immigration
- The region's reliance on international tourism is comparatively low, with 21% of total tourism spend coming from international visitors

Based on the above, the potential impacts on the land transport system (over the coming decade) identified by the research include:

- Given the relative resilience of the region's economy, no significant changes are expected in the nature, scale and location of transport demand over the medium to long term. The 10 year outlook remains largely unchanged.
- Maintaining safe and reliable connections to Waikato and Palmerston North remain important to supporting the region's recovery
- There will be an ongoing need for transport services to support the COVID-19 recovery by improving access to employment and essential services for vulnerable communities

• There will be ongoing pressure on transport revenue as a result of the COVID-19 lockdown

It is noted the insights above relate to the region as a whole and not the district specifically.

8 COVID-19 – implications for land transport in Taranaki – Waka Kotahi

4.7 Modal Change

Table 21 shows the mode share (journey to work) data for New Plymouth as captured by the previous four Censuses.

Table 21: Modal Split

	Year				
Travel mode		**2001**	**2006**	**2013**	**2018**
Vehicle	Number of trips	18,618	22,563	24,243	31,200
	%	83.7%	82.6%	84.8%	92.0%
Public transport	Number of trips	165	132	168	219
	%	0.7%	0.5%	0.6%	0.6%
Active transport	Number of trips	2,316	2,490	2,715	2,490
	%	10.4%	9.1%	9.4%	7.3%

The data indicates an increasing percentage of trips taken to work by vehicle and public transport since 2006. The number of active mode trips as a percentage of total trips on the network has decreased from the 2013 Census to the latest Census (2018).

Quality assessments undertaken by Stats NZ indicate that although the majority of key data was either of very high, high, or moderate quality, there is some data that is poor or very poor due to lower than expected participation. The data of very poor quality is absentees (people not at home during census night), iwi affiliation, and family / household information. Of relevance in this case, the overall quality of travel to work data for 2018 was rated as moderate by Stats NZ and poor by an External Data Quality Panel.

In comparison to the Census data the Council conducts cycle and pedestrian counts to understand active mode trips on the network. Pedestrian counts are conducted through the use of pedestrian counters which are placed at a variety of park locations throughout New Plymouth. The counters are used to inform the use of recreational areas, but also provide some insight into the changing demand for pedestrian facilities in the different counter locations. As discussed in **Section 3: Levels of Service**

of this AMP, improvements into the count programme are currently being investigated.

Cycling cordon counts are undertaken on a single day every March across 10-11 sites throughout New Plymouth. Counts have taken place every March since 2016. The latest count was undertaken on Tuesday the 3rd of March 2020. The counts give an indication as to how the cycle network is being used and also provide insight into the diversity of the cycling population. The trends shown in **Table 22** indicate an increasing number of cyclists throughout the network.

Table 22: New Plymouth annual cyclist cordon count

Year	Male	Female	Total	Change from last year
2016	339	75	414	N/A
2017	257	80	393	-5%
2018	299	157	456	16%
2019	358	148	506	11%
2020	534	167	701	39%

The data indicates increasing volumes of cyclists on the network. Of most interest is the 39% increase in cycle traffic observed over the period from 2019 to 2020. Based on the above, there is an increased demand on the cycle network, which the district aims to support through an increase in cycle infrastructure. A cycle network plan for New Plymouth was outlined in the New Plymouth District Cycle Strategy in 2007[9]. The cycle network plan was updated in 2019 and is shown in **Figure 32**.

[9] Cycling Network Planning Report – Via Strada

Figure 32: The proposed New Plymouth cycle network

The cycle network plan indicates significant expansion of the cycling network to improve north to south connections between the existing cycle paths, expansion of the network to the south and extensions to the Coastal Walkway. Details on specific projects are outlined in Section 5: Programme Business Case of this AMP.

The following NPDC and private sector projects that could influence the development of the future cycle network include:

- Development of an overarching integrated Transport Strategic Plan
- Development of a Central City Strategy – this may influence the selection of routes through the city centre depending on how car parking will be managed and is currently being developed by the Council

4.8 Development of Recreational Areas

The development of recreational areas can increase the traffic demand on the transportation network, but will also encourage residents to be more active and can often lead to an increase in walking and cycling trips. The Proposed District Plan identifies three different Open Space and Recreational Zones which have been identified with the purpose of providing open space areas for a range of different activities:

- Natural Open Space Zone:
  - A low level of development and built form is anticipated within this zone to retain the natural / biodiversity values within natural open space areas

- Open Space Zone:
  - Open space for passive and active leisure and recreational activities along with associated facilities and structures. These include Te Henui walkway, East End Reserve and Pukekura Park.

- Sport and Active Recreation Zone:
  - It is generally accepted that the level of development in this zone is higher than other Open Space and Recreational zones and that the sport and recreational activities that are anticipated to take place in this zone can generate traffic effects in surrounding neighbourhoods

The New Plymouth Open Space, Sport and Recreation Strategy was approved by the Council in 2015 and sets the strategic direction for Council owned facilities, open spaces and features within them. The supporting background document identifies the importance of planning tools in improving accessibility between existing and new open spaces.

Some significant recreational developments planned in the district in the future require significant transport planning in order to complement the existing transportation network. These developments and their impact are listed below:

- The Home of Football (Airport Drive) – Bringing together four to six football fields in a dedicated football complex:
  - Will be accessed from Airport Drive
  - Significant improvements to SH3 at the intersection of Airport Drive and De Havilland Drive will assist with accommodating the additional traffic generated by the proposed football complex

- Maunga to Surf (The Kaitake Trail):
  - This is the vision for connecting Mount Taranaki to the Tasman Sea using tracks and trails through the Taranaki/Egmont National Park[10]
  - In line with the vision in 2017 the Government announced funding of $3.4 million to the Department of Conservation, towards developing Pouakai Crossing; one part of the Maunga to Surf concept[11]
  - Work is already underway to enable safe and efficient movement of traffic resulting from tourism growth. A new carpark has been built at North Egmont and the Kaitake Trail infrastructure requirements are currently being finalised for the Oakura end of the trail.

[10] Funding report March 2018
[11] Funding report March 2018

4.9 Future Customer Expectations (Change in Customer Expectations)

Over the last 25 years the Council has regularly commissioned the NRB's Communitrak survey, having done so in 1994, 1996-2000 and from 2003-2019. The survey provides the Council with an indication of its performance in terms of services/facilities offered and representation given to its citizens. It also allows the Council to compare its performance against Peer Group averages. Overall the survey showed that New Plymouth residents are less dissatisfied than the Peer Group and National Average. Table 23 shows the NRB Communitrak survey results comparison to the Peer Group and National Average from the 2019 survey.

Table 23: NRB Communitrak survey results comparison to the Peer Group and National Average

Percentage of residents dissatisfied			
Year	**New Plymouth (%)**	**Peer Group (%)**	**National Average (%)**
Availability of car parking in New Plymouth	28	35	40
Overall quality of roads	21	33	27
Quality and safety of footpaths	15	27	21

There were no transport activity related areas for which New Plymouth residents were more dissatisfied than the Peer Group and / or National Average. Notwithstanding this, the survey indicated a large number of residents want more spent on transport related facilities. However, when asked what the Council could have done better in the past year, 7% of all residents indicated roading maintenance / road safety / cycling issues could have been done better.

Comparing the satisfaction levels of residents between the 2018 and 2019 iteration of the survey, the results in **Table 24** were produced.

Table 24: NRB Communitrak survey results comparison between 2018 and 2019

	New Plymouth 2018		New Plymouth 2019	
	Very/fairly satisfied	Not very satisfied	Very/fairly satisfied	Not very satisfied
Quality and safety of footpaths	80	17	82	15
Overall quality of roads	80	20	78	21
Availability of car parking in the district	75	22	71	28
Quality and safety of the cycle network	64	13	62	13

The data indicates decreasing levels of satisfaction across all areas except for the quality and safety of footpaths. This data, alongside the community desire for a greater amount of money being spent on the quality of roads reflects the community expectation for a quality road network which provides safety and accessibility for all modes.

4.10 Traffic Data and Growth

4.10.1 Traffic Counting

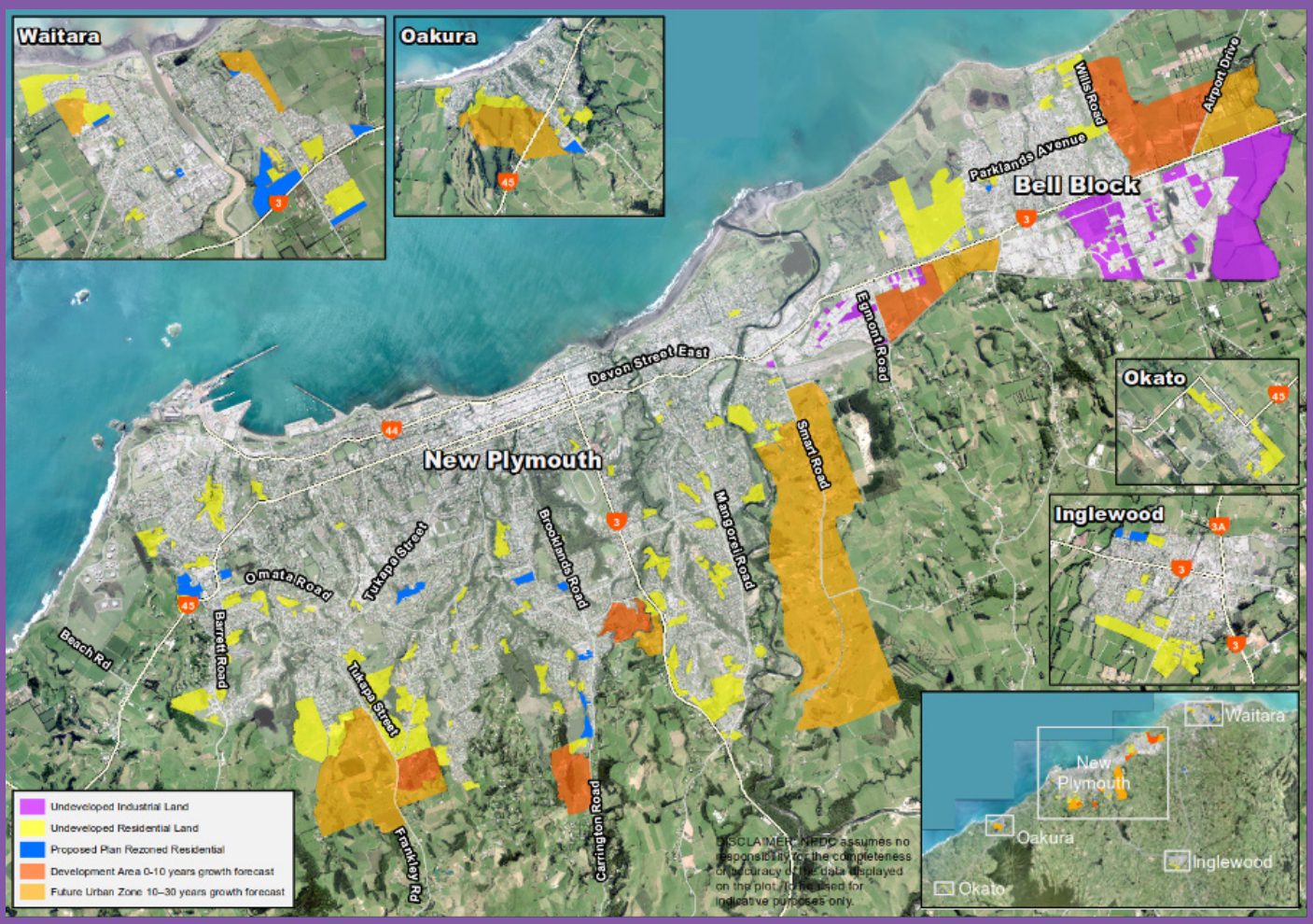
NPDC has a dedicated traffic counting program associated with the Council's maintenance activities. Traffic volume data is used to assist with planning, prioritising network improvements, road design, and road safety.

NPDC completes approximately 250 traffic counts per year throughout the district, with the counting programme carried out based on road hierarchy and need. Traffic counting data is collected every five years on the New Plymouth network, with the exception of unsealed roads where data is collected every 10 years. All traffic data is uploaded to the Council's Geographic Information System (GIS) maps and made available by the Council in the form of Metro count files. Traffic counting allows the Council to manage and coordinate improvements on the transportation network and inform road safety and temporary traffic management decisions.

4.10.2 Traffic growth

The Proposed District Plan has indicated some potential areas for growth, as shown in **Figure 33**.

Figure 33: Potential areas of growth in the Proposed District Plan (source: ECM#8133381)



Those areas that have Structure Plans in place for growth within the next 10 years are shown as the dark orange areas circled in red. Two of these areas (1 and 2) occur in Bell Block with the area north of SH3 between Wills Road and Airport Drive being zoned for residential development. There are significant improvements planned to SH3 to accommodate this growth. The traffic generation is unlikely to impact on the local roads in terms of their ONRC classification.

The second area in Bell Block (2) is zoned for industrial development and is adjacent to Egmont Road. Once again, the traffic generated from this area is unlikely to alter the ONRC classification of the local roads. The connections with SH3 are being investigated by Waka Kotahi for improvements.

The next three areas highlighted for growth are on the southern fringes of New Plymouth. Area 3 is accessed from Junction Street. A Traffic Impact Assessment has been completed and is stored in the Council's Enterprise Content Management (ECM) system (reference: ECM#7918180). The Structure Plan covers 17ha creating approximately 151 lots and thus a daily traffic flow of 1,510 vehicles per day (vpd) and a peak hour traffic flow of 151 vehicles per hour (vph). This level of increased traffic is unlikely to change the ONRC classification of the surrounding roads. However, it is possible that it will impact on the performance of the one lane bridge over Te Henui Stream. Replacement or duplication of the bridge has been identified in the capital works programme included in **Section 5: Programme Business Case** of this AMP.

Area 4 is approximately 30.7ha and is the continuation of a recent Development Area accessed from Huatoki Street. It will have links into the earlier development and onto Carrington Road. If a similar lot yield as Junction Street is used then the area will create 307 lots and a daily traffic volume of 2,920 vpd (based on a trip rate of 9.5 trips/lot/day) and a peak hour flow of the order of 300 vph. It is likely that the majority of the traffic will utilise Carrington Road; therefore, the ONRC classification may need to be reviewed along its length from the Brooklands Road / Taharua Road roundabout south to the southernmost extent of the Development Area.

The last identified area (5) is land accessed from Frankley Road and Patterson Road and is approximately 19.5ha in area. The area has some areas of steep terrain and therefore the maximum expected yield is likely to be of the order of 175 lots; however, there are 11 existing dwellings within the area so the increase will be 164 lots. These are likely to generate of the order of 1,560 vpd and 156 movements in the peak hour. Traffic will have the option to utilise Tukapa Street or Frankley Road to gain access to the city and therefore the impacts on either route is unlikely to impact on the ONRC classifications of the local roading network.

There are other areas of zoned but undeveloped land identified in the map (coloured yellow), timing on the development of these areas is unknown at this time. These lots in isolation are unlikely to generate significant volumes of lots and thus traffic sufficient to significantly affect the local roading network; however, their cumulative effects should be monitored.

The areas shaded orange are likely to be developed beyond the 10 year horizon and will be considered as part of the Integrated Transport Strategy.

4.11 Investment for Demand and Growth Opportunities

The Council typically has three reasons for purchasing land for the transportation network. These reasons are:

1. To build new roads to add resilience to the network caused by growth

2. Corridor widening to accommodate future transport demands (such as to provide footpaths through residential areas, that were previously rural) and to address boundary inconsistencies along a road frontage

3. To improve visibility at intersections, corner properties are purchased so corner splays can be designated before the property is then sold on

Tables 25 and 26 provide a summary of the funding identified for purchasing land to build new roads (item 1 in the list above) and for road widening (item 2 in the list above). The timing of the land purchase has been split into four categories; P1 (starting in 1-3 years), P2 (starting in 3-6 years), P3 (starting in 6-10 years) and P4 (starting after 10 years).

Table 25: Funding identified for purchasing land to build new roads

Description	Timing	Land purchase cost
Burgess Park Bridge		
Stage 1 – Connection to Smart Road	P3 (6-10 years)	$760,000
Stage 2 – Connection to Waiwhakaiho Road	P4 (+10 years)	$1,222,000
Stage 3 – Road widening of Waiwhakaiho Road	P4 (+10 years)	$178,000
Indicative Road from Smart Road to Henwood Road		
Stage 1 – Smart Road to Egmont Road	P1 (1-3 years)	$673,000
Stage 2 – Egmont Road to Henwood Road	P2 (3-6 years)	$628,000

Table 26: Funding identified for purchasing land to widen roads

Timing	Land purchase cost
P1 (1-3 years)	$6,240,000
P2 (3-6 years)	$4,145,000
P3 (6-10 years)	$3,143,000
P4 (+10 years)	$10,562,000

5 Programme Business Case

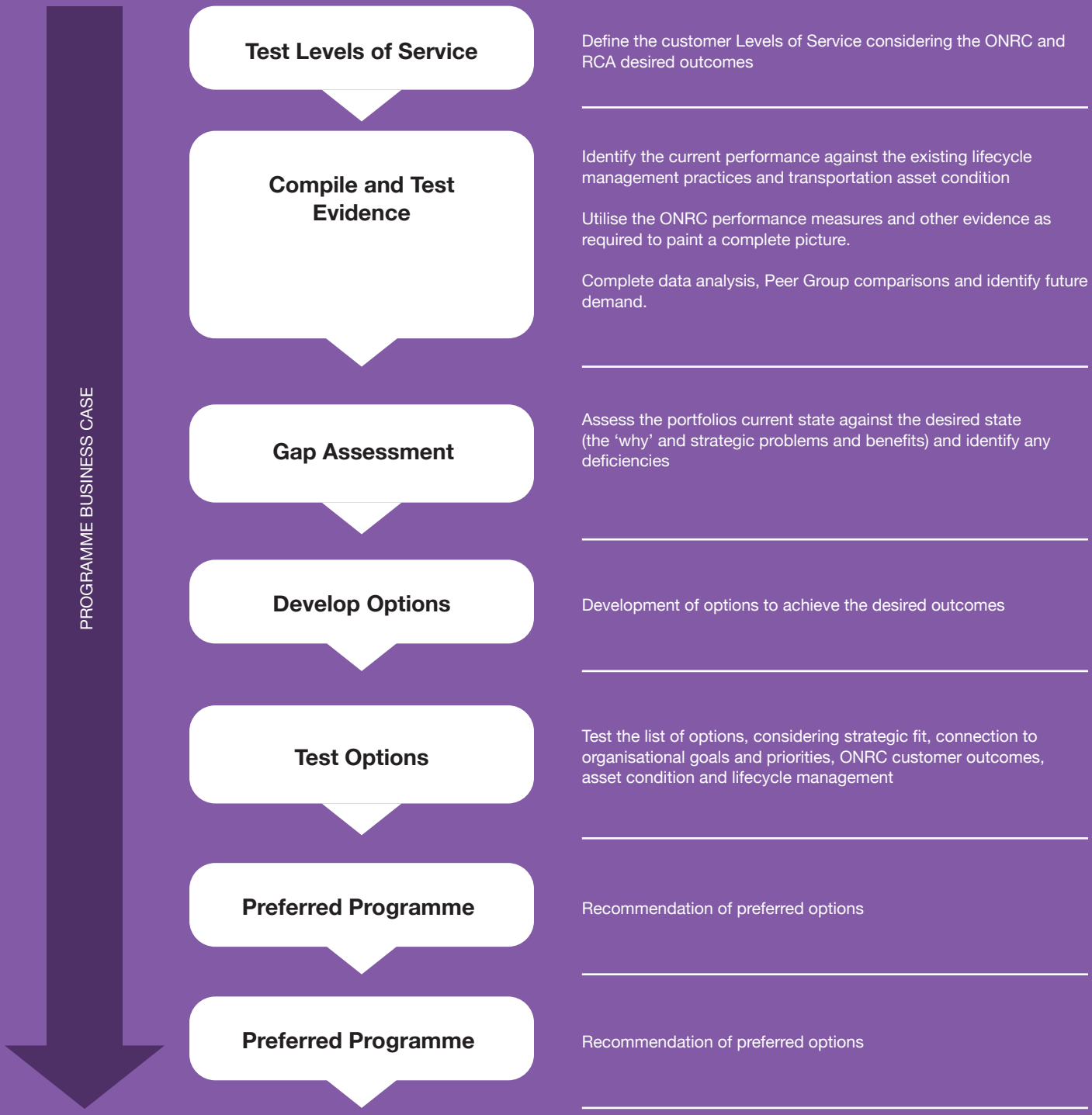
5.1 Introduction

The Programme Business Case for the transportation activity provides the case for investment in transportation assets to ensure a safe, efficient and sustainable transportation network exists now and into the future. It allows the Council and its co-investor, Waka Kotahi, the opportunity to consider a transport corridor management programme (or combination of, programmes) to adopt by allowing a trade-off to be made between risks and benefits.

A systematic approach is required in the development of the Programme Business Case for the transportation activity to ensure that key messages in the investment story are adequately communicated to investors. The Programme Business Case also demonstrates an understanding of the strategic objectives for the transportation activity by a strong linkage to the benefits and problems identified in Section 3: Levels of Service of this AMP.

The Programme Business Case pulls together the key investment related information from other sections of this AMP and summarises them into a succinct synopsis of the case for investment in the transportation activity. The Programme Business Case development process is shown in **Figure 34**.

Figure 34: The Programme Business Case Development Process



5.1.1 Investment Summary

Section 3: Level of Service of this AMP identified the following benefits for investment in the transportation activity:

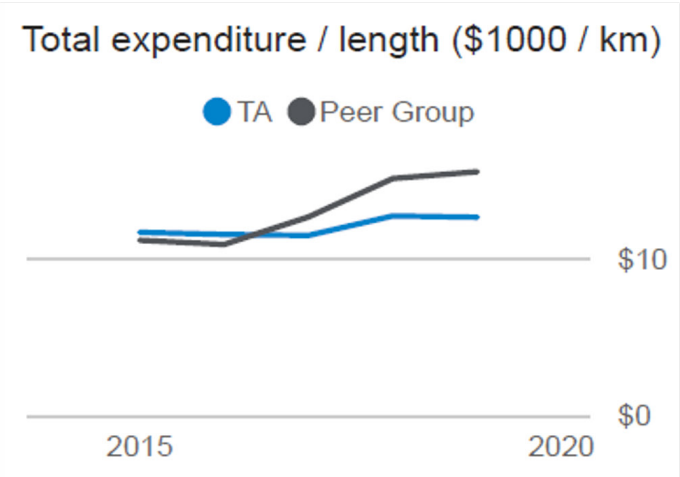
- Improved network performance
- Improved safety outcomes
- Improved economic outcomes
- Improved transport choices

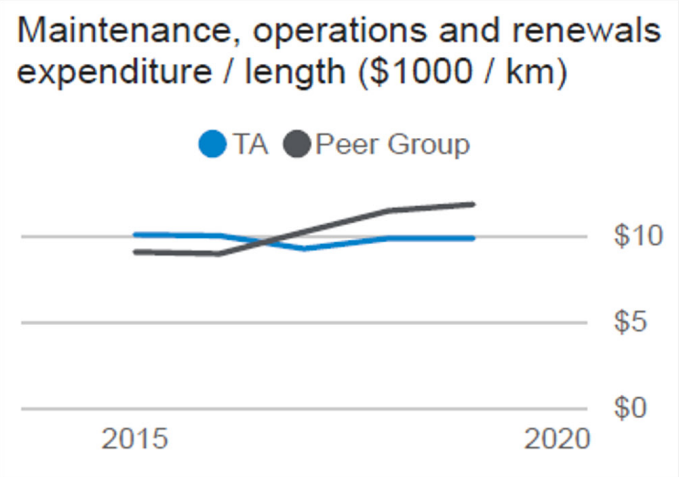
Investment in the transportation activity is described in detail in this section. The investment strategies to realise these benefits are summarised for each of the three main investment categories:

- Maintenance and operations
- Renewals
- Capital improvements

Figure 35 shows that in 2015 NPDC had an expenditure comparable to its Peer Group; however, from 2017 onwards this Peer Group has had greater expenditure. The result of a smaller expenditure has led to a greater disparity in Levels of Service when compared with the Peer Group.

Figure 35: The gap between the expenditure of NPDC and their Peer Group

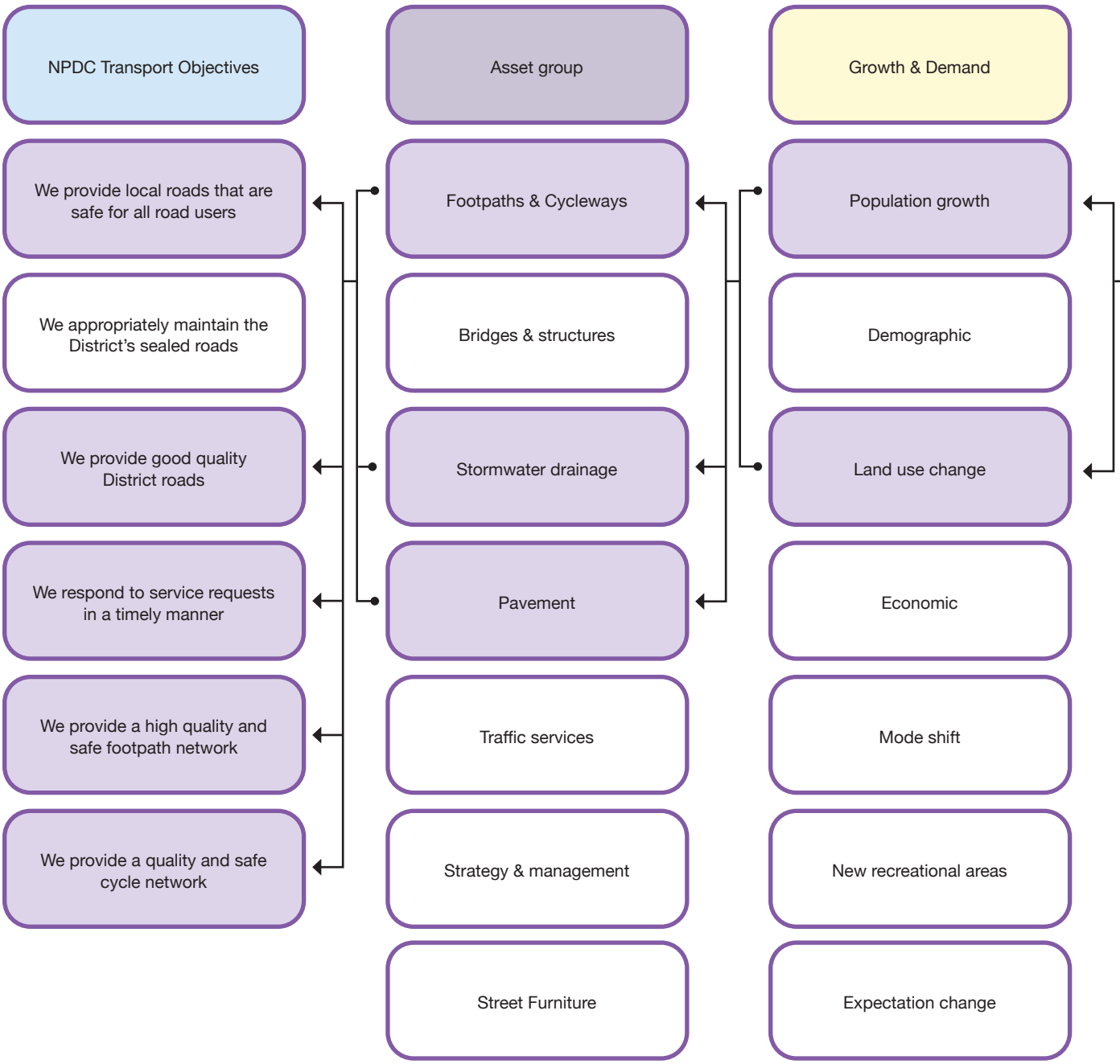




5.1.2 Capital Project Summary

The CAPEX projects discussed in the following sections cover all assets and often projects include several assets at the same time. For example, a new bridge on the Coastal Walkway applies to both the "Bridges and Structures" asset group and the "Footpaths and Cycleway" asset group. For this reason a full list of the proposed CAPEX projects and the alignment of the projects has been included in Figures 36 to 57.

Figure 36: Alignment of road widening CAPEX projects



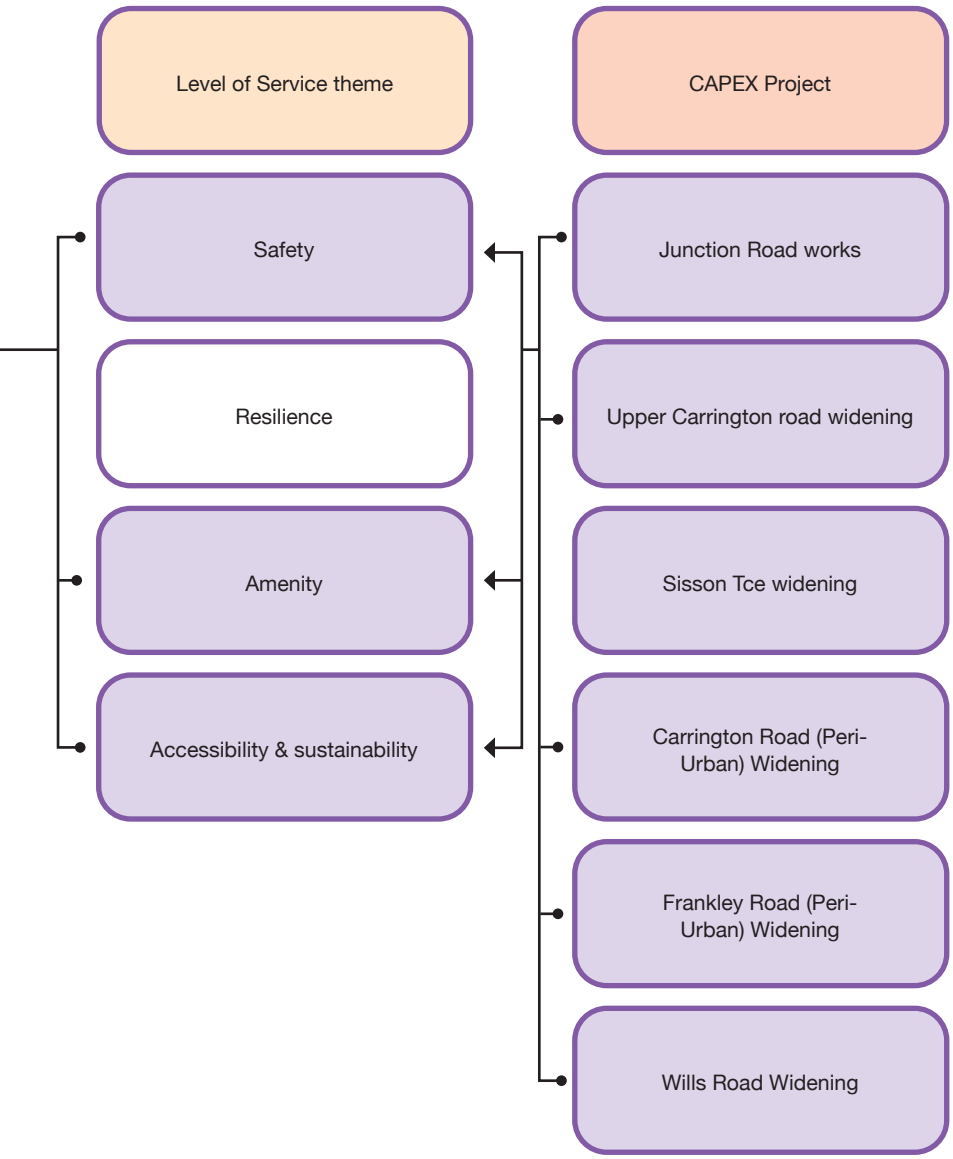
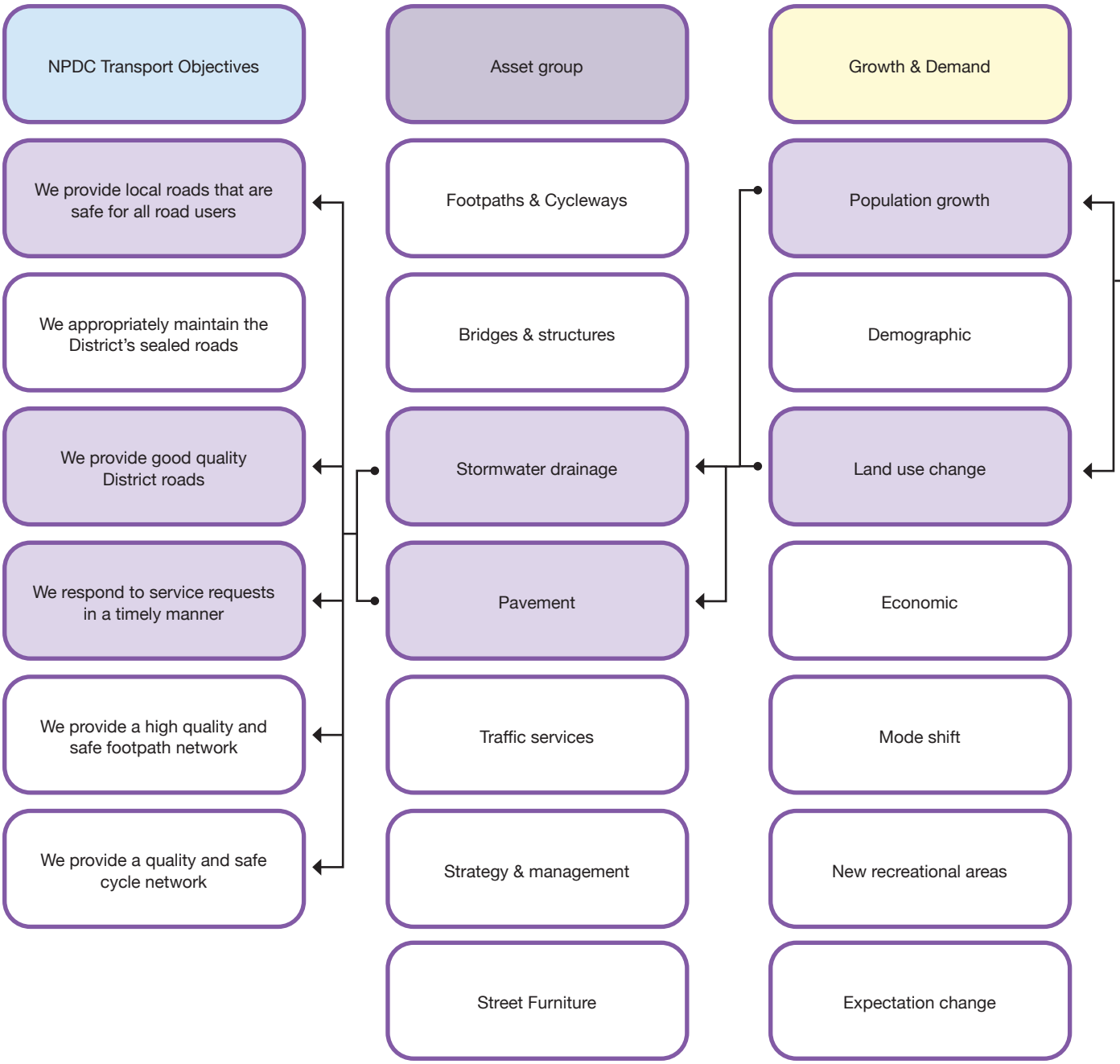

Level of Service theme
CAPEX Project
Safety
Resilience
Amenity
Accessibility & sustainability
Junction Road works
Upper Carrington road widening
Sisson Tce widening
Carrington Road (Peri-Urban) Widening
Frankley Road (Peri-Urban) Widening
Wills Road Widening

Figure 37: Alignment of rural CAPEX projects



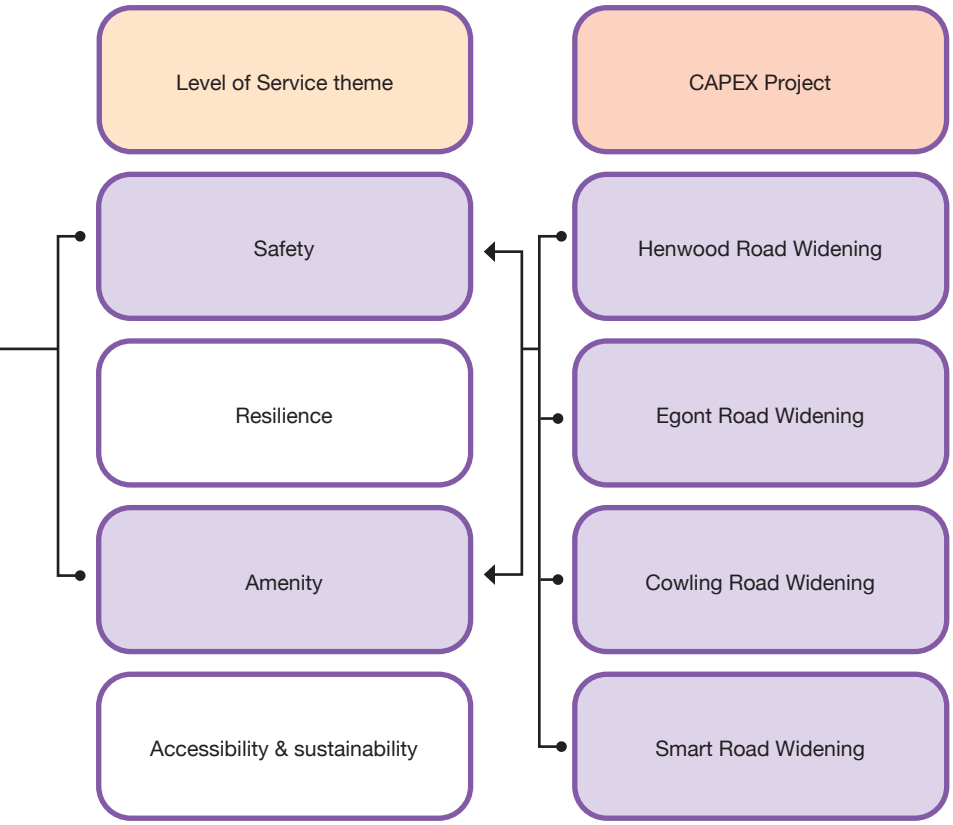
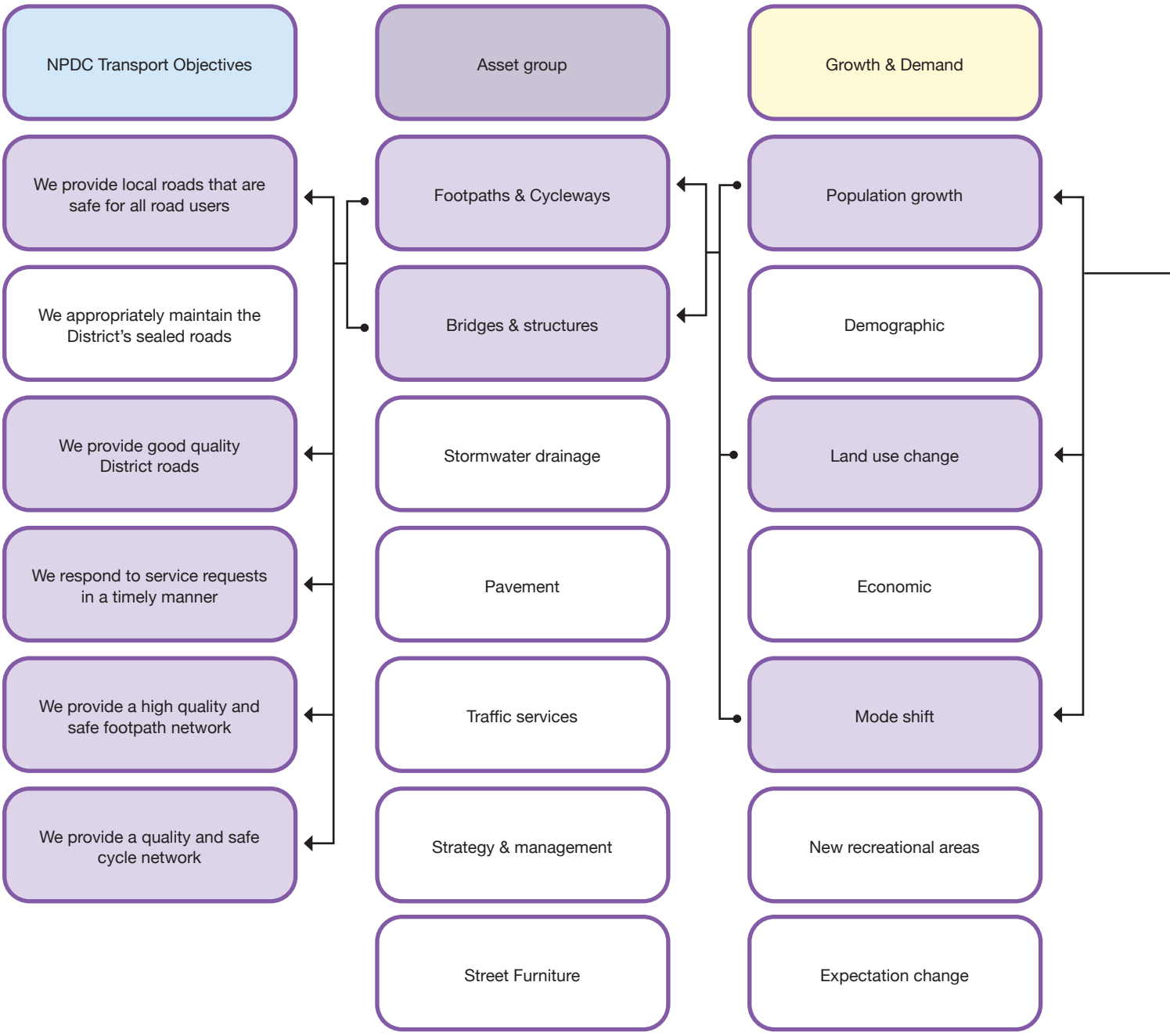

Level of Service theme
CAPEX Project
Safety
Resilience
Amenity
Accessibility & sustainability
Henwood Road Widening
Egont Road Widening
Cowling Road Widening
Smart Road Widening

Figure 38: Alignment of walking and cycling bridge CAPEX projects



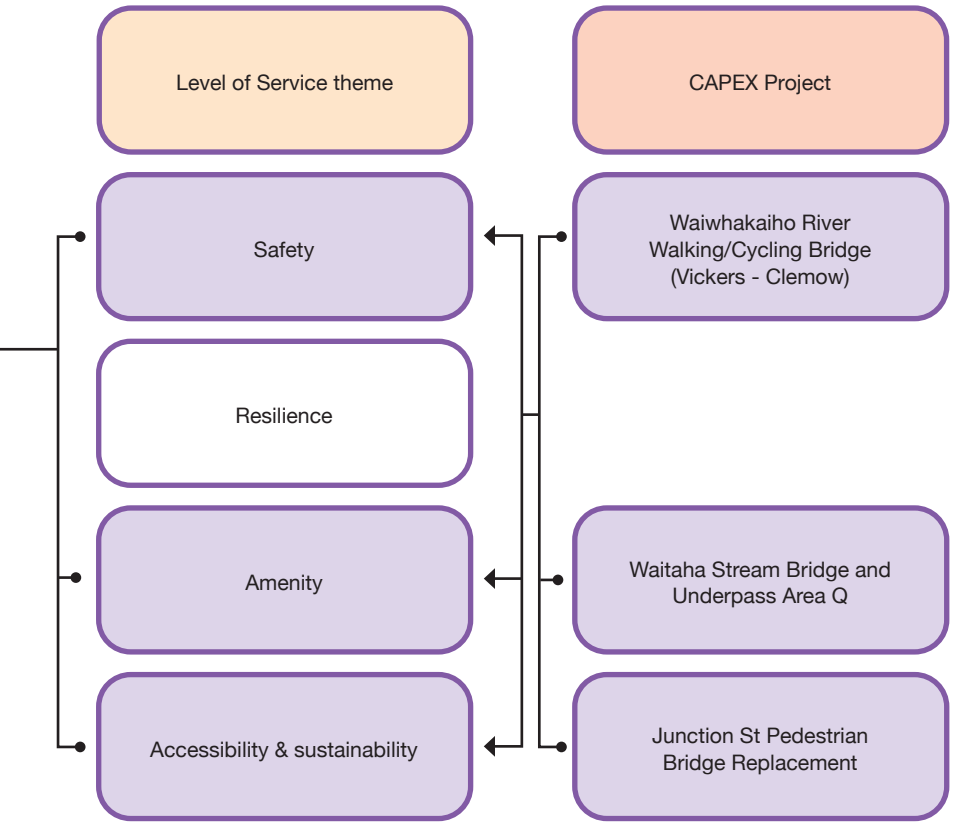
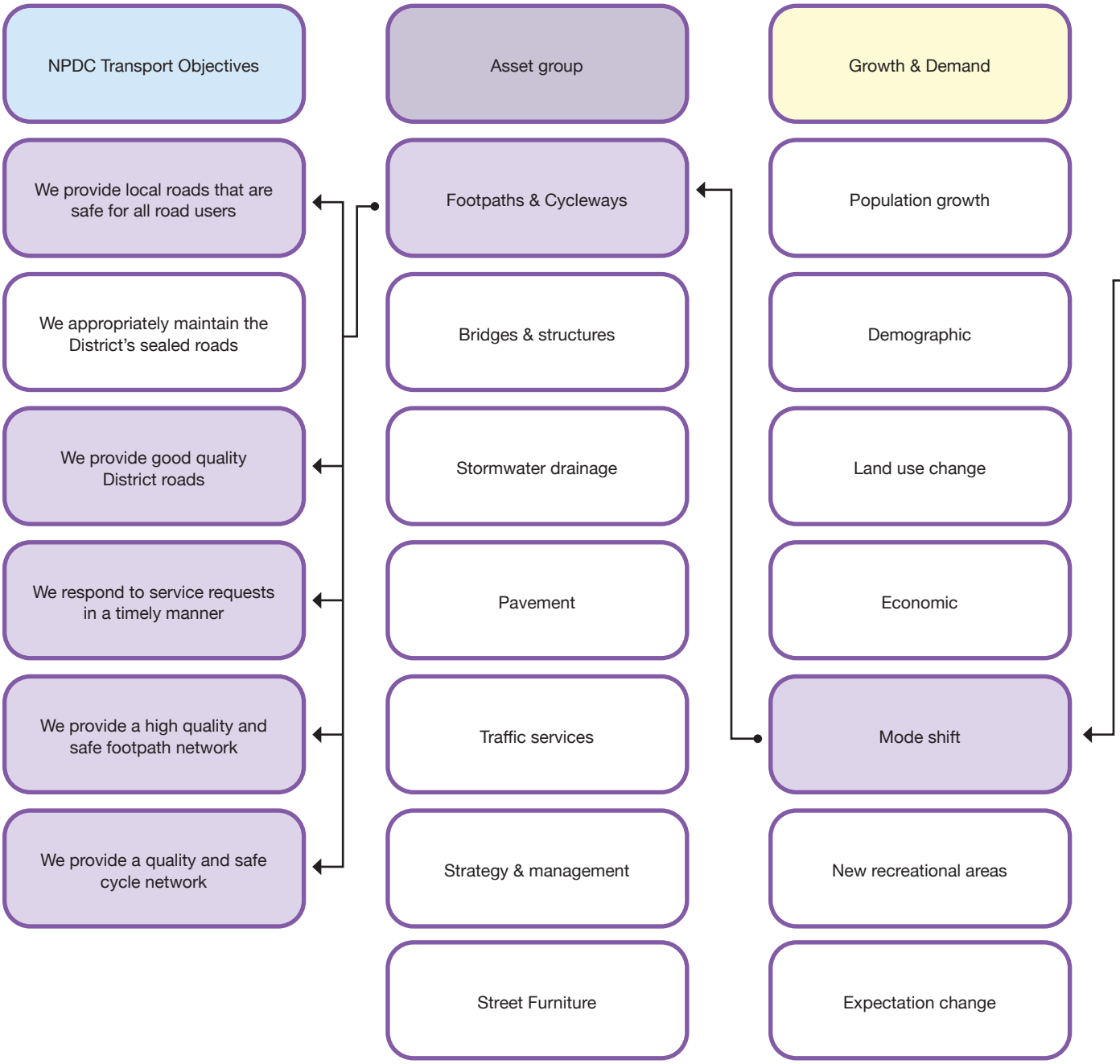

Level of Service theme
CAPEX Project
Safety
Waiwhakaiho River Walking/Cycling Bridge (Vickers - Clemow)
Resilience
Amenity
Waitaha Stream Bridge and Underpass Area Q
Accessibility & sustainability
Junction St Pedestrian Bridge Replacement

Figure 39: Alignment of walking and cycling CAPEX projects



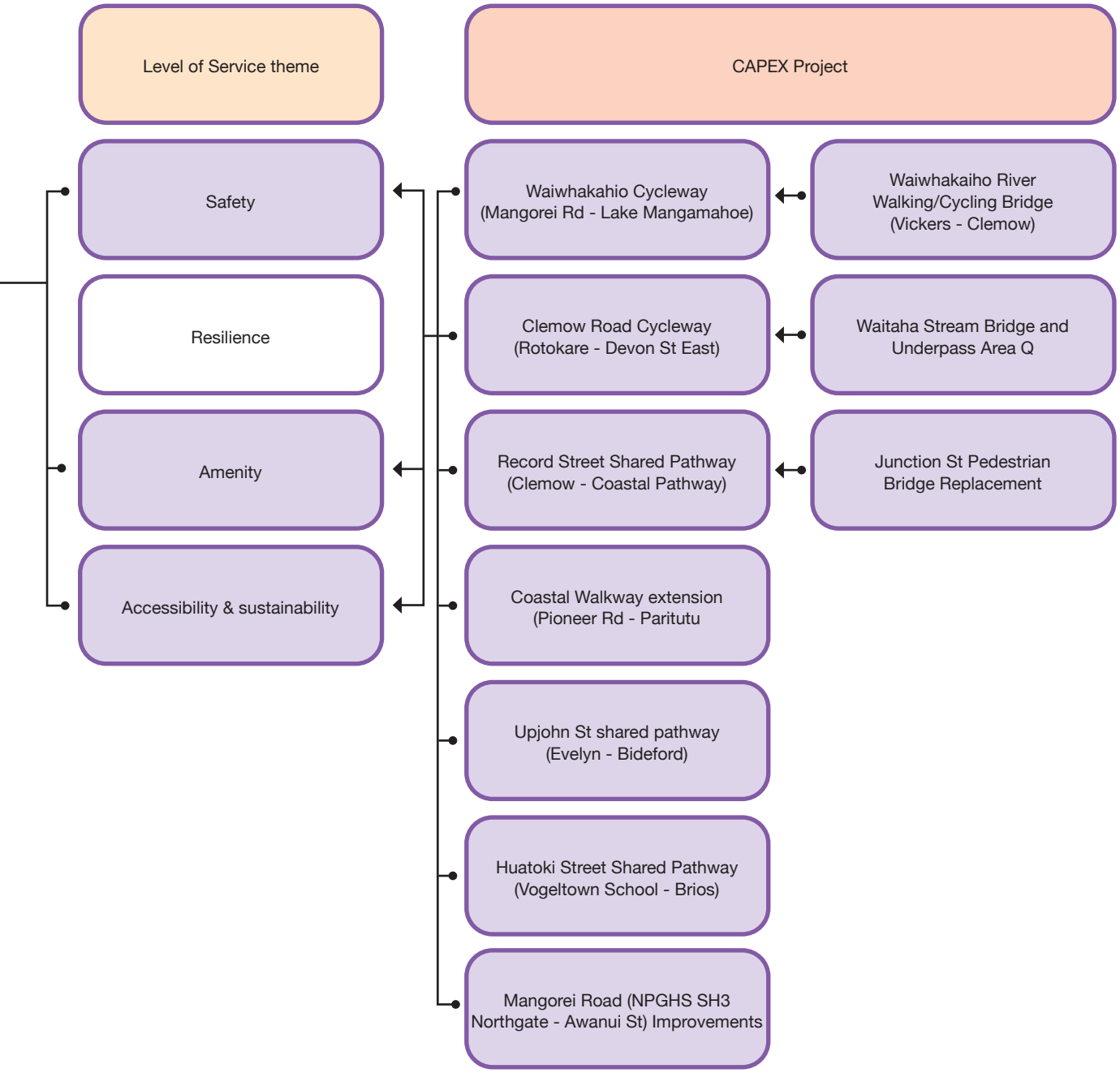
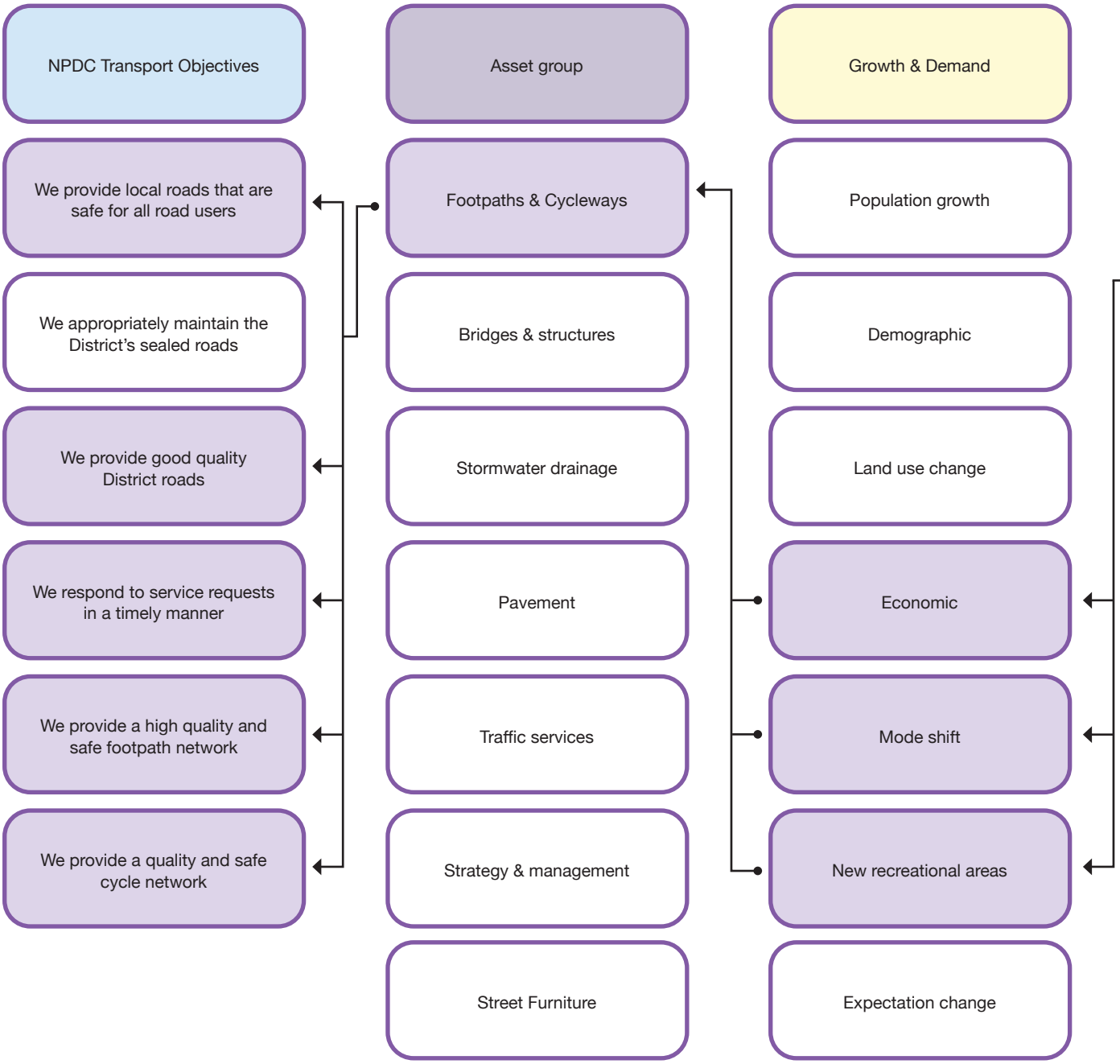

Level of Service theme
CAPEX Project
Safety
Resilience
Amenity
Accessibility & sustainability
Waiwhakahio Cycleway (Mangorei Rd - Lake Mangamahoe)
Waiwhakaiho River Walking/Cycling Bridge (Vickers - Clemow)
Clemow Road Cycleway (Rotokare - Devon St East)
Waitaha Stream Bridge and Underpass Area Q
Record Street Shared Pathway (Clemow - Coastal Pathway)
Junction St Pedestrian Bridge Replacement
Coastal Walkway extension (Pioneer Rd - Paritutu
Upjohn St shared pathway (Evelyn - Bideford)
Huatoki Street Shared Pathway (Vogeltown School - Brios)
Mangorei Road (NPGHS SH3 Northgate - Awanui St) Improvements

Figure 40: Alignment of cycleway CAPEX projects



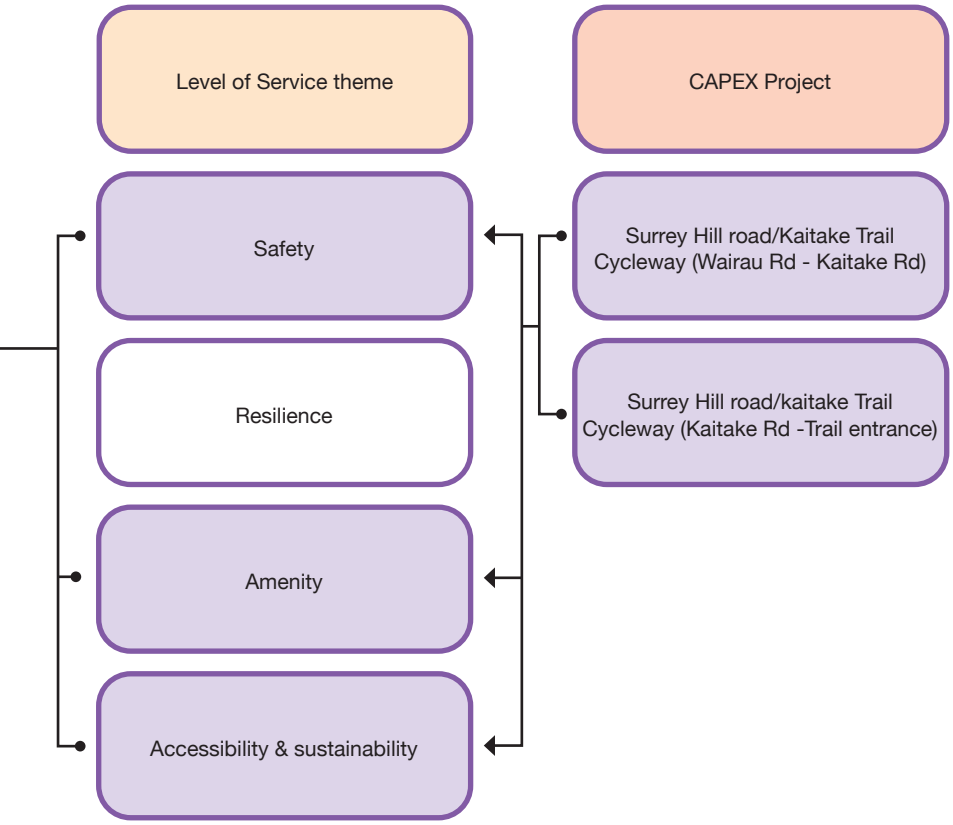
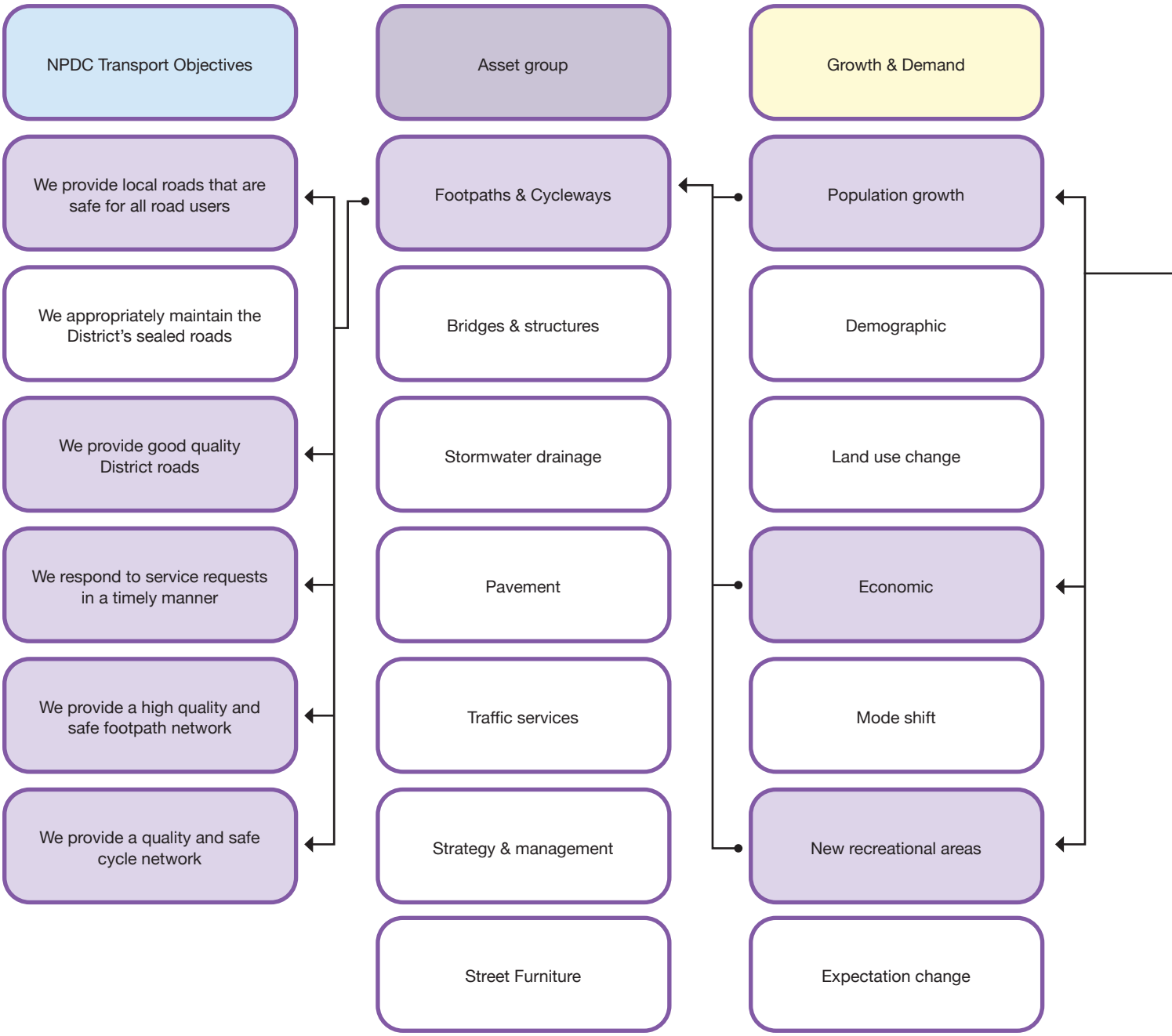

Level of Service theme
CAPEX Project
Safety
Surrey Hill road/Kaitake Trail Cycleway (Wairau Rd - Kaitake Rd)
Resilience
Surrey Hill road/kaitake Trail Cycleway (Kaitake Rd -Trail entrance)
Amenity
Accessibility & sustainability

Figure 41: Alignment of shared pathway CAPEX projects caused by land use change



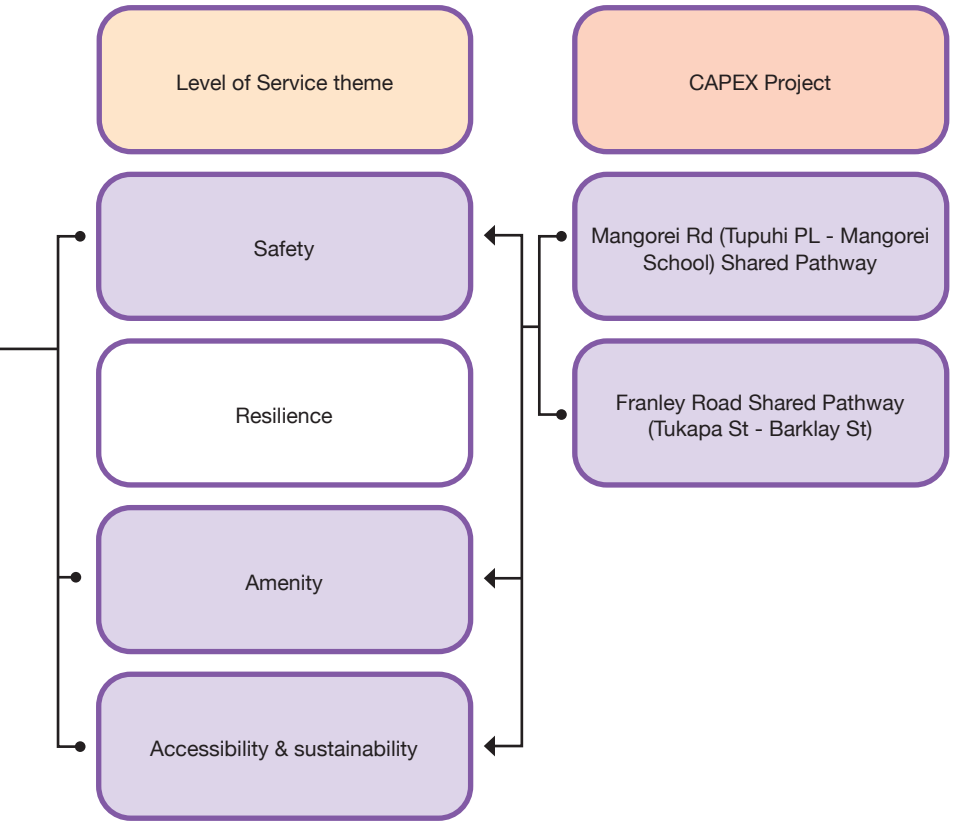
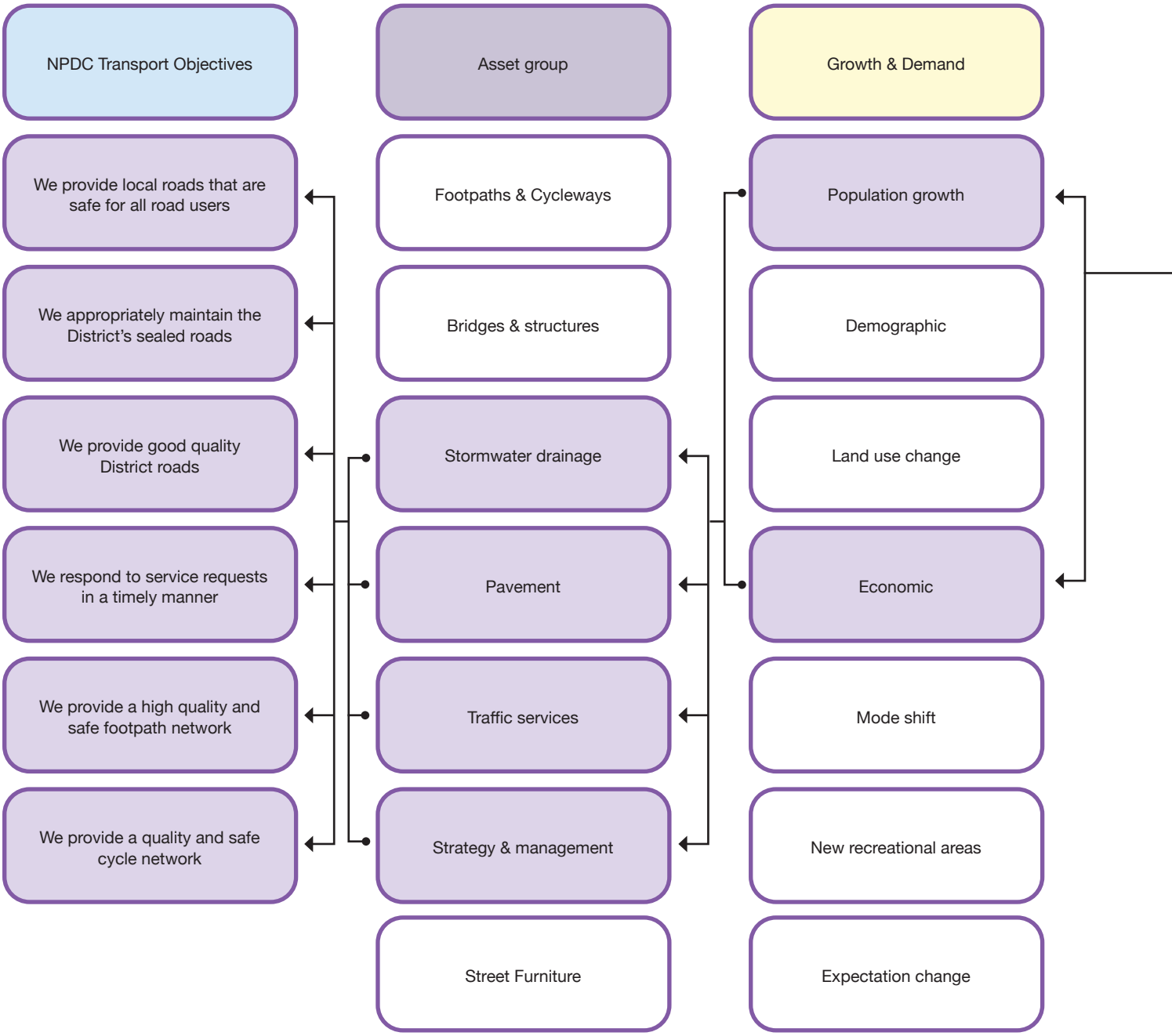

Level of Service theme
CAPEX Project
Safety
Mangorei Rd (Tupuhi PL - Mangorei School) Shared Pathway
Resilience
Franley Road Shared Pathway (Tukapa St - Barklay St)
Amenity
Accessibility & sustainability

Figure 42: Alignment of urban intersection CAPEX projects



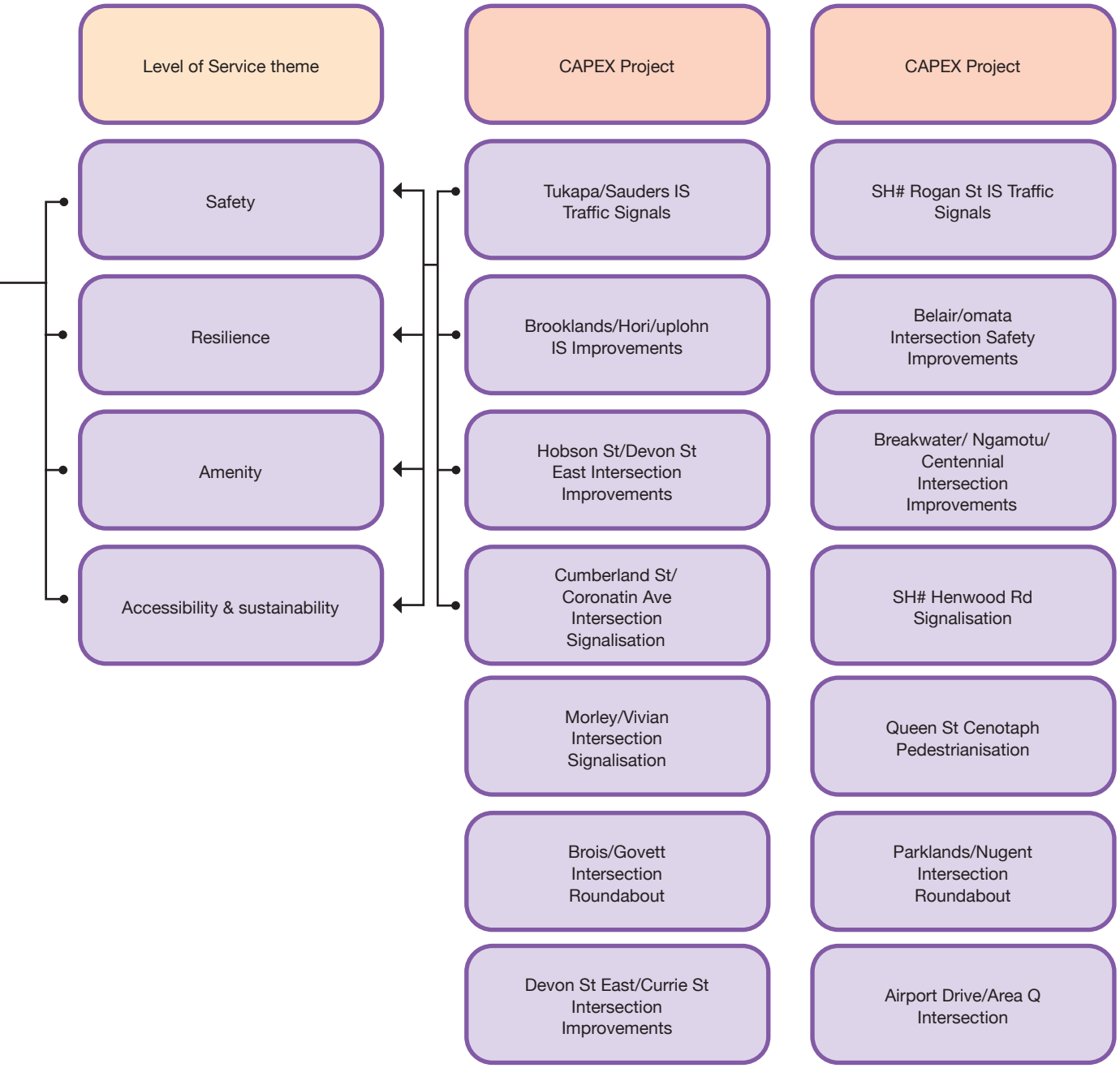
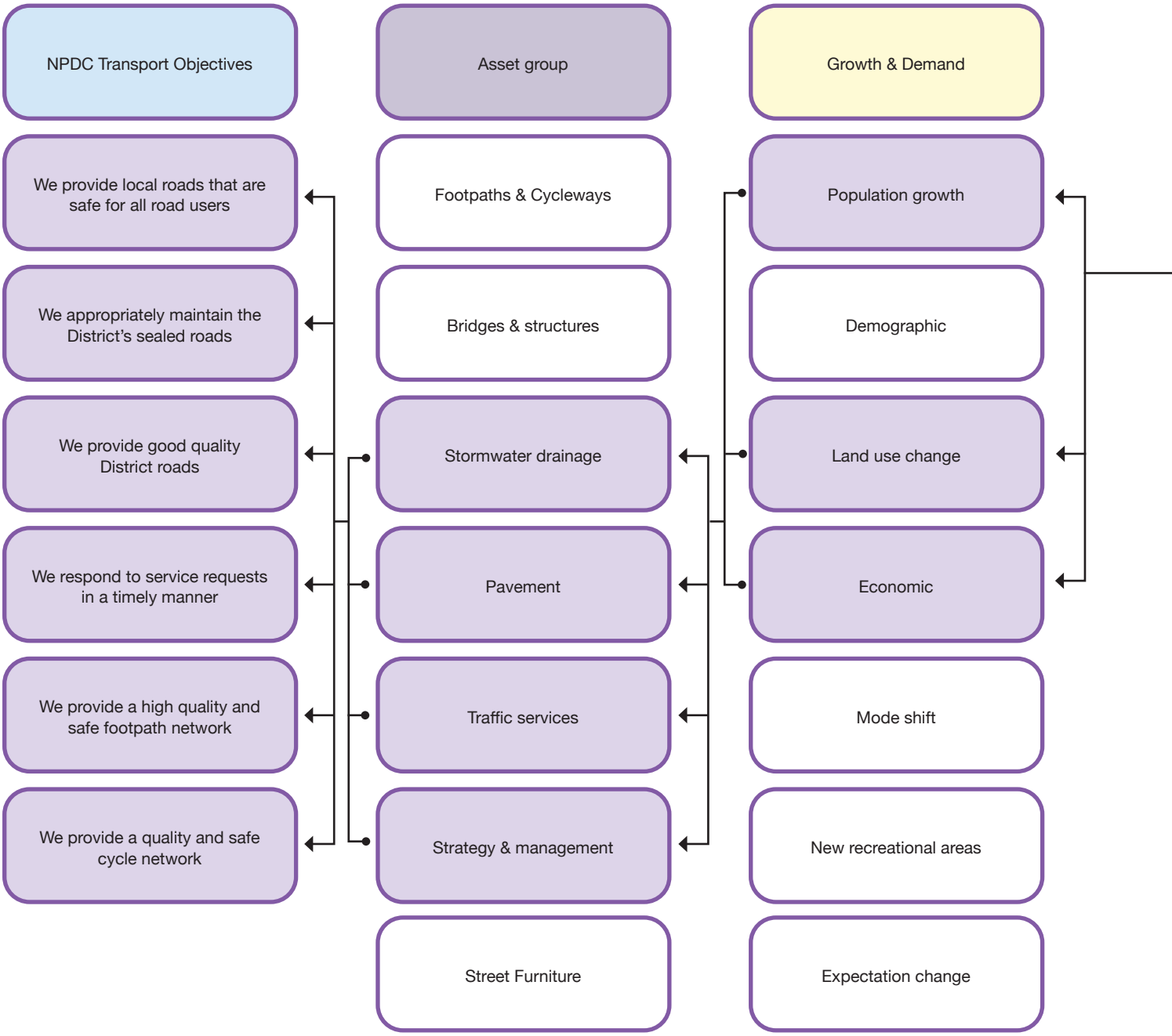

Level of Service theme
CAPEX Project
CAPEX Project
Safety
Resilience
Amenity
Accessibility & sustainability
Tukapa/Sauders IS Traffic Signals
Brooklands/Hori/uplohn IS Improvements
Hobson St/Devon St East Intersection Improvements
Cumberland St/ Coronatin Ave Intersection Signalisation
Morley/Vivian Intersection Signalisation
Brois/Govett Intersection Roundabout
Devon St East/Currie St Intersection Improvements
SH# Rogan St IS Traffic Signals
Belair/omata Intersection Safety Improvements
Breakwater/ Ngamotu/ Centennial Intersection Improvements
SH# Henwood Rd Signalisation
Queen St Cenotaph Pedestrianisation
Parklands/Nugent Intersection Roundabout
Airport Drive/Area Q Intersection

Figure 43: Alignment of rural road extension CAPEX projects



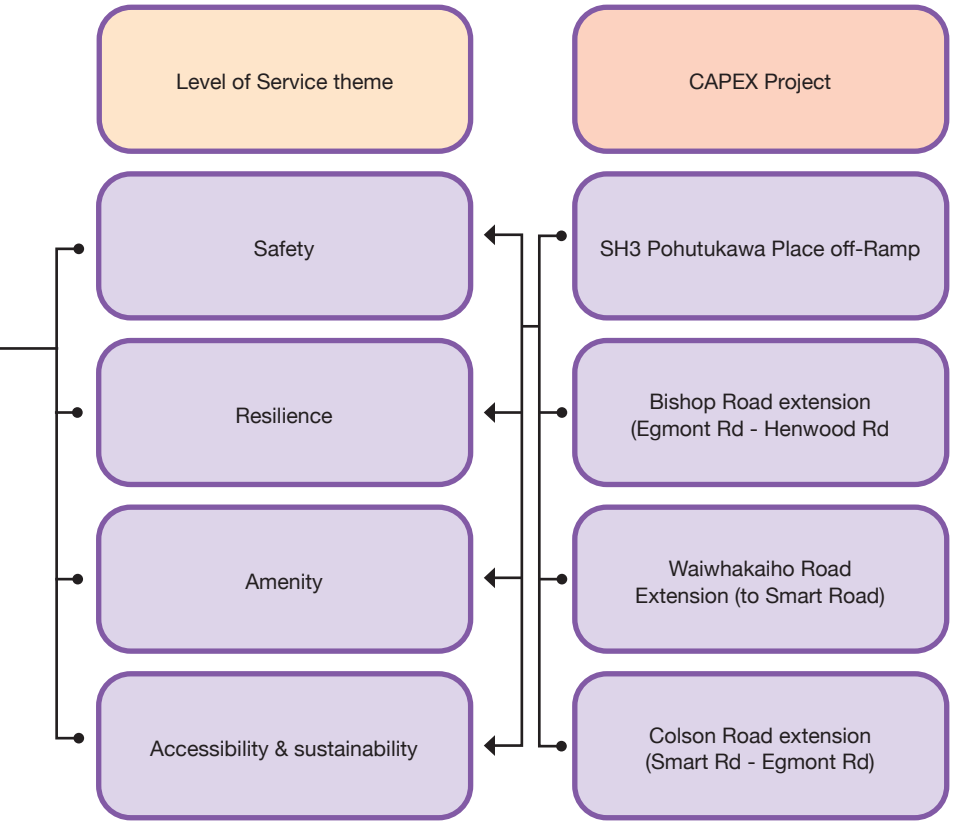
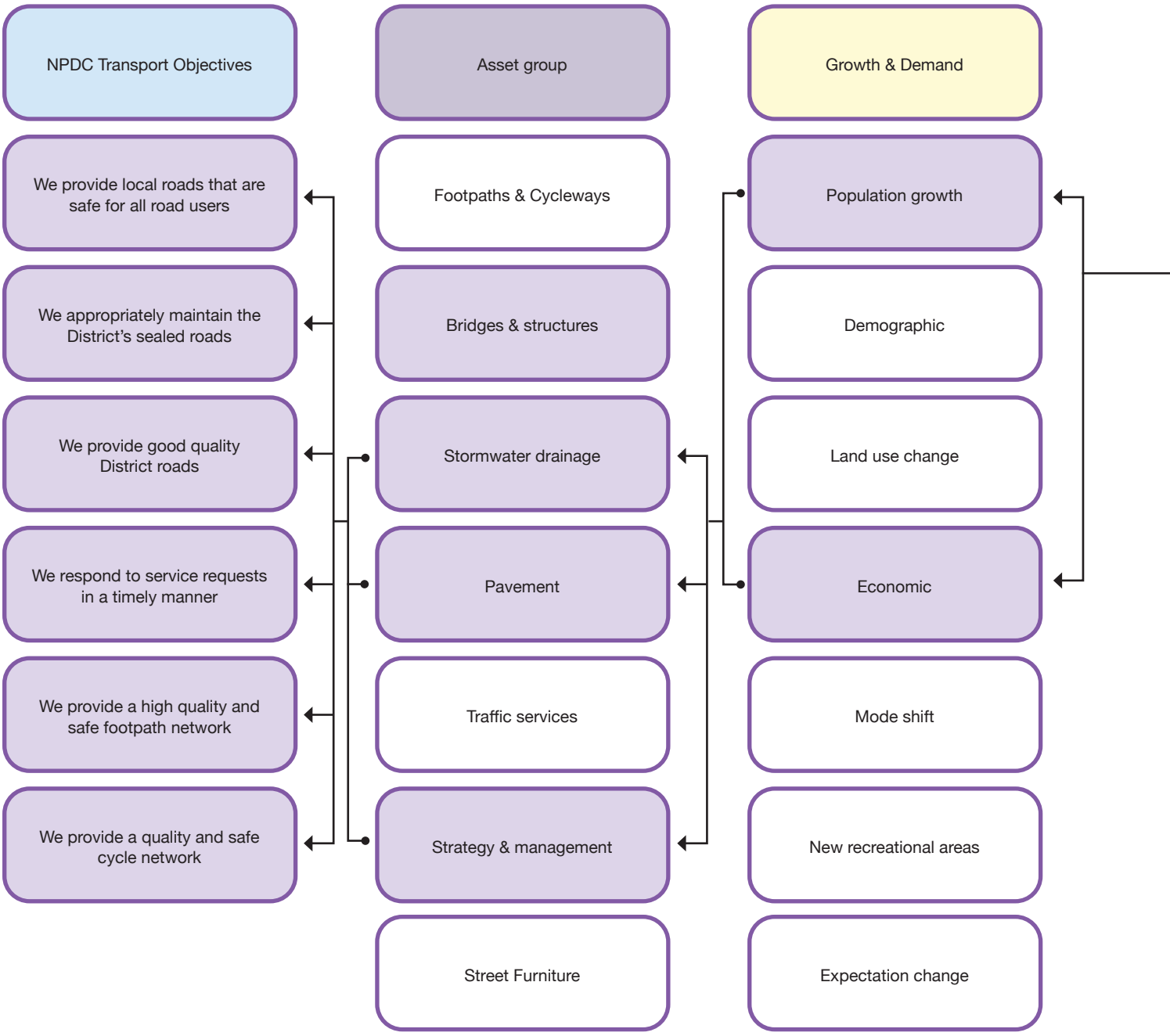

Level of Service theme
CAPEX Project
Safety
Resilience
Amenity
Accessibility & sustainability
SH3 Pohutukawa Place off-Ramp
Bishop Road extension
(Egmont Rd - Henwood Rd
Waiwhakaiho Road
Extension (to Smart Road)
Colson Road extension
(Smart Rd - Egmont Rd)

Figure 44: Alignment of new rural bridge CAPEX project



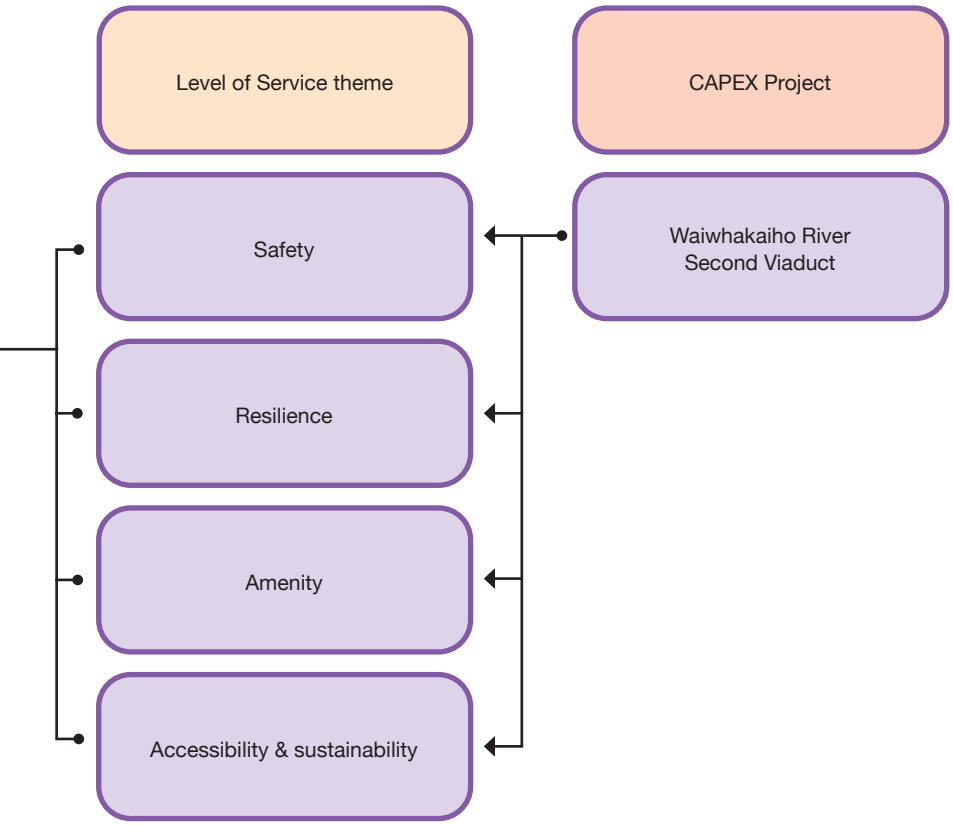
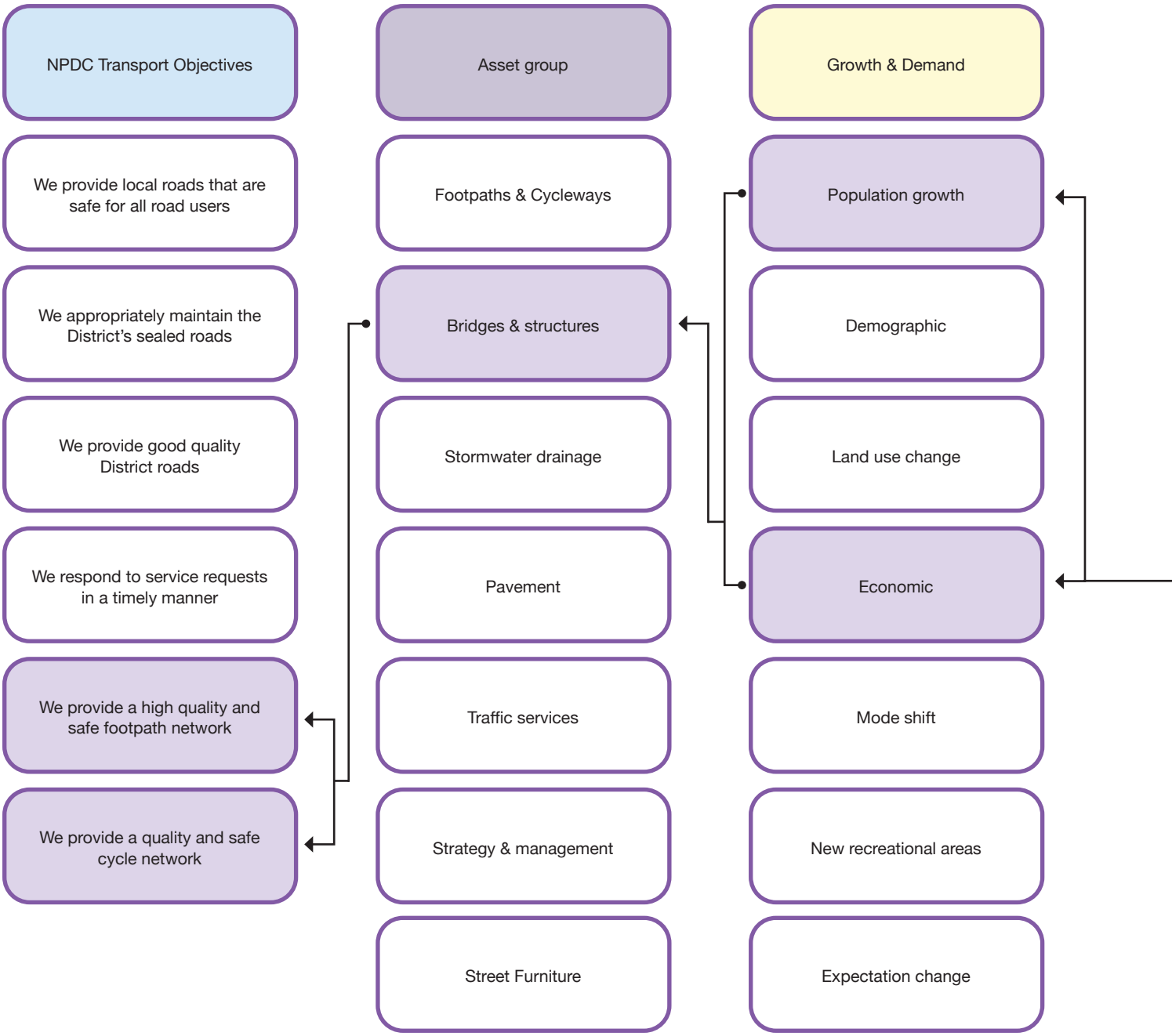

Level of Service theme
CAPEX Project
Safety
Waiwhakaiho River Second Viaduct
Resilience
Amenity
Accessibility & sustainability

Figure 45: Alignment of urban bridge replacement CAPEX project



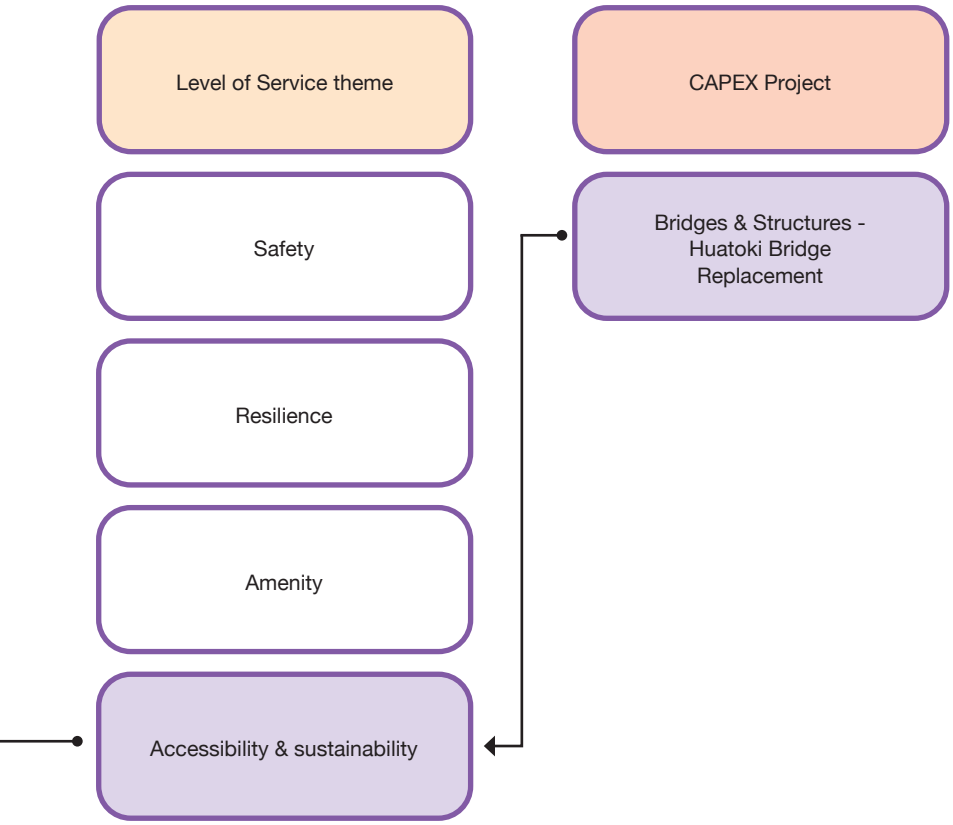
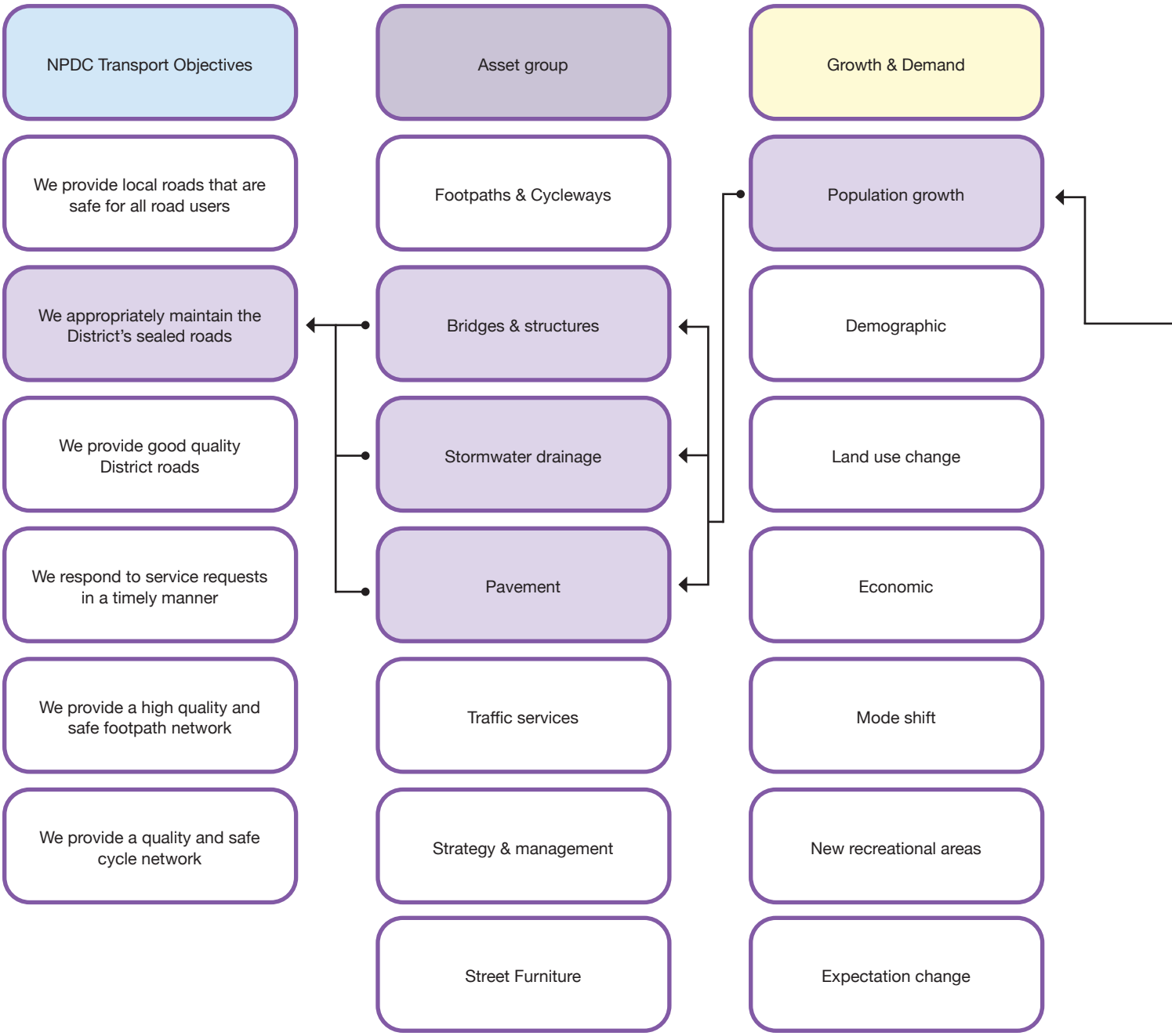

Level of Service theme
CAPEX Project
Safety
Bridges & Structures - Huatoki Bridge Replacement
Resilience
Amenity
Accessibility & sustainability

Figure 46: Alignment of rural structures CAPEX projects



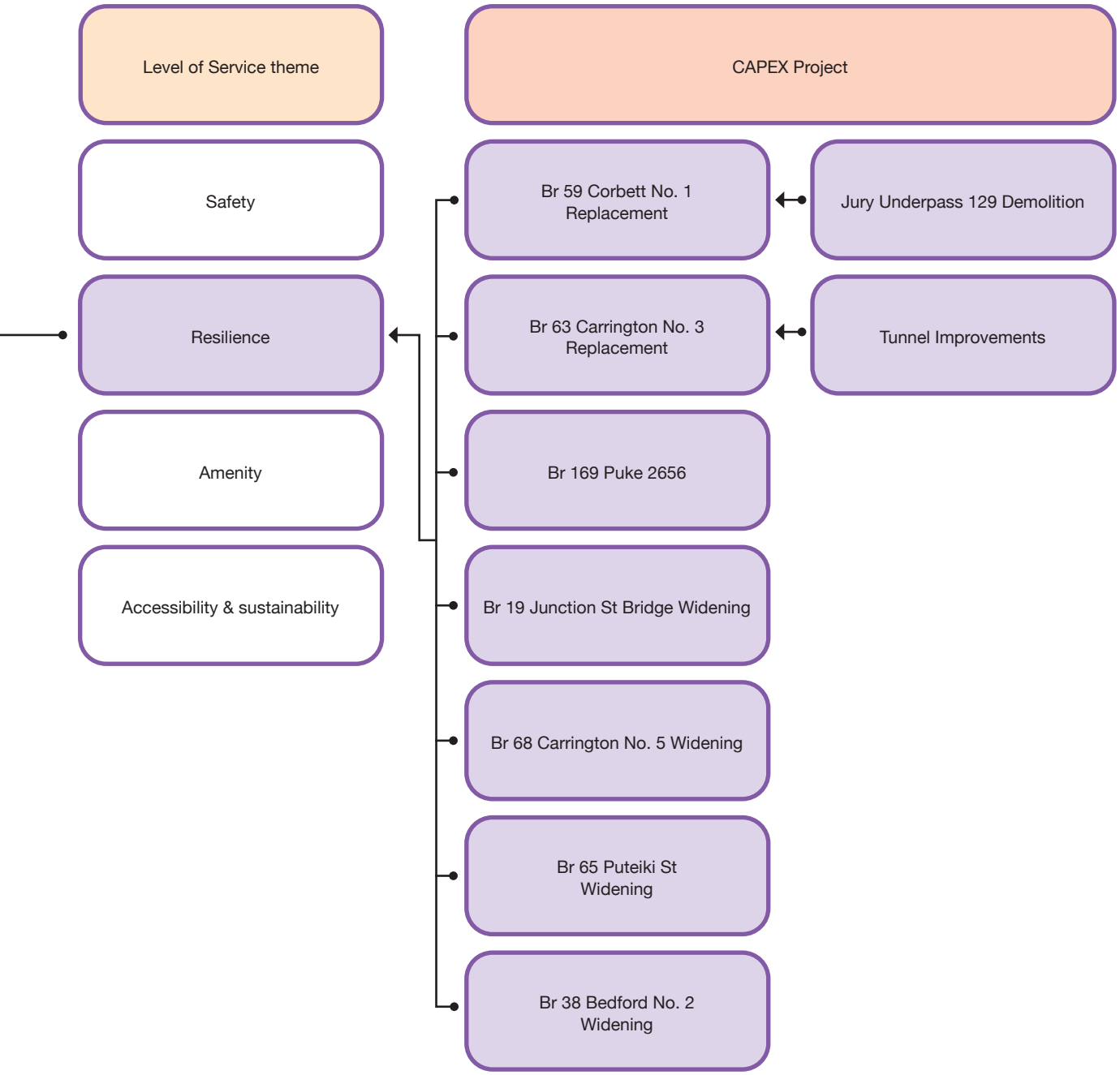
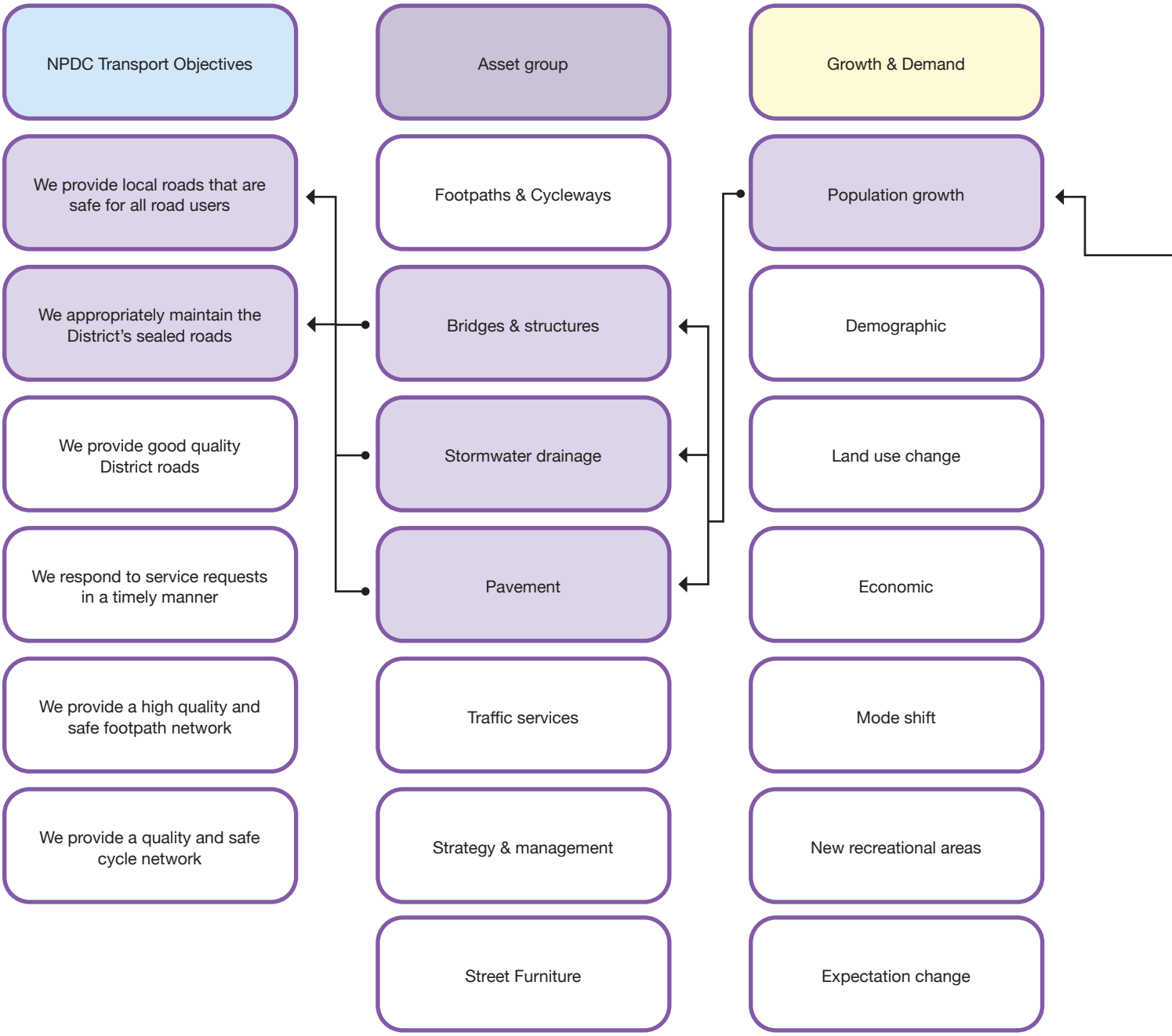

Level of Service theme
CAPEX Project
Safety
Resilience
Amenity
Accessibility & sustainability
Br 59 Corbett No. 1 Replacement
Br 63 Carrington No. 3 Replacement
Br 169 Puke 2656
Br 19 Junction St Bridge Widening
Br 68 Carrington No. 5 Widening
Br 65 Puteiki St Widening
Br 38 Bedford No. 2 Widening
Jury Underpass 129 Demolition
Tunnel Improvements

Figure 47: Alignment of structural upgrade CAPEX projects



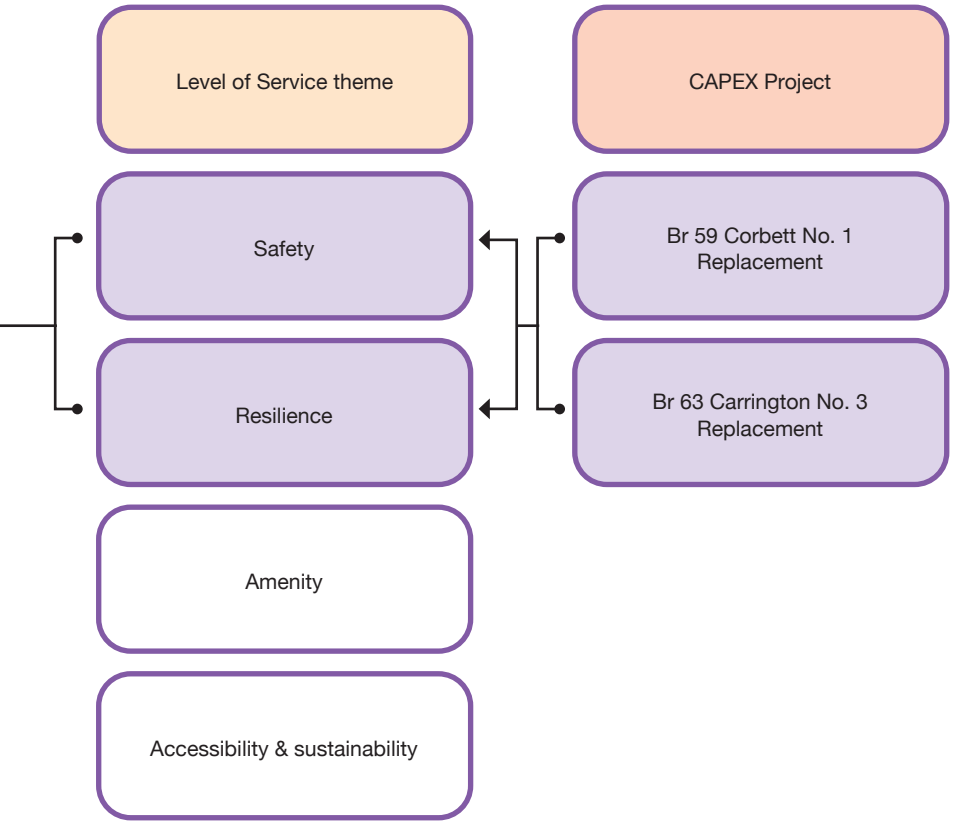
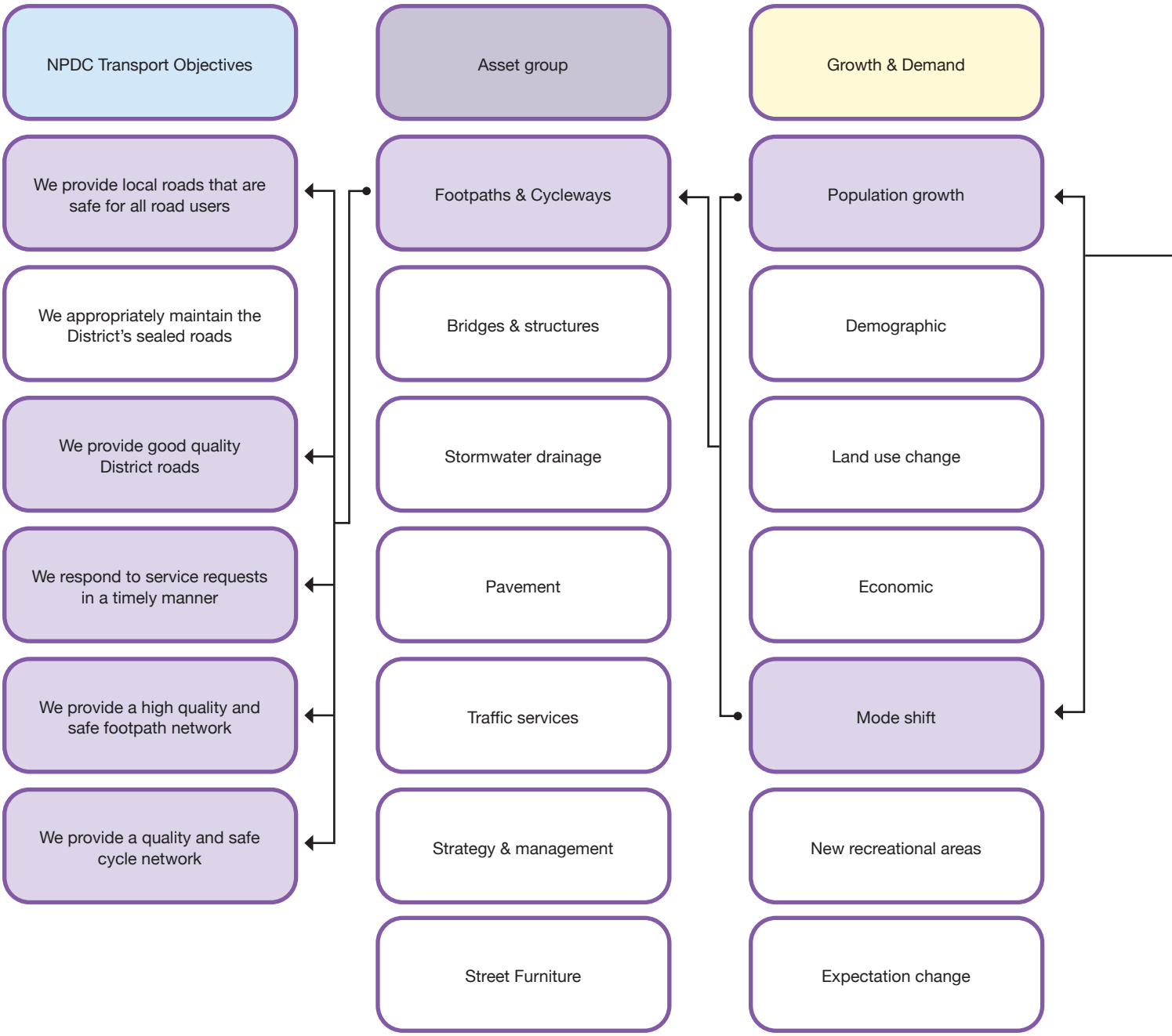

Level of Service theme
CAPEX Project
Safety
Br 59 Corbett No. 1 Replacement
Resilience
Br 63 Carrington No. 3 Replacement
Amenity
Accessibility & sustainability

Figure 48: Alignment of walking CAPEX projects focusing on improved accessibility



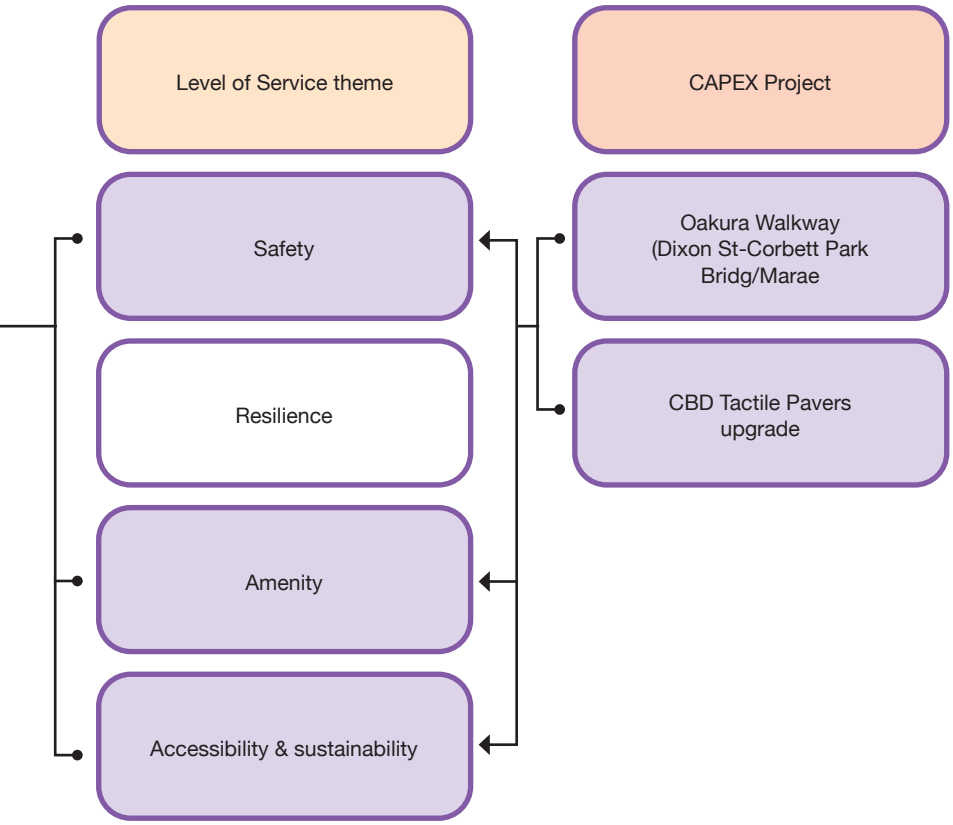
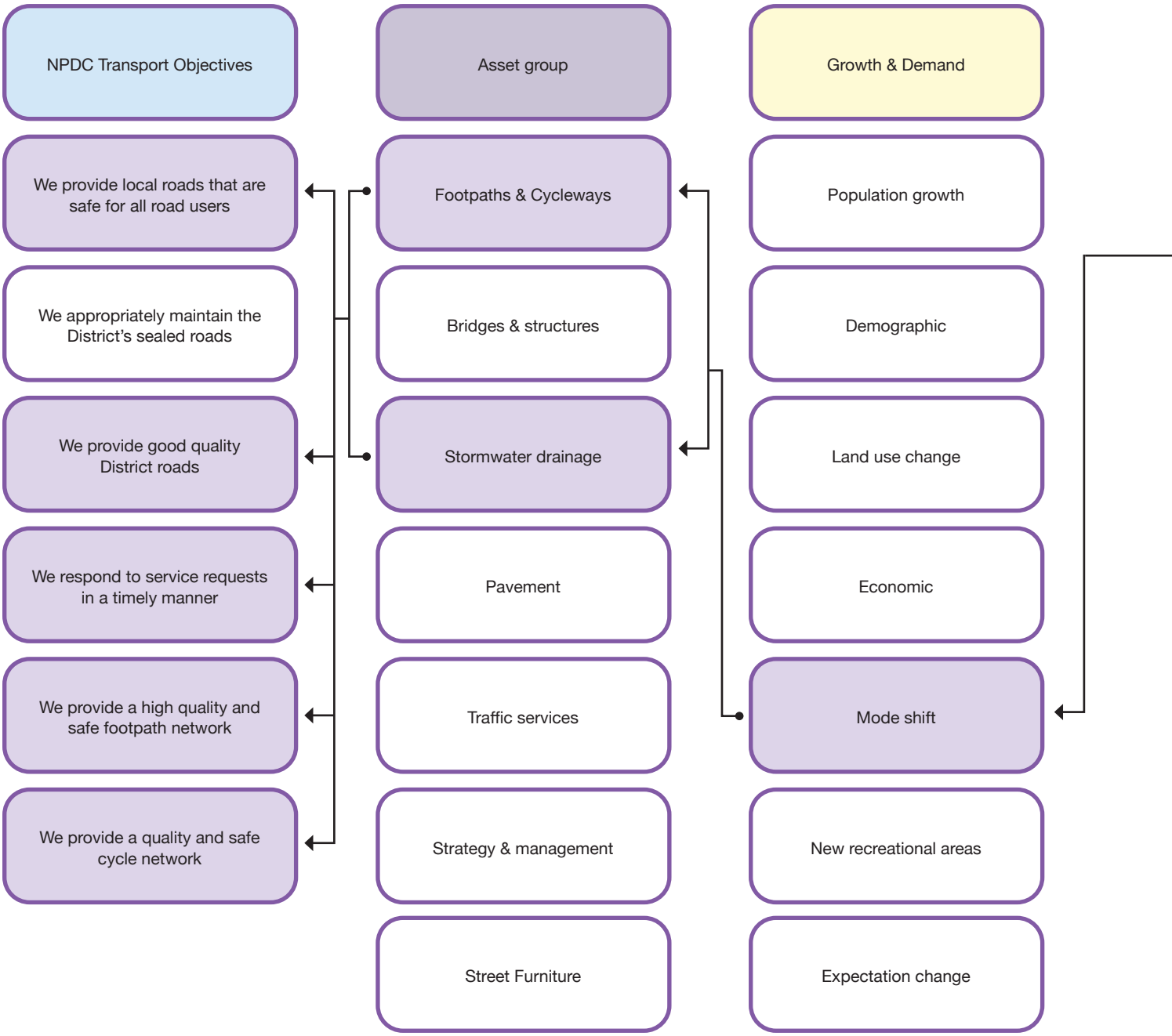

Level of Service theme
CAPEX Project
Safety
Oakura Walkway (Dixon St-Corbett Park Bridg/Marae
Resilience
CBD Tactile Pavers upgrade
Amenity
Accessibility & sustainability

Figure 49: Alignment of the walking and stormwater CAPEX project



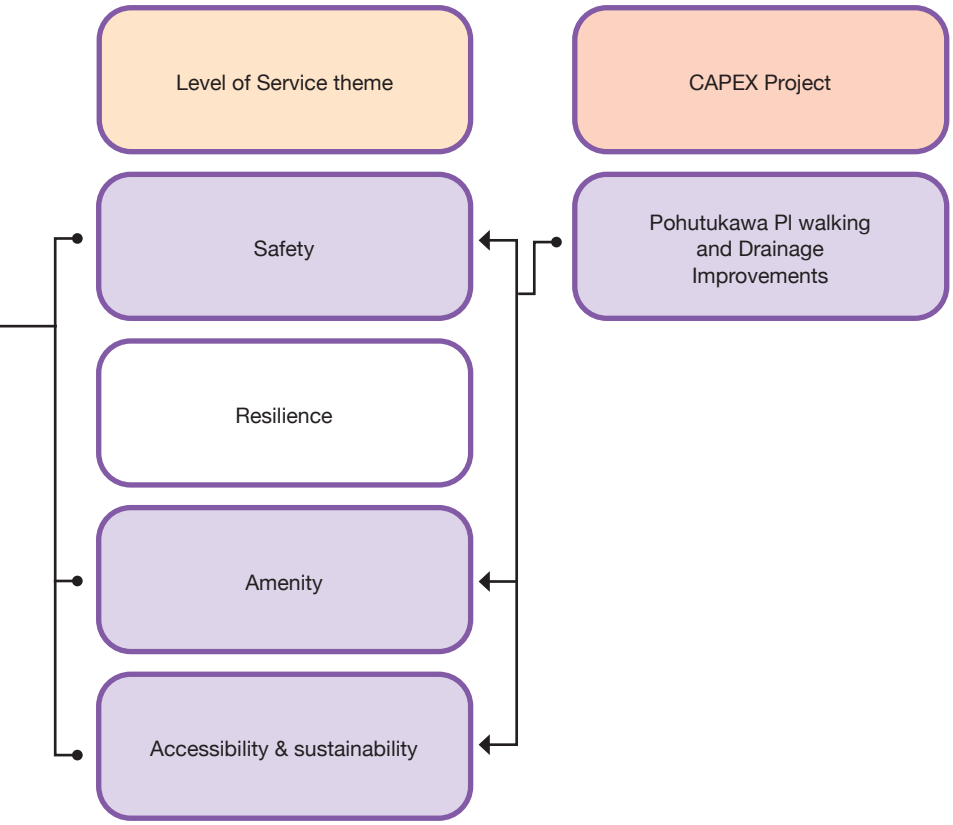
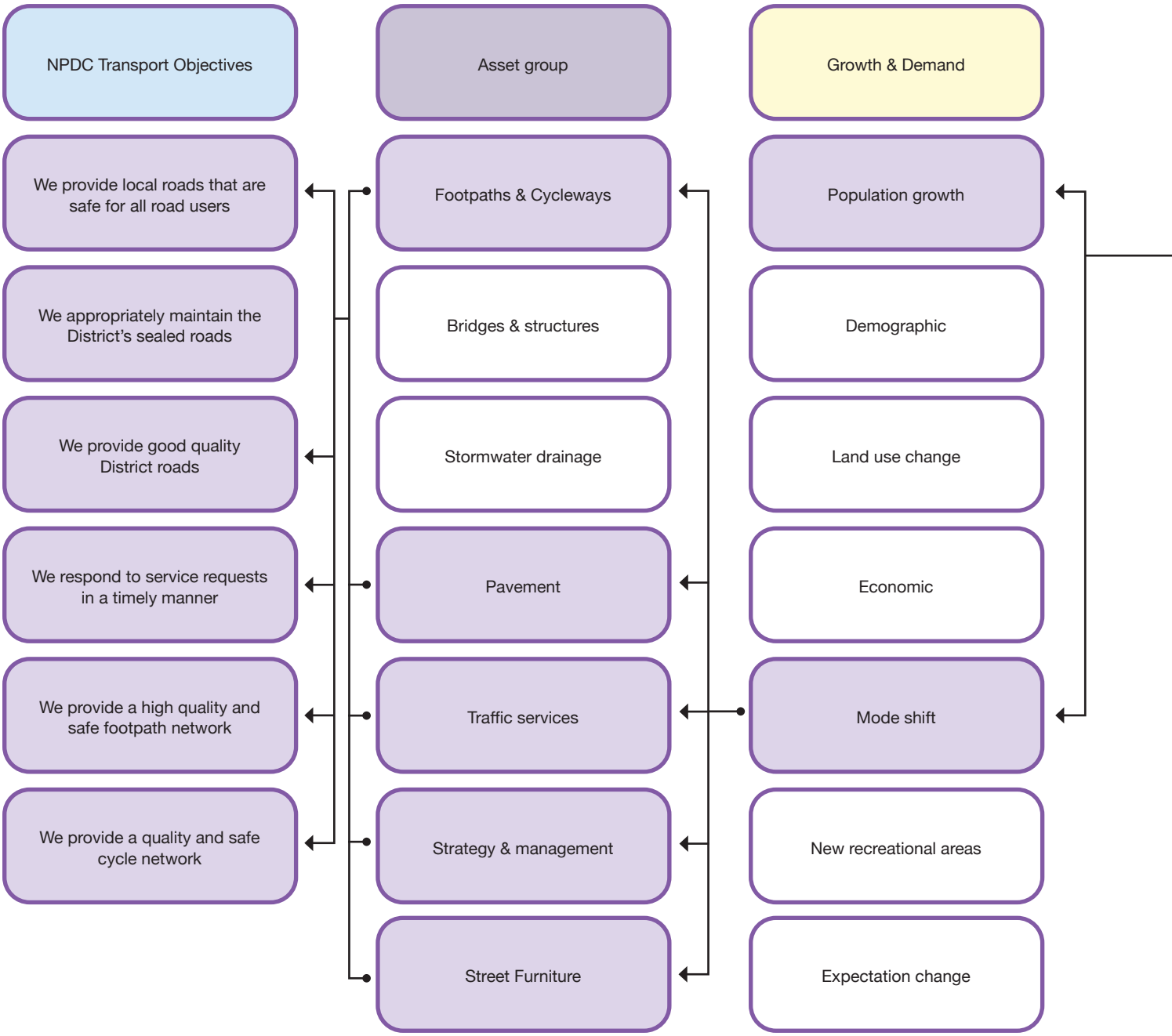

Level of Service theme
CAPEX Project
Safety
Pohutukawa Pl walking and Drainage Improvements
Resilience
Amenity
Accessibility & sustainability

Figure 50: Alignment of the placemaking CAPEX projects



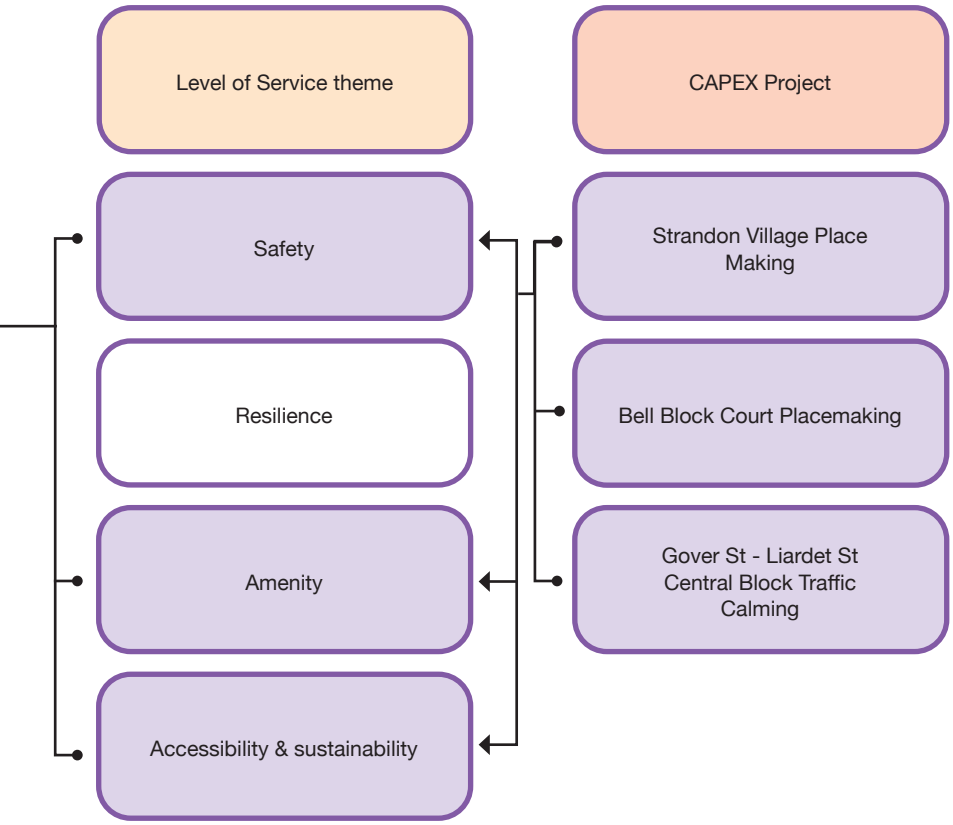
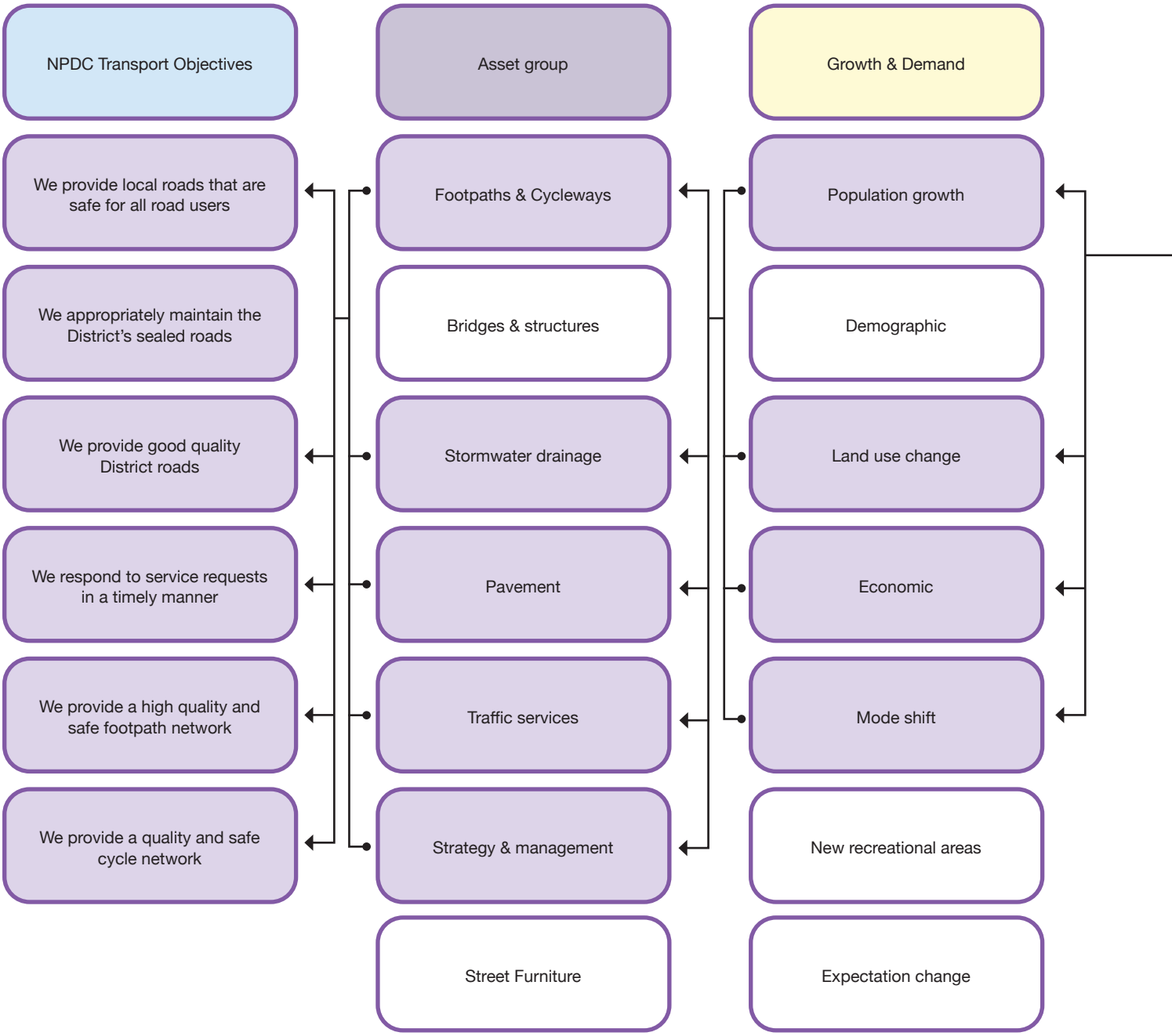

Level of Service theme
CAPEX Project
Safety
Strandon Village Place Making
Resilience
Bell Block Court Placemaking
Amenity
Gover St - Liardet St Central Block Traffic Calming
Accessibility & sustainability

Figure 51:Alignment of the land purchase CAPEX projects due to policy changes



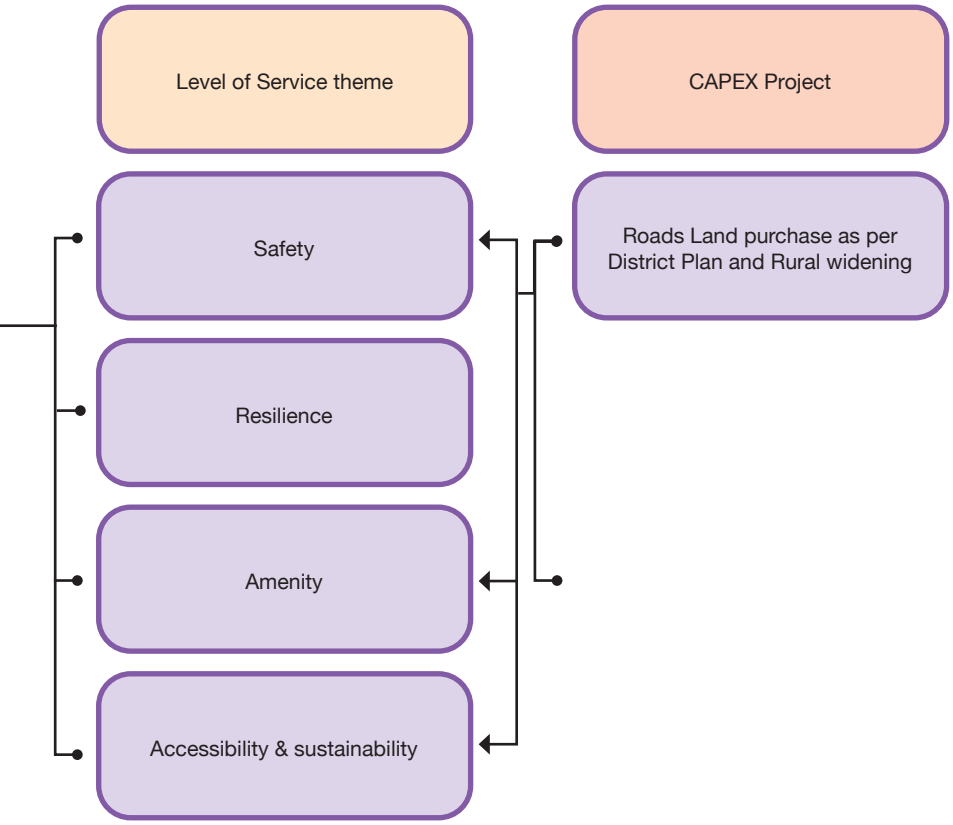
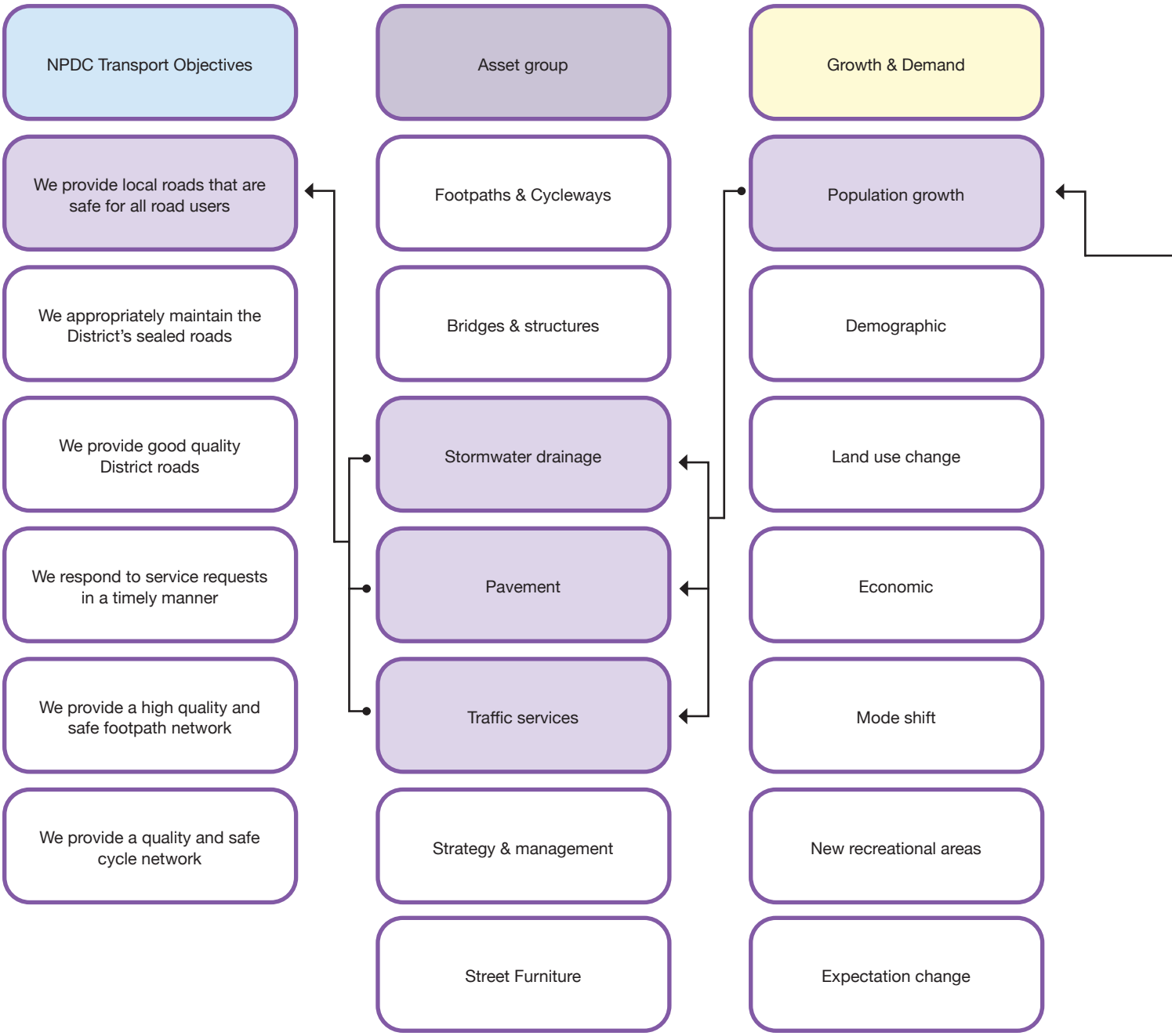

Level of Service theme
CAPEX Project
Safety
Roads Land purchase as per District Plan and Rural widening
Resilience
Amenity
Accessibility & sustainability

Figure 52: Alignment of the New Plymouth Water Treatment Plant (NPWTP) SH3 access CAPEX project



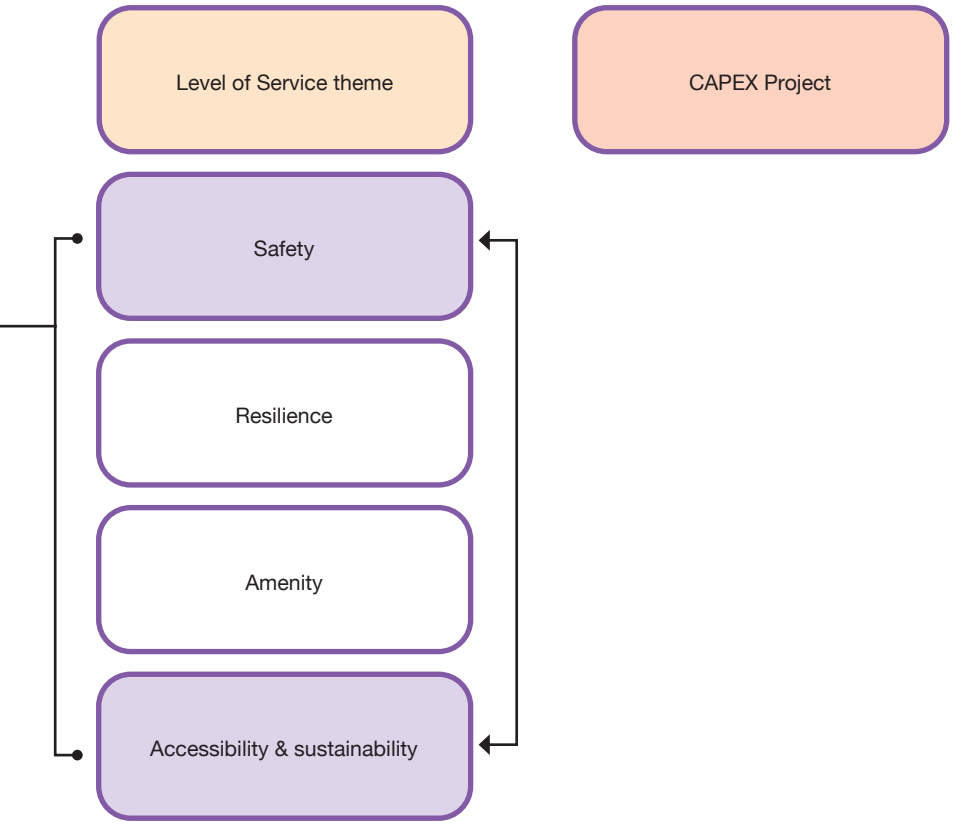
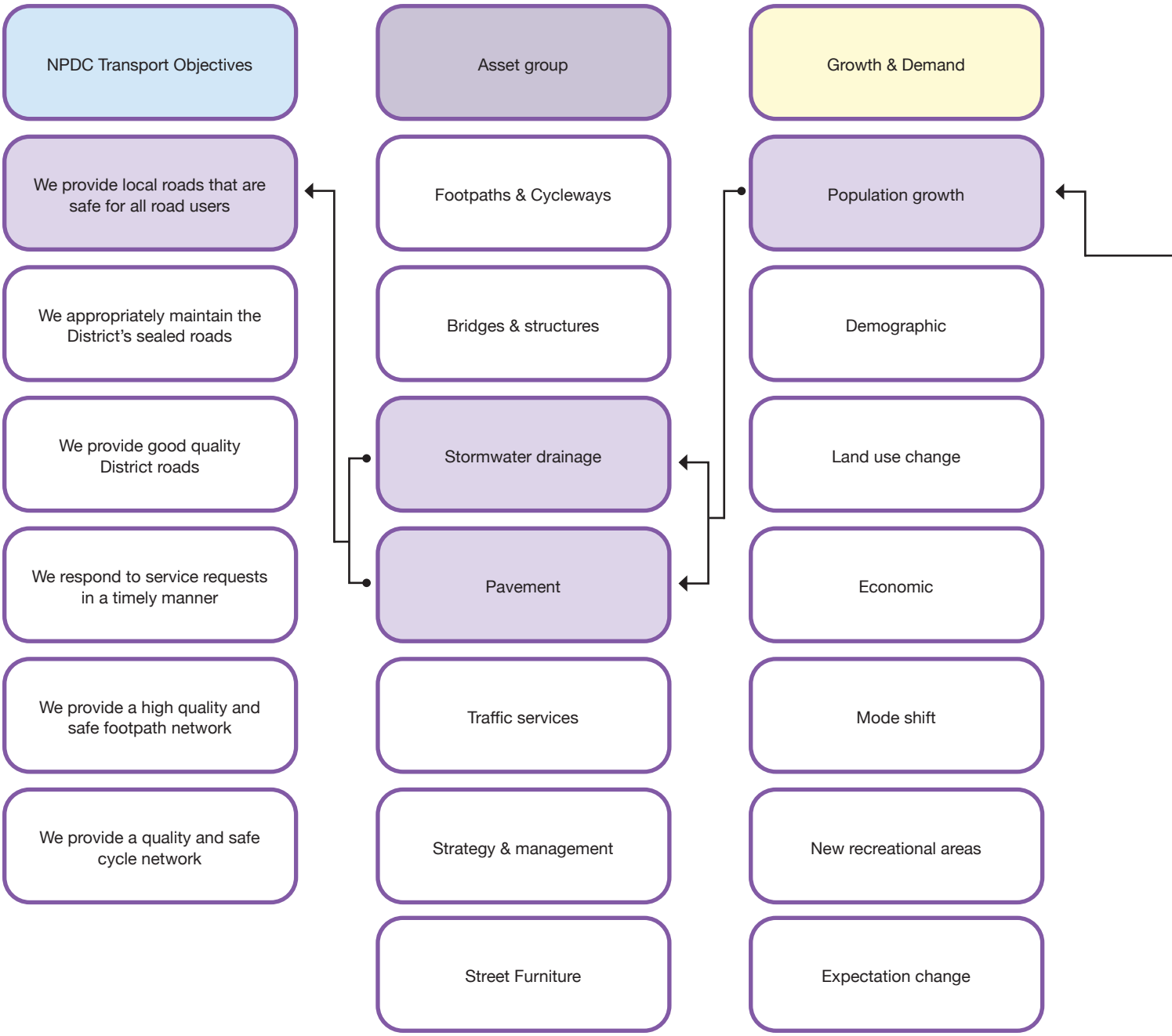

Level of Service theme
CAPEX Project
Safety
Resilience
Amenity
Accessibility & sustainability

Figure 53:Alignment of the rural geometric improvement CAPEX projects



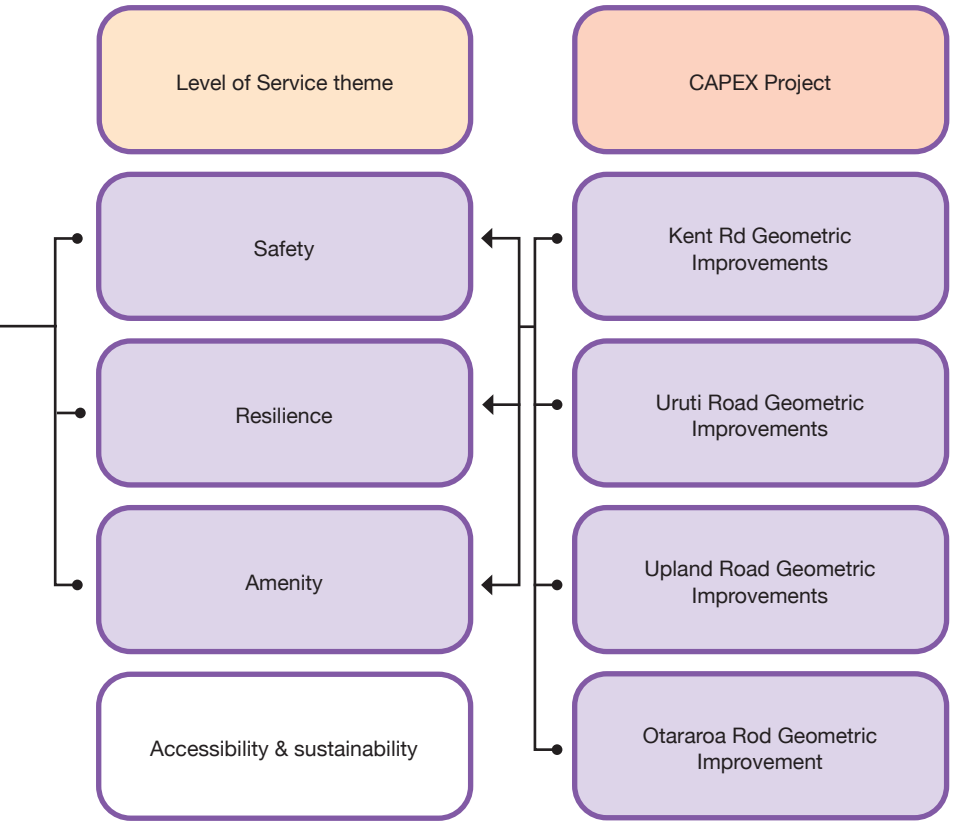
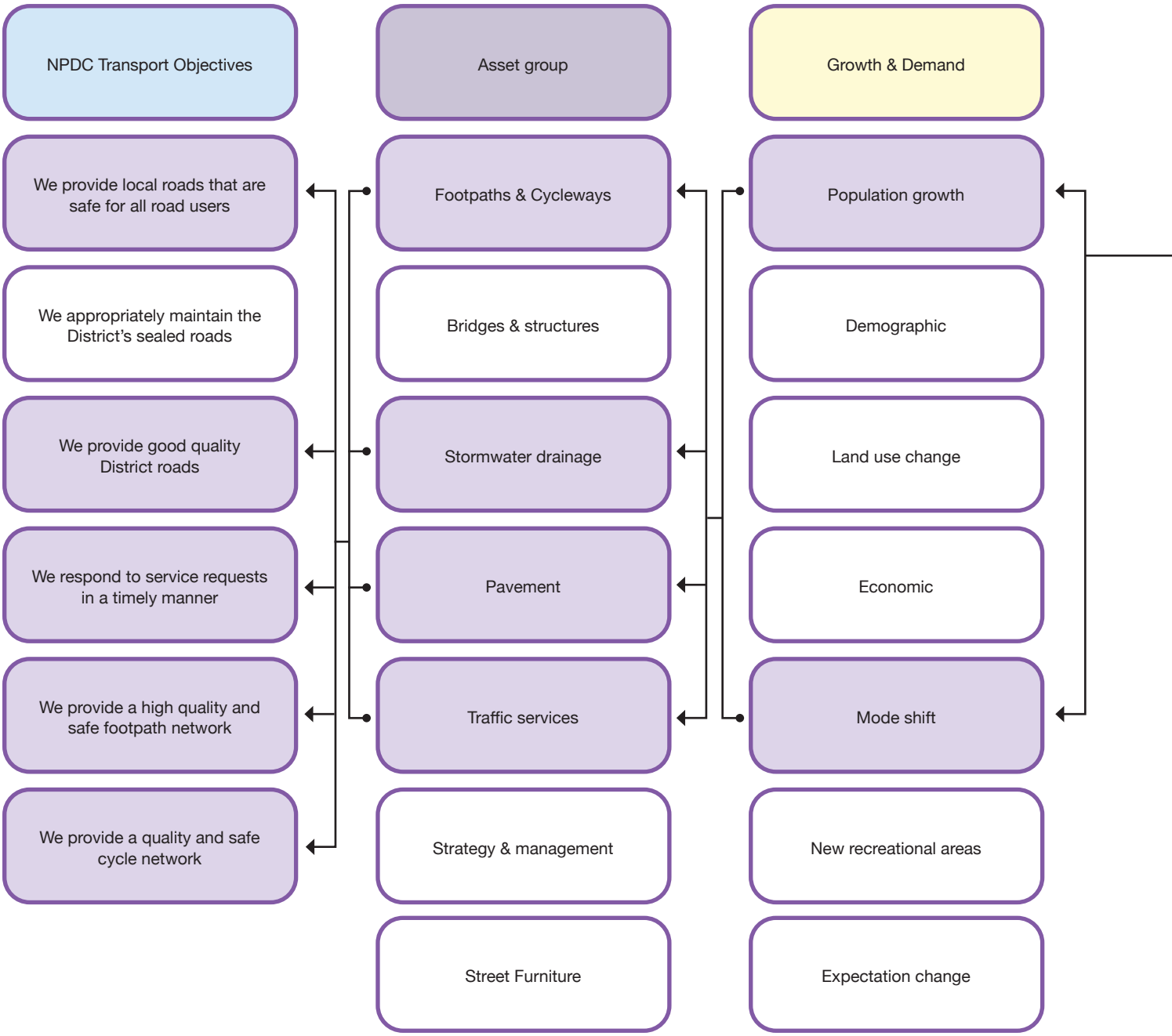

Level of Service theme
CAPEX Project
Safety
Resilience
Amenity
Accessibility & sustainability
Kent Rd Geometric Improvements
Uruti Road Geometric Improvements
Upland Road Geometric Improvements
Otararoa Rod Geometric Improvement

Figure 54: Alignment of the urban raised pedestrian crossing CAPEX projects



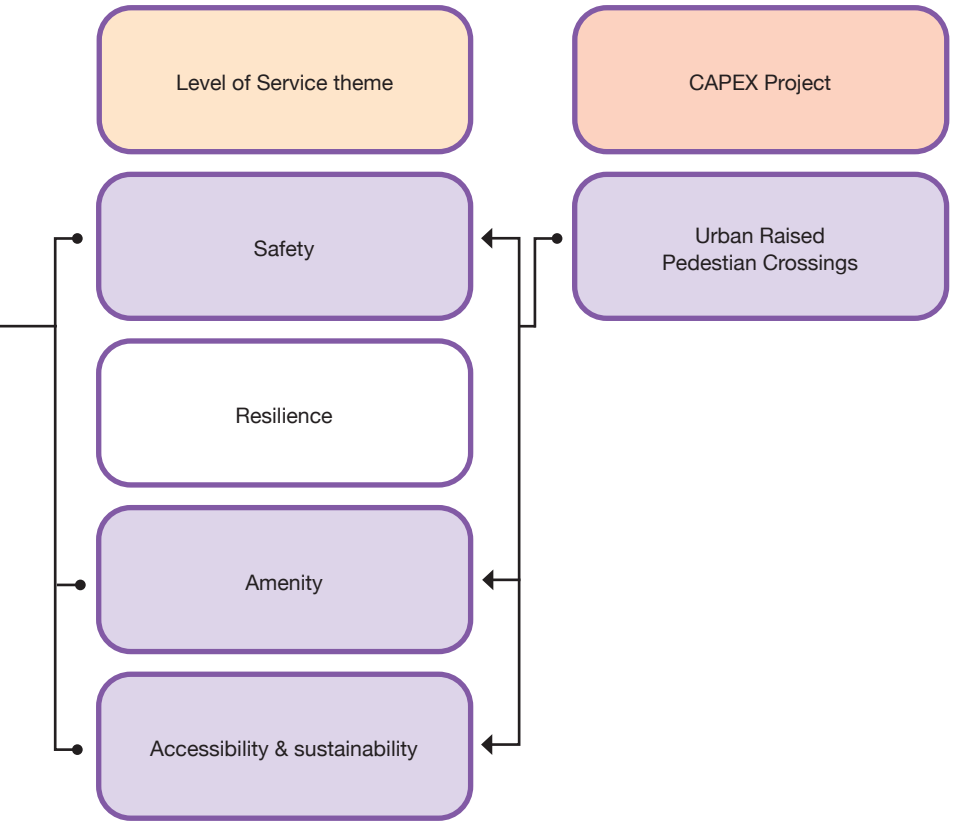
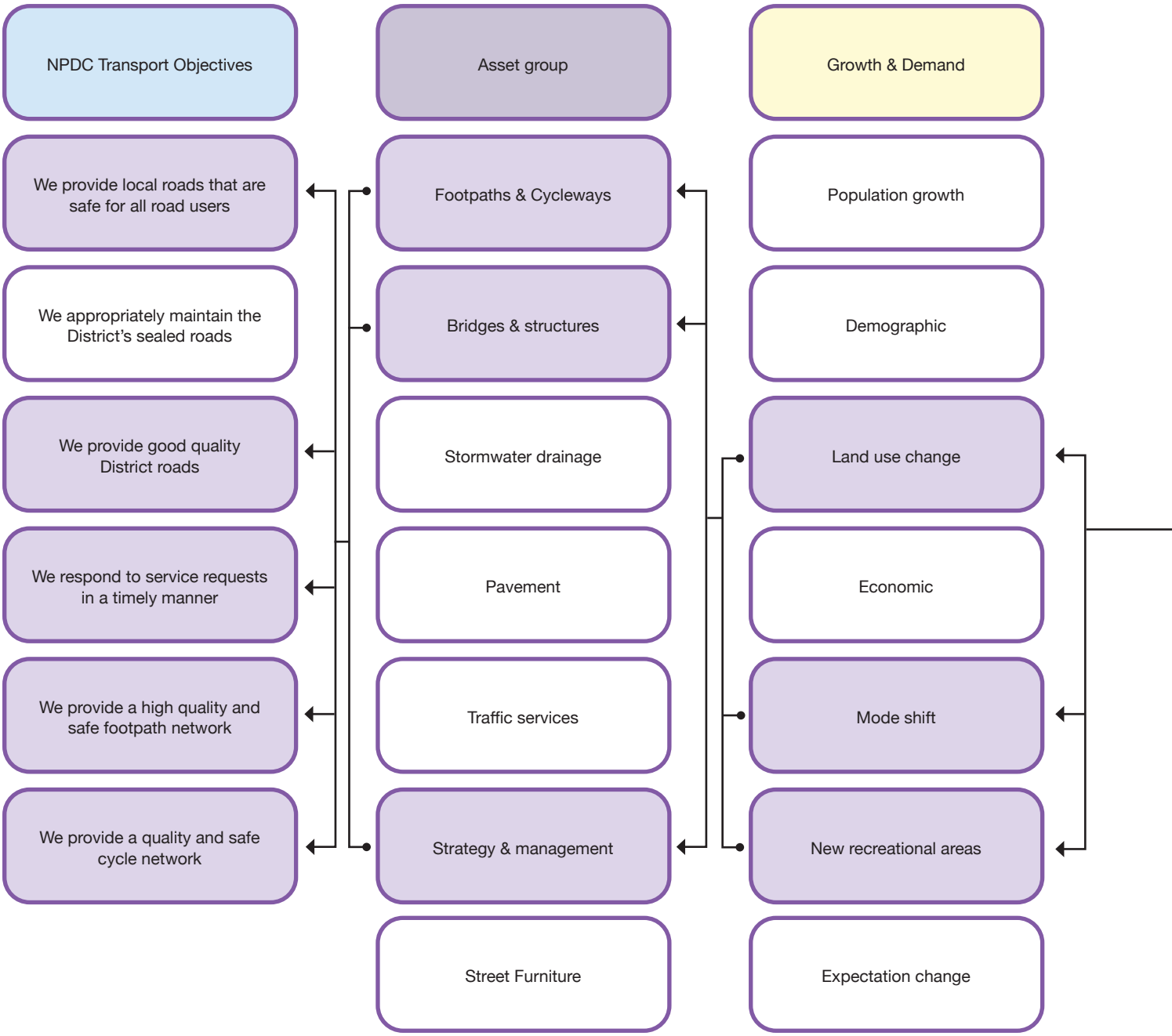

Level of Service theme
CAPEX Project
Safety
Urban Raised
Pedestian Crossings
Resilience
Amenity
Accessibility & sustainability

Figure 55: Alignment of the coastal pathway extension CAPEX project



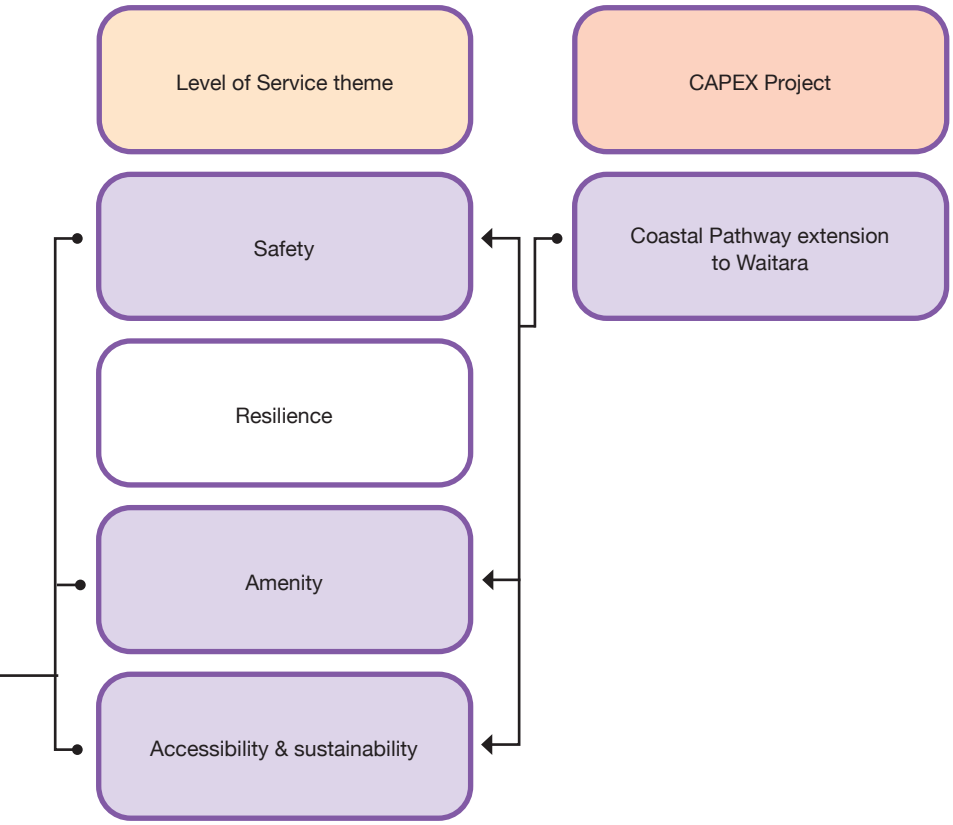
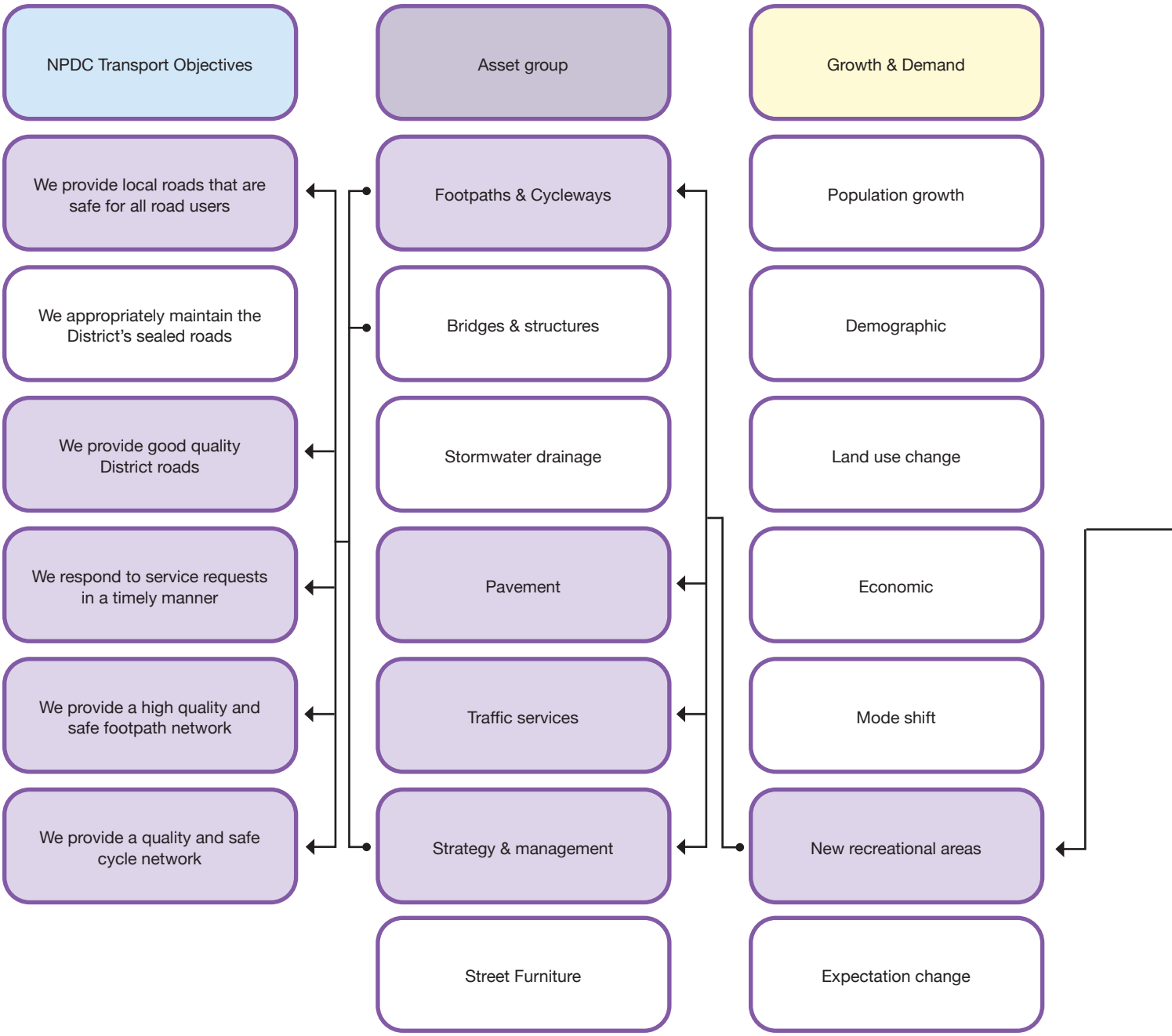

Level of Service theme
CAPEX Project
Safety
Coastal Pathway extension to Waitara
Resilience
Amenity
Accessibility & sustainability

Figure 56: Alignment of the Egmont Road Maunga Carpark CAPEX project



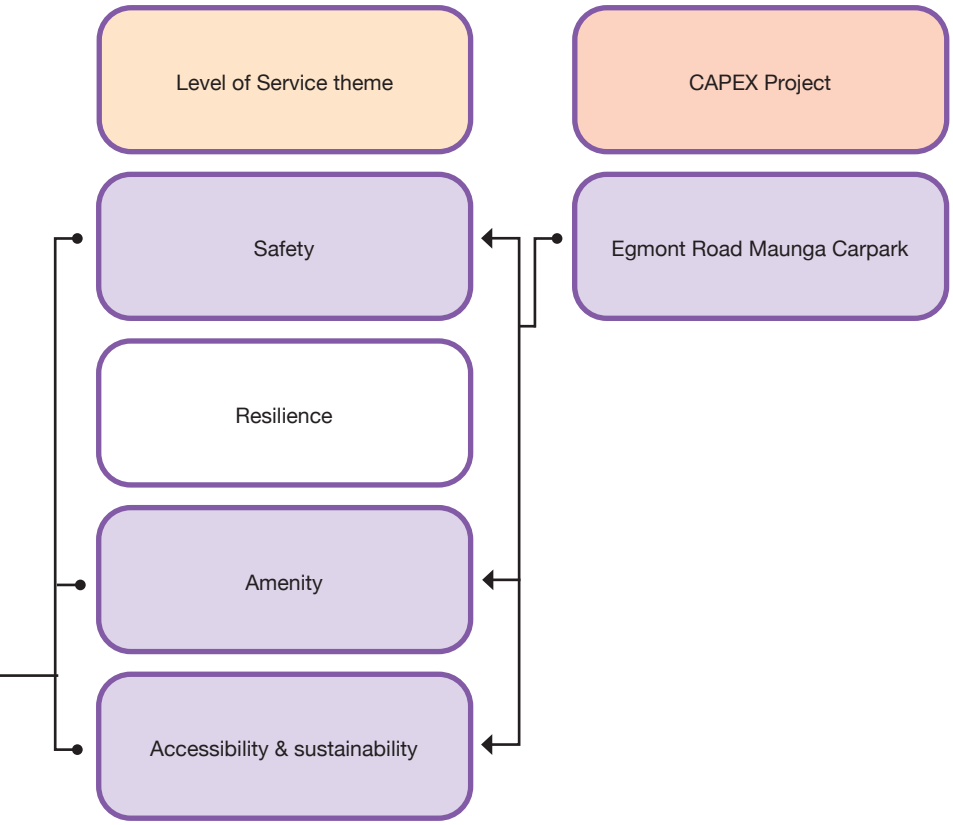
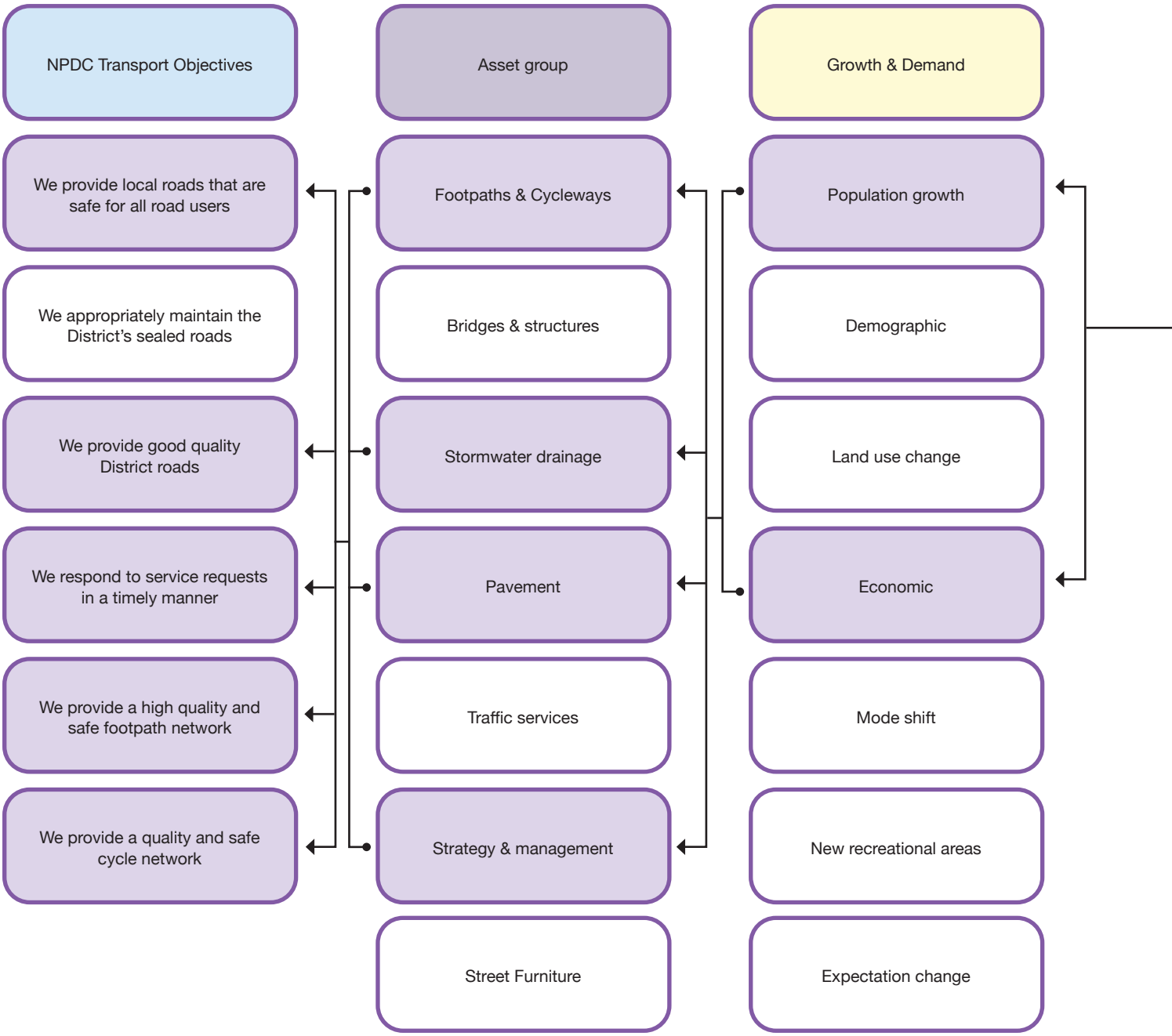
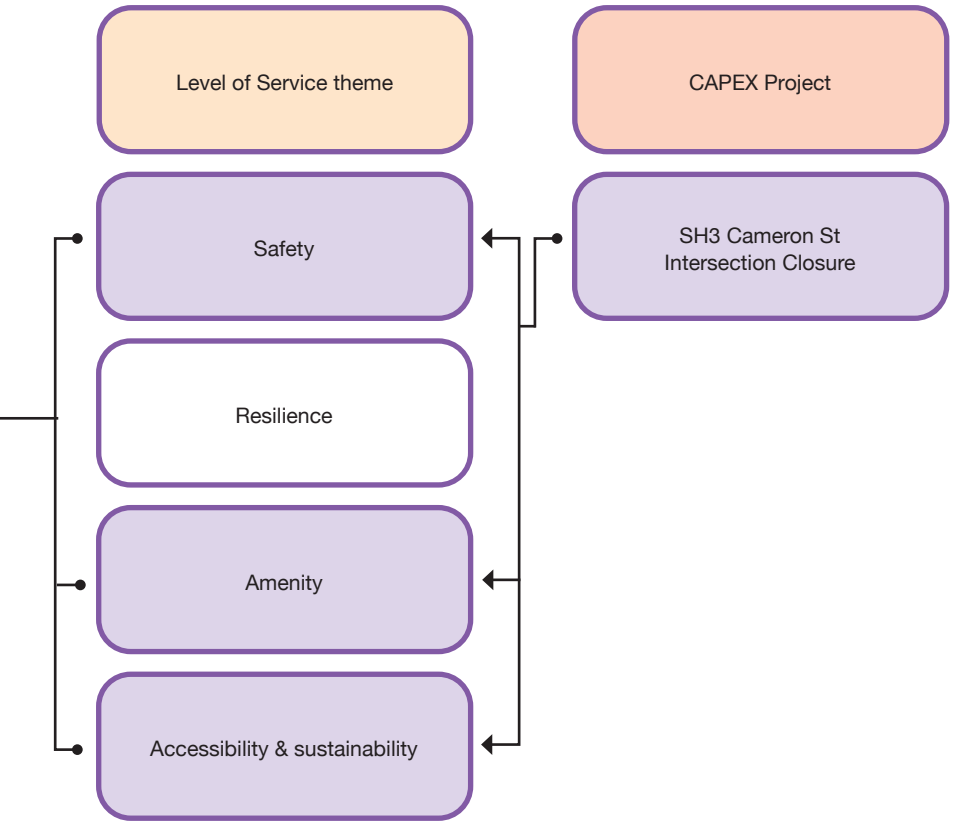

Level of Service theme
CAPEX Project
Safety
Egmont Road Maunga Carpark
Resilience
Amenity
Accessibility & sustainability

Figure 57: Alignment of the Cameron Street intersection closure CAPEX project




Level of Service theme
CAPEX Project
Safety
SH3 Cameron St Intersection Closure
Resilience
Amenity
Accessibility & sustainability

5.1.3 Consequences

The risks and implications of the funding request proposal not being realised for the transportation activity have been summarised in Table 27. These are aligned to GPSLT priorities, NPDC and ONRC customer Levels of Service outcomes.

Table 27: Consequences

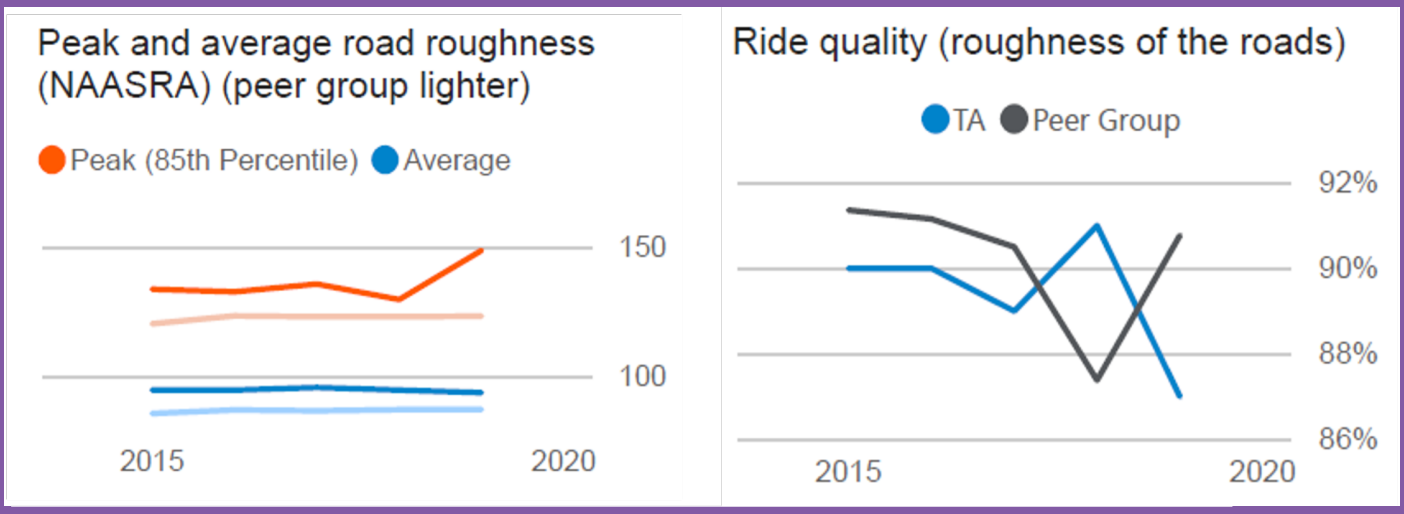
GPSLT	Community Goals	ONRC	Risks	Implications
Better travel options	Partnership Delivery Community Sustainability Prosperity	Resilience Amenity Accessibility Cost efficiency	Consumption of transportation assets from under investment	• Increase in cost to return asset condition to customer Levels of Service
			Reduction in network availability due to unplanned disruption	• Increased frequency results road user dissatisfaction • Disruption to business and freight movement resulting in increased road user costs • Loss of productivity with assets not contributing to the economy
Safety		Safety	More frequent breaches of safety thresholds	• Potential for fatal and serious injury crashes • Potential safety hazards for pedestrians if footpaths are not maintained
Climate change		Accessibility Cost efficiency	Increase in complaints received by Council from affected parties Damage to property	• Lost confidence in decision makers • Organisational embarrassment • NPDC and Waka Kotahi liability

GPSLT	Community Goals	ONRC	Risks	Implications
Improving freight connections	Partnership Delivery Community Sustainability Prosperity	Accessibility Cost efficiency	Asset condition deterioration Increase in unplanned interventions	• Agreed Levels of Service not being realised • Increase in total maintenance cost due to inefficiencies

The consequence of reduced expenditure in relation to the Council's Peer Group has led to higher peak and average road roughness (NAASRA).

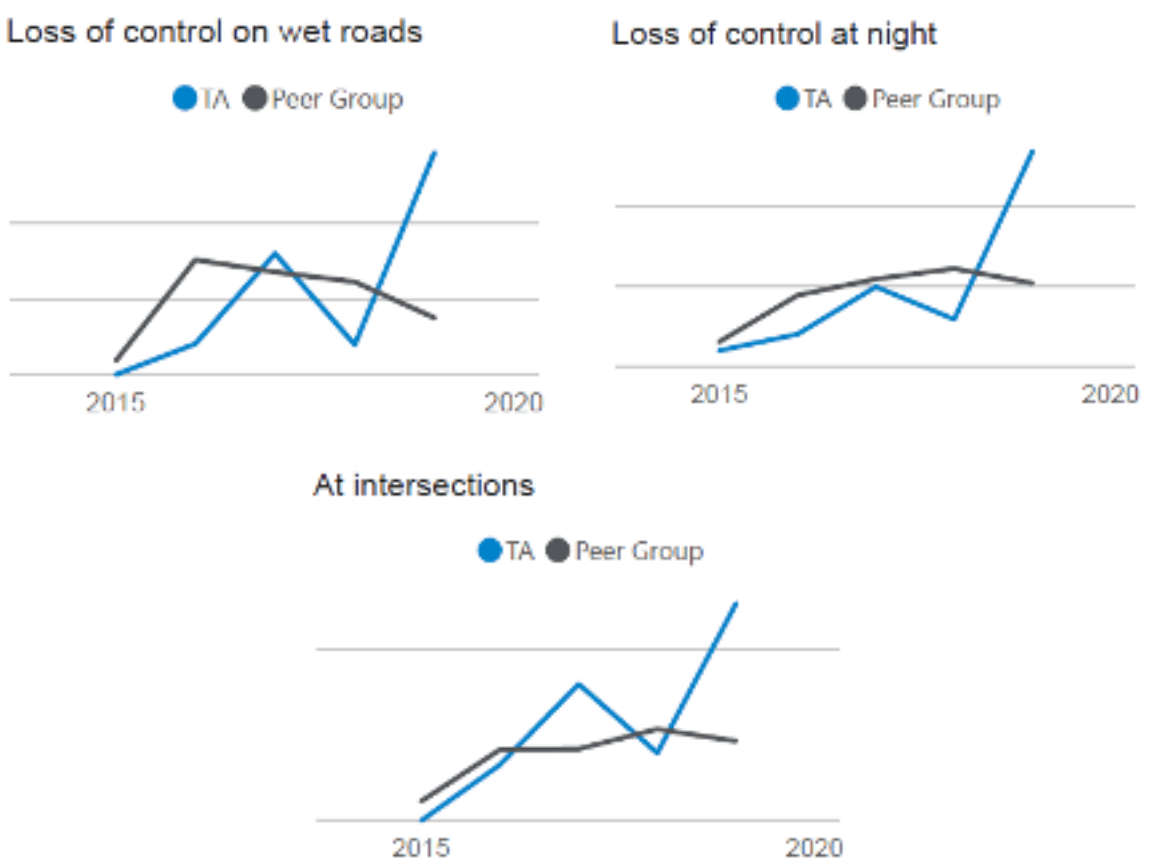
The peak (85th Percentile) is tracking higher, and without intervention, the Level of Service in relation to the Peer Group will continue to decline. Increased roughness is directly related to ride quality, where NPDC is also steadily declining. These trends are shown in **Figure 58**.

Figure 58: Historical road roughness trends



Along with roughness and ride quality, the safety on the network has been deteriorating. Although the data was already trending upwards, 2019 was one of the worst years yet for NPDC while the Peer Group had a decrease from 2018 to 2019. A lack of investment in traffic services, specifically around delineation could be a large factor for such an increase in loss of control at night, on wet roads, or at intersections. These safety trends are shown below in **Figure 59**.

Figure 59: Historical crash trends



5.2 Pavements

NPDC's purpose in managing these assets is to provide a pavement that is suitable for the effective movement of people including vehicles and cycles. The surface must be suitable for all weather conditions and appropriate to its location and function in terms of skid resistance and smoothness. It must also have a structure suitable for traffic loading requirements. There is continued pressure from Waka Kotahi to adjust National Long Term Plan (NLTP) contribution levels to RCAs based on demonstration of value and the key principle of bringing consistency across NZ's roads using the ONRC framework.

5.2.1 Strategic Case Linkage

Table 28 below shows the linkage between the Strategic Case in Section 2 and pavement – related activities

Table 28: Pavement Strategic Case Linkage

GPSLT Objectives	• Develop a land transport system where no one is killed or seriously injured • A land transport system that provides people with better transport options to access social and economic opportunities • A low carbon land transport system that supports emissions reductions, while incorporating safety and inclusive access • A land transport system with improved freight connections for economic development				
RLTP Objective	• Ensuring a regionally and nationally integrated transport network • Facilitating growth and economic development • Reducing the safety risk on Taranaki's transport network • Maintaining and improving accessibility and travel options throughout the region				
Council Goals	• Ensuring network resilience and responsiveness in the context of internal and external pressures • Addressing these issues in an environment of constrained funding and affordability yet rising costs				
	Partnership	Delivery	Communities	Sustainability	Prosperity
	Strong relationships with key stakeholders	Operational excellence	Inclusive, safe, creative, active and connected.	Mitigating our impact and adapting to climate change.	Provide a platform for a resilient and sustainable economy

GPSLT Objectives RLTP Objective Council Goals	Safety	Fault identification and prioritisation ensures that unsafe pavement defects are located and a prompt response initiated.
	Resilience	Compliance Audits undertaken at agreed frequency, evaluate results and act as required.
	Amenity	Pavement treatments are appropriate to the individual road classification thus ensuring alignment of Level of Service nationwide. Smoothness of the journey experienced by stakeholders reflects ONRC classification of the road. Measurement of network roughness undertaken annually to ensure network compliance. Customer service requests related to roads and footpath are responded to in a timely manner. Maintenance to a standard whereby the target percentage of residents are satisfied with the overall quality of the district's roads.
	Accessibility	Maintenance to a standard whereby the target percentage of residents are satisfied with the overall quality and safety of the district's transportation network. Maintenance to a standard whereby the target percentage of roads meet the Levels of Service and service standards in current condition surveys, as set out in this AMP.
	Efficiency	Demonstrate through prudent programming and clustering of maintenance activities that value for money is being achieved in delivery of outputs. Minimise through strategic planning whole of life costs while delivering the required customer outcomes.

Linkage to Problem Statements	The following identified Problem Statements have relevance to the road pavement asset group: • Natural topography and layout of infrastructure makes it difficult to complete a trip using alternative transport modes, causing severance of the community and places the network at risk during a major event • Not taking a "safe system" approach to a complex network has resulted in poor actual and perceived safety outcomes • Poor understanding of the value that our transport infrastructure provides for our community and regional economy has resulted in poorly targeted investment and missed economic opportunities
Strategic Response to Problem Statements	**Change risk profile:** • Allowing Low Volume and Access roads to deteriorate to align with ONRC. **Programme adjustment:** • No longer carrying out surface treatments based on age, but as a condition of the pavement and surface. Targeting poor roads, should in turn drive safer surfaces for all road users. • Adjusting work categories related to carriageways to allow for more focused work that aligns with ONRC **Policy approach:** • Carry on implementing the data improvement plan **Improve value for money:** • Sweating the pavement and surfacing assets allows us to focus on renewing assets that are close to end of life as opposed to purging money on 'birthday seals' **Relationship approach:** • Improve the relationship with Waka Kotahi and councillors through more reliable carriageway data that allows for informed decision making

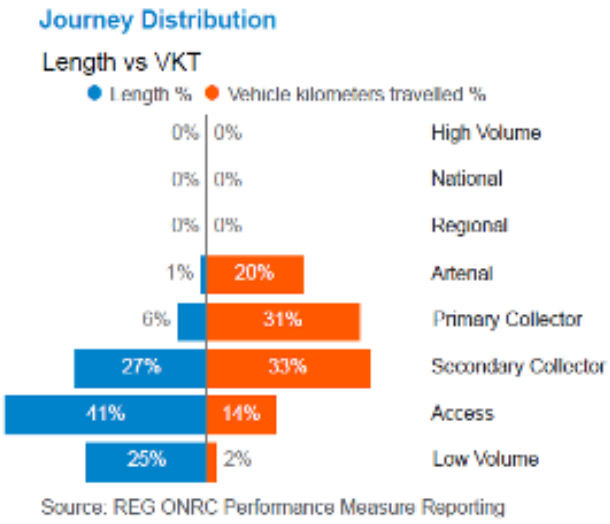
5.2.2 Pavements: Current Condition and Performance

Compile and Test Evidence

The performance of a pavement is measured by how well it meets the requirement to provide safe, smooth, all weather access and has sufficient capacity for both the volume and weight of all the vehicles that wish to use it.

Figure 60 demonstrates the load on the network and by inference where the maintenance and renewals budgets should be targeted, 84% of the vehicle kilometres travelled occurs on the 34% of the network comprising the Collector and Arterial roads.

Figure 59: Historical crash trends



The Council has chosen to align the networks Level of Service with the ONRC outcome; therefore, this trend is expected to continue, allowing roads with a greater classification to have a greater Level of Service.

A Maintenance Intervention Strategy (MIS) is currently being developed to better align pavement maintenance and renewal activities with ONRC classification and target measures (see Section 6.1.7). Care must be taken to ensure that abrupt changes to network performance do not occur thus compromising safety.
Changes in Levels of Service must therefore be undertaken in incremental steps with a robust process of monitoring network condition. An example of this is the comparative analysis of the number of defects identified to the level of customer feedback to highlight if the Level of Service drop is perceived or real.

The MIS will be developed with an emphasis on preventative maintenance activities including:

- Drainage improvements
- Pre-reseal repairs

5.2.3 Sealed Pavement Maintenance and Operations

Sealed Pavement Maintenance Strategy

The maintenance strategies used on the road network are focused on undertaking the maintenance work necessary to ensure the maintenance intervention levels are met, minimise lifecycle costs, preserve the integrity of the transport asset and maintain safety for road users.

Pavement repairs are prioritised and carried out in accordance with the maintenance intervention levels for the network and in conjunction with the periodic resurfacing of the network. They are also carried out when required in other situations to ensure the safety of road users and the integrity of the road pavement. A key factor in the prioritisation of work is the network classification with higher standards being applied to the more heavily used roads.

Pre-reseal repairs are undertaken prior to resealing. The type of repairs undertaken is dependent on the level of usage of the road and the corresponding Level of Service. There is an expectation that the pre-reseal repairs undertaken will be sufficient to provide the existing pavement at least a 10 year life. In some situations, a reseal will be applied as a holding treatment with only a limited amount of pre-reseal repairs undertaken. This is to extend the life of the existing pavement as long as possible and to keep the road serviceable until such time as the pavement can undergo a full rehabilitation.

Investment in the Right Place

Initial analysis shows that the maintenance expenditure does not align with road use, as measured by vehicle kilometres travelled, and shown in Figure 61.
Analysis of the maintenance cost data shows that NPDC are spending a disproportionate amount on Low Volume roads when contrasted to the volume of traffic they are carrying. The Council's maintenance strategy will be to align maintenance expenditure to carriageway use.

Figure 61: Maintenance costs per 1000 VKT by cost group

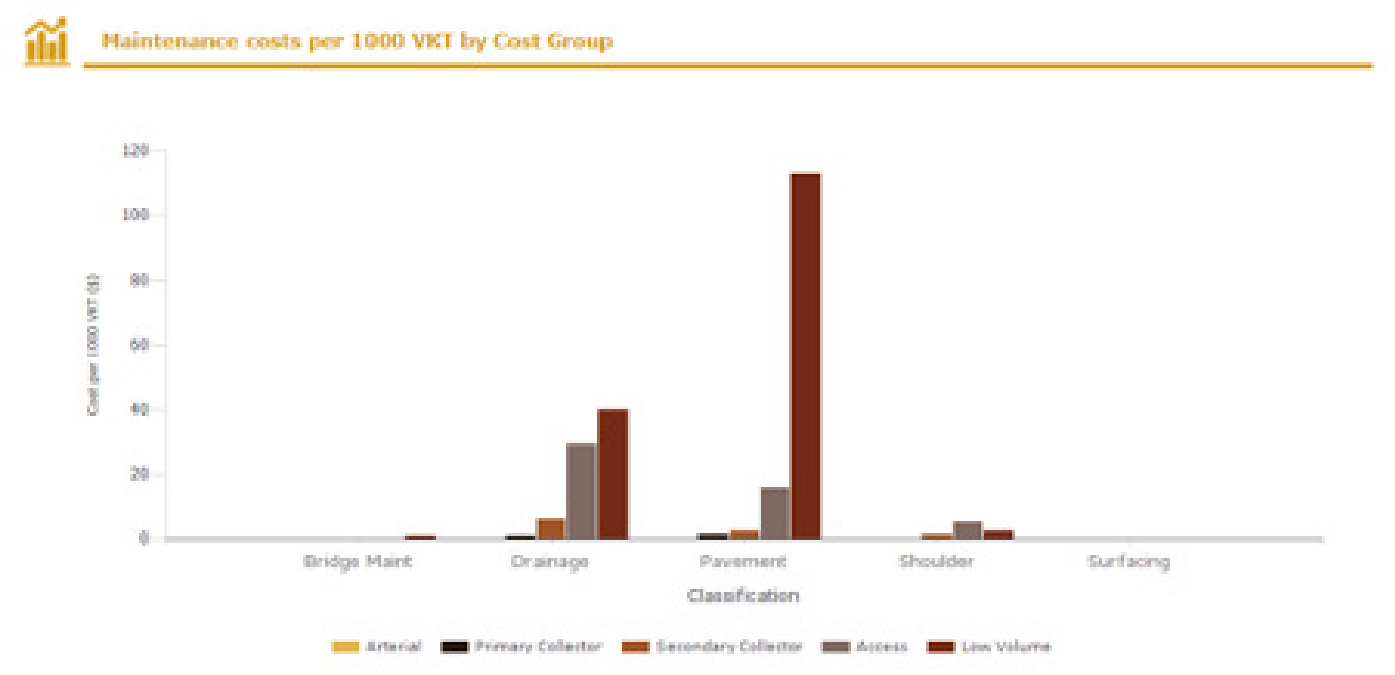
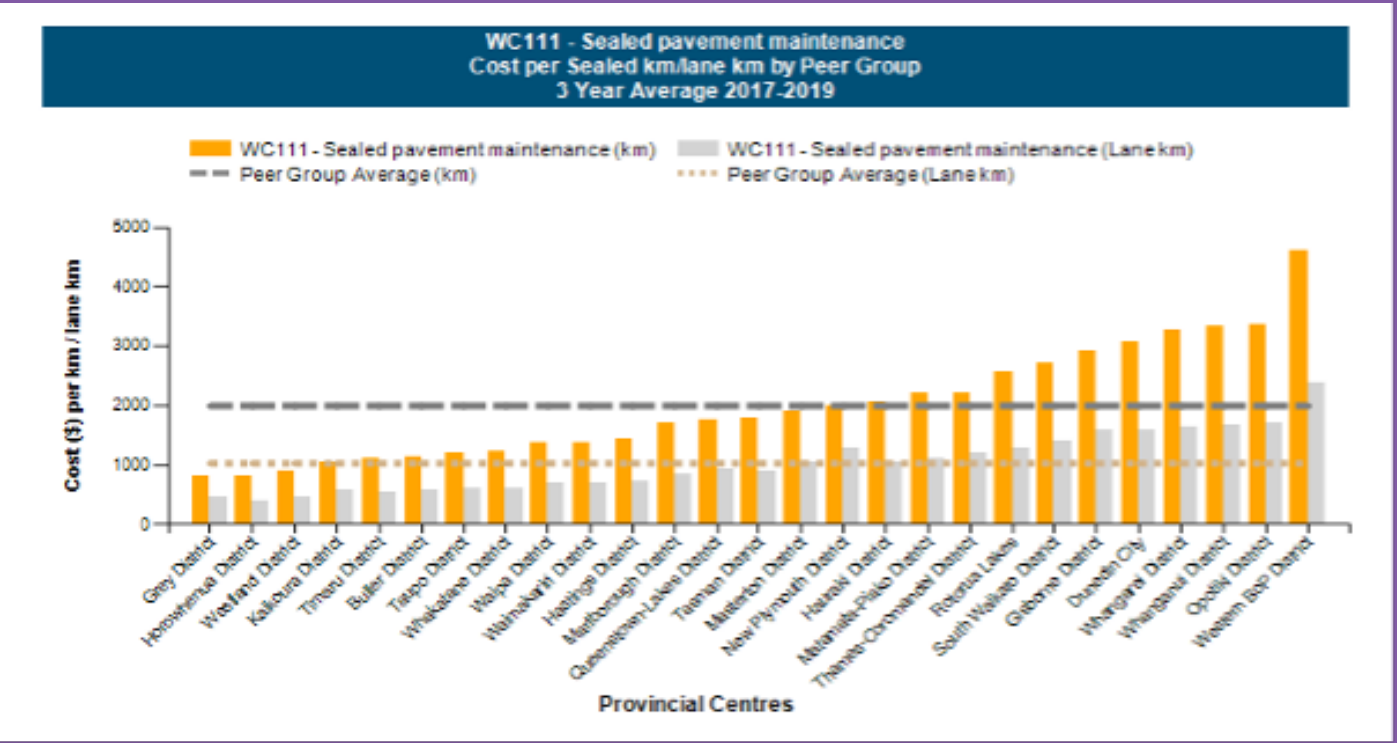


Figure 62 shows the Peer Group comparison for sealed pavement maintenance.

Figure 62 shows the Peer Group comparison for sealed pavement maintenance.

Figure 62: Sealed pavement maintenance Peer Group comparison.



During the 2017-19 period NPDC was roughly in the middle of its Peer Group. This is the desired location as it suggests that the Council is not overspending, but also not falling behind the Peer Group.

Testing the Level of Service

The maintenance strategy is to align maintenance expenditure to carriageway use. NPDC will monitor the success of this redistribution by customer feedback and annual assessment of ONRC reporting measures. The level of expenditure on the lower classification roads is largely driven by customer enquiries and the change in level for this will be actively checked to ensure over delivery is not achieved.

Specific Levels of Service which are identified as possibly being too high will be put through a testing cycle of:

- Reduction of Level of Service in incremental steps
- Monitoring of the level of customer feedback

The Council will use comparative analysis of the number of defects identified to the level of customer feedback to highlight if the Level of Service drop is perceived or real. The focus for the sealed pavement maintenance strategy is to extend asset life and limit the need for expensive rehabilitation treatments through timely:

- Maintenance interventions
- Pre-reseal repairs
- Preventative maintenance

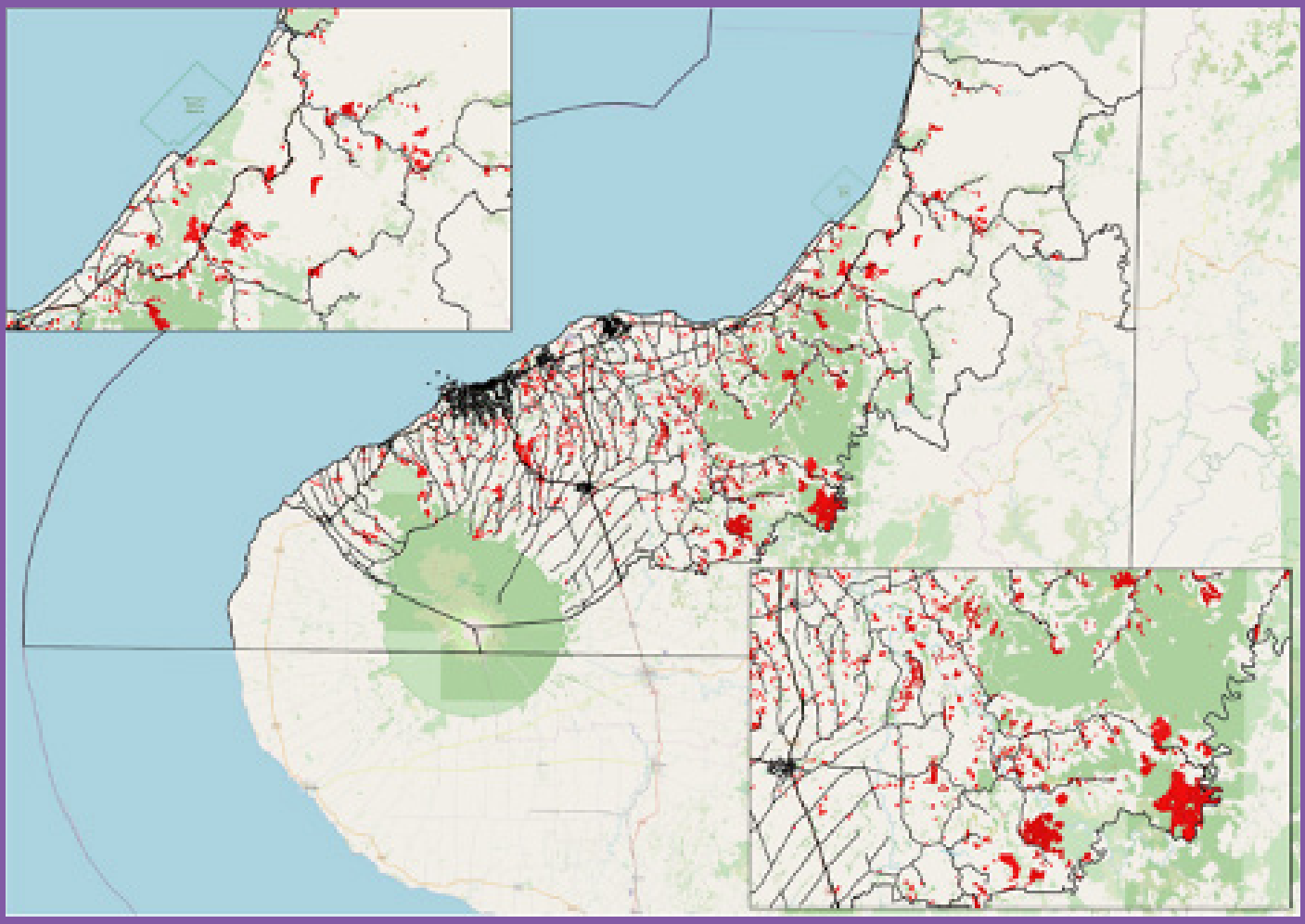
Predicted Maintenance Costs

There will be increased pressure on the pavement maintenance and renewal budgets in the future as demand, growth and development place an increasing burden on the existing infrastructure. It is considered that expectations will continue to rise in the future particularly those of new residents to the district and that further refinement of corridor maintenance contracts and intervention levels will be required to accommodate these increased expectations.

It can also be expected that increased traffic loadings from logging in particular on Local roads with weak pavements will result in higher maintenance costs and these roads will be subject to rapid deterioration during sustained periods of heavy traffic loading. This will make it difficult to optimise maintenance expenditure on these roads in the future.

The Council has undertaken a study to identify all the forestry blocks in the region to determine the most likely routes the logging trucks will utilise, the quantum of truck movements and the timing of the harvesting. **Figure 63** shows future logging sites based on data from resource consents held with TRC. The greatest number of forestry blocks are located in Tarata and Lake Mangamahoe. Further work will be needed to identify the various ages of these blocks and therefore the expected year felling will occur on these blocks. If it can be predicted when this forestry activity will occur, and the additional loading on pavements, a robust maintenance and renewal plan can be established.

Figure 63: Locations of forestry blocks in Taranaki



Until NPDC implements a predictive modelling tool such as Deighton's Total Infrastructure Management System (dTIMS), the rate and location of pavement deterioration is unclear at a network level.

Deferred Maintenance

On a network basis there is generally no significant backlog of routine maintenance despite current funding levels being significantly reduced by Waka Kotahi from requested levels. The reallocation of budgets for individual work activities within the block allocation has been required to address the maintenance need where it has been greatest. It is unlikely that this will continue in the future as the asset is consumed and repair volumes increase.

Adverse climatic conditions can create additional pressures that mean that scheduled maintenance work may need to be deferred to address the more urgent problems that arise from these types of events.

If an event is serious enough and creates repair and reinstatement that cannot be sensibly met from normal funding allocations NPDC will apply for additional funding from Waka Kotahi under Work Category (WC) 141 – Emergency Reinstatement.

5.2.4 Unsealed Pavement Maintenance and Operations

Sealed Pavement Maintenance Strategy
While the usage of the unsealed roads is limited, it still plays a major part in keeping the regions' economy moving and as such the importance of a functional unsealed network is high.

Although these roads are typically classified as Access and Low Volume as per ONRC, there is an expectation that they are:

- Fit for purpose
- Safe and trafficable: "no surprises"
- Provide a reasonable and consistent ride
- Economical in maintenance
- Maintained to exceed the design life
- Not a nuisance to NPDC's customers

Key maintenance practices, methodologies and a structured inspection regime outlined in **Section 6: Lifecycle** of the AMP ensure that unsealed maintenance costs are maintained at acceptable levels.

A programme of targeted inspections has ensured that the frequency of maintenance grading has been kept to a minimum. Surfacing deterioration as a consequence of forestry traffic is a key driver for an intervention being required. Strategic placement of metal aggregate limits the amount of unsealed road dig-outs being required presently.

Testing the Level of Service

The high influences of geological and climatic conditions on the unsealed road network influence the amount of work activity required to maintain an acceptable Levels of Service.

The Council's current methodology is meeting customer expectations in terms of the feedback received and levels of dissatisfaction. The frequency of unplanned interventions generally as a result of logging operations is on the increase and this will place additional strain on resources required to maintain the unsealed road network.

Unsealed Road Maintenance Strategy Summary

Maintenance of unsealed roads is about keeping the asset functional and fit for purpose throughout the lifecycle.

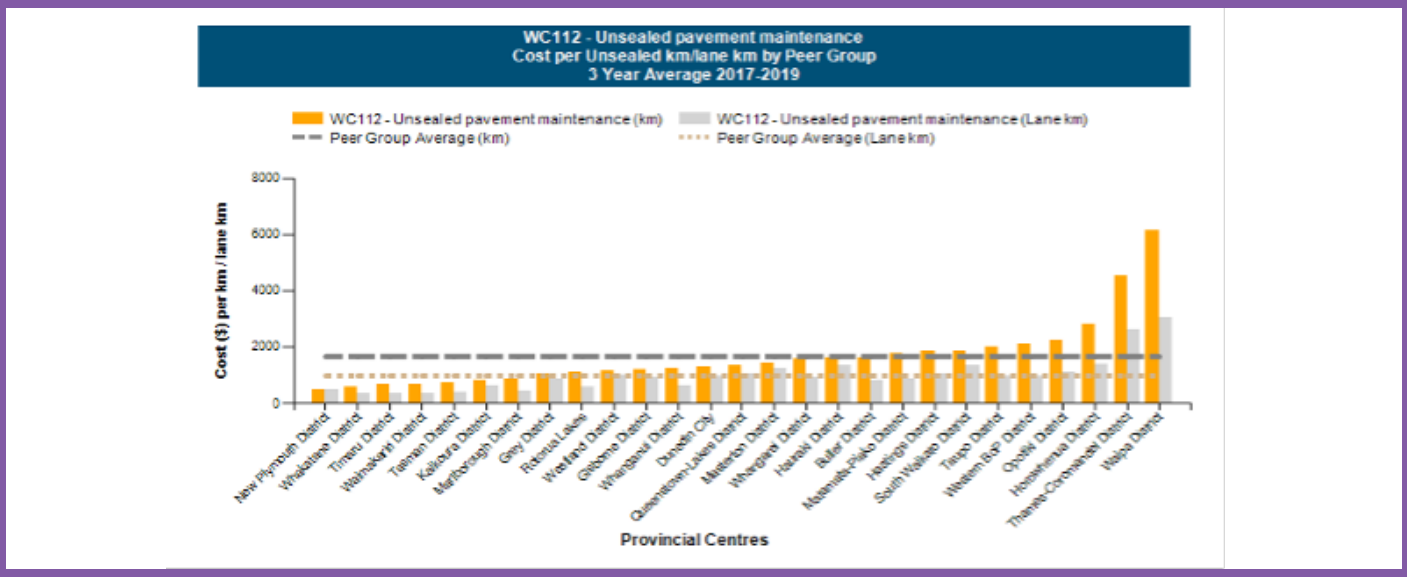
The focus for the unsealed pavement maintenance strategy is to monitor pavement condition and react in a timely manner that ensures an acceptable Level of Service is maintained for the Council's customers. In some situations this may trigger extensive renewal treatments.

Predicted Maintenance Costs

The unsealed roads maintenance budget provides for grading and the repair of damaged pavement (unsealed pavement dig-outs).

Increased demand and environmental effects are the two big considerations that will influence future maintenance costs. In anticipation of this, the Council will continue to monitor network condition and assemble data that will assist future additional investment decisions. **Figure 64** shows the unsealed pavement maintenance expenditure Peer Group comparison.

Figure 64: Unsealed Pavement Maintenance Peer Group comparison



5.2.5 Pavement Renewals

Capital Works Plan

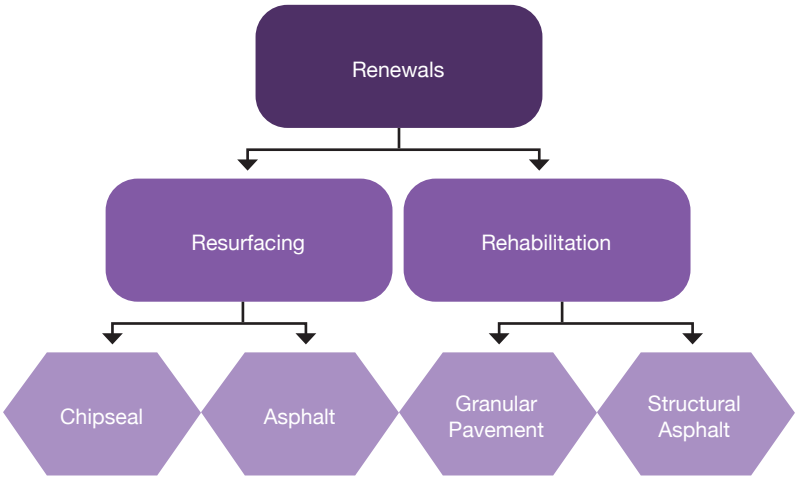
Pavement renewal is a major work activity which restores, replaces or rehabilitates an existing asset to its original capacity / expected lifespan.

There are two types of renewal carried out on the carriageway asset: resurfacing and rehabilitation:

- Resurfacing by replacement of either chipseal or asphalt (asphaltic concrete);
- Rehabilitation by granular pavement replacement or by structural asphalt (asphaltic concrete) layer construction

Figure 65 shows the various options associated with renewals.

Figure 65: Renewals Flow Diagram



The overall Levels of Service objective is to steadily renew assets considering the following:

1. The age profile
2. The condition profile
3. The level of ongoing maintenance
4. The economic lives of the materials used
5. Financial and customer risks

Renewals are reviewed regularly with any deferred work reprioritised alongside new renewal projects and a revised programme is established where required.

Capital Works Plan

Capital works are generally initiated through triggers such as growth, Levels of Service, regulatory, and operational efficiency, or vested through subdivisions.

Renewal Replacement Goals

The objective of renewing the asset is to apply the correct treatments at the optimum time so that the required Level of Service is delivered whilst minimising total lifecycle costs.

It is important when developing a forecast for pavement renewals that the future condition of the network is carefully considered. Underfunding of renewal work puts at risk the future integrity of the pavement network resulting in greater spending in the future to ensure Levels of Service are achieved. The desired strategy is to renew the asset before maintenance costs rise, resulting in the effective use of road funds (optimised decision making).

The required level of renewal works will vary, depending on:

- The age profile of carriageway surfacing and structure
- The condition profile of carriageways
- The level of ongoing maintenance demand
- The differing economic lives of the building materials used

Renewal Decision Making Process

Renewal treatments such as pavement rehabilitation and resurfacing are programmed and carried out when they can be economically justified. The selection of the actual sections of carriageway treated each year and the treatment used is based on output from RAMM, which analyses average life data for each surfacing material, the volume and mix of traffic using the road, and current condition verified through a network inspection regime.

The Council makes provision for carrying out safety improvements to address crash hotspots and road deficiencies. The projects are identified from crash reduction studies, safety audits and public feedback and prioritised on the basis of crash records and the degree of risk posed at each site.

Resurfacing Renewal and Capital Works

The current resurfacing treatment selection process includes:

- The Treatment Selection Algorithm (TSA) in RAMM is currently used to identify candidates for resurfacing based on condition and maintenance cost data
- Checking results of TSA against the MIS for alignment against Forward Works Programmes (FWP) and other Council works programmes
- Field inspection to confirm treatment is appropriate and warranted

It is important to note that the performance modelling through the RAMM treatment selection process includes the use of historical data when identifying possible sites for resurfacing. As such an emphasis is sometimes placed upon seal age and remaining life, resulting in a number of ‘birthday seals’.

Although seal age should be an input to the selection process it should not necessarily drive the resurfacing priorities. Decisions should be made that focus on the immediate need to ensure that the required Level of Service is maintained.

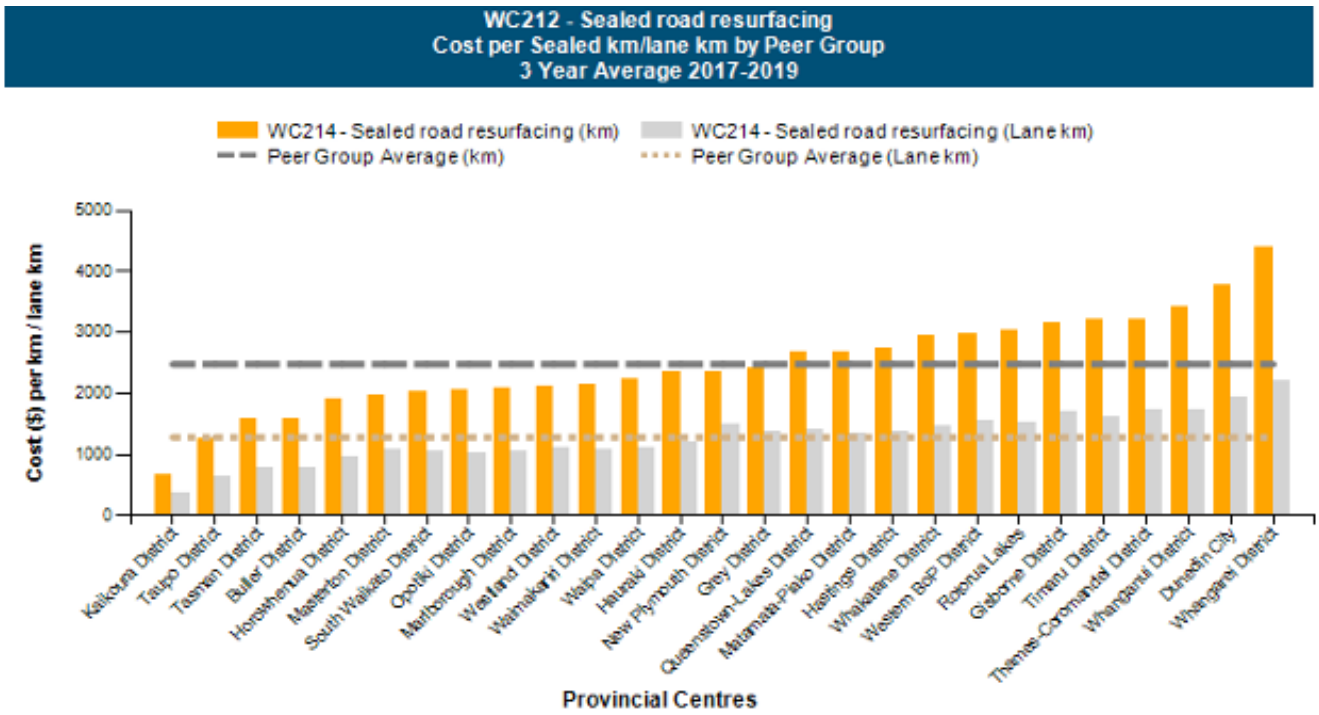
Asphaltic concrete is used on selected high stress areas e.g. cul-de-sac heads, roundabouts and other high impact areas where a specifically designed surfacing will be used.

Surfacing Treatment Selection

The type of surfacing used is determined using Waka Kotahi's 'Bituminous Sealing Manual' and is dependent on site specific factors such as the existing surface texture, surface defects, traffic stresses, traffic volumes and noise levels. The types of surfacing commonly used include single and two-coat chipseals, polymer modified chipseals, slurry seals and asphaltic concrete.

Generally reseals have a life of 12-15 years though some surfacing such as texturising seals and void fills are used either as a preparatory treatment or to extend the life of the existing surfacing and have a much shorter lifespan. The expected life of the surfacing is influenced by the underlying pavement structure and a road suffering deformation and requiring frequent repairs will usually undergo resurfacing at shorter intervals. **Figure 66** shows a comparison for the sealed road resurfacing expenditure Peer Group.

Figure 66: Sealed road resurfacing Peer Group comparison



NPDC is in the middle of its Peer Group for sealed road resurfacing. Typically the Council spends more than the Peer Group due to the need to import aggregate. Taranaki aggregate has a low Polished Stone Value and a low crushing resistance which make for poor surfacing aggregate. Previously NPDC has sat above its Peer Group due to the large cost of importing materials; therefore, to have moved to the middle of its Peer Group it is likely there has been improvements in business processes creating better 'value' for money'.

Testing the Level of Service

Chipseal surfacing in the district is generally lasting the same amount of time as the Peer Group, with the exception of Arterials which are lasting longer. The Council must be careful to ensure that sealed surfaces are performing the function they are intended for and that underlying pavement structures are not being compromised.

It is important that inspections of those sections of road (highlighted as having reached their predicted design lives) are undertaken to ensure that the information within the RAMM database is a true reflection of the network and that resurfacing is undertaken as dictated by its condition.

5.2.6 Pavement Renewal Works

Site Identification and Confirmation
Potential candidates for rehabilitation treatment are identified from the analysis of the RAMM TSA, summarisation of 'All Faults' data (see Sections 6.2.4 and 8.8.4 for information about the All Faults program), and local knowledge. These sites are investigated in detail as part of developing a programme of works. The annual programme is developed with an emphasis on road hierarchy in the first instance. Priority is given to roads with high traffic volumes, especially Heavy Commercial Vehicles (HCVs). Consideration will also be given to the likely rate of pavement deterioration should no action be taken, i.e. roads with the highest maintenance costs per unit length will be given priority for road rehabilitation.

Pavement Rehabilitation Treatments
- Granular overlay
The life of a pavement is extended by construction of an additional layer of basecourse, with a sealed surface, on top of the pavement that has reached the end of its useful life. This technique is generally referred to as an Area Wide Treatment and used predominately on rural roads.

This technique can be unsuitable where there is existing kerb and channel, such as in urban areas, as it builds up the crown of the road or street so that the resulting cross fall becomes too steep. The consequence can be that road user's vehicles "bottom out" while accessing their properties due to the break over angles. In these circumstances it is usually more efficient to carry out a full reconstruction as described below and replace the pavement, and often the kerb and channel, to the appropriate levels.

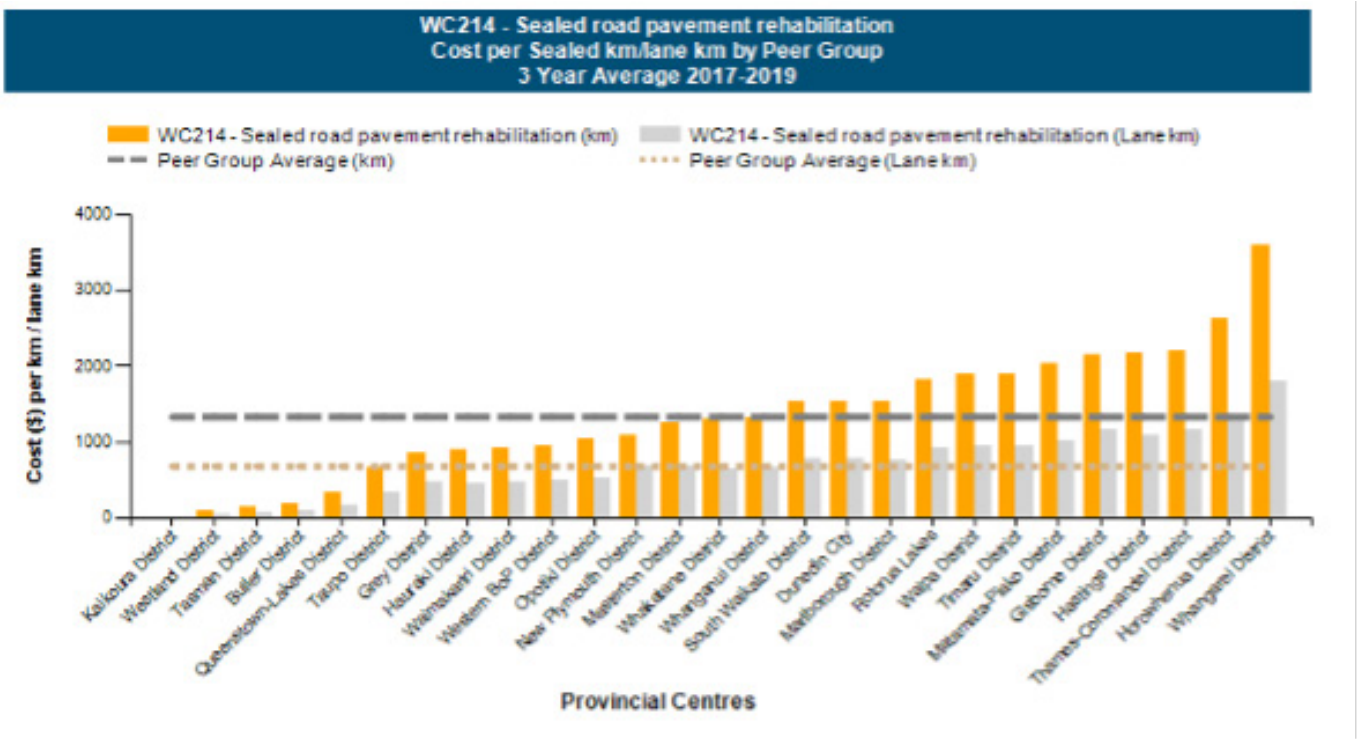
- Full reconstruction
This technique involves removal of the existing basecourse and/or sub-base and its replacement with new metal courses and a new wearing course. This is the most likely technique used on urban streets.
Renovation

This increases the strength of existing basecourse / sub-base materials by chemical stabilisation such as adding a stabiliser (hydrated lime, cement or emulsion) and re-compacting. This involves the pavement being ripped in-situ and re-laid in place by heavy plant. This technique can incorporate blending in of new materials and stabilisation measures. This is used when the existing pavement formations can be reused in a reconstituted manner.

- Smoothing
Irregularities in the road surface, where the structural condition of the carriageway is sound, are smoothed by placing additional (thick) surfacing on an existing sealed surface to smooth out irregularities. The materials used depend on traffic volumes / road geometry and road condition. The most commonly used material is asphaltic concrete.

The treatment type to be used is determined following an investigation of the existing pavement, an assessment of the future traffic loading and an economic assessment of the available options. The availability of suitable local aggregates is a prime consideration in determining the most cost-effective method of rehabilitating the existing pavement. Figure 67 shows a comparison for the Peer Group pavement renewal.

Figure 67: Sealed road pavement rehabilitation Peer Group comparison



In the last three years NPDC has been spending less than the average of the Peer Group. This will likely change in the future as the Council starts targeting pavement renewals for Arterial roads.

Projected Pavement Rehabilitation Renewal Works
The approach to option development is to consider the total expenditure of renewals and maintenance based on varying levels of renewal activity investment, to maintain the current Level of Service for the pavement assets. In the future NPDC will look to incorporate dTIMS to enable better decision making for pavement rehabilitation renewal works.

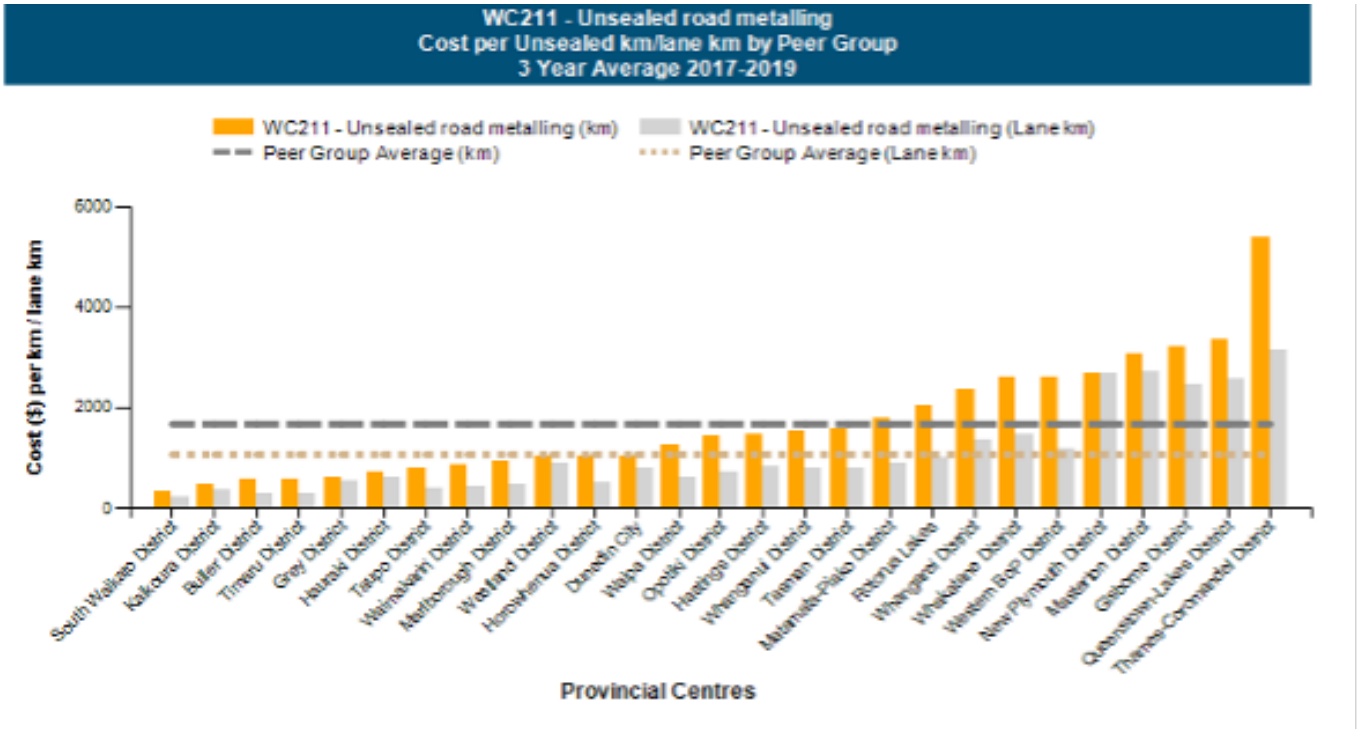
Unsealed Pavement Renewal and Capital Works

Economic, social and legislative changes in recent years have all combined in terms of impacting on the unsealed pavement network and its suitability for road users.

- Changing land use - The decline of pastoral farming and increase in alternative uses, particularly forestry and dairying, has increased loadings on the network
- Transport economics - Larger and heavier trucks have improved the economics of more remote properties and industries creating road user demand for improved roads
- Legislative changes - Legislative changes have resulted in heavier and longer vehicles on the network

Unsealed roads pavement metalling is identified through inspection, network knowledge and maintenance need. Environmental factors can also influence programmes. Figure 68 shows a comparison for the unsealed road metalling expenditure for the Peer Group.

Figure 68: Unsealed road metalling Peer Group comparison



NPDC has quite a high unsealed road metalling expenditure but the lowest unsealed pavement maintenance when compared with the Peer Group. This is most likely due to work being placed into the wrong work categories in the past. NPDC most likely spends the correct amount of money on unsealed pavements.

Projected Unsealed Pavement Renewal

With the forecast increase in logging for the district, it is expected that there will be an increase in reactive interventions for unsealed pavement. The extent of forestry is currently being investigated which will allow for better future decision making.

5.2.7 Asset Disposal

Disposal Plans
There are no plans to dispose of or cease to maintain any existing pavement network assets.

There are however a large number of paper or unformed roads throughout the district which are not required for transportation purposes (see Section 6.2). When requested, these paper roads can be stopped and the land sold to the adjoining landowner(s). In these instances the full cost of stopping the road and purchasing the land is met by the adjoining landowner(s).

A number of paper roads are used for access by adjoining landowners. These roads are not considered to be part of the transportation network and are not maintained by the Council.

5.2.8 Pavements Options Assesment

Table 29 shows the options considered for the work categories associated with pavements.

Table 29: Developed Options for Pavements

	Option Description	Benefits of Option	Negative Consequences of Option
W/C 111: Sealed Pavement Maintenance			
	Increase level of expenditure	• Increased Level of Service • Allows NPDC to target pre-reseal repairs a year ahead • Smoother roads	• Increase of sealed pavement maintenance costs

	Option Description	Benefits of Option	Negative Consequences of Option
W/C 111: Sealed Pavement Maintenance			
	Business as usual	Cheaper option to maintain current expenditure.	• Increase customer complaints • Potential for sealed roads to deteriorate under increasing forecasted demand • Higher number of defects • Increased occurrences of unplanned interventions
WC 112: Unsealed Pavement Maintenance			
	Increase level of expenditure	Improved Level of Service.	Increase of unsealed pavement maintenance costs.
	Business as usual	• Maintains current Level of Service • Maintains customer complaints at current levels • Prevents unnecessary pavement maintenance on roads that may be damaged by logging in the near future	No facility to undertake improvements
WC 211: Unsealed Road Metalling			
	Increase level of expenditure	mproved surface, smoother roads.	Increase of unsealed road maintenance costs.
	Business as usual	• Maintains current Level of Service • Maintains customer complaints at current levels	Risk of unforeseen changes to network demand resulting in increased expenditure.

	Option Description	Benefits of Option	Negative Consequences of Option
WC 212: Sealed Road Resurfacing			
	Increase level of expenditure	• Increased in Level of Service customer and technical measures • Reduce customer complaints • Can flatten bell curve of aging network	Increase in costs for activity.
BAU	Business as usual	• Maintains average surfacing lives at current levels • Ensure pavements are waterproofed • Current Level of Service customer and technical measures maintained • Maintain road user safety at current levels	The bell curve of the aging network will get steeper.
WC 214: Sealed Road Pavement Rehabilitation			
	Increase level of expenditure	• Increase annual physical achievement • Alignment with other work activities funding scenarios • Addresses bow wave of work needing to be completed that has previously been differed due to budget constraints	• Higher initial cost option • Potential for network deterioration if predicted traffic demand is not correct
BAU	Business as usual	Maintain rehabilitation levels at current level.	• The network will be consumed by a backlog of outstanding defects over time • Customer complaints will increase

Table 30 shows the test options for pavements.

Table 30: Test options for pavements

Option	Assessment Summary Statement	Predicted Levels of Service Outcomes	Option Cost
WC 111: Sealed Pavement Maintenance			
	Increasing expenditure to $2 million per annum will enable NPDC to complete pre-reseal repairs a year ahead as per best practice.	• Meeting and exceeding Levels of Service specified by ONRC technical performance and customer for most measures • The Level of Service for Amenity and Safety will be increased as a result of sealed pavement maintenance	✓
BAU	This is the lower cost of the options; however, the network consumption will be increased i.e. a backlog of outstanding work will increase which will need to be monitored.	• Maintains current Level of Service • The current level of customer requests will remain stable	Not preferred option
WC 112: Unsealed Pavement Maintenance			
	This is the high cost option, and will deliver increased Level of Service outcomes. It will allow safety to be improved through improved surface condition. The network will not be consumed i.e. no growing backlog of outstanding work.	• Proactive response to unsealed network needs as required • Provides some security in terms of unforeseen network demand timing predictions • The current level of customer requests will be reduced	Not preferred option
BAU	This is a cost neutral option and maintains the current investment level over the full term of the analysis period. Takes into consideration increased forecasted network demand scenario. Over this period it will allow the Council to maintain current safety levels. However the network will be consumed especially as forecast network demand increases, i.e. a growing backlog of outstanding work will occur which may need to be addressed within the following LTP period.	• Maintains current Level of Service which is deemed appropriate • The current level of customer requests will remain stable	✓

Option	Assessment Summary Statement	Predicted Levels of Service Outcomes	Option Cost
WC 211: Unsealed Road Metalling			
	Provide the resources to proactively manage forecasted increases in network demand by being proactive vs reactive. Put in place the required infrastructure in advance of increased demand requirements. It will facilitate programmes to improve safety on the unsealed road network.	• Proactive response to unsealed network needs as required • The current level of customer requests will be reduced	Not preferred option
BAU	This is the cost neutral option over the next three year funding term. Over this period it will allow the Council to maintain current safety levels. The backlog of outstanding work and customer requests will be maintained at current levels.	• Maintains current Level of Service which is deemed appropriate • The current level of customer requests will remain stable	✓
WC 212: Sealed Road Resurfacing			
	This option has not been considered further as an increased investment would be counterproductive.		Not preferred option
BAU	This is the most cost effective option.	Allows NPDC to maintain current budget whilst adjusting focus to Arterials and Collector roads as per ONRC.	✓
WC 214: Sealed Road Pavement Rehabilitation			
	This is the least cost long term option, and will deliver the desired outcomes and Levels of Service.	• A strategy that will over time bring ONRC customer and technical measures closer to target thresholds • Maintain customer requests at current levels	✓
BAU	This is the least cost long term option, and is forecasted to deliver the desired outcomes and Levels of Service. The network will be consumed over time with a growing backlog of outstanding work.	• General lowering of Levels of Service over time as sealed network worsens • Current level of customer requests will increase over time	Not preferred option

5.3 Bridges and Structures

Transportation bridges and structures (for example: tunnels, stock underpasses and retaining walls) support or allow the carriageway or footpaths to efficiently and safely pass through, over, around or under the existing topography or built environment. The continuous operation of this asset group is crucial to the transportation network. Structurally engineered, these assets are high risk and high value. They require proactive inspection and consequent maintenance, component renewal and ultimately full replacement. When properly designed and managed; however, they have a useful life that generally exceeds that of other road assets. Excluding pedestrian only bridges, bridges generally qualify for Waka Kotahi funding assistance.

The key issues that relate to bridges and structures are:

- The identification of strategic structures (associated with Lifelines issues).
- Demand for bridge strengthening from industry related to high productivity motor vehicle (HPMV) and 50Max HPMVs
- Safety for example on bridge approaches
- Structural capacity (strength) issues
- Vehicle efficiency issues (single lane bridges)

5.3.1 Strategic Case Linkage

Table 31 shows the linkage between the Strategic Case in **Section 2 and structures** – related activities.

Table 31. Bridges and Structures Strategic Case Linkage

GPSLT Objectives	• Develop a land transport system where no one is killed or seriously injured • A land transport system that provides people with better transport options to access social and economic opportunities • A low carbon land transport system that supports emissions reductions, while incorporating safety and inclusive access • A land transport system with improved freight connections for economic development				
RLTP Objectives	• Ensuring a regionally and nationally integrated transport network • Facilitating growth and economic development • Reducing the safety risk on Taranaki's transport network • Maintaining and improving accessibility and travel options throughout the region • Ensuring network resilience and responsiveness in the context of internal and external pressures • Reducing negative environmental and community impacts arising from transport • Addressing these issues in an environment of constrained funding and affordability yet rising costs				
Council goals	Partnership	Delivery	Communities	Sustainability	Prosperity
	Strong relationships with key stakeholders	Operational excellence	Inclusive, safe, creative, active and connected.	Mitigating our impact and adapting to climate change.	Provide a platform for a resilient and sustainable economy

GPSLT Objectives RLTP Objective Council Goals	Safety	A programme of Routine, Regular and Detailed structures inspections is in place and initiated at industry accepted frequencies Fault identification and prioritisation ensures that safety related defects are located, and a prompt response initiated at industry accepted frequencies
	Resilience	Preventative maintenance activities to ensure structures are identified, evaluated and improvements initiated where required
	Amenity	Manage the number of faults on structures that detract from the customer experience through appropriate inspections and interventions
	Accessibility	Monitor percentage access for larger vehicles to the road network and establish what limitations structures contribute to the result
	Efficiency	Minimise through strategic planning whole of life costs while delivering the required customer outcomes

Linkage to Problem Statements

The following identified Problem Statements have relevance to the road structures asset group:

- Natural topography and layout of infrastructure makes it difficult to complete a trip using alternative transport modes, causing severance of the community and places the network at risk during a major event
- Not taking a “safe system” approach to a complex network has resulted in poor actual and perceived safety outcomes
- Poor understanding of the value that our transport infrastructure provides for our community and regional economy has resulted in poorly targeted investment and missed economic opportunities
- Infrastructure and societal habits encourage motor vehicle usage causing environmental damage, poor health outcomes and unattractive urban spaces

Strategic Response to Problem Statements

Change risk profile:
- Risk to remain unchanged as structures are a critical asset

Programme adjustment:
- The consequence of underspending in maintenance has been realised and this has created a bow wave of expensive replacements
- The programme will need to incorporate structures along the Coastal Walkway that are vested with the TransportService

Policy approach:
- Implementation of rigorous inspections for all structures, not just bridges
- With the structures along the Coastal Walkway being vested from the Parks and Open Spaces Service to the Transportation Service, a robust inspection programme will need to be developed to incorporate these assets

Improve value for money:
- Increasing maintenance and component renewals to defer further bridge replacements

Relationship approach:
- Improving relationships with Waka Kotahi and Councillors should prevent maintenance and renewals budgets being reduced in the future for other critical assets

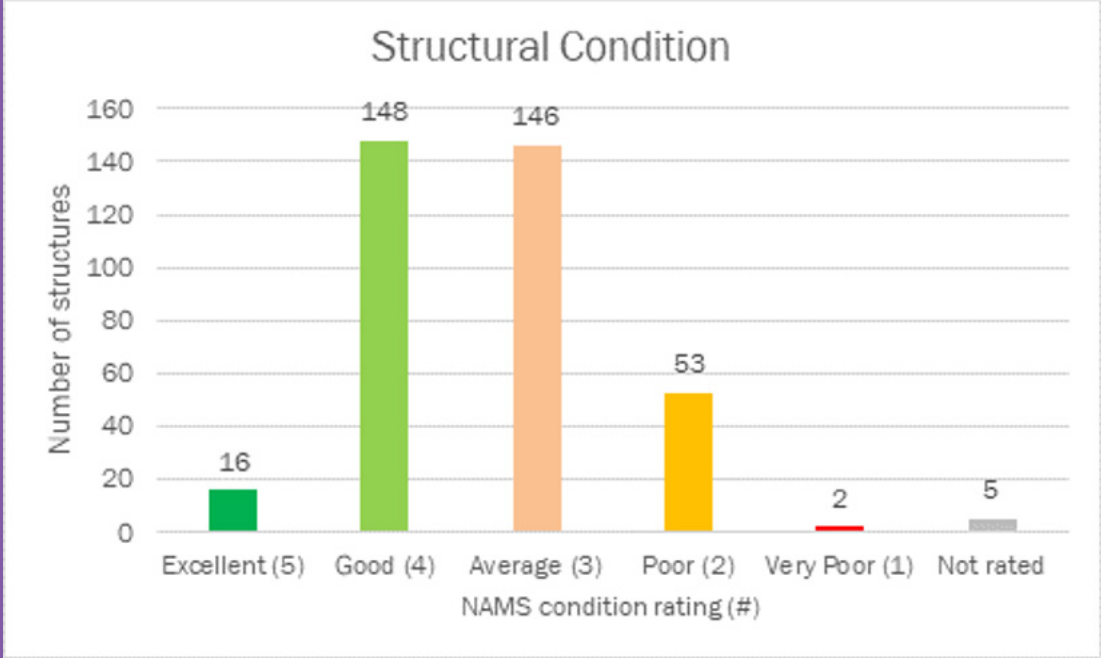
5.3.2 Levels of Service (Drainage) – (Technical)

Test Levels of Service
There are currently no technical Levels of Service influencing strategy and investment decisions for the structures asset group.

Compile and Test Evidence
Condition information within the Online Bridge Information System (OBIS) is substantially complete with only five records having no condition rating recorded. These are either new structures yet to be inspected or additional RAMM records are not currently included in OBIS.

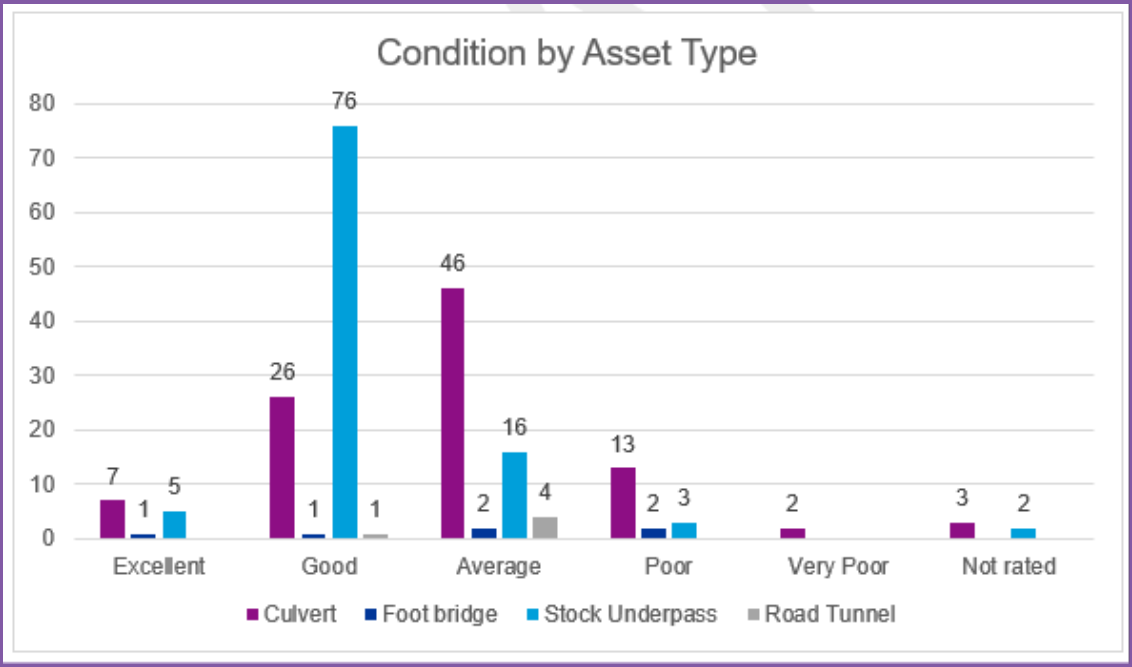
Figure 69 shows the overall condition of the network by structure type.

Figure 69: Overall network condition



Based on the above, the network structures are in 'Good to Average' condition (see the condition grades in **Section 6: Lifecycle**); however, there are 55 structures in 'Poor' or 'Very Poor' condition which reflects an under investment in structures in the past. The distribution of structures in 'Poor' and 'Very Poor' condition is shown in **Figure 70**.

Figure 70: Overall condition by structure type

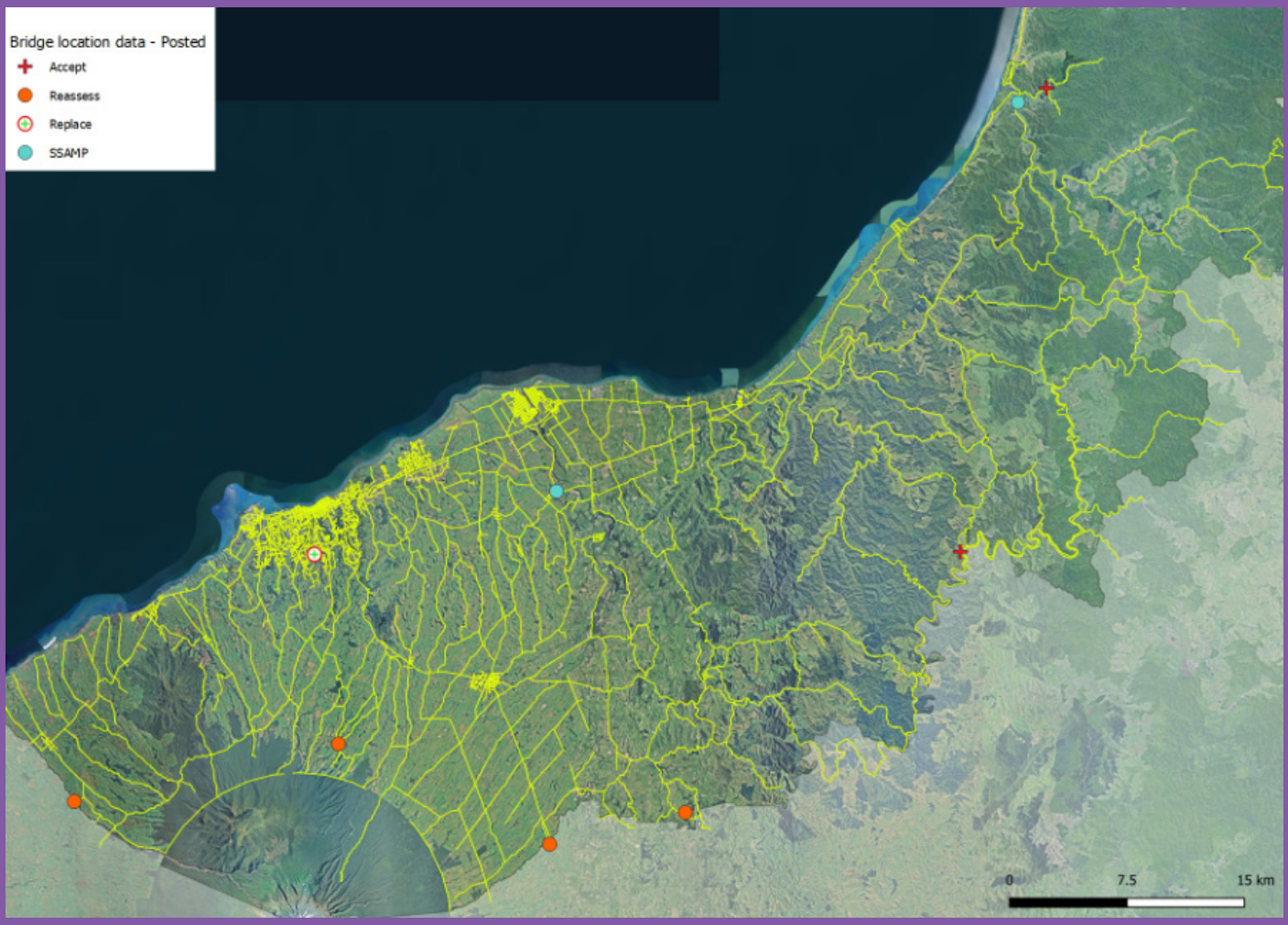


Structures in 'Poor' condition are expected to have defects affecting performance / structural integrity and likely require intervention within 6-18 months and structures in 'Very Poor' condition require immediate attention. These structures are expected to be the focus of current and upcoming maintenance programmes.

Beyond the condition assessment there are other elements of a structures performance, including structural capacity and road capacity (width) that impact on the performance of structures in the network.

On the network there are nine bridges that currently have weight restrictions in place as shown in **Figure 71**.

Figure 71: Bridges in the network with weight restrictions



Two of the bridges are on Low Volume roads and are considered to be appropriate for the volume and type of vehicles they service.

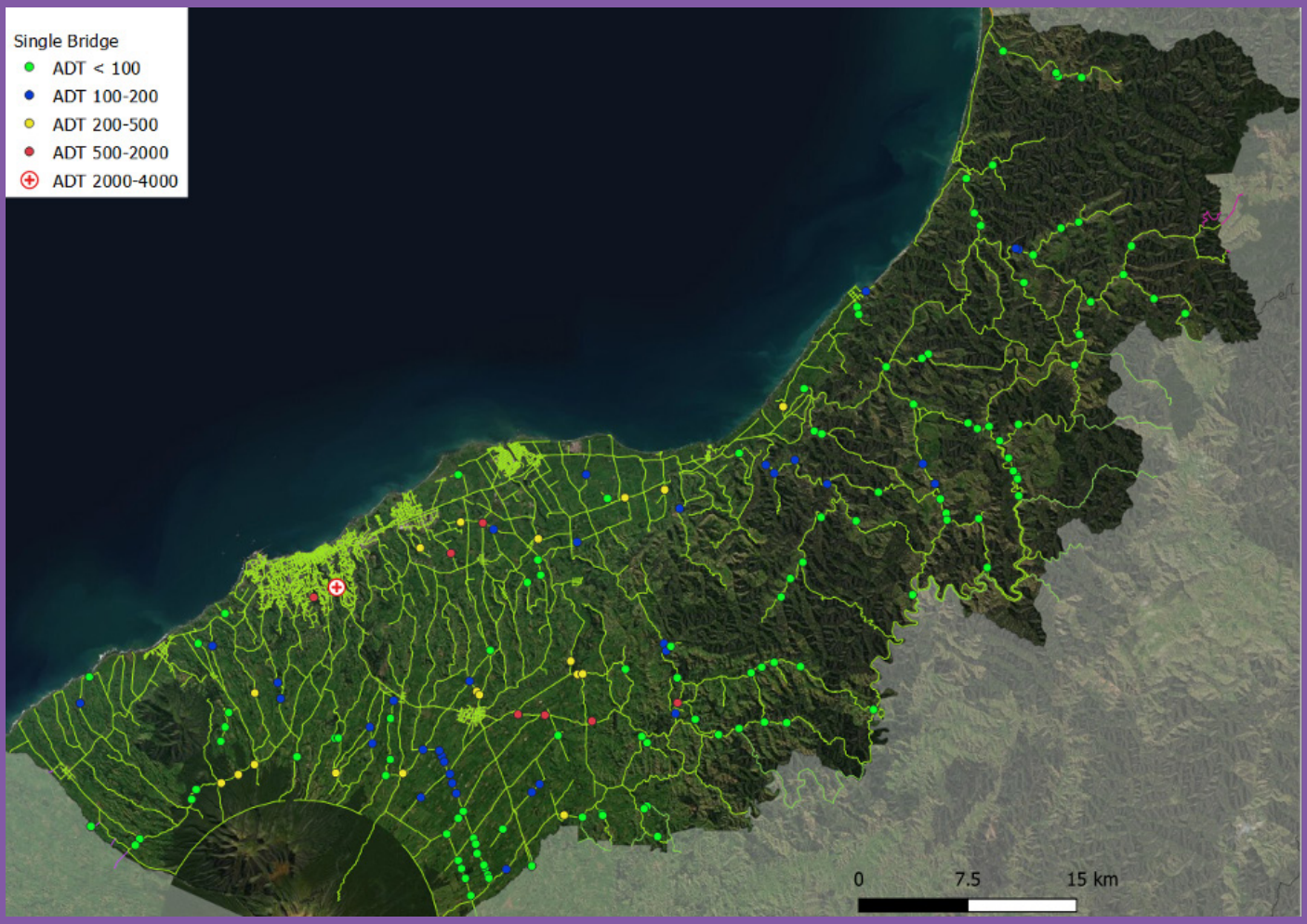
Four bridges would benefit from further analysis to determine if the restriction is still required. Two are aging swing bridges and it is recommended that special management plans are developed to manage these structures into the future.

Huatoki Street bridge is the only posted urban one lane structure in an area where there has been considerable growth in recent times and further growth is anticipated. For this reason, it is proposed to replace this structure. **Figure 72** shows Huatoki Street bridge.

Figure 72: Huatoki Street bridge ID #219

Across the network there are 187 single lane structures excluding those that have been deliberately restricted for traffic calming purposes. While single lane structures provide a lower Level of Service, the majority of these structures are considered fit for purpose as they are located in rural areas as shown in **Figure 73**.

Figure 73: Single lane bridges in the district



Notable exceptions to the above are a series of single lane structures on Bedford Road South that regularly sustain damage from overwidth vehicles (suspected to be agricultural plant). Bedford Road South also serves as an emergency alternative route for SH3.

Carrington Road is a route of increasing importance, particularly for tourism growth. Four (of eight) single lane structures on this route are on very poor alignment and present issues for tourist coaches travelling to / from Pukeiti gardens. With the further development of cycle trails and pathways currently underway, there is potential for increased traffic volumes which will further present issues. Carrington Road also serves as a bypass for SH45 in the event of a closure in the vicinity of Oakura. Bedford Road South and Carrington Road are highlighted in purple in **Figure 73**.

Also identified above are the two single lane structures in urban areas, being the Huatoki Street and Junction Street bridges, these are both located in the red circle in **Figure 73**. The Huatoki Street bridge has been discussed earlier as a structural improvement project, which includes addressing the width.

The Junction Street bridge consists of a 40m long single lane concrete structure with a footpath attached on one side. The footpath structure is in poor condition and requires replacement. Junction Street is in poor condition, is adjacent to planned growth areas and already carries an Average Daily Traffic (ADT) of 3,500 with peak hour flows of 450 vehicles. In order to accommodate projected future traffic volumes without impacting on the efficiency of the network it is proposed to replace the bridge with a modern structure with two traffic lanes, cycle lanes and footpaths. **Figure 74** shows the Junction Street bridge.

Figure 74: Junction Street bridge ID #214

5.3.3 Structures Maintenance and Operations

Structures Maintenance Strategy

Maintenance programmes are developed from the schedules of defects identified during inspections by both the maintenance contractor and professional services consultant.

Bridge maintenance tasks are identified and detailed in the Routine Bridge Repair Schedule. This work is of a non-structural nature and generally will not require specialist engineering input.

Repair treatments and priorities are determined by considering the impact on:

- Public safety
- Traffic movement and road hierarchy
- Maintaining structural integrity and serviceability
- Future costs if the work is not done

The works in the bridge maintenance programme are the most cost effective responses to the needs identified, except where shorter term but lower cost remedies are selected, when budget limitations apply and when safety is not compromised. From an asset management perspective, the additional criteria are also required and are applied to:

- Protect the investment in assets by extending the life of the structure
- Minimise repair costs

Predicted Maintenance Costs

A comprehensive list of maintenance defects has been established and costed for bridge and large culvert assets, the details of which are summarised in Tables 32 and 33 below.

In anticipation of proposed bridge renewals defects identified on those structures have been excluded.

Bridge Maintenance Strategy Summary

The district's structures are high value assets that require constant vigilance hence the inspection requirements currently being implemented.

Addressing identified maintenance needs promptly prevents defects manifesting into high cost repairs at a later date. Appropriate levels of investment are required to ensure this strategy is actioned.

The Council's strategy is to increase routine maintenance expenditure to delay an expensive renewals cost by timely interventions.

5.3.4 Structures Renewal and Capital Works

Bridge and Culvert Renewals Strategy
Renewal works are undertaken for the following reasons:

- The entire bridge has deteriorated to the extent that it no longer has the strength to carry its design loads (normal traffic) safely. As all bridges were built to carry the normal maximum legal load that prevailed at the time, current lack of capacity is generally the result of deterioration or government imposed increases in axle and vehicle weight limits.

- Major components have worn or decayed to the extent that they are preventing the bridge carrying its design loads

- The waterway's characteristics have altered to the extent that the bridge can no longer pass the design flood flows

- Flood or earthquake damage has displaced or irrevocably damaged the bridge

- Major vehicle impact damage

Renewal needs are identified and priorities are allocated from inspections, in particular specific structural inspections. The economics of renewing these bridges are then reviewed by looking at the net present value of the various options, including the "do minimum" option, for a 30 year analysis period.

Projected Structures Renewal Works
Bridge component renewals and bridge replacements have been identified and programmed across the next 30 years.

Projected Structures Capital Works
Future growth in residential and industrial areas to the east of the Waiwhakaiho River have been identified in the growth section of this document. In order to accommodate the projected increase in traffic volumes and to provide an alternative crossing of the river a new route to the south of the city has been identified.

Investigations into the route and location of a new bridge over the river have been identified to start in Year 8 of the programme.

5.3.5 Structures Options Assessment

Table 32 shows the options considered for the work categories associated with structures.

Table 32: Developed Options for Structures

	Option Description	Benefits of Option	Negative Consequences of Option
WC 114: Structures Maintenance			
	Increase level of expenditure	• Improves network structures condition rating • Extends the life of the structures	Increase of sealed pavement maintenance costs
BAU	Business as usual	Maintains current expenditure	• Structures stock condition will continue to decline • Higher cost in the long term as increasing volumes of repair are required as the structures deteriorate
WC 215: Structures component replacements			
	Increase level of expenditure	• Improves the overall structures condition rating • Reduced number of bridges with weight restrictions • Reduced structures maintenance costs	Increase of costs.
BAU	Business as usual	Maintains current condition trend	Increased risk of structures being posted as condition deteriorates.
WC 215: Structures component replacements			
This is a new WC therefore the options have not been developed or tested.			

Table 33 shows the test options for structures.

Table 33: Test options for structures

Option	Assessment Summary Statement	Predicted Levels of Service Outcomes	Option Cost
WC 211: Unsealed Road Metalling			
	An increase in funding will address a backlog of maintenance issues and will reduce costs going forward by delaying the need for greater interventions.	The overall condition rating for the network structures will improve.	
	Staying with the current level of investment will see the structures stock continue to deteriorate leading to greater costs in the long term.	The condition rating for the network structures will continue to decline.	Not preferred option
WC 215: Structures component replacements			
			
			Not preferred option
WC 216: Bridge and structures renewals			
This is a new WC therefore the options have not been developed or tested.			

5.4 Stormwater Drainage

The purpose of kerbs and channels and drainage facilities is to adequately protect the road structure from water related damage, restrict excess runoff onto adjacent properties, delineate the carriageway and provide some aesthetic and safety benefits.
There is a programme in place to install kerbs and channels in some urban areas where there are currently none (e.g. Waitara, Inglewood). Other new works programmes depend on the kerb and channel programme.

The key issues related to stormwater drainage are:

- Installation of kerbs and channels is heavily dependent on the availability of a piped stormwater system, and therefore linked to any improvement programmes for that system, managed by the Three Waters Team.
- Maintaining effective rural roadside drainage is important to ensure pavements are well drained and to minimise lifecycle costs for pavements
- Kerbs and channels are installed mainly in urban areas and are easily damaged by cars and heavy vehicles
- Ponding areas in the rural areas (culvert, inlets, outlets)

5.4.1 Strategic Case Linkage

Table 34 shows the linkage between the Strategic Case in Section 2 and stormwater drainage – related activities

Table 34: Stormwater Drainage Strategic Case Linkage

GPSLT Objectives	• Develop a land transport system where no one is killed or seriously injured • A land transport system that provides people with better transport options to access social and economic opportunities • A low carbon land transport system that supports emissions reductions, while incorporating safety and inclusive access				
RLTP Objectives	• Reducing the safety risk on Taranaki's transport network • Ensuring network resilience and responsiveness in the context of internal and external pressures • Reducing negative environmental and community impacts arising from transport • Addressing these issues in an environment of constrained funding and affordability yet rising costs				
Council goals	Partnership	Delivery	Communities	Sustainability	Prosperity
	Strong relationships with key stakeholders	Operational excellence	Inclusive, safe, creative, active and connected.	Mitigating our impact and adapting to climate change.	Provide a platform for a resilient and sustainable economy

GPSLT Objectives RLTP Objective Council Goals	Safety	The drainage network contributes towards safe travel by removing stormwater from the carriageway so that it is not a hazard for vehicles. Allowing the safe crossing of watercourses by way of culverts. Fault identification and prioritisation ensures that safety related defects are located, and a prompt response initiated.
	Resilience	Protecting the road pavement from damage caused by ponding stormwater ensures integrity and function is maintained. Efficient drainage systems contribute to keeping the road pavement dry (by lowering the ground water table level).
	Amenity	Manage the number of faults on drainage structures that detract from the customer experience though appropriate inspections and interventions.
	Accessibility	A programme of routine maintenance ensures the removal of surface water from carriageways is achieved improving the reliability for road user travel to intended destinations.
	Efficiency	Minimise through strategic planning whole of life costs while delivering the required customer outcomes.
Linkage to Problem Statements	The following identified Problem Statements have relevance to the stormwater drainage asset group: • Natural topography and layout of infrastructure makes it difficult to complete a trip using alternative transport modes, causing severance of the community and places the network at risk during a major event • Not taking a “safe system” approach to a complex network has resulted in poor actual and perceived safety outcomes • Poor understanding of the value that transport infrastructure provides for the community and regional economy has resulted in poorly targeted investment and missed economic opportunities	
Strategic Response to Problem Statements	**Change risk profile:** • Allowing Low Volume and Access roads to deteriorate to align with ONRC **Policy approach:** • Carry on implementing data improvement plan **Improve value for money:** • An improvement to data will allow targeted investment of drainage assets **Relationship approach:** • Improve the relationship with Waka Kotahi and Councillors through more reliable carriageway data that allows for informed decision making	

Levels of Service (Stormwater Drainage) – (Technical) - Test Levels of Service

There are currently no technical Levels of Service influencing strategy and investment decisions for the stormwater drainage asset group.

Drainage Current Condition and Performance - Compile and Test Evidence

- Kerb and Channel

Current performance issues for kerb and channel assets relate to:

- Poor gradient or other alignment problems
- Blockages from debris build up
- The profile of the channel
- The adequacy of supporting stormwater collection and disposal systems (blocked sumps and under capacity laterals)
- Impact of restrictions and obstructions to longitudinal grades from trees roots, detritus and breakages

- Surface Water Channel

Capacity / performance issues for surface water channel assets relate to:

- Blockages from debris build up as result of:
  - Slips and detritus from weather events
  - Vegetation
- Erosion / scour
- Interference of third parties (dumping refuse and intentionally placing impediments to flow)
- The adequacy of the receiving stormwater collection and disposal systems, e.g. culverts, drains and streams
- Vehicle entrance culverts restricting flow, e.g. undersized culverts, poor installation and headwall details
- No formal design phase undertaken on most surface water channels to establish capacity

- Culverts

Performance issues for culvert assets relate to:

- Pipe capacity - Most of the stormwater channels and culverts have not been formally designed according to the individual catchment areas for each pipe, but sized according to the best available knowledge and funding. Many cannot manage runoff leading to areas of localised flooding.
- Variable performance caused by blockages caused by debris and slips
- Downstream channels being impeded by fences and debris build up beyond the road reserve
- The adequacy of supporting stormwater collection and disposal systems
- The types of pipes and jointing systems used
- A lot of the fish passages on the network are

inadequate. Although this does not stop a culvert from performing its primary purpose, it will impact upon resource consent approval from TRC and does not meet NPDC's environmental standards.

In addition, there can be safety issues around the lack of adequate barrel length restricting the flow of traffic by narrowing the carriageway.

- Sumps

Sumps are performing well in most conditions. The greatest issue for the Council is the build-up of leaf debris on sump grates in autumn. This can be a particular problem when strong winds and heavy rain coincide causing surface flooding. This is a maintenance issue and is resolved through additional maintenance being undertaken at the appropriate times.

5.4.2 Drainage Maintenance and Operations

Drainage Maintenance Strategy

The principal maintenance activities are the proactive or cyclic cleaning of kerbed water channels, sumps and catch pits in urban areas, to keep the asset in good operational condition. Blockages will cause ponding which can cause scouring, damage the carriageway pavement and create a safety hazard. There are environmental issues as well with debris being washed into stormwater systems.

Proactive cyclic maintenance is based on asset criticality. Drainage assets on roads that cater for high traffic, cyclists and / or pedestrian volumes are treated with higher priority in order to manage the associated risk. They are therefore maintained at a higher standard than those assets on parts of the network that are a lower ONRC classification to appropriately address safety issues related to loss of control of road users on wet roads as well as ensure safety for other modes. Drainage maintenance in the rural areas principally targets culverts and surface water channels to ensure these are clear of obstructions in order to function effectively.

Since 2017, drainage related service requests have reduced from 299 in 2017 to 155 in 2019. NPDC has not changed any processes around drainage, it is believed the reduced number of service requests is related to the relatively low number of storm events in the last few years.

Based on the NZ Historic Weather Events Catalogue produced by NIWA, Taranaki has only been affected by three notable events:

- August 2019 NZ Storm (10th August 2019)
  - Tornado at New Plymouth
  - Two people injured by flying debris
  - About 800 properties with loss of power
  - Roofs lifted off of houses, windows blown in, fences blown over and trees felled

- April 2018 NZ Storm (10th April 2018)
- Tornado at Rahotu
- High wind / gusts
- 12,000 properties affected by power cuts

- February 2018 Ex Tropical Cyclone Gita (20th February 2018)
  - High wind / gusts
  - 26,000 people in the region lost power overnight
  - North Taranaki residents asked to conserve water

Drainage Renewal and Capital Works

Drainage assets are considered for renewal if the condition is such that it is impacting on other asset types (pavement) or capacity to function as intended is not being realised resulting in resilience issues on the network.

Drainage renewals encompasses three main types:

- Pavement surface drainage – verge / shoulder maintenance and kerb and channel

- Pavement structure drainage – surface water channels (lined / unlined), side slopes (verge's) side drainage, subsoil drainage, etc.

- Stormwater transfer drainage – culvert renewal, inlet / outlet structures, sumps, stormwater treatment devices etc.

Drainage renewal programmes are developed by considering data from the:

- Road surface

- Pavement structure

- Stormwater transfer assets

- Drainage maintenance records

- Flood zones or flooding records

Part of the drainage renewals process is obtaining consent from TRC which has been problematic in recent times. In order to address this NPDC intends to start the process earlier so that the consenting process is smoother. This action has been identified in the improvement plan in **Section 9: Improvement Plan** of this AMP.

Drainage Capital Works Plan

Drainage capital works are generally initiated through triggers such as growth, Levels of Service, regulatory, operational efficiency, or vested (gifted) through subdivisions. NPDC has identified a lack of detail in the networks culverts. The Council is planning to improve data quality so that catchment analysis can be completed, especially in the rural network (refer to

the Stormwater and Flood Protection AMP) for further details. Pending whether current culverts are suitable for the catchment area, some culverts may need to be upgraded through capital works.

Renewal Decision Making Process
The approach to developing a FWP is to identify high priority areas based on analysis of specific performance criteria, using RAMM condition inspections and fault identification.

A list of candidate sites is produced, with the sites being ranked by risk. The sites are then visualised in a map and the list is formatted to prioritise treatments based on:

- Alignment with other FWP
- Annual rainfall variation across the network
- Failure mode analysis outcomes

The prioritised renewal candidate sites are then compared to the annual budget to determine which sites can be added to the programme.

Stormwater Channel Programme
Currently NPDC's forward work renewal programme is planned a year in advance, with the intention to bring this up to three years in advance. The programme specifically focuses on aligning with other complementary asset groups such as footpaths, street pavements and street lighting.

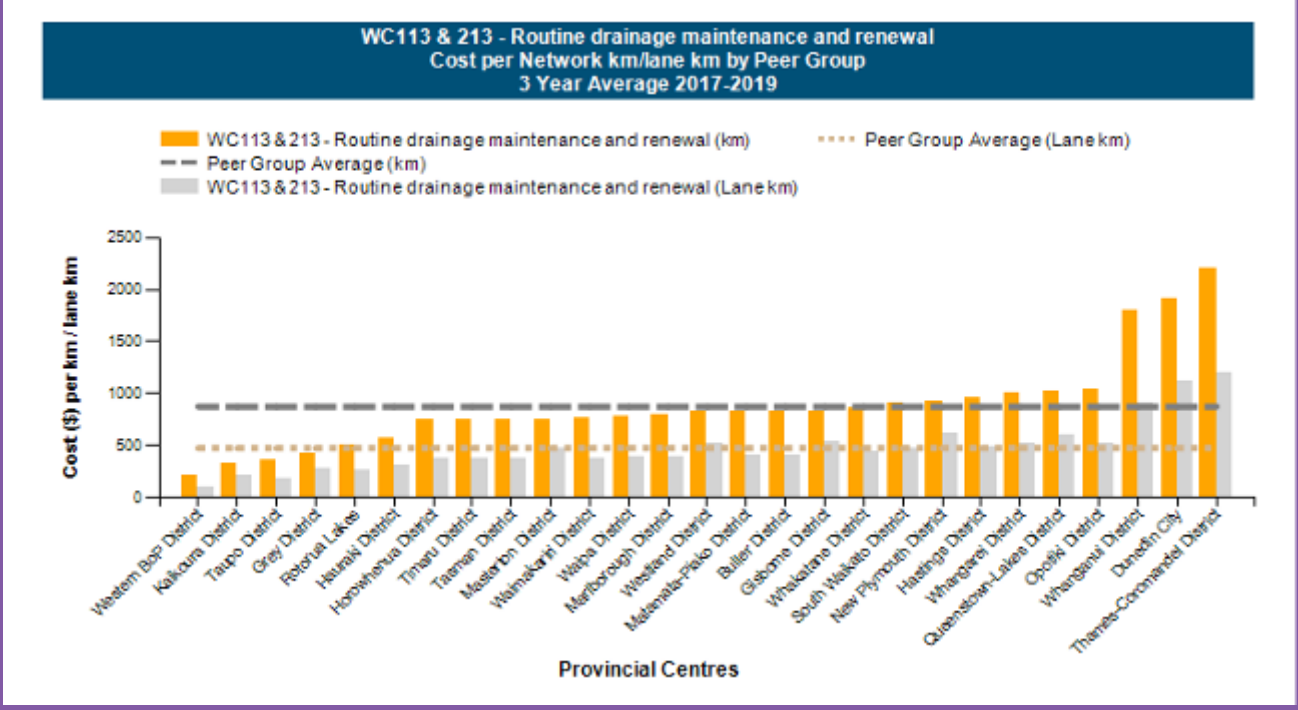
The decision to renew kerb and channel is determined by detailed visual inspection and maintenance cost analysis.

Stormwater channel programmes are aligned with the carriageway and footpath programmes to achieve operational efficiency and ensure a logical sequence of renewal of these related asset types.

- Ideally kerb and channel works should be done first as there may be opportunities to improve the levels. This should be followed by carriageway and possibly footpath works.
- When a kerb and channel renewal has been confirmed consideration is given to addressing safety related improvements
- Street sumps are generally renewed as part of kerb and channel renewal works

Figure 75 shows NPDC's routine drainage maintenance compared to the Peer Group.

Figure 75: Routine drainage maintenance Peer Group comparison



NPDC is in the upper third of its Peer Group for drainage maintenance and renewals. A past approach was to target drainage in priority of pavement maintenance and renewals which explains the higher expenditure in drainage.

Other Drainage Asset Renewal

Other drainage assets are considered for renewal when associated assets are being programmed for resurfacing or rehabilitation. Typically these drainage assets are inspected when the adjoining section of carriageway, footway, or stormwater channel is proposed for a renewal treatment. A decision is then made based on condition as to whether or not to replace the asset.

Previously culvert renewal replacements have been planned using local knowledge; however, going forward an All Faults program for culverts will be utilised to identify work and prioritise this work. The All Faults program is currently in a data collection phase. Otherwise, considering the nature of the asset, culvert replacement can be considered as more reactive based on problems that may arise periodically. Every effort is made to align culvert renewal works with other programmed works, including resurfacing and pavement rehabilitations.

5.4.3 Drainage Options Assessment Structures

Table 35 shows the options considered for the work categories associated with drainage.

Table 35: Developed Options for Drainage

	Option Description	Benefits of Option	Negative Consequences of Option
WC 113: Routine Drainage Maintenance			
	Increase level of expenditure	• Programme addresses identified deficiencies in rural network, water table drains and high berm removal • Maintains drainage systems in a state that ensures they operate as intended • Able to meet ONRC Level of Service outcomes for amenity	Increase in budget.
BAU	Business as usual	Cost neutral budget.	• Potential to increase costs in other work activities i.e. “Seal Pavement Maintenance” • Decrease resilience of the road network affecting network availability. Higher frequency of flooding from poorly maintain drainage systems. • Customer dissatisfaction with network appearance especially in urban areas, detritus in kerbs and sumps

	Option Description	Benefits of Option	Negative Consequences of Option
WC 213: Drainage Renewals			
	Increase level of expenditure	• Improvements to overall drainage assets condition • Improve network resilience and accessibility at identified network hotspots • Enable drainage works to be undertaken with other project work	Increase in budget.
BAU	Business as usual	Enables the Council to progress kerb replacement and culvert programmes.	• Overall condition of culvert assets will continue to deteriorate over the network year on year • Road user safety through road user evasive action required as a result of road surface deterioration

Table 36 shows the test options for drainage.

Table 33: Test options for structures

Option	Assessment Summary Statement	Predicted Levels of Service Outcomes	Option Cost
WC 113: Routine Drainage Maintenance			
	Provides the ability to undertake the work activity deemed necessary to efficiently manage drainage systems in New Plymouth. This level has been established by continually monitoring network condition through the All-Fault defect inspection regime and network audits.	• Maintains current Level of Service provided in terms of ONRC Amenity measures to current levels • Contributes to increasing availability of road network for customers through increased resilience • Less defects from improved drainage systems maintenance, overall network improvement, end goal	Not preferred option

Option	Assessment Summary Statement	Predicted Levels of Service Outcomes	Option Cost
WC 211: Unsealed Road Metalling			
BAU	Review current work practices and identify areas where operational efficiencies can be gained. Monitor network condition and customer feedback via level of complaints received.	• Current expenditure indicates that a lowering of Levels of Service would be the outcome if current approved budgets are enforced • Increased instances of non-compliance (increased litter, and drainage related issues on the road network	✓
WC 213: Drainage Renewals			
	This is the least cost long term option, and will contribute to delivering the desired outcomes and Level of Service. The current level of customer requests will be maintained.	• Less defects from improved drainage system, overall network improvement end goal • Contributes to increasing availability of road network for customers through increased resilience	Not preferred option
BAU	This is the least cost option over the term of the LTP. Over the term of the LTP it will allow the Council to manage growth and improve safety; however, the network will be consumed. A backlog of outstanding work will occur which will need to be addressed within the following LTP period.	Levels of Service maintained at current levels.	✓

5.5 Traffic Services

Traffic services aid the safe and orderly movement of vehicular and pedestrian traffic, and indicate road use restrictions and other information. A good standard of traffic services can contribute significantly to a safer road network. Traffic services include:

- Traffic signs
- Road facilities – markings, EMPs, RRPMs, local area traffic management devices, speed humps, traffic islands
- Traffic signals
- Street lighting (including festive and CBD lights)
- Stock effluent facility

The key issues related to traffic services are:

- Poor delineation of rural network
- Aging concrete lighting poles that are approaching end of life
- Older concrete poles do not have sufficient space to contain cable joints, therefore they are houses underground resulting in susceptibility to strikes and moisture.

The stock effluent disposal facility on SH3 at Ahititi provides a means for stock haulage traffic to dispose of effluent in a safe and environmentally acceptable way. The key issue relating to the facility is to meet TRC's resource consent conditions.

5.5.1 Strategic Case Linkage

Table 37 below shows the linkage between the Strategic Case in Section 2 and traffic services – related activities

Table 37: Traffic Services Strategic Case Linkage

GPSLT Objectives	• Develop a land transport system where no one is killed or seriously injured • A land transport system that provides people with better transport options to access social and economic opportunities • A low carbon land transport system that supports emissions reductions, while incorporating safety and inclusive access • A land transport system with improved freight connections for economic development				
RLTP Objectives	• Ensuring a regionally and nationally integrated transport network • Reducing the safety risk on Taranaki's transport network • Ensuring network resilience and responsiveness in the context of internal and external pressures • Reducing negative environmental and community impacts arising from transport • Addressing these issues in an environment of constrained funding and affordability yet rising costs				
Council goals	Partnership	Delivery	Communities	Sustainability	Prosperity
	Strong relationships with key stakeholders	Operational excellence	Inclusive, safe, creative, active and connected.	Mitigating our impact and adapting to climate change.	Provide a platform for a resilient and sustainable economy
GPSLT Objectives RLTP Objective Council Goals	Safety	Fault identification and prioritisation ensures that defective, obscured and unsecure traffic service assets are attended to within specified response times. Compliance audits including night inspections are undertaken at agreed frequency, evaluate results and act as required. Network auditing will identify deficiencies on the transportation network.			
	Resilience	Programme of preventative maintenance works undertaken that addresses key network at risk areas or hot spots.			
	Amenity	Condition of traffic services assets reduce efficiency and clarity to road users.			

GPSLT Objectives RLTP Objective Council Goals	Accessibility	A programme of routine maintenance ensures the removal of detritus from traffic services is achieved improving the reliability for road user travel to intended destinations.
	Efficiency	Minimise through strategic planning whole of life costs while delivering the required customer outcomes.
Linkage to Problem Statements	The following identified Problem Statements have relevance to the traffic services asset group: • Not taking a "safe system" approach to a complex network has resulted in poor actual and perceived safety outcomes • Poor understanding of the value that our transport infrastructure provides for our community and regional economy has resulted in poorly targeted investment and missed economic opportunities.	
Strategic Response to Problem Statements	**Programme adjustment:** • An increase in safety audits will highlight areas on our network that need safety improvements. The programme will adjust accordingly. An example of this is delineation audits. • Targeting safety improvements by ONRC will align with network needs **Change risk profile:** • We are no longer accepting the risk of allowing the network to sit below RTS-5 minimum standards. This is a positive improvement supporting our alignment with the Waka Kotahi's Vision Zero strategy. **Policy approach:** • Increase numbers of safety audits on the network **Relationship approach:** • Improve the relationship with Waka Kotahi and Councillors through more reliable carriageway data that allows for informed decision making	

5.5.2 Current Condition and Performance

Traffic Services
Performance issues for traffic services assets in the district generally relate to the accuracy of placement, visibility, reflectivity and conformity with standards. A review of delineation in the rural area indicates the network falls below the required RTS-5 standard particularly in regard to EMPs and to a lesser degree signage and road marking.

A key issue with street lighting is their deterioration due to age, with the majority of lights upgraded to modern LED units the focus is switching to the poles. Brackets and poles suffer from corrosion and fittings become loose due to wind vibration. Concrete poles are susceptible to concrete spalling as a result of corrosion to reinforcing steel components expanding, particularly in the coastal areas. Many of the older concrete poles have insufficient space to enable cable joints to be accommodated within them, resulting in buried joints which are at higher risk of failure due to strikes and water infiltration. The close proximity of a number of urban areas to the coast makes corrosion of street lighting components a significant issue in relation to asset life.

Poles can also be subject to vehicle collision damage and, if painted, the general deterioration of the coating can lead to unsightliness and eventual corrosion.

5.5.3 Traffic Services Operations and Maintenance

Traffic Services Maintenance Strategy
The general failure mode for the traffic services categories include cleanliness, visibility and damage. If the asset meets any of the failure criteria, it is entered into the All Faults database, analysed and programmed for either repair or replacement. The response and reinstatement times are managed to minimise the risk to public safety.

The All Faults process is an ongoing operation with asset inspectors continuously monitoring the deterioration of previously recorded sign faults and identifying new

defects and reviewing / adjusting the priority of recorded defects.

Traffic Signals

The maintenance strategy for traffic signals can be described as one of "scheduled preventive maintenance". Programmed inspections at regular intervals are undertaken by the contractor, following clearly defined checks of components and scheduled replacement of lamps. The contractor is required to have on hand a ready supply and availability of consumable items.

A 24 hour, seven day a week emergency repair and accident callout response is required of the contractor. On-site attendance is within one hour of notification and temporary repair is initiated within 24 hours.

Street Lighting Maintenance Strategy

With the programmed roll out of the LED upgrade all but complete a number of significant benefits are being realised in the maintenance activity.

- LED street lighting is much cheaper to run as they are far more energy efficient than the older technology street lights. The Energy Efficiency and Conservation Authority (EECA) estimates that on average a LED street light uses approximately 50% of the energy to generate the same amount of light as HPS lighting.

- The maintenance required for LED street lighting is far less than for HPS with LED lamps requiring to be replaced roughly every 20 years compared to just four years for HPS

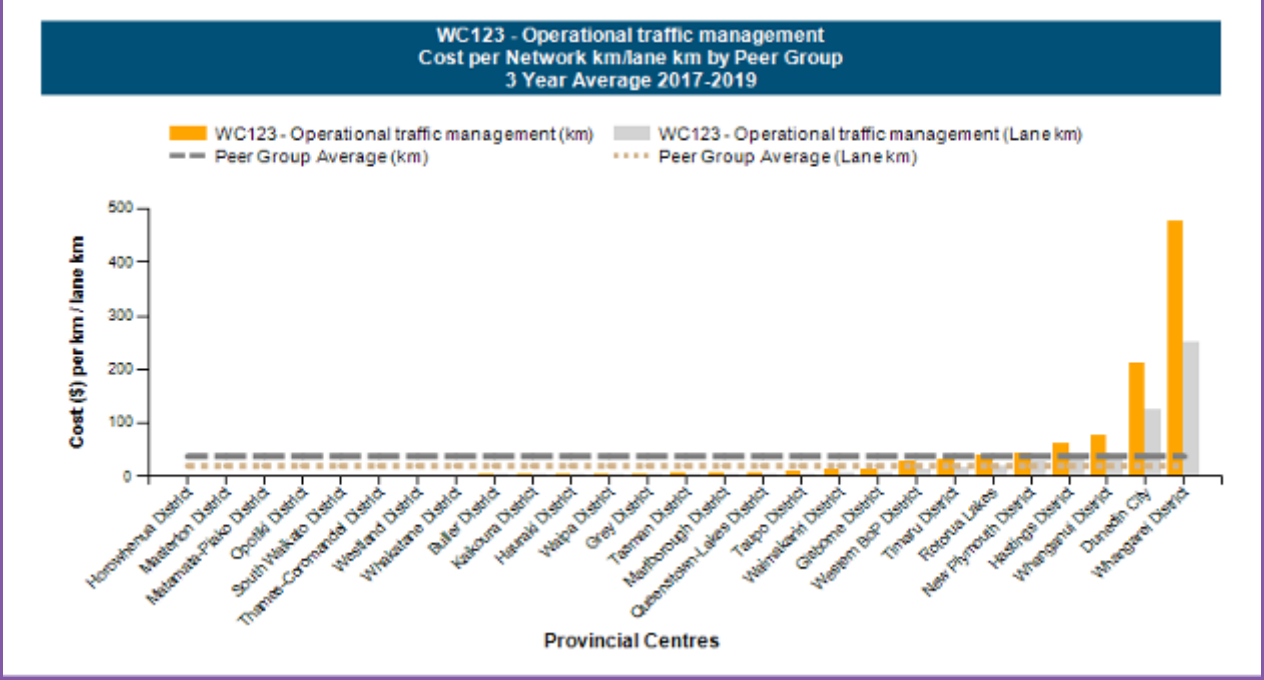
- The failure rates for LED street lights is low, at <1% compared to 6% for HPS. Each luminaire failure requires a crew to visit the luminaire to replace it, so less failures result in a lower operating costs.

- The number of customer service requests relating to street lighting has significantly reduced from 1,004 requests/year in 2016 to 433 requests/year in 2019

Operational Traffic Management Expenditure Peer Group Comparison

Figure 76 shows NPDC's operational traffic management expenditure compared to the Peer Group.

Figure 76: Operational traffic management Peer Group comparison



The variance in this measure purely comes down to the number of traffic signals a local authority has. Unless the district has large population growth, there will continue to be low operational traffic management expenditure.

5.5.4 Traffic Services Renewal and Capital Works

Traffic Services Renewal Strategy

Traffic service renewals provide for the replacement of traffic signs, and traffic management equipment like intersection signals. This links to maintaining and protecting strategic corridor use and safety, which is identified as a key problem statement in the Strategic Case (**see Section 2**). Under ONRC the Arterial / Collector and high traffic and freight routes will have higher Levels of Service and greater numbers of assets for renewal.

No changes to Levels of Service are anticipated although a review of current traffic service Levels of Service; however, new ONRC road classifications may result in additional assets being required and / or removed.

Renewal Decision Making Process

Signs, rails and barriers are renewed on a corrective basis. This means that although renewals are not planned on a large scale, their renewal is carried out when they fail to meet current standards. NPDC has sufficient mitigation strategies and focused response times to prevent delays in renewals being a risk to public safety.

Road marking is refreshed to maintain condition and performance on a bi-annual basis with 50% of the network marked each year. Some critical markings i.e. 'Stop', 'Give Way' intersections and Pedestrian Crossings are remarked on an as required basis. Where asphalt has been used as a surfacing material it is marked using longer lasting thermos plastic markings.

Traffic Signals Capital Works

The Network Operating Plan (see **Section 2.4.4**) indicated that the installation of lights at the Tukapa Street / Saunders Avenue intersection to replace the substandard roundabout and adjacent pedestrian lights would have positive outcomes in terms of efficiency and safety. The project has been put forward in the low cost / low risk programme of works.

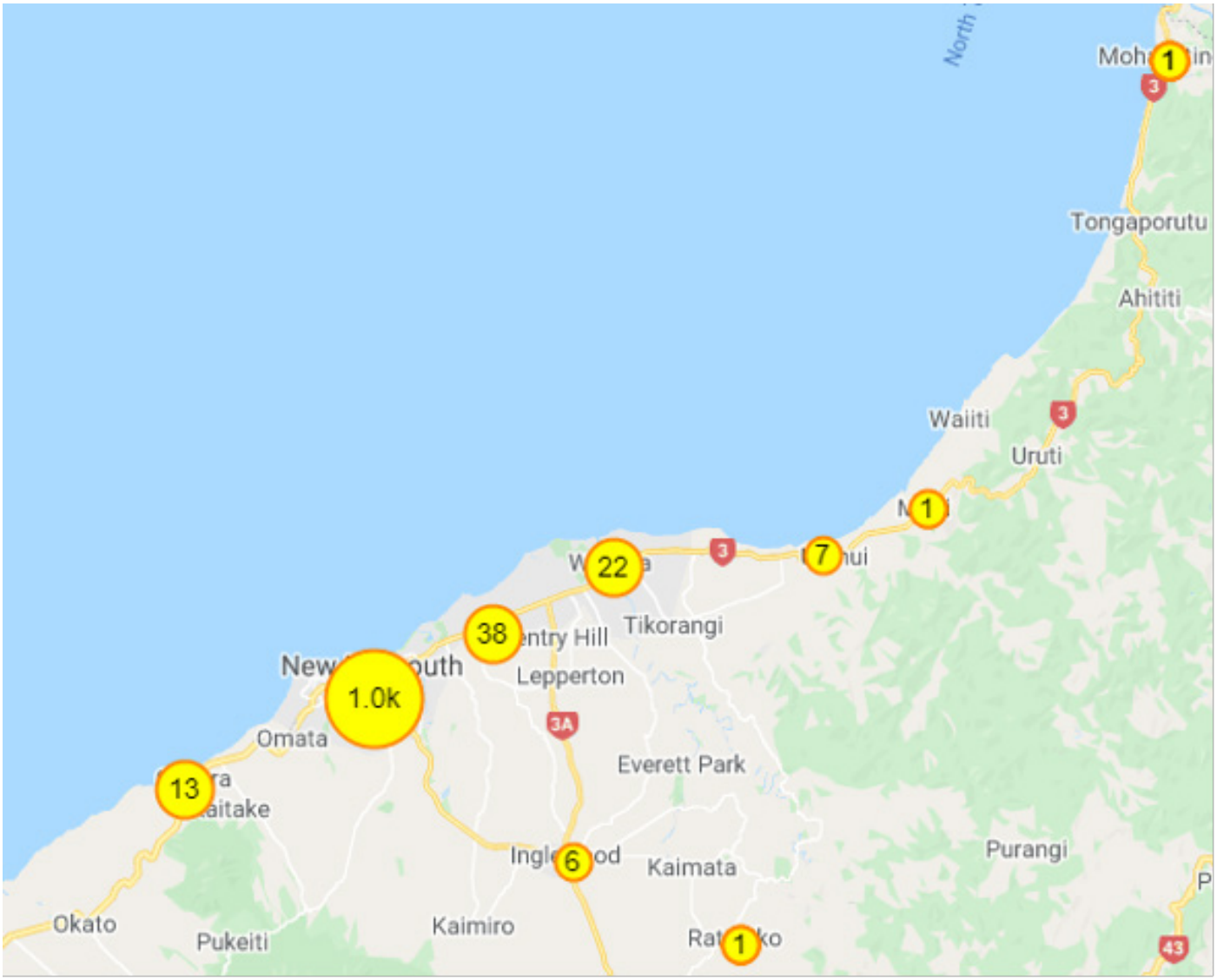
Traffic Services Capital Works

New works for additional signs are mainly driven by safety from Waka Kotahi audits and programmes to improve road safety and accessibility around schools. There are new signs and road markings associated with programmes such as safety minor works. Signs are also installed as part of road upgrades and major new works projects. There are no other specific CAPEX forecasts for traffic services at this time.

Street Lighting Capital Works

There is currently no street light programme for new installations over the 10 year forecast period.
It is intended to replace concrete light poles with modern alternatives over the next five years. **Figure 77** shows the quantum and distribution of concrete poles across the district.

Figure 77: Quantum and distribution of concrete poles across the district



In total there are approximately 1,500 concrete light poles that will require replacing at a rate of 300 per year. In order to address the issue of the underground joints the power cable is replaced at the same time as the poles. This activity is undertaken as part of the renewals programme.

With the upgrade of the LED network, the lights are now able to house units which can be retrofitted to monitor defects on the network. This will allow the contractor to determine if the fault is a single light or a larger outage, and enables the contractor to be better prepared when visiting the site and have the correct fittings to replace the defective ones.

5.5.5 Traffic Services Options Assessment

Table 38 shows the options considered for the work categories associated with traffic services

Table 38: Developed Options for Traffic Services

	Option Description	Benefits of Option	Negative Consequences of Option
WC 122: Traffic Services Maintenance			
	Increase level of expenditure	• Reduce customer complaints • Address deficiencies in rural delineation	Higher overall costs, increased budget.
BAU	Business as usual	Maintains the status quo	• Customer satisfaction levels continue to remain below target level • Rural delineation continues to be raised in audits • Rural crash record continues to increase
WC 122: Traffic Services Maintenance			
	Replace concrete light poles and power supplies	• Replace aging concrete poles improves resilience • Removal of underground joints improves asset resilience and reduces maintenance costs	Higher overall costs, increased budget.

	Option Description	Benefits of Option	Negative Consequences of Option
WC 122: Traffic Services Maintenance			
BAU	Business as usual	• Attempts to maintains current investment levels • Costs remain stable	• Potential for future increased costs as underground joints come to end of their design life and fail • Increase in renewals as concrete poles fail • Customer satisfaction unchanged
	Install remote sensor technology on LED lights	• Ability to control individual lights • Better fault reporting • Reduced maintenance costs as the contractor is able to diagnose issues from the depot	• Increase in asset value • New technology maybe a learning curve
BAU	Business as usual	No CAPEX required.	Maintenance contractor required to visit site to determine the nature (or quantum) of fault.

Table 39 shows the test options for traffic services.

Table 42: Developed Options for Footpaths and Cycleways

Option	Assessment Summary Statement	Predicted Levels of Service Outcomes	Option Cost
WC 122: Traffic Services			
	The modest increase will improve rural delineation back to an acceptable minimum standard.	Reduction in rural crashes.	
BAU	The network will continue to have issued raised in audits regarding rural delineation.	No change.	Not preferred option
WC 222: Traffic Service Renewals			
Replacement of concrete light columns			
	Replacement of this aging asset will reduce the frequency of faults and outages.	Improved Level of Service.	
BAU	Faults and outages likely to increase as underground joints fail and column deterioration increases.	The Level of Service will reduce.	Not preferred option
Installation of remote senor technology to LED lamps			
	This new technology will enable remote analysis of faults that will allow the maintenance contractor to be more efficient.	Reduced maintenance expenditure over time.	
BAU	Maintains the status quo.	Maintains current Level of Service.	Not preferred option

5.6 Footpaths and Cycleways

The purpose of footpaths is to provide a safe and effective network, catering for the transportation and recreation purposes of pedestrians and mobility devices. Footpaths provide a safe, convenient and defined means for pedestrian movement alongside and linking roadways. (Note: Pedestrian access ways connecting roads to parks and reserves are not considered in this AMP because they form part of the Parks and Open Spaces asset base – see the Parks and Open Spaces AMP).

The key issues related to footpaths are:

- Safety of pedestrians
- Identifying and prioritising routes for accessibility
- Urban character and streetscape design
- Increased public expectations over time creating greater demand for network extension and higher quality footpaths. The aging population is a factor in this.

The purpose of cycleways is to provide an efficient and safe network of cycle lanes and facilities to encourage cycling as a viable mode of transport. In 2000, the New Plymouth Cycle Facilities Review, led to adoption of the initial Cycle Strategy in 2003, which was updated in 2007. Most recently a cycle network review was undertaken in November 2019.

Key issues relating to cycleways are:

- Continuity of cycle lanes throughout the network as they are quite often disjointed near intersections and carriageway pinch points
- Cycleways being obstructed by planter boxes, kerb extensions and vehicles
- Rural cycling circuits with insufficient width and large size chipseal which can make cycling difficult and hazardous
- Development of off-road cycleways as part of a network
- Clearing of detritus from cycleways
- Cycling promotion and education including travel planning and skills training

5.6.1 Strategic Case Linkage

Table 40 shows the linkage between the Strategic Case in **Section 2** and **footpaths and cycleways** – related activities.

Table 40: Footpaths and Cycleways Strategic Case Linkage

GPSLT Objectives	• Develop a land transport system where no one is killed or seriously injured • A land transport system that provides people with better transport options to access social and economic opportunities • A low carbon land transport system that supports emissions reductions, while incorporating safety and inclusive access				
RLTP Objectives	• Facilitating growth and economic development • Reducing the safety risk on Taranaki's transport network • Maintaining and improving accessibility and travel options throughout the region • Reducing negative environmental and community impacts arising from transport • Addressing these issues in an environment of constrained funding and affordability yet rising costs				
Council goals	Partnership	Delivery	Communities	Sustainability	Prosperity
	Strong relationships with key stakeholders	Operational excellence	Inclusive, safe, creative, active and connected.	Mitigating our impact and adapting to climate change.	Provide a platform for a resilient and sustainable economy

GPSLT Objectives RLTP Objective Council Goals	Safety	Fault identification and prioritisation ensures that defective and dangerous pathway sections are recorded, and appropriate intervention undertaken.
	Resilience	Programme of maintenance works undertaken to ensure journeys are not impacted by unplanned events.
	Amenity	Regular audits are undertaken and reported in the ONRC reporting tool. Customer service requests related to the roads and footpath are responded to in a timely manner.

GPSLT Objectives RLTP Objective Council Goals	Accessibility	Maintenance to a standard whereby the target percentage of residents are satisfied with the overall quality and safety of the district's cycle network.
	Efficiency	Minimise through strategic planning whole of life costs while delivering the required customer outcomes.

Linkage to Problem Statements

The following identified Problem Statements have relevance to the footpaths and cycleways asset group:

- Natural topography and layout of infrastructure makes it difficult to complete a trip using alternative transport modes, causing severance of the community and places the network at risk during a major event
- Not taking a "safe system" approach to a complex network has resulted in poor actual and perceived safety outcomes
- Poor understanding of the value that our transport infrastructure provides for our community and regional economy has resulted in poorly targeted investment and missed economic opportunities
- Infrastructure and societal habits encourage motor vehicle usage causing environmental damage, poor health outcomes and unattractive urban spaces

Strategic Response to Problem Statements

Change risk profile:
Allowing Low Volume and Access roads to deteriorate to align with ONRC

Policy approach:
- Carry on implementing data improvement plan
- Changes to Council policy has meant a strategy of widening footpaths around schools and walkways to create a shared pathway
- The Integrated Transport Strategy will be written to actively encourage walking, cycling and public transport

Improve value for money:
- Improving pedestrian counting data will allow more informed decisions when planning footpath and cycleway activities
- By decreasing vehicle users, this will increase pavement and surfacing life, resulting in cost savings

Relationship approach:
- Improve the relationship with Waka Kotahi and Councillors through more reliable carriageway data that allows for informed decision making

Footpath and Cycleway Current Condition and Performance

- Compile and Test Evidence

The biggest condition concerns for this asset group are:

- Surface irregularities (potholes, trees roots, cracks, depressions, etc.) decreasing pedestrian safety through increased likelihood of tripping
- Substandard restoration of utilities causing defects
- Substandard appearance resulting from patching,

deterioration and in the case of metalled and chipseal surfaces colour and loose stones

- Vehicle damage, particularly where driveway crossing points have not been properly constructed

5.6.2 Footpath and Cycleway Operations and Maintenance

Footpath Maintenance Strategy
The primary aim is to ensure that the agreed Levels of Service are delivered for the lowest long term cost. This is done through a combination of general maintenance and renewal to manage the number of footpath sections that have a high number of faults.

The Council's approach of routine maintenance involves targeting high exposure footpaths where pedestrian and mobility traffic is high (shopping centres, schools, around playgrounds and parks etc.).

Footpath maintenance is impacted by the widespread use of the berm and footpath for the installation of underground services. This requires careful control over the work methods to ensure public safety during the works and satisfactory reinstatement and warranty of all disturbed surfaces. This is managed by the Corridor Access Request (CAR) process.

Both the maintenance and renewal programmes aim to coordinate timing with other activities especially those of the utility operators to avoid new work being disturbed by subsequent utility works.

5.6.3 Footpath and Cycleway Renewal and Capital Works

Footpath and Cycleway Renewal Strategy

The strategy is based on the need to maintain the asset in a safe, efficient and cost effective manner.

The collation and analysis of future condition rating surveys is likely to affect priorities and confirm whether or not the current levels of expenditure are appropriate to maintain the minimum Level of Service anticipated.

Concrete and interlocking block paths are generally replaced like with like. Interlocking blocks are used in areas where aesthetics are a primary consideration (shopping areas and high profile public spaces). Old asphaltic concrete footpaths have surfacing removed prior to resurfacing especially were additional layers can create problems with “high lips” causing difficulty in matching into adjoining surfaces.

Concrete paths have reduced future maintenance needs but are initially more expensive to construct. They are less tolerant to heavy vehicle loading, cracking and spalling under repeating loading cycles. Concrete paths are prone to differential settlement between panels over time if not constructed to a high standard. Access to services can be problematic as the footpath section usually requires removal to gain access to utility services.

Renewal Decision Making Process

Work needs are identified following condition rating surveys, routine inspections and follow up visual inspections. Priorities are based on:

- Level of Service deficiencies including safety related issues (settlement, trip hazards, undulations)
- Physical condition based on outstanding maintenance requirement
- Coordination with other road asset replacement works and forward programmes of other utilities

5.6.4 Footpath and Cycleway Capital Works

Footpaths
The timing of new subdivisions, and thus the footpaths they contain, is under the control of the respective property developers and is strongly influenced by market forces. This work is not funded by the Council and is not programmed in this AMP, or any other Council plan.

Cycleways
As part of the Cycle Strategy and Implementation Plan, off-road cycleways have been developed to enable cyclists to avoid roads and to provide more enjoyable routes within urban areas. The Council will continue to develop these in the future, possibly within reserves and drainage easements that exist for reasons other than transportation.

Shared Paths
The main capital project planned for the district is the extension of the Coastal Walkway from Bell Block to Waitara. The project has a $20m cost estimate with construction anticipated to start in 2021 and a three year construction timeframe. The detailed business case for this is currently being prepared.

5.6.5 Footpaths and Cycleways Options Assessment

Table 41 shows the options considered for the work categories associated with footpaths and cycleways.

Table 41: Developed Options for Footpaths and Cycleways

	Option Description	Benefits of Option	Negative Consequences of Option
WC 125: Footpath Maintenance			
	Increase level of expenditure	Reduce customer complaints.	Excessive cost for little gain in regard to Level of Service.
BAU	Business as usual	• Footpath defects will continue to reduce • Provide the ability to undertake footpath renewals with other work activities • Maintain safety and accessibility	Customer satisfaction levels continue to remain below target level.
WC 124: Cycle Pathway Maintenance			
	Increase level of expenditure	Maintain safety and accessibility.	Higher overall costs, increased budget.
BAU	Business as usual	• Attempts to maintains current investment levels • Costs remain stable	• Potential due to increase length of new cycle paths that investment is insufficient to provide adequate Levels of Service • Asset deterioration over time • Increased customer dissatisfaction
Footpath Renewals (Unsubsidised)			
	Increase level of expenditure	Reduce customer complaints.	Higher overall costs, increased budget.
BAU	Business as usual	• Footpath defects will continue to reduce • Ability to undertake footpath renewals with other work activities • Maintain safety and accessibility	Customer satisfaction levels continue to remain below target level.

Table 42 shows the test options for footpaths and cycleways.

Table 39: Test options for Traffic Services

Option	Assessment Summary Statement	Predicted Levels of Service Outcomes	Option Cost
WC 125: Footpath Maintenance			
	An increase in footpath renewals would be counterproductive. Overall the network is in a good condition.	Exceeding Level of Service.	Not preferred option
BAU	This current level of investment is still considered appropriate to deliver on desired outcomes and Levels of Service going forward.	• Reduction in footpath defects • There is an expectation that the current level of customer requests will improve • The asset will not be consumed i.e. no growing backlog of outstanding work	✓
WC 124: Cycle Pathway Maintenance			
Replacement of concrete light columns			
	Increase in cycleway assets will make it harder to deliver acceptable Levels of Service in the longer term. Forecasted expenditure requirement proposed in preceding funding requests. Option investment proposal proportional to cycleway length increase during 2018/21 funding period +200%.	Monitor level of cycle path faults for fluctuation during 2018/21 funding period.	✓
BAU	Cycle pathways in the district are in good condition with no significant outstanding maintenance works identified. Work activity will be generally confined to removing detritus from hard surfaces.	• The Level of Service impact for this option is neutral as no additional funding is requested. • Monitor cycleway faults for changes to the Level of Service.	Not preferred option

Option	Assessment Summary Statement	Predicted Levels of Service Outcomes	Option Cost
Footpath Renewals (Unsubsidised)			
	An increase in footpath renewals would be counterproductive. Overall the network is in a good condition.	Exceeding the Level of Service.	Not preferred option
BAU	This current level of investment is still considered appropriate to deliver on desired outcomes and Level of Service going forward. Enables work to be completed in alignment with other work activity programmes.	• Reduction in footpath defects • There is an expectation that the current level of customer requests will improve • The asset will not be consumed i.e. no growing backlog of outstanding work	

5.7 Environmental and Emergency Works

The purpose of environmental and emergency works is to provide for the routine care and attention of the road corridor to maintain safety, aesthetic and environmental standards, and provide for the reactive reinstatement of transportation assets following adverse weather. The key issues related to environmental and emergency works are:

- Climate change affecting intensity and frequency of storm events
- Highly erosion prone landscapes in the north eastern part of Taranaki
- Rising sea levels impacting coastal assets
- Public concern over the use of herbicides
- Control of noxious weeds (Yellow Bristle Grass (YBG), gorses etc.)
- Compliance with resource consent conditions

5.7.1 Strategic Case Linkage

Table 43 shows the linkage between the Strategic Case outlined in **Section 2** and **environmental and emergency** related works.

Table 43: Environmental and Emergency Works Strategic Case Linkage

GPSLT Objectives	• Develop a land transport system where no one is killed or seriously injured • A low carbon land transport system that supports emissions reductions, while incorporating safety and inclusive access				
RLTP Objectives	• Reducing the safety risk on Taranaki's transport network • Ensuring network resilience and responsiveness in the context of internal and external pressures • Reducing negative environmental and community impacts arising from transport • Addressing these issues in an environment of constrained funding and affordability yet rising costs				
Council goals	Partnership	Delivery	Communities	Sustainability	Prosperity
	Strong relationships with key stakeholders	Operational excellence	Inclusive, safe, creative, active and connected.	Mitigating our impact and adapting to climate change.	Provide a platform for a resilient and sustainable economy
GPSLT Objectives RLTP Objective Council Goals	Safety	Fault identification and prioritisation ensures that safety related defects are located, and a prompt response initiated. The drainage network contributes towards safe travel by removing stormwater from the carriageway so that it is not a hazard for vehicles. Fault identification and prioritisation ensures that defective, obscured and unsecure street furniture are attended to within specified response times.			
	Resilience	Programme of preventative maintenance works undertaken that addresses key network risk areas or hot spots. Protecting the road pavement from damage caused by ponding stormwater ensures integrity and function is maintained.			
	Amenity	Regular audits are undertaken and reported in the ONRC reporting tool. Customer service requests related to the roads and footpath are responded to in a timely manner.			

GPSLT Objectives RLTP Objective Council Goals	Amenity	Removal of detritus from drainage assets contribute to capacity being maintained.
	Accessibility	A programme of routine maintenance ensures the removal of surface water from carriageways is achieved improving the reliability for road user travel to intended destinations.

Linkage to Problem Statements

The following identified Problem Statements have relevance to the environment and emergency related activity group:

- Natural topography and layout of infrastructure makes it difficult to complete a trip using alternative transport modes, causing severance of the community and places the network at risk during a major event
- Not taking a "safe system" approach to a complex network has resulted in poor actual and perceived safety outcomes
- Poor understanding of the value that our transport infrastructure provides for our community and regional economy has resulted in poorly targeted investment and missed economic opportunities
- Infrastructure and societal habits encourage motor vehicle usage causing environmental damage, poor health outcomes and unattractive urban spaces

Strategic Response to Problem Statements

Policy approach:
- Target fish passages and waterways for environmental improvements
- Compliant with TRC consents
- Earlier intervention before a resource consent expires to ensure consent requirements are met and abatement notices are avoided

Program adjustment:
- Program brought forward, leading to earlier costs
- Improve value for money
- Proactive approach to consents as opposed to reactive

Relationship approach:
- Improve relationship with TRC and landowners, especially around consents and spraying of noxious weeds in stormwater channels

5.7.2 Environmental Maintenance

Compile and Test Evidence

Examples of qualifying activities include, but may not be limited to:

- Vegetation control (see conditions of funding below)
- Litter collection on rural roads
- Removal of, and protection against, graffiti on road structures
- Sweeping loose chip and detritus from road intersections
- Removal of rocks and minor slip material from the road or catch fences
- Maintenance of rest areas
- Maintenance of protection planting, including maintenance pruning
- Non-recoverable costs arising from clearing the carriageway of damaged vehicles, crash debris and spillages that are not the responsibility of emergency services
- Non-recoverable costs associated with removal of abandoned vehicles from road reserves

Current Service Delivery Profile

The environmental maintenance activity provides for the routine care and attention of the road corridor to maintain safety, aesthetic and environmental standards, and provides for the reactive reinstatement of transportation assets following adverse weather.

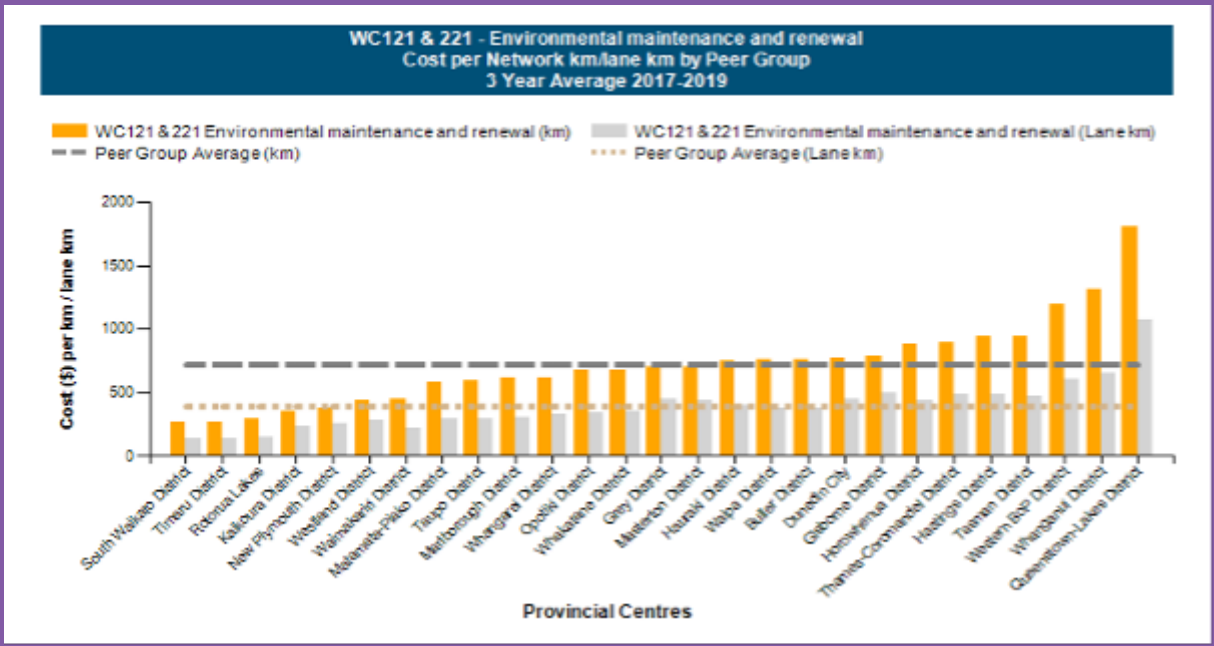
Current Levels of Service are designed to maintain asset functionality within affordability constraints. Erosion and fretting of steep cuttings is problematic and has been exasperated in recent times by significant emergency works events, the most notable event being the June 2015 weather event, which destabilised the countryside. Removal of detritus contributes to a significant proportion of the available budget and due to the randomness of occurrences makes budget forecasting difficult.

Environmental Maintenance Strategy

Routine and environmental maintenance programmes are currently achieving a good balance between network requirements and actual delivery within affordability. The Council has been constantly pulling back on routine activities and gauging customer's appetite for a lowering of Levels of Service to the level recommended in the ONRC visual guide.

Environmental maintenance programmes are integrated in a simultaneous, whole of corridor maintenance strategy where this can be achieved. Figure 78 shows NPDC's environmental expenditure compared to the Peer Group.

Figure 78: Environmental maintenance and renewal Peer Group comparison



NPDC has previously been underspending in environmental maintenance and renewals and this is highlighted by the Peer Group comparison. The Council is looking to increase expenditure to improve consent compliance with TRC.

Level of Service Gap Analysis

Four ONRC measures are linked to the environmental maintenance activity:

- Sight distance
- Roadside obstructions
- Aesthetic faults
- Activity contribution to overall network cost

NPDC does not currently record information related to these ONRC measures as the cost outweighs the benefit.

5.7.3 Environmental Maintenance options assessment

Table 44 shows the options considered for the work categories associated with environmental maintenance.

Table 44: Developed Options for Environmental Maintenance

	Option Description	Benefits of Option	Negative Consequences of Option
WC 121: Environmental Maintenance			
	Increase level of expenditure	• Safety – maintained sightlines which will reduce the likelihood of crashes and serious injury • Amenity – ensure the appearance of the road corridor is maintained to current Level of Service (litter, graffiti, vegetation control) as per ONRC visual guideline • Resilience of the network is maintained through proactive removal of obstructions from roads and drainage assets • Meeting legislative requirements and environmental needs for the good of the district and the rest of NZ	Higher overall costs, increased budget requirement.
BAU	Business as usual	• Safety – maintained sightlines which will reduce the likelihood of crashes and serious injury. Sightlines only maintained for safety and not for aesthetics. • Amenity – ensure the appearance of the road corridor is maintained to current Level of Service (litter, graffiti, vegetation control) • Removal of obstructions from roads and drainage assets at infrequent intervals • Adequate response to emergency response maintained • Take minimalistic approach to tree removal, reactionary and not proactive • Budget not exceeded	• Safety – increased exposure for road users to accidents while travelling on Local roads • Amenity – network is visually shabby affecting customer perceptions and detracting journey experience • Resilience issues affecting accessibility, increased • Overall network deterioration

	Option Description	Benefits of Option	Negative Consequences of Option
WC 221: Environmental Renewals			
	Increase level of expenditure	• Allows NPDC to meet increased regulations set by TRC • Can mitigate effects of climate change • Allow improvements to waterways and fish passages	Increase in expenditure.
BAU	Business as usual	Budget not exceeded.	Fail to comply with TRC regulations.

Table 45 shows the test options for environmental maintenance.

Option	Assessment Summary Statement	Predicted Levels of Service Outcomes	Option Cost
WC 121: Environmental Maintenance			
	Option provides the ability for the Council to achieve ONRC target Levels of Service. This is equal to or close to the service currently provided but presently exceeds budget allocation.	• This is the least cost long term option, and will deliver the desired outcomes and Level of Service • It will allow for planned intervention required to maintain road network to ONRC visual guidelines • Provide the ability to respond to network demands as required to meet response requirements. • Stable road network condition trends	
BAU	A reduction in work output will be the result if expenditure is maintain within budget envelope. More instances of non-compliance with Council and ONRC measures will be the consequence placing customer safety at risk and contributing to a general decline in network resilience and appearance.	Not meeting Level of Service specified by ONRC performance and customer measures for: • Sight distance • Roadside obstructions • Aesthetic faults • Safety	Not preferred option

Option	Assessment Summary Statement	Predicted Levels of Service Outcomes	Option Cost
WC 221: Environmental Renewals			
	Option provides the ability for NPDC to achieve ONRC target Levels of Service. It also enables NPDC to be compliant with TRC's resource consents.	Direct improvement to NPDC's community outcomes for sustainability and lifestyle.	
BAU	Consequences of underspending could lead to abatement notices from TRC.	Not meeting Level of Service requirements.	Not preferred option

5.7.4 Emergency Works and Minor Events

Compile and Test Evidence

The district's rural network consists of sharp topography and winding roads alongside rivers, which makes it susceptible to heavy and prolonged rain events. Reinstatement works to restore road access and repair damaged infrastructure adds considerable pressure to available resources, both physically and financially.

Current Profile – Emergency Works

The most notable storm damage occurred in the June 2015 weather event. This had a cost of $1,599,924 for the initial clean up and remedial treatments to get roads open, with a further $3,292,150 relating to restoring assets to their appropriate Level of Service. This gave a total cost of $4,892,074 from one storm event.

Current Profile – Minor Events

An amendment to the definition of "Emergency Works" has had the effect of making funding for emergency events harder to obtain. A higher threshold or significance of an event is now required to obtain funding outside core bulk allocations.

Emergency Works and Minor Events Strategy

Maintenance of road drainage assets is viewed as being critical to reduce the risk associated with water and

peak events that impact on the road assets. Proactive maintenance and management of drainage assets is undertaken through regular inspections, cleaning and renewal programmes.

Removal of minor slips and other loose debris accumulating on roads is a key maintenance activity required to ensure a safe trafficable roadway for road users. Undertaking regular removal of slip material accumulating in water table drains and drainage structures contributes to the resilience of the network preventing unnecessary damage from surface water being diverted into unwanted areas which can result in high cost repairs as a consequence.

Level of Service Gap Analysis

Two resilience ONRC measures are linked to emergency works and responses, being:

- The number of vehicles impacted by unplanned events
- The number of instances where road access is lost

NPDC has not previously recorded this information; however, it is part of the improvement plan going forward (see **Section 9: Improvement Plan**). Local knowledge suggests there has not been any cases of road access lost since the June 2015 weather event.

5.7.5 Emergency Works and Minor Events Options Assessment

Table 46 shows the options considered for the work categories associated with emergency works and minor events.

Table 46: Developed Options for Emergency Works and Minor Events

	Option Description	Benefits of Option	Negative Consequences of Option
WC 141: Emergency Work			
	Increase in level of expenditure for resilience planning	• Frequency and severity of incidences is reduced resulting in lower recovery and reinstatement costs • Increased availability of road network for customers	Additional funding pressure on maintenance and renewal budgets.
BAU	Business as usual	• Slips and debris are removed from carriageway surfaces and drainage assets making for safe travel • Network availability is restored for customers without undue delay • Road network does not suffer further unwarranted damage • No overdesigning of remedial works provides value of money and an opportunity for innovation	• Resources are required to restore network causing programming issues for other planned works • Potential for failure of remedial works
	Option Description	**Benefits of Option**	**Negative Consequences of Option**
WC 140: Minor Events			
	Increase in level of expenditure for resilience planning	• Reduce longer term frequency and severity of action required to maintain the status quo • Increased availability of road network for customers	Additional funding pressure on maintenance and renewal budgets.
BAU	Business as usual	• Ensures network availability for road users is maintained at acceptable levels and impact of further unplanned events is minimised • Road network is in readiness for next unplanned event	• Expenditure comes from block maintenance and renewals budgets resulting in deferrals of programmed works • Resources are required to restore network causing programming issues for other planned works

Table 47 shows the test options for emergency works and minor events.

Table 47: Test options for Emergency Works and Minor Events

Option	Assessment Summary Statement	Predicted Levels of Service Outcomes	Option Cost
WC 141: Emergency Work			
	Establishing register of hot spot locations will improve network resilience.	Increase availability of road network and make travel on roads safer.	Funded from other work activity budgets.
BAU	Responding to emergency works events with the aim of opening roads with a rapid initial response will prevent further deterioration at incident sites and provide safe roads for our customers.	• Maintains current Level of Service provided in terms of the ONRC Resilience measures at current levels • Current measure of resilience still to be established	✓
WC 140: Minor Events			
	Establish register of hot spot locations to establish a programme of works that can be undertaken to improve network resilience and safety.	• Current measure of resilience still to be established • Increased network availability	From other work activity budgets.
BAU	A focus on removing detritus removal promptly will ensures network availability for road users is maintained at acceptable levels and impact of unplanned events is minimised. Current funding allocation is insufficient to adequately maintain road resilience and safety compromising other maintenance and renewals activities.	• Maintains current Level of Service provided in terms of ONRC Resilience measures at current levels • Current measure of resilience still to be established	✓

6 Lifecycle

6.1 Overview

Assets have a lifecycle as they move through from creation to final disposal. Depending on the type of asset, its lifecycle may vary from 10 years to over 100 years. Many assets never truly cease to exist but their Level of Service performance is reset through interventions. For transportation assets this is readily demonstrated with a road pavement failing to achieve its desired Level of Service and being overlaid, thereby creating a new defect free surface and resetting its lifecycle.

Lifecycle management is a function of the following areas:

- Routine maintenance, cost effectively maintaining the required Level of Service
- Monitoring asset condition, performance, changes in asset loading
- Analysing maintenance expenditure, asset condition and residual life to determine optimum intervention strategies
- Capital replacement including replacement standards and summary of replacement costs
- Creation / acquisition / improvements including selection criteria, standards and specifications, and summary of future costs

This section covers the transportation asset groups identified in Section 1: Introduction of this AMP. Each asset group has been considered in subgroups of assets as required and the following information is provided:

- Operations and Maintenance Plan
- Renewal and Capital Works
- Disposal Plan

The Environmental and Emergency Works section (Section 6.8) includes information about environmental maintenance, emergency works and minor events.

6.1.1 Work Category Definitions

Expenditure on transportation assets have been categorised into three main areas as detailed below.

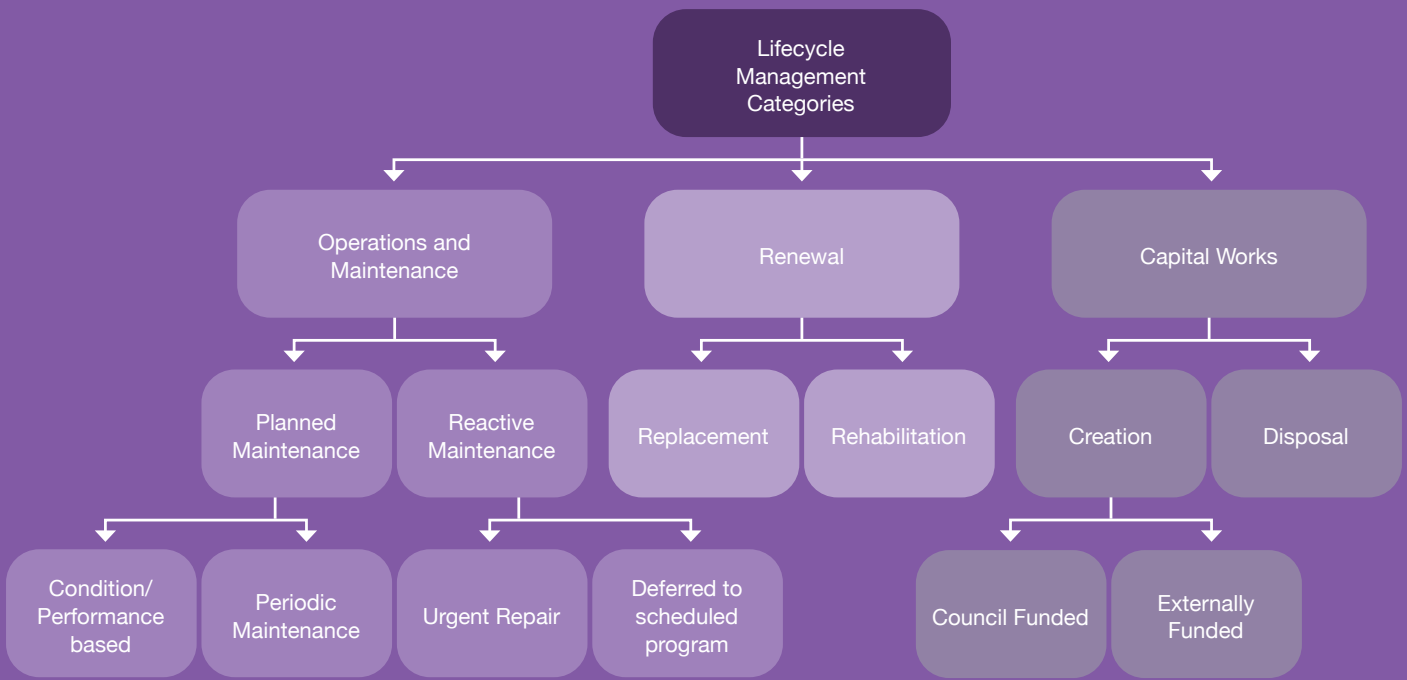
Operations and Maintenance
Operations and maintenance are the daily activities required to preserve assets, so that they continue to provide a required Level of Service and achieve the expected life.

Renewals
Renewals are projects that:
- Replace or rehabilitate existing assets
- Provide the replacement component of augmentation or new work
- Restore an asset to its original capacity, size, condition, etc.

Renewing an asset does not increase the capacity of the asset.

Capital Works
Capital works involve the creation of new assets, or works, which upgrade or improve an existing asset beyond its current capacity or performance in response to changes in usage or customer expectations. This may be due to growth or changes in the required Level of Service. **Figure 79** illustrates the components of lifecycle management categories.

Figure 79: Transport Lifecycle Management Categories



6.1.2 Disposals

Disposal is the retirement or sale of assets when they become surplus or superseded by new or improved systems. Assets may become surplus to requirements for any of the following reasons:

- Under-utilisation
- Obsolescence
- Provision exceeds required Level of Service
- Replacement before end of predicted economic life
- Uneconomic to upgrade or operate
- Policy changes
- Service provided by other means (e.g. private sector involvement)
- Potential risk of ownership (financial, environmental, legal, social)

Asset disposal processes comply with the Council's legal obligations under the LGA, which covers:

- Public notification procedures required prior to sale
- Restrictions on the minimum value recovered
- Use of revenue received from asset disposal

6.1.3 Asset Useful Life

The Total Useful Life (TUL) of an asset is the period of time over which an asset is expected to be available for use by an entity. The TUL varies for each asset and can be affected by operational factors such as pavement use.

Each asset (component or subcomponent) is assigned a TUL. An initial assessment of Remaining Useful Life (RUL) is then calculated as the difference between TUL and the age of the asset. Where information is available, further adjustments are then made to the RUL estimate to take into account the condition and use of the asset.

It has been identified that the Council's database holds insufficient condition data to adjust for condition. Asset data Improvement is an item in the improvement plan (see **Section 9: Improvement Plan**).

Minimum RUL (min RUL) have been set for assets that are still in service beyond their TUL to recognise that there is still remaining life and value in these assets. Once an asset extends beyond the RUL it is reset to the min RUL.

6.1.4 Asset Condition

Asset condition is a key parameter in determining RUL and can be used to predict how long it will be before an asset needs to repaired, renewed or replaced. Asset condition is also an indicator of how well it is able to perform its function. It is important that NPDC has a sound knowledge of its assets and their condition so that well informed, data driven decisions can be made.

The development and continued use of condition assessment data will build up a collection of historical data, allowing for a more accurate prediction of remaining life. Condition surveys are undertaken based on the risk of the asset. This is to ensure the transportation assets are maintained, replaced or developed over the long term to meet the required Level of Service and future demands.

6.1.5 Condition Assessment and Results

Roading condition data is predominantly collected through High Speed Data (HSD) surveys, condition surveys, and faults identified in the All Faults regime (see **Sections 6.2.4 and 8.8.4**).

Roughness surveys are undertaken annually on Arterial, Primary Collector and Secondary Collector roads, with Access and Low Volume roads biennially. Pavement roughness is generally defined as an expression of irregularities in the pavement surface that adversely affect the ride quality of a vehicle and thus the road user. Roughness is an important pavement characteristic because it affects not only the ride quality but also fuel consumption and maintenance costs. Roughness is also referred to as ‘smoothness’ although both terms refer to the same pavement qualities.

Condition rating surveys involve a visual assessment of pavement surface condition and are generally undertaken every second year on the sealed network. This condition rating involves a detailed walkover and identification of defects on the carriageway over the full length of all sealed roads in the network. The defects recorded include the number of potholes and the area or length of defects including cracking, rutting, shoving, scabbing, flushing, edge breaks, inadequate shoulders and drainage issues. These defects are recorded into the RAMM database and influence the FWP.

These surveys enable trends in the condition of the network to be determined, comparisons made between the condition of roads in different areas and assist in identifying sections of road that should undergo closer

inspection for maintenance and renewal treatments. The trends in regard to roughness are a useful indicator of how effectively the pavement maintenance strategies are meeting the demands of increased traffic loadings and the network increasing in age.

It is important to note that road pavements are always in a state of decay and that as they age their condition deteriorates and the cost of maintenance increases. The rate of deterioration is a function of the initial pavement strength, traffic loading and the maintenance effort. Another factor is the oxidation of bituminous surfaces. Regardless of traffic, bituminous products deteriorate over time.

Road condition is monitored throughout the year by the Council's Network Inspectors. Defects are identified and the required remedial work is programmed and undertaken in accordance with the NPDC Infrastructure Term Services Contract (see **Section 8.6.1**) requirements. The amount and type of work undertaken is dependent on the needs of the network, maintenance strategies, maintenance intervention levels and available funding.

Tables 48 to 52 are from the National Asset Management Support (NAMS) and show the condition rating, criticality and risk ratings NPDC use to manage assets.

Table 48: Condition Rating Mode

Grade	Condition	Description	Proportion of network
1	Excellent	As new, no defects	Very Good Condition No maintenance required (0%)
2	Good	Structurally sound, only a few superficial defects	Minor Defects Only Minor maintenance required (5%)
3	Fair	Starting to show signs of deterioration but not enough to affect Level of Service	Maintenance Required to Return to Accepted Level of Service Significant maintenance required (10-20%)
4	Poor	Advanced deterioration requiring maintenance to remain operational	Requires Renewal Significant renewal/upgrade required (20-40%)
5	Very Poor	Failed or close to failing	Asset Unserviceable Over 50% of asset requires replacement

Table 49: Asset Criticality Rating

Rating	Description	Consequence
1	Catastrophic	Loss of service to over 50,000 customers or several critical customers
2	Major	Loss of service to 5,000-50,000 customers
3	Moderate	Loss of service 500-5,000 customers or a critical customer
4	Minor	Loss of service to 50-500 customers
5	Insignificant	Loss of service to less than 50 customers

Table 50: Asset Risk Rating

Consequence	Criticality Group	Condition Grade 1	Condition Grade 2	Condition Grade 3	Condition Grade 4	Condition Grade 5
Substantial 100	5				Priority 1	
Major 70	4				Priority 2	
Moderate 40	3			Priority 3		
Minor 10	2		Priority 4			
Minimal 1	1					

Table 51: Calculating Asset Risk Rating

Likelihood	Rare	Highly Unlikely	Unlikely	Possible	Likely
Likelihood Score	1	2	3	4	5
Frequency	Is expected to occur within a 100 year timeframe	Is expected to occur within a 50 year timeframe	Is expected to occur within a 10 year timeframe	Is expected to occur within a 2 year timeframe	Is expected to occur yearly
Annual probability	1% chance of occurring in any year	2% chance of occurring in any year	10% chance of occurring in any year	50% likelihood of occurring in any year	90% likelihood of occurring in any year

Table 52: Asset performance and performance monitoring maturity

Asset Group	Asset Type	Asset Performance	Performance Monitoring Maturity
Pavements	Roads and Pavements	Good	Core
Structures	Bridges and large Culverts	Fair	Intermediate
	Retaining Walls	Fair	Core
Footpaths and Cycleways	Footpaths	Good	Core
Stormwater Drainage	Drainage	Fair	Basic
Traffic Services	Traffic Services	Fair	Basic
Street Furniture	Street Furniture	Good	Basic

6.1.6 Confidence Rating

Confidence ratings have been assigned to the source data. Data from the RAMM database was generally considered to have a confidence rating of B. This confidence rating comes from the 2019 NPDC Road Asset Valuation Report. **Table 53** shows the overall rating.

Table 53: Asset Confidence Rating

Grade	Label	Description	Accuracy
A	Highly reliable	Data based on sound records, procedure, investigations and analysis, documented properly and recognised as the best method of assessment. Dataset is complete.	±2%
B	Reliable	Data based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings, for example some data is old.	±10%
C	Uncertain	Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported or comes from a limited sample.	±25%
D	Very uncertain	Data based on unconfirmed verbal reports and/or cursory inspection and analysis. Dataset may not be fully complete and most data is estimated or extrapolated.	±40%

6.1.7 Maintenance Intervention Strategy

NPDC has developed and is refining its MIS for asset renewals. The MIS is used to optimise maintenance activities against planned works by providing guidance on when to intervene with an appropriate treatment response, i.e. monitoring, maintenance, holding prior to renewal or capital works. A MIS is created once the FWP has been established. Each treatment length or asset will have a nominated type or code, which will guide maintenance treatments prior to the implementation of the periodic treatments defined by the FWP.

Under the Term Services Contract, the FWP is finalised by the end of February each year and adopted at the beginning of the following financial year. It provides a statement of the types of periodic treatments that are planned for each treatment length / asset and the proposed timeframe. The FWP guides and influences the MIS which indicates a cost effective maintenance treatment to repair defects given upcoming works. For example, surface cracking, on a road to be resealed in the current year will be repaired to a high standard as a pre-seal repair (repair the root cause), whereas a similar defect on a road to be rehabilitated will be repaired with a holding treatment (repair the symptom).

The robust development of monthly work programmes requires the compilation of several separate programmes into a combined programme that recognises the individual programme interdependencies to ensure correct sequencing and timing for completion.

The MIS will be further developed to align with the ONRC road classifications. It is expected that each road classification will have individual strategies that recognises different Levels of Service and corresponding performance measures (i.e. a Low Volume road may not have surface smoothing treatments undertaken as target levels of roughness for this road classification have a higher threshold level and to undertake such maintenance activity would be to over deliver or exceed target performance levels).

6.1.8 Operations and Maintenance

Maintenance is intended to maintain the agreed Levels of Service; mitigate risk and minimise costs by implanting a balanced programme of planned and reactive works. Proactive inspections are carried out to prevent asset failure.

Operations and Maintenance Drivers

General maintenance work is classified as priority work where:

- The safety of road users may be compromised
- The required Level of Service has fallen below the prevailing level for the adjacent parts of that section of road
- It is likely that the area of distress may expand so that the road is incapable of providing the required Level of Service and capital works or upgrade will then be required
- The scope of repair work would change to become significantly more expensive, if left to deteriorate further
- Subsequent maintenance, renewal or new improvements work depends on the completion of the planned maintenance repair. A suitable level of preparedness for prompt and effective response to asset failures and emergencies is maintained by ensuring the availability of suitably trained and equipped staff and service delivery contractors. This is provided through specific requirements detailed in the Term Services Contract.
- The initial, practical and objective response to asset failures is to restore service as quickly as possible by the most economic method available. This may mean having to make temporary repairs if major repairs or replacement works are required. The Council's operations and maintenance strategy is to implement the most cost effective maintenance options through:
  - Adequately monitoring the condition and performance of assets
  - Investigation and improvements of any system deficiencies
  - Identification of the most appropriate work required to correct defects

To achieve this, assets are monitored through routine proactive inspections, testing, and analysis of customer complaints and condition reports. Service levels are managed by assessing the consequences of asset failure and assessing the levels of customer expectation. Asset ownership costs are minimised by identifying, evaluating and introducing new technologies, initiatives and equipment that may improve operational and management efficiencies.

Exposure to risk is managed by maintaining up to date fault detection systems and providing a prompt and effective response to system failures. This exposure is also minimised by maintaining insurance on key insurable assets, undertaking structural checks of key assets and controlling environmental impacts.

A partnering approach is sought and encouraged between the Council's staff, consultants and contractors; its aim is to make effective use of resources, systems and procedures by taking collective ownership of the transportation network, hence the Council's commitment to a 10 year Term Services Contract with a contractor and supply chain partners.

6.1.9 Maintenance Activities

Routine maintenance is the work required to keep the transportation assets in a safe and serviceable condition. The work undertaken ranges from planned work of a cyclical nature such as vegetation control or maintenance grading to unplanned work such as clearing of spillages or the clearing of blocked sump grates during rain events. The work undertaken includes, but is not limited to:

- Pothole repairs
- Pavement patching and repairs
- Shoulder maintenance
- Maintenance and repair of surface water channels and drainage structures
- Grading of metal roads
- Replacement of wearing and running course metal on unsealed metal roads
- Control of roadside vegetation
- Maintenance and repair of traffic signs, EMPs and pavement markings
- Maintenance and repair of bridges
- Litter collection
- Removal and cleaning up of crash debris and spillages
- Cleaning of channels and sumps
- Emptying street rubbish receptacles
- Environmental maintenance

All the physical work carried out on the transportation network is undertaken through the Term Services Contract. This contract reduces procurement costs, encourages collaboration and innovation, and provides assurance and security to the contractor and the supply chain to invest in plant and people to improve operational delivery.

The identification of network faults is undertaken by NPDC Network Inspectors and faults are loaded into RAMM. Monthly and work activity specific programmes are developed and the type of work undertaken is dependent on the needs of the network, maintenance strategies, maintenance standards, safety considerations and the available funding.

The initial response to asset failures is to restore service as quickly as possible using the most practical and economic method available. Temporary repairs will only be made if major repairs or renewal replacements are required or the permanent repair will take too long to implement.
Table 54 shows the different types of maintenance activities.

Table 54: Types of Maintenance Activities

Type	Activities
Cyclic and Reactive	Pothole repair, edge-break (<5m), low shoulder (<5m), detritus removal, marker post renewal, RRPM replacement, sign cleaning/ replacement, bridge cleaning, litter collection, culvert cleaning, incident response, temporary holding repairs. These are completed as 'Find and Fix'
Three Monthly Rolling. Monthly (Routine Planned Activities)	Crack sealing, scab sealing, second coat patch sealing, stabilisation, dig outs, edge-break (>5m), low shoulder (>5m), minor levelling, lined channel cleaning, sump cleaning, isolated kerb repairs.
Seasonal	Grass verge mowing, leaf collection, vegetation spraying, and winter maintenance.

6.1.10 Maintenance Standards

The Council's standards and specifications for operational and maintenance activities reflect the best and most appropriate use of current technologies, in accordance with national standards and legislative requirements.

The inspection cycles, intervention levels and general maintenance response times for the transportation network are generally in accordance with guidelines set out by the ONRC. The maintenance standards vary in accordance with the level of usage of the road.

6.1.10 Maintenance Standards

The Council's standards and specifications for operational and maintenance activities reflect the best and most appropriate use of current technologies, in accordance with national standards and legislative requirements.

The inspection cycles, intervention levels and general maintenance response times for the transportation network are generally in accordance with guidelines set out by the ONRC. The maintenance standards vary in accordance with the level of usage of the road.

6.1.11 Operations and Maintenance Delivery

The monthly programme uses the prioritisation methodology based on ONRC road classification and NAMS Condition Rating. This ensures tasks are completed in order of importance whilst being aware of:

- Network trends
- Maintenance strategies
- Task prioritisation
- Risks with alternative maintenance standards
- Summary of future costs
- Clustering efficiency

6.1.12 Fault Identification

Faults and defects are identified by Network Inspectors and cyclic patrols. This process involves trained field operatives canvasing the network to identify All Faults (and defects, across all assets) and then assigning each a severity level based on the Level of Service. The severity level is changed (rate of change tracked within recording system) as defects deteriorate and new defects are added with each inspection.

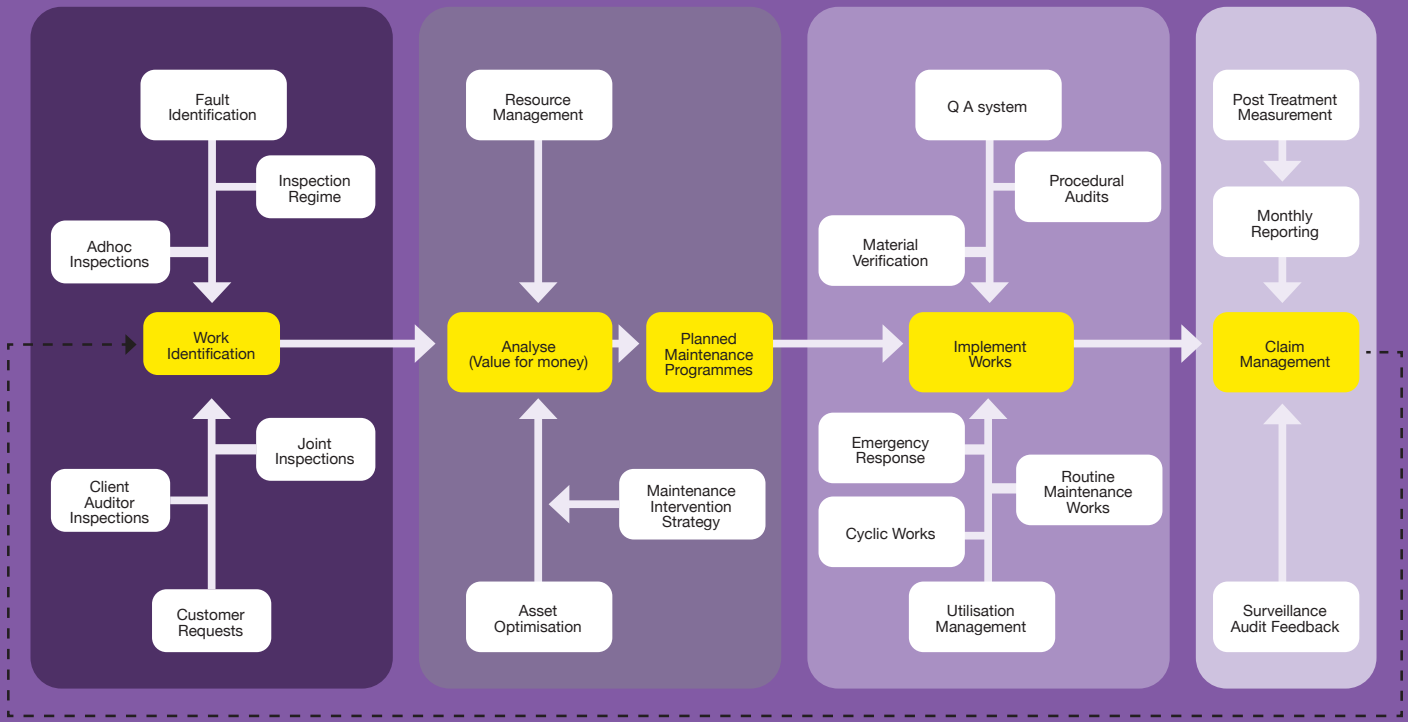
Network Inspectors use a visual assessment guide as a benchmark to assess a defect against the target Level of Service. Network Inspectors will record a defect severity based on an assessment of each defect, dimensions of defect a primary cause and an initial proposed treatment.

The condition assessment prioritisation (severity) guidelines from the National Asset Management Steering Committee (2011) have been adopted here:

- Very good condition – No fault is measured / recorded (monitor only)
- Minor fault – Identified fault is above the Level of Service but is recorded and is only being monitored, such as a minor edge-break. The threshold for data capture is that it would be corrected as part of a pre-seal repair.
- Moderate fault – Fault is safe and is below the Level of Service for the contract. However, if a similar activity was programmed nearby these repairs would be considered to be included.
- Requires intervention – Fault is now a defect and is above the requirements of the Level of Service and requires intervention within the appropriate response time
- Unsafe – Defect requires an immediate intervention through temporary repair or site management

Figure 80 shows the work process.

Figure 80: The process by which work is identified, planned, implemented and reported.



6.2 Pavements

6.2.1 Pavements

The purpose of managing these assets is to provide a pavement that is suitable for the effective movement of all road users. The surface must be suitable for all weather conditions and appropriate to its location and function in terms of skid resistance and smoothness. It must also have a structure suitable for current and future traffic loading requirements.

Table 55 shows a breakdown of the network according to ONRC.

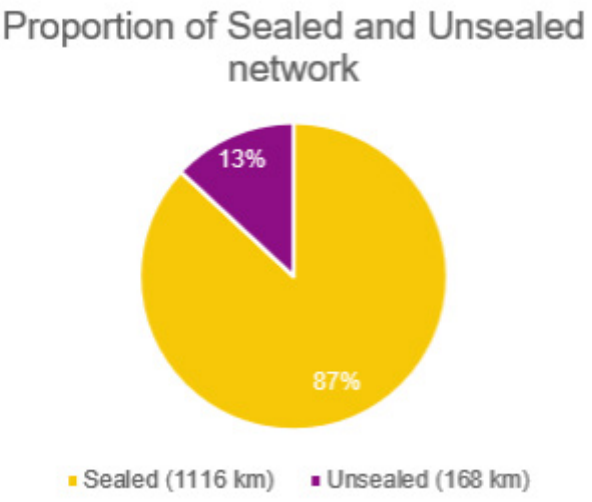
Table 55: Network Statistics by ONRC

ONRC	Urban (km)	Rural (km)	Total Length (km)	Lane (km)	Urban Journeys (M VKT)	Rural Journeys (M VKT)	Annual Total Journeys Travelled (M VKT)	% of length
Arterial	15	-	15	31	50.1	-	50.1	1%
Primary Collector	36	41	76	153	51.3	28.4	79.7	5%
Secondary Collector	89	256	345	622	48.8	36.1	84.9	23%
Access	113	420	532	720	19.8	16.1	36.0	36%
Low Volume	76	240	315	396	3.2	1.9	5.1	21%
Unclassified	-	-	184	-	-	-	-	13%
Total Network	**329**	**956**	**1,469**	**1,922**	**173.3**	**82.5**	**255.8**	

There is a variation in length of 6km between the total length from the consultants' valuation and the total length the Performance Measures Reporting Tool (PMRT) measures based on ONRC. There are multiple factors for differences in data. The PMRT tool collects data from the Carriageway Section Table in RAMM, whilst the consultants' valuation collects data from the Treatment Length Table in RAMM. In the carriageway table the calculated start-end length can vary from the adjusted length column. Typically, when the adjusted length is different to the end start-end length, this is due to a calibration error or measurement error. As part of the improvement plan NPDC will look into whether these disparities are genuine, or if data inaccuracies exist (see **Section 9: Improvement Plan**).

Figure 81 shows the proportion of sealed and unsealed network.

Figure 81: Sealed vs Unsealed Network



In addition to formed roads, there are approximately 710km of partly formed and / or unformed roads. An unformed legal road (commonly called paper road) is land that is legally designated for road purposes but is not currently a formed carriageway. NPDC have adopted a policy for managing these unformed roads. This policy covers funding of improvements to unformed roads and the process for disposing of assets deemed surplus to requirements.

The NZ Walking Access Commission published a document in February 2011 titled 'Guidelines for the Management of Unformed Legal Roads'. This document is available for the Council's use in administrating unformed roads. The Council is yet to complete a detailed survey and analysis of hazards, structures and occupation on unformed roads. Once this has been done, recommendations will be made regarding the best strategies to manage risks.

The roads are made up of a number of layers as shown in **Table 56**.

Table 56: Road formation layers

Pavement Asset Group	Description
Road Formation	Cutting or filling of the natural ground/terrain to establish a suitable surface (subgrade) upon which the road is constructed
Subbase	Lower levels of metal construction, laid upon the subgrade
Basecourse	Upper, high quality metal layer (typically about 100-150mm thickness)
Top Surface	Final layer or top surface of material over which vehicles pass, typically asphalt, chip seal or running course for unsealed roads

There is a requirement for a more efficient and accurate process for capturing data to ensure it is maintained to a high quality. The Council needs to analyse any gaps and inaccuracies in existing asset data in RAMM to ensure there is a better and more accurate data for future asset management planning. These are recorded as actions in **Section 9: Improvement Plan** of this AMP.

Table 57: Summary of Formation Quantities

Asset Description		
Formation Rural	957,169m	9,407,427m2
Rural Sealed Subbase	788,463m	5,238,600m3
Rural Unsealed Subbase	168,706m	818,736m3
Formation Urban	333,913 no.	4,780,287 no.
No Formation	280 no.	3,156 no.
Total	1,291,362 no.	14,190,870 no.

Table 58: Summary of Subbase Quantities

Asset Description	Length (m)	Area (m2)
No subbase	280	2,176
Urban Sealed Subbase	333,788	3,610,967
Urban Unsealed Subbase	125	625
Total	1,291,362	9,671,104

Table 59: Summary of Basecourse Quantities

Asset Description	Length (m)	Area (m2)
No Basecourse	280	1,756
Sealed Basecourse	1,122,251	7,166,190
Unsealed Basecourse	168,831	566,115
Total	1,291,362	7,734,061

Table 60: Summary of Surfacing Quantities

Asset Description	Length (m)	Area (m2)
Single Coat Seal	400,319	2,328,876
Two Coat Seal	499,664	3,481,185
Asphaltic Concrete	8,866	99,426

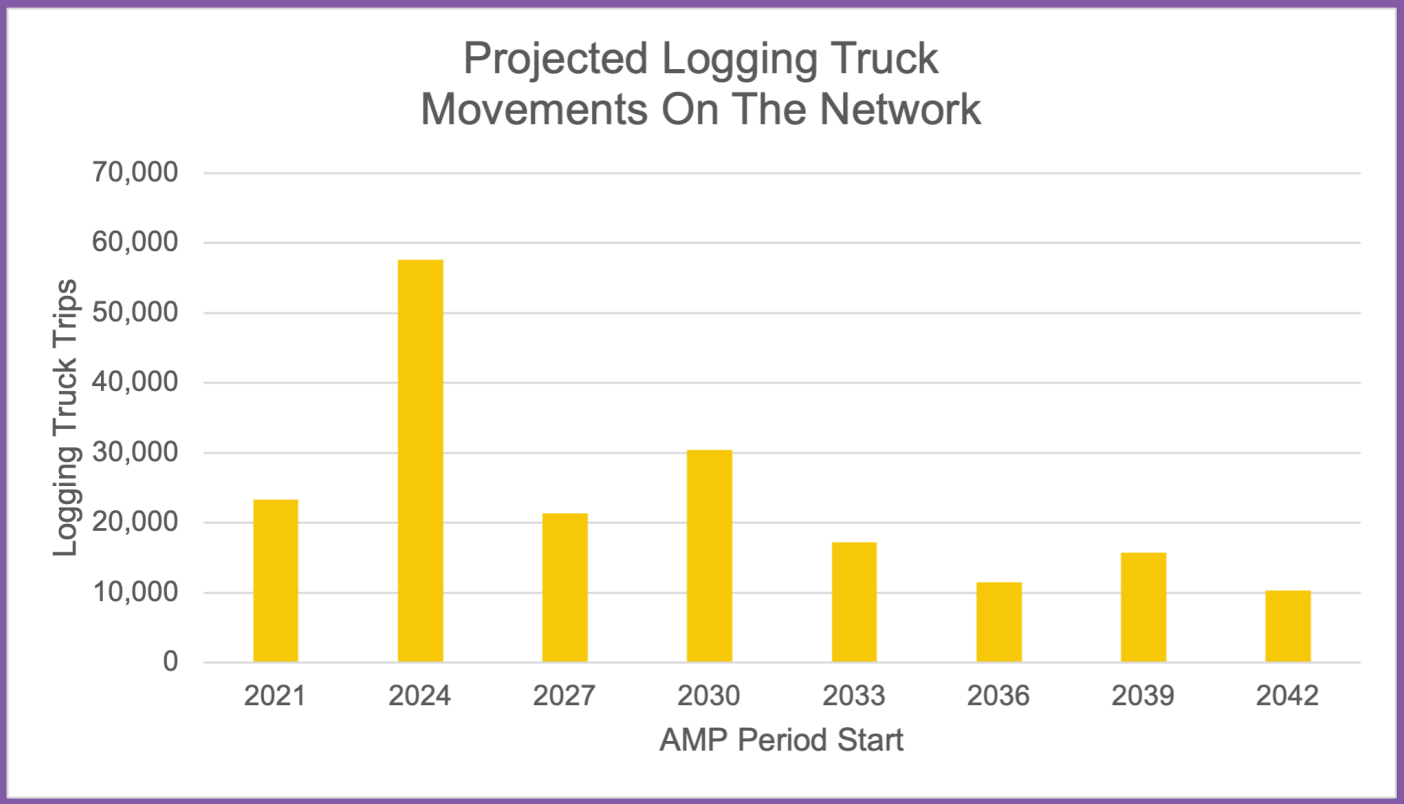
Asset Description	Length (m)	Area (m2)
Concrete	120	988
No Surface Seal	169,317	512,789
OGPA/SMA	4,012	53,916
Racked in Seal	116,663	976,002
Slurry Seal	2,893	31,831
Texturising Seal	6,165	42,634
Void Fill Seal	65,716	401,327
Total	1,273,735	7,928,974

6.2.2 Pavement Asset Condition and Performance

Pavement performance is measured by how well it meets the requirement to provide safe, smooth, all weather access and does it have sufficient demand capacity for all vehicles. Carriageways are typically strong enough for the loads they are expected to carry. Arterial roads are designed and constructed for larger volumes of HCVs while access and low volume roads carry much fewer HCVs. HPMVs and 50MAX trucks are also using the network with numbers expected to increase over time, these are restricted to approved routes deemed capable of carrying the increased loads. Another concern is the effect of forestry related HCVs on the rural roads, which is already noticeable on the network. These roads were designed for low numbers of HCVs, not large volumes of logging trucks during winter months, which are consuming the asset at higher rate than anticipated.

A study is currently underway to identify the future impacts of logging trucks by identifying the known forested areas and their likely harvest times. This will allow better targeted intervention strategies moving forward. **Figure 82** shows projected logging truck movements on the network.

Figure 82: Projected logging truck movements on the network



Condition and Monitoring

HSD, Roughness and Condition Rating surveys enable trends in the condition of the network to be determined, comparisons made between the conditions of roads in different areas and assist in identifying sections of road that require closer inspection for maintenance and renewal treatments.

Roughness is a measure of the longitudinal profile of the road and is measured using specialised equipment mounted to vehicles which travel the network in both directions. The NAASRA count is the commonly used unit for the measurement of roughness. A high NAASRA count indicates a rougher road.

Roughness

The trends in regard to roughness are a useful indicator of how effectively the pavement maintenance strategies are meeting the demands of increased traffic loadings and the network increasing in age. It is important to note that the road pavements are always in a state of decay and that as they age, their condition deteriorates and the cost of maintenance increases. The rate of deterioration is a function of the initial pavement strength, traffic loading and the maintenance effort applied.

Further information is in Section 3: Levels of Service of this AMP in Section 3.3.3.

Smooth Travel Exposure

The principle measure of sealed road performance in NZ is STE which reports the traffic volumes using roads of different roughness levels. This means that if the roads which have the highest traffic volumes are the smoothest on the network then there will be a higher STE figure than if the roads with the least traffic volumes are the smoothest.

STE is a combination of roughness data and traffic loading. The ONRC reporting tool 'Performance Measures Reporting Tool (PMRT) allows councils to compare network data with their Peer Group, their region and nationally.

Further information is in Section 3: Levels of Service of this AMP in Section 3.3.3.

Surface Condition Index

The Surface Condition Index (SCI) is an overall condition value that reports an aggregation of a number of surface defects (alligator cracking, scabbing, pothole patches and flushing) over a specified length of road pavement. The purpose of the SCI is to summarise and report the overall health of a road network. This indicator can also be used to monitor the performance of maintenance and construction activity completed on a road network.

Condition ratings involve a visual inspection where defects are measured and recorded in a standard and objective manner. Condition rating is undertaken on the road network with a 10% sample measured every 500m. This information is reported as a condition index and is used to monitor trends in the network condition, including against the national average. The SCI is used to trigger resurfacing or reseal treatments.

NPSC's SCI is 98.2% as compared with the previous AMP (2018-2028) where the SCI index was 98.4%. There is a very slight deterioration; however, this is still above the baseline performance of 98.0%.

This SCI has come from inspections during the period of 2016-2018. This data is starting to get old, and therefore less relevant. In 2019 NPDC decided to take a different approach to measuring the quality of the network, this is with the introduction of the All Faults program. Unfortunately, to understand if the network is improving or deteriorating, the All Faults program requires historical data. As this is not possible for the first few years, NPDC may need to look at combining the All Faults programme with Condition Surveys in the interim.

Pavement Integrity Index

The Pavement Integrity Index (PII) is a combined index of the pavement faults in sealed road surfaces. It is a 'weighted sum' of the pavement defects divided by the total lane length. PII combines surface faults with rutting and shoving. This index combines the information gathered from the condition rating survey with the measurements recorded during the HSD surveys.

NPDC's 2020 PII index is 92.0% as compared with the previous AMP where the PII was 95.8%. This suggests the network's pavement has deteriorated and this is below the acceptable standard of 95.0%. Caution should be taken; however, as the data dates back to 2016-2018 and there is data missing for 281 out of the 3,219 treatment lengths. A deteriorating trend does not always indicate that corrective action should be taken, although future values should be monitored closely to ensure that this does not become a continuing trend.

The All Faults program will supersede the SCI and PII in the future and will enable NPDC to track trends over the network. To track trends the Council requires historical data so it is expected that there will be a better understanding of the condition of the network by the next NLTP.

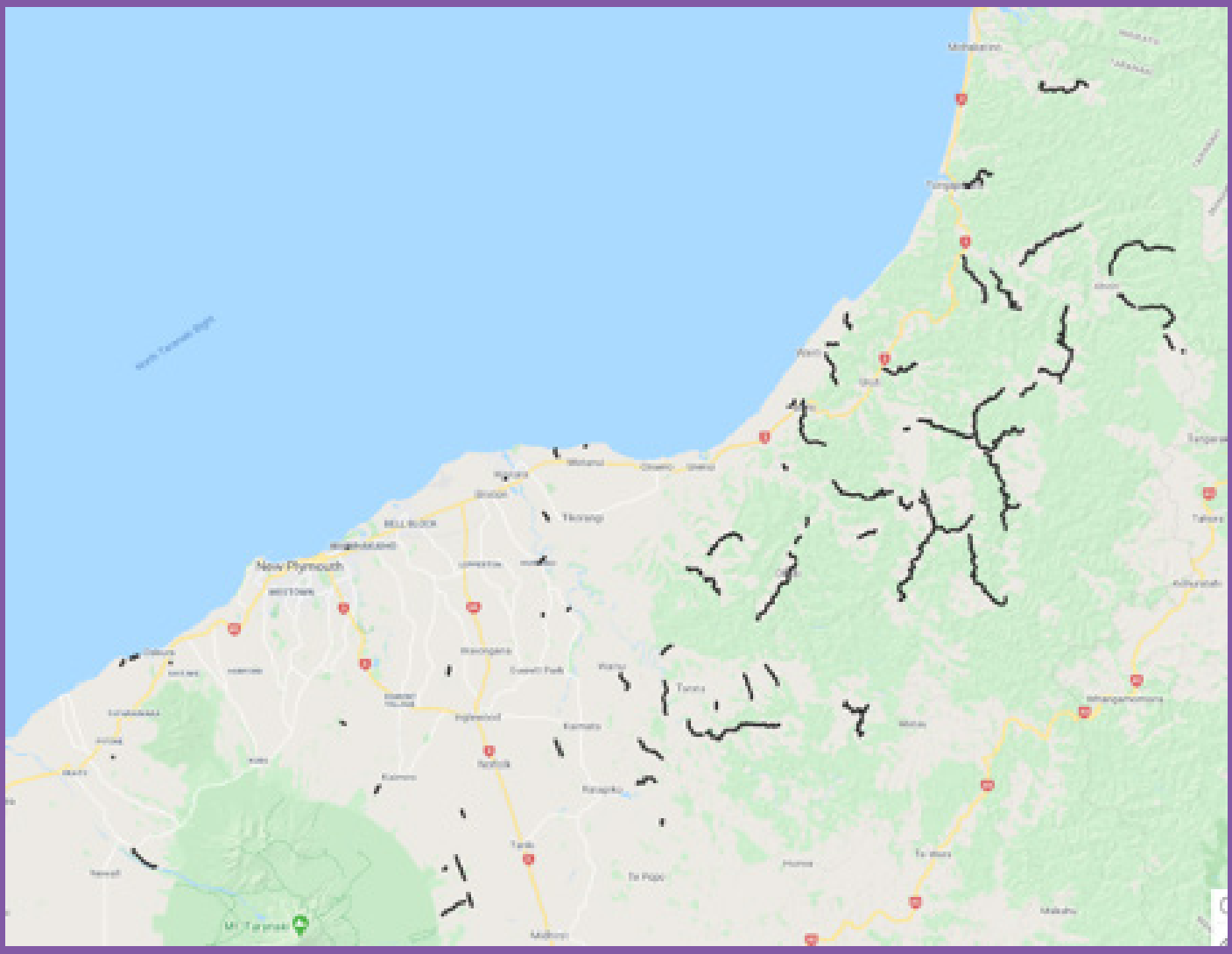
Unsealed Roads

The issues the district faces are also common occurrences for other local authorities in NZ. The unsealed network is highly susceptible to vast changes in weather, and therefore maintaining the network to an acceptable Level of Service has its challenges. Hot, dry spells result in dust and corrugations, whilst torrential rainfall creates wet and slippery roads. Many of the unsealed roads are in the eastern hill country where slips are a common occurrence.

6.2.3 Unsealed Pavements

The district has 168km of unsealed network which only makes up 13% of the network. These roads provide vital access to rural communities, which predominantly have low traffic volumes.

Figure 83: Unsealed Carriageways on New Plymouth Network



The issue with the unsealed network is that it caters for both light vehicles and heavy vehicles, this leads to different maintenance requirements. For light vehicles, a smooth and safe network is the Council's commitment; however, heavy vehicles require a suitably wide road built to withstand heavy wheel loads.

Another key issue common amongst local authorities is logging in rural areas. With the increase in HCVs on these rural roads, there has been an increase in loadings on pavements that were never designed to take these loads.

Although the locations of forestry blocks is known, without knowing exactly when the trees will be logged creates another issue. The Council can try and target roads prior to harvesting to mitigate the damage, or simply wait and

repair the damage to roads after harvesting has occurred. The preferable approach is to carry out any urgent repairs as a result of the logging traffic, but to wait until the logging has finished to complete any permanent repairs. NPDC has approached Community Boards in the past and advised them that the Level of Service will drop as a result of the activity i.e. some sections of sealed pavement reverting to unsealed. Renewal / maintenance works then happen once the logging is finished.

Programming
Grading frequency is dependent on the following factors:

- Traffic conditions (Average Annual Daily Traffic (AADT), HCV)
- Materials used on previous metalling programmes
- Climate and rainfall
- Road cross-falls and grades
- Road width
- Existing road condition and pavement strength
- Drainage
- Level of Service and customer expectations (safety, defects and roughness)

Typically, unsealed roads require reactive maintenance as opposed to preventative maintenance due to extreme weather events. Network Inspectors frequently update the All Faults data on these roads so any potential safety related faults can be kept on top of. In turn, this prevents NPDC from unnecessary spending on grading and metalling as all maintenance is targeted.

6.2.4 Maintenance and Operations Plan

In the past, machine collected data has been the mainstay for pavement analysis and performance measurement. The problem is that machine collected data does, which is historical data, and does not portray the full picture. The measures therefore become ‘lag’ measures.

NPDC’s Network Inspectors routinely inspect the network identifying faults and assigning severity priority levels as per agreed intervention levels. Logged faults are collected electronically utilising Pocket RAMM in the field. Faults data identified form the basis of forward programmes for prioritising maintenance activities. These identified real

time faults provide a view of the changing performance of the network that has led to the development of new types of 'lead' indicator performance measures.

This enhanced visual condition rating system, All Faults is a paradigm shift in how maintenance operations occur in NZ and shows that good infrastructure asset management practices are also good commercial management practices. Further information is provided in Section 8.8.4.

Each fault whether it be a pothole or pavement dig out repaid has a corresponding repair costs obtained from established contract unit rates. The sum of All Faults identified is established for the entire roading network.

Cost of All Faults = (Unit area of the fault × unit rate).

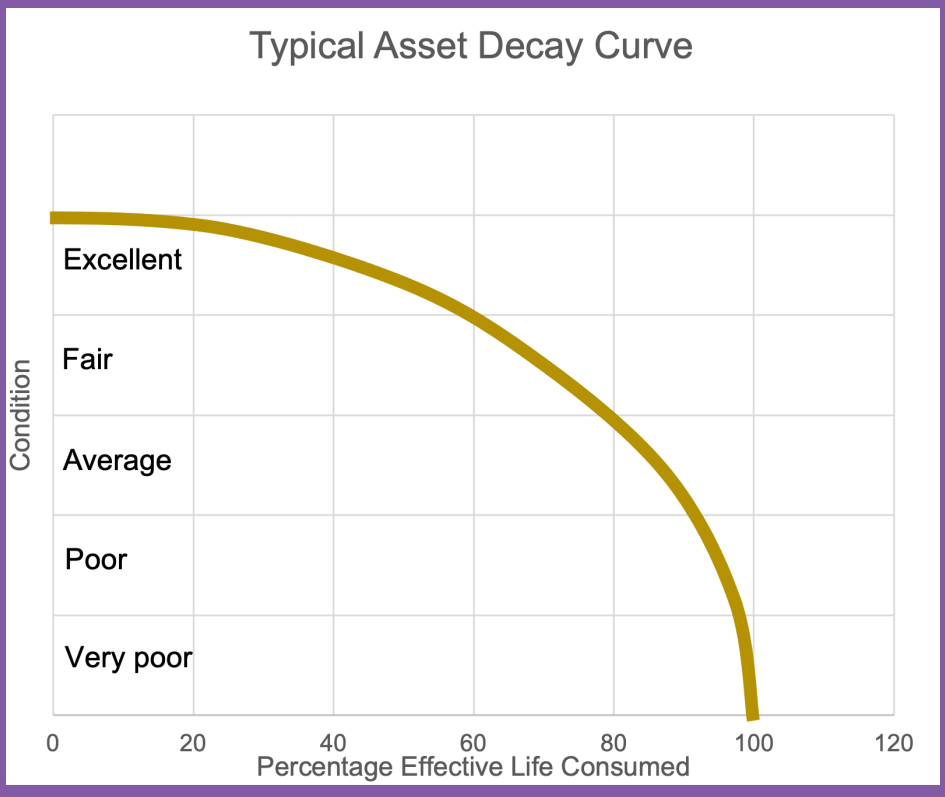
Further, each defect is assigned a priority, 1 to 5 with 1 being new pavement assets with no defects and 5 being safety related faults requiring immediate repair (aligned with NAMS).

Severity Priority (SP) = (unit area of the faults × unit rate × priority)

Network condition is established from the following formula:

Condition = (SP/Unit area of the faults × unit rate)

Figure 84: Typical Asset Condition Decay Curve



The current network condition is sitting at a score of 3.15 which is a 'Fair' condition. **Figure 85** shows the historical trend of the network. Where the network is green, it is improving, orange is no change and red is deteriorating, fortunately the network condition is improving. A typical target is to maintain a network at a 3 or 'fair' condition, 2 or 'good' condition is considered over investment and unnecessary expenditure.

Figure 85: Current Trend of Network Condition

The All Faults program relies on the Network Inspectors covering the whole network. Currently 100% of the rural network has been inspected while 75% of the urban network has been inspected. As this is a relatively new tool that was only introduced in September 2019, it will take a few years to contribute to the historical data of the network, allowing the Council to undertake meaningful trend analysis on the data.

Table 61 breaks down the condition of the network by ONRC. Until the entire network is inspected, some of the ONRC categories may be over represented; however, as a general trend, the network is fairly consistent based on ONRC. The preferred trend would be an increasing score from Arterial to Low Volume, showing a higher Level of Service for a higher classification.

Table 61: Condition of Network by ONRC

ONRC Category	Condition Rating
Arterial	3.21
Primary Collector	3.05
Secondary Collector	3.11
Access	3.26
Low Volume	3.16
Unclassified	3.00

At any point in time the cost of repairing all identified faults and the overall condition of the roading network can be established. This is a practical output in:

- Analysing whether the network is improving or deteriorating based on the total value of repairs identified
- Assessing deferred maintenance needs
- Highlighting budget deficiencies
- A reality check to determine whether existing maintenance strategies are working
- Establishing network condition

Advanced Pre-Reseal Repair Treatments

Delivery of pre-reseal preparatory repairs the year prior to resurfacing treatments is considered best practice in pavement operations and enables resurfacing to be done at the most optimal time of the year rather than being delayed. An allowance has been made to move to this practice over time, bringing forward a portion of the following years preparatory repairs each year based on proximity of treatment lengths and improved operational delivery. This should allow the Council to deliver this work type within current resources, whilst moving to more advanced delivery of carriageway renewals. Urgent repair works can offset the pre-reseal programme, and delay pre-reseal repairs. Currently the Council is 20% ahead of the current year with a future long term target (three years) of 100% of pre-reseal repairs completed a full year ahead.

6.2.5 Unsealed Pavements

Maintenance and Operations

Maintenance of the unsealed roads is about keeping the asset functional and fit for purpose throughout the lifecycle. The unsealed network is inspected for surface profile, surface defects and ability to shed water to the adjacent roadside drains. Maintenance grading occurs twice per year based on current network condition and maintenance metalling programmed as required.

Network classification informs the level of maintenance expected for each treatment length. Lower classification roads will have a higher tolerance of deteriorating condition, as the appetite for risk is higher due to the lower usage. Whereas high classification roads have a lower tolerance of risk and will subsequently be maintained to a higher degree.

While a formal condition assessment or summary is not captured for unsealed roads the use of All Faults means the ability to highlight areas requiring maintenance or renewal activities (and as such) can ensure the expected Levels of Service are adhered to.

As a minimum, the following information is needed to describe the planned and reactive maintenance regime of the unsealed road:

- Faults and defects (potholes, corrugations, rutting, soft spots, drainage etc.)
- Maintenance (per km, per ADT for HCV, per season, per aggregate type)
- FWP and Annual Plan
- MIS codes

Inspections

The routine inspections focuses on unsealed pavement assets and the obvious drainage assets include:

- Safety, line of sight (sight distance, vegetation encroachment), vegetation control and its effectiveness, customer requests
- Reactive maintenance (for example potholes, corrugations, flooding, loose aggregates, surface water runoff)
- Condition rating
- Visual check of known dropouts and slips.

The detailed inspection drives the Capital Works (metalling renewal programme) and assists in fine-tuning the maintenance grading programme.
Post grading inspections include:

- Drainage assets (water table, culverts, cut outs, soak pits, marker posts, etc.) and their effectiveness
- Visual check of known dropouts and slips

A pre-grading inspection determines the scope and type of grading and is usually carried out by the rural inspector.

6.2.6 Renewal and Capital Works

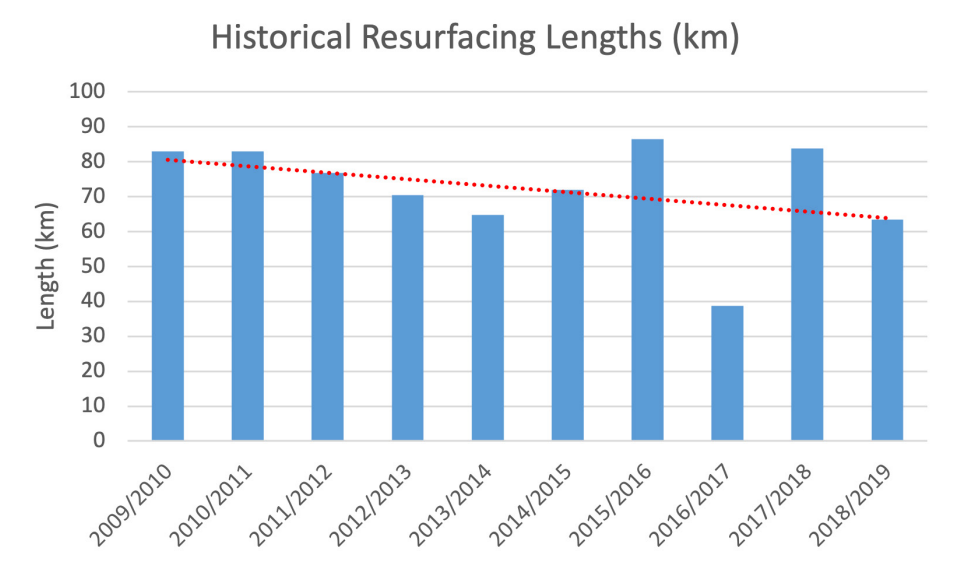
Historical Surfacing Renewal Works

NPDC roads have relatively low traffic volumes compared to other RCA and failure due to wear only occurs in high stress areas. Typically this is at points where heavy vehicles turn at intersections in industrial areas and at cul-de-sac turning heads. The main failure mode for chipseal surfacing is aging. This occurs when oxidation of the bitumen causes it to harden which accelerates cracking, chip loss and flushing / loss of texture when further compacted by traffic.

Figure 86 shows the length of resurfacing undertaken for the last 10 years. On average NPDC has resurfaced 72km a year, which equates to 6.5% of the network. This is the equivalent of a seal life of 15.4 years.

With the flat lining of Waka Kotahi budgets and NPDC's commitments to set minimal rates rises, the actual current rate of resurfacing that can be achieved within annual budgets is at an interval of 17 years.

Figure 86: Historical Resurfacing Lengths



Previously NPDC targeted its resurfacing programme based on age, with priority given to roads that have their 'birthday seal' due. A better approach to consider is a combination of age and condition. A road does not necessarily require resurfacing just because it is old. There is a decrease in surfacing length for the year 2016/17 which is due to a change in contract. This resulted in a ramp up of work for the 2017/18 year.

Typically chipseals are achieving a similar life to NPDC's Peer Group, regionally and nationally, with the exception of chipseals on Arterial roads, which are exceeding 15 years. This is illustrated in Figure 87.

Figure 87: Chipseal resurfacing average life achieved

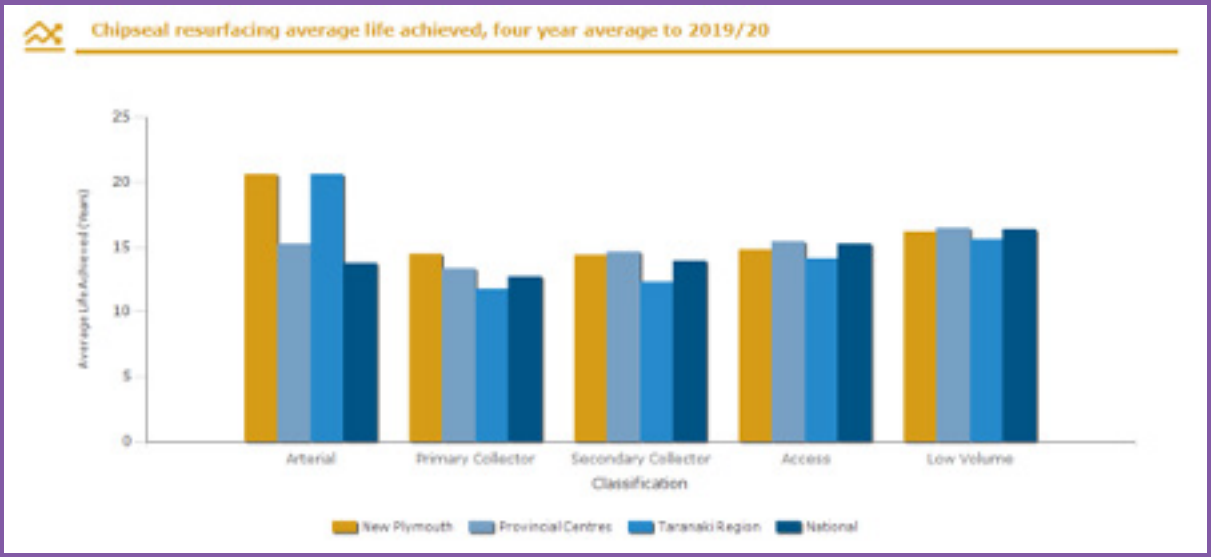


Figure 88 shows the asphalt resurfacing average life that is currently achieved.

Figure 88: Asphalt resurfacing average life achieved

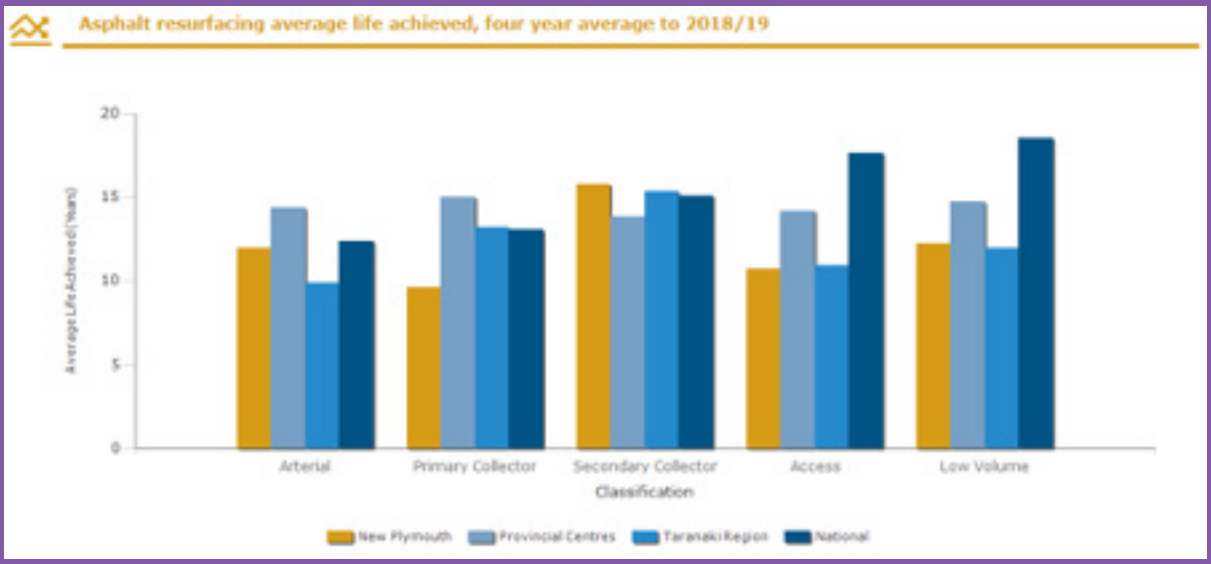
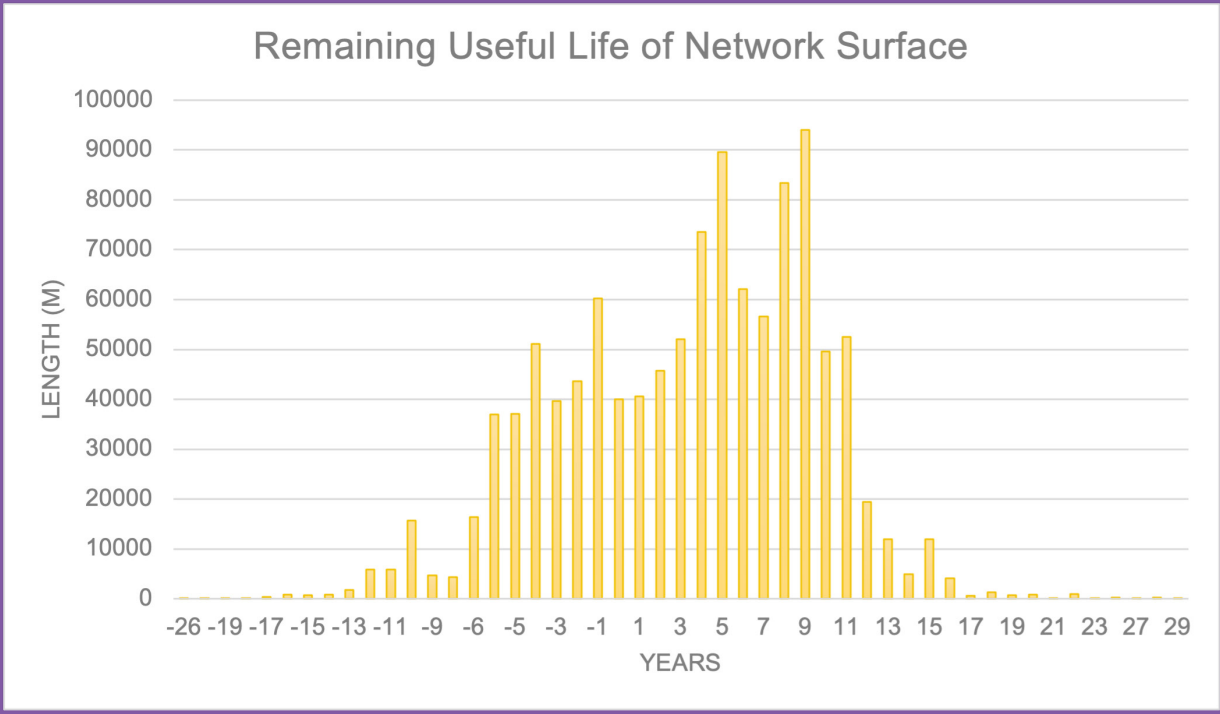


Figure 89 shows the RUL of the surfaced network. Years that are negative are older than the expected life, and years that are positive still have life remaining. To manage these assets well, it is important to spread the cost or 'flatten the curve' so that not all surfaces need to be renewed at the same time, creating a large expense. If NPDC continue to resurface at a rate of 5.9% of the network (17 year cycle), this will continue to age the network and increase the length of network which exceeds the expected life. This should be monitored to ensure the Council is not under-investing.

Figure 89: Remaining Useful Life of Surfaced Network



Age of surface is not the sole factor for a renewal; however, it is a good trigger to inspect the surface and determine an appropriate outcome. The expected life for different surfacing types and traffic conditions are summarised in **Table 62**. These values are the default seal age values in RAMM which are average values for NZ and not site specific; therefore, in some cases the seal can last much longer.

Table 62: NPDC expected life per surfacing type, by traffic volume

Surfacing Type	Traffic Volumes (VPD)						
	<100	100-500	500-2,000	2,000-4,000	4,000-10,000	10,000-20,000	>20,000
Asphaltic Concrete	25	23	22	20	18	15	10
OGPA	20	18	17	15	12	10	8
Slurry Seal	12	10	9	8	4	3	2
Reseal Grade 2	16	14	12	11	10	9	8
Reseal Grade 3	15	14	12	11	10	10	8
Reseal Grade 4	15	14	12	11	10	10	8
Reseal Grade 5	8	7	6	5	4	3	2
Reseal Grade 6	6	5	4	3	2	1	1
Multi Coat Reseals (2/4)	18	16	15	15	14	10	9
Multi Coat Reseals (3/5)	16	15	15	15	12	10	8
Multi Coat Reseals (4/6)	15	14	12	12	10	10	8

Surfacing Type	Traffic Volumes (VPD)						
	<100	100-500	500-2,000	2,000-4,000	4,000-10,000	10,000-20,000	>20,000
Single Coat First Coat	3	3	2	1	1	1	1
Two Coat First Coat	4	3	3	2	2	1	1

Special Roads

NPDC will continue to maintain, operate and renew (when required) the section of Egmont Road (see Figure 90) leading to the North Egmont Visitor Centre in the National Park. This road is classed as a 'Special Purpose Road'.

Figure 90: NPDC's sole 'Special Purpose Road'

Pavement Capital acquisitions Vested assets
New assets installed by developers to serve new domestic and non-domestic developments are usually vested in NPDC. Assets are built to the NZS4404:2010 – Land Development and Subdivision Standard. NPDC's specific requirements are defined in the NPDC, SDC and STDC adopted standard for Land Development and Subdivision Infrastructure, which is based on NZS4404:2010 with local amendments. NPDC assumes full responsibility for any assets vested with the Council and includes them in operations, maintenance and future renewal plans.

Seal Widening
Minimal seal widening has been carried out in recent years. Typically the only seal widening that occurs is on rural roads where a widening will improve a safety aspect of the road, or will improve the Level of Service for businesses that utilise these roads such as logging or agriculture. The following roads will be widened over the next three years:

- Carrington Road
- Henwood Road

Seal Extension
NPDC undertakes sealing of unsealed roads when these projects are economically justified with priority being given to the unsealed roads receiving the greatest use.
The benefits arising from the sealing of unsealed roads are a smoother ride for motorists, reduced vehicle operating costs, improved safety and capacity, a greater degree of security of access and the alleviation of the effects of dust on adjoining property owners and road users. There are no seal extensions planned in the short term.

Resurfacing Renewal Works
Resurfacing is undertaken periodically to retain the waterproofness of the sealed surface and good skid resistance. There are a number of defects that can result in a requirement to either reseal or repair the existing road surface. For example:

- Cracking
- Potholes
- Loss of waterproofing
- Flushing
- Chip loss (scabbing and ravelling)
- Loss of texture / skid resistance

Pavement Rehabilitation Renewal Works
Road pavement rehabilitation renewals are required where the pavement layers are reaching the end of their design life and are showing signs of deterioration. Renewal works, rather than resurfacing, then becomes the best option when considering the whole-of-life costs of the pavement.

Arterial roads within the urban network are the cause of concern at present based on current condition and increasing traffic volumes. Hence, the Council will be looking to potentially reduce the annual chipseal resurfacing programme and to increase the Asphalt Rehabilitation Sites within the urban network.

Unsealed Roads
The unsealed network is much more dynamic than the sealed network as it responds adversely to heavy rain, periods of dry weather, peak traffic flows and heavy loads. Unsealed roads usually require pavement renewal for one of two reasons:

1. Failure of the pavement structure in a similar manner to which occurs on sealed pavements

2. Insufficient renewal of the metal surface, resulting in traffic running on the pavement structural layers, eroding and damaging them

Economic, social and legislative changes in recent years have all contributed to impacting the unsealed pavement network regarding its suitability for road users. Further details are provided below:

- Changing land use – the decline of pastoral farming and increase in alternative uses, particularly forestry and dairy farming, has increased loadings on the network
- Transport economics – larger and heavier trucks have improved the economics of more remote properties and industries creating road user demand for improved roads
- Legislative changes – have resulted in heavier and longer vehicles being able to be driven on any road without restriction and with no appreciable upgrading in the network.

Unsealed roads pavement metalling is identified through inspection, network knowledge and maintenance need. Environmental factors can also influence programmes. Figure 91 shows the roads that are historically expensive to maintain.

Figure 91: Historically Expensive Areas of the Network

Predictive pavement deterioration modelling
Historically a dTIM's model of the network was built in-house in 2001, due to lack of pavement information the model only gave limited insights into the performance of the network. There are a number of elements that dTIM's requires to enable a complete analysis to be undertaken. A review of the RAMM database identified a number of gaps that would affect the analysis. The primary gaps were the subgrade strength, pavement depths and pavement materials, particularly on the rural network.

In 2019 the Council undertook to complete a falling weight deflectometer survey of the network based on the RIM's criteria of adjusting the spacing of the tests depending on the road length and traffic volumes on the road. During tendering of the testing contract NPDC became aware of Geosolve Ltd's Multi Speed Deflectometer test which operates from a truck travelling at near the operating speed of the roads, thus reducing costs through not requiring traffic management. It also records the pavement deflections on every rotation of the truck wheel and can then average the results to a desired spacing i.e. every 10 or 20m.
Geosolve Ltd undertook the survey in October 2019 and supplied updated pavement depth and subgrade strengths which were then imported into RAMM. NPDC is now in a much stronger position to run dTIM's and get more meaningful results from it during the period of this AMP.

Geosolve Ltd are also developing a GIS based tool from this data that will predict the residual life of the pavements. Over the course of this AMP the Council will monitor progress with their tool and if it proves successful it is likely to be implemented as part of the decision making process for the next round.

6.2.7 Disposal Plan

There are no plans to dispose of any pavement assets over the period of this AMP. As part of the improvement plan NPDC will look into asset disposal further in the 24-27 NLTP (see **Section 9: Improvement Plan**). There is a likelihood there are assets on the network that are surplus to requirements.

6.3 Structures: Bridges, Large Culverts and Retaining Structures

The purpose of bridges and large culvert structures is to provide continuous all-weather road access over rivers, streams and uneven terrain, supporting vehicles and ensuring the safety of road users. Retaining walls restrain soil to a slope that it would not normally keep to, protecting the networks assets and ensuring safety of road users. The continuous operation of this asset group is crucial to the transportation network. These assets are structurally engineered and are high risk and high value. They require proactive inspection and consequent maintenance, component renewal and ultimately full replacement. When properly designed and managed; however, they have a useful life that generally exceeds that of other transportation assets.

Excluding pedestrian only bridges, bridges generally qualify for Waka Kotahi funding assistance. There are exceptions such as those on very Low Volume roads. The key issues that relate to bridges, large culverts and retaining structures are:

- The identification of strategic structures (associated with Lifeline issues)
- Demand for bridge strengthening from industry related to HPMV and 50Max HPMVs
- Safety (e.g. bridge approaches)
- Protecting waterways
- Low historical maintenance expenditure creating a bow wave of work

An external consultant has produced a report entitled "Road Structures Life Cycle Management Plan 2020"[12] which covers known structures in the district in detail. This section of the AMP summarises the report.

The different types of bridges, large culverts and retaining walls in this asset category are shown in **Tables 63 to 65**.

[12] Road Structures Life Cycle Management Plan 2020, 2020/09/18, Rev.4

Table 63: Summary of Bridge and Culvert Quantities

Asset Description	Quantity (No)	Length (m)
Road bridge	166	3,379
Road major culvert	97	1,639
Stock underpass	102	-
Tunnel	5	464
Retaining wall	365	6,427
Total road structures	735	11,909
Coastal Walkway Bridges	9	212
Coastal Walkway Retaining walls	27	5,470
Total Structures	771	5,682

Table 64: Summary of retaining wall types

Asset Description	Quantity	Area (m2)
Block	9	245
Concrete- Gravity	20	888
Concrete -Anchored	3	133
Concrete - Cantilever	7	179
Concrete- Single Crib	29	2,494

Asset Description	Quantity	Area (m2)
Earth- Reinforced	27	2,661
Steel- Cantilever	4	196
Steel Composite- Anchored	50	2,209
Steel Composite- Cantilever	31	862
Steel Composite- Single Crib	1	31
Stone- Facing Wall	3	327
Stone- Gabion	31	1,598
Stone- Rock	9	1,810
Timber- Anchored	35	1,500
Timber- Cantilever	98	2,269
Timber- Facing Wall	6	442
Timber- Sheet Pile	2	270
Total	365	18,114

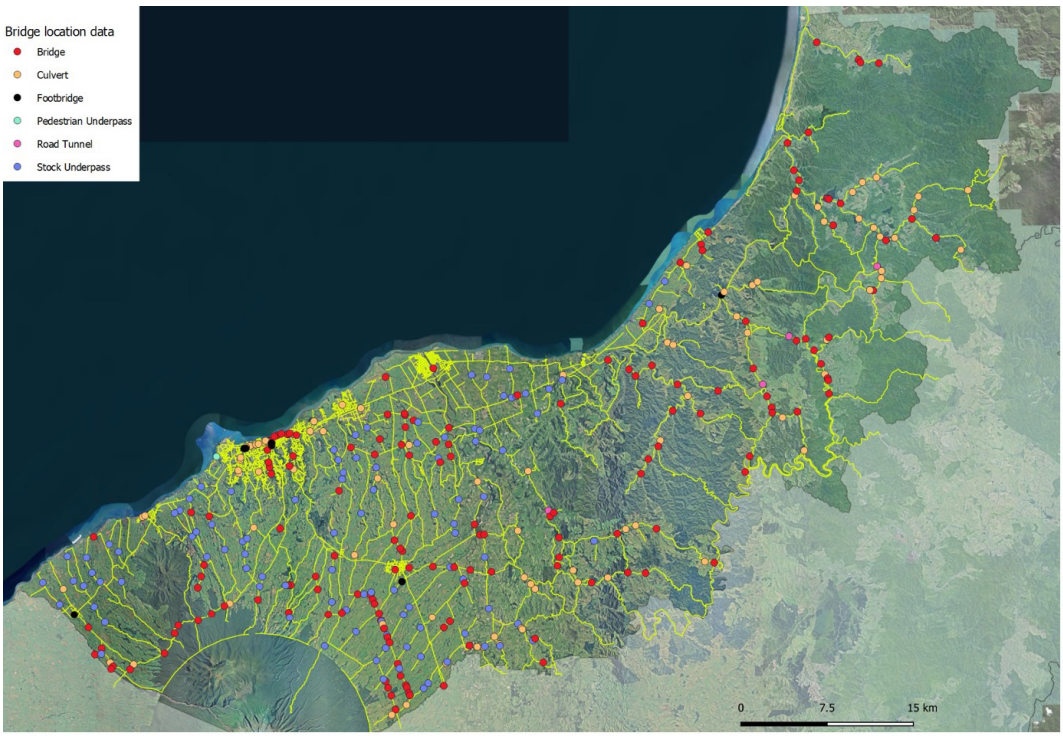
Table 65. Transport Agency Structures Summary

Asset Description	Quantity (No)	Length (m)
All Bridge Structures	170	3,506.4
All Culverts Ø1.2-1.8m	196	606.1
Total	366	4,112.5

The quantity of asset data is from the "Road Asset Valuation Report 2019" produced by an external consultant based on data from RAMM. The reason the quantities do not align with Waka Kotahi's Structures Summary from OBIS 2019 is due to some large culverts (classified as a bridge by cross sectional area) being valued with drainage, this is reflected in the Stormwater and Flood Protection AMP. It is part of the Improvement Plan to have all of the data in OBIS updated in RAMM so the two databases align (see **Section 9: Improvement Plan** of this AMP).

Figure 92 shows the known structures on the transportation network.

Figure 92: Known structures on the transportation network



Bridge structures have a number of different forms from the historic Bertrand Road suspension bridge to modern concrete structures as demonstrated in **Figure 93**.

Figure 93: Photos showing Bertrand Road suspension bridge and a modern concrete bridge

The different forms require different approaches in monitoring and maintenance.

6.3.1 Bridges, Large Culverts and Retaining Structures Asset Condition

Condition and Monitoring

Bridge structures are inspected in accordance with the current Waka Kotahi's Bridge Inspection Policy (TNZ S6). Bridge structures are inspected with the frequency outlined in Table 66.

Table 66: Bridge structure inspection frequency

Inspection type	Inspection Frequency (Years)
General	2
Principal	6
Special	
Posted Bridges	1
Others	As required and generally occur following a significant natural event

Superficial six monthly inspections are undertaken by the contractor under the Term Services Contract. These inspections are carried out as part of the normal inspection cycle for the roading network.

Maintenance schedules prioritising maintenance, repairs and further inspections are prepared annually.

Culvert structures are also inspected in accordance with the current Waka Kotahi Bridge Inspection Policy (TNZ S6). Inspections are completed with the frequency outlined in **Table 67**.

Table 67: Culvert structures inspection frequency

Structure Category	Inspection Frequency (Years)	
	General	Detailed
Large Culverts (>3.4m2)*	2	6
Major Culverts 1**	5	10
Major Culvert 2***	5	-

* Large Culverts: Waterway area greater than 3.4m2 treated as a bridge

** Major Culverts 1: Culverts > 900mm diameter (or equivalent area) and < 3.4m2

*** Major Culverts 2: Culverts > 600mm diameter (or equivalent area) and < 900mm

Culverts of less than 600mm diameter or equivalent area are inspected every five years by the network maintenance contractor and include a superficial inspection of inlets, waterway and barrels prior to winter for potential blockage.

Inspections are reported on an appropriate form, which is then uploaded into RAMM. A Summary Report, and Maintenance Schedule prioritising maintenance, repairs and further inspections are prepared periodically by six zones, spanning across the district from west to east.

Retaining walls are scheduled for detailed inspections every 10 years. The inspection regime identifies maintenance requirements and over a full inspection cycle of 10 years a better assessment of condition, maintenance and renewal requirements can be made.

6.3.2 Bridges and Large Culverts Capacity / Performance

Weight Capacity

There are currently nine bridges posted in accordance with the Heavy Motor Vehicle Regulations 1974, Regulation 11 Protection of Bridges.

These limits (which are advertised annually) comprise gross weight and axle weight limits and speed limits for heavy motor vehicles. Five of the bridges give access to a limited number of properties and typically would carry fewer than 25 vehicles per day. The posted restrictions reflect the fact that these structures were designed and built as part of a “Class 2” roading network which was limited to vehicles with lesser gross and axle weights than the current universal Class 1 limits. The Class 2 limit is 70% of Class 1.

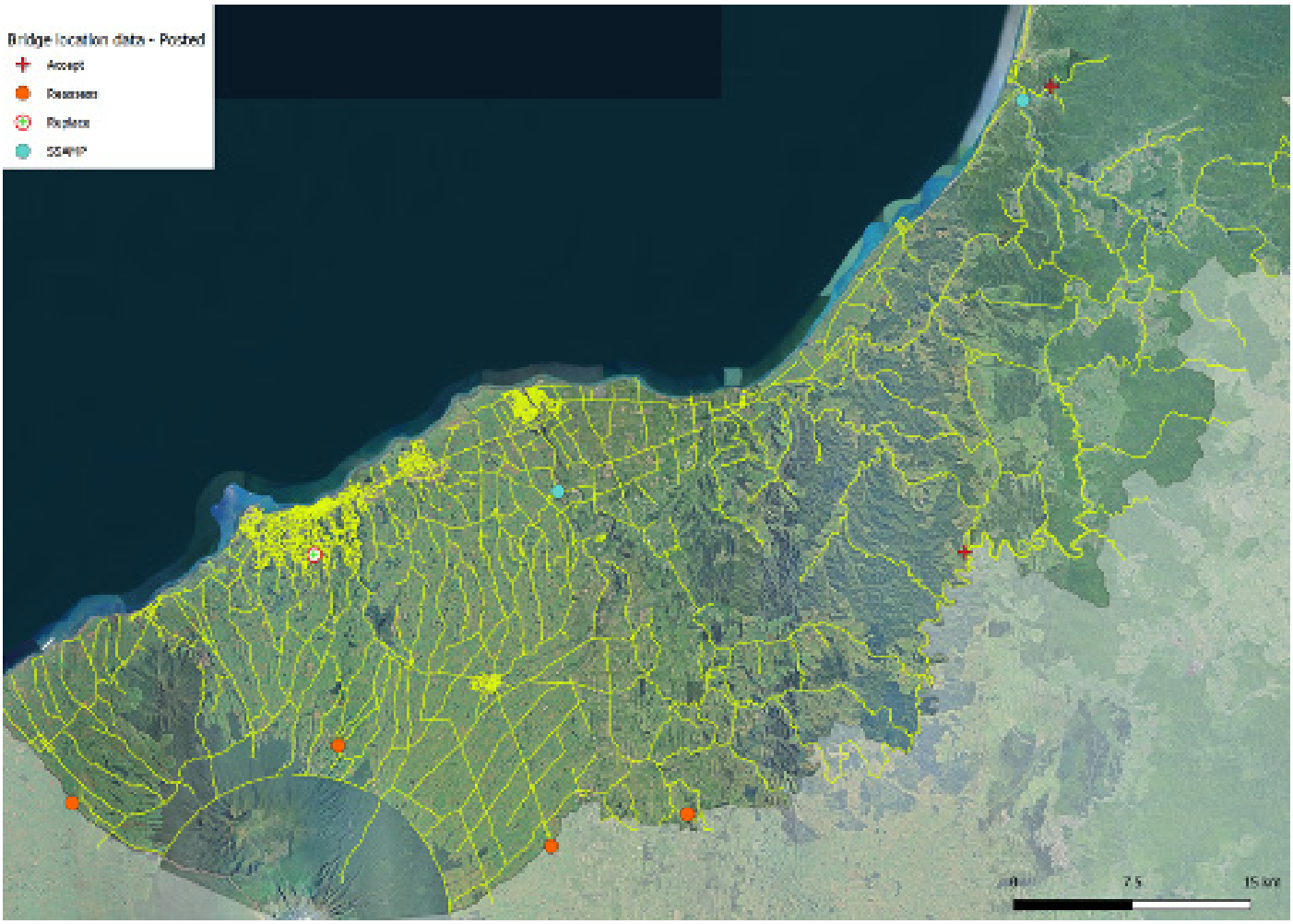
Of the nine structures four may benefit from further assessment to refine the restriction or map their future. Two are aging suspension bridge structures for which Structure Specific AMPs are to be prepared to address multiple issues / vulnerabilities.

The Huatoki Street bridge is in an urban area and is servicing increasing volumes of traffic. Replacement of this structure is planned to address multiple Level of Service issues.

The remaining two bridges are deemed appropriate at this time.

Figure 94 illustrates the distribution of posted bridges within the network. Structures highlighted in orange are structures which may not require posting if further assessment and / or material testing is undertaken. Structures highlighted in blue will require Structure Specific AMPs. Structures with red crosses have no proposed actions while the green cross in the red circle is the Huatoki Street bridge which has a planned replacement.

Figure 94: Posted Road Structures



6.3.3 Traffic Capacity

There are currently 187 single lane structures on the transportation network. Most of these structures are on Low Volume rural roads. While single lane structures provide a lower Level of Service, the majority of the 187 structures are considered fit for purpose.

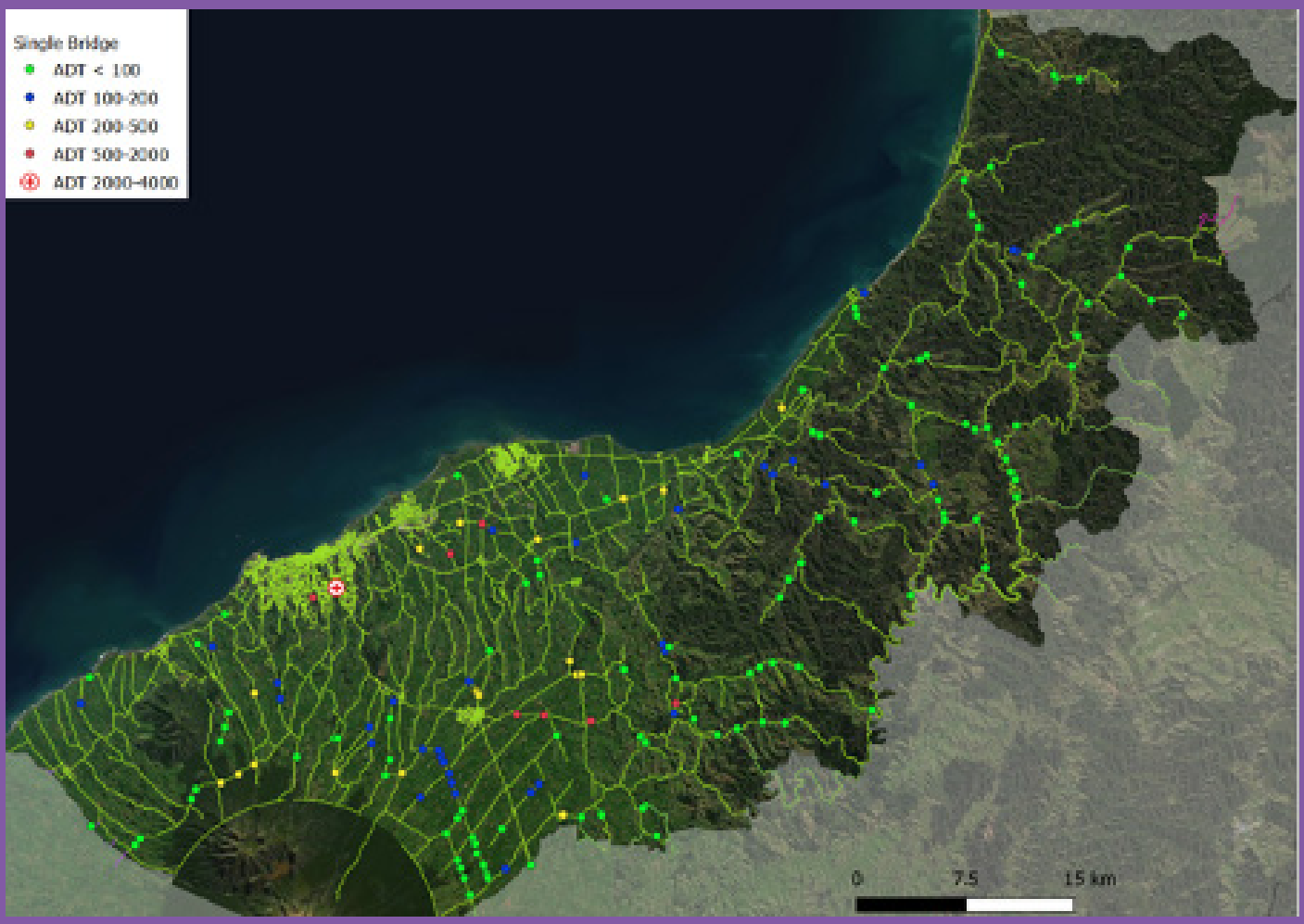
Notable exceptions to the above are the following:

- A series of single lane structures on Bedford Road South that regularly sustain damage from overwidth vehicles (suspected agricultural plant). Bedford Road South also serves as an emergency alternative route for SH3.

- Junction Street provides access across Te Henui Stream to the south of the city without accessing SH3. It currently carries a daily average traffic volume of 3,134. It is adjacent to planned growth areas in the Proposed District Plan which will increase delays at the bridge as development comes on stream. It is planned to increase the capacity of the bridge to two lanes.
- Carrington Road is also a route of increasing importance, particularly for tourism growth. Four (of eight) single lane structures on this route are on very poor alignment and present issues for tourist coaches travelling to / from Pukeiti. With the further development of cycle trails, pathways currently underway, there is potential for increased traffic volumes which will further present issues. Carrington Road could also serve as a bypass for SH45 in the event of a closure in the vicinity of Oakura.

Figure 95 shows the location of the width restricted bridges.

Figure 95: Location of width restricted bridges



6.3.5 Structural Capacity

Bridges in the hill and high country areas are susceptible to increased traffic volumes and weights from the developments in these areas e.g. forestry. This could potentially have a flow through effect as the forests reach maturity and are logged.

Apart from posted bridges there are no constraints on Class 1 compliant vehicles. The HPMVs routes will be typically determined by State Highway bypass routes which can be found on Waka Kotahi's Detour Routes website https://detours.myworksites.co.nz/.

6.3.6 Waterway Capacity

There are no significant problems with waterway capacity. Any minor problems are generally isolated to the smaller bridges. As with traffic capacity, any upgrading in waterway capacity warrants considering only when these bridges are replaced at the end of their serviceable lives.

In the eastern hill country and on the shoulders of Mount Taranaki, river channels are well contained in gullies and other natural low points. Peak flows can arrive at some sites very quickly and at high velocity, dependent on the intensity and duration of the storm event in the contributing catchment area. This can put significant pressure on waterway protection works, abutments and piers which can result in damage or losses. Debris build up at bridges can significantly reduce waterway capacity and cause turbulence and scouring around piers and abutments potentially resulting in undermining and instability of bridge and culvert structures. A proactive approach by TRC is required to actively manage catchments, particularly the effects of logging and allowing the stockpiling of debris in potential floodplains.

In lowland areas bridges and culverts generally have sufficient capacity to accommodate the flood flows in the formed channels they serve. During significant storm events overland surface flooding can cause disruption to the transportation network but these are not usually attributed to just the performance of individual bridges and culverts.

Planting, development and occupation of overland flow paths (flood berms) restrict flow paths and causes significant Level of Service issues. Another significant issue to be considered is 'sensitive' catchments. These are typically catchments of which the upper reaches are in steep country with the stream flowing onto flat land with a consequent sudden change in stream gradient. This often results in significant flooding in the lower reaches which is difficult to manage.

6.3.7 Side Protection

Few existing bridges and culverts have side protection (guardrails and barriers) which would meet current design standards. Single lane bridges with wheel guards seem to perform well as the vehicle angle of attack tends to be low. Many existing bridges are difficult to retrofit due to deck strength limitations; however, the approaches could be treated to achieve a reduction in risk.

Assessment of side protection of all existing structures is undertaken as part of the structural inspection regime. New structures should be rationally designed in accordance with current standards as appropriate to the environment and geometric constraints.

6.3.8 Natural Hazards

Bridges, culverts and structures are at risk from natural hazard events such as earthquakes, floods and the failure of attached and adjacent services e.g. water mains.

The majority of bridges within the district were designed and constructed prior to 1980 when the first national guidelines for seismic design of bridges were published. It is only in recent times that adequate earthquake resistance has been incorporated into bridge designs. A seismic rise screening program should be based on network importance taking into account traffic volumes and alternative route availability. No earthquake risk assessment of the bridges in the district has been undertaken and this is considered to be a high priority risk item which is included as an action in **Section 9: Improvement Plan** of the AMP.

6.3.9 Operations and Maintenance Plan

Bridge Maintenance

General minor bridge and waterway maintenance and approaches maintenance is carried out as part of the Term Services Contract. A close working relationship between the Council, consultants and contractors ensures priority works are identified and completed with due haste and that budgets are monitored.

Operations and Maintenance Goals

Under the Road Maintenance Contract routine visual inspections occur as part of the contractor's general network inspection cycle. More detailed inspections are carried out during and after events that might threaten the safety or performance of bridges, such as floods, earthquakes or overloading.

Routine surveillance inspections check to identify:

- Waterway scouring or bed aggregation
- Debris in the waterway and around piles and piers
- Damage or the deterioration of guardrails
- Wearing or loose timber deck planks
- Loose detritus on the deck
- Blocked deck drains
- Damaged signs and delineators

Maintenance programmes are developed from the schedules of defects identified during the inspections by both the network maintenance contractor and professional services consultant. Repair treatments and priorities are determined by considering the impact on:

- Public safety
- Traffic movement and road hierarchy
- Maintaining structural integrity and serviceability
- Future costs if the work is not done

The works in the bridge maintenance programme are the most cost effective responses to the needs identified, except where shorter term but lower cost remedies are selected when budget limitations apply and safety is not compromised. From an asset management perspective, the following are also required:

- Protect the investment in assets by extending the life of the structure
- Minimise repair costs

In addition to the work identified through the routine inspections discussed above, other types of maintenance work can include:

- Repairing structural defects, e.g. concrete spalling, corroded fastenings, rotten timber, undermining of foundations
- Repairing or replacing damaged components, e.g.

wheel guards and handrails
- Restoring protective coatings, e.g. painting
- Restoring or cleaning deck expansion joints
- Watercourse training
- Repairing road approach and abutment settlements
- Cleaning around bearings

6.3.10 Maintenance Standards

- Waka Kotahi's Bridge Inspection and Maintenance Manual
- TNZ S6 Bridges and other significant highway structures inspection policy
- TNZ S8 Tunnels management and inspection policy
- Other relevant NZ and other standards for design, construction and workmanship

6.3.11 Renewal and Capital Work

Renewals

Renewal is undertaken when a structure, or significant component has reached the end of its useful economic life, i.e. it is more economical to replace or rehabilitate the structure or component than to continue maintaining it.

Renewal can include:

- Replacement of an entire structure
- Replacement of individual structural components e.g. bridge deck, bearings, handrails

- Rehabilitation to restore the structural integrity of components, e.g. reinforcing repairs

Reasons for renewal can include:

- Deterioration of the structure or component
- Damage to the structure or component via flood, earthquake or vehicle impact
- The waterway's characteristics have altered to the extent that the bridge can no longer pass the design flood flows

Renewal needs are:

- Identified through routine and detailed inspections
- Confirmed through detailed structural investigation
- Validated by economic justification of net present value option consideration

Renewal needs are identified, and priorities allocated, from inspections and in particular specific structural inspections. The economics of renewing these bridges are then reviewed, by looking at the net present value of the various options, including the 'do minimum' option, for a 30 year analysis period.

6.3.12 Uneconomic Bridges

Economic assessment of bridges also requires the corresponding portion of road serving the bridge to be considered. The Waka Kotahi policy goes on to state "On application, [Waka Kotahi] will consider the eligibility of non-maintenance activities on uneconomic roading facilities for financial assistance on a case by case basis".

Consideration of divestment or retention of these bridge and culvert assets needs to be formalised to provide future direction for asset management and forecast expenditure.

6.3.13 Renewal Works Standards

Replacement bridges are built to modern engineering standards. They are usually constructed of concrete, although steel beams and concrete decks may be considered.

Single lane bridges are replaced with new single lane structures, unless there are known capacity issues or significant future growth forecast. The adopted width for new single lane bridges is 4.2m, which allows for any vehicle that will fit through a standard farm gate.

Two lane bridges are replaced with new structures with two 3.3m wide lanes and a footpath(s) where appropriate. When old bridges are replaced, the new structures are provided with protective railing or sight rails to current standards, regardless of the railings that were present on the previous structure. Bridges with spans of less than 5m or so are generally replaced with large culverts, as these are cheaper; however, in some circumstances resource consent requirements may require construction of a bridge to avoid the impact on a waterway.

6.3.14 Capital Bridge and Culvert Works

New improvement works fall into the following categories:

- Construction of new structures to allow land development or to achieve traffic efficiencies by providing links across significant features (waterways, grade separation – roads under and over, etc.)
- Upgrading of existing structures to carry increased traffic or heavier loads than they were originally designed for
- Provision of new bridges as part of land developments. These are normally fully funded by the site developer.

6.3.15 Development Strategy

The Council will generally only consider constructing a significant new bridge if the project is subsidised by Waka Kotahi.

The total benefits to road users and the land transport system, cost benefit ratios and first year rates of return are all calculated using the economic evaluation procedures found in Waka Kotahi's Economic Evaluation Manual.

If prioritisation is required it will normally be by ranking projects in terms of Waka Kotahi's funding criteria. The Council may contribute to the cost of a non-subsidised bridge on a public road if there are strong reasons why it should be built, and provided the cost to the Council does not exceed its share if the bridge had been subsidised, though the Council may contribute less where there is reduced benefit to the wider public.

New bridges can also be funded through Development Contribution and Financial Contribution levies on new land development and subdivisions. These can be required in situations where a bridge is necessary to improve the roading connectivity between and within new and expanding development areas.

6.3.16 Disposal Plan

Bridges on roads which service single properties may be reviewed for disposal. The Council may decide that bridges identified in any review process for disposal will no longer be maintained by the Council, but will be subject to a legally binding agreement with the adjacent property owner. The Council could decide to either:

- Undertake routine inspections on these bridges, paid for by the adjacent property owner who will be responsible for all maintenance requirements identified, or
- Decommission the bridge to reduce potential Council liability

All relevant costs of disposal will be considered when considering disposal options. These costs may include:

- Evaluation of options
- Consultation / advertising
- Obtaining resource consents
- Professional services, including engineering, planning, legal, survey
- Demolition, site clearing or the cost of making safe

The use of revenue arising from the sale of assets, or the source of funds required to dispose of assets, would be considered by the Council at the time of its consideration of any asset disposal.

A bridge may be disposed of if it is uneconomic, unsafe or becoming so, and it is not in the public interest to maintain it in an appropriate safe condition. Disposal of bridges can be carried out in the following ways:

- Sale
- Gifted
- Demolished and replaced with a concrete ford
- Demolition without replacement

There are no bridges, large culverts or retaining wall assets to be disposed of at this time, but this will need to be reviewed and reassessed during the life of this AMP. Typically a structural asset is not disposed of, although maintenance is stopped. However, the asset is still inspected for defects as a duty of care to the public. An example of this is the bridge on Plantation Road (ID #430) which was vested with NPDC when Waka Kotahi realigned SH3.

6.4 Stormwater Drainage

The purpose of stormwater drainage facilities is to adequately protect the road structure from water related damage, restrict excess runoff onto adjacent properties, keep the carriageway available and safe to traverse in all but extreme rainfall events, delineate the carriageway and provide some aesthetic and safety benefits.

Key issues relating to this asset group are:

- There is a programme in place to install kerbs and channels in some urban areas where there are currently none (e.g. Waitara, Inglewood)
- Other new works programmes (e.g. footpaths) depend on the kerb and channel program
- Installation of kerbs and channels is heavily dependent on the availability of a piped stormwater system, and therefore linked to any improvement programmes for that system, managed by the Three Waters Team
- Maintaining effective rural roadside drainage is important to ensure pavements are well drained and to minimise lifecycle costs for pavements

- Kerbs and channels are installed mainly in urban areas and are easily damaged by cars and heavy vehicles
- Ponding areas in rural areas (stormwater culvert, inlets, outlets)

Open water channels / roadside drains in rural areas are defined as the area between the edge of the pavement shoulder metal-course and the bottom of the 'v' drain or water table. In order to maintain the effectiveness of the rural roadside drainage function this area must be maintained true to cross-section.

Stormwater culverts installed in rural areas and their associated drainage structures such as channels, sumps, headwalls, etc. provide drainage infrastructure for the rural road network. The majority of these stormwater culverts are 300mm to 375mm in diameter, but there are some pipes up to 1m in diameter.

Table 68 shows a summary of the kerb and channel quantities and Table 69 shows the summary of drainage quantities.

Table 68: Summary of Kerb and Channel Quantities

Kerb & Channel Type	Length (m)
Dished Channel (Asphalt)	233
Dished Channel (Concrete)	3,024
Kerb & Channel (Concrete)	532,362
Kerb & Channel (Stone)	1,627
Kerb & Dished Channel (Concrete)	2,025
Kerb Only (Concrete)	13,370
Mountable Kerb & Channel (Concrete)	77,478
Mountable Kerb Only (Concrete)	546
Nib Kerb (Concrete)	7,956
Slot Channel	31

Asset Description	Quantity (No)
Kerb & Channel (Concrete)	493
Mountable Kerb & Channel HD (Concrete)	325
Nib Kerb HD (Concrete)	128
Total	639,598

Table 69: Stormwater asset summary

Asset Description	Quantity (No)	Length (m)
Single Sump	57	147
Double Sump	5	-
Stormwater Culvert (Concrete)	4,202	52,590
Stormwater Culvert (Other)	554	7,923
Drop Chamber	2	-
Flume	48	562
Ford	2	4
Manhole	511	-
Soak Pit	1	-
Subsoil Drain	17	1,365
Total	5,399	62,591

6.4.1 Drainage Asset Condition

Kerb and channel asset condition is based on the All Faults inspection regime. Asset defects are logged and assigned a priority based on the severity of the defect. The Council uses the overall ratings for the whole pavement to derive the condition of kerbs and channels, based on the information used to select sections of pavement for renewal or rehabilitation.

Stormwater culverts and inlets / outlets are inspected during planned and reactive maintenance. A record of observations is compiled to assist or justify further repair works or renewals.

The Council does not formally capture condition ratings on the RAMM asset inventory for kerb and channel assets or stormwater culvert and inlet / outlet assets.

Typical modes of failure for kerbs and channels are:

- Lack of waterproofing – this is the key failure mode as leakage of water into pavement basecourse can accelerate pavement deterioration
- Damage from heavy vehicles – kerbs can be subjected to heavy vehicle loads, particularly at changes in alignment (e.g. intersections)
- Ponding – channels may not perform adequately due to inadequate grade. This can be caused by settlement of the subgrade or the adjacent pavement.
- Deterioration arising from weak materials and / or construction deficiencies – use of weak or non-compatible aggregates may results in reduced expected lives. Similarly, poorly constructed concrete kerbs and channels have typically shorter lives than well-constructed ones.

For rural assets the primary modes of failure for other drainage facilities are:

- Blockage or material failure of stormwater culverts causing ponding of stormwater and overflow over land or roads, resulting in scour and other damage
- Accumulation of vegetation, detritus and other material in water channels. A key challenge is the loss of depth affecting the ability to remove and keep water below the pavement sub-grade level.

6.4.2 Operations and Maintenance Plan

Urban
In urban areas, maintenance of kerbs and channels, and sumps is part of the Term Services Contract. Street cleaning is also an activity included in the contract. The function of the road determines the Level of Service. For example, a CBD will have a higher frequency of cleaning for aesthetic purposes.

Maintenance activities include repairing minor breakages and defects, and replacing some short lengths of kerb and channel.

Rural
In rural areas, both stormwater culverts and water tables are maintained under the Road Maintenance Contract. This includes checking and cleaning stormwater culverts, minor repairs, vegetation control and other activities to ensure that water tables are kept clean and function effectively.

Water Channels
In past years the Council has heavily invested in establishing effective rural roadside drains. With this work being substantially complete, it needs to ensure that the function of water channels is protected through cost effective maintenance.

Maintenance needs of water channels are defined in the 'A Maintenance Strategy for Rural Roadside Drains – March 2007', which recommends a method based approach. This involves mowing and total vegetation control using chemical spraying on the bottom of roadside drains on a cyclic basis, combined with targeted cleaning on a needs only basis. A key environmental issue that has arisen in recent years is the establishment of noxious weeds. An increased amount of spraying is required to maintain these table drains. Changes to the spraying of table drains will be made over the course of this AMP to address these issues.

Stormwater Culverts
NPDC maintain stormwater culverts as part of reactive maintenance; however, condition inspections as part of the Road Maintenance Contract also allow maintenance items to be planned where necessary.

To ensure the network condition is safe, fit-for-purpose and meets customer satisfaction targets, the Council will need to continue to maintain stormwater drainage at the same level as the approved 2018-21 NLTP budgets but make provision for increased costs to address environmental issues during the 2021-24 NLTP and beyond. The proposed 2021-24 NLTP values and the 10 year inflated forecast for expenditure on drainage maintenance are shown in **Section 7: Financial Forecasts** of this AMP.

6.4.3 Renewal and Capital Works

Urban

Most kerb and channel renewals are coordinated with the resealing programme. Kerbs and channels are relatively young (about 50 years) and most of the stock has not yet reached the end of one cycle.

Approximately 2km of kerb and channel is renewed per year and the following observations have been made:

- Because the stock is relatively young, the length of kerb and channel failing per year is relatively low. As the stock ages it is anticipated that the lengths requiring replacement per year will increase.

- The assumed effective life for these assets may be too short. Some local authorities in the North Island assume effective lives of 100 years, which is longer than NPDC's 70-80 years. However, it is important that failure modes are compared as well. NPDC will continue to review the effective life assumptions as more data becomes available.

Rural

Until NPDC has condition ratings for all stormwater culverts, it is difficult to give an accurate prediction of renewal requirements. Currently, the Council replaces stormwater culverts that have deteriorated to such an extent that they will adversely affect the integrity of the road. To date only stormwater culverts larger than 1.2m diameter have been condition rated and it is envisaged that several large diameter stormwater culverts (0.9-1.2m diameter) will need to be renewed up to 2021/22.

The Council reforms roadside drains when necessary, as identified through routine inspections.

As surface water channels and other drainage facilities continue to age, more investment in renewal may be required in order to maintain current reliability levels. There will be a greater understanding once the drainage inspections are completed.

To keep up with the planned rate of pavement renewals and allow sufficient expenditure to keep stormwater culvert assets safe and fit for purpose, the Council will need to continue to renew stormwater culverts and kerb and channel assets at similar rates to the 2018-21 NLTP. This will allow sufficient expenditure for kerb and channel renewal.

New assets installed by developers to serve new developments are usually vested in NPDC. Assets are built to the NZS4404:2010 – Land Development and Subdivision Standard. The Council assumes full responsibility for any assets vested in it and they are included in operations, maintenance and future renewal plans.

6.4.4 Disposal Plan

NPDC do not anticipate any drainage asset disposals over the period of this AMP.

6.5 Traffic Services

Traffic services aid the safe and orderly movement of vehicular and pedestrian traffic, and indicate road use restrictions and other information. A good standard of traffic services can contribute significantly to a safer transportation network. In particular, street lighting provides agreed lighting levels in streets for the safe and efficient movement of vehicles, cyclists and pedestrians as per standard 'M30 - Specification and Guidelines for Road Lighting Design'.

Traffic signs provide guidance, delineation, warning, direction and information that is easy to see and understand and contributes to the safety and efficiency of the roading system. For convenience, EMPs and sight and guardrails are included in this category, as both also provide information to road users (as well as protection in the case of guardrails).

The key issues relating to traffic signs are:

- Traffic signs are relatively low cost but high visibility / high risk asset group. Their consistency and effectiveness can greatly affect driver behaviour.
- Vegetation, street furniture and other obstructions can impair the visibility of signs
- Sign information is stored in RAMM
- Excessive signage can create confusion and visual pollution
- The cleanliness and visibility of EMPs

Traffic facilities aid safe and orderly movement of traffic and contribute to the safety and efficiency of the roading system. Road markings include all measures applied or attached to the road surface to guide and regulate the movement of traffic. This includes various paint types and adhesive materials as well as RRPMs.

The key issues relating to traffic facilities are:

- Quality of markings, quality control of painted marking thickness
- The need for consistent delineation of cycleways (refer to New Plymouth Cycle Strategy 2007 and Waka Kotahi's Manual of Traffic Signs and Markings)

- Maintaining minimum visibility / reflectivity

Traffic signals provide traffic control facilities at major road intersections to reduce the potential for crashes and optimise the flow of traffic. They also regulate, guide and warn traffic including pedestrians. Their effectiveness depends on their design, maintenance, and construction. It also depends on effective coordination between signals if connected to the Sydney Coordinated Adaptive Traffic System (SCATS) and correct interpretation and timely reactions by road users. SCATS is an adaptive urban traffic management system that synchronises traffic signals to optimise traffic flow across a whole city, region or corridor.

Traffic signals are 'active' assets in that as well as maintenance and renewal, they require proactive management and operation.

The key issues relating to traffic signals are:

- Selecting appropriate intersections for operating traffic signals in a way that minimises long term costs and maintains the stated Level of Service
- Considering other appropriate treatment options which may be cheaper to operate but can deliver similar key road user benefits (e.g. safety)
- Most are State Highway traffic signals, owned by Waka Kotahi and managed by NPDC
- Coordination between signals to achieve minimum total system delays and safety objectives
- Facilitating the impact of the right hand rule change e.g. two intersections were provided with right turn arrows to alleviate the backing up of traffic

Street lighting provides ambient illuminance levels on streets for safe and efficient movement of vehicles, cycles and pedestrians and contributes to general security.

The key issues relating to street lights are:

- Reviewing lighting type to achieve efficiency and energy savings whilst providing an acceptable Level of Service and embracing new technology where supported by a business case
- The desire for continuous and reliable under-veranda lighting in the CBD and for similar lighting to be applied to Inglewood and Waitara CBD areas. The need for lighting consistency, especially at intersections.

As noted earlier, a description of assets is included in Section 1: Introduction of this AMP. A more detailed description of the traffic services assets is below:

Traffic signs

Signs contain a variety of information including:

- Regulation instructions that road users are required to obey
- Warnings of temporary or permanent hazards which may not be self-evident
- Directions and distances to destinations

- An indication of road user services and tourist features / establishments
- Other information of general interest to road users

Table 70 shows a summary of the type and number of signs in the district.

Table 70: Summary of Sign Quantities

Sign Type	Number
Guide	145
Hazard Markings	1,198
Information General	80
Information Miscellaneous	300
Information signs (street name signs)	3,170
Local Authority	76
Miscellaneous	14
Motorist Services	87
Permanent Warning	2.240
Regulatory General	2,407
Regulatory Heavy Vehicle	28
Regulatory Parking	1,520
Tourist	88

Sign Type	Number
Warning Miscellaneous	6
Total	11,359

Traffic facilities

Materials used for traffic facilities include:

- Waterborne and chlorinated rubber paints
- Raised RRPMs
- Thermoplastic road markings
- EMPs

The transportation network has 462km of road markings and 1,320 RRPMs. Types of markings on the network are shown in Table 71.

Table 71: Types of markings on the transportation network

Non-intersection markings	Intersection markings	Miscellaneous markings
• Centre lines and lane lines	• Centre lines / edge lines / lane lines	• Messages and symbols
• Edge lines and shoulder markings	• Lane arrows	• Pedestrian crossings
• No overtaking lines / passing lines	• Wait lines / continuity lines	• Railway level crossings
• Median markings	• Cycle lanes	• Raised pavement markers
• Cycle lanes with green surface	• Border lines / diagonal lines	• Speed humps
• Parking demarcation areas including blue surface for disability parks	• No stopping lines	
• Bus stops		
• No stopping lines		

To delineate rural roads EMPs made of plastic or similar flexible material are used. All components must be able to resist the weather and seasonal effects of the climate and be able to re-stand after being run over by a vehicle.

TNZ P/14 is the specification from Waka Kotahi for the installation of reflectorised pavement markers.

To highlight traffic lanes and improve safety, RRPMs have been installed on many urban Arterial and Collector

roads, especially in areas with substantial volumes of traffic. RRPM installation has also been generated through the Minor Improvements programme. RRPMs are also used on key rural roads (Arterials and key Collector roads) with annual average daily traffic counts greater than 1,000 (in accordance with the 'Road and Traffic Standards 5 – Delineation for Rural Roads' (RTS 5)).

Speed humps prevent speeding in certain road sections that require slow driving speeds and restrict the entrance of cars to residential areas or school districts. They are mainly installed in urban areas near schools, kindergartens, children's playgrounds, neighbourhood parks, housing complexes and shopping facilities. The primary purpose of traffic islands and speed humps is to improve flow of traffic, reducing the number of conflict points and reducing vehicle speeds.

Sight rails are generally constructed of light timber and painted white, sight rails have traditionally been used to highlight hazards such as curves, bridges, culverts, intersections and under slips. Using sight rails to protect road users against higher risk roadside hazards such as bridge abutments and steep banks is generally strongly discouraged. At these sites, a guardrail or other recognised barrier is appropriate.

The number of other traffic facilities components are shown in Table 72.

Table 72: Summary of Traffic Facility Quantities

Component	Count
EMPs	4,695 No
RRPMs	1,320 No
Safety Devices (Railings)	15,547m
Speed Humps	34 No
Traffic Islands	7,118m2

There is no inventory of EMPs in RAMM; however, the 2016 valuation valued 4,695 EMPs. There are 1,320 RRPMs in RAMM while the 2016 valuation had 8,819 RRPMs. This will need to be investigated and is identified in the Improvement Plan in **Section 9: Improvement Plan** of this AMP.

Traffic signals

NPDC operates traffic signals at 25 (urban) locations, six of which are the Council's installations. The remaining 19 are State Highway installations, located at intersections, and are managed by the Council on behalf of Waka Kotahi. As noted above, the Council operates the SCATS to coordinate multiple sets of traffic signals. The system consists of controllers, poles, lanterns, detectors in the pavement, pedestrian pushbuttons and assorted cabling. Currently 22 out of 25 intersections are linked to the SCATS.

Street lighting

There are 8,652 lanterns and 3,927 poles in the district. Lighting for roads has three categories, namely carriageway, amenity and flag lighting. For safety reasons standalone lighting is usually on high poles. Further information is below:

- NPDC own all standalone poles
- Poles that also carry power lines are owned by Powerco
- Waka Kotahi installs and owns the lights on State Highways. NPDC arranges maintenance and power supply which is paid for by Waka Kotahi.

Amenity lighting in the roading context includes:

- Under-veranda lighting
- Any other lighting not directly related to the operation of those roads (e.g. up lighting for street trees, Festival of Lights etc.)
- Around 4,522 lanterns are attached to poles owned by others (predominantly Powerco). Therefore, these assets are influenced by the undergrounding strategies of others, and could require NPDC to provide new poles in the future.
- Additional to the street lighting, there are 95 lights for the TSB Festival of Lights within the roading corridor

6.5.1 Traffic Services Capacity / Performance

Performance issues for Traffic Services assets in the district generally relate to the accuracy of placement, visibility, reflectivity and conformity with standards.

Street light capacity and performance issues relate to light intensity, colour, reliability, safety and the areas of the urban areas covered. Major rural intersections may also be lit for safety purposes.

6.5.2 Traffic Services Standards

The Council has adopted the standards and specifications of Waka Kotahi's Manual of Traffic Signs and Markings. Technological improvements in retro-reflective traffic control materials are constantly evolving and are investigated and applied where appropriate.

Delineation standards for rural roads are described in RTS 5. The publication is intended to reduce the disparity between rural State Highways and Local rural roads by ensuring that motorists receive the appropriate visual guidance to achieve an improved level of safety.

The importance of the road routes and their traffic volumes are the main factors which should determine the level of road markings and delineation devices in rural areas.

NPDC currently uses the guidelines for new installations and road improvement works. A review of the current level of delineation on rural roads has been completed and shows the network fails to meet the guidelines in some delineation aspects and a programme will be implemented to address this over the duration of this AMP.

The adopted street lighting technical standard is AS/NZS 1158:2015, with V3 standard on roads designated Arterial in the District Plan and P3 on other roads within 50km/h areas in urban areas. These set out requirements for lighting systems, primarily to provide a safe and comfortable visual environment for both vehicular and pedestrian movement at night.

The lighting categories are broadly defined as follows:
Category V lighting (vehicles):

- Lighting which is applicable to roads on which the visual requirements of motorists are dominant, e.g. traffic routes
- Subcategories range from V1 to V5
- Subcategories V3 is appropriate for urban Arterial roads because it has the following operating characteristics:
  – Mixed vehicle and pedestrian traffic
  – Moderate to high vehicle volume
  – High pedestrian volume
  – Moderate to low vehicle speeds
  – Stationary vehicles alongside the carriageway
  – Through and local traffic
  – Moderate traffic generation from abutting properties

Category P lighting (pedestrian):

- Lighting which is applicable to roads on which the visual requirements of pedestrians are dominant
- Subcategories range from P1 to P12
- Subcategory P3 is appropriate for urban Collector and Local roads that have basic operating characteristics of mixed vehicle and pedestrian traffic and has selection criteria for pedestrian / cycle activity, risk of crime and need to enhance prestige

6.5.3 Street Lighting LED Technology

NPDC has completed a LED upgrade programme, except for a few lights on Tukapa Street that have bespoke light columns for which a suitable LED lantern is not available. The HPS lights will remain until such time as the streetscape is upgraded.

It is generally accepted by both Waka Kotahi and the EECA that LED lighting is the superior technology. The application of LED lighting is proving to be the lowest whole of life cost lighting option in almost all situations – both for new and renewal of existing installations.
The current condition of street lighting is considered good as the majority of bulbs on the network have been replaced in the last NLTP. There are a few exceptions along Tukapa Road (New Plymouth), Mclean Street (Waitara) and SH3 (Inglewood) where the bulbs are not currently compatible with the poles.

6.5.4 Operations and Maintenance Plan

Traffic services maintenance includes the maintenance of sight / guardrails and specifies:

- Minimum maintenance standards
- Frequency of routine inspections
- Response times to correct defects

Problems with signs are routinely reported by the public, staff and elected members. These are passed on to the contractor for action via the All Faults system.

Many sites and routes have had improvements to road markings, signage and railings over the last few years, which have been triggered by crash reduction studies, roading improvements and in response to public concerns and requests.

From a maintenance allocation perspective, funding for these assets is covered by the Waka Kotahi WC 122 – Traffic Services Maintenance.

6.5.5 Traffic Signals

The maintenance strategy for traffic signals can be described as one of "scheduled preventive maintenance". Programmed inspections at 13 / 26 / 52 weekly cyclic intervals are undertaken by the contractor, following clearly defined checks of components and scheduled replacement of lamps. The contractor is required to have on hand a ready supply and availability of consumable items.

A 24 hour, seven day a week emergency repair and accident callout response is required of the contractor. On-site attendance is within one hour of notification and temporary repair is initiated within 24 hours.

All the signals in the district including the State Highways utilise the SCATS and are managed by the Wellington Traffic Operations Centre.

6.5.6 Street Light Maintenance

All lights, brackets and poles have been maintained under contract 15RM03 which terminates in June 2021. This includes the lights on State Highways administered by Waka Kotahi for economy and efficiency reasons, as they are all essentially on the one network. Waka Kotahi reimburses the Council with the cost of maintaining and operating these lights on its behalf.

Moving forward there are two options being considered to replace 15RM03, including another standalone contract similar to 15RM03 or to bring this service inside the Term Services Contract. At the time of preparing this AMP a decision had not been reached on the delivery mechanism.

Operations and maintenance activities and costs include:

- Power costs
- Planned maintenance inspections.
- Repairing / replacing damaged or unsound components, e.g. lanterns, control gear, poles
- Planned bulk bulb replacement and structural defects

Historically the maintenance regime has been to replace bulbs at failure instead of a bulk replacement of similar bulbs in an area. Following the upgrade to LED lights this may have to be reviewed as the long term performance of the LEDs is determined.

The contractor is required to carry out a range of works and other functions including:

- Receiving and responding to complaints, either directly or via the Council's Service Request System
- Maintaining the RAMM Street Light Database
- Carrying out inspections and repairing faults and failures identified

- Replacing lamps
- Repairing and maintaining light fittings and poles
- Straightening poles and support arms
- Carrying out replacement programmes e.g. bulk changes of fluorescent lights
- Installing new lights

The street light network is inspected by the street lighting maintenance contractor for outages and damage at no less than monthly intervals. Inspection from a vehicle often suffices in ensuring that each individual lantern is operating in accordance with the lantern specification and that no pole is in danger of collapse.

To ensure safety to the public and continued security of the lanterns and columns the contractor undertakes a close personal inspection once every three months to:

- Visually inspect each column
- Visually check to ensure that covers for the control gear and / or housing at column bases are in place
- Visually inspect the rigidity of column / base bolting / securing system
- Visually check the ready readability of any column numbering
- Check for any suspected vandalism

Once yearly checks of control and switching equipment is completed for electrical safety, including earthing of the installation equipment. The contractor is required to attend to faults and inoperative lights within the response times specified in the contract specification.

Programming requirements for the street lighting contract includes providing:

- Details of routine inspections
- Details of planned bulk replacement of lamps
- Details of planned remedial or replacement work
- Allowances for unplanned remedial work to meet response time requirements

Faulty, accident damaged or vandalised lanterns, lamps, control gear columns and associated equipment will be repaired on demand and within the specified response timeframes.

The street lighting maintenance contractor is not responsible for the supply of the electricity necessary to run the lights. The majority of the lights are on ripple control switches and power consumption is simply a function of the number of lights multiplied by the duration they are operating times a unit rate. There are number of flag lights and some lights in Tongaporutu, in northern Taranaki that are billed separately from meters, due to their distance from any significant street light circuits and a different supplier.

The Council seeks to recover the cost of accident damage from those responsible, usually following Police advice. On average three street light poles are hit each month by vehicles.

6.5.7 Maintenance and Renewal Standards

All signs are designed, located and maintained according to the following standards:

- Waka Kotahi's Manual of Traffic Signs and Markings - Part 1. Traffic Signs
- Waka Kotahi Specification P/16: Road Markers
- Waka Kotahi Specification M/14 1991: Marker Posts
- Waka Kotahi Specification P/12: Paint Application - Signs
- NZS 5414:1977 Specification for Construction of Traffic Signs
- The Electricity Act 1992 and Amendments
- The Electricity Regulations 1993 and Amendments
- The Contract Specification, Contract 15RM03 Street Light Maintenance
- The relevant NZ and Australian Standards

Additional and more detailed standards are specified in the various physical works contracts. For example, all paints used for pavement markings meet the requirements of Waka Kotahi's Specification M/7. This includes the notes, which are in accordance with Waka Kotahi's Manual of Traffic Signs and Marking: Part II. Further:

- Waterborne road marking paint is used in the district
- Raised pavement markers meet the requirements of Waka Kotahi's Specification M/12 including the notes

6.5.8 Renewal and Capital Works

Traffic Signs
Traffic signs are renewed on a corrective basis. This means that although renewals are not planned on a large scale, their renewal is carried out when they fail to meet the standards in the MIS. The term corrective is used to emphasise that the Council has sufficient mitigation strategies and response times to prevent this being a risk to public safety.

The triggers for renewal works include:

- Replacement of obsolete, damaged, substandard and non-conforming signs identified during routine inspections

- Renewals are undertaken according to the following priority:
  - Public safety
  - Traffic volumes
  - Convenience of road users

- The condition of the asset

- The economic / useful lives of the materials used

Traffic Facilities
Road markings are refreshed to maintain condition and performance. Due to the advancements in paint technology the Council undertakes remarking at two yearly intervals.

Critical markings, including ‘Stop’ and ‘Give Ways’, are marked annually as well as roads that have recently been resurfaced. A move to thermoplastic road marking has reduced overall life costs of road markings - although there is an increase in cost of paint, there is a large saving in traffic management as crews do not need to remark roads as frequently.

6.5.9 Traffic Signals

The process outlined in priority order for selection for renewal works on traffic signals is below:

Site Condition Rating
Traffic signal sites are visually checked every six months and condition rated every 12 months with the routine maintenance rounds.

6.5.10 Lanterns

Technology advances have meant that older incandescent and Quartz Halogen lanterns are now not available. Quartz Halogen and incandescent sites require regular changes of lamps to ensure failures are minimised.

Quartz Halogen and incandescent lamps are typically older and are condition rated accordingly but any sites with these lanterns should be programmed for renewals to LED so that maintenance and power cost benefits are achieved.

6.5.11 Associated Projects

If there are associated projects proposed then it is of benefit to include traffic signal renewal within them i.e. if there are proposed integrated transport projects that intend to modify an existing intersection then incorporation of the traffic signals should be included. This could also mean the funding for potential upgrade work could come from capital budgets.

6.5.12 Reliability and Customer Requests

Usually a component of a traffic signal can be replaced which may resolve a fault; however, sometimes this is not the case and a technician may need to repeatedly visit a site to carry out repairs. These ongoing faults can cause repetitive customer requests / complaints. A renewal of either the controller or the entire site should be considered if this is the case.

6.5.13 Street Lighting

Asset renewal replacements are undertaken when a street light or a significant component of a light has reached the end of its economic life, e.g. lantern, brackets or pole. Renewals are reviewed regularly, with any deferred work reprioritised alongside new renewal projects and a revised programme is established where required.

6.5.14 Street Lighting Capital Works Plan

Street lights are typically acquired or upgraded in the following circumstances:

- When new lights are provided by the Council where no street lights previously existed
- When the Council's street lights are installed and vested in the Council as part of a new urban subdivision
- Through work to meet the Level of Service arising from:
  - Improvements in association with a street upgrading programme
  - Safety improvements
  - Improvements in association with undergrounding of overhead utility reticulation

The Council does not have plans to improve the existing street lighting other than in conjunction with other safety works. These works will be paid from the Low Cost Low Risk programme.

6.5.15 Street Lighting Renewal Works Standards

When a number of adjacent lights are renewed at the same time, the installation is designed to the new lighting standards appropriate for that street. The new lanterns and poles are also required, where practicable, to be generally complementary in style and light colour with adjacent streets.

When individual light fittings are renewed, the new fitting is usually the most appropriate modern engineering equivalent of the failed fitting. Replacement poles will be lightweight galvanised sectional-steel poles (e.g. Octlite) of appropriate height. Exceptions to both of these practices occur when the adjacent poles are of a decorative type, in which case appropriate decorative poles and luminaries are used.

6.6 Footpaths and Cycleways

The purpose of **footpaths** is to provide a safe and effective network, catering for the transportation and recreation purposes of pedestrians (and associated contrivances which are not vehicles).

Pedestrian access ways provide a safe, convenient and defined means for pedestrian movement alongside and linking roadways. (Note: Pedestrian access ways within parks and reserves are not considered in this volume because they form part of the Parks and Open Spaces asset base (see the Parks and Open Spaces AMP).

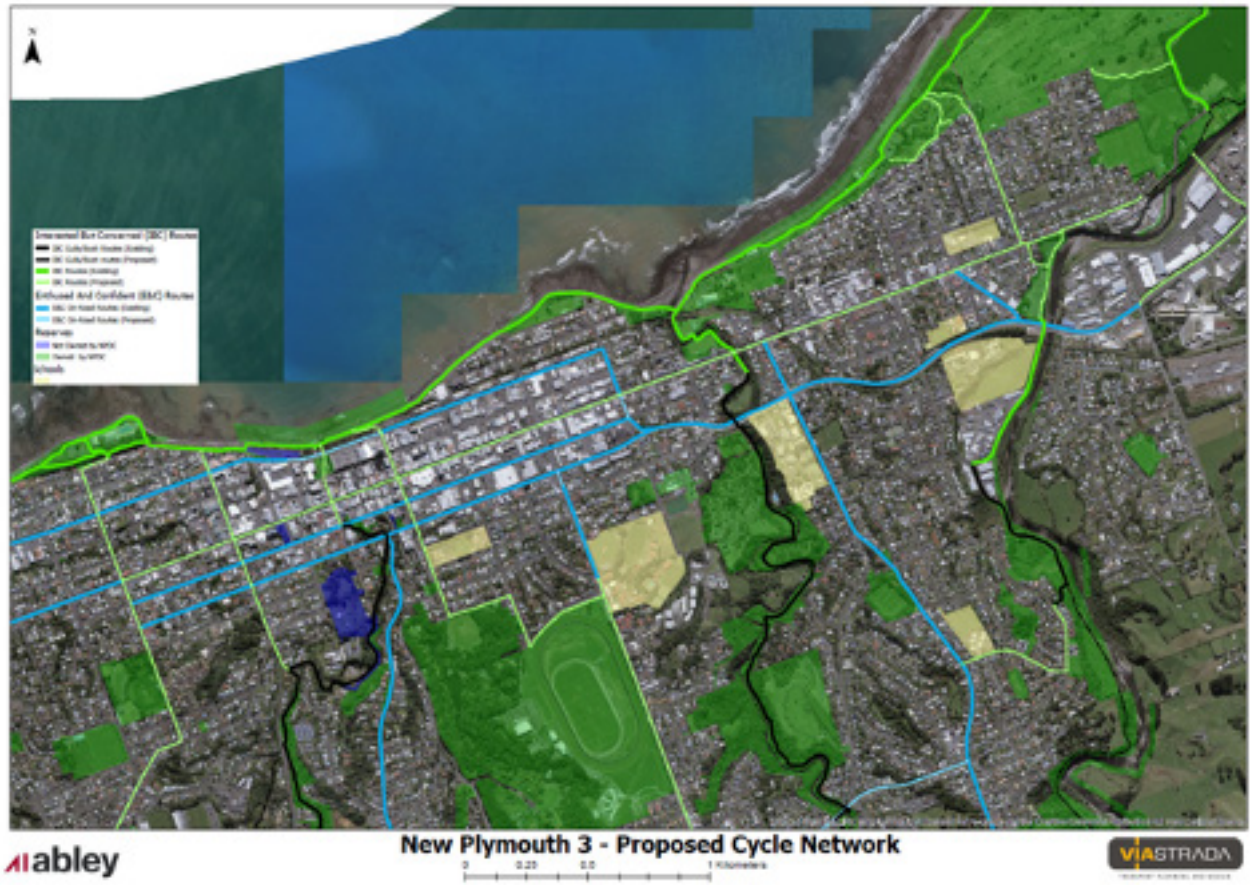
The key issues related to footpaths and pedestrian access ways are:

- Safety of pedestrians
- Identifying and prioritising routes for accessibility
- Urban character and streetscape design
- Increased public expectations over time creating greater demand for network extension and higher quality footpaths. The aging population is a factor in this.
- Potential improvements in Levels of Service as a direct result of NPDC's Accessibility Strategy
- Direct relationship with New Plymouth being one of Waka Kotahi's two model walking and cycling communities in NZ

The purpose of **cycleways** is to provide an efficient and safe network of cycle lanes and facilities to encourage the use of cycles as a viable mode of transport within the road corridor.

In 2000, the New Plymouth Cycle Facilities Review, led to adoption of the initial Cycle Strategy in 2003, which was updated in 2007. This has since been superseded by the Model Communities for Walking and Cycling project (Let's Go). In 2019 NPDC engaged consultants to undertake a review of the local cycling network. This has outlined recommendations for improvements for New Plymouth, Bell Block, Waitara and Inglewood. **Figure 96** shows the proposed cycle network plan. Currently the only record in the RAMM database of the cycle network is based on the road markings. An action is included in **Section 9: Improvement Plan** of this AMP for the creation of a User Defined Table to capture data on the entire cycle network, not just what is on the carriageways.

Figure 96: New Plymouth proposed cycle network



Key issues relating to cycleways are:

- Continuity of cycle lanes throughout the cycleways network as they are quite disjointed near intersections and carriageway pinch points
- Cycleways being obstructed by planter boxes, kerb extensions and vehicles
- Rural cycling circuits with insufficient width, large size chip seals etc., which can make cycling difficult and hazardous
- Development of off-road cycleways as part of the network
- Provision of appropriate space on specific rural cycling circuits
- Clearing of detritus from cycleways
- Cycling promotion and education including travel planning and skills training

Urban road berms provide a buffer space between carriageway, drainage, footpaths and property for safety, amenity and drainage. This space is also used for installing utilities and street furniture. Typically rural road berms provide a buffer space between the carriageway shoulder and the property boundary for drainage and enable vehicles to stop safely off the road in emergencies.

The details of the footpath network are provided in **Table 73**.

Table 73: Summary of Footpath Quantities

	Material	Quantity
Footpaths	Concrete	579,107m2
	Seal/Asphalt	261,215m2
	Other	19,684m2

Initially, all concrete footpaths constructed were between 50mm and 75mm thick. Current requirements are that footpaths are constructed to be 100mm thick and 1.5m wide, with a 2% cross-fall. In general, footpaths in residential areas are constructed from concrete while those in commercial areas are constructed from seal or asphalt.

6.6.1 Vehicle Crossings

Urban vehicle crossings are installed at the cost of the property owner and may only be installed by an approved contractor. An urban crossing from the roadway to the property boundary will be approved if it allows good vehicle access without detrimentally affecting the road, drainage, or footpath.

6.6.2 Cycleways and Pedestrian Access Ways

The Council promotes cycling, walking and public transport as alternative modes of transport in the district to optimise the network and support sustainability, reducing reliance on fossil fuels and limiting carbon emissions. This is coupled with wanting to improve public spaces, where the urban built environment is focused on people rather than motor vehicles. To support this, the Council is developing a comprehensive path / cycleway network within and between urban settlements in the district.

Currently, the relative mass difference is weighted in favour of motor vehicles, with cyclists and pedestrians disadvantaged when competing for the same commute space. To alleviate this conflict, the Council foresees some key components of the ultimate network eventually becoming off road, either as separate cycleways within the road reserve, or as paths / walkways within reserves. Future works is captured by the Low Cost Low Risk programme identified in **Section 5: Programme Business Case** of this AMP. As such, future management issues will have to be resolved. Existing walkways and pathways in reserves are managed by the Parks and Open Spaces team (see the Parks and Open Spaces AMP).

Most designated cycleways are currently in the New Plymouth urban boundary and are demarcated on road carriageways. In some instances, the footpath is designated for shared use with cycles (outside New Plymouth Girls High School and the Shared Pathway network). The Shared Pathway Network is managed by the Parks and Open Spaces Team.

6.6.3 Capacity / Performance

Future demand and growth in the district is addressed in the documents 'Keeping New Plymouth Moving and Growing' and the 'New Plymouth Urban Cycle Strategy'. These reports include ILM, problem statements, benefits and investment KPIs for growth.

6.6.4 Footpath Standards

The related legislation, codes and standards include:

- Waka Kotahi's Pedestrian planning and design guide
- NZS4404:2010 Land development and subdivision infrastructure

Footpath Asset Condition

The Council assesses the condition of all footpaths during ratings surveys conducted on the roading network. The overall condition rating is determined by identifying the faults (settlements, bumps, depressions, cracks, scabbing, patches, vegetation, multiple breaks etc.) within the rated lengths of footpath. Where a section of footpath within a longer section is deemed to be in extremely poor condition, the entire section is designated as 'failed'.

The condition of the footpath assets based on the latest condition assessments is shown in **Table 74**.

Table 74: Condition grading by length

Condition Rating	Length (m)	% by condition
1	209,268	39.7
2	251,158	47.7
3	59,785	11.4

Condition Rating	Length (m)	% by condition
4	6,337	1.2
5	104	0.0
Unknown	87	0.0
Total	526,739	100

As shown in **Table 72**, 87.4% of the network is in 'good' condition or better (grades 1 and 2) while 1.2% of the footpath network is classified as 'failed' (grade 4). The footpath condition assessment includes the associated steps and crossings.

The Council assesses the condition of cycle lanes that form part of the pavement assets at the same time as the pavement surface is assessed. Results are recorded in the Pavement section (**Section 6.2**) of this AMP.

6.7 Operations and Maintenance Plan

6.7.1 Footpath and Cycleway Maintenance

The overall maintenance strategy for footpaths and cycleways is to retain their integrity and to promptly repair defects that are hazardous. For example, the Council may replace, relay, or repair sections to prevent the defect from tripping a pedestrian.

Service delivery is performed under the Term Services Contract. The major work activities are:

- General maintenance – retain the integrity of the footpath by carrying out repairs such as patching of failed areas, levelling, tree root damage, sunken trenches, cracked areas, etc.
- Damage repairs – carry out footpath repairs where the damage is attributed to others and can be recovered (e.g. building contractors)
- Pre-seal patching – pre-sealing maintenance work on sealed footpaths, including patching and smoothing, typically on a 16-17 year cycle to match resealing operation

Note: The operation and maintenance of cycle lanes forming part of the pavement assets is included in the Pavements section (**Section 5.2**) of this AMP.

The Council has installed a number of combined walk / cycle paths and facilities as part of the 'Let's Go' programme that now require operation, maintenance and minor components of renewal.

Maintenance Standards

Technical and material standards for maintenance works generally align with pavements works. Care is required to avoid creating issues caused by tracking of bituminous products or loose chip on footpaths and cycleways. To overcome these issues, concrete or asphaltic concrete is the preferred option.

6.7.2 Renewal and Capital Works

Renewal Works Plan

Whilst on a purely financial basis the use of concrete is the most cost effective on a whole-of-life basis, in some circumstances there are other non-financial drivers. Other factors to consider include the level of desired amenity and appearance, and the location and growth of tree roots. Footpath renewals are specified on the following basis:

- High amenity areas such as CBDs – Bluestone, Clay Pavers or Concrete with 4% of black oxide and exposed aggregate
- Areas around trees where future growth could displace footpath construction - asphalt
- All other areas – concrete with a broom finish

All renewals will be in line with NZS4404:2010.
The work activities for concrete and sealed footpaths are:

- Footpath renewals – replace the footpath including excavation and renewal of the footpath structure itself

The Council develops the renewals programme using the data obtained from regular condition inspections. Following an annual data review, an annual programme is produced based on the overall expenditure levels defined in the renewal strategy (reference: ECM#7108907 – Asphaltic Concrete and Concrete Footpath Resurfacing Options). This document sets the required annual expenditure for footpath maintenance and renewal at approximately $560,000 per annum. This will allow approximately 10,000m2 per year (1.2%) to be renewed, which is sufficient to meet the defined Level of Service for footpath condition and to progressively phase out sealed and slurry footpath surfaces.

Renewal of footpath vehicle crossings is included as part of the footpath renewals programme. While vehicle crossings technically belong to the property owner they serve, it is often very difficult or impossible to get the owner to fund the crossing during renewal of the adjacent footpath. Failing to renew the vehicle crossing could have a detrimental effect on the newly formed footpath or create a low amenity match if the vehicle crossing is in a poor condition or non-matching material. Therefore, a provision in the renewal strategy has been included to renew vehicle crossings when renewing footpaths.

6.7.3 Capital Works Plan

The most significant drivers to the acquisition of new footpath and cycleway assets include:

- Council shared pathway strategies (cycling and walking)
- New paths being constructed by the Council where no path previously existed
- New footpaths being vested with the Council from new urban subdivisions by private developers
- Upgrading to improve the Level of Service, particularly in relation to special or superior treatment from that which previously existed prior to the upgrade

As previously noted, new assets installed by developers to serve new domestic and non-domestic developments are usually vested in the Council. Assets are built to the NZS4404:2010 – Land Development and Subdivision Standard. NPDC's specific requirements are defined in the NPDC, SDC and STDC adopted standard for Land Development and Subdivision Infrastructure, which is based on NZS4404:2010 with local amendments. NPDC assumes full responsibility for any assets vested with the Council and includes them in operations, maintenance and future renewal plans.

6.7.4 Renewal and Capital Works Standards

Renewal and capital works comply with the standards for new works using the NPDC engineering standards relating to shared pathways and footpaths.

6.7.5 Disposal Plan

The Council does not anticipate any asset disposals over the period of this AMP.

6.8 Environmental and Emergency Works

6.8.1 Environmental Maintenance

Environmental maintenance is defined as those activities that provide for the routine care and attention of the road corridor to maintain safety, aesthetics and environmental standards.

Examples of activities currently undertaken by the Term Services Contract include:

- Vegetation control (spraying, roadside mowing and general vegetation control)
- Removal of minor slips, litter and other loose debris accumulating on roads
- Clearing vehicle accident debris and spillages
- Road sweeping / cleaning
- Fish passages maintenance/installation
- Rip rap maintenance/installation
- Stock effluent facility material transfer

One of the keys issues related to environmental (and emergency) works is related to the lack of data, specifically around fish passage and rip rap sites. Further information for some of these activities is provided below.

6.8.2 Slip and Debris Removal

The northern and eastern areas of the New Plymouth rural road network is constructed in high relief topography which passes through steep sided cuttings commonly affected by high rainfall. The combination of steep topography and high rainfall can at times lead to a large number of underslips / overslips which heavily influences the high rural maintenance cost. Localised high intensity rainfall events can also cause waterways to rise rapidly. An example of this being Okau Road in the Clifton Ward, where the river causes significant damage to existing infrastructure during flood events. This is evidenced by the high maintenance cost of this road.

Harvesting of trees for forestry operations can often lead to unstable hillsides which contribute to slips and accumulation of debris in drainage assets.

The expense generated in maintaining safe travel for road users and ensuring drainage structures and water table drains are clear is significant and difficult to forecast from one year to the next. This is a critical preventative activity that can greatly reduce the cost of repairs to other transportation assets such as pavements, retaining walls or bridges.

6.8.3 Spraying

Spraying roadside vegetation is undertaken on sealed and unsealed roads and specifically at inverts of roadside drains, bridges, culvert headwalls, sight rails, EMPs, kerb and channel and traffic signs.
The vegetation is sprayed using approved chemicals where it is:

- Obscuring abutments, headwalls, signs etc.
- Affecting the functioning of the kerb and channel and sumps etc.
- Affecting the aesthetics of the streetscape

If a member of the public does not wish to have the outside of their property sprayed, they can be added to a no spray list which is recorded in the Council's GIS database.

Pest plants on the network are routinely identified and programmed for spraying in the appropriate season, examples include: Gorse, Agapanthus, and self-seeded pine trees.

YBG is becoming an increasing problem on the transportation network and various trials are being undertaken and planned to ensure it is managed during its growth periods. YBG is currently not listed as a pest

plant by TRC but work is underway across the region to coordinate a regional approach. The onset of YBG has led to an increase in drainage maintenance expenditure as disposal sites for roadside vegetation accumulation are becoming more difficult to locate, leading to longer cartage times.

Any growth noted during the inspection cycles is programmed for spraying and completed by the contractor, although programmed cyclic spraying of the network generally maintains vegetation within the relevant specification. (Note: Specifications and performance criteria are detailed in the relevant sections of contract documentation pertaining to this activity).

6.8.4 Roadside Mowing

Mowing is carried out on both the rural and urban transportation network; however, the majority of mowing occurs on the rural network as residents in urban areas typically take responsibility for berms outside of their properties. The main purpose for mowing is the safety aspect as it provides a line of sight and reduces fire hazards.

Roadside mowing is typically done three times per year on the network.

6.8.5 Vegetation Control

The requirements for the control of overhanging vegetation are that no foliage shall encroach outside the specified vegetation envelope such that the passage of traffic is impeded, causes visibility issues or otherwise interferes with the safe use of the road.

6.8.6 Emergency Works and Minor Events

Emergency Works
Emergency works normally arise from adverse weather events like storms that result in wind damage, flooding and slips. Work associated with these events is generally completed, even if it means that there is expenditure over the budget or other routine work is deferred to keep overall expenditure within budget. This is particularly relevant for safety related works and work that is needed to restore and reopen a road.

If the extent of an event becomes too severe, or the effects too significant, the Council can apply to Waka Kotahi for additional funding under WC 141 – Emergency Works, under the categories of immediate response and permanent reinstatement.

Initial Response
An immediate response covers the work necessary to open a road, where practicable, to at least a single lane facility for safe use by traffic or to minimise risk of further damage.

This work may include:

- Slip clearance and removal of carriageway obstructions
- Construction of temporary detours
- Temporary reinstatement
- Restoration of roadside drainage
- Patrols during and / or after storm events
- Clearing and controlling spillages to minimise environmental impacts
- Frost, ice gritting and snow clearance on Egmont Road, leading to Mount Taranaki

Under the Term Services Contract, roving patrol crews respond to emergency situations while these are in progress, patrolling, and erecting signage to warn motorists of potential hazards on the roads and where possible preventing damage to transportation assets, facilities and private property. The follow up tasks of restoring assets to full or part service potential are completed under the initial response activity.

The most recent emergency works relate to the June 2015 weather event where TRC's hydrology sites recorded over half the month's normal total rainfall. The rain event caused significant damage to infrastructure including bridges and roads being washed out or damaged by flooding, and power disruptions. Massive slips and landslides, and surface flooding, blocked many Local roads around the region.

Permanent Reinstatement
Permanent reinstatement involves work that is required to restore the road to its former or similar condition. As the work is of a long term nature, it generally involves an engineering appraisal of options and may require design input. Permanent reinstatement works have included the design and construction of retaining structures, road retreats and realignment and culvert replacements. These features are added to the RAMM asset inventory upon completion and capitalised where appropriate.

Minor Events

The minor event WC is funded from the Local roads maintenance activity and applies to any works that would otherwise qualify as emergency works except that the total cost of the works is less than $100,000 per event. This WC was introduced for the 2015-18 NLTP and

applies to the following:

- Removal or rocks and slip material from roads and cycleways
- Repairs to road and cycleway surfaces
- Reinstatement of network facilities damaged as a result of a minor event

7 Financial Forecasts

Asset management planning translates the physical aspects of planned operational, maintenance, renewal and new works into financial terms. Management and maintenance of the transportation network is funded from local funding and financial assistance received from Waka Kotahi from dedicated transport funding.

Local funding is obtained through a transportation rate as part of general rates and is a uniform annual charge. It is also funded through the road user revenue. For capital improvements the local funding is loan-funded while the renewal and replacement of assets comes from financial assistance and renewal reserves.

Co-investment Funding Assistance Rate (FAR) received from Waka Kotahi for the 2018-21 financial period has been 51% of the cost for maintaining operations and renewals of the transportation network and 51% of the cost for transportation capital improvements. The 51% FAR is expected to continue over the 2021-24 period and it is also assumed to continue over the 10 year LTP period and 30 year infrastructure strategic period.

7.1 Expenditure Categories

Expenditure on transportation assets can be categorised into four main areas:

- Operating expenses
- Maintenance
- Capital works, including:
  - Capital renewals
  - Capital augmentatio

7.1.1 Operating Expenses

Operating expenditures are those costs where the benefits are used within one year. Operating expenditure can be funded by grants and subsidies, interest income and user charges. If these sources of revenue are unavailable or if they are insufficient then the default funding source for operating expenditure is rates.

7.1.2 Maintenance

Maintenance costs are generally subdivided into three groups:

- Routine maintenance – Day-to-day maintenance that is required on an ongoing basis and is budgeted for
- Proactive / planned maintenance – Non-day-to-day maintenance that is identified in advance and is incorporated into a maintenance budget for a required period of time
- Reactive maintenance – Maintenance that is unexpected and necessary to be attended to immediately to continue operational services

7.1.3 Capital Works

CAPEX arises when the benefits derived are for longer than the current year. People in future years will continue to receive the benefit of the expenditure and should pay towards that cost. This is achieved through capitalising the cost and therefore recognising it as an asset. The cost is then charged to current and future users through a depreciation charge. CAPEX is divided into augmentation and renewal expenditure as detailed below.

Capital Renewals

Renewal expenditure includes rehabilitation and replacement of assets to restore an asset to its original Level of Service, i.e. capacity or the required condition. Renewals expenditure forecasts cover the cost of asset renewal through its whole lifecycle through to disposal of the asset. Renewal CAPEX is funded from rate funds or loans with an annual interest charge allocated to operating expenditure.

Capital Augmentation

Capital augmentation involves the creation of new assets (acquisition) or (improvement) works that upgrade or improve an existing asset beyond its current capacity or performance in response to changes in usage or customer expectations. These can be either to improve Level of Service deficiencies or to improve current Levels of Service. New CAPEX is funded by loans and an annual interest charge is allocated to operating expenditure.

7.2 Asset Management Assumptions

Schedule 10 (section 11) of the LGA contains provisions relating to 'significant forecasting assumptions'. The LGA requires the Council to identify the significant forecasting assumptions and risks underlying the financial estimates. The following asset management assumptions and risks have been made in preparing the 10 year expenditure forecasts:

- The base financial assistance rate used by Waka Kotahi will remain at 51% for both road maintenance and improvements
- It is anticipated that the funding criteria and policy used by Waka Kotahi will remain relatively unchanged from 2021/22
- The rate of deterioration of road pavements will increase as a consequence of increased demand, particularly urban Arterial routes, which are rapidly deteriorating (due to poor historic investment in their upkeep)
- Forestry harvesting will have a major impact on road pavements
- Extremely high rate (34/100,000 population) of fatal and serious injury crashes on Local roads requires investment in safety related (improvements and education) project to achieve the 'Road to Zero' goals of the GPSLT
- Changes in the management, programming and scheduling of work activities are to align with the ONRC Levels of Service and the new ONF
- Walking and cycling improvement of key transport nodes will continue in order to enable users to have sustainable alternatives option choices as per the goals of the GPSLT

7.3 Asset Valuation

Statutory financial reporting requires the Council to revalue its fixed assets at least every five years. An asset valuation is used for asset management (calculating long term asset renewal projections), identifying loss of service potential (depreciation) and for financial reporting purposes. Transportation assets are revalued every year.

7.3.1 Accounting Standards

The NZ International Financial Reporting Standard (NZIAS16) applies to all transportation assets considered in the scope of this valuation for the general purpose of financial reports.

7.3.2 Asset Valuation Summary 2019

The latest valuation of transportation assets was undertaken in 2019 and accounts for inflation. The replacement value of roads assets is approximately $1,005 million as detailed in **Table 75**.

Table 75: Transportation Asset Valuation Summary 2019

Asset	Replacement Cost	Depreciated Replacement Cost	Annual Depreciation
Formation	$177,938,101	$177,938,101	$0
Subbase	$235,728,443	$208,818,002	$586,903
Basecourse and First Coat	$188,165,990	$76,705,797	$2,352,075
Surface	$55,968,284	$23,566,084	$3,615,190
Berm	$11,252,470	$11,252,470	$0
Bridge	$118,247,040	$38,487,465	$1,310,110
Crossing	$16,147,217	$8,128,022	$201,840
Drainage	$25,950,486	$15,627,432	$365,448
Feature	$357,462	$187,215	$12,777
Footpath	$57,995,760	$39,607,415	$880,917
Island	$6,150,069	$4,289,584	$137,128
Markings	$346,140	$297,974	$6,968
Minor Structures	$2,741,389	$2,054,541	$70,349
Railings	$2,587,962	$1,374,955	$60,328
Retaining Walls	$22,776,926	$16,163,761	$332,782
Signs and Posts	$4,017,086	$1,848,153	$400,052
Street Lights	$15,736,690	$11,082,558	$642,759
Surface Water Channel	$62,243,953	$34,376,694	$778,127
Traffic Signals	$537,689	$283,445	$21,887
Total	$1,004,889,157	$672,089,666	$11,775,641


35
35

7.4 Transportation Assets Financial Forecasts

Table 76 provides the financial forecast for maintenance, operations and renewals, **Table 77** provides the financial forecast for augmentation, and **Table 78** provides the financial forecast for investment management.

Table 76: Maintenance, Operations and Renewals Financial Forecast

WC	Description	Service Level Driver	2021/22 ($)	2022/23 ($)
111	Sealed pavement maintenance	Maintenance	2,142,300	2,000,000
	Sealed pavement maintenance (SPR)	Maintenance	10,000	10,000
112	Unsealed pavement maintenance	Maintenance	150,000	150,000
113	Routine drainage maintenance	Maintenance	620,000	620,000
	Street Cleaning & Sump Clearing	Maintenance	538,000	550,000
	Routine drainage maintenance (SH)	Maintenance	97,000	99,000
	Routine drainage maintenance (SPR)	Maintenance	5,000	5,000
114	Structures maintenance	Maintenance	1,065,900	1,071,900
124	Cyclepath maintenance	Maintenance	26,873	27,463
125	Footpath maintenance	Maintenance	305,186	311,886
140	Minor events	Maintenance	450,000	450,000
141	Emergency works	Renewals	452,700	463,545

2023/24 ($)	2024/25 ($)	2025/26 ($)	2026/27 ($)	2027/28 ($)	2028/29 ($)	2029/30 ($)	**2030/31 ($)**
1,600,000	1,632,000	1,665,000	1,698,000	1,732,000	1,767,000	1,800,000	1,840,000
50,000	10,000	10,000	50,000	10,000	10,000	50,000	10,000
150,000	200,000	250,000	200,00	250,000	250,000	250,000	250,000
620,000	660,000	660,000	660,000	695,000	695,000	695,000	695,000
562,000	575,000	590,000	605,000	620,000	630,000	644,000	656,000
102,000	104,000	106,000	110,000	112,000	115,000	117,000	120,000
5,000	7,500	7,500	7,500	10,000	10,000	10,000	10,000
1,048,700	825,000	835,000	840,000	880,000	920,000	930,000	915,000
28,095	28,740	29,430	30,165	30,920	31,695	32,485	33,295
319,069	326,394	334,231	342,578	351,152	360,000	369,000	378,000
450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000
477,000	488,925	501,165	513,675	526,500	540,180	554,760	569,745

WC	Description	Service Level Driver	2021/22 ($)	2022/23 ($)
121	Environmental maintenance	Operations	870,000	885,000
	Environmental maintenance (SPR)	Operations	45,000	47,500
122	Traffic services maintenance	Operations	1,031,463	1,067,392
	Traffic services maintenance (SH)	Operations	286,788	297,977
123	Operational traffic maintenance	Operations	49,000	50,468
	Operational traffic maintenance (SH)	Operations	144,000	147,760
131	Level Crossing warning devices	Operations	36,000	36,000
151	Network and asset management	Operations	2,321,682	2,120,283
211	Unsealed road metalling	Renewals	465,158	486,759
212	Sealed road resurfacing	Renewals	3,041,616	3,325,171
	Sealed road resurfacing (SPR)	Renewals	32,453	33,960
213	Drainage renewals	Renewals	948,922	992,949
214	Sealed road pavement rehabilitation	Renewals	5,021,843	5,144,041
215	Structures component replacements	Renewals	3,911,505	2,281,592
216	Bridges and structures renewals	Renewals	0	0
221	Environmental renewals	Renewals	276,317	283,444
222	Traffic services renewals	Renewals	895,340	

2023/24 ($)	2024/25 ($)	2025/26 ($)	2026/27 ($)	2027/28 ($)	2028/29 ($)	2029/30 ($)	**2030/31 ($)**
900,000	920,000	940,000	960,000	880,000	1,005,000	1,030,000	1,050,000
50,000	50,000	50,000	50,000	55,000	55,000	55,000	55,000
1,103,695	1,155,358	1,196,000	1,239,299	1,302,242	1,357,259	1,416,209	1,478,285
309,887	322,356	335,629	349,728	364,531	381,910	400,316	419,812
51,957	53,468	55,004	56,564	58,150	59,762	61,401	63,069
151,710	155,746	160,025	164,548	169,196	173,860	178,642	183,547
36,000	38,000	38,000	38,000	40,000	42,000	44,000	46,000
1,995,437	2,061,229	2,308,824	2,337,764	2,381,725	2,425,680	2,293,629	2,377,691
510,461	977,850	1,002,330	1,027,350	1,053,000	990,330	924,600	822,965
3,638,491	3,952,097	4,167,849	4,391,772	4,741,465	4,990,987	5,255,569	5,531,052
35,614	37,524	39,387	41,381	43,516	45,763	48,173	50,711
1,041,318	1,088,697	1,138,272	1,190,019	1,244,125	1,301,980	1,363,864	1,428,718
5,719,340	3,908,702	4,454,206	5,138,412	4,684,077	4,808,268	3,584,571	2,924,462
1,611,200	949,212	992,101	1,036,517	1,082,590	1,137,495	1,189,589	1,243,751
2,581,100	184,705	1,425,536	0	0	0	0	0
292,205	300,067	308,163	316,465	325,004	341,617	359,434	378,189
943,400	456,330	1,030,173	496,553	1,134,900	544,982	1,257,456	603,930

WC	Description	Service Level Driver	2021/22 ($)	2022/23 ($)
222	Traffic services renewals (SH)	Renewals	66,396	67,987
225	Footpath renewals	Renewals	605,788	633,919
432	Road safety promotion – Roadsafe Taranaki	Operations	375,109	382,571
432	Education & Encouragement – Let's Go Programme	Operations	540,999	550,140
514	PT Operations and Maintenance (TRC)	Operations	113,704	115,699
NA	Unsubsidised Maintenance	Maintenance	1,177,660	1,204,573
NA	Unsubsidised Operations	Operations	4,032,652	4,525,328
NA	Unsubsidised Renewals	Renewals	260,714	235,478

Table 77: Augmentation Financial Forecast

WC	Description	Service Level Driver	2021/22 ($)	2022/23 ($)
314	LCLR Road to Zero	Augmentation	236,410	1,921,137
314	LCLR Walking and Cycling	Augmentation	508,030	3,379,758
314	LCLR Local Road Improvements	Augmentation	1,217,260	2,678,260
314	Junction Road works	Augmentation	352,100	360,535
532	LCLR PT Improvements (TRC)	Augmentation	110,660	113,311
452	Coastal Pathway Extension (Bell Block-Waitara)	Augmentation	3,892,214	3,976,186
322	Airport Drive Realignment	Augmentation	0	0

2023/24 ($)	2024/25 ($)	2025/26 ($)	2026/27 ($)	2027/28 ($)	2028/29 ($)	2029/30 ($)	**2030/31 ($)**
69,960	76,055	77,959	79,905	87,032	91,526	96,346	101,422
664,787	700,461	735,217	772,434	812,301	849,883	890,082	933,116
391,394	399,314	408,011	416,589	425,348	434,376	443,688	453,206
561,497	577,942	594,972	612,406	630,051	648,681	668,005	687,794
123,056	125,225	132,493	134,827	142,197	144,728	152,370	155,090
1,334,362	1,263,351	1,293,634	1,325,125	1,357,155	1,388,918	1,879,575	1,927,214
4,618,006	4,627,353	4,938,663	4,752,228	4,859,518	5,116,181	5,240,208	5,170,811
246,498	266,120	295,269	440,245	442,351	316,792	338,846	355,772

2023/24 ($)	2024/25 ($)	2025/26 ($)	2026/27 ($)	2027/28 ($)	2028/29 ($)	2029/30 ($)	**2030/31 ($)**
2,231,745	439,576	0	0	0	0	0	0
1,992,800	1,333,679	2,666,755	1,364,093	0	0	0	0
1,844,400	1,166,951	2,328,845	0	0	0	0	0
371,000	380,275	389,795	399,525	409,500	420,140	431,480	443,135
116,600	130,380	133,644	136,980	146,250	150,050	160,264	170,924
5,893,600	2,987,875	5,145,294	6,415,230	0	0	0	0
1,060,000	1,629,750	0	0	0	0	0	0

WC	Description	Service Level Driver	2021/22 ($)	2022/23 ($)
322	Waiwhakaiho River Second Viaduct	Augmentation	0	0
322	Colson Road extension (Smart Rd-Egmont Rd)	Augmentation	0	103,010
322	Bishop Road extension (Egmont Rd-Henwood Rd)	Augmentation	0	0
NA	Unsubsidised Augmentation	Augmentation	1,927,118	3,082,300

Table 78: Investment Management

WC	Description	Service Level Driver	2021/22 ($)	2022/23 ($)
003	Devon St East ONF Business Case (Hobson St-Sackville St)	Augmentation	75,000	-
003	Tukapa Street ONF Business Case (Morley St-Wallath Rd)	Augmentation	-	75,000
003	Asset Management Data Standards implementation	Augmentation	150,000	100,000

	2023/24 ($)	2024/25 ($)	2025/26 ($)	2026/27 ($)	2027/28 ($)	2028/29 ($)	2029/30 ($)	**2030/31 ($)**
	0	0	0	0	0	0	0	314,650
	157,452	162,975	751,748	1,084,425	2,340,000	0	0	0
	0	0	94,665	1,580,978	1,755,000	0	0	0
	3,772,228	3,907,489	2,174,388	2,380,941	1,597,050	1,649,470	1,703,606	1,896,618

	2023/24 ($)	2024/25 ($)	2025/26 ($)	2026/27 ($)	2027/28 ($)	2028/29 ($)	2029/30 ($)	**2030/31 ($)**
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	50,000	-	-	-	-	-	-	-

8 Business Processes and Risk Management

The Council's transportation asset management system is a combination of processes, data and software applied to provide the essential outputs for effective asset management. The transportation activity utilise a number of these aspects for the effective management of transportation assets.

This section provides information regarding the Council's systems, procedures, strategies and processes. Information obtained from public consultation on Levels of Service, updated construction rates and data reflecting the changing of condition or performance will be used to keep this AMP current.

8.1 Health and Safety

NPDC cares for the wellbeing of the district's people, community and the environment people live and work in. The Council is committed to continuously learning and improving its Health, Safety and Environment (HSE) performance. The Council welcomes and encourages feedback and involvement, acknowledging that it can always do better.

Through its Pinnacle Health, Safety and Environment Management system, the Council provides a number of guidelines to ensure that staff are provided with the tools and processes to support the implementation and delivery of its HSE policies.

While Health and Safety is primarily the responsibility of the Employer, it is also the responsibility of every individual. Managers remain responsible for ensuring that management practices in regard to Health and Safety are both put in place and undertaken.

8.2 New Plymouth District Council Financial Strategy

The Council's Financial Strategy aids in delivering a financially sustainable district in the long term, one in which its citizens can afford to live in the near future, but also in 50 and 100 years from now. It is intended to guide decisions made now and in the future to ensure they contribute to the Council's vision and goals identified in **Section 2: Strategic Case** of this AMP.

The Council's Financial Strategy applies the following principles:

- Fairness and equity (intergenerational equity, balanced budget, borrowings funding, distribution of benefits, development contributions, market neutrality)
- Willingness to pay
- Value for money
- Risk management and assessment
- Good financial governance and stewardship

Being fair to ratepayers and customers means that transportation activities are cost-effective and necessary for the community's current and future needs. It means that rates and charges are allocated to those who benefit and to those who have a negative impact on (or exacerbate) community wellbeing; that costs are spread across today's and tomorrow's users (inter-generational equity) to match when benefits arise; and being aware of not excessively burdening today's users with the impact of yesterday's users not having contributed enough.

The Council's AMPs are renewed regularly and inform a 30 year Infrastructure Strategy. Every three years the Council prepares a 10 Year Plan. Every year the Council prepares a detailed Annual Plan. The Council consults the community on what is proposed and at the end of every year it reports back to the community on how well it has done against the plans.

8.3 Road Assessment and Maintenance Management

The Council uses the RAMM system to obtain information about assets. The RAMM system contains a schedule of all roads in the network and information on carriageway widths, surfacing types and ages, pavement composition, traffic volumes and loadings and road condition data. Information on structures such as drainage facilities, footpaths, bridges, street lights and signs is also stored on the RAMM system.

Information contained in this AMP will be used in the preparation of the LTP and subsequent Annual Plans, as well as in the preparation of insurance schedules. The Council will move to use the RAMM valuations module by the next AMP (2024).

Advanced asset management techniques such as optimised decision making, will be further integrated into the system as asset management as the transportation activity evolves. Further details for RAMM are in Sections 8.3.1 and 8.3.2 and other sections below (where relevant).

8.3.1 Asset Management Processes

The RAMM database is annually updated to enable short term forward work programmes to be developed via the Treatment Selection process. Early in 2020, the Council commenced the process of improving its data quality and will, by the next NLTP 2024, be able to better predict a longer term programme using the predictive monitoring software dTIMS. These programmes provide analysis, prediction and costing of major pavement capital works such as reseals and sealed road pavement rehabilitations, in addition to other works such as kerb and channel and footpaths.

Currently, the Council predominantly uses the RAMM Treatment Selection processes for decision making and long term planning.

8.3.2 Treatment Selection Process

The Council uses performance modelling through the RAMM treatment selection process as one tool for establishing pavement renewal programmes. This includes the use of historical data when identifying possible sites for resurfacing. As such, an emphasis is sometimes placed upon seal age and RUL resulting in a number of 'birthday seals'. Although seal age should be an input to the selection process it should not necessarily drive the resurfacing priorities. Decisions should be made that focus on the immediate need to ensure that the required Level of Service is maintained.

8.4 Accounting and Financial Systems

The Council's financial accounting system is delivered via a software package entitled TechnologyOne.

Accounts are compiled in accordance with Generally Accepted Accounting Principles (GAAP) standards to meet LGA regulations. The RAMM database (detailed above) holds all pertinent financial information relating to an asset on an asset-by-asset basis. Financial information includes: purchase or commissioning date, asset value, and depreciation charged. The financial information held in the register allows financial transactions such as depreciation to be calculated. The register also reflects changes to existing assets that occur over their life, such as revaluations and disposals. The register also holds non-financial information for the management of the assets.

8.5 New Plymouth District Council Procurement Strategy

The Council maintains ownership and responsibility for managing the transportation activity and associated infrastructure. In order to maximise efficiencies and long term value for money, the transportation network is managed with a holistic asset management focus. This means that all procurement is linked operationally and strategically where the maintenance management system, the intervention strategy and the 10 year programme is linked.

The Infrastructure Procurement Strategy (reference: ECM#7758249) was updated in July 2018 and outlines "how NPDC will apply the rules and processes of our procurement manuals and policies in order to maximise the long term value when procuring infrastructure services". This strategy supports NPDC's Infrastructure team in the position of Supply Chain Leader (see **Section 8.6** below).

The road maintenance and capital works contracts form the largest component of NPDC's procurement of transportation services. For maximum effectiveness the whole NPDC road corridor maintenance contract is carried out by a single entity. The Alliance model exploits the local knowledge from the team, determining what works and what does not work. Decisions are made by people who actively plan and manage the transportation network with full knowledge of the strategic outcomes.

The Term Services Contract helps achieve the Council's vision by:

- Providing a line of sight between the Council's objectives and goals
- Making a long term investment in people, plant and materials
- Improving safety by investment in the right equipment and people
- Reducing tendering costs over the life of the Term Services Contract
- Increasing synergy between various work activities and asset groups
- Maximising contract management efficiency
- Obtaining value for money
- Increasing asset lives
- Parties working collaboratively

To achieve this vision it is vital to have the right team on board. The make-up of the New Plymouth Alliance team and how it operates is summarised in Figures 97 and 98.

Figure 97: The make-up of the New Plymouth Alliance team

Figure 98: How the New Plymouth Alliance operate as a team

Through this team environment, the Council wants the New Plymouth Alliance to achieve excellence through knowledge management, engaged workforce, literacy and numeracy, high skilled workforce, operational excellence and healthy wellbeing. The details of this are provided in Figure 99.

Figure 99: How the New Plymouth Alliance team will achieve excellence

8.6 Supplier Capacity and Capability to deliver the Asset Management Plan

In order to establish Optimal Value for Money, NPDC is working on becoming a Supply Chain Leader rather than just a conventional client. This will assist risk management across whole supply chains and ensure a coordinated and cohesive understanding of contractual interdependencies and relationships amongst all parties in the supply chain. Target unit rates in the AMP and programme business cases reflect some of the potential savings that the Council believes are achievable.

NPDC will develop a new procurement strategy to take advantage of the identified opportunities. This will include all parties involved in the supply chain in capacity and capability planning to deliver the activities included in the AMP. This will allow longer term partnerships with contractors to be formed and improved term contracts to be developed, to the mutual benefit of all parties in the supply chain.

8.6.1 Term Service Contract

Delivering the 'activities' of the AMP falls to the supply chain, who carry out the maintenance and renewal physical works. The Council manages these through an NEC4 Term Service Contract and CEMAR is the administrative tool used by the parties involved.

NEC4 is a collaborative contract and CEMAR achieves true collaboration, drives consistency and frees teams from administration, through a cloud-based contract management system. CEMAR focuses on the user experience and allows engineers, supervisors, managers and consultants to spend their time on their profession instead of administration.

Key features enable participants to:

- Keep in line with contract compliance, through a single register of events
- Stay up-to-date with action reminders, with party-sensitive reminders and email alerts

- Audit, archive and remain in control, through permissions, user threshold settings and internal approval workflows

- Unlock valuable overview and insights with real time reporting

8.7 New Plymouth District Council as a "Smart Buyer"

In 2011 the Government established the Road Maintenance Task Force to identify opportunities to increase the effectiveness of road maintenance. In particular, they reviewed the areas of asset management, risk management and procurement methods. In the 2012 review report, the Task Force listed the characteristics that would be exhibited by a RCA that has the capability and the capacity to be a "Smart Buyer".

The REG, a collaborative project between local government and Waka Kotahi has subsequently developed a Self-Assessment form for RCAs to assess their own performance in this area. Figure 100 indicates NPDC's assessment. The score of 58 is interpreted as "Our organisation has embraced Smart Buyer principles but can still improve".

Figure 100: NPDC Smart Buyer self-assessment

REG | THE ROAD EFFICIENCY GROUP

Smart Buyer Self Assessment

This assessment is based on the Smart Buyer Principles identified in the Road Maintenance Task Force Report. Score the following by ticking the appropriate box - (1) Disagree to (5) Strongly Agree.

Whenever you score yourself "4 or 5" think of an example you can use to justify your score to an independent auditor or the other attendees at this workshop.

Assessment statement Our Organisation	Score				
	1	2	3	4	5
1. Fully understands the different contracting models available.				✓	
2. Holds meetings that update the contracting industry on the forward works programme and any changes in approach, and proactively engages with the contracting industry to ensure it gains optimal value from any changes being implemented.				✓	
3. Has sufficient robust data (or is in the process of gathering robust data) on our networks to enable optimal integrated decision-making.				✓	
4. Has access to expertise that fully enables best use of the data available.				✓	
5. Is open to alternative solutions to those proposed in the contract documents.					✓
6. Understands risk and how to allocate and manage it.				✓	
7. Has a Council that is prepared to pay more now to achieve a lower whole of life cost.					✓
8. Actively pursues value for money & does not always award contracts to the lowest price					✓
9. Is able to manage supplier relationships/contracts to ensure optimal expenditure, which sustains infrastructural assets at appropriate levels of service.				✓	
10. Supports ongoing skill and competency training and development for staff.				✓	
11. Actively shares and gains knowledge within the sector.				✓	
12. Is effective in keeping up with best practice in procurement, including best practice RFP/contract documentation.				✓	
13. Regularly seeks and receives candid feedback from suppliers on its own performance as a client and consistently looks to improve its performance.			✓		
14. Explores opportunities for collaboration by either sharing in-house resources with neighbours, or by procuring together or tendering together. That exploration could be through an LGA s17A evaluation of transport function delivery options.				✓	
Number of ticks in each column			1	10	3
Multiplying factor	x1	x2	x3	x4	x5
Total Score in Column			3	40	15
Total Score				58	

8.8 Asset Data

8.8.1 Asset Data Accuracy

Throughout the AMP the accuracy / confidence grade of the data presented on the quantity, type (material), age, value, expected life, RUL and performance is assessed and indicated in accordance with Table 79 This table is based on IIMM Section 2.4.5 on Maintaining and Improving Data Confidence.

Table 79: Asset data accuracy/confidence grades

Accuracy/Confidence	Description
A - Highly Reliable	Data based on sound records, procedures, inspections. Data recorded in well maintained system. Estimated accuracy ± 2%.
B - Reliable	Data based on sound records, procedures, inspections. A few records questionable or missing or extrapolated. Estimated accuracy ± 10%.
C - Uncertain	Data based on sound records, procedures, inspections which is incomplete. Some records questionable or missing with up to 50% extrapolated. Estimated accuracy ± 25%.
D - Very Uncertain	Data based on unconfirmed verbal reports or cursory inspections. Most data estimated or extrapolated. Estimated accuracy ± 40%.
E - Unknown	None or very little data held.

8.8.2 Asset Condition Grades

Throughout the AMP the condition assessment for the assets has been summarised in accordance with **Table 80**, which is based on IIMM Section 2.5.4 on Condition and Performance Rating Systems.

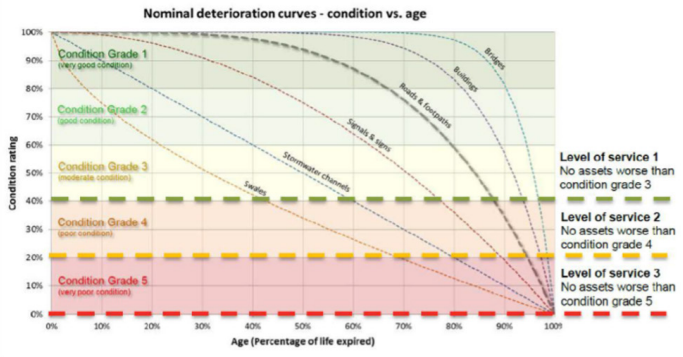


Table 80: Asset condition grades

Rank	Description or Condition
1	Excellent Condition
2	Good Condition – minor defects only
3	Average Condition – maintenance required to return to acceptable level of service
4	Poor Condition – needing renewal
5	Very Poor Condition – approaching unserviceable
6	Unknown

8.8.3 Asset Criticality Ratings

Throughout the AMP the condition assessment for the assets has been summarised in accordance with Table 81, which is based on guidance in IIMM Section 3.2.4 on Identifying Critical Assets.

Table 81: Asset criticality ratings

Criticality Rating	Description
1	Non-Critical
2	Moderate
3	Important
4	Critical
5	Non-Applicable
6	To be Determined

8.8.4 All Faults Network Condition

Over / above the previously mentioned condition grading and criticality ratings, the Council also identifies and captures all unsealed and sealed network faults (hence called All Faults), which can be used to provide real time

indicators to inform programming of routine forward works. This enhanced visual condition rating system is roughly aligned to the NAMS lifecycle rating (1 to 5), where 1 is a pavement asset in new condition and 5 is at the end of its serviceable life, and has been summarised in accordingly in **Table 82** below.

A key feature of this system is that it considers the asset condition in terms of the health and safety the hazard to poses to users of the network.

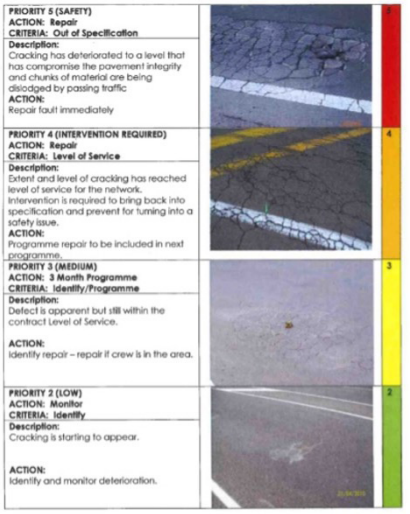


Table 82: All Faults condition ratings

All Faults Rating	Description
1	New asset condition
2	Low priority fault identified, for monitoring
3	Medium priority fault identified, for action in a three month programme
4	Intervention required for hazardous identified fault, for repair action
5	Out of specification, levels of service and hazardous fault, for immediate repair action

8.8.5 Asset Data Types

Information on age, condition, risk factors, material, cost and location is captured within the RAMM system for all assets. The NAMS guidelines, Rawlinsons construction cost manual and manufacturers specifications, and maintenance schedules are utilised for asset management decision making. Spatial representation of the transportation network is located within the Council's GIS system, which allows for spatial analysis.

Since the 1990's RAMM has provided a uniform national inventory system and is also used by Waka Kotahi to obtain consistent data and condition reporting over the country's transportation network.

Street light data is held within RAMM in the SLIM database.

8.8.6 Asset Data Quality

Information quality forms a cornerstone of effective asset management. Confidence in the accuracy and completeness of asset information impacts the degree of which that information contributes as an enabler for fact-based decision making. To that end the Council produced a transportation 'Data Quality Management Plan' (in 2020) setting out the Council's data collection requirements, frequency and data standards for managing the transportation network in a manner that meets its goals. This document is to be used in conjunction with the Contractor's Data Quality Plan.

Frequency and method of inspections and data to be collected is related to the service being provided by the particular asset. The aim is to ensure data is used to determine need and timing of some preventative or remedial action to maintain the desired Level of Service.

The criticality of the asset, or the skill set required to assess the asset, determines whether the inspections are carried out in-house or via an external contractor or consultant. There are two Network Inspectors; one to service the rural network and one to service the urban network. Between the two inspectors, they assess the asset conditions of pavements, footpaths, cycleways, stormwater drainage, traffic services and street furniture. The remaining surveys / inspections are undertaken by external contractors.

The asset management system uses the following asset information data:

- Asset Inventory – Physical parameters (asset type, age, size, material and location)

- Asset Location – Linear (km post or reference point) and spatial (GPS coordinates)
- Asset Condition – Condition assessment (manual condition and high speed survey)
- Traffic Volume – Traffic count and traffic estimation
- Data Collection Level – Network level and project level
- Standard and Policies – Waka Kotahi data requirements and Council policies
- Budget – Annual / multiyear budget by each asset type

8.9 Asset Management Improvement Programme

A multi-disciplinary Asset Management Steering Committee was formed in mid-2016, tasked with the delivery of the Asset Management Policy Statement:

“The Council’s asset management practices ensure the prudent stewardship and the efficient and effective use of its resources in the interests of the district, including planning effectively for the future management of its assets”.

8.9.1 Asset Management Maturity

An internal assessment of transportation asset management maturity was conducted in July 2020 using the IIMM maturity guidelines. The assessment covers 16 key areas of the specification and each area attracted a score between 0 and 4. A new assessment tool (IAM SAM 2014) was adopted in December 2020, refer Section 10 - Strategic Asset Management Plan. Future asset maturity assessments will be undertaken to align with this.

The maturity scores in most areas were assessed as being in the 1.0 – 2.0 range indicating that some improvement is required. The medium term plan i.e. during 2020 and 2023 period is to increase maturity scores to into the 2.0 – 3.0 range. The scores assessed for each of the 16 components and the aims to improve the scores to take the organisation's asset management practices from current ratings to core and optimised levels is shown in **Table 83**.

Table 83: Asset management maturity ratings score

Element	Aware	Basic	Core	Intermediate	Advanced
	0	1	2	3	4
AM Policy Development					
Levels of Service and Performance Management					
Demand Forecasting					
Asset Register Data					
Asset Condition					
Decision Making					
Risk Management					
Operational Planning					
Capital Works Planning					
Financial and Funding Strategies					

Element	Aware	Basic	Core	Intermediate	Advanced
	0	1	2	3	4
Asset Management Teams					
AMPs					
Management Systems					
Information Systems					
Service Delivery Mechanisms					
Improvement Planning					

Key: Maturity rating status at 2020 Proposed improvements to 2023

The AMPs produced to date have therefore been developed during a period of basic asset maturity competence. There is an expectation that the next AMP developed for the next 10 Year Plan (2024) will be at a more advanced maturity level.

8.9.2 Asset Management Processes Improvement

The current (2020) data quality and programming tools limit the effective and efficient control of NPDC's operational planning and risk management. The first steps to correct this has been put in place by engaging (NPDC) Network Inspectors to improve the database, and data quality in RAMM and the use of MAX.

quality (see **Section 8.9.3**), a systemised approach to maintaining data quality across the RAMM database. The next steps can only occur when the RAMM base data quality improves. Through the processes covered by the Data Quality Management Plan the Council should be in a better place by the end of 2021 to use the dTIMS pavement deterioration modelling and the RAMM Asset Valuation tools for the next 10 Year Plan (2024).

8.9.3 MAX.quality

MAX.quality is an automated RAMM setup developed by GHD to help the road management industry to improve their data quality and to support the management of their various business activities, which are supported by the RAMM system.

MAX.quality tests data for correctness based on a mixture of logic (locations of assets not within the carriageway where they should not be, for example) and testing fields that lookup tables such as materials or type for missing data or selected values (custom to an individual database) which are considered to be incorrect.

An insightful summary table for each information category has broken the current errors down into a number of areas of issue as listed in Table 84.

Table 84: Total errors by area of issue (at 25 March 2020)

Area of Issues	Total Errors	Notes
Age/Life	24,386	Date of construction, expected life, etc.
Classification	715	Specific type of asset, definition of the network, etc.

Table 84: Total errors by area of issue (at 25 March 2020)

Area of Issues	Total Errors	Notes
Condition	10,837	Does it have a condition rating
Details	10,255	Catch all, includes such items as material, colour, etc.
Dimensions	20,270	Length, height, width, depth, shape, etc.
Location	15,129	Route position, side, offset, etc.
Missing Activity	3,764	An activity such as condition rating, traffic estimates that has not occurred within an expected timeframe
Missing Assets	80	Locations where an asset would be expected yet there is no asset
Ownership	30,856	Missing or incorrect ownership
Value	202	Value of assets or maintenance cost values
TOTAL	116,494	

8.9.4 Pavement Deterioration Modelling

8.9.4 Pavement Deterioration Modelling

The Council will be gearing up to carry out deterioration modelling of its sealed pavements using NZ dTIMS CT software, supplied by IDS Ltd, by the next 10 Year Plan (2024). This software is accepted by Waka Kotahi as being suitable for this purpose. Other procedures based on condition rating surveys have been developed to assess the condition of footpaths, kerb and channel, and street lights. dTIMS provides outputs ranking optimised projects at a network level for incorporation into a FWP.

The pavement deterioration model for the transportation network assesses the future condition of the network under different investment scenarios.

8.9.5 RAMM Asset Valuation

As noted in **Section 8.3**, the Council will be gearing up to use the Asset Valuation Module in RAMM to calculate the replacement cost, depreciated replacement cost and annual depreciation costs of its transportation assets, by the next 10 Year Plan (2024). The Council will need to update / collect vital information which is currently missing on key asset types.

8.10 Traffic Data Collection

An annual traffic counting programme is in place to monitor traffic volumes on the network and to ensure that the information held on the RAMM database is accurate.

The Council operates 20 traffic counters with priority given to the counts being undertaken on proposed resurfacing and pavement rehabilitation sites in the first instance and other roads requiring updated traffic composition for reporting and analysis purposes. The Council also operates a cycling counter, which is used when needed.

Classified traffic counts also identify the composition of the traffic carried, which is necessary for pavement and resurfacing design purposes. These counts are also used to monitor the speed of vehicles.

8.11 Business Systems

The Council has systems to support a management decision making structure with accurate information. The information systems necessary to support this type of program are often based around IT systems. The resources required include project management, implementation and ongoing support staff, software, hardware, data collection, and system operation and maintenance. The cost can represent a substantial business investment, and this warrants a dedicated project management team to ensure satisfactory implementation and completion.

The Council has developed its Information Services for infrastructure around a number of key products that provide a platform for all IT applications. Over / above the systems already mentioned, these include:

- Microsoft - Word processing, spreadsheets, emails, project, etc.
- TechnologyOne - Ci Anywhere extension for records management
- Miles - esri powered GIS mapping
- Smartrak - Vehicle fleet management
- Ochre - Human Resources system
- Affinity - Clever timesheets and payroll system

8.12 Waka Kotahi / NZ Transport Agency

As part of Waka Kotahi's quality processes, they carry out a number of audits within NZ across all RCAs. These audits are intended to check compliance with Waka Kotahi's procedures and policies. They also check processes systems and personnel are in place to support analysis and good asset management decision making. These audits form a significant part of the business processes that determine how well the Council's assets are performing and how well they are being managed, maintained and renewed.

8.12.1 Procedural Audits

Procedural audits are carried out in terms of section 69(1) (k) of the LTMA. A procedural audit of each RCA is carried out every two to four years. The objectives of the procedural audits are generally as follows:

- To review any issues arising from previous procedural audit(s)
- To review final claims for the period being audited
- To assess the audit trail of transactions for financially assisted works
- To assess compliance with Waka Kotahi's approved procurement procedures
- To review contract management procedures
- To review the Council's professional services provider / network manager / business unit for compliance with Waka Kotahi's requirements
- To recommend measures for improved practice if appropriate

8.12.2 Technical Audits

Technical audits are carried out on at least a four-year cycle. Factors that determine the frequency include the value of the financial investment, the complexity of each RCAs programme, network condition (pavement and safety) and the outcome of previous audits. Each RCA will be advised at least a month in advance of the audit commencing. The objectives of the technical audits are generally as follows:

- To review any issues arising from previous technical audit(s)
- To assess whether the level and quality of transportation maintenance being carried out by the Council is realistic and acceptable
- To determine the extent to which the Council's structural and corridor maintenance programme is meeting (not exceeding) maintenance needs
- To determine the extent to which the Council's RAMM database is able to provide reliable reports and treatment selections
- To determine in light of the answers to the above, that there is progress towards achieving a least cost, long term, maintenance programme

8.12.3 Reporting Tools

The REG publishes a range of financial and non-financial information related to the performance of its transport investments. This data is collected as part of a statutory annual achievement return process and is published as part of the Waka Kotahi's commitment to open Government data. These tools were developed several years ago and are currently maintained with data updates only. Waka Kotahi keeps them under review and will remove any tools if they are no longer required. Most of the metrics reported are not the same as the ONRC measures.

The REG Performance Measures Reporting Tool is specifically reporting the ONRC measures and is useful for the RCA to view their performance and compare performance against other RCAs. The tool is developed specifically for this purpose.

New to the investment decisions is the ONF. This new framework intends to extend the ONRC to the next level and provide a common language for all disciplines, including urban and rural planners, urban designers, land use planners, traffic engineers, journey managers, network and asset managers, construction designers

and landscape architects. Further information for the ONF is provided in Section 2: Strategic Case of this AMP.

8.12.4 Road Infrastructure Safety Assessment

The Road Infrastructure Safety Assessment (RISA) is a safety focused technical review of several sample sections of a road network to identify areas that could be improved.

The RISA is based on international best practice guidelines. The safety audit is carried out in advance of a technical review and the results are included in the technical review report. The recommendations are typically used to prioritise safety improvements, which RCAs can then include in their next NLTP.

8.13 Risk Management

Risk management identifies potential risks to transportation assets, analyses the consequence and likelihood of those risks occurring, and details how NPDC is managing those risks through various treatments. The risk management process also identifies who is responsible for managing each of the identified risks. This process then informs policy and planning, and ensures that risk is managed in a way that enables

consistent achievement of key business objectives and community outcomes.

Risk assessments are conducted, recorded, managed, escalated and monitored in accordance with the Corporate Risk Management Framework: Policy and Process (reference: ECM#1479536). A summary of how the policy and process operate and a list of the current key risks that are relevant to all asset groups and those particular to transportation assets is included in the Strategic Asset Management Plan.

8.13.1 Sources of Risk

NPDC is exposed to many and varied sources of risk. As a framework for risk identification and analysis, there are nine identified sources of risk that are relevant to all Council activities, as identified below:

People and knowledge:

- Inability to attract and retain skilled staff
- Ineffective employment relations
- Poor staff knowledge, skills, engagement
- Inadequate human resource planning

Health and Safety:

- Failure to provide a safe work environment
- Non-reporting of incidents / accidents, and / or not identifying trends from those reported
- Inadequate focus on Health and Safety, especially at high risk workplaces

Governance, reputation, legislative compliance and control:

- Ineffective relationship the community (with reputational risk being a contributor)
- Ineffective relationship with and between elected members
- Implications of the election cycle e.g. the learning curve for new members as they become familiar with the functions and requirements of local government
- Failure to comply with legislative requirements
- Lack of internal control

Planning and strategy:

- Inadequate business improvement planning
- Inadequate planning to meet future requirements (growth, renewals, changing Levels of Service) as documented in the LTP, Annual Plan and Annual Report
- Inadequate emergency response / business continuity planning

Financial:

- Fraud (misappropriation of Council funds)
- Inability to secure funding or credit
- Inappropriate or inadequate procurement practices
- Lack of internal control

Information management:

- Inadequate management of technology and systems
- Poor staff knowledge of systems
- Viruses, hacking, unauthorised access, inappropriate use of IT systems

Property and assets:

- Facilities do not meet requirements
- Failure to deliver on key projects
- Inadequate asset information and management
- Inadequate insurance cover
- Poor safety and security at public facilities: accidents, criminal activity, unacceptable behaviours, abuse

Environment:

- Natural hazards
- Security
- Hazardous and toxic materials
- Public health – disease outbreak
- Emergency / disaster management
- Waste and refuse

Operations and service delivery:

- Poor operations or customer service (including poor contractor management and performance)

Table 85 includes an extract from the register of risks relevant to transportation assets.

Table 85: Transportation Risk Register

ID	Team	Type of risk	Description	Inherent risk assessment - Consequence
53	Transport	Financial	Increased community expectations over time require levels of service above those in the LTP, resulting in unplanned increases in cost and reprioritisation of resource allocation.	Major
54	Transport	Operations and service delivery	We are unable to meet planned Levels of Service because of increasing costs and budgetary constraints, resulting in community discontent and the potential for service disruption if key assets fail.	Major
56	Transport	Financial	Financial pressure on our transport activities increases because of legislative change e.g. with increased vehicle dimension or mass limits, resulting in new compliance costs.	Catastrophic
58	Transport	Financial	We are found liable for an event that causes damage to property or serious harm / death to individuals because of our design of new network assets or the failure of existing ones, resulting in financial loss.	Catastrophic
59	Transport	Financial	There is unbudgeted expenditure because of ongoing repairs of damage to the transport network due a natural catastrophe, resulting in a need to revisit future year budgets.	Catastrophic
60	Transport	Financial	Waka Kotahi withdraws or reduces its subsidies for roading maintenance and other initiatives because of factors including: The ONRC system and Waka Kotahi's Investment Framework, resulting in a need to allocate more funding to transportation than planned.	Catastrophic
208	Transport	Health and Safety	A member of the public has an accident on our roading network because of a deficiency in our infrastructure, resulting in serious harm or death. Examples of deficiencies are things that do not meet current design standards or Levels of Service e.g. sharp corners with no signage or barriers, and a chipseal with insufficient skid resistance.	Major

Inherent risk assessment - Likelihood	Inherent risk rating	Current treatment	Residual risk assessment - Consequence	Residual risk assessment - Likelihood	Residual risk rating
Almost certain	9.0	Any new service level request now needs to be justified with a Business Case. Document systems and guidelines re current Levels of Service, including in the RAMP, for the use of staff / consultants / contractors covering the full range of transportation activities.	Minor	Likely	5.5
Almost certain	9.0	Ensure that the discussion with the community during the LTP and Annual Plan processes clearly outlines the relationship between budgets (and rate increases) and Levels of Service.	Minor	Likely	5.5
Possible	6.5	Expectation that any significant change would provide sufficient lead in time to allow financial preparations to be made. Also look at innovative ways to achieve compliance at the least possible cost. Accept some corporate / reputational risk with having a reactive rather than a pro-active management approach.	Minor	Possible	3.0
Possible	6.5	Best practice regarding design, supported by inspections of the network to identify deficiencies and remedy them, along with a rapid response to calls from the public logging issues with the network.	Major	Unlikely	5.0
Moderate	8.0	Identify alternative funding from a reserve to assist with financial impact.	Moderate	Moderate	6.0
Possible	6.5	Internal processes, and ensuring they follow Waka Kotahi's requirements for business cases (ONRC). Supported by ongoing relationship management and communication, and an expectation that Waka Kotahi will signal early on any significant changes to its funding models that will have financial implications for local government.	Major	Possible	5.5
Likely	8.0	Reduce the likelihood and severity of crashes with the Minor Improvement Programme, speed controls, monitoring of crash data and behaviour change programmes.	Major	Possible	5.5

8.13.2 Minor Emergency Events

Risk #59 noted in Table 85 identifies the following risk: "There is unbudgeted expenditure because of ongoing repairs of damage to the transport network due a natural catastrophe, resulting in a need to revisit future year budgets".

The Operations, Maintenance and Renewal programme does include a provision for minor emergency events (WC 140) at approximately $500,000/annum. Examples of qualifying activities include, but may not be limited to:

- Any activities that would otherwise qualify as Emergency Works except that the total cost of the works is less than $100,000 per event per RCA or Waka Kotahi (State Highways) region, including:
  - Removal of rocks and slip material from roads and cycleways that have resulted from minor events
  - Repairs to road and cycleway surfaces in response to minor events
  - Reinstatement of network facilities damaged as a result of a minor event

Other potential activities that are not in the above list should be discussed with Waka Kotahi for eligibility. Waka Kotahi's definition of Emergency Works includes events that qualify for NLTP funding as Emergency Works that will:

- Be of unusually large magnitude or severity for the particular area in which they occur (as a guide, they would be expected to have an annual return period greater than 1 in 10 years)

- Originate from natural, short duration triggering events, including very high intensity rainfall, severe wind, severe drought in government declared drought areas or seismic events

- Have reduced, or will reduce within a 12 month period, levels of transport service significantly below those that existed prior to the event

- Involve a total cost of $100,000 or more per event per RCA or Waka Kotahi (State Highways) region

- Be clearly defined, named and described, with a separate funding application required for each event

In accordance with Waka Kotahi's Emergency Funding Policy, the cost of Emergency Works will attract the normal FAR for claims having a value of up to 10% of the total approved maintenance programme. For claims in excess of 10% the FAR will increase by an additional 20% up to a maximum of 95%, unless the event is classed as an extreme event when a 100% FAR would apply.

Waka Kotahi's Emergency Funding Policy does create a risk in terms of NPDC's capacity to complete the programme should funding for Emergency Works be required. If Emergency Works expenditure is required, to contain overall Council expenditure within approved budgets, the Council would either need to make a corresponding reduction in the maintenance programme, and / or use alternative funding, or increase budget levels. This risk could be mitigated if Waka Kotahi change their policy to applying a FAR of 100% to all Emergency Works.

9 Improvement Plan

9.1 Continuous Improvement

NPDC is adopting a strategic management approach to improvement planning, and implementing improvement processes and practices. This Improvement Plan is integral to that approach, quantifying current business practice and measuring progress toward an identified future position.

9.2 Improvement Cycle

The purpose of the Improvement Plan is to identify, prioritise and implement specific projects and tasks which will increase the level of maturity over time.

9.3 Current Practice Assessment

The first step of asset management improvement planning is to understand the current and future "appropriate practices". To do this is a systematic way the following elements will be assessed, being:

- Asset Management Policy Development
- Levels of Service and Performance Management

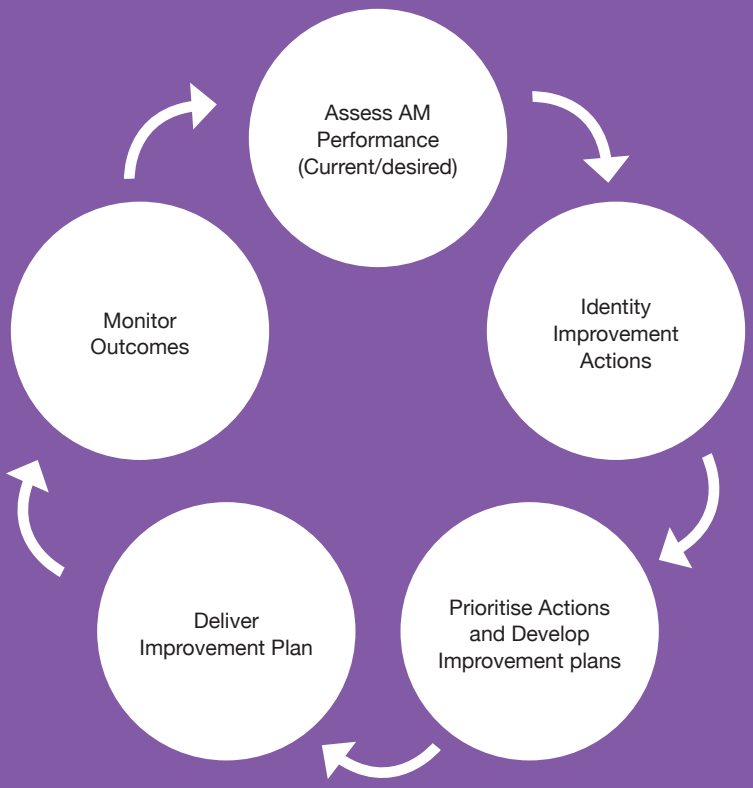
- Demand Forecasting
- Asset Register Data
- Asset Condition
- Risk Management
- Decision Making
- Operational Planning
- Maintenance Planning
- Capital Works Planning
- Financial and Funding Strategies
- Asset Management Teams
- AMPs
- Information Systems
- Service Deliver Mechanisms
- Quality Management
- Improvement Planning

These key elements are critical to achieving sustained performance of the organisation at the lowest lifecycle cost and to form a clear picture of how well it is performing in each of these elements and where the weaknesses lie. Each of the elements “adds value” to the raw business processes which leads to good asset management practice.

9.4 Identify Improvement Actions

A clear understanding of the gap between current and appropriate practice will help drive identification of improvement actions. However identifying improvements should also be an ongoing activity not just a “one-off” gap assessment process.

Figure 101: Continuous Improvement Cycle



Improvement actions need to be clearly scoped and defined. Failure to recognise the full costs associated with improvements may see the projects inadequately resourced and potentially not meeting the desired outcomes.

9.5 Develop Improvement Plan and Prioritise Actions

The Improvement Plan will be developed to identify the high priorities requiring action to focus the organisation on the most important areas. Utilising a simple improvement framework that has clear relationship to the assessment elements will help people understand how the actions relate to the appropriate level of asset management required.

Plan, do, check, act is an iterative four-step management method used in business for the control and continuous improvement of processes and products. It is also known as the Deming circle or Shewhart cycle and is illustrated in Figure 102.

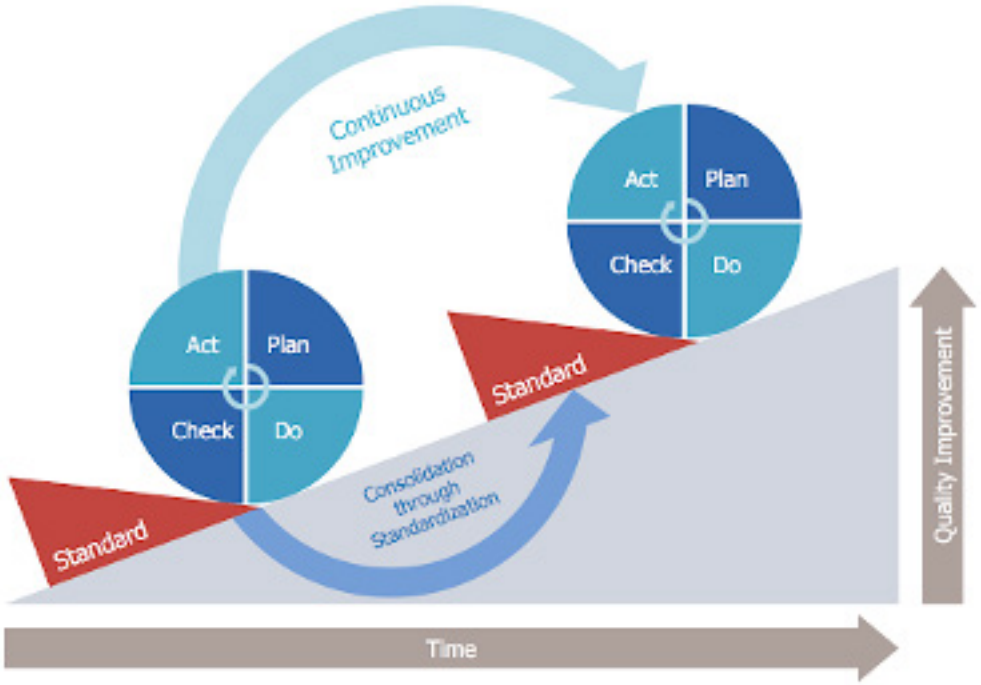
Plan
Establish objectives and processes required to deliver the desired result.

Do
Carry out the objectives from the previous step.

Check
During the check phase, the data and results gathered from the do phase are evaluated.

Act
Also called the “adjust”, this act phase is where process is improved.

Figure 102: Quality Improvement over time



9.6 Deliver the Improvement Plan

The Improvement Plan needs to be strongly led, properly resourced and regularly monitored and reported by a steering group. Clear targets must be well defined with specified deliverables that help focus on what is required.

9.7 Monitor the Outcomes

Organisations are under pressure to show the quantifiable benefits from improving asset management outcomes and this is a real challenge across local government. Regular asset management assessments using the frameworks in this section are currently the best way to demonstrate ongoing improvement to asset management practices. Assessments should be undertaken over a number of years to track progress.

9.8 Current Practice Assessment

As part of the improvement planning process, NPDC assessed the current maturity for the transport activity across 16 key asset management elements. The framework used to assess the maturity levels of each asset management element is from the IIMM. These elements have also been utilised to develop strategies for improving asset management practices for the next NLTP. The results of NPDC's Transport Activity Asset Management Maturity Current Assessment and Gaps is contained in this AMP in Section xx.

9.9 Strategies for Improving Asset Management

9.9.1 Setting Priorities

A thorough asset management review process will often identify more improvements than an organisation is able to realistically deliver in a short timeframe. As such, there is a need to prioritise these actions so they are realistic and affordable.

NPDC sets priorities on programme business cases based on a 1-4 scale as demonstrated in **Figure 103**. This has also been utilised for prioritising improvements.

Figure 103: The Eisenhower Matrix

It is important to record priority 4 s as this shows that the improvement has been considered and can avoid rework in the future. Options can also change importance and urgency over time.

9.10 Future Improvements

All of NPDC's improvements are contained in the Asset Management Improvement Plan in SharePoint. This allows NPDC to include detailed descriptions of improvements, set due dates, provide a status on the improvement, the scope of work required to get this improvement 'over the line', who is responsible, the drive for this improvement and any actions required. Point of Entry Business Cases are also contained in SharePoint and can be linked with improvement plans where necessary.

Table 86 provides a list of transportation related improvements.

Table 86: Transportation related improvements

Activity	Improvement	Priority
Street Lighting	Concrete light columns and associated underground cable joints are coming to the end of their design lives and cables are prone to damage through strikes.	1
Environmental Renewals	An increase in regulations set by TRC could lead to abatement notices should we keep under spending in this area.	1
Pavement Deterioration Modelling	Currently there are no tools for network pavement deterioration to drive decisions on pavement rehabilitation.	1
Street Lighting Control System	With the completion of the LED light upgrade programme technology is now available to allow each light to be remotely controlled and monitored. Allowing for more accurate fault assessments and thus improved maintenance efficiencies.	1
Suspension Bridge Specific Management Plans	Develop specific asset management plan for the Historic Betrand Road suspension bridge and the O'Sullivans bridge at Tongaporutu.	2
Permanent hazards and delineation	Permanent hazards are not marked and signed in a consistent manner across the network.	3
Temporary traffic management sites	While the standard to Temporary Traffic Management sites is increasing, there is still further room for improvement.	3
Safe road use	Areas of concern have been identified in the crash data.	3
Guardrails and barriers	Guardrail and barrier inspections are not scheduled and do not review the structural integrity of barriers.	3
Collective risk rating on Arterial and Primary Collector Roads	The collective risk rating on Arterial and Primary Collector roads is higher than other authorities in our Peer Group.	3
Bridges and Structures	A history of underspending in structures maintenance and structures component replacement has led to a bow wave of structures near end of life.	3
Pavement and Surface	Previously resurfacing has been completed on 'birthday reseals' priority, rather than a condition priority.	3

Accountable	Details	Responsible
David Langford	Undertake a programme of works to replace concrete poles with modern poles with the cable joints in the bases.	Rui Leitao
David Langford	Increase in environmental renewal expenditure.	Rui Leitao
David Langford	Utilise a deterioration modelling tool to drive pavement rehabilitation decision making.	Rui Leitao
Rui Leitao	Implement programme of installation of remote sensors across the network.	
David Langford		Rui Leitao
David Langford	Council to comply with national standards.	Rui Leitao
David Langford	Maintain existing temporary traffic management investment.	Rui Leitao
David Langford	Maintain existing community road safety investment.	Rui Leitao
David Langford	Increase structures renewal program.	Rui Leitao
David Langford	Increase network management budget.	Rui Leitao
David Langford	Increase in bridges and structures investment.	Rui Leitao
David Langford	Similar level of investment however targeted to ONRC and condition.	Rui Leitao

Activity	Improvement	Priority
Pavement and Surface	A fiscal budget in pavement maintenance has resulted in a decrease in STE and an increase in peak and average road roughness specifically on our Arterial network.	3
Network and Asset Management	Our data quality is not at a level that brings confidence, therefore there is some doubt about decisions made in the past on whether they had value for money.	3
Resident Satisfaction	The results of the NRB survey showed comparatively low levels of satisfaction in Clifton and Waitara.	3
Bridges and Structures	Some of the bridges on our network are limited to 50MAX vehicles, which affects the resilience of our network.	3
Alternative Mode Share	We have a poor understanding of the number of people walking and cycling. At present, one cycling cordon survey is undertaken in February each year, and pedestrians are not regularly counted.	3
Asset Management Maturity	An internal assessment of our transportation asset management maturity was conducted in July 2020 using the IIMM maturity guidelines. The assessment covers 16 key areas of the specification and each area attracted a score between 0 and 4.	3
Improve Data Quality	MAX.quality is an automated RAMM setup developed by GHD to help the road management industry to improve their data quality and to support the management of their various business activities supported by the RAMM system.	3
Cycleways and Shared Pathways	Currently knowledge of cycleways and shared pathways is limited to local knowledge. Robust data is required so we can keep track of current cycleways and shared pathways.	3
Catchment Analysis	A catchment analysis needs to be completed to ensure the current drainage assets on our network are fit for purpose and meet the Level of Service required.	3
Transportation Asset Disposal	As part of the development of the 2021-31 Transportation AMP it was identified there may be a need to look into asset disposal further. It was discussed that this would be developed for the following NLTP (2024-27).	3

Accountable	Details	Responsible
David Langford	Increase in pavement rehabilitation renewals expenditure.	Rui Leitao
David Langford	Increase in network and asset management expenditure.	Rui Leitao
David Langford	An increase in budget for environmental maintenance and traffic service maintenance and renewals.	Rui Leitao
David Langford	Increase in CAPEX to allow for greater resilience (should this be the desired outcome for that particular bridge).	Rui Leitao
David Langford	In the yearly NRB survey capture the community satisfaction rating with alternative mode infrastructure. Undertake a systematic yearly pedestrian and cyclist count programme. Monitor the length of new cycle network, footpath and shared pathway built each year.	Rui Leitao
David Langford	Improve the PAS55 scores to take the organisation's asset management practices from 'Basic' rating to 'Core' rating.	Rui Leitao
David Langford	MAX.quality tests data for correctness based on a mixture of logic and testing fields that lookup tables such as materials or type for missing data or selected values (custom to an individual database) which are considered to be incorrect.	Rui Leitao
David Langford	Capture data in RAMM.	Rui Leitao
David Langford	Complete a catchment analysis on drainage assets for the rural network.	Rui Leitao
David Langford	Identify assets that should be disposed.	Katie Armstrong

Activity	Improvement	Priority
Seismic Rise Screening Program	A seismic risk screening program should be based on network importance taking into account traffic volumes and alternative route availability.	3
Drainage Consenting & Consent Monitoring	Earlier intervention and proactive monitoring of consents for drainage is required to smooth the process with regional council and other stakeholders.	3

Access to the full list of council improvements is through the URL below: https://intranet/sites/Projects/Infrastructure/AssetManagement/Lists/Asset%20Management%20Improvement%20Plan/AllItems.aspx#InplviewHash77ea5e03-259d-4158-970d-49460715cbd6https://intranet/sites/Projects/Infrastructure/AssetManagement/Lists/Asset%20Management%20Improvement%20Plan/AllItems.aspx

Accountable	Details	Responsible
Rui Leitao	Develop and undertake seismic risk screening program	WSP Opus
David Langford	Earlier intervention and proactive monitoring of consents for drainage is required to smooth the process with TRC and other stakeholders.	Rui Leitao

Glossary of Terms

Acronym	Definition
ADDT	Annual Average Daily Traffic
ADT	Average Daily Traffic
AEP	Annual Exceedance Probability
AMP	Asset Management Plan
AMSG	Asset Management Steering Group
CAPEX	Capital Expenditure
CAR	Corridor Access Request
CAS	Crash Analysis System
CBD	Central Business District
CCTV	Closed Circuit Television
CI	Condition Index
Communitrak	Annual survey performed by NRB
DIA	Department of Internal Affairs
DSI	Deaths and Serious Injuries
dTIMS	Deighton Total Infrastructure Management System
EAM	Enterprise Asset Management
ECM	Enterprise Content Management
EECA	Energy Efficiency and Conservation Authority

Acronym	Definition
EMP	Edge marker posts
FAR	Financial Assistance Rate
FUZ	Future Urban Zone
FWP	Forward Works Programmes
GCRC	Gross Current Replacement Cost
GDP	Gross Domestic Product
GIS	Geographic Information System
GPS	Government Policy Statement
GPSLT	Government Policy Statement on land transport
HCV	Heavy Commercial Vehicles
HPMV	High Productivity Motor Vehicles
HPS	High-pressure sodium
HSD	High Speed Data
HSNO	Hazardous Substances and New Organisms
IIMM	International Infrastructure Management Manual
ILM	Investment Logic Mapping
IT	Information Technology
KPI	Key Performance Indicator

Acronym	Definition
LED	Light-emitting Diode
LGA	Local Government Act 2002
LTMA	Land Transport Management Act 2003
LTP	Long Term Plan
MIS	Maintenance Intervention Strategy
NAASRA	National Association of Australian State Roading Authority
NLTP	National Land Transport Plan
NPDC	New Plymouth District Council
NRB	National Research Bureau
NZ	New Zealand
OBIS	Online Bridge Information System
ONF	One Network Framework
ONRC	One Network Road Classification
PII	Pavement Integrity Index
PMRT	Performance Measures Reporting Tool
RAMM	Roading Asset Maintenance and Management
RCA	Road Controlling Authority
RISA	Road Infrastructure Safety Assessment

Acronym	Definition
REG	Roading Efficiency Group
RLTP	Regional Land Transport Plan
RMA	Resource Management Act 1991
RRPM	Raised Reflective Pavement Marker
RTS	Road Traffic Standards
RUL	Remaining Useful Life
SADD	Students Against Dangerous Driving
SCATS	Sydney Coordinated Adaptive Traffic Systems
SCI	Surface Condition Index
SDC	Stratford District Council
SH3 and 45	State Highway 3 and 45
SP	Severity Priority
STDC	South Taranaki District Council
STE	Smooth Travel Exposure
TRC	Taranaki Regional Council
TMP	Traffic Management Plan
TTM	Temporary Traffic Management
TUL	Total Useful Life

Acronym	Definition
TSA	Treatment Selection Algorithm
VKT	Vehicle kilometres travelled
VPD	Vehicles per day
VPH	Vehicles per hour
WC	Work Category
YBG	Yellow Bristle Grass