
Whangarei to Auckland – Connecting Northland

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August 2017

Programme Business Case



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SUPPORTING DOCUMENTS

30 Year Transport Strategy for Northland, 2010	
Brynderwyn North Notice of Requirement for alteration to designation,	
Northland Regional Transport Strategy	
Rodney – Kaipara Co-ordinating Land Use Study (Dome Brynderwyn sub-region)	
Tai Tokerau Northland Economic Action Plan	
Tai Tokerau Northland Regional Growth Study	
Upper North Island Ports Study, 2012	

GLOSSARY OF TERMS

Benefit Cost Ratio	BCR
Coastal Marine Area	CMA
Detailed Business Case	DBC
Indicative Business Case	IBC
Ministry of Business Innovation and Employment	MBIE
Multi-Criteria Assessment	MCA
Net Present Value	NPV
One Network Road Classification	ONRC
Programme Business Case	PBC
Road Controlling Authority	RCA
Road of National Significance	RoNS
Scheme Assessment Report	SAR
State Highway 1	SH1
State Highway 12	SH12
State Highway 14	SH14
State Highway 15	SH15

EXECUTIVE SUMMARY

NZ TRANSPORT AGENCY **Connecting Northland**

AUCKLAND TO WHANGAREI

CORRIDOR STRATEGY

The Tai Tokerau Growth Strategy (2015) has brought a whole of Government approach to tackle the economic challenges facing Northland. Connecting Northland through better transport links is a game changer for the region and a critical action within the Northland Economic Action Plan (2016).

Connecting Northland is an integrated transport approach which recognises the importance of improving transport access within a multi-modal environment.

The vision for the Auckland to Whangarei state highway corridor is a safe corridor which provides reliable journey times to support the economic growth of the region and access to key markets.

As part of an integrated transport system, access to Auckland (including the airport and inland ports) and Northport to support distribution of freight is required. This includes the potential for rail access to the port in the future.

Non infrastructure measures such as access to driver licensing and education programmes to support Northland communities is also required.

Investment in the corridor will address three critical problems:

- poor safety record with a high number of deaths and serious injuries
- frequent unplanned events (not maintenance) resulting in significant detours.
- a higher cost of moving freight as a result of the poor alignment and journey times which are not competitive with other regions.

The long term goal is a divided carriageway on a good alignment between Auckland and Whangarei. Progress towards this will be prioritised based on need and return on investment. Four major infrastructure schemes have been identified to progress to construction in the next 30 years:

- A dual carriageway between Whangarei (SH14) and Port Marsden Highway (SH15a)
- A Brynderwyn Hill bypass
- Warkworth to Wellsford RoNS
- Puhoi to Warkworth RoNS

Safety improvements on the remaining sections will be progressed as well as reducing the impact of traffic on townships and upgrading existing detour routes.

The programme delivers confidence in travel times for the freight industry supporting business investment in the northland economy. Improvements to the transport corridor attract domestic and international tourists providing benefits for the communities of Northland. The result is that Northland is better connected by a corridor which is safe, resilient and enables economic development.

CONNECTING NORTHLAND

Around 2 million tonnes of freight moves between Northland and Auckland each year. Tourism in Northland accounts for \$1 billion a year.

The State Highway 1 corridor is therefore a vital link between Northland and the rest of the country for freight and tourism.

The Northland economy performs poorly when compared to other regions of New Zealand. This is particularly disappointing given its proximity to Auckland. One of the key enablers for improving the economic performance of Northland is transport accessibility. This has been confirmed through the recent all-of-government Tai Tokerau Northland Economic Action Plan.

State Highway One (SH1) plays a critical transport accessibility role, connecting Northland with New Zealand. Improving the northern state highway network will help Northland contribute to the so-called ‘golden triangle’ of Auckland, Hamilton and Tauranga. Together these three centres generate 36% of New Zealand’s Gross Domestic Product (GDP) with a prediction for this to rise to 47% by 2026. Investment in transport between Auckland and Whangarei will contribute significantly to this.

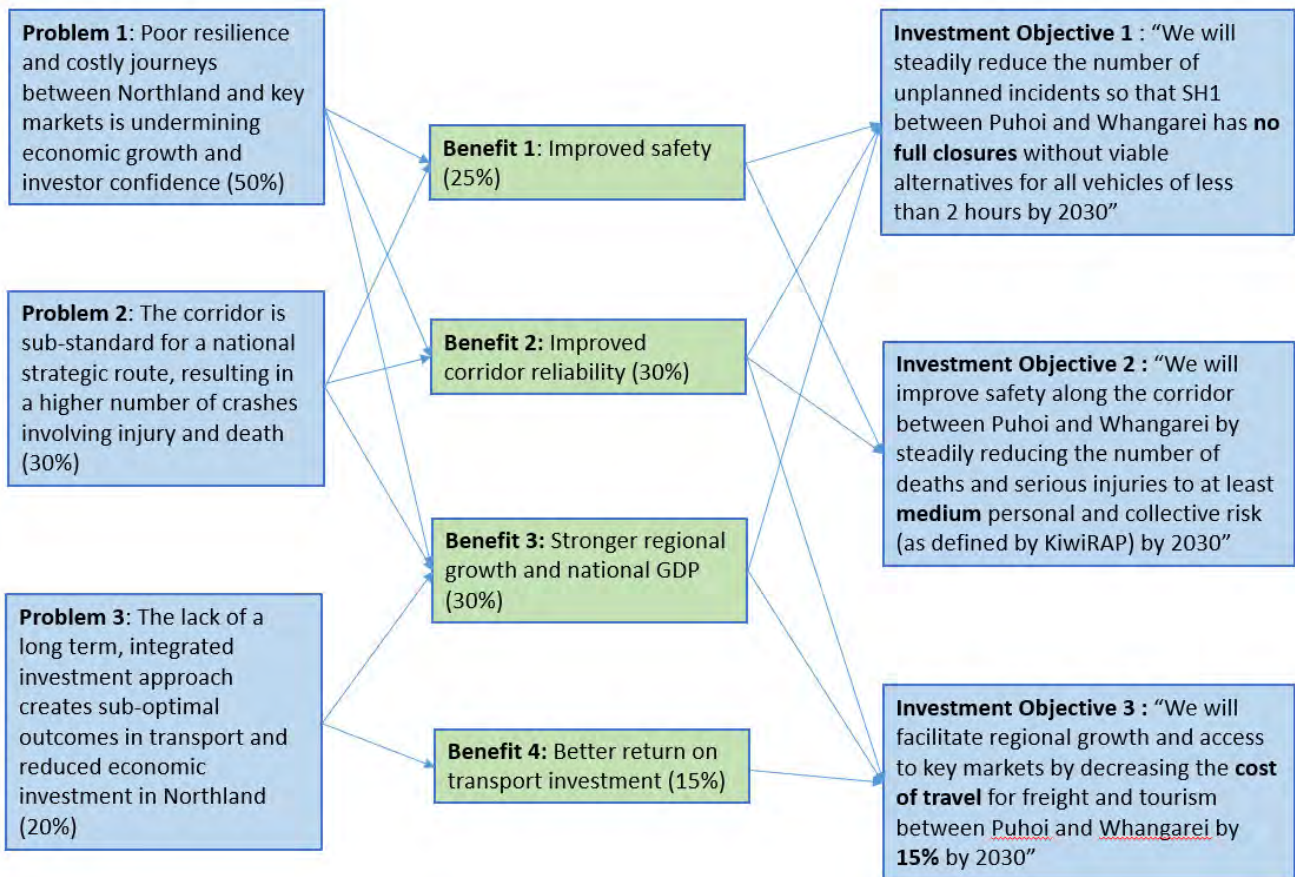
At present the corridor between Auckland and Whangarei is often closed, its alignment is comparatively unsafe by national standards and the cost of travel is an impediment to economic growth in Northland. This is not consistent with the One Network Road Classification (ONRC) aspirations of a National (High Volume) Strategic Route.

Providing a safer, more resilient and cheaper route between Auckland and Whangarei not only provides better accessibility between Auckland and Northland, but also Northland and the rest of New Zealand, and indeed the rest of the world through the Ports of Auckland and Auckland Airport.

A comprehensive and collaborative approach has been adopted with stakeholders to develop this Programme Business Case (PBC). This has resulted in alignment on the problems, benefits and investment objectives for the corridor as outlined in Figure 1.

The collaborative PBC approach has involved the development of options to best address the problems identified and then the compilation of a suite of programmes from these options to best deliver the outcomes sought by the agreed investment objectives.

Figure 1 : Project problems, benefits and investment objectives



Ten programmes were developed and assessed in detail, ranging from lower-cost interventions to programmes that aimed to fully meet the ONRC aspirations for the corridor.

The recommended programme best balances achieving the desired investment outcomes in an economically efficient manner. This has been achieved through a combination of operational and capital interventions. The recommended programme and performance against the investment objectives is outlined in Figure 2.

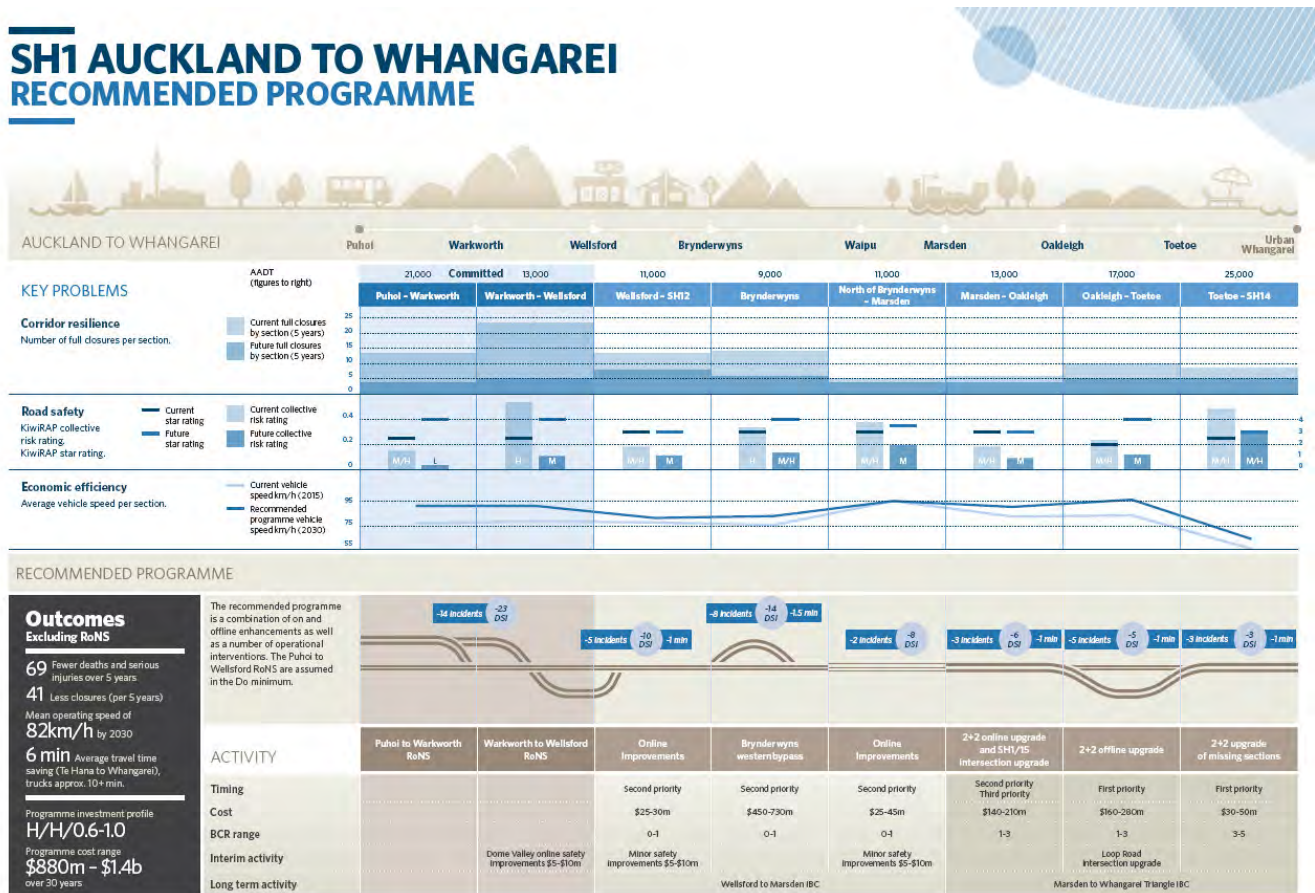
The recommended programme includes a suite of operation interventions including improved signage, targeted driver behaviour programmes, rest areas, truck stops, park n ride facilities and detour routes will also be upgraded to be fully HPMV capable. Capital projects are also part of the recommended programme. The recommended programme is shown in Figure 3.

The outcomes achieved by the recommended programme include:

PBC Investment Outcomes

- 6 min average travel time saving (Te Hana to Whangarei), trucks approx. 10+ min
- Mean operating speed of 82km/h
- 69 fewer deaths and serious injuries every five years
- \$880M - \$1.4B cost, over 30 years

Figure 2: Recommended programme summary



The benefit cost ratio (BCR) for the recommended programme is between **0.6 - 1.0** and best matches the level of investment required to deliver the investment outcomes sought. As well as these transport outcomes, opportunities exist to deliver further benefits for the local, regional and national economy, including social, economic and land use benefits.

The recommended programme has an investment profile of H/H/0.6-1.0.

The recommended programme has been assessed to carry manageable implementation risks. Implementation of the programme is initially focussed on the most immediate safety areas, improving the form of the connection between Whangarei and SH15 (Port), followed by the Brynderwyn Hills bypass and then the remaining components of the programme. Due to the economic efficiency of some projects within the programme, implementation may be subject to delays in order to obtain funding.

The recommended programme meets the investment outcomes sought for the corridor, connecting Northland with a safer, more resilient and less costly journey that will enable the growth of the Northland economy. This is achieved through a wide range of projects along the corridor length.

Figure 3: Recommended programme



PART A – THE STRATEGIC CASE

1. INTRODUCTION

This Programme Business Case (PBC) considers the case for investment to address problems on SH1 between Whangarei and Puhoi. Whilst the PBC is focussed on SH1, it also includes consideration of the role of SH15, including the newly proposed inland freight route link connecting SH1 and SH14 via Loop Road and Otaika Valley Road and must be considered in the multi-modal context of the rail and coastal shipping modes that also operate in the corridor.

As shown in Figure 1, this PBC is part of a wider suite of corridor plans examining key journeys and routes in the Tai Tokerau Northland region.

Figure 4: PBC context



The Tai Tokerau Northland economy is one of New Zealand's poorest performers and, given its proximity to the country's largest and strongest performing centre there is real opportunity to improve this current situation. The recently completed Ministry of Business, Innovation and Employment (MBIE) Tai Tokerau Northland Economic Action Plan sets out an All-of-Government plan to revitalise the Northland economy. Transport connectivity is a key part of this plan, identified both in its own right and as a key contributor to a range of identified opportunities.

Connecting Northland is an integrated transport approach which recognises the importance of improving transport access within a multi-modal environment. This section of SH1 has a nationally important function, linking Northland with the rest of New Zealand and the world (through international ports and airports). SH1 has been identified in the One Network Road Classification (ONRC) as a National (high volume) road to Wellsford and a National road between Wellsford and Whangarei. It has been upgraded to allow the operation of full High Productivity Motor Vehicles

(HPMVs). It currently has a dual role providing for local and inter-regional light and heavy vehicle (freight) traffic between major centres of population and economic activity. There is a rail corridor between Auckland and Whangarei, which operates freight services, and a deep water port, NorthPort, at Marsden Point.

This PBC has been developed with stakeholders and investors to ensure that all parties are directing change and improvement in the right areas. In particular it:

- Confirms (with minor refinement) the Strategic Case problems and benefits;
- confirms the need to invest and the case for change;
- Develops investment objectives;
- Is informed by customer insights;
- Investigates options and alternatives to address the problems in the corridor; and
- Identifies a preferred programme of works to address the problems in the corridor;
- identifies the key asset and non-asset based projects that will support the programme outcomes, including proposed priority and timing, and
- seeks the early approval of decision-makers to develop subsequent project-based business cases.

2. PROGRAMME CONTEXT

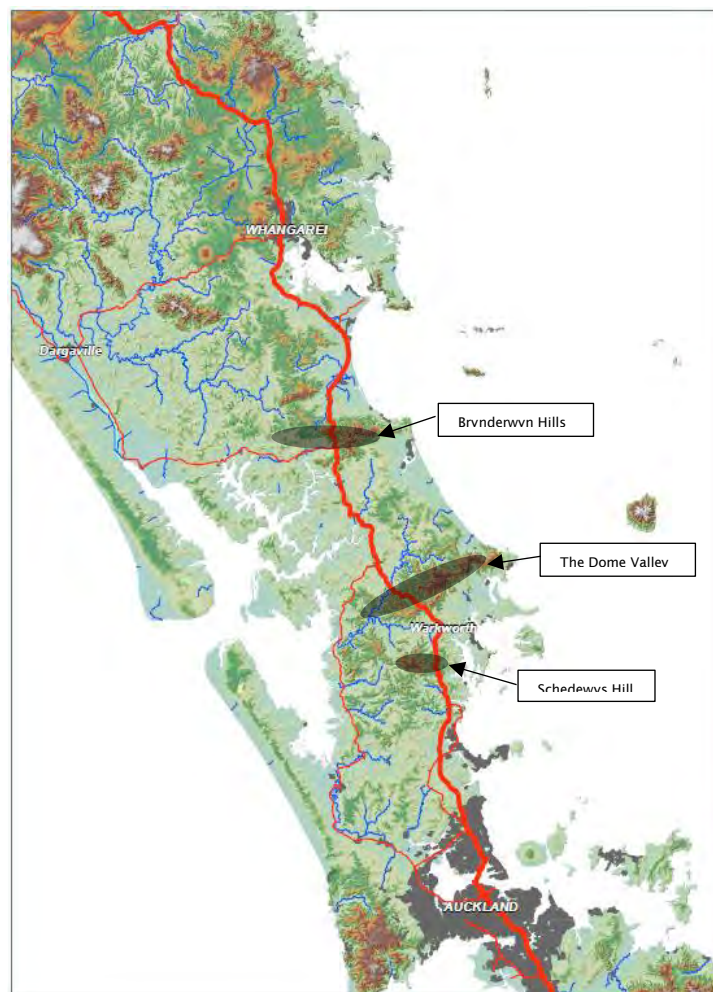
2.1 GEOGRAPHIC AND ENVIRONMENTAL CONTEXT

As outlined in Figure 5, SH1 traverses a broad range of terrain and environments along the 115km distance between Whangarei and Puhoi. Generally, the terrain is hilly between Puhoi and Waipu, with three distinct ranges crossed, being Schedewys Hill, Dome Valley and the Brynderwyn Hills. The ground conditions are challenging with poor soil conditions affecting the current performance and alignment of SH1. The geographic and geological conditions through these sections create challenges for road alignment (both vertical and horizontal) with increased cost to build and operate infrastructure.

The corridor is close to the coastline in a number of locations and therefore traverses a number of different catchment areas. Over the hillier sections of the route the environment is a combination of productive forest and native bush. In the less hilly sections, pastoral farming is more prevalent. There are a number of Department of Conservation (DoC) reserves along the route, generally protecting native bush areas.

North of the Brynderwyn Hills, the terrain flattens out and the area is predominantly used for farming at both a lifestyle block and larger scale.

Figure 5: Geographic and environmental context



2.2 SOCIAL CONTEXT

2.2.1 Region

Northland has one of the most deprived populations in the country. While 20% of New Zealand's population is in the lowest quartile of the deprivation index, the equivalent measure for Northland is 35%.

Economically this story has two distinct extremes. Auckland is New Zealand's largest economy, the economic engine room of the country. In contrast, Northland is one of the most economically deprived areas of the country.

Northland is a regional economy that has been underperforming relative to other New Zealand regions and relative to its resource base for too long. The regional economy was impacted by the Global Financial Crisis (e.g. a large reduction in tourists from the UK and the USA) and some significant climatic events, both severe storms and drought conditions. The Far North and Kaipara districts have similar economic structures, with a strong focus on primary production. Whangarei is the region's main urban and servicing centre with a higher concentration of manufacturing and service industries.

Northland's economy accounts for 2.5% of New Zealand's Gross Domestic Product (GDP). Nominal GDP in the region increased by 2.6% per annum on average over the past five years, compared to the national average of 4.1%. Northland has an unemployment rate three percentage points above the national rate and nominal GDP per capita is 32% below the national average. Just over 20% of Northland's usually resident population live in areas that have the lowest deprivation score compared to 10% nationally.

Northland's relatively low population density and geographic remoteness have contributed to its economic underperformance despite being in relatively close proximity to the strongly performing Auckland economy.

2.2.2 Growth

A number of towns and settlements are located along the route. Warkworth is an identified growth area in the Auckland Unitary Plan and considerable growth in population and employment is forecast for this area. The Eastern Beachs (Snells Beach, Algies Bay, Sandspit, Omaha and Matakana) are popular holiday destinations and are forecast for strong growth and an increasing permanent population.

Further north, other towns along the route such as Wellsford, Te Hana and Kaiwaka have not experienced growth for a number of years. The Mangawhai area (Kaipara District) has steady growth forecast with a recent acceleration. Closer to Whangarei, the Ruakaka area is also identified for considerable growth.

2.2.3 Communities

The SH1 corridor passes through a number of towns and communities between Auckland and Whangarei. The following communities are situated on SH1 with direct connection to the state highway:

- Warkworth
- Wellsford
- Te Hana
- Kaiwaka

- Brynderwyn

Townships situated along the corridor experience both positive and negative effects from the State Highway. Access and pass by trade provide opportunities to these areas, while severance, road safety, visual, emissions and noise effects reduce the sense of place to these areas.

A number of other towns are situated adjacent to the route with secondary connection to SH1:

- Puhoi
- Eastern Beachs
- Port Albert
- Mangawhai /Te Arai
- Langs Beach
- Ruakaka / Marsden Point
- Mangapai

Connectivity to these communities is seen as a critical factor. Outside of the settlements and towns, a number of residents and farms enjoy direct access to the State Highway corridor.

2.3 TRANSPORT CONTEXT

2.3.1 Economic importance

Due to its geographic position and isolation from key markets, transport connections for the Northland region are critical for its economic development. Efficient access to the large market and economic opportunities of metropolitan Auckland as well as connectivity to the Auckland airport and seaports at Northport, Auckland and Tauranga will help underpin future growth.

The recent MBIE Tai Tokerau Northland Economic Action Plan has identified the importance of the transport network as a key enabler for economic growth in Northland and in particular the role of SH1 in providing access to the rest of the country.

Given the economic structure of the region with a high proportion of primary activities relying on export markets, freight movements within the region and to Northport are of major strategic importance. It is currently proposed to strengthen the road transport network connecting Northland's primary industry, forestry, with Northport through a new state highway (SH15), which will provide a more resilient inland freight route.

2.3.2 Multimodal network

The current rail line provides very few services a day (and all freight services) and is subject to both size and weight restrictions. Perhaps the biggest constraining factor to use of the rail line for the corridor is the constraint of the urban Auckland rail network. Congestion on the Auckland Western line is a significant constraint for rail from Northland adding cost and time delay to services. As the Auckland commuter rail task increases, freight will be increasingly difficult to move through the area. The line requires a significant investment to upgrade bridges, tunnels and operating systems if this level of service is to be enhanced.

As a result of current constraints to rail freight, usage of the freight rail service is restricted to selected industries.

Coastal shipping plays an important role in the transport of freight out of Whangarei. Due to the nature of shipping, this is restricted to moving large volumes of low value goods such as aggregate, logs and oil.

2.3.3 Road network

The ONRC is a classification system that identifies the level of service, function and use of road networks and state highways. The SH1 road corridor is identified as a National (High Volume) route between Puhoi and Warkworth (the highest classification) and a National route from Wellsford to Whangarei and SH15A, due to their role providing access between Whangarei and Auckland (including international airport and port facilities).

SH1 between Auckland and Wellsford is classified by the ONRC as a '*High Volume*' route with the SH1 section between Wellsford and Whangarei and SH15A classified as a '*Strategic*' route. SH16, SH12 and SH14 are classified as '*Primary Collectors*'. **Appendix A** includes a transport network plan, outlining the critical local and strategic links in the network.

SH1 between Puhoi and Whangarei is over 115km in length and there are many variables to the form of the road. In general the road is a single lane (in each direction) undivided carriageway. Figure 6 summarises the current demand and shows that traffic flows range from 8,000 – 24,000 vehicles per day. It indicates that the heaviest flows are between Whangarei and SH15 and between Wellsford and Puhoi. Traffic growth has been assumed at a rate of 1.5% over the length of the corridor between Wellsford and Whangarei.

Figure 6 also shows HCV flows per day, which range between 900 and 1800 and between 8-14% of the traffic composition. It also shows that HCV growth has been greater than other general traffic between 2010 and 2014. The greatest heavy vehicle flows are also between Whangarei and SH15 and Warkworth and Puhoi.

There are a number of passing lanes along the corridor. From Puhoi to Wellsford, the corridor is identified as a Road of National Significance (RoNS). The Puhoi to Warkworth section has statutory approval for an offline, four-lane divided, motorway-standard road, which is currently being procured through a Public Private Partnership (PPP) arrangement (with completion expected in 2021/2022). Statutory approvals applications are currently being prepared for the Warkworth to Wellsford section.

Figure 6: Existing AADT



2.4 ENVIRONMENTAL CONSTRAINTS AND OPPORTUNITIES

There are a number of environmental and topographical constraints and opportunities along the corridor that have influenced the development of this PBC.

Figure 7 shows the landform and settlements along the route. Of particular note are settlements at Warkworth, Wellsford, Te Hana and Kaiwaka, which are located immediately on the corridor. Integration with these townships is a particular area of focus.

Figure 7 also indicates significant landforms through the Dome Valley and Brynderwyn Hills. **Appendix B** includes other environmental constraint plans, which show Outstanding Natural Landscapes and Features immediately adjacent to the route in the Dome Valley and Brynderwyn Hills. Although it is important to ensure that any new infrastructure sensitively addresses these features, they also represent an opportunity to attract visitors, potentially through well-designed stopping places.

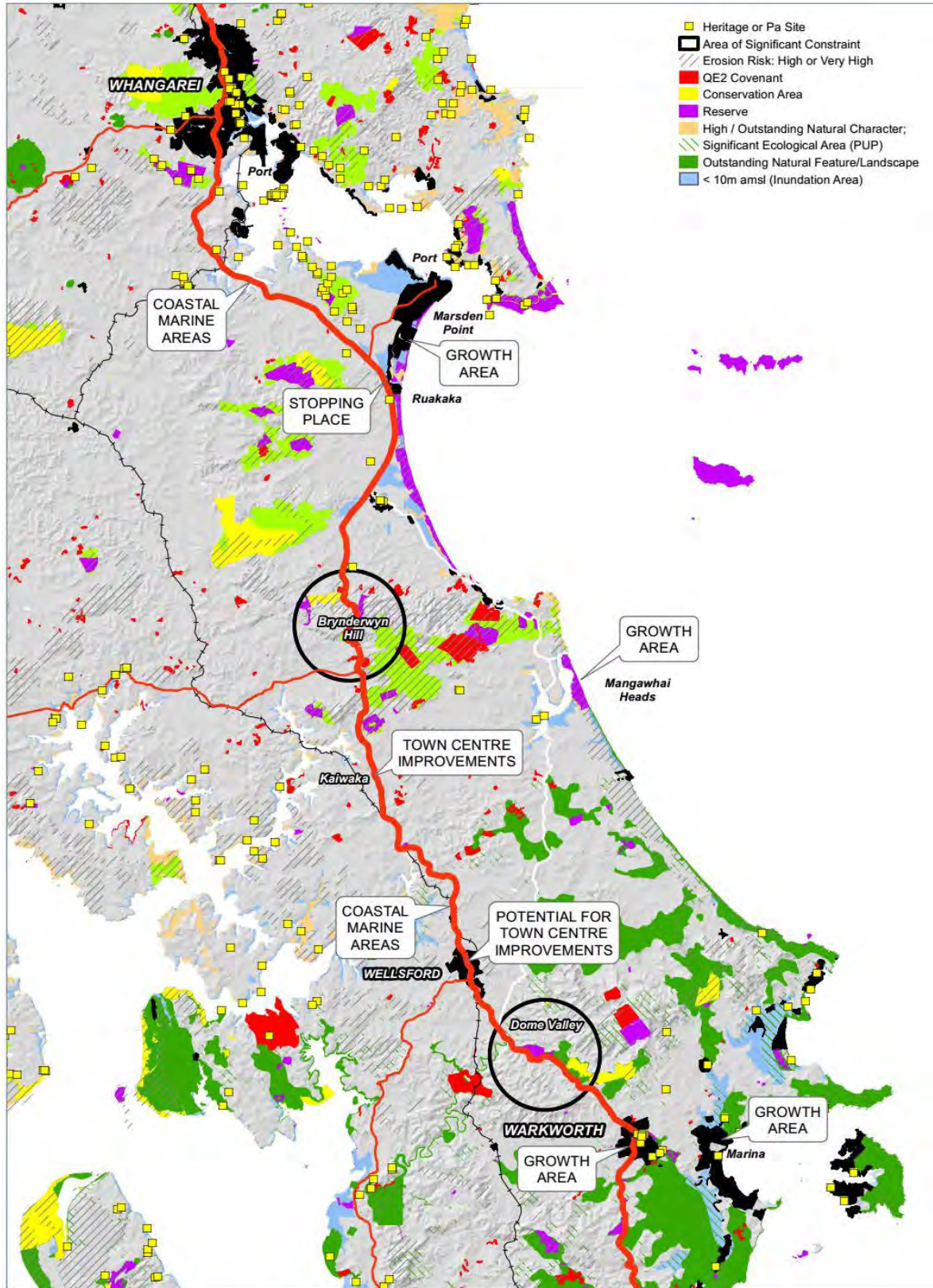
Appendix B identifies cultural and heritage features along the route. It highlights a particular concentration of archaeological and pa sites to the south of Whangarei.

Recreation and tourism opportunities along the corridor are also highlighted, including the walking / cycling tracks through the Dome Valley and close to the coast at Ruakaka. It also shows a trail connection to the Brynderwyn Hills. A key consideration for this PBC is how best to maximise these opportunities.

Environmental and social issues and opportunities were discussed at the stakeholder workshop. A range of issues and opportunities were identified for the corridor. These issues and opportunities were key inputs into the development of a social and environmental filter to test options against. The social and environmental issues and constraints specific to this corridor are as follows:

- Sustainability of towns/centres along the route (Kaiwaka, Wellsford)
- Areas of cultural and heritage significance
- Sensitive ecological areas and receiving environments
- Landscape character, and protected landscapes
- Topography and soil types
- Biosecurity (e.g. Kauri die-back)
- Land use (e.g. productive landscapes)
- The quality of the journey, visual quality, tourism experience and stopping places
- Severance, accessibility, walking, including national pathways
- Cycling and relationship with national cycle network

Figure 7: Landform and Settlements



0 5,000 m
1:250,000 @ A3
Data Sources: Refer to individual constraints maps for data sources
Projection: NZGD 2000 New Zealand Transverse Mercator

DRAFT

SH1 - PUHOI TO WHANGAREI - OPPORTUNITIES & CONSTRAINTS
OPPORTUNITIES & CONSTRAINTS SUMMARY

Date: 14 July 2016 | Revision: 1
Plan prepared for NZTA by Boffa Miskell Limited
Project Manager: robert.schofield@boffamiskell.co.nz | Drawn: PMO

3. PARTNERS AND KEY STAKEHOLDERS

The activities and problems relating to this section of SH1 affect a number of different organisations and customers. The engagement through the PBC built upon engagement undertaken during the development of the Strategic Case and widened the number of stakeholders to ensure a broader level of engagement across this long corridor.

As well as these stakeholders, discussion and liaison with Heavy Haulage Association, KiwiRail, and significant transport users (i.e. Northport) was also undertaken.

3.1 INVESTMENT PARTNERS

3.1.1 NZ Transport Agency

The Transport Agency is responsible for managing, operating, planning and improving state highways.

As a partner to this business case, the Transport Agency is fundamentally concerned with ensuring the safety and efficient travel for users on this section of the state highway network. Investment in the state highway network may therefore be needed to help solve the problems identified in the Strategic Case, and fully realise the benefits of investing.

3.1.2 KiwiRail

KiwiRail is responsible for the rail infrastructure that services the area. Investment by KiwiRail is potentially required to fully realise the benefits as identified in the Strategic Case.

3.2 KEY STAKEHOLDERS

Based on engagement with stakeholders, the following key focus areas have been identified. Generally, there is strong alignment between stakeholders regarding the focus areas for the corridor.

Stakeholders	Focus areas
NZ Transport Agency – Highway Networks Operations	Development of a programme of works that provides for the safe and efficient operation of SH1
NZ Transport Agency – Planning and Investment	Development of a programme that has a sound evidence base and represents a good investment
Whangarei District Council	Focused on a programme that is implemented with priority that links Whangarei more efficiently and safely with the rest of the country, whilst also supporting growth aspirations
Kaipara District Council	Focused on the interaction with the communities along the current corridor and understanding any implications and opportunities from the programme
Northland Regional Council	Development of a fundable programme that increases accessibility to Northland
Northland Inc	Development of a programme quickly that provides for the increased economic growth of Northland
Auckland Transport	Particularly focussed on the Puhoi to Wellsford section and the interface with identified growth areas

Stakeholders	Focus areas
Auckland Council	Interface with growth areas and impact of programme on towns along the route such as Wellsford
Northport	A clear vision for the corridor to provide investors with certainty
Freight Industry	Reducing the cost of travel in Northland and addressing key areas of deficiency such as the Bynderwyns and Loop Road
Iwi Partners	Cultural assessment of the corridor and road safety on the corridor

3.3 ALIGNMENT TO EXISTING STRATEGIES / ORGANISATIONAL GOALS

This section describes how the proposed “assessment” outcomes align to relevant national, regional, sector and organisational strategies. **Appendix C** provides a detailed assessment of the applicable strategies. The strategies with the most direct impact on this PBC are outlined below.

3.3.1 One Network Road Classification (ONRC)

The ONRC has been developed by the Road Efficiency Group (which is a collaboration between Road Controlling Authorities across New Zealand) as a classification system that identifies the level of service, function and use of road networks and state highways. The SH1 road corridor is identified as a National (High Volume) route between Puhoi and Warkworth (the highest classification) and a National route from Wellsford to Whangarei, due to its role providing access between Whangarei and Auckland (including international airport and port facilities).

3.3.2 Upper North Island Freight Story

The Upper North Island Strategic Alliance undertook work in 2013 to support informed decision making on key land use, infrastructure and investment, to improve the economic performance of the Upper North Island and New Zealand. The Freight Story sought to understand the supply and demand of industrial land, promote a strategic and integrated approach towards land use and transport planning and identify constraints on the Upper North Island’s strategic rail and road networks.

The problems and potential outcomes for the SH1 corridor are consistent with a number of the critical freight issues that the Upper North Island Freight Story seeks to address. The Freight Story confirmed strategic road and rail network constraints as their top critical issue and in particular, ranks highly the inter-regional road corridor (Auckland/ Waikato/ Bay of Plenty) in terms of ‘scale of benefit of collective partner focus’ in reducing the cost to do business.

3.3.3 Tai Tokerau Economic Action Plan

The Tai Tokerau Northland Economic Action Plan (February 2016) brings into focus a group of projects that together will contribute to transforming Northland’s economy. This is an all of government action plan to improve the economic performance of Northland.

The Action Plan is short to medium term, covering 10 years; one that encourages new projects to be included as existing projects come to completion. A broad range of organisations will contribute to the success of the Action Plan, from business and Iwi/Maori through to not-for-profit organisations and local and central government, including the Transport Agency.

The Study highlighted a range of opportunities for Northland. These have been narrowed down in the development of the Action Plan to coalesce limited resources around the projects that will make

the greatest short to medium term difference. These projects have been organised together into common work areas that fall under four broad work streams. The objectives for each are:

1. **Enablers:** To bring Northland’s transport, digital infrastructure, skills and capabilities and water resources to a standard that creates an enabling environment for economic development in Northland.
2. **Land & Water:** To identify and develop opportunities for more productive use of land and water resources across a range of primary industry sectors.
3. **Visitor Industry:** To reduce the impact of seasonality, improve product dispersal across the region and enhance tourism promotion.
4. **Specialised Manufacturing & Services:** To support the development of new innovation and specialised manufacturing and service sectors.

The Tai Tokerau Northland Economic Action Plan has identified that the lack of robust transport accessibility between Northland and the rest of the country is a contributing factor to the area’s poor economic situation and has identified four ‘game changers’ to underpin business growth. The first of these game changers is:

Transport: – better connectivity with Auckland, within the region and with export markets. Northland is a place-based economy. Roothing in particular, is critical for Northland to develop and affects virtually every part of the economy.

A number of sectors, identified in the Tai Tokerau study as potential growth areas, require good links to markets and suppliers in Auckland and beyond. These activities include:-

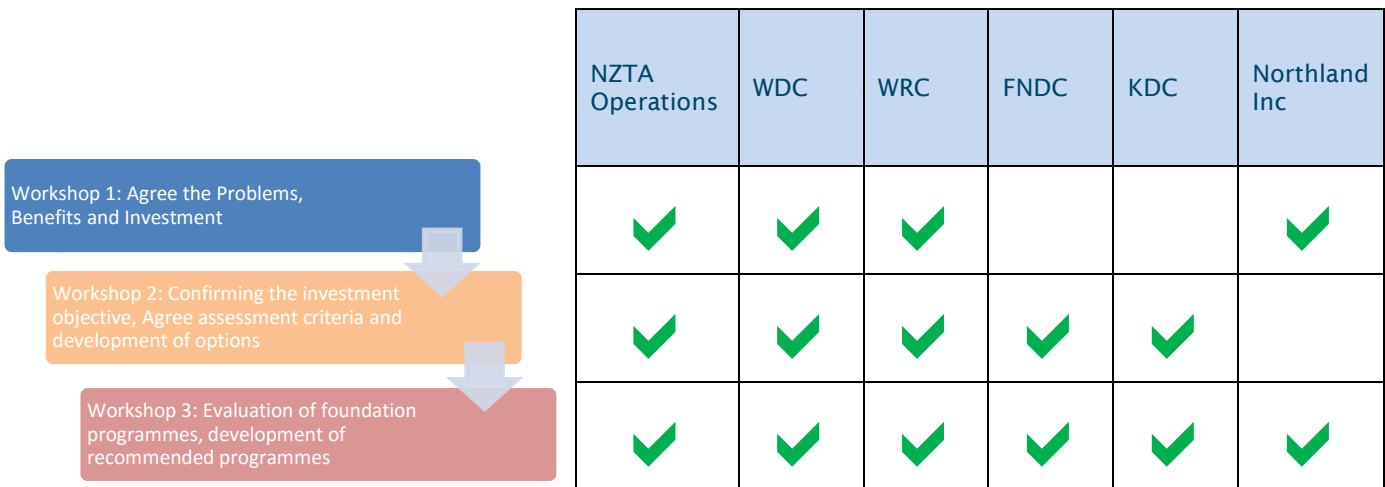
- Improving dairy and related production and processing
- Forestry and related wood processing, and especially growing wood processing including a new saw and pulp mill at Ngawha.
- Aquaculture (although the scale of this is probably more limited)
- Horticulture

Other opportunities that may depend on good links to Auckland would include:

- Marine manufacturing (links to suppliers and markets)
- International education
- Tourism

3.4 WORKSHOP COLLABORATION

The PBC has been developed through a Collaborative process with active involvement from a technical stakeholder group. The workshops held and attendance is outlined in the figure below:



3.5 CUSTOMER INSIGHTS

Initial communications with the wider public occurred with the launch of the Connecting Northland website which was promoted to attendees at a Transport for Future Urban Growth (TFUG) public open day in Warkworth on 30 April 2016. A PDF flyer promoting the online engagement was distributed to key stakeholders via email and provided to attendees at the TFUG event.

Promotion of the online engagement was through targeted Facebook ‘boosts’ (which were paid advertising posts aimed at generating visitors to the Connecting Northland website). Each ‘boost’ generated significant site traffic with over 6,000 visits to the website ‘Tell us what you think’ page during the engagement period.

3.5.1 Qualitative data

Submitters were asked to consider six areas of the state highway network and to identify which three (if any) they would prioritise for future investment. The six areas were identified as:

- Dome Valley
- Kaiwaka to Te Hana
- Brynderwyn Hill
- Ruakaka to Waipu
- Otaika Valley Road (to become SH15)
- Through Whangarei

Of the 988 submissions received through the Connecting Northland website, 860 prioritised Dome Valley (87%) as the area needing transport investment due to safety risks, speed restrictions and resilience (significant detours during unplanned events). Brynderwyn Hills were the second priority with 693 (70%) and the third priority was Kaiwaka to Te Hana with 433 (44%) responses. The state highway section identified with the least priority was Ruakaka to Waipu with 102 responses.

3.5.1 Qualitative data

In order to support comments across a broad corridor, only two questions were posed:

1. Provide feedback on the areas you have prioritised
2. Any other comments on the corridor plan

Across the total survey responses, question two elicited the most written responses. Puhoi to Wellsford (including the Dome Valley) was the strongest theme represented in the comments. Other recurring themes included:

1. Resilience (SH closures due to unplanned events or weather)
2. Safety
3. Capacity (need to increase)
4. Connecting Northland
5. SH1 Brynderwyn Hill (rationale for northside safety improvements)
6. Otaika Valley/Loop Road
7. Quality of Northland roads
8. Maintenance and operations
9. Rail

Comments were also made on the timeliness of implementing projects, particularly in respect of projects around Warkworth. A number of submissions were received on Penlink and these responses have been forwarded on to Auckland Transport. The full Public Consultation Report – Auckland to Whangarei PBC has been included in **Appendix D**.

4. STRATEGIC ASSESSMENTS – OUTLINING THE NEED FOR INVESTMENT

4.1 DEFINING THE PROBLEM

A facilitated workshop was held on 17th February 2015 with key members of the internal project team to gain a better understanding of investment drivers and the need to invest in change during the Strategic Case. Subsequent to this initial session a further facilitated workshop with key stakeholders was undertaken on 19th March 2015. During the PBC, further evidence was gathered to confirm the problems of the Strategic Case.

Based on this further evidence and discussion, Problem Statement 1 has been reworded to better reflect the resilience focus of the problem, rather than the travel time reliability focus of the existing wording. Problem Statement 3 has also been refined to better reflect the discussion and focus more on its effect on investment in Northland. The weightings have remained the same. The revised wording and weights are provided below:

- **Problem 1:** Poor resilience and costly journeys between Northland and key markets is constraining economic growth and investor confidence (50%)
- **Problem 2:** The corridor is substandard for a national strategic route, resulting in a higher number of crashes involving injury and death (30%)
- **Problem 3:** The lack of a long-term, integrated investment approach creates suboptimal outcomes in transport and reduced economic investment in Northland (20%)

The revised Investment Logic Map is attached as **Appendix B**.

4.2 THE BENEFITS OF INVESTMENT

The benefits of successfully investing to address these problems were identified as part of the ILM process in 2015. Four benefits were identified for the corridor when the problems were addressed. These benefits are:

- **Benefit 1:** Improved safety (25%)
- **Benefit 2:** Improved corridor reliability (30%)
- **Benefit 3:** Stronger regional growth and national GDP (30%)
- **Benefit 4:** Better return on transport investment (15%)

During PBC Workshop 1 there was discussion and engagement in relation to the benefits as part of preparing to develop investment objectives for the corridor. During this discussion there were no changes proposed as it was agreed that the benefits and KPI's developed during the Strategic Case remain appropriate and relate well to the updated problem statements.

4.3 IDENTIFICATION OF UNCERTAINTY AND RISK

During the development of the investment objectives, stakeholders also gave consideration to the risk and uncertainty of key assumptions that should be considered during the development of the PBC. Table 1 outlines the identified risks and uncertainties. Treatment of each risk and uncertainty has been done on a case by case basis. Some risks have been used to develop project options, others have form the backbone of a programme. The majority have been considered and will form the basis of sensitivity tests carried out on project options or become trigger points within the recommended programme.

Table 1: Uncertainty Log

Risk	Time	Likelihood	Severity / Impact on corridor	Comments
Land use changes				
Growth forecasts Whangarei changes. Marsden Point increases population and employment		Reasonably foreseeable	Medium	As per WDC high forecast for Marsden Point
Warkworth growth as per SubRAP with Future Urban area	2020	More than Likely	High	As per latest ART modelling
Wellsford population increases	2020 post RoNS	Hypothetical	Medium	Growth in accordance with Warkworth
Kaipara District Council development	2020 post RoNS	Reasonably foreseeable	Low	Growth in KDC higher than anticipated following improved access
Port activity				
Bigger containers or bulk goods import role at Northport	Post 2020	Hypothetical	High	Informed from the UNI Freight Study scenarios and the Auckland Port Study currently in progress
Air travel				
Whangarei Airport increases domestic flights	unknown	Hypothetical	Low	Informed by Whangarei Airport study
Whangarei Airport moves	unknown	Hypothetical	Low	Reduction in accessibility to Whangarei
Rail mode share				
Investment in rail network, including Marsden Rail connection	unknown	Reasonably foreseeable	Medium	Greater portion of freight transported by rail. Reduction in heavy vehicles on road.
Inability of rail freight to travel through Auckland economically following increasing Auckland commuter demand.	Post CRL	More than likely	Medium	Risk of rail investment being ineffective due to constraints outside the scope of this corridor.
Economic development				

Risk	Time	Likelihood	Severity / Impact on corridor	Comments
Development of key industries creating additional jobs	unknown	Reasonably foreseeable	Medium	Informed by Tai Tokerau Growth Study
Increased tourism industry activity – more visitors	2025	Reasonably foreseeable	Medium	Tourism in Northland accounts for a large proportion of industry and affects traffic volumes significantly
Transport baseline				
Fuel prices	unknown	Reasonably foreseeable	Medium	Change in fuel price will affect vehicle travel and traffic levels on the corridor

4.4 PROBLEM 1: POOR RESILIENCE CONSTRAINS ECONOMIC GROWTH

“Poor resilience and costly journeys between Northland and key markets is constraining economic growth and investor confidence.”

4.4.1 The Evidence

SH1 from Whangarei to Puhoi is the main transport connection between Northland and the rest of the country. The evidence shows that the corridor suffers regularly from unplanned incidents, which affect its resilience and availability.

Further analysis of the Strategic Case evidence was undertaken and is summarised in Figure 8. In 2014, there were 27 full closures along the route, with an average delay of 7-8 hours. This gave a total of 216 hours of closure, equivalent to an average of nearly 20 hours per month. This data excludes partial closures, which would further compound the issues. At the end of this study, 2015 closure data was made available.

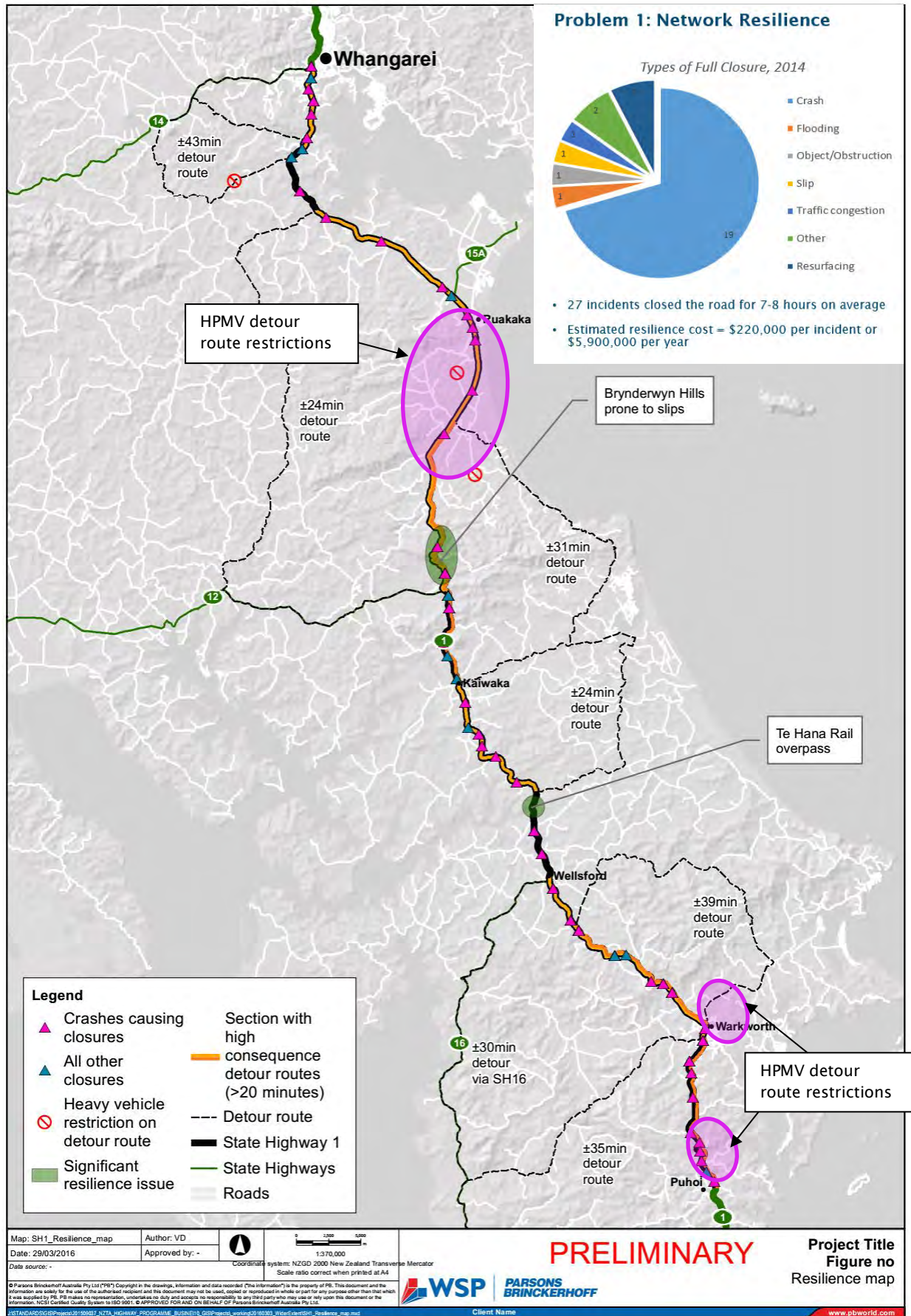
Of these unplanned incidents, 70% resulted from crashes with the remainder a combination of other predominantly environmental factors. The location of these closures is also shown in Figure 8, indicating resilience challenges in the Brynderwyn Hills as a priority. It also shows a high number of crashes along the section between Whangarei and SH15.

During the 2015 year, 19 incidents occurred on the corridor with a average delay of 2-3 hours. While significantly less than the 2014 year, the incidents followed similar trends in cause and location.

The detour routes for many of these closures are also challenging, as shown in Figure 8. These detour routes are not able to carry full HPMVs. These two factors, the length of the detour routes and their inability to carry HPMVs, significantly restrict the ability to divert freight traffic away from incidents.

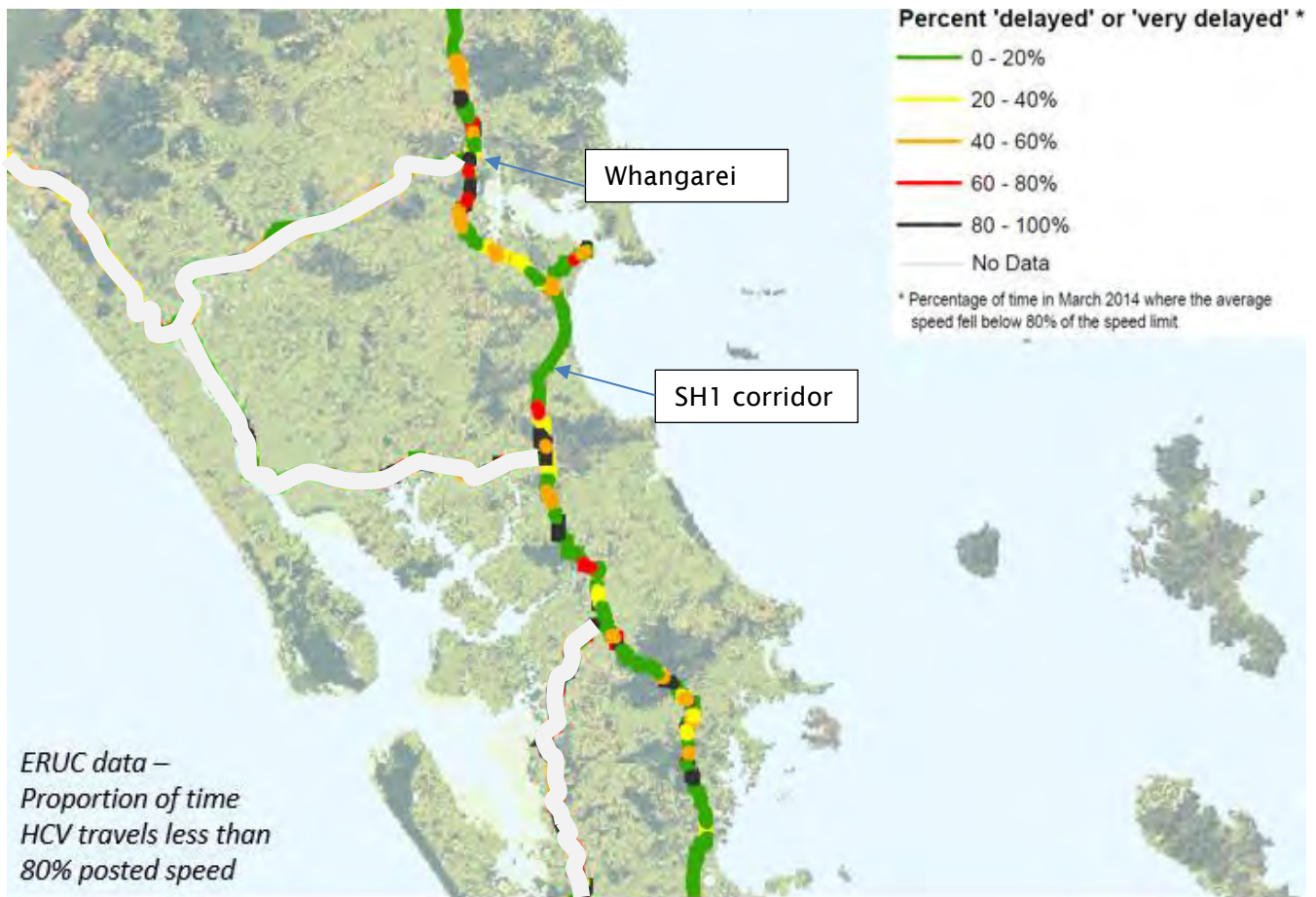
Significant delay can occur during once a detour route is implemented. Delay time on Figure 8 represent additional travel time for traffic once a detour is set up. Accounts from the network operators suggest detour routes themselves are often subject to additional delay as a result of one-lane bridges, priority intersections and crashes on the detour routes themselves.

Figure 8: Unplanned Incidents and Detour Restrictions



In terms of ‘costly journeys’, new analysis of travel times derived from the information used to collect Electronic Road User Charges (ERUC) data is shown in Figure 9. This analysis compares actual travel times with posted speeds by road section. This shows that heavy vehicles are delayed on the hillier sections of SH1, particularly through the Brynderwyn Hills, the Dome Valley and the town centres of Wellsford and Warkworth.

Figure 9 : ERUC Data



Speed data was analysed for the entire journey between Whangarei and Hamilton and as shown in Figure 10 and Figure 11, the trip north of Auckland is generally slower than the south of Auckland sections of the route (but is not affected by the capacity induced peak-time issues). During peak commuter periods Auckland can be slower, but generally the evidence shows that the average speed on SH1 north of Auckland is slower than through Auckland and between Auckland and Hamilton.

Figure 10 : Current Speed in Corridor by Section

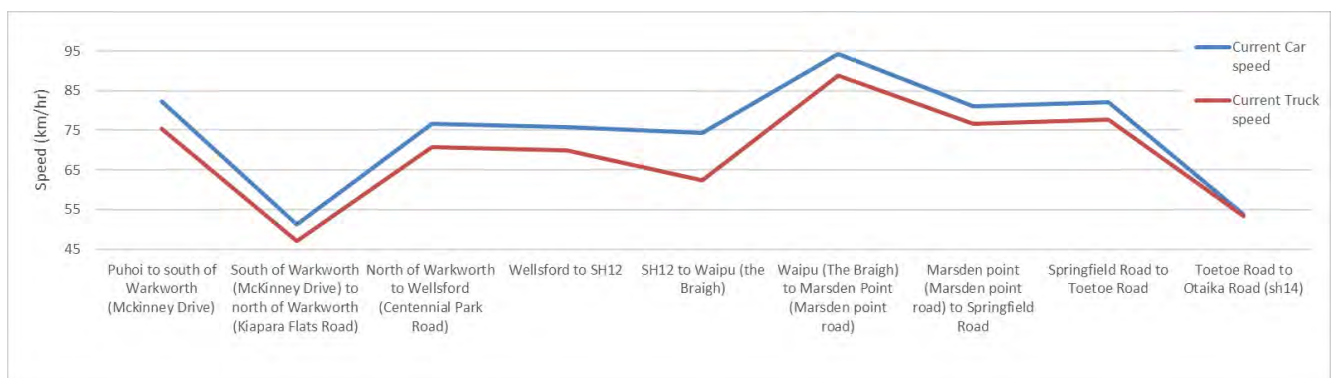
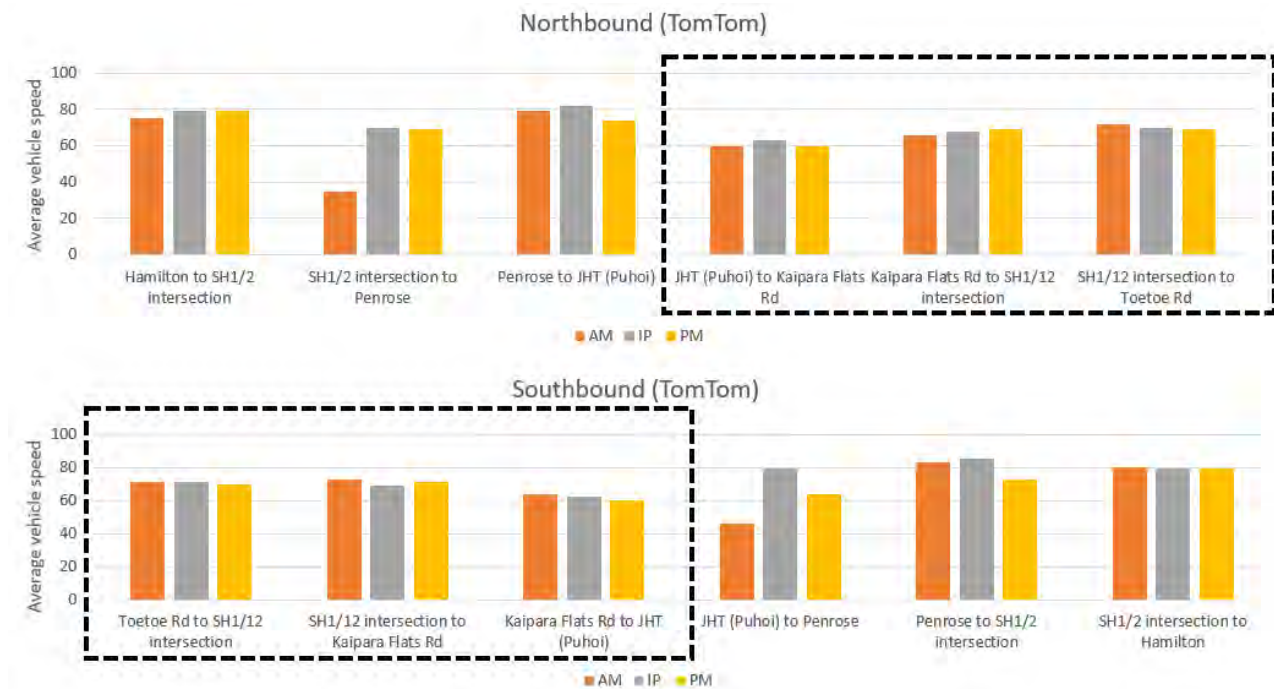


Figure 11 : Speed Data Whangarei to Hamilton



4.4.2 Implications of the Evidence

This evidence strengthens the evidence gathered in the Strategic Case. The evidence has identified that some travel time variability exists but the main issue is one of resilience when SH1 is not available. With the route fully closed for over 200 hours a year and additional partial closures, there is strong evidence to support a resilience problem.

The evidence has also shown that the average speed (and therefore cost of travel) for this section of SH1 is slower than sections of highway with the same ONRC classification. Recent improvements to the Waikato Expressway have targeted 110km/h speed limits and will likely see operating speeds in excess of 90 km/h. The SH29 corridor, a 'High Volume Strategic' route, operates at an average speed of 86km/h¹. The evidence supports the perception of costly journeys in Northland. Based on customer and industry insights, the high cost of travel is linked to decisions by industry and business to invest in the region.

Establishing a direct link between economic performance and transport accessibility is difficult as there are many factors that influence economic outcomes, particularly for regions like Northland. However, a strong message from stakeholders and the evidence we have is that the performance of the transport network, and particularly connectivity to a strong economic centre such as Auckland, has a role to play in the economic performance of a region such as Northland. This is confirmed by the Tai Tokerau Northland Economic Action Plan.

The evidence shows there is a problem with the resilience and performance of SH1 between Auckland and Northland and that the Northland economy is one of the poorer performers in New Zealand. The evidence therefore supports the following problem:

“Poor resilience and costly journeys between Northland and key markets is constraining

¹ Based on 2014 ERUC light vehicle data between Paerere and Tauriko.

economic growth and investor confidence”

A 50% weighting was identified for this problem, as it is the most significant issue for the corridor. Addressing this problem will make a real difference to the Northland economy.

4.5 PROBLEM 2: SAFETY

“The corridor is substandard for a national strategic route, resulting in a higher number of crashes involving injury and death”

4.5.1 The Evidence

The Strategic Case undertook a review of crash data from 2010 to 2014. As part of this PBC, available 2015 data was also reviewed. The 2015 safety records indicate that the corridor continues to perform poorly from a safety perspective with 6 fatalities and 16 serious injuries recorded in the 9 months of available data.

We also know that in the first three months of 2016, there have been four fatal accidents on SH1 between Whangarei and the Brynderwyn Hills, which have not yet been included in CAS. An assessment of these crashes shows a similar pattern to the analysis undertaken in the Strategic Case.

Figure 12 includes a summary of the fatal and serious crashes through the corridor over the past 10 years. Of these crashes, more than 50% were head-on incidents. Analysis of the major contributing factors indicates that alcohol and drugs were a significant factor related to over 50% of these crashes, with speed (25%), fatigue (22%) and heavy vehicles (28%) also important contributors.²

The PBC corridor crash record has also been compared with other areas of the network using the KiwiRAP Collective and Personal Risk methodologies, as shown on the side of Figure 12 and in Figure 13. This identifies high-risk areas, specifically Puhoi to Wellsford and Oakleigh to Whangarei have medium-high personal risk ratings. The recent 2015 and 2016 data (fatalities) is likely to increase the risk rating further between the Brynderwyn Hills and Whangarei.

² It should be noted that accidents can have more than one contributing factor.

Figure 12 : Fatal and Serious Accidents 2005-2015

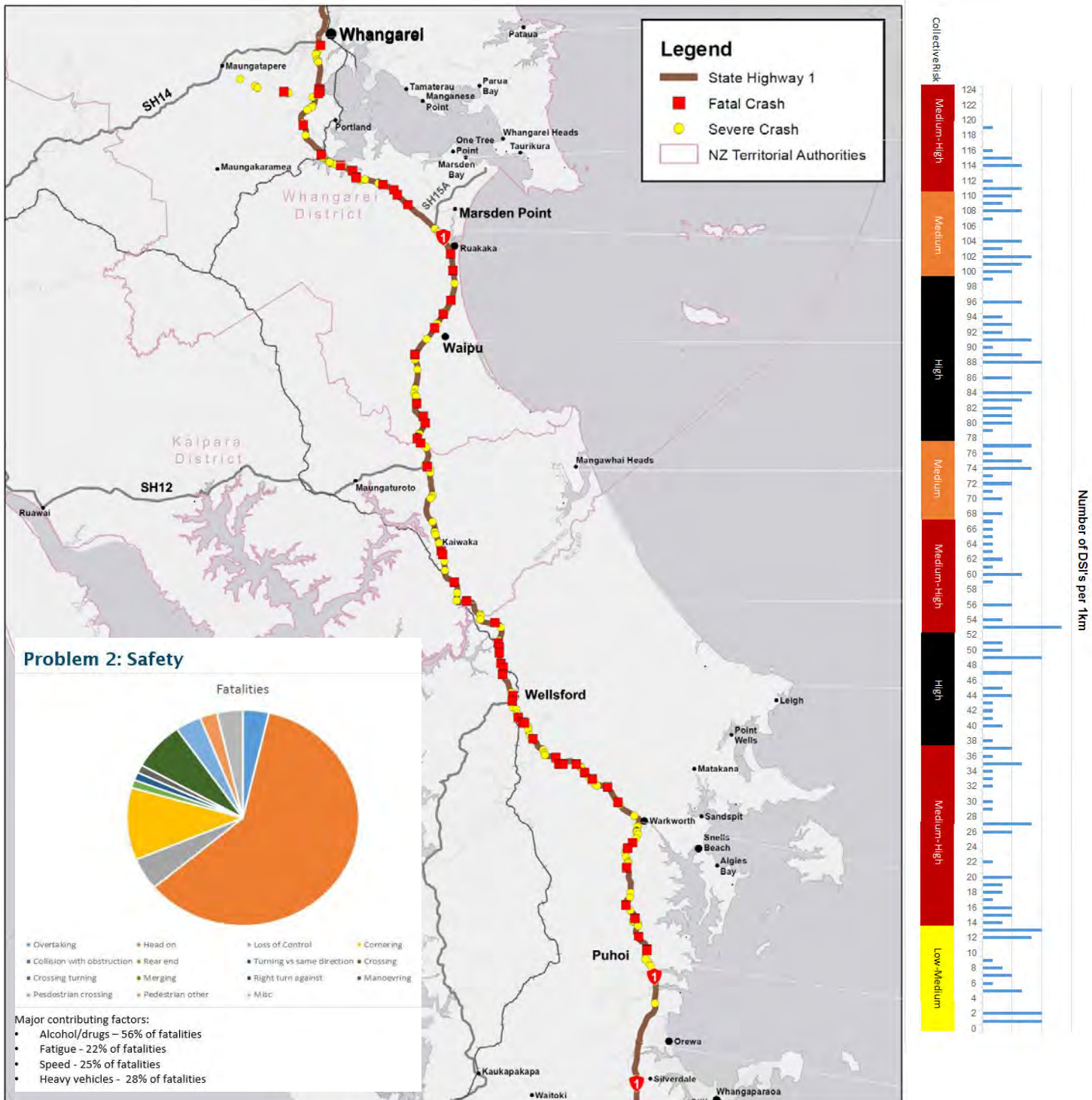
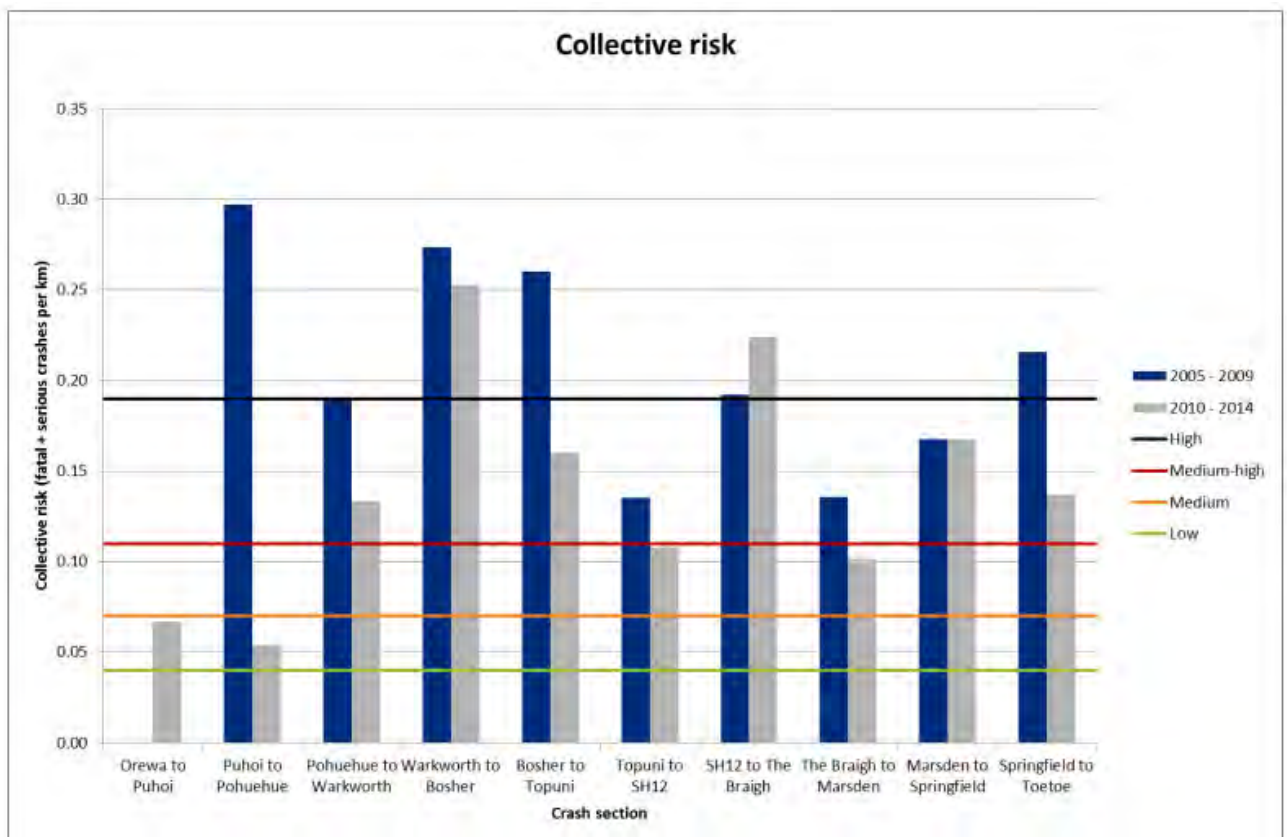
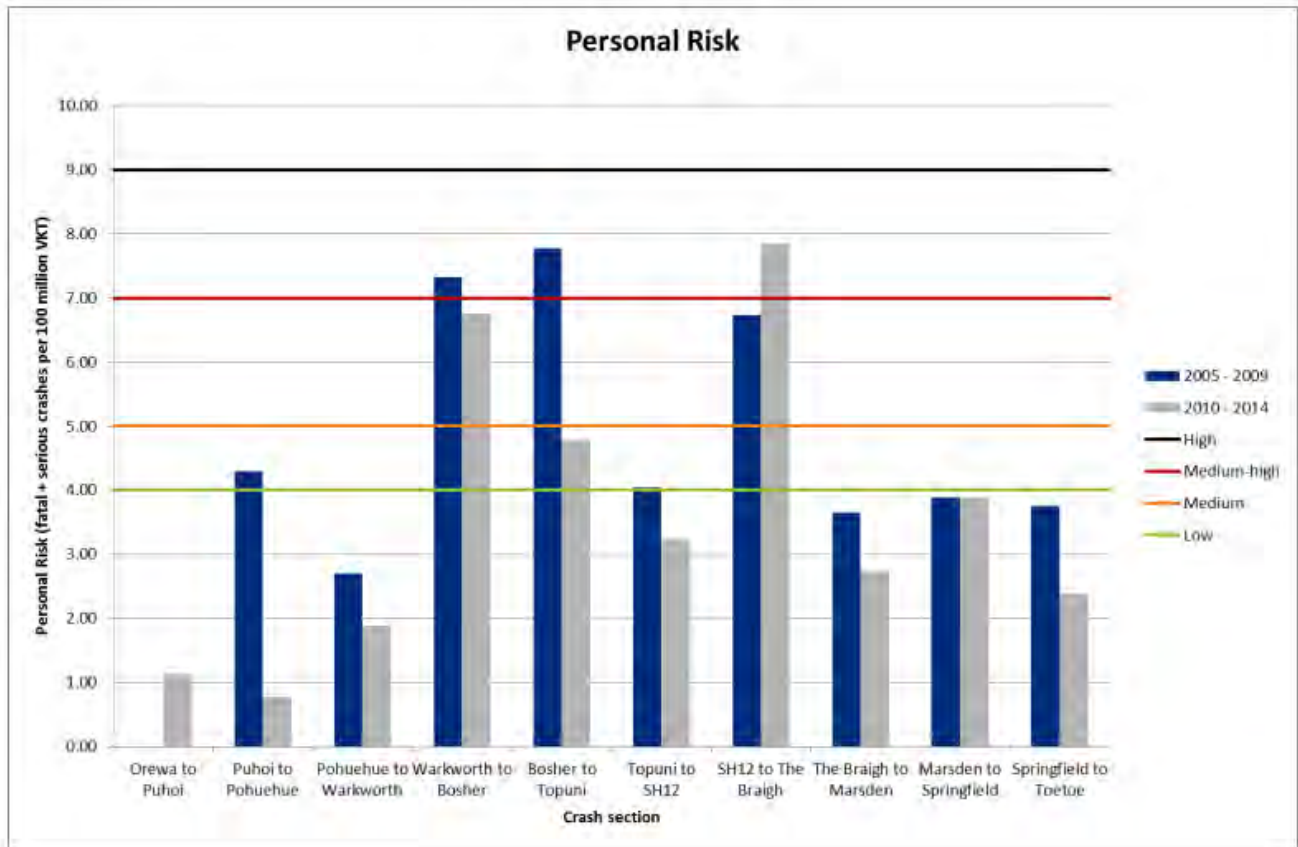


Figure 13: KiwiRAP personal and collective Risk for SH1



As outlined in **Appendix F**, this section of SH1 carries the highest classification in the ONRC system

as a “National” road, with part of the route (south of Wellsford) also being “High Volume National”. From a safety perspective this requires the following standard:

- **High Volume National:** Mostly forgiving roads and roadsides, equivalent to KiwiRAP 4-Star standard. User hazards absent or mitigated, including head on risk. Active road users generally do not have access - if present, they are provided with separate space or are physically separated. The road form provides road user guidance
- **National:** A high KiwiRAP 3 or 4-star standard, or equivalent, with consistent and predictable alignment. User hazards mostly mitigated. Active road users (if present) are mostly provided with separate space or are physically separated. Some lower standards and/or winding sections may require lower speeds and extra care. High level of road user safety guidance provided.

The current route is predominantly 2 or 3 star standard. This does not meet the standard sought for a National route (and certainly not a high volume route).

Safety also has a significant impact on the resilience of the route (due to closures because of incidents) and it is noted that the ONRC also seeks the following resilience standard for a National route:

- **Resilience Level of Service** - Route is always available during major weather or emergency events and viable alternatives exist. Rapid clearance of incidents affecting road users. Road users are generally advised in advance of issues and incidents

The evidence assessed to date confirms the problem identified in the Strategic Case.

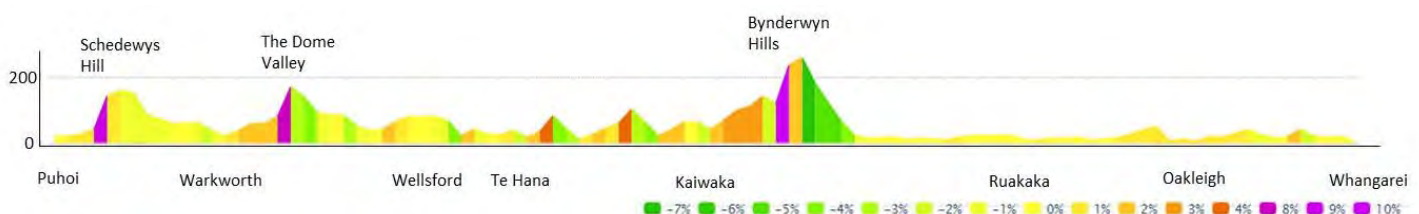
4.5.2 Implications of the Evidence

In accordance with the ONRC, this National state highway should have at least a 3-4 star KiwiRAP rating. Currently the corridor has no 4-star rated sections and 36% of its length is rated 2-star.

The evidence shows that the current SH1 safety record is poor and is not commensurate with its ONRC. The evidence shows that the worst sections of risk exposure are at Dome Valley, the Brynderwyn Hills and between SH15 and Whangarei, which all have medium-high risk ratings.

The Whangarei to Puhoi corridor is defined by a number of geometric constraints resulting in areas of tight horizontal and steep vertical alignment. This is particularly evident in many of the crash black spots on the corridor including Schedewys Hill, the Dome Valley and the Brynderwyn hills. The crash history reflects this with high proportions of head on, cornering and loss of control crashes of high severity. Cornering crashes are particularly prevalent in minor and non-injury crashes, and are the highest proportion of crash incidents overall. The lack of central median barrier on the route is considered to contribute to the high number of head-on crashes, many of which result in serious injuries or fatalities. This results in an unacceptable level of death and serious injuries.

Figure 14: Vertical profile of the Auckland to Whangarei corridor



Further analysis suggests the corridor is also over represented in crashes with driver fatigue listed as a contributing factor. Crashes involving heavy vehicles are also over represented compared with national levels and are especially high when considering crashes involving serious and fatal injuries.

Given this evidence, the following problem has been identified:

“The corridor is substandard for a national strategic route, resulting in a higher number of crashes involving injury and death”.

A 30% weighting was identified for this problem as this is a significant issue for the corridor and addressing this problem would significantly improve the corridor’s performance.

4.6 PROBLEM 3: REDUCED ECONOMIC INVESTMENT IN NORTHLAND

“The lack of a long term, integrated investment approach creates suboptimal outcomes in transport and reduced economic investment in Northland”

4.6.1 The Evidence

In 2013, Finance Minister Bill English and Economic Development Minister Steven Joyce released the *Regional Government Expenditure Report* jointly commissioned by Treasury and MBIE and undertaken by NZIER. The report shows that Northland spends above the national average on operating costs for the transport network and one third less than the national average on capital investment. This leads to an increasing OPEX burden, as there is relatively little investment in new infrastructure, putting even more emphasis on the need to maintain existing infrastructure.

Issues raised during consultation on the draft Regional Land Transport Plan (RLTP) and through the development of the Network Operating Framework include:

- There is no route protection for future State Highway improvements in urban Whangarei
- Northport has highlighted the lack of an investment commitment as a reason that investors have walked away
- Intersection improvements (developer and safety led) are being constructed without a longer term plan to be consistent with
- Land use developments that are likely to be within the footprint of future road improvements are currently being consented
- Safety improvements are being developed without regard to the overall efficiency of the corridor
- Significant development is occurring in Waipu without any strategy for how this traffic will access the state highway efficiently

Customer insights from Northland Inc outline that a clear, confirmed and committed investment strategy for SH1 would significantly assist the case for upgrading Northport. It is important to note that transport is one of many factors considered to contribute to unlocking the development potential along the corridor. Consideration must be given to other infrastructure provision. Clarity on the corridor transport plan will provide certainty to allow land use planning for townships located on the State Highway, such as Kaiwaka and Wellsford, to be confirmed. Presently, planning cannot be effectively implemented because of the lack of investor confidence, with transport accessibility an important factor in these decisions, based on customer insights and stakeholder engagement.

There is also an opportunity to future proof the corridor in urban areas so that the emerging land form does not compromise the efficiency of the state highway. The recent Puhoi to Warkworth clarity commitment has helped land use planning in Warkworth to confidently identify appropriate locations for growth and necessary complementary infrastructure, some of which is already being realised.

4.6.2 Implications of the Evidence

Without the clarity of a long term investment plan for SH1, there is the risk that the current investment in the corridor will not be as effective as it could be. A corridor plan was last developed by the Transport Agency in 2010. Since then, the Puhoi to Warkworth section of the RoNS project has progressed through to a PPP for construction in 2021/2022.

There is considerable investment being made (or planned to be spent) in the corridor on safety improvements, such as the Loop Road intersection upgrade. It is prudent to ensure that this investment, where possible is consistent with the long term strategy for the corridor. In some locations, interventions such as median barriers may be installed and then replaced or removed in the near future to accommodate longer-term solutions for the corridor, which could include four-laning.

As outlined in the context section, the Tai Tokerau Northland Economic Action Plan has identified that the lack of robust transport accessibility between Northland and the rest of the country as a contributing factor to the area's poor economic situation and transport is one of the required 'game changers' to underpin business growth.

Given this evidence, the following problem has been identified:

“The lack of a long term, integrated investment approach creates suboptimal outcomes in transport and reduced economic investment in Northland”.

A 20% weighting was identified for this problem as although the development of this PBC will assist in addressing this problem, it is seen by stakeholders in particular as of high importance for the corridor, and is likely to reinforce a communication approach for the completed PBC.

4.7 INVESTMENT OBJECTIVES

A workshop was held with stakeholders on 19 February 2016 to confirm the identified problems and benefits. The workshop was also used to develop investment objectives for the PBC.

SMART investment objectives were developed with reference to the key benefits sought. Investment objectives must provide enough information to enable an investor to make a sound investment decision. Four investment objectives were identified as outlined below.

4.7.1 Investment Objective 1: Resilience

Problem 1 identified that the unreliable and costly nature of the corridor was affecting economic growth. Safety is a part of the problem and therefore Benefits 1 and 2 are directly applicable to this problem. Benefit 3 is the opportunity to increase economic growth (because of more reliable and available transport accessibility). Linking this problem and benefits, the following investment objective was developed:

“We will steadily reduce the number of unplanned incidents so that SH1 between Puhoi and Whangarei has no full closures without viable alternatives for all vehicles of less than 2 hours by 2030”

Important considerations for this investment objective were:

- Full closures cause the most significant delays for users and are the most measurable, as the Transport Agency specifically collects this data. Partial closures often occur in an ad hoc manner and are not always reported.
- A 2-hour closure limit was selected, as this allows a optimistic but achievable response time for operators of the network to address an incident.

- The year 2030 was selected as it allows time to complete the likely interventions.

4.7.2 Investment Objective 2: Safety

There is a real safety problem in the corridor and an opportunity to enhance the lives of users when this is addressed. Linking Problem 2 and Benefit 1, the following investment objective was identified:

“We will improve safety along the corridor between Whangarei and Puhoi by steadily reducing the number of deaths and serious injuries to at least a medium personal and collective risk (as defined by KiwiRAP) by 2030”

Important considerations for this investment objective were:

- The KiwiRAP criteria provides a nationally benchmarked standard. A medium risk level is equivalent to an average rating.
- Using both personal and collective risk criteria addresses the crash history as well as exposure rate.
- The year 2030 was selected as it allows time to complete the likely interventions

4.7.3 Investment Objective 3: Northland Economic Development

Problems 1 and 3 are related to the need for economic growth in Northland and this is a key focus for many government agencies. This is the outcome of Benefit 3 and an outcome associated with Benefit 4. The role of freight and tourism in the economic recovery of Northland is substantial. Linking these problems and benefits, the following investment objective was identified:

“We will facilitate regional growth and access to key markets through decreasing the cost of travel for freight and tourism between Puhoi and Whangarei by 15% by 2030.”

Important considerations for this investment objective were:

- There was extensive discussion with stakeholders regarding the wording of this investment objective and the use of trip reliability or speed as a proxy for economic growth. Trip travel time, was considered, however as the overall intent for economic growth is to reduce the cost of travel, average speed rather than an arbitrary travel time was considered more appropriate.
- A vehicle speed / travel time measure was selected as this is the significant factor (and most easily measurable) in cost of travel.
- The corridor between Whangarei and Puhoi is currently observed to operate at an average speed of 76km/h.
- If this was improved to be consistent with other National routes, an average speed of 90km/h is considered an appropriate target. This represents a 15-minute travel time saving, which would be a noticeable improvement or roughly equivalent to a 15% reduction in Cost of travel. It would increase accessibility to Auckland and reduce the cost of travel on the route for freight in particular.
- The year 2030 was selected as it is within the timeframe of the MBIE Tai Tokerau Northland Economic Action Plan and some projects required to address this objective could be of a large scale and require longer lead times.

4.7.4 Summary

PBC investment objectives have been developed based on the problems and benefits identified through engagement with stakeholders and project partners. Three investments have been identified

as follows:

- **Investment Objective 1** : “We will steadily reduce the number of unplanned incidents so that SH1 between Puhoi and Whangarei has no full closures without viable alternatives for all vehicles of less than 2 hours by 2030”
- **Investment Objective 2** : “We will improve safety along the corridor between Puhoi and Whangarei by steadily reducing the number of deaths and serious injuries to at least a medium personal and collective risk (as defined by KiwiRAP) by 2030”
- **Investment Objective 3** : “We will facilitate regional growth and access to key markets through decreasing the cost of travel for freight and tourism between Puhoi and Whangarei by 15% by 2030”

4.8 THE KEY PERFORMANCE ATTRIBUTES AND MEASURES

It is important that the potential benefits of successfully investing are able to be assessed and measured in order to demonstrate ongoing delivery against investment criteria.

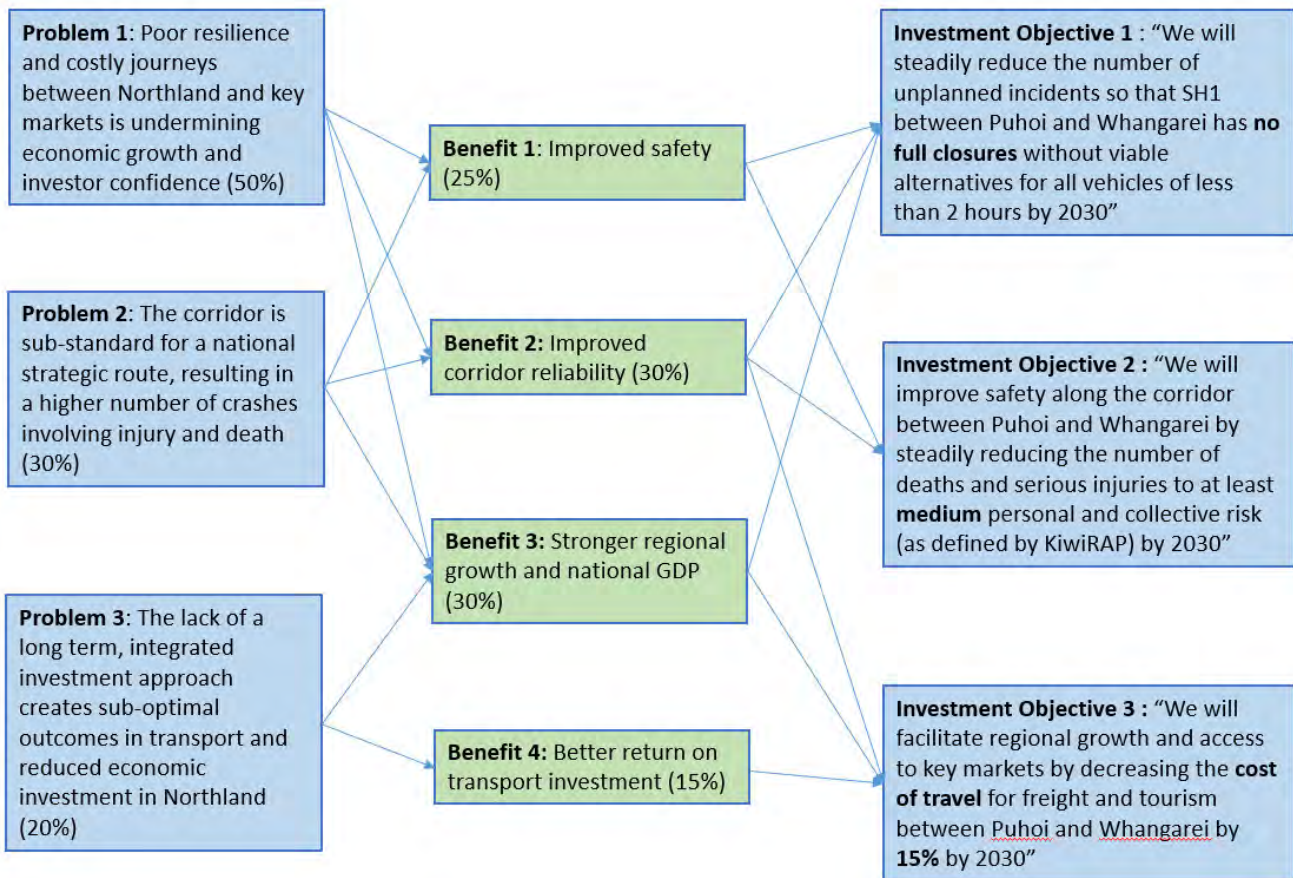
Across the different benefits highlighted above a number of KPIs have been identified during the ILM process, as set out below. These KPIs are consistent with the Investment Performance Measurement: Outcome Classes.

Table 2: Key performance measures

Investment objective	Investment KPI	Measure	Baseline	Target
Investment objective 1: Resilience	Reduction in incidents	Number of full closures per year	27 per year	0 by 2030
	Reduction in incidents without viable alternative	Closure of more than 2 hours with no viable alternative	18 per year	0 by 2030
Investment objective 2: Safety	Reduction in deaths and serious injuries	No. of deaths and serious injuries	144 DSI in 5 year period	58 DSI in 5 years
	KiwiRAP risk rating on each section	Medium personal and collective risk rating	66% personal 11% collective achieve target	All section achieve by 2025
Investment objective 3: Cost of travel	Reduced cost of travel	Average travel speed on corridor	76km/h	90km/h by 2030
	Northland regional GDP	GDP per capita	\$35k in 2015 (74% of national average)	National average by 2030

Figure 15 shows how these investment objectives inter-relate to the problems and benefits identified.

Figure 15 : Investment Objective Development



The vision for the Auckland to Whangarei State Highway corridor is a safe corridor which provides reliable journey times to support the economic growth of the region and access to key markets. The long term goal is a divided carriageway on a good alignment between Auckland and Whangarei. Progress towards this will be prioritised based on need and return on investment.

The investment objectives identified for the PBC are consistent with the long term vision for the corridor.

PART B – DEVELOPING THE PROGRAMME

5. ALTERNATIVES AND OPTIONS

5.1 ALTERNATIVE AND OPTION GENERATION

Options and alternatives have been developed and subsequently combine to create programmes of work. This section presents an overview of the methodology adopted with respect to the generation of a long list and summarises the options and alternatives considered.

Options and alternatives were developed to address the problem statements and deliver the agreed investment objectives as agreed with stakeholders. The agreed problem statements and investment objectives for the corridor are set out in Part A - Strategic Case.

The methodology adopted for this process was:

- Initial development of options by project team
- Workshops with Transport Agency technical specialists to further develop and identify new options
- Workshop with stakeholders on 17th March 2016 to further develop and identify new options
- Preparation of assessment criteria by project team, based on Transport Agency guidelines
- Presentation and endorsement of assessment criteria at workshop on 17th March 2016
- Assessment of options and ranking by project team
- Endorsement of option assessment by wider team

Assessment criteria were taken from NZ Transport Agency guidelines for option evaluation, agreed with stakeholders and used to evaluate the identified options and alternatives with respect to their relative ability to deliver against the agreed investment objectives for the corridor.

This allowed the options to be ranked, with the ranking informing the compilation of programmes.

The assessment criteria agreed for this project and endorsed by the stakeholders is shown in Table 3.

The assessment criteria have been grouped according to a number of headline categories, relating to investment objectives, ability to be implemented and an assessment of effects and opportunities.

The ability for an option to be implemented was further broken down into feasibility, affordability and public / stakeholder support. The assessment of effects and opportunities was broken down into cultural heritage, environmental, social and community wellbeing, economy and safety considerations.

At the option long list stage, options have been considered against these headline categories, while the more detailed considerations will be used to evaluate the performance of programmes, once these are developed.

Table 3: Assessment Criteria

Objectives	Considerations	Measures
Investment objectives		
Investment Objective 1	We will steadily reduce the number of unplanned incidents so that SH1 between Puhoi and Whangarei has no full closures	Reduced volume, duration and impact of SH1 closures

Objectives	Considerations	Measures
	without viable alternatives for all vehicles of less than 2 hours by 2030	
Investment Objective 2	We will improve safety along the corridor between Puhoi and Whangarei by steadily reducing the number of deaths and serious injuries to at least a medium personal and collective risk (as defined by KiwiRAP) by 2030	Reduced deaths and serious injuries on the corridor
Investment Objective 3	We will facilitate regional growth and access to key markets through increasing freight and tourism average travel speeds to 90 km/h by 2030	Average travel speed over the corridor
Ability to be Implemented		
Feasibility	How straightforward is it to implement this alternative / option?	Level of complexity. I.e. tunnelling, community consultation, challenging ground conditions etc.
	Are innovative technologies involved?	Level of innovation
	Are there significant hazards that may pose a health, safety in design risk?	Level of hazards
	Are there likely property risks?	Impact of project on property
	Are other infrastructure providers affected?	Other organisations beside NZTA
	Are there consenting risks that could affect delivery or cost risk?	Level of consenting risk for option
	Are there factors likely to affect the ability to operate / maintain the option over its projected life without major additional costs?	Maintenance and operation costs
Affordability	What are the funding risks of the alternative/option?	Included in the RLTP to no funding allocation
	Can the alternative be funded traditionally? (economic efficiency)	Estimated economic efficiency of project
	Are alternative funding mechanisms required?	yes / no
	Are there cashflow risks that might affect the delivery programme?	yes / no
	Are there ongoing operating cost risks?	Level of operating costs

Objectives	Considerations	Measures
	Are operating subsidies required? How will these be funded?	Tolling / PQP procurement
Public / Stakeholders	Has the alternative been made public?	Yes / no
	How acceptable is the alternative?	Level of anticipated acceptance
	Are there real or anticipated objections from the community or stakeholders?	Level of anticipated acceptance by stakeholders
Assessment of Effects		
Cultural heritage, environmental, social and community wellbeing	Are there any sites or features (including their setting) of significance to Maori (archaeological or existent) affected?	
	Are there any historic heritage places (including their setting) (e.g. archaeological or buildings, sites, remnants) affected?	
	Are any (first tier) outstanding landscapes or natural features, or (second tier) significant/special landscape or natural features affected?	Environmental mapping
	Are there any ecological areas, or areas with habitat value (inc large areas of native vegetation) affected?	
	Are there any coastal marine areas, wetlands, lakes, rivers, streams or their margins affected?	Environmental mapping
	Are there any areas of contaminated land affected?	
	Are there community facilities (park/schools/hospitals etc.), or residential or other sensitive land uses in the area that could be affected by adjacency effects (e.g. noise, disruption, vibration, air quality etc.)?	Assessment of proximity to settlements
	Are there potential effects from hazards or risks (including from future climate change) from erosion, flooding, fault lines, sea level rise	
	Extent to which the option integrates transport and land use to make best use of existing networks and infrastructure.	Extent of integration with land use aspirations
Are there any communities affected by reduced cohesion, connectivity or accessibility?	Qualitative assessment of access to the road network	

Objectives	Considerations	Measures
	Are there opportunities to enhance the active travel modes - cycling and walking and/or linkages to other national or regional recreational cycle networks for longer distance cyclists?	Qualitative assessment of access to alternative modes
	Extent and significance of land take, severance; negative and positive opportunities	Severance / connectivity
Economy	How will the alternative/option affect traffic volumes?	Level of growth catered for
	Does the option provide an opportunity to reduce vehicular travel time on SH1 between the Auckland and Northland regions?	Qualitative evaluation
	Does the option improve journey time reliability?	Qualitative evaluation
	Are there gainers and losers (modes / regions)? What is the overall effect?	Qualitative assessment of overall benefits to surrounding communities
	Does the option provide for more efficient freight supply chains between the Auckland and Northland regions	Route quality
	How well does the option integrate with land use with reference to regional growth strategies	Consistency with regional growth strategies
	How well does the option enhance the development potential of adjacent land / attract new jobs / help existing businesses?	Qualitative assessment of access to land use
	How well does the option preserve the function of SH1 as a National High Volume route, consistent with ONRC	Qualitative evaluation
	How well does the option address route security, resilience and flexibility	Extent to which the option improves route resilience
Safety	How will the alternative enhance safety for different types of transport users?	Alternative mode safety
	Will it involve gainers and losers in terms of safety?	Adverse safety effects from the option.
	Are there impacts on personal safety / security?	Assessment of the reduction in crash risk
	What is the impact on fatal / serious injuries?	Assessment of reduction in DSI

5.2 OPTION LONG LIST

A list of more than 115 options was developed with reference to the Agency's intervention hierarchy, in order to optimise investment in the corridor.

Firstly, a range of options that aimed to better integrate land use and transport were identified, such as safer access to rest areas, bypassing settlements and rationalising property accesses onto the State Highway.

Options that delivered a more resilient outcome were identified next. These options are intended to reduce or remove the closure of the existing state highway and improve the alternative routes available to customers.

A further suite of options focussed on making the best use of the existing network was identified as well as operational solutions. These options include a review of road marking and advisory signage to ensure consistency across the corridor. Side barriers, shoulder widening, speed restrictions and police enforcement to manage travel speeds were also considered. Social programmes focussed on the current safety issues related to alcohol and driving standards were identified.

A wide range of new infrastructure solutions were also identified, from very large offline schemes, to smaller corner realignments and intersection improvements. These were evaluated based on the level of service requirements for the corridor as well as affordability and realistic need.

The Auckland to Whangarei transport corridor is multi-modal and therefore options for the enhancement of other modes to address the investment objectives were also considered. This included options that increased the capacity of the rail network, including significant strengthening and tunnel widening works, increasing the role of coastal shipping, park and ride options and active mode options.

The full list of options is included in **Appendix G** as well as further detail on how the assessment criteria was applied to the assessment of each option.

5.3 ALTERNATIVE AND OPTION ASSESSMENT

An initial assessment was undertaken for each 'head' criteria. A seven point assessment system was used, ranging from +++ for a strongly positive performance to --- for a strongly negative performance in comparison with the do minimum. This is a coarse system, given the broad nature of the assessment, however is considered appropriate at this long list stage. **Appendix G** outlines this process in more detail and the assessment of individual options.

The application of the assessment criteria to the options identified the following key outcomes:

- The cycling and walking options were assessed to not have a noticeably positive effect on any of the investment objectives
- The best performing option was safety improvements in the Dome Valley
- There were a number of highly ranked options which including operational interventions such as improved wayfinding signage on detour routes and improved police enforcement
- Highly ranked larger capital schemes included a bypass of the Brynderwyn Hills and a 2+2 configuration between SH15 and Whangarei
- Upgrade of diversion routes scored well providing resilience benefits and benefits to local communities
- The worst performing options were the freight lanes in Auckland and passenger rail between Marsden Point and Auckland

Overall, the conclusion of this long list assessment is that there is a wide range of options and ways to meet the project objectives from cheaper operational options, through to large-scale capital-intensive interventions.

5.3.1 Option Analysis

In order to analyse options in more detail, the corridor was divided into sections and a number of potential options for each section identified. Many operational interventions were applied across a number of sections, with physical options varying between sections. For example, a range of improvements such as a divided carriageway 1+1 arrangement, 2+1 divided carriageway, 2+2 divided carriageway, offline and online were identified for the section between Toetoe Road and Oakleigh. None of these options were discarded, but some options were considered to respond better to specific issues than others. For example, an offline alignment provides travel-time savings while a divided 1+1 online alignment with wire rope responds to the high number of head-on collisions on this section. Option analysis considerations are summarised by section below:

- **Operational interventions** – A suite of non infrastructure projects were considered for the corridor, making best use of the existing infrastructure. Interventions included a strong focus on education and licensing, enforcement of speed, alcohol and heavy vehicle loads. Land use rules and regulations were considered including zoning and access restrictions. Operational options included measures to improve response times to incidents, reduce maintenance delays, improve detour operations and monitoring of the corridor. A suite of improvements were identified for tourists including improved road markings, signage and more frequent rest stops. Out of the box options such as freight lanes from Puhoi north and subsidised hotel rooms were also considered.
- **Alternative modes** – A number of options to increase the role of other modes were considered, including increased coastal shipping capacity, increased rail operation and walking and cycling schemes. The walking and cycling schemes were assessed as having good benefits, particularly with respect to tourism, albeit with limited impact on the safety and resilience problems identified in the corridor. Rail options provided opportunity to increase the rail mode share, particularly for freight trips. This was assessed positively, however delivered comparatively small outcomes for safety, resilience and economic growth with very significant implementation costs. Coastal shipping enhancements were assessed similarly to rail, with operational challenges more the issue rather than costs, with good outcomes predicted if implemented (like rail). Cycle provision has been considered over the length of the corridor providing access to the existing network and making best use of existing infrastructure.
- **SH14 to Toetoe Road (urban Whangarei)** – This predominantly urban section included a number of options focussed predominantly on additional capacity to meet expected increases in traffic demand and to tie into currently planned four-lane works between SH14 and the I-site in Otaika. Safety, increased reliability and provision for other modes, particularly walking and cycling, were also considered given the urban nature of this section. The options that best addressed capacity, safety and resilience were 2+2 alignments. Both online and offline options were considered. Both online and offline present significant challenges due to the built up nature of this section of the corridor and the close proximity of shops and dwellings.
- **Toetoe Road to Oakleigh** – This section has a high collective risk rating, including a number of recent head-on fatalities. Traffic demand forecasts indicate that additional capacity will be required within 10 years. A range of interventions were considered from very site-specific safety improvements, to comprehensive offline solutions. A major assessment consideration was the comparison between an online upgrade of this section with an offline alignment near

the Portland cement works. The offline option performs better from a safety perspective and provides travel time savings, whilst the online solution likely requires less property. Different options for this section were included in different programmes to allow different levels of intervention to be assessed, with the offline solution assessed to deliver the greatest outcomes in this section, albeit for a higher cost.

- **Oakleigh to Port (SH15)** – An IBC completed for this section concludes that an upgrade is required immediately to address the safety problem and additional capacity will be required by approximately 2025. Options for additional capacity beyond 2025 were assessed, including offline and online options in the form of either 2+1 or 2+2. The IBC recommended online upgrades as the online alignment is adequate and offline options would be more expensive with minimal additional benefit. The form of the solution was also assessed, with 2+2 considered the best long term solution as a 2+1 solution does not provide the long term capacity required and would only be ‘useful’ for a relatively short period of time before 2+2 was required. The level of disruption to implement two upgrades was not valued highly and the incremental benefits of this would be poor. The recent increased levels of growth at Ruakaka and Marsden Point were also factored into this assessment, as recent growth has been considerably higher than previous years.
- **Port (SH15) to Brynderwyn Hills** – A number of longer-term options were assessed in this area, including online and offline solutions in the form of 2+1 and 2+2 arrangements. The flat terrain and good existing alignment meant an offline alignment in this area is expensive and likely to provide little additional benefit. The capacity forecasts and current operation of this section also means that 2+1 solutions are adequate to meet forecast demands and therefore meet the needs of the corridor for the next 30 years. 2+2 options provided further additional capacity, but little additional benefit with respect to travel time or safety.
- **Brynderwyn Hills to SH12** – A wide range of options were assessed in this area to address the safety, resilience and travel time (speed) problems. This included consideration of online upgrades (to complement the online realignment currently under construction on the northern side of the hills), bypasses to the west and east of the current alignment and tunnelling through the Brynderwyn Hills. Western bypasses were considered to better address the identified problems as the eastern bypass terrain is poorer than the current alignment and online options would be very challenging to build and deliver against the investment objectives for the project. The tunnel option performed well, although was significantly more expensive. Three western bypass options were assessed, from a relatively short section to a larger and more significant realignment. The bigger the bypass, the flatter the resultant grades, but longer the total journey. The middle western bypass option was assessed as striking the best balance. A number of western bypass options were included in different programmes to allow the different level of outcomes to be considered at the programme level.
- **SH12 to Te Hana** – A number of options were considered in this section, from online minor upgrades through to offline 2+2 options. The ‘bigger’ options delivered greater outcomes, however, in this section the gap between these ‘bigger’ options and smaller ones was not as significant as in other areas of the corridor as the future demand is forecast to be low and level of problems were not to the same scale. Detour upgrades were also considered through this section.
- **Te Hana to Warkworth** – The Warkworth to Wellsford RoNS is assumed part of the do minimum for this PBC and one of the key considerations for this section was to confirm a termination point, including the extension of the RoNS to beyond Te Hana or Kaiwaka. The key consideration in this regard was the inclusion of options to address the problems of resilience and travel time through Te Hana. There are a number of constraints from a social, cultural and environmental perspective in Te Hana and the extension of the RoNS project was assessed as providing the strongest investment outcomes for the least impact. Options in this section are likely to be longer-term solutions and therefore options for shorter-term

implementation were also developed and assessed as performing well, particularly safety focussed options through the Dome Valley, which currently has a high-risk rating. The Kaiwaka township is also located on this section and consideration was given to safety and amenity improvements.

- **Puhoi to Warkworth** – With the RoNS well advanced, this section focussed on more operational options to maximise the opportunity the RoNS provides, included Park and Ride at Warkworth and localised safety enhancements to the existing road network.

5.3.2 Options which do not address the investment objectives

At the long list stage of the assessment some options were discarded, as they did not fundamentally address the investment objectives.

A number of walking and cycling schemes were identified along the corridor. In isolation, they were not considered to meeting the investment objectives of increasing the average corridor speed to 90 km/h, reducing deaths and serious injuries or reducing full closures of more than two hours along the corridor. However, many of these options represent opportunities to enhance the journey experience of the corridor at little cost. They could therefore be considered further with respect to the recommended programme.

Passenger rail was also discarded at this stage as it requires substantial investment to implement (estimated at over \$1B) and, as it is likely to attract only a small proportion of general traffic from the corridor, has limited impact on the investment objectives.

Some of the more extreme options were also discarded at this stage, such as a proposed southern hemisphere space port for Virgin Galactic near Waipu.

Overall, very few options were discarded as being fatally flawed. However, as will be discussed in subsequent sections, not all remaining options were included in a programme in the next stage.

6. PROGRAMME OPTIONS DEVELOPMENT AND ASSESSMENT

6.1 PROGRAMME DEVELOPMENT

6.1.1 Initial Programme Development

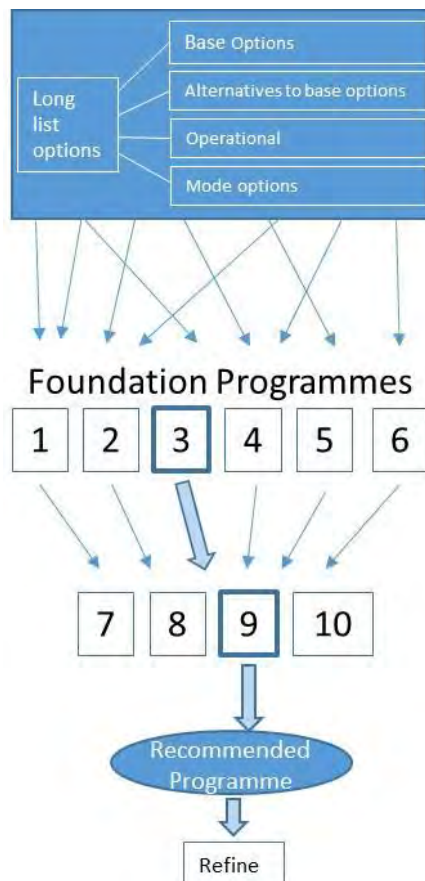
The SH1 Auckland to Whangarei PBC is a programme of works to address the corridor problems and deliver on the investment objectives. The ultimate programme will almost certainly be a package comprising a number of options.

This section summarises how the development of proposed programmes has been undertaken in a robust and transparent manner. The Transport Agency’s Alternatives and Preferred Programme templates have been used to describe each programme. These templates and a detailed description of how programmes were developed is provided in **Appendix H**.

The assessment of long list options against the above criteria and relative scoring between options was a key consideration when developing each programme.

Initially, six ‘foundation programmes’ were developed to address individual investment objectives (programmes 1-3) with three additional programmes developed addressing the key risks and uncertainties on the corridor; investment in response to high growth, significant investment in alternative modes and a low level of investment focusing on low impact and operational measures. An outline to the process adopted is provided in Figure 16.

Figure 16 : Programme development process



The foundation programmes were developed by examining sections of the route and reviewing the options assessment to identify the best performing options for the assessment criteria related to each foundation programme. An example is Programme 1 where the best performing resilience options along the corridor were identified and compiled.

Fundamental to each programme was a suite of operational and non-infrastructure projects. A number of projects scored high in the option assessment and could be implemented with each of the programmes improving the use of existing infrastructure on the corridor in the short term.

These ‘foundation programmes’ were

- **Foundation Programme 1 - Resilience:** This programme addresses critical resilience issues on the corridor and specifically aims to reduce full closures of more than 2 hours with no viable alternative route. It extends the RoNS to north of Te Hana and includes a bypass of the Brynderwyn Hills, as these are two high resilience risk locations. It provides a 2+2 alignment between Whangarei and SH15 (as contra-flow can be facilitated more easily on a separated carriageway). It also improves detour routes to be HPMV capable, provides a Park and Ride facility at Warkworth (as an alternative to car travel) and improves VMS to provide early warning of closures and viable detour options.
- **Foundation Programme 2 – Low Cost Safety:** This programme addresses critical safety issues, predominantly using the existing route. It deliberately chooses interventions that are online, and require minimal road widening, therefore typically at a lower cost than larger intervention, including shoulder widening, corner realignments, access rationalisation, wire rope barriers, online improvements to the southern side of the Brynderwyn Hills, rest areas and travel time signage to combat fatigue. It also recommends increased police enforcement and driver education campaigns targeted at fatigue and speed.
- **Foundation Programme 3 – Economic Efficiency:** This programme aims to achieve an average speed of 90 km/h for all vehicles travelling between Auckland and Whangarei. This is used to measure the decrease in cost of travel as a proxy for enabling economic growth in Northland. This programme recommends extending the four lane upgrade from Wellsford to north of Kaiwaka, bypassing the Brynderwyn Hills to the west and a full 2+2 upgrade on the current alignment from the base of the Brynderwyn Hills to Whangarei, including a four lane urban section in Whangarei.
- **Foundation Programme 4 – One Network Road Classification (ONRC):** This programme aims to address the ONRC aspirations of this National High Volume corridor. It provides a full 2+2 expressway standard route between Puhoi and Whangarei (Toetoe Road) which will be constructed offline. Within Whangarei, a four-lane urban section is provided to the SH14 intersection.
- **Foundation Programme 5 - Alternative Modes:** This programme aims to maximise alternative mode opportunities between Auckland and Northland. It includes Park and Ride provision at Warkworth and Wellsford and significant investment in the rail line to enable it to carry full size 20TEU containers. It also includes passenger rail services and the construction of the Whangarei to Northport rail line. Increased coastal shipping capacity is also assumed. Offline cycleways are included between Whangarei and Waipu and between Puhoi and Wellsford.
- **Foundation Programme 6 - Least Impact:** This programme aims to address the investment objectives while having the lowest possible physical impact on corridor. Therefore, a number of minor online safety improvements and minor intersection improvements are recommended, as well as rest areas and investment in police enforcement, improvements to detour routes and improved provision for cyclists.

Following the development of the foundation programmes, the project team undertook an assessment against the MCA criteria to establish the effectiveness of each. This assessment was presented to the stakeholder group at Workshop 3. Stakeholders were given the opportunity to comment on each programme and its assessment.

6.1.2 Further Programme Development

Each foundation programme was developed to address a specific project objective or issue. With the knowledge of how each foundation programme performed with respect to the MCA; at Workshop 3, stakeholder groups were asked to develop programmes that best responded to all of the investment objectives. Groups were asked to take the best aspects of each foundation programme (as well as any other options that they felt would be appropriate) to create a recommended programme. Using this approach, four further programmes were developed, being:

- **Programme 7 – Stakeholder 1:** A variant of the 90km/h programme with the exclusion of any large infrastructure projects between Te Hana and Kaiwaka.
- **Programme 8 – Stakeholder 2:** Similar to the Resilience programme with a lesser treatment on the Brynderwyn Hills to SH15 section, an online solution between Oakleigh and Toetoe Road and Whangarei urban improvements added.
- **Programme 9 – Stakeholder 3:** Similar to the Resilience programme with a lesser treatment on the Brynderwyn Hills to SH15 section, an offline solution between Oakleigh and Toetoe Road and Whangarei urban improvements added.
- **Programme 10 – Stakeholder 4:** A variant of the 90km/h programme with a 2+1 solution on the Brynderwyn Hills to SH15 section.

Appendix H outlines these programmes in detail.

6.2 DO-MINIMUM

A Do Minimum programme has been developed for this corridor, against which the recommended programmes are assessed. In the first instance, the Do Minimum was developed through engagement with relevant areas of the Transport Agency. It was endorsed by the project stakeholders at Workshop 2.

In order to determine the Do Minimum network for this corridor, projects that are currently under construction, or are planned/committed have been included. The Do Minimum is summarised in Table 4.

Table 4: Do Minimum

Project	Do Minimum	Discussion
Ongoing maintenance	Yes	NOC agreements
Puhoi to Warkworth RoNS	Yes	PPP currently being tendered, complete 2022
Warkworth to Wellsford RoNS	Yes	Proposed completion by 2027
Loop Road north intersection upgrade	Yes	Intersection with Portland Road improvements 2018

Northern Brynderwyn Hills upgrade	Yes	Current safety works completed late 2016
Rail Network	Yes	No upgrades
SH14 Hospital intersection	Yes	Assume in place 2017

6.3 PROGRAMME ASSESSMENT

A three-stage programme assessment approach was used as shown in Figure 16. Firstly, the foundation programmes were assessed against the MCA criteria and then the programmes developed in collaboration with the stakeholders were assessed against the same criteria. The third step was the consideration of other factors outside of the MCA. **Appendix H** outlines in detail the assessment undertaken for the programmes, including completion of the Transport Agency programme assessment forms. A summary of the assessment undertaken is included in this section of the report.

6.3.1 Foundation Programme Assessment

The foundation programmes were developed to best address a specific issue, being one of the investment objectives, low impact or ONRC aspirations. These programmes therefore performed very well against some, but not necessarily all, assessment criteria.

Of these programmes, Programme 5 (Alternative Modes) and 6 (Least Impact) delivered the least well against the assessment criteria. Programme 5 is very expensive due to the cost of upgrading the rail line and its ability to significantly improve the safety and reliability of the road corridor is considered low. Programme 6 conversely has little impact on the environment and from a cost perspective provides exceptional value, however the scale of expected outcomes against the investment criteria was considered low. These two programmes were therefore discounted from consideration as a preferred programme.

Programme 1 performed very well against the resilience objective, however comparatively it did not perform as well as against the other investment objectives and its economic efficiency was not strong. Programme 2 likewise performed well against the safety criteria and reasonably well from an economic efficiency perspective, however did not address the economic growth investment objective well. These two programmes were therefore discounted from consideration as a preferred programme.

This left Programme 3 (Economic Efficiency) and Programme 4 (ONRC) which performed the best (and similarly) against all investment objectives and the best of all the foundation programmes. The assessment highlighted that a bigger investment provided a greater level of benefits for the corridor. The results do however, indicate a level of diminishing returns once a certain level of investment as demonstrated by the relatively close scoring of Programmes 3 and 4 with a large cost differential

It is however noted that both programmes are expensive and perform poorly from an economic efficiency perspective. However, these two programmes remained in contention for the recommended programme at this point.

As outlined previously, further programmes were then developed, taking the best from each foundation programme. These programmes were assessed and compared against the two best performing foundation programmes.

6.3.2 Further Programme Assessment

Programmes 7-10 were assessed against the same criteria as the foundation programmes. Interestingly, although developed separately by each stakeholder group, all four programmes are similar in form and therefore perform similarly against the assessment criteria.

Programme 10 was the best performing of these four programmes, best meeting the investment objectives and delivering strong outcomes.

Programmes 7, 8 and 9 performed slightly less well than Programme 10. Whilst these three programmes performed very similarly, Programme 9 was the best of these three due to its better affordability and stronger performance from a resilience perspective.

Programmes 7 and 8 were therefore discounted, leaving Programmes 9 and 10.

This left Programmes 3, 4, 9 and 10 still within contention. Figure 17 summarises the programme assessment, relative ranking of the programmes and the outcomes expected for the investment. The initially discarded programmes are 'greyed' out, to highlight the four programmes still in 'in play' for the recommended programme.

Figure 17: Programme Assessment

	Programme 1 – Resilience	Programme 2 – Safety	Programme 3 – Efficiency (90 km/h)	Programme 4 – ONRC	Programme 5 – Alternative Modes	Programme 6 – Least Impact	Programme 7	Programme 8	Programme 9	Programme 10
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Summary										
Objective 1 – reduce full closures with no alternative route	+++	+	+++	+++	+	+	+++	+++	+++	+++
Objective 2 – reduce deaths and serious injuries	++	++	+++	+++	+	+	++	++	++	++
Objective 3 – increase travel speed to 90 km/h	++	0	+++	+++	0	0	+++	++	++	+++
Feasibility	-	-	-	-	-	-	-	-	-	-
Affordability	-	0	--	--	--	-	--	-	0	-
Public / Stakeholders	0	-	+	+	-	-	+	+	+	+
Cultural, Social and Environmental Effects	-	0	-	-	0	0	-	-	-	-
Safety	+++	++	++	++	+	+	++	++	++	++
Economy	++	0	++	+++	0	0	++	++	++	++
Ranking	7	8	3	1	11	9	6	5	4	2
Average score	8.7	3.1	11.0	11.9	-0.4	0.8	9.8	9.9	10.3	11.6
Cost (Lower Bound)	\$970	\$430	\$1,900	\$2,200	\$1,000	\$430	\$1,500	\$820	\$880	\$1,700
Cost (Upper Bound)	\$1,500	\$730	\$2,800	\$3,200	\$2,300	\$650	\$2,400	\$1,300	\$1,400	\$2,500
Cost (Lower Bound) NPV 2025	\$610	\$270	\$1,200	\$1,390	\$630	\$270	\$950	\$520	\$550	\$1,070
Cost (Upper Bound) NPV 2025	\$950	\$460	\$1,760	\$2,020	\$1,450	\$410	\$1,510	\$820	\$880	\$1,580
Benefits	\$470	\$240	\$540	\$620	\$310	\$310	\$450	\$410	\$530	\$550
BCR lower	0.8	0.9	0.5	0.4	0.5	1.1	0.5	0.8	1.0	0.5
BCR upper	0.5	0.5	0.3	0.3	0.2	0.8	0.3	0.5	0.6	0.3
Programme Performance	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Investment Objective 1: Proportion with viable alternative	100%	70%	100%	100%	70%	70%	100%	94%	100%	100%
Investment Objective 2: KiwiRAP corridor rating (collective)	0.10	0.14	0.09	0.08	0.14	0.14	0.08	0.10	0.10	0.08
Investment Objective 3: Mean vehicle speed km/h	81.7	78.5	84.8	86.6	79.7	79.7	81.7	82.5	82.1	86.6
Approximate travel time saving on corridor (min)	5.0	1.4	9.5	11.9	2.6	2.6	6.0	6.4	5.6	11.9
Reduction in DSI's per 5 years	85	77	91	99	64	64	99	85	86	99
Scoring – All average weights	9	3	11	12	0	1	10	10	10	12

The four remaining programmes, as shown in Figure 17, are the four highest ranked programmes based on the MCA. At a macro scale, the four programmes perform similarly with respect to the investment outcomes sought. There are however, differences between the four programmes. This is summarised as follows:

- **Resilience** – All of the four remaining programmes deliver well against this objective, will each programme resulting in 100% of the corridor meeting the investment objective. Not all of the previous discarded programmes achieve this level of outcome. In addition, all four of the programmes will deliver significant reductions in the number of incidents causing closure through improved safety performance and bypass of problem areas.
- **Safety** – Programmes 3, 4 and 10 deliver the greatest reduction in DSI's with the corridor meeting the objective of a medium KiwiRAP Collective and Personal Risk rating or better by providing a Low rating and between 90 and 100 DSI's forecast to be saved in a five year period. Programme 9 also delivered an overall Collective KiwiRAP rating for the corridor of Medium and over 85 DSI's forecast to be saved in a five year period.
- **Economic Growth (90km/h)** – Programmes 10 and 4 deliver the greatest outcome for this objective, with an average speed of more than 86km/h, which equates to a travel time between Puhoi and Whangarei of 1hr and 08 mins (1:08), representing over 10 minutes saving in travel time. Programme 3 is next with an average speed of 85km/h and Programme 9 the next best with an average speed of 82km/h, which equates to a travel time between Puhoi and Whangarei of 1:13 mins, representing over five minute saving in travel time.

Correspondingly, the NPV economic benefits for these four programmes are similar, with a range of between **\$530M and \$620M**.

Sensitivity testing of the MCA was undertaken by doubling the weighting for specific criteria. This is summarised in Figure 18. This shows some changes in order, but fundamentally the ranking of a programme stayed within one position of its base ranking, indicating that there was not a significant sensitivity to a particular category. The partial exception to this is the affordability criteria where more affordable programmes did gain a number of placings in the rankings.

Figure 18 : Programme Sensitivity Testing

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Summary										
Objective 1 – reduce full closures with no alternative route	+++	+	+++	+++	+	+	+++	+++	+++	+++
Objective 2 – reduce deaths and serious injuries	++	++	+++	+++	+	+	++	++	++	++
Objective 3 – increase travel speed to 90 km/h	++	0	+++	+++	0	0	+++	++	++	+++
Feasibility	-	-	-	--	-	-	-	-	-	-
Affordability	-	0	--	--	--	-	--	-	0	-
Public / Stakeholders	0	-	+	+	-	-	+	+	+	+
Cultural, Social and Environmental Effects	-	0	-	-	0	0	-	-	-	-
Safety	++	++	+++	+++	+	+	++	++	++	++
Economy	++	0	+++	+++	0	0	++	++	++	++
Ranking	7	8	3	1	11	9	6	5	4	2
Sensitivity Testing	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Objective 1 – increase travel speed to 90 km/h	7	8	3	1	10	9	6	5	4	2
Objective 2 – reduce deaths and serious injuries	7	8	3	1	10	9	6	5	4	2
Objective 3 – reduce full closures with no alternative route	7	8	3	1	11	9	4	6	5	2
Feasibility	7	8	3	2	11	10	6	4	5	1
Affordability	7	8	4	3	11	10	6	5	2	1
Public / Stakeholders	7	8	3	1	11	10	6	5	4	2
Cultural, Social and Environmental Effects	7	8	3	1	11	9	6	5	4	2
Enhanced safety for different types of transport users?	7	8	3	1	10	9	6	5	4	2
How will the alternative/option affect traffic volumes?	7	8	3	1	10	9	5	6	4	2

6.3.3 Other Considerations

A significant difference between the programmes is the affordability, with Programme 9 less than half of the cost of the other three programmes. This is shown in the sensitivity testing where Programme 9 jumps to the second ranked programme, from fourth when affordability is weighted more heavily.

Therefore, although Programme 9 is the 4th ranked programme in the MCA it has been selected as the recommended programme. This is because it delivers a similar level of benefit and investment outcome (at a macro level) as the three programmes ranked above it in the MCA, but it achieves this for approximately 40% of the cost. It therefore has far superior economic efficiency. It is also the only programme of these four with a BCR approaching the required economic efficiency of 1.0, with a BCR range of **0.6 to 1.0**.

Figure 19 shows the relative performance of the programmes from an economic efficiency perspective and the level of transport benefits the investment can sustain (based on the problems identified). Programme costs are reported as a range to reflect the level of detail available for cost estimates.

A threshold of programme benefits has been estimated (as indicated by the background colours) based on the problems and investment objectives identified for the corridor. This has been developed in an effort to right size the investment response. As a rough guide, \$400-\$500M (NPV) of benefits are considered to meet the investment objective. Programme which exceed this are providing additional benefits from those sought by the investment objective.

While most of the programmes follow a general trend of ‘more investment – more benefits’, the assessment indicates a level of diminishing return after a certain point. Programme 9 strikes the best balance between delivering the available level of benefits in the corridor for an economically efficient investment.

Figure 19 : Comparative Economic Efficiency of Programmes

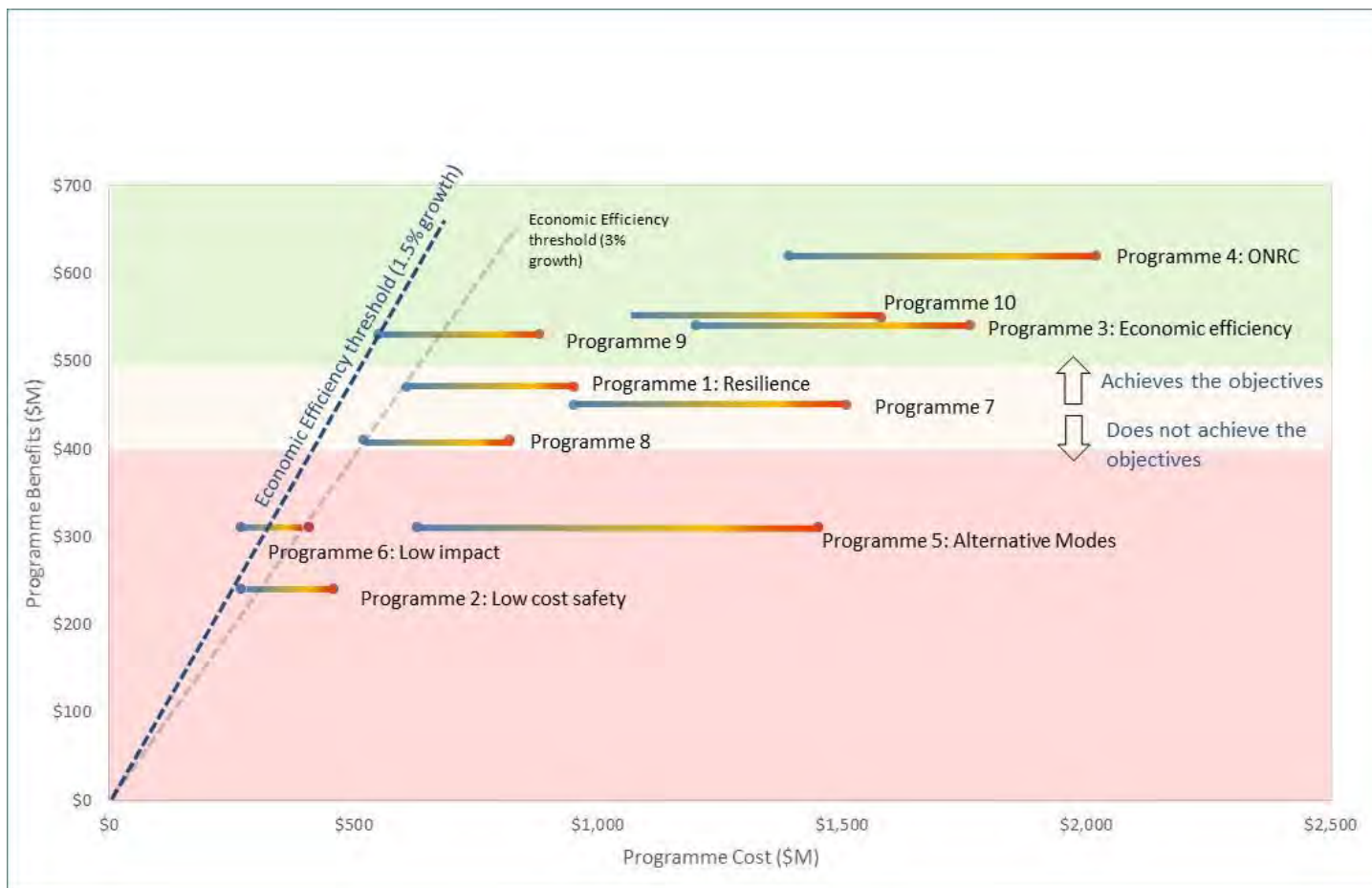


Figure 19 also indicates the change in economic efficiency threshold if forecast traffic demand on the corridor was doubled from an average of 1.5% to 3%. It indicates that Programmes 1 and 8 may become economically efficient, but that these do not deliver as fully against the agreed investment objectives. It also shows that Programmes 3 and 10, while delivering more against the investment objectives, do not become economically efficient. If greater transport outcomes were desired, Programme 4 delivers the most benefits.

There may be other reasons to justify further investment in transport outcomes that have not been considered as part of this assessment (including Wider Economic Benefits as an example). Further work would be required to quantify and justify this additional investment if additional outcomes were desired.

7. RECOMMENDED PROGRAMME

7.1 PROGRAMME OVERVIEW

The vision for this corridor is that it is safer and more reliable with a level of performance and quality of alignment and form comparable to other New Zealand roads of a similar classification, so that it is not an impediment to growth.

In a financially unconstrained environment, this vision may indicate that a four lane expressway standard alignment is required. However, this business case indicates that the transport benefits available in the corridor alone do not warrant investment of the scale necessary to deliver that outcome within the next 30 years.

The recommended programme for SH1 between Puhoi and Whangarei therefore comprises a range of interventions, including operational, supporting infrastructure (rest areas and service centre) and both online and offline alignment enhancements. The schemes that make up the recommended programme are outlined in Table 5 and Figure 20 (pictorially) although the exact details of the alignments will be confirmed in subsequent IBC stages.

Table 5 : Recommended Programme Components

Section	Infrastructure Investment
OPERATIONAL - Driver education and enforcement	<p>Licence assistance – programme to assist young people in Northland to obtain drivers licenses. Programme implemented in partnership with local councils and the NZ Police.</p> <p>Alcohol education programme to target areas of poor compliance with drink driving limits.</p> <p>Courtesy shuttles at popular pubs and drinking establishments along and near the corridor</p> <p>Increased police enforcement – Increasing budget to the Police to undertake road enforcement including drink driving, speed and *555 response.</p> <p>Safe Police observation bays</p>
OPERATIONAL - Wayfinding	<p>Tourist signage – Enhance use of the Twin Coast Discovery Route</p> <p>Travel time signage – Retrofit existing distance guidance with travel time in order to set travel time expectations. VMS detour advance warning at key decision points on journey. I.e. at Wellsford with information on SH16 vs SH1 to airport. Directional arrows installed at 2.5km centres.</p> <p>SATNav details of detour routes</p>
SH15: Inland Freight Route (SH1 to SH14)	<p>Corner realignment and shoulder widening on selected corners to ease significantly substandard horizontal radii to address safety concerns on this route. Includes provision for a weigh station near the SH1/SH15 intersection.</p>
Whangarei Urban Improvements	<ul style="list-style-type: none"> • Four laning between Toetoe Road and Rewa Rewa Road • Four laning between Southend Avenue and Murdoch Crescent • Four laning between Murdoch Crescent and Tarewa Road • Footpath between Toetoe Road and Murdoch Crescent

Section	Infrastructure Investment
	<ul style="list-style-type: none"> Cycle facilities between Toetoe to SH14 intersection
Toetoe to Oakleigh	<p>Offline 2+2 alignment with divided carriageway between Toetoe Road and Oakleigh (Mangapai Road).</p> <p>Connection provided between Otaika Valley Road and Portland.</p>
Oakleigh to SH15	<p>2+2 online upgrade of existing alignment with installation of wire rope central and side barriers.</p> <p>Truck stop at SH15A intersection including vehicle charging facilities</p> <p>Intersection improvements at SH15A</p>
SH15 to Brynderwyn Hills	<p>Central wire rope barrier installed. Additional passing lanes provided to improve passing opportunities.</p> <p>Access rationalisation in Waipu</p>
Brynderwyn Hills	<p>Western Bypass of the Brynderwyn Hills. 2+1 or 2+2 lanes. Wire rope barriers provided.</p> <p>Tourist rest area – top of Brynderwyn Hills</p> <p>Truck stop – SH12 intersection including vehicle charging facilities</p>
Brynderwyn Hills to Te Hana	<p>Safety improvements including minor curve realignment particularly around Ross Road. Installation of some side barriers. Selected shoulder widening, paint marking and signage improvements.</p> <p>Kaiwaka township improvements including gateway treatments.</p> <p>Upgrade detour routes including Mangawhai Road and Kaiwaka-Mangawhai Road including sections of shoulder widening and minor curve realignments.</p> <p>Truck stop/rest area in Kaiwaka including vehicle charging facilities</p> <p>Improved permanent detour and tourism signage</p>
Te Hana to Warkworth	<p>RoNS project including extension to north of Te Hana. Offline 2+2 divided carriageway with interchanges north of Warkworth, Wellsford and north of Te Hana.</p> <p>Online safety improvements – Dome Valley</p> <p>Town Centre improvements in Wellsford.</p>
Warkworth to Puhoi	<p>Puhoi to Warkworth RoNS. A 2+2 divided carriageway built to a high standard. Includes interchanges at Puhoi and northern interchange at Warkworth.</p> <p>Park and Ride - Warkworth</p>

The total cost of the recommended programme is between **\$880M to \$1,430M**. A range of costs have been provided, given the level of detail of the estimates developed, as this is a programme business case and individual options are in many instances not defined in detail.

This cost range includes operational and capital projects, however excludes the maintenance costs of the programme (which are not assumed to create a significant additional maintenance burden). The individual projects within the Do Minimum are not included in the programme costs as they are assumed committed already.

Figure 20 : Recommended Programme (9)



7.2 PROGRAMME IMPLEMENTATION STRATEGY AND TRIGGER POINTS

The implementation of the recommended programme has been considered in its development. The programme, whilst consisting of predominantly Transport Agency projects, will also require implementation by other parties.

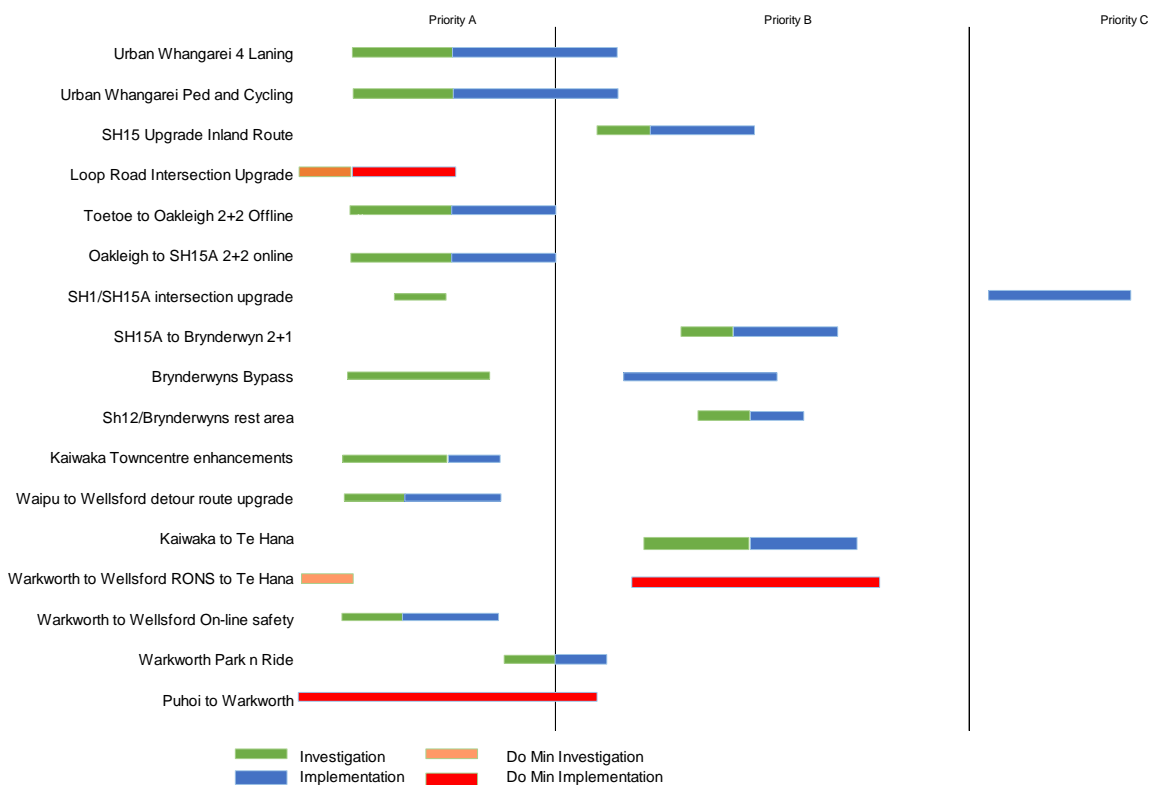
7.2.1 Timing and Triggers

In determining the timing for the implementation of the individual projects within the programme, a number of factors has been considered, including the demand, economic efficiency and the need to best meet the investment objectives. Prioritisation has been made by balancing a number of criteria and applying the Transport Agency Performance Assessment Framework, with the following priority of criteria applied:

- network performance and capability
- safety
- health
- environment
- cost

Based on this assessment, the implementation strategy for the programme from a timing perspective is outlined in Figure 21. This separately identifies the investigation and physical implementation components of each project as some warrant early investigation to understand preferred alignments and interface with others projects is considered important.

Figure 21 : Recommended Programme Implementation



The key aspects of this implementation strategy include:

- The safety and capacity improvements between Whangarei (SH14) and the Port is the most urgent part of the programme given the demand and the current safety problems. To compliment this upgrade, improvements to the inland freight route (SH15) will provide benefits to heavy vehicles. The southern section (Oakleigh to SH15 would be triggered by demand of 20,000 vpd).
- Investigation (through an IBC) of the Brynderwyn Hills bypass is an immediate priority to identify a preferred alignment so that costs, benefits and impacts can be better quantified.
- Upgrades to the detour routes between Waipu and Wellsford should be progressed immediately as HPMV resilience is required and works on SH1 in this area are not forecast for a number of years.
- The Kaiwaka town centre enhancements should be done as soon as possible given the lack of other improvements in this area of the programme and potential impact on the community.
- Online safety improvements through the Dome Valley should be undertaken immediately
- Warkworth Park n Ride should be progressed to ensure it is in place by the opening of the Puhoi to Warkworth PPP project.

7.2.2 Implementation Partners

The recommended programme requires implementation from others. This includes local Councils and partnerships in some of the behavioural options. Specifically, the implementation partnerships include:

- WDC, Kaipara District Council and Auckland Transport - proposed resilience upgrades to local roads between Waipu and Wellsford
- Whangarei District Council – in relation to the urban safety and capacity upgrades required between Toetoe Road and SH14 given the built up nature of this section of the corridor
- The behavioural options will require close collaboration and implementation with the Police and other government entities to ensure the most effective implementation of these options
- Rest areas / truck stops will require partnership with private entities

More details on the implementation of projects are outlined in the Implementation plan provided in Appendix I.

8. RECOMMENDED PROGRAMME – ASSESSMENT

A completed Transport Agency Programme Assessment Form for Programme 9 is included in **Appendix H**.

Programme 9 was selected as it delivers on the outcomes sought for the corridor in an economically efficient manner. Programme 9 offers a value for money programme that is affordable and able to be implemented in stages over the next 30 years, with a manageable impact on the environment, communities and culturally sensitive areas.

Programme 9 delivers the following outcomes:

PBC Investment Outcomes

- 6 min average travel time saving (Te Hana to Whangarei), trucks approx. 10+ min
- Mean operating speed of 82km/h
- 69 fewer deaths and serious injuries every 5 years
- \$880M - \$1.4B cost, over 30 years

8.1 PROGRAMME OUTCOMES

The investment objectives describe the outcomes sought from investing in this corridor. A summary of the outcomes achieved by the recommended programme is provided below:

8.1.1 Resilience

A step change in resilience is delivered by Programme 9. Resilience problems areas at the Brynderwyn Hills and Dome Valley are bypassed by higher standard alignments. The offline upgrade between Oakleigh and Toetoe Road in the north of the corridor will provide additional resilience in this area where safety problems are significant and create route resilience challenges. Between Oakleigh and SH15 (Port) an online upgrade is provided. This new 2+2 alignment, whilst on the existing alignment will greatly increase the safety and resilience of this section of the network.

The remaining sections between SH15 (Port) to Brynderwyn Hills and Brynderwyn Hills to Te Hana will have minor alignment enhancements but the road safety performance of these section will improve, in turn reducing the frequency of closures.

Programme 9 will ensure that all corridor sections have a detour route suitable for all vehicles, including HPMV, of less than 2 hours, fully meeting the investment objective. This will greatly enhance the route security for users and in particular freight users.

8.1.2 Safety Outcome

Programme 9 addresses the most significant safety concern areas (Toetoe Road to SH15 and the Brynderwyn Hills) in the corridor with a mixture of online and offline improvements in these areas as outlined in Figure 20. This programme achieves the objective of a MEDIUM KiwiRAP rating for the corridor length. This rating is achieved in all areas, along the corridor with the exception of the

urban area of Whangarei and between the Brynderwyn Hills and Te Hana. The implementation of this programme is expected to save 69 deaths and serious injuries every five years (the 86 in the evaluation tables included Puhoi to Wellsford RONS savings). This will provide a safe corridor and a significant improvement over its current safety performance for all road users, including freight and tourists.

8.1.3 Economic Growth (90km/h) Outcome

Programme 9 delivers an average speed of 82km/h for the corridor (89km/h, including the Do Minimum), which equates to a travel time between Puhoi and Whangarei of 1:13 min, representing more than 5 minutes saving over the Do Minimum travel time.

The sections of the corridor that do not meet the 90km/h average speed target are between the Brynderwyn Hills and Te Hana and within the urban Whangarei area. Between Brynderwyn and Te Hana, the current speed environment is not that far from the average sought. The cost to increase the speed in this section was not justifiable given the lack of other problems and the forecast level of demand.

Within the urban Whangarei section, the presence of signalised intersections, side friction and reduced speed environments do not allow the wider target to be achieved, however travel time and reliability savings can be achieved through addressing pinch points in the network.

The improvements in freight travel times and reliability mean that economic confidence is anticipated to increase in Northland, removing one of the current barriers identified as adversely affecting the region's economic growth.

8.1.4 Benefits Delivered Spatially

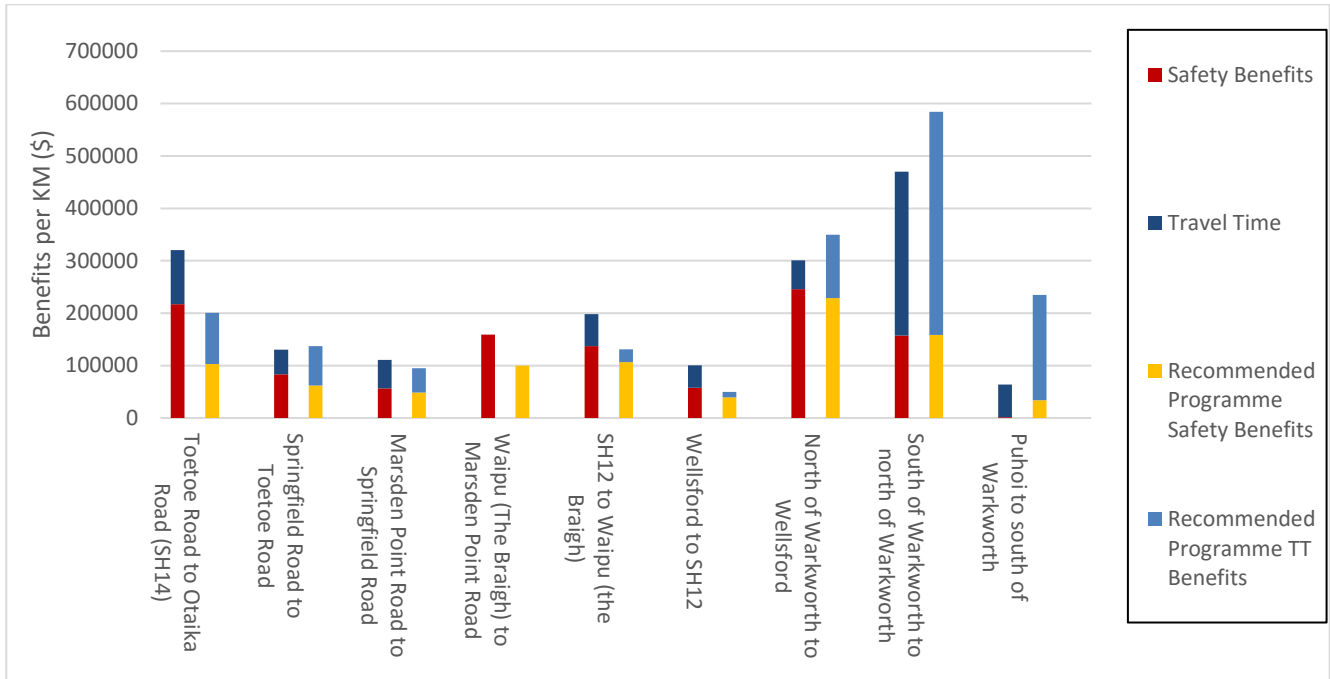
These outcomes are indicatively represented by the forecast transport benefits of the programme. Figure 22 shows the benefits available by delivering the desired level of investment outcomes for each corridor section. It compares this with the actual benefits realised by Programme 9.

Figure 22 shows that Programme 9 appropriately matches the level of investment at the northern end of the corridor, under invests in the middle section (between SH12 and Wellsford) and potentially over invests in the southern section.

The 'under investment' in the middle section relates to the significant level of investment required between the Brynderwyn Hills and Te Hana to provide a higher level of outcome (reduced gradient and improved horizontal alignment to increase average travel speed). This investment is not part of the recommended programme given the lack of current or forecast demand over the next 30 years. This is also reflected in the relative scale of available benefits in this section compared to the benefits available at the northern and southern ends of the corridor.

The indicated 'over investment' in the southern section of the corridor relates to the significance of the RoNS investment and the additional outcomes that this level of investment achieves when compared to the investment objectives outlined in this PBC (which were not the same drivers for the RoNS investment).

Figure 22 : Recommended Programme Benefits



8.2 PROGRAMME RISK

The recommended programme has a number of risks associated with its implementation that were assessed as part of the programme assessment framework. These are summarised below:

8.2.1 Feasibility

Programme 9 was considered to have minor risks with respect to feasibility. Generally, the options proposed are straightforward, well understood and ‘standard’ in nature.

Two new offline sections are proposed with this programme (Toetoe Road to Oakleigh and western Brynderwyn Hills bypass). These carry some property and consenting risk, particularly with respect to the coastal marine area (CMA) near Oakleigh.

The Whangarei urban improvements require widening of the State Highway in a built-up area. There are potential consenting and property risks associated with this. In addition, all online schemes will require careful planning to ensure the corridor continues to provide accessibility through construction. No fatal flaws are envisaged with respect to consenting and construction.

The operational options carry some risk, as they require careful collaboration with other parties, including the Police and other government organisations to ensure implementation is appropriately planned and rolled out.

8.2.2 Affordability

Programme 9 is considered relatively affordable, given its BCR range (0.6 - 1.0) is at or close to the minimum threshold. Therefore, it is considered that the programme is likely to be efficient and fundable through the National Land Transport Fund (NLTF). Table 6 sets out costs and benefits for each of the programmes considered.

Table 6: Programme Benefits vs Costs

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Cost (Lower Bound)	\$970	\$430	\$1,900	\$2,200	\$1,000	\$430	\$1,500	\$820	\$880	\$1,700
Cost (Upper Bound)	\$1,500	\$730	\$2,800	\$3,200	\$2,300	\$650	\$2,400	\$1,300	\$1,400	\$2,500
Cost (Lower Bound) NPV 2025	\$610	\$270	\$1,200	\$1,390	\$630	\$270	\$950	\$520	\$550	\$1,070
Cost (Upper Bound) NPV 2025	\$950	\$460	\$1,760	\$2,020	\$1,450	\$410	\$1,510	\$820	\$880	\$1,580
Benefits	\$470	\$240	\$540	\$620	\$310	\$310	\$450	\$410	\$530	\$550
BCR lower	0.8	0.9	0.5	0.4	0.5	1.1	0.5	0.8	1.0	0.5
BCR upper	0.5	0.5	0.3	0.3	0.2	0.8	0.3	0.5	0.6	0.3

However, with an expected cost of between \$880M and \$1.43 billion, the programme represents a prioritisation risk, with respect to the potentially limited funds available through the NLTF. It is likely that construction would be staged over a number of years.

Further, detailed analysis is required to confirm these funding arrangements, as projects are developed in more detail through Indicative and Detailed Business Case phases.

Some programme options could potentially use alternative funding sources given their design, which could make tolling options possible. Further investigation would be required to understand the benefits and impacts of this funding option.

Aspects of the programme will require implementation by other parties. The details of these funding arrangements are yet to be confirmed.

8.2.3 Stakeholder / Public Considerations

Stakeholder and public perceptions are always a risk for infrastructure projects. To mitigate this risk and ensure that as many perspectives as possible were included in the development of the PBC; stakeholders were invited to attend a number of interactive workshops. In addition, public views were sought via a web page dedicated to the PBC.

Options and alternatives were developed collaboratively with stakeholders at a workshop. Assessment criteria were taken from NZ Transport Agency guidelines for option evaluation, agreed with stakeholders and used to evaluate the identified options and alternatives with respect to their relative ability to deliver against the agreed investment objectives for the corridor. Stakeholders then participated in a workshop to develop a range of potential programmes for the corridor. Programme

9 was developed by one of these stakeholder groups with only minor refinements made by the project team.

There will likely be differences of perception with respect to the proposed implementation plan. In particular different groups are likely to have differing views of the options that should be prioritised for early implementation. Specific management plans will need to be developed and actioned as the programme is developed further and implemented.

Programme 9 is considered likely to attract both support and opposition like most infrastructure projects. Fundamentally it is considered that the key aspects of the project, providing a safer and higher quality alignment from Whangarei to SH15 (Port) and through the Brynderwyn Hills will be well received by stakeholders and the public. This assessment is based on the feedback from stakeholders through this PBC process.

8.2.4 Cultural Heritage, Environmental and Social Responsibility Considerations

There are identified areas of significance from a cultural heritage, environmental and social perspective along the corridor. Programme 9 is considered to carry some risk in this area however as it does not affect any specifically identified significant areas it is considered that this risk can be managed.

Culturally there are areas of significance throughout the corridor. Detailed investigation will be undertaken as part of individual project development, however based on what is known at this time, the programme does not directly affect any specific cultural heritage sites and therefore it is considered that this risk can be avoided or mitigated appropriately.

Environmental sensitive areas exist along the route and large-scale infrastructure projects will have an effect on the environment. These will need to be managed. The main areas of concern relate to the CMA near Oakleigh and ecologically sensitive areas through the Dome Valley and the Brynderwyn Hills. Like the cultural issues, more work is needed to understand these in detail, however no significant concerns have been identified at this stage.

There will be social enhancements with the improved safety and accessibility delivered by Programme 9. This must be balanced with the potential social impacts of property purchase and severance caused by new offline alignments recommended in Programme 9.

A bypass of Te Hana is recommended. This will need to be sensitively addressed and mitigation measures provided. Kaiwaka is likely to have increased traffic volumes and appropriately managing the competing functions of through traffic and local town accessibility are an important focus for the Kaiwaka town centre improvements project.

8.2.5 Safety

This risk is closely related to the Safety Objective, with Programme 9 providing a safer corridor. Appropriate implementation planning to ensure safety during this construction will be required. This risk is well understood with the options proposed as part of the overall programme.

8.2.6 Economy

Programme 9 improves the safety, reliability and performance of SH1 between Puhoi and Whangarei. Travel times between Puhoi and Whangarei will reduce to 1:13 mins. This level of improvement in transport performance will create a greater level of confidence for investor and business in Northland.

Programme 9 is a key component of the investment story improving connectivity to the Northland region to a comparable level to the rest of the country and acting as an enabler to economic growth. If the GDP of Northland was increased by only 1% as a result of this programme, this would equate to over \$60M of increased economic activity **per year**.

8.3 PROGRAMME OPPORTUNITIES

The proposed programme delivers against the investment outcomes sought and results in some risks to implementation as outlined above. The recommended programme also offers a number of opportunities to users, investors and the wider community. These include:

8.3.1 Social

The recommended programme bypasses Wellsford and Te Hana, this offers these towns the opportunity to redevelop and redefine themselves without the constraint and adverse effect of SH1 running through the middle of the town. Kaiwaka will continue to have SH1 running through the middle of town. The proposed town centre enhancement project within the recommended programme is an opportunity to realise real social and community benefits outside of the transport and safety benefits of the enhancement project. Further social opportunities exist for the communities on the eastern beaches along the corridor. The increased resilience and improved signage of roads in this area (as part of alternative route upgrades) presents an opportunity to attract more tourists and users to their communities. Finally, the social programmes to address safety problems, such as the license support programme offer greater social and community opportunities and benefits than simply the safety benefits directly claimed as part of this programme.

8.3.2 Tourism

As outlined above improving alternative routes will provide additional opportunities for tourism in the corridor. The programme is also predicted to provide increased tourism ‘traffic’ due to the higher quality route that will be provided, making the journey more attractive to tourists using the corridor to connect with Northland. The programme also provides enhanced and more frequent rest areas, intended to improve tourist journey quality. The recommended programme will also be more commensurate with the quality of road experienced by tourists when leaving Auckland and traveling north.

8.3.3 Land Use Integration

The recommended programme is a significant investment and offers considerable land use integration opportunities along the route and also for nearby communities. As outlined above, townships directly on or near the route will have the opportunity to respond to the programme and plan land use in an integrated manner. With increased accessibility this land use can potentially change from current thinking. Further afield communities such as Mangawhai could also realise the opportunity of increased accessibility through land use changes. The enhancements between Whangarei and SH15 (port) also create the opportunity for different thinking about land use integration along this section.

8.4 VALUE FOR MONEY

Programme 9 balances the cost of achieving the investment outcomes sought, particularly compared to the other programmes assessed. With NPV benefits of \$530M and a cost range of \$880m to \$1,430m, a BCR of between **0.6 and 1.0** is forecast.

Detailed analysis is required for each individual option within the programme, during subsequent IBC and DBC phases; however there is a good benefit stream that indicates a good value for money story.

This BCR analysis has been based on appropriate assumptions for a programme at this stage, with further benefits envisaged as more detailed analysis is undertaken. The economic assessment is based on a 6% discount rate, 40 year evaluation period, 4 year construction period and 2025 opening date. The benefits for each programme were calculated on a case by case basis but following the broad assumptions set out below:

- Safety benefits were calculated by applying a crash reduction factor of between 35 % and 75% depending on the intervention proposed on each section.
- Travel time benefits have been calculated based on changes in traffic speeds from the current operating speed up to 90km/h depending on type of intervention
- Vehicle operating costs have been assumed at 10% of travel time benefits.

Wider economic benefits have not been included, and given economic growth is a key part of the objectives of this project (and with transport identified as a key enabler for economic growth in the NEAP) it is considered likely that these would exist for this programme, further strengthening the value for money proposition of this programme.

8.5 SENSITIVITY ANALYSIS

The forecasting of future costs and benefits at the programme level involves a degree of uncertainty and the economic analysis is sensitive to the assumptions or predictions inherent in the analysis.

To ensure that the recommended programme has been selected on a robust basis, reference is made to the uncertainty log agreed with stakeholders as part of the Strategic Case and outlined in Table 1. Four scenarios were developed to assess the sensitivity of Programme 9 as the recommended programme. The scenarios were:

- **Growth forecast increases** – Part of the reason for this project is to improve the economic performance of Northland. A sensitivity test was undertaken to understand the effect on the programme if current forecast growth rates doubled. From a transportation demand perspective, this means average growth rates increasing from 1.5% to 3% pa.
- **Growth forecast reduces** – A scenario was developed assuming that current growth forecasts were not realised and the traffic growth rate halved to 0.75% pa.
- **NorthPort expansion** – If NorthPort significantly increased its tonnage due to rationalisation of ports across the Upper North Island, this could result in increased demand for road-based freight trips (500 trucks / day assumed) and increased rail demand.
- **Rail mode share reduces** – This scenario tests the effect on the programme if constraints in the downstream rail network (Auckland) for freight increase. It assumes that all current rail freight is moved by truck on SH1.

8.5.1 Scenario Outcomes

The potential outcome of these scenarios is summarised in Table 7.

Table 7 : Sensitivity Analysis Outcomes

Scenario	Safety Objective	Growth Objective	Resilience Objective	Economic Efficiency
Increased Growth	Medium KiwiRAP rating achieved for route	Average speed slows slightly and increases demand on SH15 (Port) to Brynderwyn Hills and Brynderwyn Hills to Te Hana sections. Requirement for Brynderwyn Hills bypass accelerated. Unlikely to increase requirement to 2+2 capacity on these sections.	Increased demand may accelerate implementation of Brynderwyn Hills bypass to improve the resilience of that section. Resilience interventions may be considered for Brynderwyn Hills to Te Hana section	Increases to approx. 0.7-1.2
Reduced Growth	Medium KiwiRAP rating achieved for route	Average speed increases slightly and extends the implementation timeframe for some interventions	Timeframes for interventions would be delayed, in particular the SH15 (Port) to Brynderwyn Hills section	Reduces to approx. 0.5-0.9
NorthPort Expansion	Medium KiwiRAP rating achieved for route	Average speed slows slightly and potentially accelerates requirement for the Brynderwyn Hills bypass	Increased demand may accelerate implementation of Brynderwyn Hills bypass to improve the resilience of that section. Resilience interventions may be considered for Brynderwyn Hills to Te Hana section	Increases to approx. 0.7-1.1
Rail Mode Share	Medium KiwiRAP rating achieved for route	Average speed slows slightly and potentially accelerates requirement for the Brynderwyn Hills bypass	Increased demand may accelerate implementation of Brynderwyn Hills bypass to improve the resilience of that section. Resilience interventions may be considered for Brynderwyn Hills to Te Hana section	Increases to approx. 0.7-1.2

Overall, the conclusion of this sensitivity analysis is that the timing of options within the programme could be delayed or accelerated dependent on the scenario. If the scale of the change was significant, it may be necessary to revisit the need for some of the options. If growth was significantly greater, it is possible that the section of the corridor between the Brynderwyn Hills and Te Hana could require additional capacity near the end of the 30-year time horizon of this programme. Conversely if growth was slower, the option of a 2+1 online enhancement between SH15 (Port) and the Brynderwyn Hills could be delayed further and potentially not needed at all.

The rail mode share and NorthPort scenarios would likely result in additional heavy vehicles and freight movements on the route, which could result in the acceleration of the Brynderwyn Hills bypass option within the programme.

Overall, it is considered that the recommended option responds to these sensitivity scenarios well.

8.6 ASSESSMENT PROFILE

An assessment profile of H/H/0.6-1.0 has been determined for the programme using the Transport Agency’s Investment Assessment Framework as detailed below:

8.6.1 Strategic Fit

Strategic fit of the problem, issue or opportunity that is being addressed: H/M/L

Overall the corridor has been given a **high** strategic fit as the problems and benefits defined by the project partners, and supported by the currently available evidence, are closely aligned with achieving the Government’s goals for land transport and the Transport Agency’s three-year strategic priorities on predictable journeys for urban customers and improved freight network productivity.

The Strategic Case confirms that the key problems relate to safety, efficiency, reliability and resilience, particularly for freight, and that these are significant from a national perspective.

Evidence collected through the Strategic Case indicates that the gap between current customer levels of service on the corridor and that considered appropriate for a National High Volume corridor is significant.

In line with the Transport Agency’s current Investment and Revenue Assessment Framework, the Strategic Case also focuses on improving SH1 as a national route by:

- Contributing to economic growth and productivity through improving the cost of travel along SH1, especially for the movement of freight
- Improving the safety of the corridor so that it is consistent with requirements for a National High Volume route, resulting in a reduced number of crashes involving injury and death
- Improving the resilience of the corridor between Northland and key markets to remove constraints on economic growth and investor confidence

This indicates a high Strategic Fit.

8.6.2 Effectiveness

Effectiveness of the proposed solution: **H/M/L**

Overall, the corridor has indicatively been given a **high** effectiveness rating subject to further investigation. Whilst options have not yet been considered in detail, the following provides an indicative view of the potential effectiveness of improving the SH1 corridor.

This is based on the intent and potential scope of the preferred programme(s) to deliver against the range of effectiveness criteria set out in the current Investment Assessment Framework, as set out below.

Component	Explanation	Rating
Outcomes focused	<ul style="list-style-type: none"> tangible change in addressing the problem, issue or opportunity identified in the Strategic Fit assessment consistency with levels of service in an appropriate classification system 	L/M/ <u>H</u>
Integrated	<ul style="list-style-type: none"> consistency with the current network and future transport plans consistency with other current and future activities consistency with current and future land use planning accommodates different needs across modes support as an agreed activity across partners 	L/M/ <u>H</u>
Correctly scoped	<ul style="list-style-type: none"> the degree of fit as part of an agreed strategy or business case has followed the intervention hierarchy to consider alternatives and options including low cost alternatives and options is of an appropriate scale in relation to the issue/opportunity covers and/or manages the spatial impact (upstream and downstream, network impacts) mitigates any adverse impacts on other results 	L/M/ <u>H</u>
Affordable	<ul style="list-style-type: none"> is affordable through the lifecycle for all parties has understood and traded off the best whole of life cost approach has understood the benefits and costs between transport users and other parties and sought contributions as possible 	L/M/ <u>H</u>
Timely	<ul style="list-style-type: none"> delivers enduring benefits over the timeframe identified in the justified strategy or business case provides the benefits in a timely manner 	L/M/ <u>H</u>
Confidence	<ul style="list-style-type: none"> manages current and future risk for results/outcomes manages current and future risk for costs 	L/M/ <u>H</u>
Overall	<ul style="list-style-type: none"> Assessment based on lowest rating of all components 	L/M/ <u>H</u>

Achieving the agreed benefits would support and promote the National High Volume role of SH1.

Based on the problems identified, there is sufficient scope to identify appropriate alternatives that would make a significant contribution to achieving the multiple impacts of the GPS.

The agreed problems and benefits are integrated, and therefore there is scope to make a significant contribution to multiple outcomes including:

- Improving safety outcomes for the corridor
- Improving journey time reliability
- More efficient and productive freight supply chains
- Improving route resilience and route security

The PBC will have a role in wider regional strategies and planning documentation though increased confidence in the corridor and will provide ongoing integration between land use and transport for the corridor.

8.6.3 Efficiency

Benefit and cost appraisal: H/M/0.6-1.0

Details of the benefit and cost appraisal are provided in Section 8.4, above. The BCR has been assessed to be within the range of 0.6 – 1.0.

9. PROGRAMME FINANCIAL CASE

9.1 INDICATIVE COST

The cost of the programme was developed through the development of costs for each individual option that made up the recommended programme. These individual costs were then combined to give a total cost.

These costs were developed through the knowledge of Transport Agency projects and previous costings for options from early investigations (where this existed). All cost estimates are expressed as a range, i.e. upper-bound and lower-bound values only have been provided.

Given the strategic nature of a programme business case, detailed option development has not been undertaken and therefore a range best represents the costs at this stage in the programme life cycle. Table 8 shows the cost per project element within the programme.

It indicates that the expected total cost range for Programme 9 is **\$880 to \$1,430M**.

Table 8 : Programme Cost

Section	Road Infrastructure Investment	Cost of project (\$M undiscounted)
Inland Freight Route	SH15 improvements for HPMV	\$20-30
Whangarei urban	Urban multi-modal capacity improvements Footpath and cycle facilities	\$30-50
Toetoe to Oakleigh	2+2 offline	\$160-280
Oakleigh to SH15A	2+2 online	\$140-210
SH15A to Brynderwyn Hills	Online safety improvements + extension of passing lanes. Intersection upgrade	\$30-50
Brynderwyn Hills	2+2 bypass to the west Tourist rest area – top of Brynderwyn Hills Truck stop – SH12 intersection Upgrade detour routes: <ul style="list-style-type: none"> • Improved permanent signage • Satnav details of detour routes <ul style="list-style-type: none"> • Improved alignment Provision for cyclists	\$450-730
Brynderwyn Hills to Te Hana	Minor online improvements Kaiwaka township improvements	\$10-30
Te Hana to Warkworth	Truck stop – Te Hana Online safety improvements – Dome Valley Improvements to SH16	\$30-40

Section	Road Infrastructure Investment	Cost of project (\$M undiscounted)
Warkworth to Puhoi	Park and Ride – Warkworth	Less than \$5
Driver education and enforcement	<ul style="list-style-type: none"> • Licence assistance • Alcohol education programme • Courtesy shuttles • Increased police enforcement 	Less than \$5
Wayfinding	<ul style="list-style-type: none"> • Tourist signage • Travel time signage • VMS detour advance warning 	Less than \$5
TOTAL		\$880-1430

9.2 FUNDING ARRANGEMENTS

The expected programme BCR is at the minimum threshold. Therefore, it is considered that the programme will be efficient and fundable through the National Land Transport Fund (NLTF).

However, with an expected cost of between \$880M and \$1.43 billion, the programme represents a prioritisation risk, with respect to the potentially limited funds available through the NLTF.

It is likely that construction would be staged over a number of years, with improvements to the section between SH14 and Oakleigh recommended to commence within 5 years, while the full programme is not expected to be constructed for more than 20 years.

Further, detailed analysis is required to confirm these funding arrangements, as projects are developed in more detail through Indicative and Detailed Business Case phases.

Funding will need to be confirmed through the inclusion of individual components of the programme in the 2018-2021 National Land Transport Plan, which is due for development for the next 3+3+4 years in June 2017.

Aspects of the programme will require implementation by other parties. The details of these funding arrangements are yet to be confirmed.

9.3 AFFORDABILITY

As indicated above, it is considered that the recommended programme will be efficient and fundable through the NLTF. Implementation would be staged over several years.

The recommended programme will be jointly progressed in coordination with Road Controlling Authorities Auckland Transport (AT), Kaipara District Council (KDC) and Whangarei District Council (WDC). This approach is proposed, as several programme elements are located on the local road network, under the control of these organisations.

PART C – DELIVERING AND MONITORING THE PROGRAMME

10. MANAGEMENT CASE

The management case assesses whether a programme is deliverable. It tests the programme planning, governance structure, risk management, communications and stakeholder management, benefits realisation and assurance. It sets out a plan to ensure that the programme benefits are realised and includes measures to assess and evaluate this.

10.1 PROGRAMME GOVERNANCE AND REPORTING

The programme will be led by the NZ Transport Agency. Some components of the programme will require investment from other organisations including Auckland Transport, Whangarei District Council, Kaipara District Council and the NZ Police.

A project management team will be responsible for the day-to-day management of the project. A project control group will meet fortnightly to consider and endorse key project milestones.

The project team will engage Professional Services specialists to develop Indicative and Detailed Business Cases for individual projects as required. These Professional Services resources would report directly to the in-house project team. The subsequent stages of project development should use this PBC as a key reference document for an subsequent development and could trigger the need to update the PBC should any of the key assumptions change.

In addition, inputs from a number of Transport Agency teams will be required. The table below shows the responsible person in each case:

Role	Responsible Person
Programme Sponsor	Jim Sephton
Stakeholder / Comms	Kelli Sullivan
Transport Planning	Sebastian Reed
Planning and Investment Case Manager	Martin Taylor
Road Safety	Brian Rainford
Network Operations	Graham O'Connell
Network Management	Tim Crow
Project Services	TBA

10.2 STAKEHOLDER ENGAGEMENT AND COMMUNICATIONS PLAN

The key stakeholders for the PBC are listed below. The stakeholders have been identified based on the practical and technical details of the range of issues, interactions and alternatives/options that may be considered. Most of the stakeholders have been engaged through participation in the PBC workshops including confirming the strategic case, developing alternatives/options and the preferred option(s) workshops. They will also be included in the circulation of the related business case documents for review and agreement.

- Auckland Council
- Auckland Transport

- Kaipara District Council
- Whangarei District Council
- Northland Inc
- Iwi
- Road Transport Association
- NZ Police
- National Road Carriers
- Northport

Different stakeholders will bring specialist judgement or bring different perspectives and skills at different stages.

A stakeholder plan will be developed to ensure these relationships are appropriately managed and to optimise the development of individual IBCs and DBCs. This will also address the specific details for each stakeholder, including key contact person and approach for engagement.

Stakeholders will be managed through the Programme Manager, with support from the Agency's communications team, who knows the stakeholders well and will assist with organisation and preparation for this stakeholder engagement.

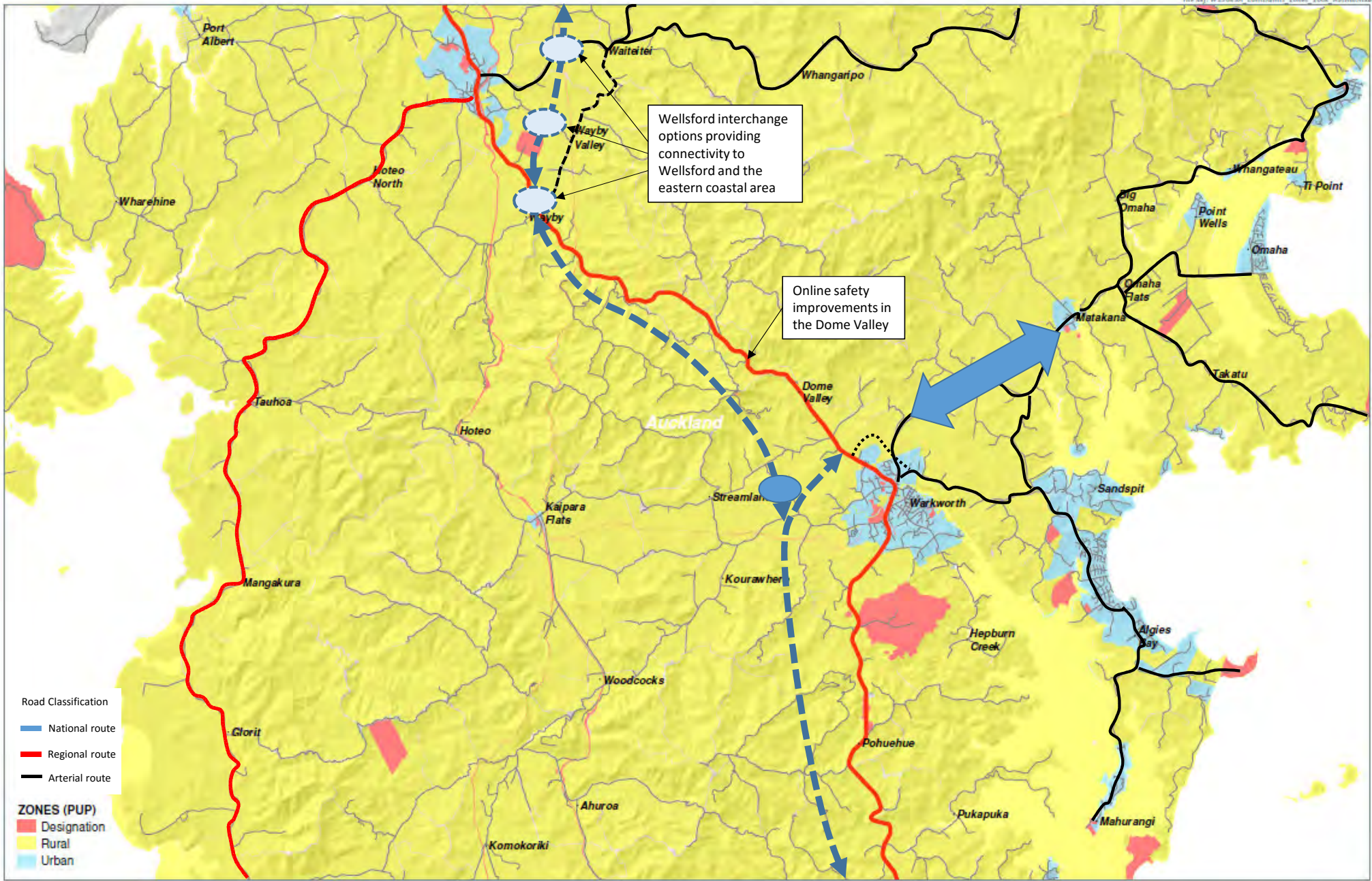
External communications will be managed through the Programme Manager, with support from the Agency's communications team, who will assist with organisation and preparation for these communications. A Communications Plan will be prepared.

10.3 PROGRAMME PERFORMANCE AND REVIEW

It is important that performance against the investment objectives and desired outcomes be reviewed following implementation of each programme element. This review may indicate that other parts of the programme may not need to be pursued or that triggers may need to be reviewed.

With respect to the SH1 Auckland to Whangarei corridor programme, it is likely that the four-lane component of the programme from Whangarei to SH15 will be delivered ahead of other programme components. As such, a performance review hold-point is recommended following construction to determine whether triggers for further interventions remain appropriate.

APPENDIX A – NETWORK PLAN

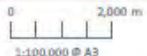


- Road Classification
- National route
 - Regional route
 - Arterial route

- ZONES (PUP)
- Designation
 - Rural
 - Urban



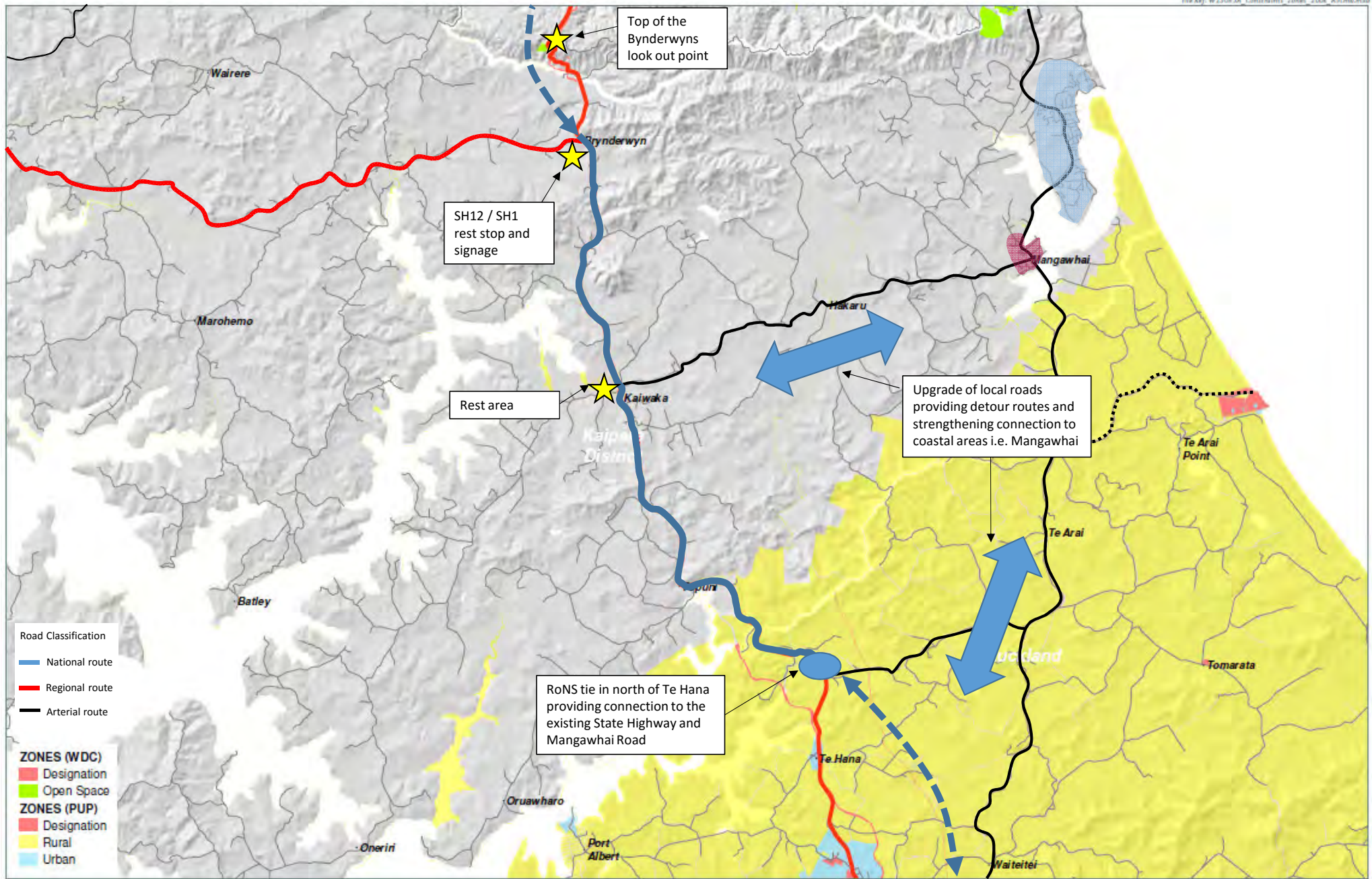
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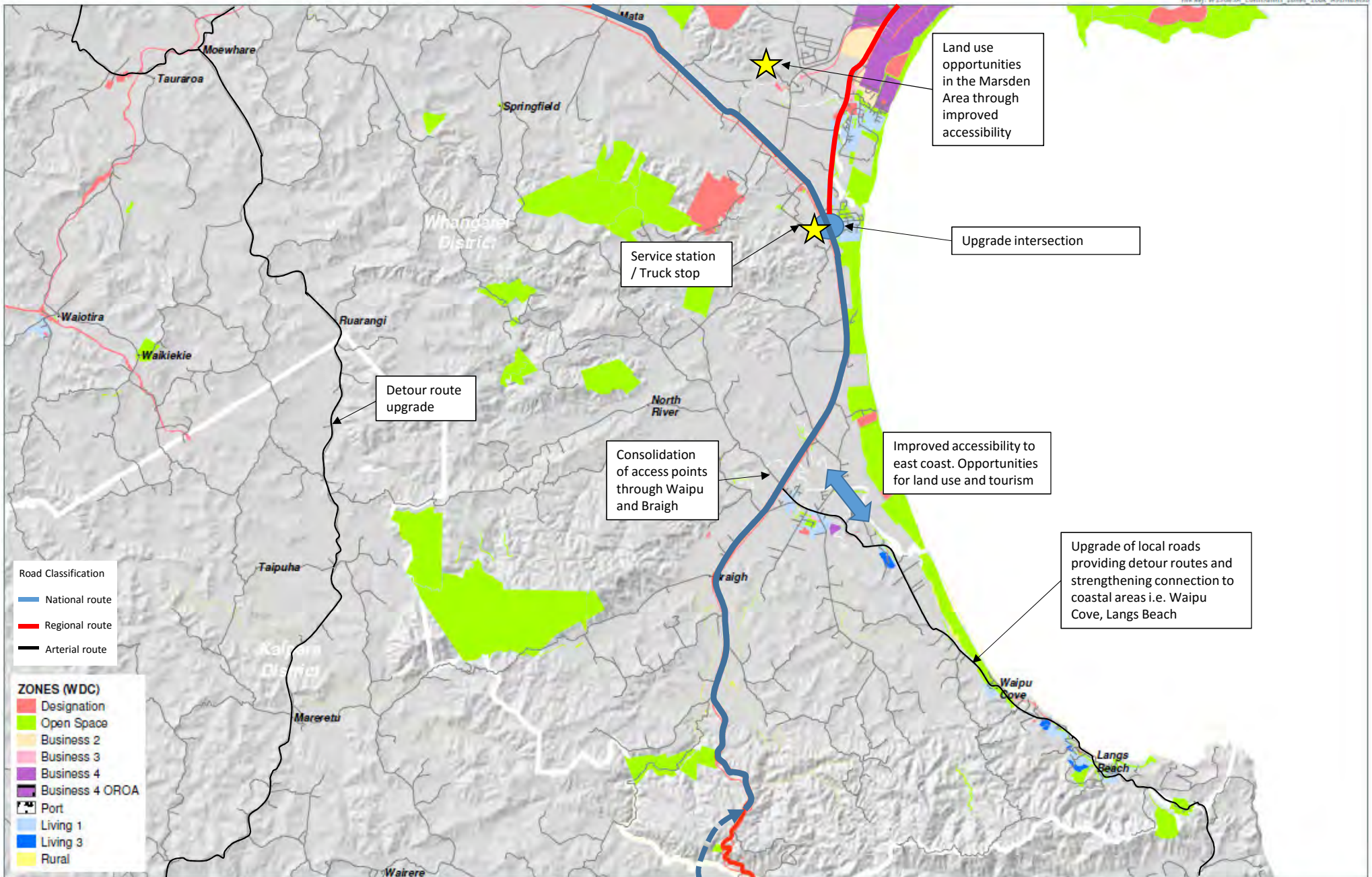


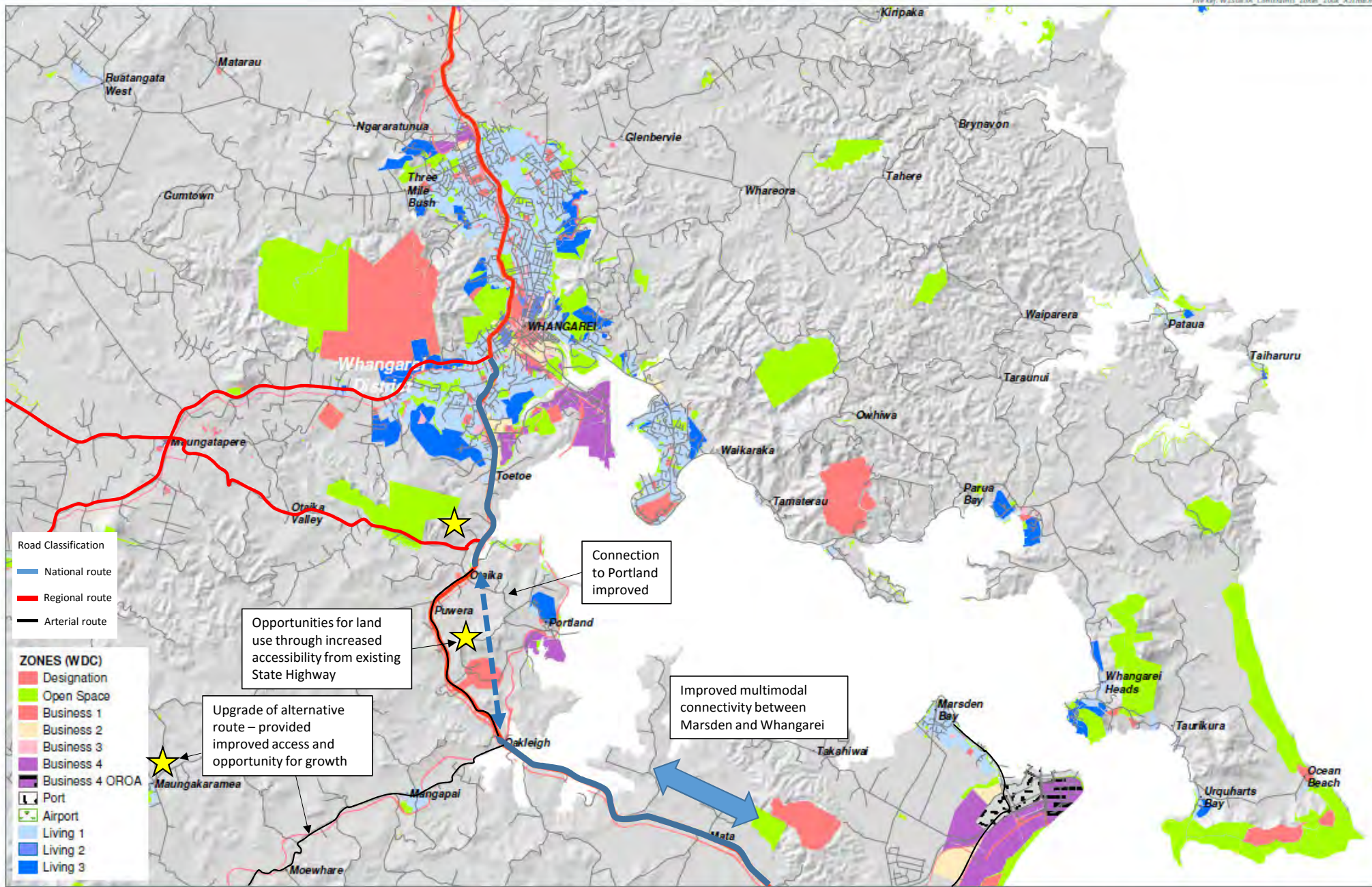
Projection: NZGD 2000 New Zealand Transverse Mercator

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APPENDIX B - ENVIRONMENTAL PLANS



Data Source:



Projection: NZGD 2000 New Zealand Transverse Mercator

DRAFT

SH1 - PUHOI TO WHANGAREI - OPPORTUNITIES & CONSTRAINTS


LANDFORM



Date: 4 March 2015 | Revision: 0

Plan prepared for NZTA by ICF Consulting Limited

Project Manager: robert.lachfield@icfconsulting.com | Drawn: TWG




NZ TRANSPORT AGENCY
 WAIATA KOTAHAE

Data Source: Land Cover data sourced from the Ministry for the Environment, LCCD database version 4.
 Projection: NZGD 2000 New Zealand Transverse Mercator

DRAFT

SH1 - PUHORO TO WHANGAREI - OPPORTUNITIES & CONSTRAINTS
LANDSCAPE AND ECOLOGY
 Date: 4 March 2016 | Revision: 0
 File prepared for NZTA by Softa Miskell Limited
 Project Manager: robert.lachfield@softamiskell.co.nz | Drawn: N/A





APPENDIX C – STRATEGY DOCUMENTS

Government Policy Statement on Land Transport 2015/16 – 2024/25

The NZ Transport Agency must give effect to the Government Policy Statement (GPS), which sets out the Government’s strategic direction for investment in the land transport network. The GPS places particular importance on investment in the state highway network, in recognition of its importance to the efficient movement of people and freight, and addressing the safety problems across the network. Whilst the focus of the GPS is very much on delivering the current Roads of National Significance programme, the associated long-term results sought are intended to directly support economic growth and productivity through provision of better access to markets and employment.

Regional Land Transport Strategy

The current Regional Land Transport Strategy (RLTS) identifies a number of regional policies and priorities that seek to achieve integrated transport outcomes in the future. Four of the seven priorities are key to supporting the outcomes that are desired for the SH1 corridor:

- Resilience of the road network
- Alignment with HMPV usage
- Freight and economic development
- A safer road network, reducing fatalities and serious injuries.

The RLTS recognises that volumes of freight are significant and the importance of the Auckland to Whangarei transport corridor (SH1) as critical to the Northland region’s growth and performance:

“The Auckland isthmus effectively separates the Northland region from the rest of New Zealand. As a result, Auckland is a key lifeline for Northland. Secure and reliable transport connections to Auckland and beyond are critical for economic success of both regions. Access difficulties (through Auckland, through Northland or both) may deter some visitors and have significant implications for freight movements, particularly with the trend towards ‘just in time deliveries’ to retail and wholesale sector outlets serving Northland’s consumer and tourism sectors rather than businesses stockpiling supplies.

Secure transport connections are therefore vital to ensure the security of supply of the goods, food and fuel that the region depends upon. Northland’s road network is also vital for access to emergency and essential services.”

NZ Transport Agency

National Programme Business Case - Safer Journeys (Roads & Roadsides)

The National Programme Business Case for Safer Roads and Roadsides identifies the majority of the SH1 corridor between Puhoi and Whangarei as high-risk roads requiring action over the next 10-year period (See Section 3.4). This confirms the case for change to improve road safety along the whole of this PBC corridor, and that this will contribute to reducing deaths and serious injuries.

Network Resilience - National Strategic Case

The Transport Agency is currently preparing a National Resilience Business Case to assist planning for investment to improve network resilience. This study has identified three key problem areas and associated benefits, each of which are relevant to SH1:

- Poor highway resilience may impede critical services from providing disaster response and recovery support.
- Unreliability of some highways affects businesses and undermines economic growth.

- The risky environment of some roads increases the possibility of harm to road users. The development of the National Resilience Programme Business Case is ongoing. However current indications are that a preferred programme focus will be to keep the state highway network open or to ensure that alternative routes are always available. The indication at this stage is that priority will be given to the national routes and high volume routes. This confirms that resilience (and route security) issues along SH1 between Auckland (Puhoi) and Whangarei are significant and support the case for future improvement.

High Productivity Motor Vehicles – National Strategic Case

The Transport Agency has prepared a Strategic Case that outlines the case and context related to allowing heavy vehicles to operate outside the current mass and dimension limits. Beyond the Strategic Case, work to develop and assess alternative programmes to achieve the associated productivity gains is ongoing. The National Strategic Case for HPMV confirms the investment routes for the 2012-15 period and this includes SH1. Physical works have been undertaken to strengthen bridges in the corridor, allowing the route to be used by full HPMVs.

One Network Road Classification (ONRC)

The ONRC system classifies all roads into different types of roads. This is based on criteria in relation to safety, resilience access, traffic volume and other measures. There are also Level of Service guidelines for how the different types of classification should be performing against the above criteria. The Transport Agency uses this system to classify all of the state highways in the country.

As outlined in Figure X below, state highway one in this corridor is classified as a National route for the entire length of the PBC area, with the section south of Wellsford classified as “High Volume” also due to the traffic volumes. The National classification is the highest classification in the system and is defined as:

National: *These are roads that make the largest contribution to the social and economic wellbeing of New Zealand by connecting major population centres, major ports or international airports and have high volumes of heavy commercial vehicles or general traffic. They must meet the thresholds for 3 criteria, including at least one of the following movement criteria (Typical Daily Traffic, Heavy Commercial Vehicles or Buses, Urban Peak) and at least one of the economic and social criteria (i.e. 3 in total). To be included in the high volume subset a road must meet one of the high volume criteria for typical daily traffic or HCVs.*

This confirms the strategic importance of this road as a connection between Northland and Auckland.

APPENDIX D –PUBLIC CONSULTATION REPORT

Public Consultation Report – Auckland to Whangarei PBC

Kelli Sullivan

23 June 2016

VERSION 1

A summary of the online engagement campaign to support engagement on the Auckland to Whangarei Programme Business Case



1. EXECUTIVE SUMMARY

The NZ Transport Agency, on behalf of the NZ Government is investigating future investment in the state highway between Auckland and Whangarei. SH1 between Auckland and Whangarei is a National Strategic Route connecting freight, commuters and visitors.

Improvements along this section of SH1 will strengthen the route, making it safer and more reliable for users and provide better accessibility between Northland and Auckland and the Upper North Island for freight vehicles, tourists or local travellers.

To inform the Auckland to Whangarei Programme Business Case (PBC) engagement with key stakeholders, including transport industry representative, Councils and iwi. Public consultation took the form of an online survey during May-June.

During the consultation period 988 submissions on the Auckland to Whangarei PBC were received online, with an additional 175+ customer comments captured as a result of Facebook posts.

This report outlines the findings of the public engagement.

2. INTRODUCTION

The consultation report details the public communications and online engagement undertaken to inform the Auckland to Whangarei Programme Business Case.

This engagement was undertaken in parallel with key stakeholder workshops and internal communications, led by external consultants (Commute).

Initial communications with the wider public occurred with the launch of the Connecting Northland website which was promoted to attendees at a Transport for Future Urban Growth (TFUG) public open day in Warkworth on 30 April 2016. A PDF flyer promoting the online engagement was distributed to key stakeholders via email and provided to attendees at the TFUG event.

Promotion of the online engagement was through targeted Facebook ‘boosts’ which were paid advertising posts aimed at generating visitors to the Connecting Northland website. Each ‘boost’ generated significant site traffic with over 6,000 visits to the website ‘Tell us what you think’ page during the engagement period.

3. ONLINE ENGAGEMENT FRAMEWORK

3.1 Quantitative data

Submitters were asked to consider six areas of the state highway network and to identify which three (if any) they would prioritise for future investment. The six areas were identified as:

- Dome Valley
- Kaiwaka to Te Hana
- Brynderwyn Hill
- Ruakaka to Waipu
- Otaika Valley Road (to become SH15)
- Through Whangarei

The intention of the ‘tick box’ quantitative data gathering was to illustrate the ‘whole corridor’ considerations before submitters funnelled their feedback to areas of specific interest to them through the free text boxes. Respondents were asked to consider the supporting map of the network to assist in their prioritisation.



3.2 Qualitative data

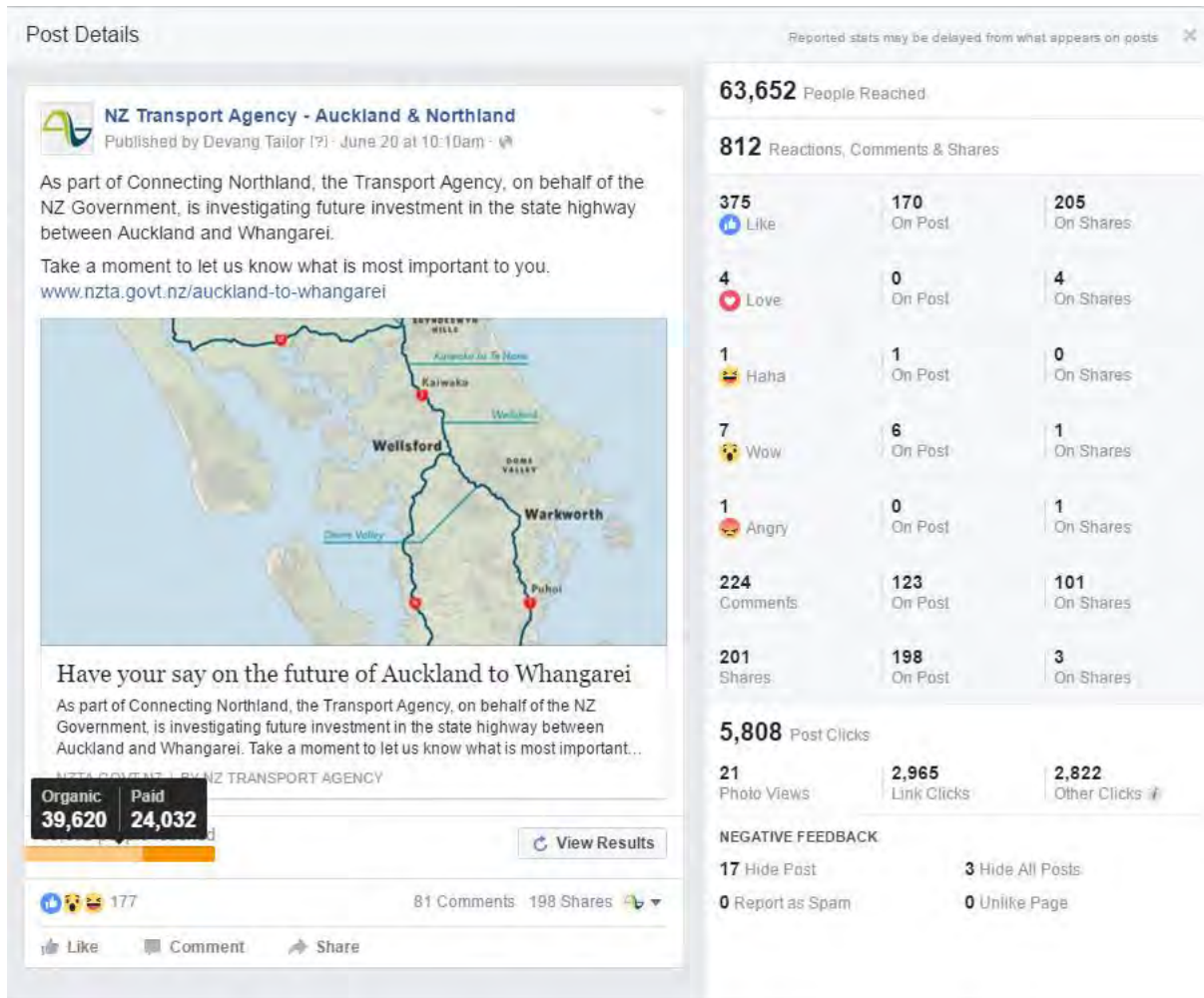
In order to support free comments across a broad corridor, only two questions were posed:

1. Provide feedback on the areas you have prioritised
2. Any other comments on the corridor plan

Across the total survey responses, question two elicited the most written responses.

4. SOCIAL MEDIA PROMOTION OF THE SURVEY

63,652 people were reached through the Transport Agency’s Facebook posts specific to the PBC engagement. A summary of the Facebook activity is as follows:



To reach a wide range of customers and to increase survey participants, a series of paid ‘boosts’ advertised the survey via the Transport Agency’s Facebook page. These paid boosts resulted in an additional 24,032 ‘hits’ on the Facebook posts.

The ‘boosts’ targeted geographical areas and other demographics.

Leveraging both organic and paid promotion via Facebook resulted in 6,123 visits to the ‘Tell us what you think’ survey page on the Connecting Northland webpages. Visits to the survey spiked in the final week of the survey (June 19-23), with smaller peaks in May coinciding with Facebook ‘boosts.’

A breakdown of the demographics and reach of the paid ‘boosts’ is outlined below:

Boost Post

OVERVIEW EDIT PROMOTION

You are targeting **men and women, ages 18 - 65+** who live in **17 locations**.

Show full summary

This promotion will run **continuously**.

Your daily budget for this promotion is **\$100.00**.

1,188 Actions **24,032** People Reached (?) **\$44.74** Total Spend (?)

Actions | People | Countries

32.1% Women **67.9% Men**

Age Group	Women (%)	Men (%)
13-17	~2%	~2%
18-24	~6%	~12%
25-34	~6%	~18%
35-44	~5%	~14%
45-54	~6%	~11%
55-64	~7%	~8%
65+	~2%	~6%

DESKTOP NEWS FEED MOBILE NEWS FEED

NZ Transport Agency - Auckland & Northland Sponsored

Like Page

As part of Connecting Northland, the Transport Agency, on behalf of the NZ Government, is investigating future investment in the state highway between Auckland and Whangarei.

Take a moment to let us know what is most important to you.
www.nzta.govt.nz/auckland-to-whangarei

Have your say on the future of Auckland to Whangarei

As part of Connecting Northland, the Transport Agency, on behalf of the NZ Government, is investigating future investment in the state highway between Auckland and Whangarei. Take a moment to let us know what is most important...

NZTA GOVT NZ | BY NZ TRANSPORT AGENCY

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5. FEEDBACK SUMMARY

Due to the geographical scale of the corridor and the diverse users of the state highway, an online programme of engagement provided the optimal reach to gather public feedback. While the team acknowledge online channels limit consultation to customers with internet access, the purpose of the online engagement was not to connect with every road user, but rather ensure a cross section of feedback was considered alongside key stakeholder inputs in the PBC process.

Online engagement went ‘live’ on April 2016, with submission officially closing on 30 May. Due to a late ‘boost’ via Facebook, additional comments and submissions were considered up to 22 June.

5.1 Quantitative data

Of the 988 submissions received through the Connecting Northland website, 860 prioritised Dome Valley as the area needing transport investment due to safety risks, speed restrictions and resilience (significant detours during unplanned events). Brynderwyn Hills were the second priority with 693 and the third priority was Kaiwaka to Te Hana with 433 responses. The state highway section identified with the least priority was Ruakaka to Waipu with 102 responses.

While the geographical location of the respondent was not asked, the three priorities chosen by each submitter tended to be in a geographical sequence which would suggest they were ‘local’ to particular areas of the highway. For example, the majority of respondents who prioritised the Dome Valley also prioritised Kaiwaka to Te Hana and the Brynderwyns. Likewise, those who prioritised Otaika Valley Road, also prioritised Through Whangarei.

For the next PBC online survey (Twin Coast Discovery Route), identifying the geographical location of the respondent will improve the quantitative data gathering.

5.2 Qualitative data

Puhoi to Wellsford (including the Dome Valley) was the strongest theme represented in the comments. Other recurring themes included:

- Resilience (SH closures due to unplanned events or weather)
- Safety
- Capacity (need to increase)
- Connecting Northland
- SH1 Brynderwyn Hill (rationale for northside safety improvements)
- Otaika Valley/Loop Road
- Quality of Northland roads
- Maintenance and operations
- Rail

Comments were also made on the timeliness of implementing projects, particularly in respect of projects around Warkworth. A number of submissions were received on Penlink and these responses have been forwards on to Auckland Transport.

6. PUBLIC SUBMISSIONS

6.1 Puhoi to Wellsford (including Dome Valley)

Main points centre on journey time reliability due to congestion at the Johnston Hill tunnels and again through Warkworth. The reduced speed limit through the Dome Valley and lengthy detours during frequent unplanned incidents also generated commentary.

Anecdotal feedback as follows:

- The speed limit of 80km/hr through the entire Dome Valley is overkill (excuse the pun). I personally get very tired when travelling long distances at such slow speeds, and this means I am more in danger of having a crash. Only parts of this section of highway need to be 80k/hr. All drivers are disadvantaged due to a few incompetent drivers.
- Warkworth to Dome Valley badly needs upgrading
- Puhoi to north of Warkworth is one of the worst pieces of road for being congested due to increased traffic caused by the lack of housing in Auckland.
- Warkworth needs double lanes or a bypass.
- Is the Warkworth by pass going ahead? (Priority!!!)
- My first and foremost that I feel affects me in the north is Warkworth. 4 sets of lights now builds traffic up to the tunnels and well into the dome Valley. The sooner Warkworth is bypassed the better. This to me is a higher priority than any other development. The flow north will improve as long as a set of lights aren't put in. Mind you one is better than 4. Round about
- The single northern lane at Puhoi tunnels is a major bottle neck, 2 lanes North to and beyond Warkworth will greatly alleviate the situation. In my experience, much past Warkworth isn't a major issue yet, unless there is an accident.
- Warkworth is a bottle neck
- I use SH 16 to get to Wellsford.
- Please hurry up with the upgrade through Warkworth and Dome Valley
- The bottle necks of Warkworth and Wellsford would be good to deal to.

- bypass Wellsford a priority (after Warkworth of course, that intersection is hopeless.
- Please bypass Warkworth it will save a lot of time.
- Rooding into and through Warkworth would be the biggest issue between Auckland and Whangarei.
- SH1 through Warkworth also needs to be upgraded. It's ridiculous that a state highway is in the condition it is in and a joke when taking guests on this road. A complete bypass would be great!
- I think a Wellsford bypass would be worth thinking about
- Looking forward to the Puhoi to past Warkworth, major traffic holdups with people going out Matakana direction. To totally bypass Warkworth through the back of Woodcock road and come out at traffic lights at other side would be awesome.
- Wellsford really needs to be by-passed
- Wish Warkworth was one of the options. Bypassing the 4 traffic lights would make a huge difference.
- hopefully, in time the Puhoi to Wellsford strategic highway will be extended to Whangarei. By pass dome valley somehow, fix both sides Brynderwyns, the rest I feel is quite good road
- you need to bypass Warkworth and Wellsford
- Sort out the Wellsford junction. Too congested
- Bypass around Wellsford business centre
- Need to urgently upgrade bypass Puhoi past Wellsford.
- Puhoi to Warkworth road is high volume on normal day and high accident rate. Sick of fatalities. Everytime firestation siren goes off people cringe.
- This isn't a plan, a plan would be 'we are going to bypass Dome Valley'
- Get rid of Warkworth intersections
- Warkworth is the worst place to transit in the whole country and should be bypassed urgently.
- Better quality roading to make safer driving around Puhoi to Warkworth and Dome Valley. So many fatalities. More open wider lanes with passing areas
- Completely bypass Warkworth and Wellsford
- The Puhoi to Warkworth part should start north end so it bypasses Warkworth first
- The motorway needs to be prioritized through from Puhoi to Whangarei. The roads need to be wider, level and more straight. The corners are death traps.
- Just keep extending the motorway north from Puhoi and South from Whangarei and don't stop until both ends meet.
- you need to bypass Warkworth and Wellsford
- At Wellsford, 2 state highways converge into one and both are critical routes, needs to be consideration about how they would work together. Warkworth is another point in the network that causes a lot of delays.
- Warkworth needs a bypass ... Hill Street intersection is shocking (at any time, any day)
- Warkworth thru Wellsford will be the next bottleneck, let's fix it before it's clogged
- Congestion at Warkworth needs sorting. I know Wgtn closes some passing lanes on busy weekends, maybe that would help up this way too?
- I would just like the motorway to extend from Puhoi up to Whangarei to ease congestion.
- I think the expressway between Auckland and Wellsford is a great idea and will really open up Northland to investment. If the journeys length can be reduced it can only be good, especially during peak holiday periods. A 2:1 road the remaining length between Wellsford and Whangarei would also improve the journey dramatically, and make it easier to extend the expressway in the future. The Brynderwyns Hills are currently a major barrier and perhaps a long term plan needs to look at a new area to cross them, further west, as the south side currently doesn't really allow for much improvement.
- Wellsford bypass must happen

- Some Valley and Warkworth bypass of some sort would give most bang for buck
- Warkworth to Wellsford needs work
- Bypasses of Wellsford and Kaiwaka should also be investigated - even if only to future-proof the land that would be needed for these.

6.2 SH1 Brynderwyn Hill

The overwhelming feedback received in relation to Brynderwyn Hill is disagreement with the current investment in the northern side of the Hill. Suggestions for a western bypass have been made, along with the following anecdotal comments:

- We need a tunnel through Brynderwyns
- The wrong section of the Brynderwyn Hill is being improved. The southern side is where the \$ should have been spent. Crazy decision doing the northern side!
- Brynderwyns is a waste time to future invest and start the tunnel
- Money wasted on the wrong side of the Brynderwyn Hill on this last project
- Work is being done on Brynderwyns now - why not just tunnel straight through?
- Yes, all of that money being spent on the north side of the Brynderwyn Hill should have been spent on the south side where it is narrower and more dangerous. The 80km speed limit kept the north side in check, and there was already a passing lane from top to bottom.
- Work so far on Brynderwyn is a waste of money. The wrong side was targeted.
- The South side of Brynderwyns seems to get overlooked all the time. would be great to see this upgraded
- The south side of the Brynderwyns need realigning to make it safer especially with increased heavy traffic
- The northern side of the Brynderwyns is important to upgrade.
- What is going to happen on the south side of the hill?
- Brynderwyns is a waste time to future invest and start the tunnel
- Money wasted on the wrong side of the Brynderwyn hill on this last project
- The North side of the Brynderwyns seems like a waste of time & money- Maybe more public education of what you are actually doing could have been a good idea. Maybe money spent on the south side of the hill would make the public more happy!
- The Brynderwyns are dangerous.
- Find a way to just skirt around the Brynderwyn Hills.
- Why is the Northern Side of the Brynderwyns being completely rebuilt when it seemed like a great road but the southern side is dangerous and narrow and hasn't had any investment in it all for years?
- Brynderwyns is such a waste of money you have spent millions on a road that did not need it! Road works that are taking years are not making the journey better! Northland roads are shocking and need attention. Instead of pulling the same section of road up over and over again work on something else

6.3 Otaika/Loop Road

Otaika Valley Road did not generate as many comments as expected, given the level of media and community interest in the road during the engagement period. Irrespective of the numbers of comments received, the resounding feedback centres on current safety risks at the SH1/Loop Road (North) intersection. Anecdotal feedback as follows:

- Much concern around the number of log trucks CONSTANTLY travelling between out SH14/Mangakahia rd through Otaika Valley. For the last 6 years I (and hubby) have not once

been on this stretch of road without being behind a log truck and having them come the other direction. Lots of accidents and lots of damage to road not to mention environment. Perhaps user should pay- am sure diesel tax not covering their mess.

- Otaika Valley Road, currently used as a thoroughfare to Marsden Port is not designed to take the heavy trucks using this road daily, the exit off Loop Road onto SH1 is extremely dangerous and need serious attention.
- Otaika Valley needs a roundabout similar to Ruakaka as a large number of log trucks use it
- Portland turnoff opposite Otaika Valley road through to Otaika Loop road where logging trucks turn onto SH1 needs a reduced speed limit. There is 2 primary schools and a kindergarten using these turnoffs, it is terrifying!
- Make sure whatever happens safety is paramount in Loop Rd /Otaika Valley. It is rural residential
- Otaika Valley road congested with too many trucks as is the whole network upgrade the rail links and get logs etc off the roads. It's a no brainer
- Please put in a turning bay for Portland and Loop road intersection. It's too dangerous.
- Please make Otaika Valley Road a top priority before anyone else gets hurt or even killed!
- Safety first Loop Rd-Portland intersection and narrow bridge and Loop road exit up the road has constant road blockages from log trucks a roundabout here would relieve this and reduce danger from log trucks!

6.4 Connecting Northland/Economic potential

While comments specific to the broader Connecting Northland strategy were not actively sought, a number of submitters provided feedback on freight connections, tourism potential and the interrelationship between transport investment and regional growth in Northland. Anecdotal feedback as follows:

- Northland is such a rich and beautiful part of New Zealand which attracts many tourists both local and from abroad, we need to keep people safe on the roads by designing safer Road systems.
- We need Northland to be accessible to international tourists and local businesses - that means an end to our poor standard of roading - they must be benchmarked on international standards.
- The link between Auckland and Whangarei is the key to improving economic and trade ties to the rest of the country and the world.
- The plan is great and needs to be elevated. Northland has a lot to offer the nation and the priority seems to be the golden triangle (Waikato, BOP etc.) Northland is not that far away and needs the opportunities the gateway will bring.
- This is a really important project for the long term sustainability of Auckland and Northland. Please prioritize!
- Enhancing access between the regions and major centres via roading infrastructural development is so important in terms of increasing economic growth and improving return and well-being for residents/tourists/other users of the roads. I am impressed by the road networks developed in the past 10 years in the CNI and further south to link Auckland/Tauranga/Hamilton and cities and towns in that area, and would very much like to see the same happen with linking Auckland and Whangarei in the first instance (and via Whangarei the rest of Northland). Whangarei is increasingly becoming an important tourist destination as well as a key regional centre, and a good road network to Auckland is very important to its future development.
- Fantastic to be having debate on this. Northland is underutilised and better safer roads would improve the economy there.

- Just do it- vital for industry in the north to get goods and services to market
- Hurry up and do it. Should have been completed by now. As with any developments to go ahead the roads have to get done first. Will bring economic benefits north
- State highway one access to the north is critical to the Northland economy whether it be tourists, business people or heavy vehicles. It must be a safe and efficient road so investment in making it straighter and wider is critical. Personally I think investment in a bigger airport for Whangarei and decent rail to Auckland will also help achieve this.
- Really pleased that there is a plan developing. The vision to open up and develop Northland with an initiative should be more than tinkering with the existing road.
- It is really great that NZTA is both seriously looking at but also completing major improvements on this key infrastructure 'Connecting Northland' Northland is a 'Producer' of goods and Auckland the 'Consumer' roads the gateway of goods being exported from Northland. Northlands economic survival and growth is strongly connected to this important route making us more vulnerable than most other regions in NZ.
- Although it is called a holiday highway by Labour the route north is imperative for Northland to sustain economic growth.
- Improving this route will have long term economic benefits for Northland, and will help reduce the existing transportation constraints that hamper Northland's growth.
- This project requires a bold and global overview and central government commitment to realise the potential of the deep water port at Marsden Point as a viable international freight hub for Auckland that caters for the next generation of large shipping !

6.5 Need for increased capacity

A dual carriageway between Auckland and Whangarei is supported by the majority of submitters, with a minimum 2+2 supported in the short term. Concerns about population growth in Northland placing more pressure on 'bottlenecks' were tabled with the need to 'future proof' any investment for long term growth. A sample of the feedback includes:

- I think a highway all the way through to Kaitaia would significantly improve the economy of the North and open it up for future generations.
- Just to continue on from Orewa motorway all way to Whangarei please - will be fantastic
- The ideal would be a road like the Waikato Express Way
- A continuous 4 lane highway (2 lanes each for North and South directions) between Whangarei and Auckland
- Why not add an extra lane either side. I don't think the main road going north should only be one lane a side as holiday traffic is a nightmare.
- So desperately needed safer, better roads with at least 2 lanes each way. Good for North Auckland in so many ways.
- Don't build any more motorways, they are a waste of money
- The plan for all of SH1 should be a minimum of two lanes in either direction and a concrete median barrier dividing the 4 lanes, we all know this would save a lot of lives during its existence. Calling this road a holiday highway is wrong, it's a road that should be safe regardless and is an obvious bottleneck, removing Northland from the rest of NZ unless you are very keen!
- Widen the road to a dual carriageway so all traffic can pass safely
- The priority should be from the top of the current motorway in Auckland through to Whangarei and Northport. There should be a master plan to 4 lane expressway between Auckland and Whangarei. This is a strategic issue for Auckland and Northland
- Please allow for 4 lane roading. If it is to be a main route for trucking since rail is no longer used, two lanes isn't enough

- If there was an option for 4 lane express way the same as Auckland-Hamilton then do it ! Build for future growth not just a 5-10 year fix
- Allocate a route for a motorway all the way to Whangarei. This will save a lot of money and heartache as people will know not to subdivide and build in this zone.
- Dual carriageway from Auckland to Whangarei. As a weekly commuter this would improve my run greatly and many people and would reduce the amount of accidents.
- An expressway like the one south of Auckland would provide a better and safer gateway to the north for all traffic
- Double-laning everywhere.
- A high way all the way to Whangarei sooner than later. Also do build it properly in the first place do not wasting money on repairs a few months later.
- The entire road needs to be fixed. To call it a state highway is a joke. Two lanes heading both North and south are the minimum that should be provided.
- It would be excellent to have a motorway the whole way.
- I think the expressway between Auckland and Wellsford is a great idea and will really open up Northland to investment. If the journeys length can be reduced it can only be good, especially during peak holiday periods. A 2:1 road the remaining length between Wellsford and Whangarei would also improve the journey dramatically, and make it easier to extend the expressway in the future. The Brynderwyn Hills are currently a major barrier and perhaps a long term plan needs to look at a new area to cross them, further west, as the south side currently doesn't really allow for much improvement.
- Planning further into the future. A more direct route from AKL to WHG, Puhoi to Whangarei super highway. One can dream.
- As a regular user of the SH1 from Whangarei to Auckland, there is a huge need for the continuation of the double-laning all the way to Whangarei from Puhoi.
- It seems inconceivable to me that State Highway 1 is not two lanes in both directions all the way. This needs to be addressed
- Dual carriage way all the way to Whangarei. It is needed and there is more than enough traffic on this road to support the plan.

6.6 Quality of Northland roads

Feedback received in relation to the current quality of Northland roads suggests a widely-held view the maintenance and operations of the network is substandard in comparison with other regions. The majority of feedback relates to poor road surface, with a sample of feedback as follows:

- The quality of the roads in Northland are terrible compared to the rest of the country. Pot holes/ poor repairs
- Bring Northland roads up to the standard of the rest of NZ
- The general state of the highways is poor with the potholes; mentality seeming to prevail amongst NZTA's contractors
- The amount of traffic using SH1 to go north and come south make it a priority as the poor quality holds back development of one of the poorer areas of NZ
- Fix the far north roads
- Roadie quality between Auckland and Whangarei why not use the same seal as the motorways
- Having less logging trucks on the roads and therefore less road works, uneven surfaces and potholes would also be a big step forward towards better safety. To this end a revival of rail should be promoted. (I like the way you have designed your consultation process. Simple and easy :-)
- Northland has often missed on getting roads upgraded in favour of other areas and it should be a high priority in stopping the road carnage

- The road surfaces in northland are sub par. I have experienced road surfacing in second and third world countries that are far superior to the Northland roads.
- The roads in Northland are probably the country's worst. Admittedly the soils represent the biggest challenges, however it is high time Northland got its investment.
- Please start now on this. It is badly needed. The current state of the road is throttling Northland's economy.
- Get better work crews the roads are broken up to easily. Needing more attention over and over. Wider bridges. Less trucks!
- Road surfaces north of Warkworth are generally appalling
- Do a decent job not the patch jobs we have seen done in the past. Spit and polish surprisingly doesn't last!
- A concerted effort of keeping the roads in good repair, we've notice a significant lack of this since Auckland became a supercity, around the Dome and Wellsford.
- The section of road between Kaiwaka and Brynderwyn Hill is always very 'bumpy' compared to other sections of road. It isn't great for NZ's major state highway to be in that condition
- Through Whangarei particularly approaching from the southern side and right up thru to Otaika shops is an eyesore with over grown vegetation and looking into the backyards of unkempt low cost housing this does not give the impression of a town you would like to stop at
- Please add more passing lanes from Northland to Auckland

6.7 Safety (general)

Aside from one specific location (SH16), feedback in relation to safety is relatively generic 'improve safety' comments. There is a majority view in support of wire rope barriers as well as suggestions for improved lighting and line markings. A sample of feedback received as follows:

- Please make the camber of the bends appropriate so easier to go round.
- Can't emphasize how important the No Overtaking signs are, every km at least
- Safety needs to be improved , starting immediately, this is long overdue
- Stop wasting money on wire barriers
- Safer roads, routine inspections as trucks ruin the roads
- Improvement of danger spots is the highest priority, not producing a motorway. Whatever the savings from improving to a safe-but-non-motorway standard should go into rail improvements to diminish heavy truck traffic that necessarily slows down on upgrades and is difficult for motorists to pass. The heavy truck presence is a hazard in its own right, and also inspires dangerous driving from impatient motorists. The trucks also do more than their share of damage to the road itself, a cost that is not adequately reimbursed through their RUCs.
- Think of the drivers not the policy makers. Better lighting and lane marking and put the wires under the road to get rid of power poles.. people like crashing into them.. plant hedges.. much softer impact should anything happen.
- SH16 urgently needs armco barriers on Cleesbeys hill (10km south of wellsford) as the hill as on either side of the road on the ridge has drop offs of over 50meters. There is a bad off camber corner about 300 meters south of the lookout on Cleesbeys hill. SH16 between Wellsford and Kaukapakapa could do with a few slow vehicle lanes. Contact Martin Roest 0274422885 if you want more clarification
- Maybe being able to cut the travel time from whangarei to Auckland will reduce fatigue in drivers also
- Please place dividers on the centre line

- I drive Warkworth to North Shore every day. Instead of widening the roads, could we perhaps commission some research into how we can set up a cable barrier on these roads PLEASE. If only at least for corners and especially where there are passing lanes.

6.8 Resilience

Diversion routes due to unplanned events were a common theme, which may in part be attributed to a number of unplanned state highway closures occurring during the engagement period. In comparison to comments on safety and the quality of Northland roads, feedback on resilience was low. The two comments below have been included in the report to see how network resilience between Auckland and Whangarei compares against feedback resilience from the next two PBC consultations.

- A reliable alternative for when the main road is taken out of service. Being from Hokianga, when the roads there get looked at would be better
- My concern is alternative routes if sh1 is blocked ,last week SH1 was blocked heading south from Warkworth to Auckland on a week day morning-mayhem occurred -only route available was highway 16 -some diverted back to SH1 via Ahuroa /Puhoi which part is gravel roads and another accident occurred. This road needs to be addresses -sealed and widen so if there is issues on SH1 this is a safe alternative for motorists - going thru Kaukapakapa just takes too long.

6.9 Rail

Rail generated the most feedback from all respondents. Rail is seen as a solution to remove heavy vehicles off the state highway, move people (including tourists) on passenger rail, to free up the state highway and improve safety. A sample of the feedback received is as follows:

- Improve the rail system in the far north and get the trucks off the road.
- Freight rail!!
- Should be spending money on a passenger rail link
- This survey misses the point completely. Road development exclusively without providing for investment in rail is not an option for a sustainable future.
- The whole stretch is a priority and you must include rail upgrading and rail services
- Yes, the rail link to Marsden Point is critical as well. This deep water port is strangled by the fact that only trucks can carry goods to and from its wharves. This is crazy, it only needs a few kms of tracks reinstated and it would be hooked to the main truck line. This would ease the amount of trucks and take a load off the highways. It's a no brainer, why is it taking so long for someone to recognise this?
- Yes, fix the railway to get some of the heavy traffic off the road between Whangarei and Auckland.
- Upgrade the rail system so we can get those trucks that slow everybody down off the roads - especially the logging trucks....The state highway from Puhoi to Bay of Islands is a disgrace--- roads have not been upgraded for decades-and compared to the Auckland-Hamilton highway we are the very poor cousins -start concentrating on bypassing all these small towns
- Yes. Develop the rail connections right up to Kaitaia. Get the heavy trucks off the roads and you will save millions in road repairs and improvements.
- We need a rail link between Auckland and Whangarei
- Upgrade rail. Limit trucks and roads will last longer.
- Should reinstate the Northern Rail line and link it to Marsden to get freight off dangerous slow trucks that damage the road and into rail instead.

- Half the problems with SH1 could be reduced if there was a decent rail service for freight and passengers from Auckland to Whangarei and beyond. It would get half the trucks off the road and is a very scenic rail route. It's backwards thinking to not put more energy into rail - just get the lines included into the transport budget and leave Kiwirail the job of running trains.
- Upgrade of the railway line, for freight to come off the road and go by rail to the port. Keep the trucks off our roads. They are a menace, they hold up the traffic, they chew up the roads, they chew up the fuel, there have just been 6 accidents in the past 6 weeks, we don't want them. Get rid of them put the freight on rail. Save money, save fuel, save lives save tempers.
- Yes...I hope plans is also to improve the railway between AKL and Whangarei including tunnels and to get some of these massive freight trucks off this very busy and dangerous road. Northland needs such things. Wellsford itself desperately needs a bypass as traffic can be bank up there for several kms at peak times. It seems no one even discusses that but it is terrible. Usually the block is northbound.
- RAIL...upgrade rail line so it is suitable for passenger and huge freight trains. Trucks can make the short trips from depot or logging area to nearest train station, then get all those huge and dangerous trucks off the highway. The truck drivers can work less hours and make a lot more short trips, meanwhile there can be more work for the rail. Also with passenger trains we can get some of the lunatic tourist drivers out of our midst and cut down on accidents from those not used to our roads and terrain. They will get a lovely view from train without the distraction of trying to drive at the same time.
- Need rail upgrades including to Northport. Stop wasting money on overbuilt motorways.
- Rail would be ideal, and a better investment than just building more roads.
- Why not rail? Passenger and freight. Get the trucks off the road and improve NZ public transport which is an absolute joke. Train is a very elegant solution to connect Whangarei to the rest of NZ.
- Need to invest in rail between Akld and Whangarei - traffic flow would improve no end as there would be less trucks and other HT vehicles on the road
- Add rail. High speed rail. If we had this it could be feasible to live in Whangarei and work in Auckland
- Why is rail not being considered? Like it would be in normal countries?

6.10 'Out of the Box' suggestions

Three submitters suggested alternate viewpoints on potential solutions for the corridor:

- Make a direct route. Also look at investing in a highway down the west coast from Dargaville to west Auckland
- Or build a toll road from Hamilton to Whangarei with a ring road through Auckland
- Heading north, redirecting SH1 from the SH12 turnoff, and bringing it back in just south of the SH15 and north of Oakleigh make the most sense to me.

7. NEXT STEPS

Consideration and application of the comments raised by submitters needs to be demonstrated within PBC documentation. Messaging will need to be developed around the emerging programme and how this aligns/does not align with what our customers have told us through the online engagement. Where there is significant 'disconnect' between public comment and PBC programme, the PBC team are advised to draw on their wider engagement with key stakeholders to inform this messaging. This will demonstrate how the programme has been informed, while reinforcing that broad consultation has been undertaken beyond the online public engagement.

The majority of online submitters have requested to stay informed of the developing PBC. Once the programme has been approved it is recommended, and associated announcements made, that an update is provided to respondents. This will be programmed towards the end of the year, once timing for the Minister’s announcement(s) have been confirmed.

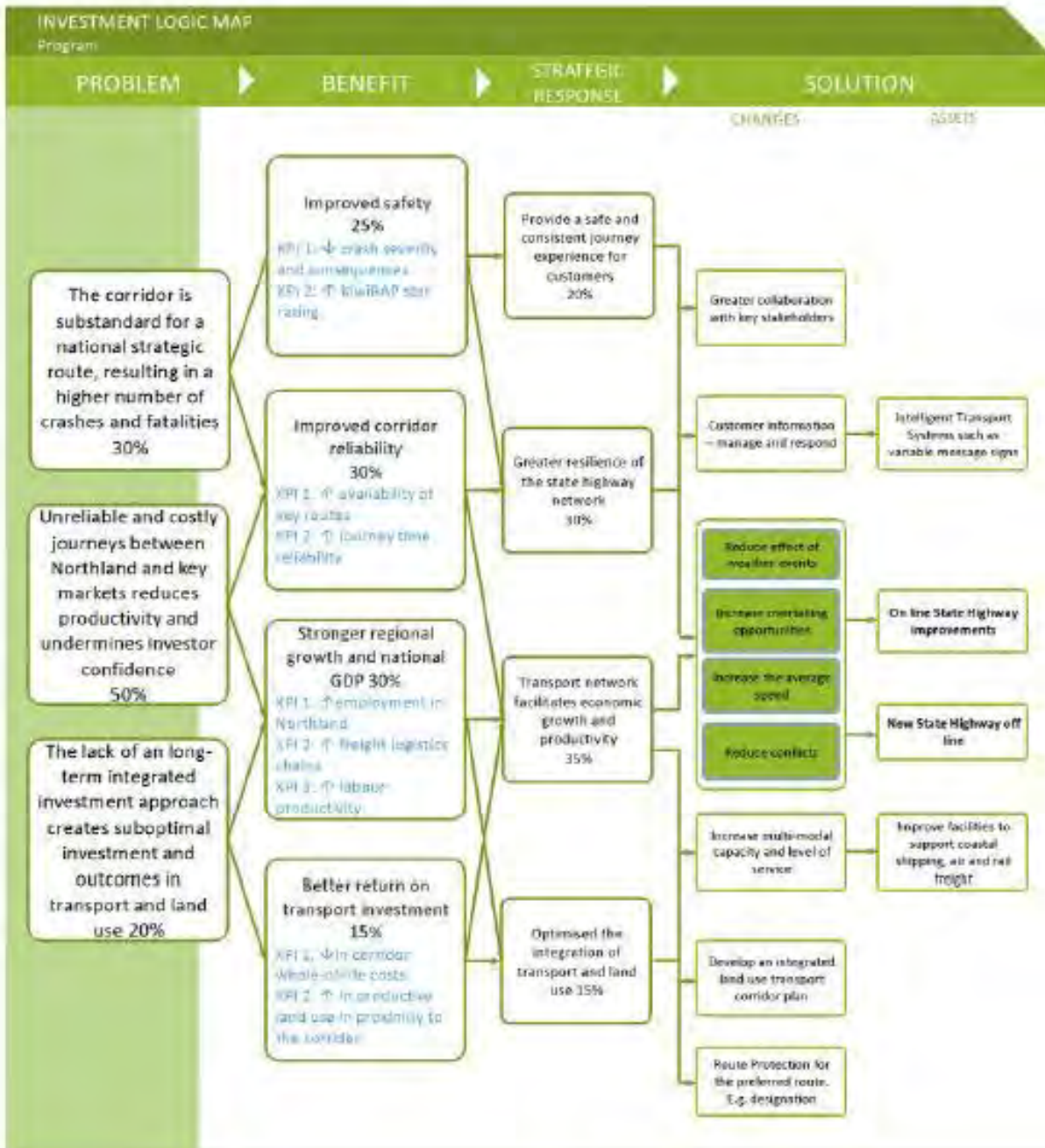
To inform the public consultation methods for the impending Twin Coast Discovery Route PBC, a ‘lessons applied’ discussion is warranted in respect of formulating and implementing online surveys as a consultation tool.

APPENDIX E - ILM MAP

New Zealand Transport Agency

Connecting Northland

Increasing productivity between Northland and Auckland



Investor: Air Sephton
Facilitator: Lauren Jewell
Accredited Facilitator: No.

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APPENDIX F - ONE NETWORK ROAD CLASSIFICATION



APPENDIX G – OPTION DEVELOPMENT AND ANALYSIS

Contract No: NO15-075

State Highways Programme Business Case

SH 1 Auckland to Whangarei

Options and Alternatives Development and
Assessment

June 2016



PARSONS
BRINCKERHOFF

commute
TRANSPORTATION CONSULTANTS

Boffa Miskell



State Highways Programme Business Case

SH 1 Auckland to Whangarei

Rev	Date	Details
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1 Introduction

This note summarises the Programme Business Case (PBC) option development phase for the SH1 Auckland to Whangarei corridor. This includes the development of the long list of options to address the problem statements developed with the stakeholder group, development of assessment criteria and the application of this assessment criteria against the option long list.

The purpose of this report is to set out the process adopted, the long list options identified and the resultant ranking following the assessment.

1.1 Option Development

The SH1 Auckland to Whangarei PBC will be a programme of works to address the problems identified in the corridor. The agreed problem statements and investment objectives for the corridor are set out in the Part A - Strategic Case. The ultimate programme will almost certainly be a package comprising a number of individual options that will vary in scale, timeframe and cost.

To ensure that appropriate programmes are developed, a long list of options was initially identified and assessed at a high level against agreed criteria. These criteria were taken from NZ Transport Agency guidelines for option evaluations for business cases. This allowed the options to be ranked. The option ranking will inform the development of programmes for further and more detailed assessment in a subsequent phase of PBC development.

The methodology adopted for this process was:

- Initial development of options by project team
- Workshops with Transport Agency technical specialists to further develop the long list
- Development of options with stakeholders at workshop on 23rd March 2016
- Preparation of assessment criteria by project team, based on Transport Agency guidelines
- Presentation and endorsement of assessment criteria at stakeholder workshop on 23rd March 2016
- Assessment of options and ranking by project team
- Endorsement of assessment by wider team

The assessment criteria used are shown in Table 1-1.

Objectives	Considerations	Measures
Investment Objective 1	We will facilitate regional growth and access to key markets through increasing the average speed to 90km/hr by 2030	Assessment of average speed in the corridor
Investment Objective 2	We will improve safety along the corridor between Puhoi and Whangarei by steadily reducing the number of deaths and serious injuries to at least a medium personal and collective risk (as defined by KiwiRAP) by 2030	Reduced deaths and serious injuries on the corridor
Investment Objective 3	We will steadily reduce the number of unplanned incidents so that SH1 between Puhoi and Whangarei has no full closures without viable alternatives for all vehicles of less than 2 hours by 2030	Reduced volume, duration and impact of SH1 closures

Objectives	Considerations	Measures
Implementability		
Feasibility	How straightforward is it to implement this alternative / option?	Level of complexity i.e. tunnelling, community consultation, challenging ground conditions.
	Are innovative technologies involved?	Level of innovation
	Are there significant hazards that may pose a health, safety in design risk?	Level of hazards
	Are there likely to be property risks to delivery?	Impact of project on property
	Are other infrastructure providers affected?	Other organisations beside NZTA
	Are there consenting risks that could affect delivery or cost risk?	Level of consenting risk for option
	Are there factors likely to affect the ability to operate / maintain the option over its projected life without major additional costs?	Maintenance and operation costs
Affordability	What are the funding risks of the alternative/option?	Included in the RLTP to no funding allocation
	Can the alternative be funded traditionally? (economic efficiency)	Estimated economic efficiency of project
	Are alternative funding mechanisms required?	yes / no
	Are there cashflow risks that might affect the delivery programme?	yes / no
	Are there ongoing operating cost risks?	Level of operating costs
	Are operating subsidies required? How will these be funded?	Tolling / PQP procurement
Public / Stakeholders	Has the alternative been made public?	Yes / no
	How acceptable is the alternative?	Level of anticipated acceptance
	Are there real or anticipated objections from the community or stakeholders?	Level of anticipated acceptance by stakeholders
Assessment of Effects		
Cultural heritage, environmental, social and community wellbeing	Are there any sites or features (including their setting) of significance to Maori (archaeological or existent) affected?	
	Are there any historic heritage places (including their setting) (e.g. archaeological or buildings, sites, remnants) affected?	
	Are any (first tier) outstanding landscapes or natural features, or (second tier) significant/special landscape or natural features affected?	Environmental mapping
	Are there any ecological areas, or areas with habitat value (including large areas of native vegetation) affected?	

Objectives	Considerations	Measures
	Are there any coastal marine areas, wetlands, lakes, rivers, streams or their margins affected?	Environmental mapping
	Are there any areas of contaminated land affected?	
	Are there community facilities (park/schools/hospitals etc.), or residential or other sensitive land uses in the area that could be affected by adjacency effects (e.g. noise, disruption, vibration, air quality etc.)?	Assessment of proximity to settlements
	Are there potential effects from hazards or risks (including from future climate change) from erosion, flooding, fault lines, sea level rise	
	Extent to which the option integrates transport and land use to make best use of existing networks and infrastructure.	Extent of integration with land use aspirations
	Are there any communities affected by reduced cohesion, connectivity or accessibility?	Qualitative assessment of access to the road network
	Are there opportunities to enhance the active travel modes - cycling and walking and/or linkages to other national or regional recreational cycle networks for longer distance cyclists?	Qualitative assessment of access to alternative modes
	Extent and significance of land take, severance; negative and positive opportunities	Severance / connectivity
Economy	How will the alternative/option affect traffic volumes?	Level of growth catered for?
	Does the option provide an opportunity to reduce vehicular travel time on SH1 between the Auckland and Northland regions?	Qualitative evaluation
	Does the option improve journey time reliability?	Qualitative evaluation
	Are there gainers and losers (modes / regions)? What is the overall effect?	Qualitative assessment of overall benefits to surrounding communities
	Does the option provide for more efficient freight supply chains between the Auckland and Northland regions	Route quality
	How well does the option integrate with land use with reference to regional growth strategies	Consistency with regional growth strategies
	How well does the option enhance the development potential of adjacent land / attract new jobs / help existing businesses?	Qualitative assessment of access to land use
	How well does the option preserve the function of SH1 as a National High Volume route, consistent with ONRC	Qualitative evaluation
	How well does the option address route security, resilience and flexibility	Extent to which the option improves route resilience
Safety	How will the alternative enhance safety for different types of transport users?	Alternative mode safety

Objectives	Considerations	Measures
	Will it involve gainers and losers in terms of safety?	Adverse safety effects from the option?
	Are there impacts on personal safety / security?	Assessment of the reduction in crash risk
	What is the impact on fatal / serious injuries?	Assessment of reduction in DSI

Table 1-1: Option Assessment Criteria

The assessment criteria have been grouped according to a number of headline categories, relating to Investment Objectives, implementability and an assessment of effects and opportunities.

The ability for an option to be implemented was further broken down into feasibility, affordability and public / stakeholder support. The assessment of effects and opportunities was broken down into cultural heritage, environmental, social and community wellbeing, economy and safety considerations.

At the option long list stage, options have been considered against these headline categories, while the more detailed considerations will be used to evaluate the performance of programmes, once these are developed.

1.2 Option Long List

A list of 102 options was developed, ranging from improved traveller information and education, through to major infrastructure improvements. Options were classified into the following categories:

- Road infrastructure projects (online and offline capacity improvements)
- Rail infrastructure projects
- Land use integration (access rationalisation, township treatments)
- Public transport / Park and Ride
- Cycling and walking
- Tourism interventions (stopping places, rest areas, signage)
- Improved signage and wayfinding (including VMS)
- Upgrades to alternative routes (including HPMV capacity)
- Minor safety works (corner realignments, wire rope medians, shoulder widening)
- Maintenance
- Police enforcement
- Driver education
- Other improvements

The full list of options is included in Appendix A.

2 Option Assessment

An initial assessment was undertaken for each 'head' criteria. A seven point assessment was used, as outlined below. This is a coarse criteria given the broad nature of the assessment, however is considered appropriate at this long list stage.

Figure 2-1: Assessment Criteria

Correspondence Table		
+++	3	+++
++	2	++
+	1	+
0	0	0
-	-1	-
--	-2	--
---	-3	---

The following key conclusions that can be drawn from the application of this criteria to the previously outlined considerations are summarised in the following sections.

2.1 Investment Objective 1: AVAILABILITY / RESILIENCE

Options that were considered to provide greater resilience were ranked higher. Offline improvements were ranked higher (due to enhanced alignment and route design options) allocated ++. No +++ scores were given as all options were spatially constrained within the corridor and provided enhancement for a specific section, but not the entire corridor.

Options that predominantly enhanced the existing route were given a + rating. No options were scored negatively.

2.2 Investment Objective 2: SAFETY

Options were evaluated with respect to the scale and likely effect of the safety improvement. At this stage a detailed crash reduction analysis was not undertaken, but engineering judgement was applied by the experienced evaluation team.

Offline motorway standard improvements were given a ++ rating and localised safety improvements a single +. No options were considered to make safety worse than the current situation. Operational solutions were largely given a single + due to general improvement offered.

2.3 Investment Objective 3: EFFICIENCY

The potential travel time improvement for freight was estimated for each option. No specific travel time analysis was undertaken, rather an engineering judgement was made based on a comparison of current speeds with the potential scale of improvement. The best performing options were the off line enhancements (++), followed by online enhancements.

Some options were given a negative rating as they were assessed to increase travel times over current levels. These were related to the speed restriction options that were targeted at safety enhancements.

2.4 Implementability

An assessment was made with respect to the likely ability to implement an option. Consideration was given to the ease with which resource consents could be obtained and also practicality.

Offline options were scored the lowest at --, with most other options -. The dedicated freight lanes was the only option to score --- due to its complexity in terms of operation and likely requirement for additional land in a constrained corridor.

2.5 Affordability

Cost estimates for individual options were not developed, although for most of the larger options feasibility cost estimates were available from previous work. Where this information was unavailable, engineering judgement was used to assess whether an option had a likely cost of less than \$10M, or above \$300M.

Options less than \$10M were given a – rating, options above \$300M a --- rating and those in between were --.

2.6 Stakeholders

An assessment of the likely reaction from external organisations and the wider community to an option was made. This included the general public as well as key stakeholders, including freight users.

It was acknowledged that options would generate different perspectives from the public. However there were some options that were seen as negative, being those options that artificially forced driver behaviour (such as changing road user charges) and it was considered that projects that greatly affected communities would be viewed negatively.

2.7 Assessment of Effects: Cultural and Environmental

A high level assessment of the potential effects on the cultural, social and environmental values of the corridor was undertaken. Where the option had the potential to but no certainty that it would adversely affect some value (as it would depend on the location, extent and nature of the particular work), it was scored with a – rating. Where it was certain that a value would not be adversely affected or, alternatively, not be enhanced, it was scored with a 0 rating.

Given the nature of the corridor, the principal areas of effects were in relation to the townships and urban areas, and/or the natural values of the Brynderwyn Hills and/or Dome Valley. In general, the greater the scale of physical work required, the more significant the potential effects, recognising that route selection and/or detailed design could reduce the level of impact.

2.8 Economy

The same scores as those given for the efficiency investment objective 1 were given to this criterion.

2.9 Safety

The same scores as for the safety investment objective 3 were given to this criterion

2.10 Key Assessment Outcomes

The application of the assessment framework to the long list options identified the following key outcomes:

- Generally, the higher cost options had greater benefits, but also greater effects.
- With such a broad range of options and a relatively limited number of assessment criteria, the ability to distinguish between options is difficult. This is shown in the cost assessment where options between \$10M and \$300M have the same score.
- The cycling and walking options were assessed to not have a noticeably positive effect on any of the investment objectives, although these may represent opportunities for combination with an ultimate programme to maximise investment in the corridor at small additional cost.

- The best performing option was safety improvements in the Dome Valley
- There were a number of highly ranked options, including operational interventions (such as improved wayfinding signage on detour routes) and improved police enforcement as well as larger capital schemes, including a bypass of the Brynderwyn Hills and a 2+2 configuration between SH15A and Whangarei
- The worst performing options were the Space Port, freight lanes in Auckland and passenger rail between Marsden Point and Auckland

The conclusion of this option long list assessment is that a wide range of options can address the corridor problems, ranging from operational improvements through to large scale capital intensive interventions.

Generally, the assessment has shown that the options which require the greatest investment deliver the most benefits; the better performing options against each of the investment objectives will go forward to the development of programmes for improving the corridor. It is at this stage that the economic efficiency of each of the options will be quantified.

The option long list assessment framework is shown in Appendix B.

3 Option Evaluation Summary by Section

This section summarises how options within a route section performed with respect to the assessment criteria described above.

3.1 Puhoi to Warkworth

	Puhoi to Warkworth existing SH1				
	Speed reduction – whole route	Speed reduction – Schemeways	Online safety improvements (out of context curves, intersection visibility)	Improve access to adjacent development	Enhanced tourism experience
	1	2	3	4	5
Summary					
Objective 1 – Economic growth 90km/h	-	-	0	-	-
Objective 2 – reduce deaths and serious injuries	+	+	++	0	0
Objective 3 – reduce full closures with no alternative route	0	+	+	0	0
Feasibility	0	0	--	0	0
Affordability	0	0	-	-	0
Public / Stakeholders	-	-	-	+	0
Cultural, Social and Environmental Effects	0	0	0	0	0
Safety	+	+	++	0	0
Economy	-	-	+	-	-
Ranking	83	78	49	99	107

Because the Puhoi to Warkworth RoNS is part of the do minimum scenario for this corridor, options for improvement along the existing SH1 focus on small scale improvements to address safety and improve access. The RoNS is expected to be constructed within 5 years.

This table shows that in the section between Puhoi and Warkworth, the best performing option is online safety improvements. This option is considered to deliver better against the investment objectives, and particularly safety, than the other options.

It is noted that once the RoNS is constructed, improving access to adjacent development and enhancing the tourism experience are valuable options for implementation on the corridor, however they do not score well against the investment objectives identified at a high level for the corridor. These are considered to represent opportunities for enhancement, complementary to the main programme of work.

3.2 Warkworth to Wellsford

	Warkworth to Wellsford short term improvements			Warkworth to Wellsford (do minimum). Question is where to terminate – offline				
	Shoulder widening	Curve Realignments	Speed reduction	Terminate at Matheson Road	Terminate at Lovers Lane	Terminate north of Te Hana	Extend RoNS to Kaiwaka	Interchange at Wayby Valley Road
	6	7	8	9	10	11	12	13
Investment Objectives								
Objective 1 - Economic growth 90km/h	0	+	-	++	++	++	++	++
Objective 2 - reduce deaths and serious injuries	+	+	+	++	++	++	++	++
Objective 3 - reduce full closures with no alternative route	+	+	+	++	++	+++	++	++
Feasibility	-	-	0	--	--	--	--	--
Affordability	-	--	0	---	---	---	---	---
Public / Stakeholders	0	+	0	-	-	-	-	-
Cultural, Social and Environmental Effects	0	0	0	--	--	--	---	--
Safety	+	+	+	++	++	++	++	++
Economy	0	+	-	++	++	++	++	++
Ranking	62	46	61	54	54	39	70	54

The Dome Valley carries a high collective and personal risk rating, using the KiwiRAP classification. The alignment is winding and narrow and the topography is challenging with respect to construction.

The Warkworth to Wellsford RoNS is assumed to form part of the do minimum for this corridor. However, the PBC is required to confirm its termination point. This evaluation indicates that terminating north of Te Hana performs best against the investment objectives and specifically against the resilience criteria. It does indicate that there is greater environmental effect associated with continuing the RoNS to Kaiwaka, due to the significantly longer distance.

When the RoNS is constructed, traffic volumes on the existing SH1 will be significantly lower. However, because of its high risk, short term improvements are warranted in addition to the RoNS.

In the short term, curve realignments are considered to provide the most benefit against the investment objectives on the existing alignment.

3.3 Wellsford to Brynderwyn Hills

	Te Hana	Wellsford to Brynderwyns						
	Bridge replacement	Online improvements, shoulder widening, wire rope barrier	SH12 intersection upgrade	2+1 online	2+2 online	2+2 offline	Upgrade alternative route to Mangawhai / Waipu / Langs	Upgrade alternative route to the west
	14	15	16	17	18	19	20	21
Investment Objectives								
Objective 1 – Economic growth 90km/h	0	0	+	+	+	+	+	+
Objective 2 – reduce deaths and serious injuries	+	++	++	++	++	++	+	+
Objective 3 – reduce full closures with no alternative route	+	+	+	+	++	++	++	++
Feasibility	-	-	-	-	-	-	-	-
Affordability	--	-	-	---	---	---	--	--
Public / Stakeholders	0	-	-	-	-	-	-	-
Cultural, Social and Environmental Effects	-	-	-	-	--	--	-	-
Safety	+	+	++	++	++	++	+	+
Economy	+	0	+	++	++	++	+	+
Ranking	76	77	26	56	54	54	72	71

This section is characterised by rolling hills and some winding alignments. Passing lanes are provided in both directions and traffic demand is lower than south of Wellsford. Its collective risk rating is Medium, indicating that significant interventions are not warranted from a safety perspective.

Of the alignment options considered for this section, a 2+1 online arrangement scores the best against the investment objectives and other considerations. However, it is considered to be very unaffordable.

Upgrades to alternative routes to the east and west contributed strongly towards improving the resilience of the corridor by providing viable alternative routes capable of carrying HPMV. 2+2 alignments also scored well against this criterion as the fully divided nature of the cross section means that contra-flow arrangements can more easily be operated during an incident.

3.4 Brynderwyn Hills

The Brynderwyn Hills represent a significant barrier to travel between Northland and Auckland. Online improvements are currently under construction on the northern side of the Hills but no projects are currently planned to address the steep gradient and winding nature of the road on the southern side.

	Brynderwyns Hills				
	Bypass to the west – as per PFR work on Brynderwyns south	Bypass to the west – Kaiwaka to Glenmohr Road	Bypass to the east	Online improvements – southern side	Online improvements – Shoulder widening, wire rope barrier, wide centre line
	22	23	24	25	26
Investment Objectives					
Objective 1 – Economic growth 90km/h	+	+	+	+	+
Objective 2 – reduce deaths and serious injuries	++	++	++	+	+
Objective 3 – reduce full closures with no alternative route	++	++	++	+	+
Feasibility	-	-	-	-	-
Affordability	---	---	---	--	-
Public / Stakeholders	+	+	+	-	-
Cultural, Social and Environmental Effects	--	--	--	-	-
Safety	++	++	++	+	+
Economy	+	+	+	+	+
Ranking	43	43	43	84	75

This table shows that all options improve the average speed of the route, however, although bypasses reduce the gradient and improve the alignment of the route, increasing travel speed, they also increase the length of the journey meaning only a small positive improvement against this criterion.

Bypasses were considered likely to reduce DSIs to a greater extent than online improvements because of the reduced gradient and improved alignment. Bypasses also provide an alternative route in case of a closure. However, it is noted that bypass options are considered very unaffordable due to the very high expected cost and relatively low volume of traffic now and in the future that is forecast to use this section of the corridor.

3.5 Brynderwyn Hills to SH15

This section of the corridor is predominantly flat with a generally good alignment. Traffic volumes are relatively low in comparison with the rest of the corridor and average travel speeds are currently quite high. The section has a medium collective risk and therefore does not warrant significant safety interventions.

The table below shows that all options score well against the investment objectives as they all provide a high standard divided carriageway. However, as a result of its existing and likely future performance, it is not considered necessary to provide significant interventions on this section of the corridor.

	Brynderwyns to SH15A		
	2+1 online	2+2 online as per IBC	2+2 offline
	27	28	29
Investment Objectives			
Objective 1 – Economic growth 90km/h	+	+	+
Objective 2 – reduce deaths and serious injuries	++	++	++
Objective 3 – reduce full closures with no alternative route	+	+	+
Feasibility	--	--	--
Affordability	--	--	--
Public / Stakeholders	+	+	+
Cultural, Social and Environmental Effects	--	--	--
Safety	++	++	++
Economy	+	+	+
Ranking	58	58	58

3.6 SH15 to Oakleigh

As for the previous section, the alignment is relatively straight with gentle rolling gradients along this section. Traffic volumes increase as a result of traffic to and from the Port, which uses this route to access Whangarei. It is also part of the inland freight route (SH15) that connects Kaikohe with SH1 at Loop Road. In recent years residential development has also increased in the Marsden Point / Ruakaka area, increasing traffic demand between SH15 and Whangarei.

It is considered likely that additional capacity will be required on this section of the corridor within 10 years.

The table below indicates that a 2+2 online alignment scores the best against the investment objectives. This is largely because this section includes a causeway and it is considered that widening the existing causeway would have less environmental effect than constructing a second causeway at a new location. There are some consenting risks associated with this section, as a result of the causeway and subsequent works required within the CMA.

It is noted that raising the causeway to address flooding risk would assist to improve the resilience of the corridor but would not address the other investment objectives.

	SH15A to Oakleigh (including causeway)				
	Raise the road level to address flooding	Online improvements Shoulder widening, wire rope barrier, wide centre line	2+1 arrangement online	2+2 online	2+2 offline
	30	31	32	33	34
Investment Objectives					
Objective 1 – Economic growth 90km/h	0	0	+	+	+
Objective 2 – reduce deaths and serious injuries	+	+	+	+	+
Objective 3 – reduce full closures with no alternative route	+	+	+	++	++
Feasibility	-	-	-	-	-
Affordability	--	-	--	--	--
Public / Stakeholders	0	0	+	+	0
Cultural, Social and Environmental Effects	-	-	--	--	--
Safety	+	+	+	+	+
Economy	0	0	+	+	+
Ranking	102	84	74	55	83

3.7 Oakleigh to Toetoe Road

As for the previous section, traffic between the Port and Whangarei is a large proportion of the demand. This demand is forecast to increase and additional capacity is expected to be required on this section within 10 years.

	Oakleigh to Toetoe Road				
	Raise the road level to address flooding	Online improvements Shoulder widening, wire rope barrier, wide centre line	2+1 online	2+2 online	2+2 offline
	30	31	32	33	34
Investment Objectives					
Objective 1 – Economic growth 90km/h	0	0	+	+	+
Objective 2 – reduce deaths and serious injuries	+	+	+	++	++
Objective 3 – reduce full closures with no alternative route	+	+	+	++	++
Feasibility	-	-	-	-	--
Affordability	--	--	--	--	-
Public / Stakeholders	0	0	+	+	+
Cultural, Social and Environmental Effects	-	-	--	--	--
Safety	+	+	+	+	+
Economy	0	0	+	+	+
Ranking	102	83	73	42	25

For this section, the offline alignment scores better against the investment objectives because it is significantly shorter and straighter than the existing alignment, therefore providing a quicker, safer route. However, as it is a new offline alignment, property acquisition and consenting risks are expected to be high.

3.8 Whangarei Urban Improvements

The Transport Agency is currently progressing work to increase the capacity of SH1 between the SH14 intersection and the I-site in Otaika to four lanes. There is also a section of four-laning between Rewa Rewa Road and Southend Road. Demand is expected to increase on this section and capacity increase is likely to be required for the section between Southend Road and the I-site within 10 years.

	Whangarei Urban Improvements				
	Raise the road level to address flooding	Southend Road to I-site four lanes online	Toe Toe to Rewa Rewa four laning	SH1 footpath – Toetoe to Murdoch Crescent	Cycle facility on SH1 – Toetoe to SH14
	35	36	37	38	39
Investment Objectives					
Objective 1 – Economic growth 90km/h	0	+	+	0	0
Objective 2 – reduce deaths and serious injuries	0	+	+	0	0
Objective 3 – reduce full closures with no alternative route	0	+	+	0	0
Feasibility	-	-	-	-	-
Affordability	--	--	--	-	-
Public / Stakeholders	-	-	-	+	+
Cultural, Social and Environmental Effects	0	0	0	0	0
Safety	0	+	+	0	0
Economy	0	+	+	0	0
Ranking	114	74	74	102	102

The table above shows that providing four lanes on the two urban sections of the corridor addresses all investment objectives. It is noted that although the walking and cycling schemes in isolation do not address the investment objectives, these provide an opportunity to enhance the overall programme and could be included as complementary schemes at minimal additional cost.

Appendix A Option Long List

Ref #	Section / Category	Option Description
0	Do Min	
1	Puhoi to Warkworth existing SH1	Speed reduction - whole route
2		Speed reduction – Schedewys Hill
3		Online safety improvements (out of context curves, intersection visibility etc.)
4		Improve access to adjacent development
5		Enhanced tourism experience
6	Warkworth to Wellsford short term improvements	Shoulder widening
7		Curve realignments
8		Speed reduction
9	Warkworth to Wellsford RoNS (included as part of the do minimum.	Terminate at Matheson Road
10		Terminate at Lovers Lane
11	<i>Question is where to terminate</i>	Terminate north of Te Hana
12		Extend RoNS to Kaiwaka
13		Interchange at Wayby Valley Road
14	Te Hana	Bridge replacement
15	Brynderwyns to SH15A	Online improvements, shoulder widening, wire rope barrier
16		SH15A intersection upgrade (grade separation)
17		2+1 arrangement online
18		2+2 online
19		2+2 offline
20	Brynderwyn Hills	Upgrade alternative route to Mangawhai / Waipu / Langs Beach
21		Upgrade alternative route to the west
22		Bypass to the west - as per PFR work on Brynderwyn south
23		Bypass to the west - Kaiwaka to Glenmohr Road
24		Bypass to the east
25		Online improvements - southern side
26	SH15A to Oakleigh (including causeway)	Online improvements (shoulder widening, wire rope barrier, wide centre line)
27		2+1 arrangement online
28		2+2 online as per IBC
29		2+2 offline
30		Raise the road level to address flooding

Ref #	Section / Category	Option Description
31	Oakleigh to Toetoe Road	Online improvements Shoulder widening, wire rope barrier, wide centre line
32		2+1 arrangement online
33		2+2 online
34		2+2 offline
35		Raise the road level to address flooding
36	Urban Whangarei improvements	Southend to I-site four-lanes - online
37		Toetoe Road to Rewa Rewa Road four lanes
38		SH1 footpath implementation between Toetoe Road and Murdoch Crescent
39		Cycle facility on SH1 between Toetoe and SH14
40	Online upgrade to self-explaining roads (no out of context curves, intersection visibility, right-turn bays, shoulders)	Te Hana - Kaiwaka
41		Kaiwaka - Brynderwyn
42		Brynderwyn - SH15A
43		SH15A - Whangarei
44		Right turn bays at all intersections
45		Turn around area
46	Townships	Kaiwaka - speed management, gateway treatments
47		Wellsford - town centre improvements post RoNS
48		Maximise connections to townships
49	Access Rationalisation	Waipu
50		Wellsford
51		Te Hana
52		Kaiwaka
53	Alternative Routes	Improve SH16 as alternative to SH1
54		Upgrade bridges on alternative routes
55		Remove one way bridges / corner realignment on Inland Freight Route
56		Permanent signage on detour routes
57		Liaison with SatNAV companies re detour routes
58		Improve detour signage legibility
59	Stopping Places	Top of the Dome
60		SH12 intersection in combination with promotion of Twin Coast Discovery route
61		Top of the Brynderwyn Range
62		Uretiti Beach
63		Engage photographer
64		Service station at SH15A roundabout
65	Rest areas for trucks	Te Hana

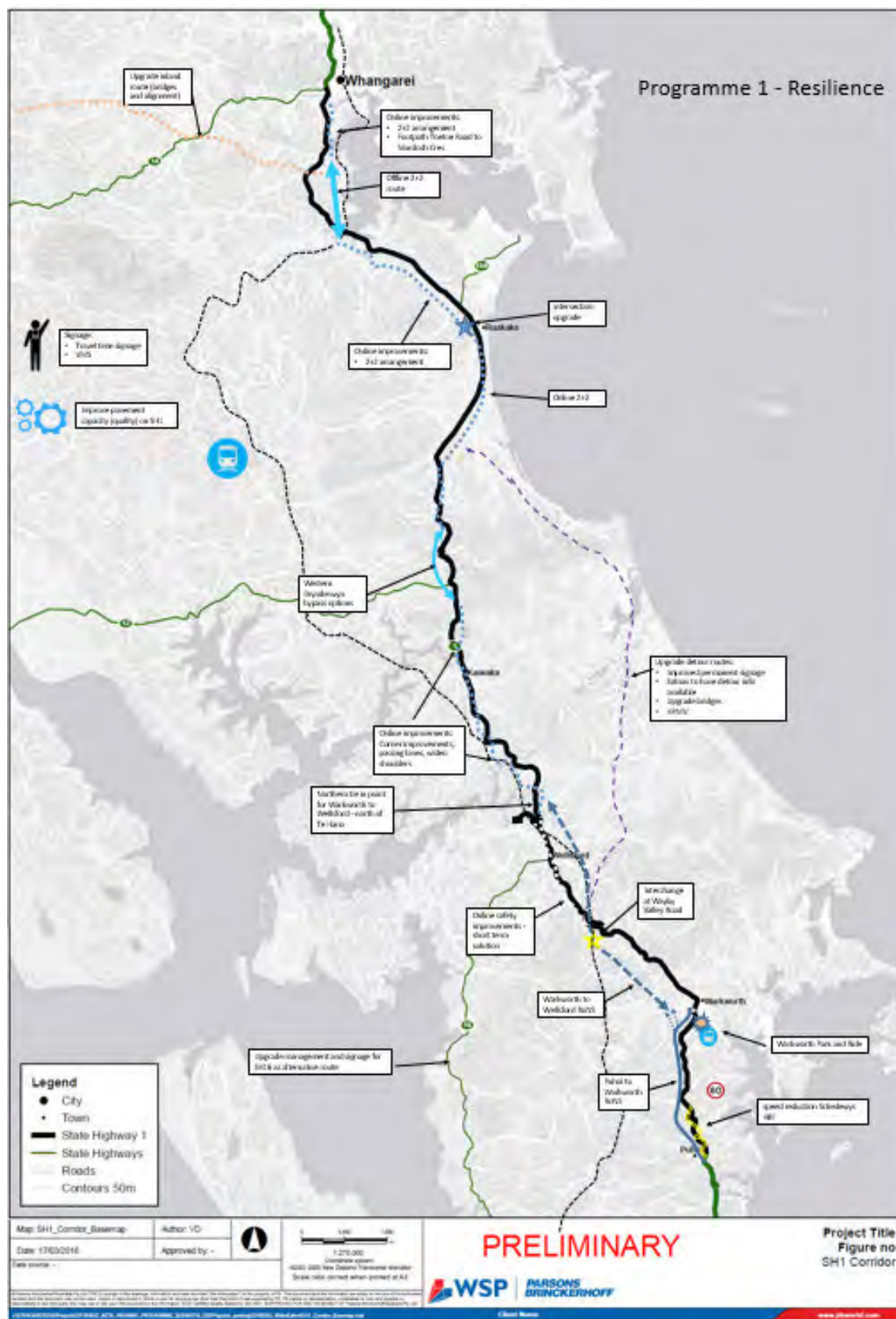
Ref #	Section / Category	Option Description
66		Brynderwyns
67	Rail	Marsden to Oakleigh rail stub
68		Tunnel upgrades - existing rail line
69		Address high resilience risk areas - existing line
70		Auckland to Whangarei passenger rail
71		Marsden to Whangarei passenger rail
72	Park and Ride	Warkworth
73		Marsden
74	Cycling and Walking	P-Wk - retrofit cycleway on existing route
75		P-Wk offline cycle route
76		Wk-W retrofit cycleway on existing route
77		Wk-W offline cycle route
78		Whangarei - Marsden cycleway
79		Cycleway connection between Kauri Coast and Brynderwyn
80		Ruakaka Coast - National Walkway opportunity (Marsden to Waipu)
81		Tourism interventions
82	Directional arrows at 2.5km centres	
83	Audio Tactile Paving	
84	VMS	
85	Yellow lines	
86	Better information to travellers	Signage displaying travel times
87		Wellsford information on SH1/16
88		Information at Puhoi regarding RoNS / SH1
89	Variable speed signs	Weather related
90		Intersections
91		Times of the day
92		Holidays
93	Education	Licensing assistance / training
94		Seatbelts campaign
95	Police Resources	Safe Police observation bays and areas to pull over larger vehicles
96		High risk safety signs implemented at black spots
97		Coordination between Auckland and Northland regions to cover peak periods
98		Improving efficiency of breath testing at location
99		Variable speed signs at Otaika Road to slow traffic down coming into urban area
100		More enforcement personnel

Ref #	Section / Category	Option Description
101		More SCU trained personnel
102		Improving response time
103		Monitoring
104		Better and more current information provided to police
105		Emergency response at Wellsford
106	Maintenance	Schedule maintenance outside peak times
107		Improved pavement to reduce maintenance
108	Other	Increase costal shipping
109		Upgrade detour routes for HPMV
110		Courtesy vans to prevent drink driving
111		Subsidised Public Transport
112		Crawler lanes
113		Space Port in Waipu
114		Freight priority lanes in Auckland

Appendix B Option Evaluation Table

APPENDIX H – PROGRAMME ANALYSIS AND ASSESSMENTS

Programme Business Case Assessment of Alternatives Summary Table



PROPOSAL DETAILS			
Business case name:	SH1 – Auckland to Whangarei	Name of Project Manager & Region:	Jim Sephton, Auckland
Business case purpose:	To develop a programme of works to strengthen the transportation links between Northland and Auckland, as a gateway to the international airport, port and remaining markets in New Zealand. A 30 year time horizon for this programme has been identified.		
Programme 1 – Resilience			
Alternative description:	<p>This programme provides a four-lane expressway standard corridor between Puhoi and north of Te Hana and between Oakleigh and Whangarei. A 2+2 online improvement is provided between the Brynderwyns and Oakleigh. It is primarily focussed on resilience, by providing a high quality separated carriageway. It also proposes to upgrade key detour routes to ensure that a route is always available for all vehicles.</p> <p>This programme delivers a very high standard intervention along the majority of the corridor as well as a suite of operational interventions to meet all three of the investment objectives.</p> <p>A number of operational enhancements for resilience purposes are also proposed, including improving the pavement quality.</p> <p>Dependencies : None</p>		
Estimated total public sector funding requirement:		Lower	Upper
	Estimated cost (\$m):	\$963 million	\$1,525 million
	Present value of cost to govt. (\$m):	\$606 million	\$961 million
Estimated BCR range:		0.8	0.5
Timing of need:	Optimal programme:		Likely:
IAF profile:	Strategic fit: H/M/L	Effectiveness: H /M/L	Efficiency: H/M/L

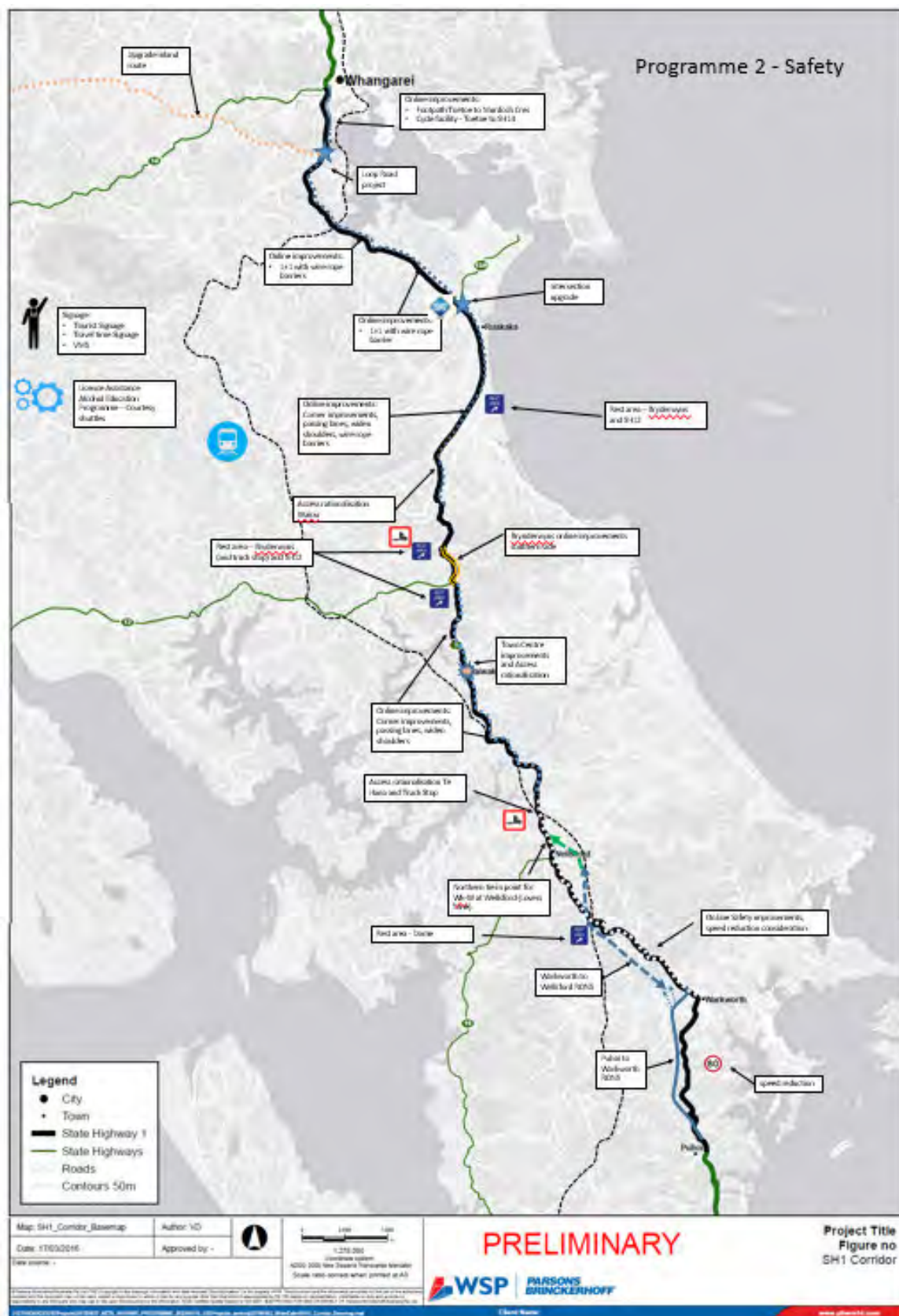
MULTI CRITERIA ASSESSMENT – PROGRAMME 1

Criterion	Score	Discussion
Objective 1: Resilience	+++	This option performs very well against this criterion as the route is largely upgraded to 2+2, with the only section that is not upgraded has no resilience issue. There is also considerable investment in alternate routes, providing a +++ rating.
Objective 2: Safety	++	The option performs strongly from a safety perspective. It is considered that the medium rating is achieved on all sections, giving a strong ++ score
Objective 3: 90km/h	++	The level of interventions in this programme achieves a strong proportion of the route at an average speed of 90km/h. The only section is the section between Te Hana and SH12. This achieves a ++ score
Feasibility:	-	<p>This option scored a – overall. This was largely due to a combination of adverse impacts, ranging from 0 to --. This implies there are implementation risks, however these are manageable.</p> <p>The programme was considered straightforward to, being largely online or offline solutions that are well understood. No innovative technologies are proposed and some considerable hazards were considered associated with the programme, including the CMA near Oakleigh and the Brynderwyns bypass.</p> <p>The programme is largely on line so whilst there will be property impacts, these are largely well known. The two exceptions, being the CMA near Oakleigh and the Brynderwyns bypass. No significant infrastructure is impacted, the Te Hana rail bridge being the main impact.</p> <p>Considerable consenting risk is likely for the new offline sections in particular, including the CMA near Oakleigh and the Brynderwyns. Whilst the online components will be easier, there will also be some risk. The scale of the consenting has added to the considerable assessment.</p> <p>Might there be notable property risks to delivery? Might the alternative/option affect other infrastructure providers and in what way?</p> <p>No substantive change in maintenance is envisaged, although the additional lanes will cost more to</p>

Affordability:	-	<p>This option scored a – overall. This was largely due to a combination of adverse impacts, ranging from 0 to --. This implies there are some affordability risks, however these are manageable.</p> <p>Given the likely economic efficiency of this programme, some alternative funding mechanisms will likely be required. Given a large online component to the programme, alternative funding sources are limited.</p> <p>Operating costs are not likely to be a risk for this programme, with fairly standard options proposed.</p>
Public / Stakeholders:	0	<p>The programmes have not been made public and it has been assessed that there will be a largely positive reaction to the programme from stakeholders.</p>
Safety:	++	<p>The programme will improve safety, largely meeting the medium rating target set in the investment objectives. The benefits will largely relate to motor vehicles and not all modes.</p>
Economy:	++	<p>This option will enable the forecast traffic forecasts to be met. Journey times will be reduced and travel time reliability is assessed to improved considerable with the level investment in the route and the alternative route enhancements proposed. Wellsford and Te Hana bypass have been assessed as having adverse impacts on the connectivity to these towns. The freight supply chain will be improved through the additional capacity provided. The programme has been assessed as providing good access to a number of growth areas along the corridor, including Ruakaka and Kaiwaka and Whangarei. The additional route security was also valued highly economically for northland with this option.</p>
Environmental and social:	-	<p>There would be some potential impact of the offline roading options on sites of significance to Māori and heritage sites, particularly in the area south of Whangarei and in the Brynderwyns.</p> <p>Similarly, the offline options are likely to have some impact on ecology, as well as freshwater and marine systems, including the extension of the RoNS motorway in the Dome Valley north to Te Hana.</p> <p>The bypassing of several communities along State Highway 1, including Wellsford, would improve the amenity of these settlements and local connectivity and cohesion (for example, it would improve cycling and walking). Although there would an economic impact on activities dependent on passing traffic.</p> <p>Some additional noise and impact on amenity values to areas close to the offline options.</p> <p>The offline options would improve resilience to natural hazards, particularly flooding south of Whangarei.</p>

<p>Environmental opportunities</p>	<p>Offline options would present opportunities for environmental mitigation, particularly to offset potential impacts on the Brynderwyns.</p> <p>They would also present opportunities for enhancing other modes of transport, either through an integrated approach to multimodal design of bypasses and/or for local roads and connections when State Highway traffic is removed.</p>
<p>Social opportunities</p>	<p>This programme provides for the growth at Ruakaka and with the proposed grade separated interchange at SH15A, there is an opportunity for further growth.</p> <p>The upgrading of detour routes also provides an opportunity for increase accessibility and growth to these coastal communities.</p> <p>There is an opportunity to make something of Wellsford with the proposed programme, which increases access (Wayby Valley) whilst bypassing the town at a considerable distance.</p>
<p>Rationale for selection or rejection of alternative:</p>	<p>This option ranked 7th of the 10 programmes which have been developed. It delivers relatively low benefits in comparison with other programmes, at a relatively high cost.</p>

Programme Business Case Assessment of Alternatives Summary Table



PROPOSAL DETAILS			
Business case name:	SH1 – Auckland to Whangarei	Name of Project Manager & Region:	Jim Sephton, Auckland
Business case purpose:	To develop a programme of works to strengthen the transportation links between Northland and Auckland, as a gateway to the international airport, port and remaining markets in New Zealand. A 30 year time horizon for this programme has been identified.		
Programme 2 - Safety			
Alternative description:	<p>This programme provides largely online improvements primarily to address the safety investment objective.</p> <p>Interventions comprise wire rope medians with no capacity increase, corner realignments and intersection upgrades. Rest areas and truck stops are provided to address fatigue related crashes. Investment is made in increased police enforcement and driver education campaigns.</p> <p>Dependencies : None</p>		
Estimated total public sector funding requirement:		Lower	Upper
	Estimated cost (\$m):	\$430 million	\$733 million
	Present value of cost to govt. (\$m):	\$271 million	\$462 million
Estimated BCR range:		0.9	0.5
Timing of need:	Optimal programme:		Likely:
IAF profile:	Strategic fit: H/M/L	Effectiveness: H /M/L	Efficiency: H/M/L

MULTI CRITERIA ASSESSMENT – PROGRAMME 2		
Criterion	Score	Discussion
Objective 1: Resilience	+	This option provides some improvements to the resilience through increased safety performance, but that lack of additional capacity provided (and the resilience this capacity provides for vehicles moving past incidents) reduced the assessment to a + rating
Objective 2: Safety	+++	The option performs strongly from a safety perspective. It is considered that the medium rating is achieved on all sections, giving a strong +++ score
Objective 3: 90km/h	0	This option provides improved safety rather than capacity and alignment improvements and it is therefore assessed that this option will not increase the speed from current levels, giving it a 0 score
Feasibility:	-	<p>This option scored a - overall. This was largely due to a combination of adverse impacts, ranging from 0 to --. This implies there are implementation risks, however these are manageable.</p> <p>The programme was considered straightforward to, being largely online that are well understood. No innovative technologies are proposed and some hazards were considered associated with the programme, including the Brynderwyns online solution.</p> <p>The programme is largely on line so whilst there will be property impacts, these are largely well known. No significant infrastructure is impacted.</p> <p>Some consenting risk is likely for the online upgrades, but nothing significant.</p> <p>No substantive change in maintenance is envisaged, although the likely wire rope is expensive to maintain.</p>
Affordability:	0	<p>This option scored a 0 overall. This was largely due to a combination of adverse impacts, ranging from + to --. This implies there are some affordability risks, however these are manageable.</p> <p>Given the likely economic efficiency of this programme, this is the best performing programme from an affordability perspective.</p> <p>Operating costs are not likely to be a risk for this programme, with fairly standard options proposed.</p>
Public / Stakeholders:	-	The programmes have not been made public and it has been assessed that there will be a largely negative reaction to the programme from stakeholders due to the lack of capacity enhancement and increased resilience.
Safety:	++	The programme will improve safety, largely meeting the medium rating target set in the investment objectives. The benefits will largely relate to motor vehicles and not all modes.

Economy:	0	<p>This option will not enable the forecast traffic forecasts to be met. Journey times will slightly increase and travel time reliability is assessed to be slightly improved. This programme is largely online and so township access is assessed as being largely the same as current. The freight supply chain will not be improved as no significant changes in grade or congestion points are targeted with this programme.</p> <p>The programme has been assessed as providing a slight improvement to access along the corridor in regard to assisting in the development of adjacent land use. This programme would not be consistent with the ONRC for the route, but does offer an improved to the Do Minimum.</p>
Environmental and social:	0	<p>Some of the online work may impact on some sites of significance to Māori and/or heritage value along the existing alignment. Similarly, such work may impact on adjoining natural ecosystems and watercourses.</p> <p>The extension of the RONS motorway through the Dome Valley and around Wellsford will have some impact on the natural environment. However, it will result in improved amenity values and community cohesion in this part of the corridor, improving local connectivity and walking and cycling.</p> <p>Some land take needed for W2W RoNS and some other options (for example, interchange at Ruakaka)</p>
Environmental opportunities	<p>Provides opportunities for improved pedestrian and cycling facilities.</p> <p>Provides opportunities for township improvements</p>	
Social opportunities	<p>This programme provides for the opportunity to make something of the proposed rest areas and truck stops along the route.</p> <p>The Kaiwaka town centre improvements also offers opportunity for social enhancement.</p> <p>The social improvement aspects of the programme (alcohol education etc) provides an opportunity for greater community benefit,</p>	
Rationale for selection or rejection of alternative:	This option ranked 8th of the 10 programmes that have been developed.	

PROPOSAL DETAILS			
Business case name:	SH1 – Auckland to Whangarei	Name of Project Manager & Region:	Jim Sephton, Auckland
Business case purpose:	To develop a programme of works to strengthen the transportation links between Northland and Auckland, as a gateway to the international airport, port and remaining markets in New Zealand. A 30 year time horizon for this programme has been identified.		
Programme 10 – Stakeholder developed programme			
Alternative description:	<p>This programme provides a four-lane expressway standard corridor between Puhoi and Whangarei.</p> <p>This programme delivers a very high standard intervention along the whole corridor as well as a suite of operational interventions to meet all three of the investment objectives. It's primary focus is to deliver on Investment Objective 3 – 90 km/h average speed as a proxy for economic growth.</p> <p>A number of operational enhancements for safety purposes are also proposed, including a driver license assistance programme.</p> <p>Dependencies : None</p>		
Estimated total public sector funding requirement:		Lower	Upper
	Estimated cost (\$m):	\$1,934 million	\$2,738 million
	Present value of cost to govt. (\$m):	\$1,218 million	\$1,763 million
Estimated BCR range:		0.4	0.3
Timing of need:	Optimal programme:		Likely:
IAF profile:	Strategic fit: H/M/L	Effectiveness: H /M/L	Efficiency: H/M/L

MULTI CRITERIA ASSESSMENT – PROGRAMME 3

Criterion	Score	Discussion
Objective 1: Resilience	+++	This option provides significant improvements to the resilience through increased safety performance, and the additional capacity provided (and the resilience it provides) reduced the assessment to a +++ rating
Objective 2: Safety	+++	The option performs strongly from a safety perspective. It is considered that the medium rating is achieved on all sections, giving a strong +++ score
Objective 3: 90km/h	+++	This option provides improved capacity and therefore speed giving a programme that results in a 90km/h average speed environment, giving it a +++ score
Feasibility:	-	<p>This option scored a – overall. This was largely due to a combination of adverse impacts, ranging from 0 to ---. This implies there are implementation risks, however these are manageable.</p> <p>The programme was considered straightforward to implement, being well understood. No innovative technologies are proposed and some hazards were considered associated with the programme.</p> <p>The programme is largely off line so there will be property impacts. No significant 'other' infrastructure is impacted.</p> <p>Considerable consenting risk is likely for the off line upgrades.</p> <p>No substantive change in maintenance is envisaged, although the likely wire rope is expensive to maintain.</p>
Affordability:	--	<p>This option scored-- overall. This programme performs poorly from an economic efficiency perspective and would not meet the minimum criteria for funding from the NLTF.</p> <p>Given the likely economic efficiency of this programme, this programme would require alternative funding sources to proceed.</p> <p>Operating costs are not likely to be a risk for this programme, with fairly standard options proposed.</p>
Public / Stakeholders:	+	The programmes have not been made public and it has been assessed that there will be a largely positive reaction to the programme from stakeholders due to the increase in capacity resilience.
Safety:	++	The programme will improve safety, meeting the medium rating target set in the investment objectives. The benefits will largely relate to motor vehicles and not all modes.

Economy:	+++	<p>This option will enable the forecast traffic forecasts to be met. Journey times will increase and travel time reliability will improve. This programme is largely off line and so township access will be slightly worse than the current access as interchange locations are not at each town. The freight supply chain will be improved as significant changes in grade and congestion points are targeted with this programme.</p> <p>The programme improves access along the corridor to assist the development of adjacent land use. This programme is consistent with the ONRC for the route.</p>
Environmental and social:	-	<p>There may be some potential impact of the offline roading options on sites of significance to Māori and heritage sites, particularly in the area south of Whangarei and in the Brynderwyns.</p> <p>Similarly, the offline options are likely to have some impact on ecology, as well as freshwater and marine systems, including the extension of the RoNS motorway in the Dome Valley and in other areas north to Kaiwaka.</p> <p>Greater visual and landscape impacts between Warkworth and Waipu, including on outstanding landscapes</p> <p>The bypassing of several communities along Sh1, including Wellsford, would improve the amenity of these settlements and local connectivity and cohesion (for example, it would improve cycling and walking). Although there would an economic impact on activities dependent on passing traffic.</p> <p>Some additional noise and impact on amenity values to areas close to the offline options.</p> <p>The offline options would improve resilience to natural hazards, particularly flooding south of Whangarei.</p> <p>Much greater land take and impact on land use required.</p>
Environmental opportunities		<p>Offline options present opportunities for environmental mitigation, particularly to offset potential impacts on the Brynderwyns.</p> <p>The programme also presents opportunities to enhance other modes of transport, either through an integrated approach to multimodal design of bypasses and/or for local roads and connections when State Highway traffic is removed.</p> <p>Opportunities for land development on the old State Highway in the case of an offline alignment in the south of Whangarei.</p> <p>Opportunities for town centre/main street improvements for towns which are bypassed.</p>

Social opportunities	<p>This programme provides the opportunity to improve access to towns along the route by improving the performance of SH1.</p> <p>The social improvement aspects of the programme (driver licensing, township improvements) provides an opportunity for greater community benefit</p>
Rationale for selection or rejection of alternative:	This option ranked 3 rd of the 10 programmes that have been developed.

PROPOSAL DETAILS			
Business case name:	SH1 – Auckland to Whangarei	Name of Project Manager & Region:	Jim Sephton, Auckland
Business case purpose:	To develop a programme of works to strengthen the transportation links between Northland and Auckland, as a gateway to the international airport, port and remaining markets in New Zealand. A 30 year time horizon for this programme has been identified.		
Programme 4 – One Network Road Classification			
Alternative description:	<p>This programme provides a four-lane expressway standard corridor between Puhoi and Whangarei. Interchanges are provided at key points along the route to further facilitate growth.</p> <p>Its purpose is to provide economic stimulus for the Northland economy by making a significant investment in the SH1 corridor.</p> <p>This programme delivers a very high standard intervention along the whole corridor as well as a suite of operational interventions to meet all three of the investment objectives. It offers additional investment over that proposed by Programme 3 – Efficiency.</p> <p>A number of operational enhancements are also proposed, including alcohol awareness campaigns and VMS</p> <p>Dependencies : None</p>		
Estimated total public sector funding requirement:		Lower	Upper
	Estimated cost (\$m):	\$2,172 million	\$3,195 million
	Present value of cost to govt. (\$m):	\$1,369 million	\$2,013 million
Estimated BCR range:	0.5		0.3
Timing of need:	Optimal programme:		Likely:
IAF profile:	Strategic fit: H/M/L	Effectiveness: H /M/L	Efficiency: H/M/L

MULTI CRITERIA ASSESSMENT – PROGRAMME 4

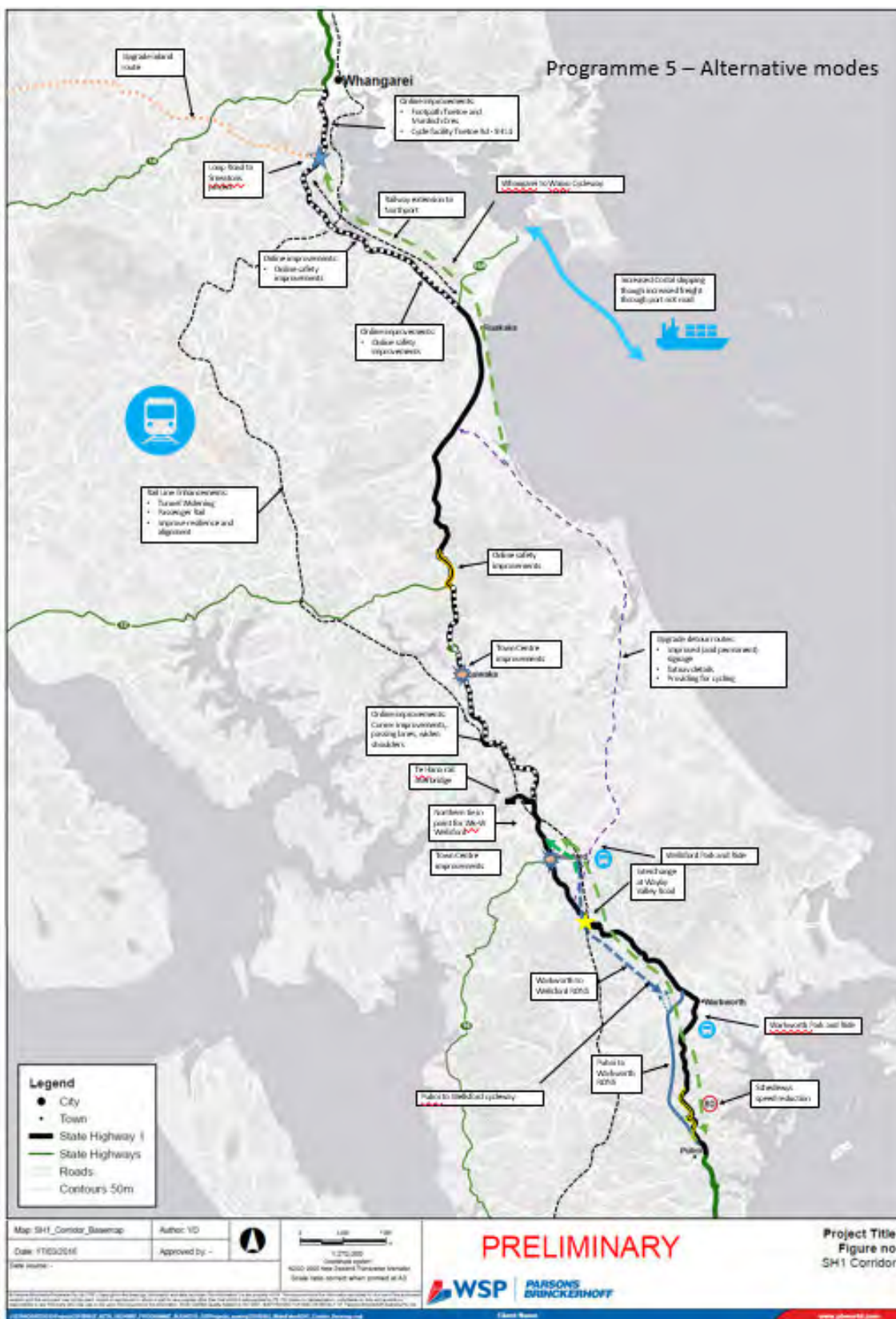
Criterion	Score	Discussion
Objective 1: Resilience	+++	This option significantly improves the resilience of the corridor with a largely offline 2+2 alignment. This programme effectively provides two alternate corridors and excellent interchanges along the entire length of the route.
Objective 2: Safety	+++	The option performs very strongly from a safety perspective as a result of the significant level of investment in new 2+2 offline alignment. It is considered that the medium rating is achieved on all sections, giving a strongly positive +++ score
Objective 3: 90km/h	+++	This option provides a 90km\h average speed along the entire length of the corridor.
Feasibility:	--	This option scored -- overall. This implies there are implementation risks and that some of these are significant. The programme is largely off line so there will be considerable property impacts. Considerable consenting risk is likely for the offline upgrades. No substantive change in maintenance is envisaged, although the increase in number of roads will be more expensive to maintain.
Affordability:	--	This option scored -- overall. This was largely due to a combination of adverse impacts, ranging from - to ---. This implies there are some significant affordability risks. Given the likely economic efficiency of this programme, alternative funding mechanisms will likely be required. The offline nature of the options enables tolling options to assist with funding. Operating costs are not likely to be a risk for this programme, with standard options proposed.
Public / Stakeholders:	+	The programmes have not been made public. However, it is considered likely that this programme would be viewed substantially positively by stakeholders based on the scale of road based investment, given this is where most people think investment is most needed.
Safety:	++	The programme will significantly improve safety, meeting and potentially exceeding the "medium" investment objective target.

Economy:	+++	<p>Travel time reliability is likely to improve significantly as a result of the planned investment in the route.</p> <p>This option is likely to enable the forecast traffic demands to be met. Journey times are likely to be reduced significantly along some sections.</p> <p>This programme provides an increased level of accessibility and land use development potential over the Do Minimum.</p> <p>The freight supply chain will be improved with significant reductions in grade and congestion points targeted with this programme.</p> <p>This programme would be consistent with the ONRC for the route.</p>
Environmental and social:	-	<p>There is likely to be some potential impact from the offline roading options on sites of significance to Māori and heritage sites, particularly in the area south of Whangarei and in the Brynderwyns.</p> <p>Similarly, the offline options are likely to have some impact on ecology, as well as freshwater and marine systems, including the extension of the RoNS in the Dome Valley and in other areas north to Kaiwaka.</p> <p>This programme is likely to have the greatest visual and landscape impacts, including on outstanding landscapes.</p> <p>The bypassing of several communities along SH1, including Wellsford, would improve the amenity of these settlements and local connectivity and cohesion (for example, it would improve cycling and walking). Although there would an economic impact on activities dependent on passing traffic.</p> <p>Some additional noise and impact on amenity values to areas close to the offline options.</p> <p>The offline options would improve resilience to natural hazards, particularly flooding south of Whangarei.</p> <p>This programme has the greatest land take required, and therefore impact on existing land uses.</p>
Environmental opportunities		<p>Offline options present opportunities for environmental mitigation, particularly to offset potential impacts on the Brynderwyns.</p> <p>They would also present opportunities for enhancing other modes of transport, either through an integrated approach to multimodal design of bypasses and/or for local roads and connections when State Highway traffic is removed.</p> <p>Opportunities for town centre/main street improvements</p>
Social opportunities		<p>As a result of the significant increase in capacity on a new alignment, there is an opportunity for the amenity of the existing road to be improved, particularly where it passes through townships such as Kaiwaka and Wellsford.</p> <p>The social improvement aspects of the programme (alcohol education etc) also provide an opportunity for greater community benefit.</p>

Rationale for selection or rejection of alternative:

This option ranked **1st** because it best meets the Investment Objectives sought. However, its high cost relative to the level of benefits delivered means that it is not economically efficient.

Programme Business Case Assessment of Alternatives Summary Table



PROPOSAL DETAILS				
Business case name:	SH1 – Auckland to Whangarei	Name of Project Manager & Region:	Jim Sephton, Auckland	
Business case purpose:	To develop a programme of works to strengthen the transportation links between Northland and Auckland, as a gateway to the international airport, port and remaining markets in New Zealand. A 30 year time horizon for this programme has been identified.			
Alternative Number 5 – Alternative Modes				
Alternative description:	<p>This programme provides a suite of operational and physical interventions to meet the investment objectives through investment in alternative modes.</p> <p>This programme includes significant investment in the rail, coastal shipping and cycling networks. Minor safety improvements are also provided on the road network. The programme includes township improvements, park and ride facilities and improvements to detour routes such that they are HPMV capable.</p> <p>No substantive capacity increase is proposed.</p> <p>Dependencies : None</p>			
Estimated total public sector funding requirement:		Lower	Upper	
	Capital cost (\$m):	\$6,462 million	\$8,674 million	
	Present value of cost to govt. (\$m):	\$4,071 million	\$5,465 million	
Estimated BCR range:		0.1	0.1	
Timing of need:	Optimal programme:		Likely:	
IAF profile:	Strategic fit:	H/M/L	Effectiveness: H/M/L	Efficiency: H/M/L

MULTI CRITERIA ASSESSMENT – PROGRAMME 5		
Criterion	Score	Discussion
Objective 1: Resilience	+	This programme offers a slight improvement against the Do Minimum for this objective as the online route is only upgraded with minor safety improvements. There is however investment in alternate routes, providing a + rating.
Objective 2: Safety	+	The programme performs better than the do minimum from a safety perspective as a result of the minor online safety improvements provided. It is considered that the medium rating is achieved on all sections except between Loop Road and Whangarei, giving a relatively positive + score
Objective 3: 90km/h	0	It is considered that this programme will result in a similar speed to the do-minimum. This achieves a 0 score
Feasibility:	-	This programme scored a – overall. This was largely due to a combination of adverse impacts, ranging from 0 to --. This implies there are implementation risks, some of significance. The programme was not considered to be straightforward to implement as increasing the capacity of the rail line and coastal shipping is politically, physically and operationally complex. No innovative technologies are proposed and some hazards may be associated with the programme, including rail implementation hazards. The programme is largely online so whilst there will be property impacts, these are largely well known. No significant infrastructure is impacted, the Te Hana rail bridge being the main impact. Some consenting risk is likely for but overall not considered significant. Operating the rail and coastal shipping components of the programme is likely to carry additional maintenance burden.
Affordability:	--	This programme scored -- overall. This was largely due to a combination of adverse impacts, ranging from - to ---. This implies there are some significant affordability risks. Given the likely economic efficiency of this programme, some alternative funding mechanisms will likely required. Given a large online roading component to the programme, alternative funding sources are limited. Operating subsidies are possible for the rail line with this programme.

Public / Stakeholders:	-	The programmes have not been made public. However, it is considered likely that this programme may provoke a negative reaction from stakeholders based on the lack of road based investment, given this is where most people think investment is most needed.
Safety:	+	The programme will improve safety, largely meeting the "medium" investment objective target, but not totally. The benefits will largely relate to motor vehicles and not all modes.
Economy:	0	Travel time reliability is likely to improve slightly as a result of the planning investment in the route and in alternative modes. However, this programme is not likely to enable the forecast traffic demands to be met. Journey times are not likely to be reduced. Generally this programme provides the same level of accessibility and land use development potential is provided as the Do Minimum.
Environmental and social:	0	Some impacts on heritage sites and sites of significance to Māori along existing alignment, particularly between Whangarei and Ruakaka as a result of online improvements and the new rail line. Impacts on natural environment, watercourses and coastal marine area are expected, particularly in the south, between Whangarei and Ruakaka, and along rail corridor. Minor impacts on the landscape. State Highway traffic removed from local communities in the south, including Wellsford, improving local amenity values, connectivity and community cohesion. Some additional noise and impact on amenity values to areas close to W2W. Significant improvement to connectivity and accessibility via other modes. Improved resilience, and best use of existing infrastructure. Some land take and impact on land uses would occur.
Environmental opportunities		Offline options in the south would present opportunities for environmental mitigation. Opportunities for town centre/main street improvements for Wellsford and Kaiwaka.
Social opportunities		The alternative modes (particularly walking and cycling between SH15A and Whangarei) provides an opportunity for increased growth in the area. Improvements to detour routes also provide an opportunity to increase accessibility and growth to coastal communities. There is an opportunity to improve the Kaiwaka and Wellsford town centres.

Rationale for selection or rejection of alternative:

This option ranked **11th** because it does not achieve the Investment Objectives sought and its high cost relative to the level of benefits delivered means that it is the least economically efficient of all programmes.

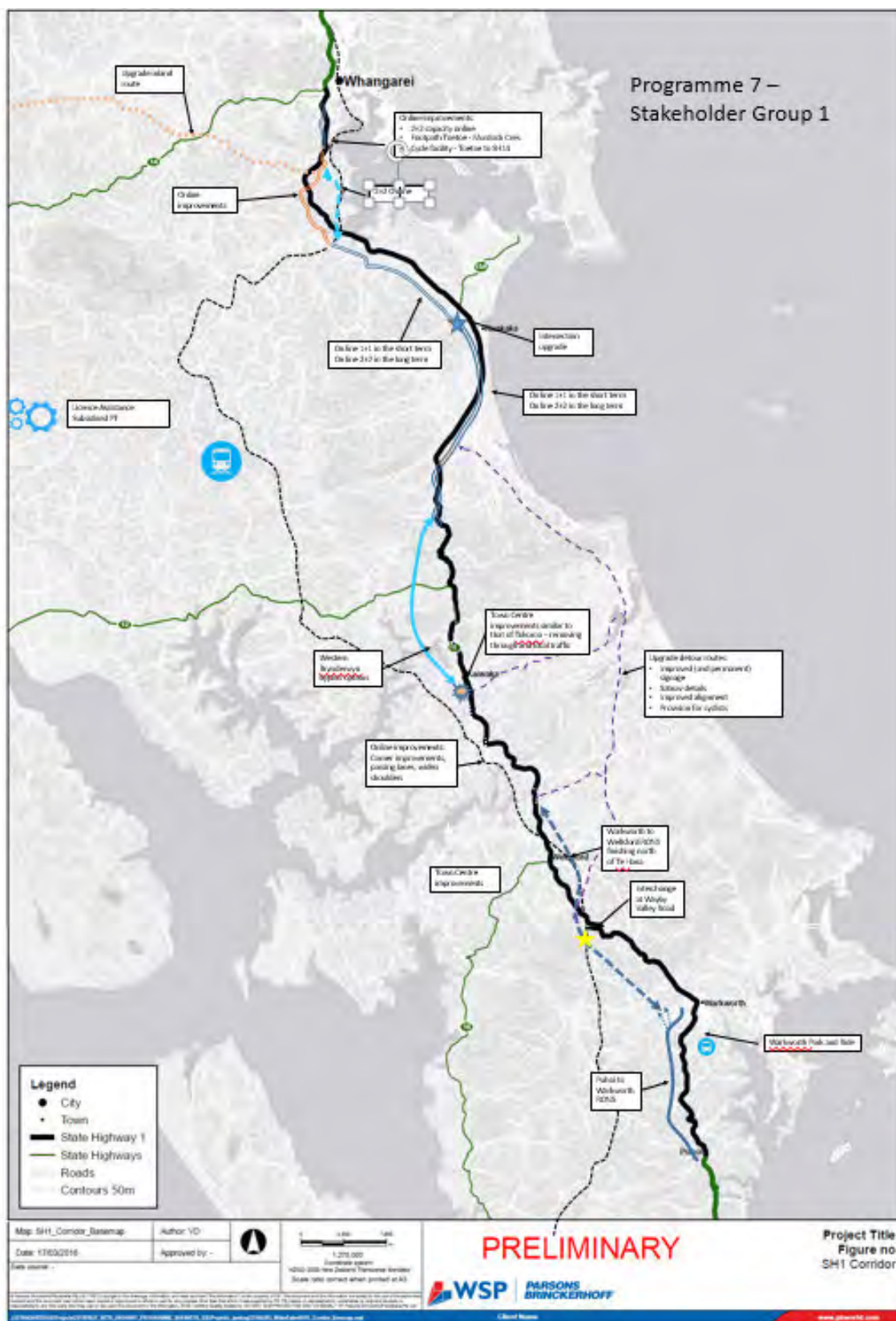
PROPOSAL DETAILS			
Business case name:	SH1 – Auckland to Whangarei	Name of Project Manager & Region:	Jim Sephton, Auckland
Business case purpose:	To develop a programme of works to strengthen the transportation links between Northland and Auckland, as a gateway to the international airport, port and remaining markets in New Zealand. A 30 year time horizon for this programme has been identified.		
Alternative Number 6 – Least Impact			
Alternative description:	<p>This programme provides a suite of operational and physical interventions to meet the investment objectives while having the least impact on the environment and socially sensitive areas in the corridor.</p> <p>This programme includes a number of physical online upgrades and significant investment in other modes including enhancements to the rail and cycling networks.</p> <p>No substantive capacity increase is proposed.</p> <p>Dependencies : None</p>		
Estimated total public sector funding requirement:		Lower	Upper
	Capital cost (\$m):	\$427 million	\$644 million
	Present value of cost to govt. (\$m):	\$269 million	\$405 million
Estimated BCR range:		1.2	0.8
Timing of need:	Optimal programme:		Likely:
IAF profile:	Strategic fit: H/M/L	Effectiveness: H/M/L	Efficiency: H/M/L

MULTI CRITERIA ASSESSMENT – PROGRAMME 6

Criterion	Score	Discussion
Objective 1 : Resilience	+	This option offers a slight improvement against the Do Minimum for this objective as the online route is only upgraded with minor safety improvements. There is however investment in alternate routes, providing a + rating.
Objective 2 : Safety	+	The option performs better than the do minimum from a safety perspective as a result of the minor online safety improvements provided. It is considered that the medium rating is achieved on all sections except between Loop Road and Whangarei, giving a relatively positive + score
Objective 3 : 90km/h	0	It is considered that this programme will result in a similar speed to the do-minimum. This achieves a 0 score
Feasibility:	-	This option scored a – overall. This was largely due to a combination of adverse impacts, ranging from 0 to --. This implies there are implementation risks, some of significance. The programme was not considered to be straightforward to implement as increasing the capacity of the rail line is politically, physically and operationally complex. No innovative technologies are proposed and some hazards were considered associated with the programme, including rail implementation hazards. The programme is largely on line so whilst there will be property impacts, these are largely well known. No significant infrastructure is impacted, the Te Hana rail bridge being the main impact. Some consenting risk is likely for but overall not considered significant. Operating the rail is likely to carry additional maintenance burden.
Affordability:	-	This option scored – overall as it does not deliver as many benefits as other options and still requires an investment of between \$400-\$600 million. Operating subsidies are possible for the rail line with this option.
Public / Stakeholders:	-	The programmes have not been made public. However, it is considered likely that this programme may provoke a negative reaction from stakeholders based on the lack of road based investment, given this is where most people think investment is most needed.
Safety:	+	The programme will improve safety, largely meeting the “medium” investment objective target, but not totally. The benefits will largely relate to motor vehicles and not all modes.

Economy:	0	<p>Travel time reliability is likely to improve slightly as a result of the planning investment in the route and in alternative modes.</p> <p>However, this option is not likely to enable the forecast traffic demands to be met. Journey times are not likely to be reduced.</p> <p>Generally this programme provides the same level of accessibility and land use development potential is provided as the Do Minimum.</p>
Environmental and social:	0	<p>Some impacts on heritage sites and sites of significance to Māori along existing alignment.</p> <p>Minor impacts on the landscape.</p> <p>Significant improvement to connectivity and accessibility via other modes.</p> <p>Improved resilience, and best use of existing infrastructure.</p> <p>Some land take and impact on land uses would occur.</p>
Environmental opportunities	<p>Offline options in the south would present opportunities for environmental mitigation.</p> <p>Opportunities for town centre/main street improvements for Wellsford and Kaiwaka.</p>	
Social opportunities	<p>The alternative modes (particularly walking and cycling between SH15A and Whangarei) provides an opportunity for increased growth in the area.</p> <p>Improvements to detour routes also provide an opportunity to increase accessibility and growth to these coastal communities.</p> <p>There is an opportunity to improve the Kaiwaka and Wellsford town centres.</p>	
Rationale for selection or rejection of alternative:	<p>This option ranked 9th because it does not achieve the Investment Objectives sought and its high cost relative to the level of benefits delivered means that it is not economically efficient.</p>	

Programme Business Case Assessment of Alternatives Summary Table



PROPOSAL DETAILS				
Business case name:	SH1 – Auckland to Whangarei	Name of Project Manager & Region:	Jim Sephton, Auckland	
Business case purpose:	To develop a programme of works to strengthen the transportation links between Northland and Auckland, as a gateway to the international airport, port and remaining markets in New Zealand. A 30 year time horizon for this programme has been identified.			
Programme 7 – Stakeholder developed programme				
Alternative description:	<p>This programme provides a suite of operational and physical interventions to meet all three of the investment objectives.</p> <p>This programme is a variant of the economic efficiency programme with some changes to better address corridor reliability and safety. The investment includes offline investment in two key areas; The Brynderwyns and Whangarei South with online intervention on the remainder of the corridor.</p> <p>A number of operational enhancements for safety purposes are also proposed, including a license assistance programme.</p> <p>Dependencies : None</p>			
Estimated total public sector funding requirement:		Lower	Upper	
	Capital cost (\$m):	\$1,514 million	\$2,432 million	
	Present value of cost to govt. (\$m):	\$954 million	\$1,532 million	
Estimated BCR range:		0.5	0.3	
Timing of need:	Optimal programme:		Likely:	
IAF profile:	Strategic fit:	H/M/L	Effectiveness: H/M/L	Efficiency: H/M/L

MULTI CRITERIA ASSESSMENT – PROGRAMME 7

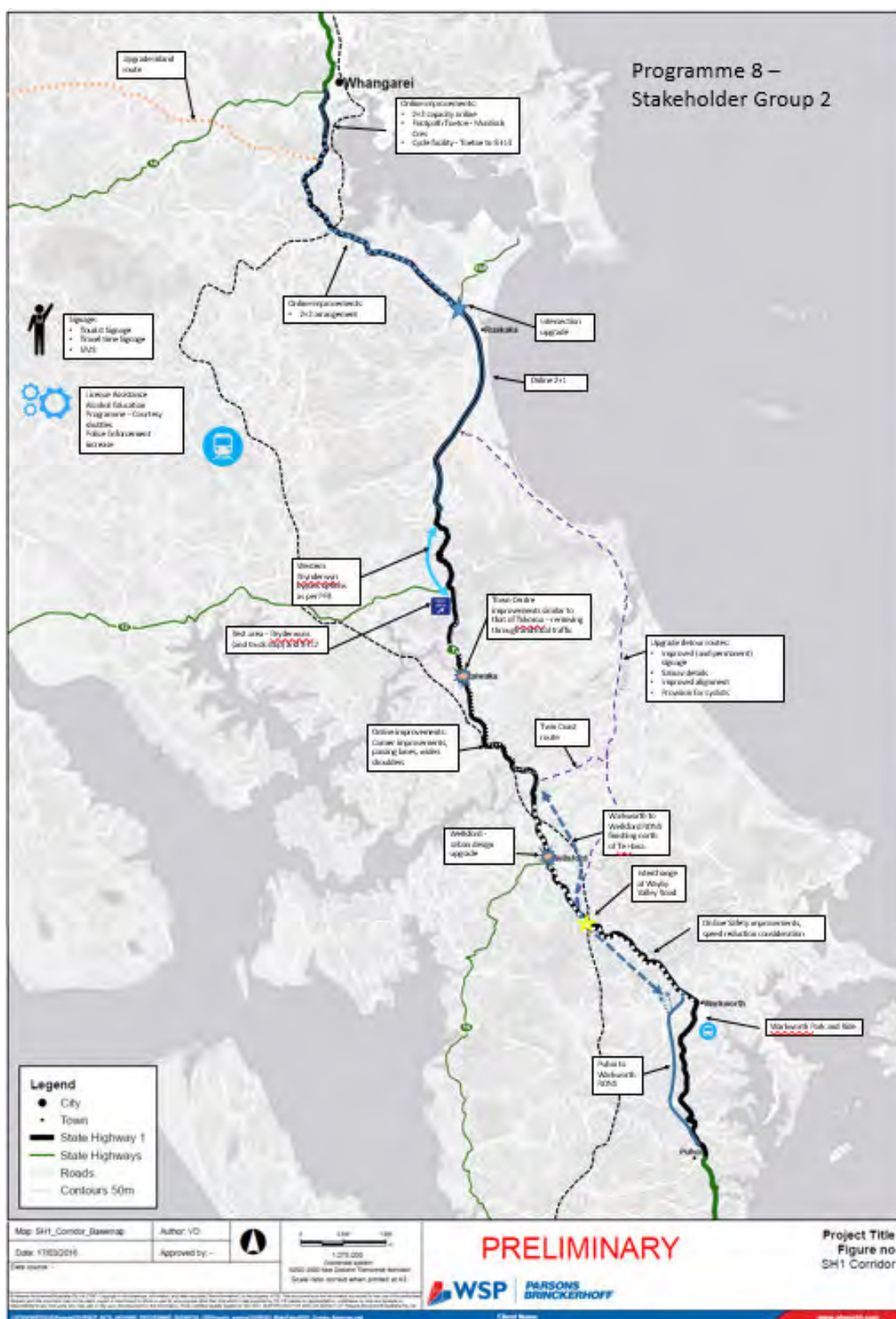
Criterion	Score	Discussion
Objective 1: Resilience	+++	This option provides significant improvements to the resilience through increased safety performance, and the additional capacity provided (and the resilience this capacity provides for vehicles moving past incidents) reduced the assessment to a +++ rating
Objective 2: Safety	++	The option performs strongly from a safety perspective. It is considered that the medium rating is achieved on all sections, but does not treat all sections on the corridor giving a strong ++ score
Objective 3: 90km/h	+++	This option provides improved capacity and therefore speed focused on sections which operate poorly presently giving a programme that results in a 90km/hr average speed environment, giving it a +++ score
Feasibility:	-	<p>This option scored a – overall. This was largely due to a combination of adverse impacts, ranging from 0 to ---. This implies there are considerable implementation risks, however these are manageable.</p> <p>The programme was considered straightforward to implement, being well understood. No innovative technologies are proposed and some hazards were considered associated with the programme.</p> <p>The programme is off line over large section so there will be property impacts. No significant 'other' infrastructure is impacted.</p> <p>Considerable consenting risk is likely for the off line upgrades especially in areas such as the Brynderwyns.</p> <p>No substantive change in maintenance is envisaged, although additional infrastructure will be developed and wire rope sections increase maintenance costs over some sections.</p>
Affordability:	--	<p>This programme scored a -- overall. This was largely due to a combination of adverse impacts, ranging from 0 to --. This implies there are some affordability risks.</p> <p>Given the likely economic efficiency of this programme, this programme will require some alternative funding.</p> <p>Operating costs are not likely to be a risk for this programme, with fairly standard options proposed.</p>
Public / Stakeholders:	+	The programmes have not been made public and it has been assessed that there will be a largely positive reaction to the programme from stakeholders due to the increase in capacity resilience.
Safety:	++	The programme will improve safety, meeting the medium rating target set in the investment objectives. The benefits will largely relate to motor vehicles and not all modes.

<p>Economy:</p>	<p>++</p>	<p>This option will enable the forecast traffic forecasts to be met. Journey times will increase and travel time reliability is assessed to be improved. This programme is offline over some sections but most of the townships along the route remain online.</p> <p>The freight supply chain will be improved as significant changes in grade and congestion points are targeted with this programme.</p> <p>The programme has been assessed as providing an improvement to access along the corridor in regards to assisting in the development of adjacent land use. This programme would be largely consistent with the ONRC for the route.</p>
<p>Environmental and social:</p>	<p>-</p>	<p>There would be some potential impact of the offline roading options on sites of significance to Māori and heritage sites, particularly in the area south of Whangarei and in the Brynderwyns.</p> <p>Similarly, the offline options are likely to have some impact on ecology, as well as freshwater and marine systems.</p> <p>Greater visual and landscape impacts around the Brynderwyns including on outstanding landscapes.</p> <p>The bypassing of selected communities along State Highway 1, including Wellsford and Te Hana, would improve the amenity of these settlements and local connectivity and cohesion (for example, it would improve cycling and walking). Although there would be an economic impact on activities dependent on passing traffic.</p> <p>Some additional noise and impact on amenity values to areas close to the offline options.</p> <p>The offline options would improve resilience to natural hazards, particularly flooding south of Whangarei.</p> <p>Much greater land take and impact on land use required.</p>
<p>Environmental opportunities</p>		<p>Offline options present opportunities for environmental mitigation, particularly to offset potential impacts on the Brynderwyns.</p> <p>They also present opportunities for enhancing other modes of transport, either through an integrated approach to multimodal design of bypasses and/or for local roads and connections when State Highway traffic is removed.</p> <p>Opportunities for land development on the old State Highway in the case of an offline alignment in the south of Whangarei.</p> <p>Opportunities for town centre/main street improvements for towns which are bypassed.</p>

Social opportunities	<p>This programme provides for the opportunity to improve access to towns along the route through an increased performance of SH1.</p> <p>The social improvement aspects of the programme (driver licensing) provides an opportunity for greater community benefit,</p>
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Rationale for selection or rejection of alternative:	This option ranked 6th of the 10 programmes that have been developed.
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Programme Business Case Assessment of Alternatives Summary Table



PROPOSAL DETAILS				
Business case name:	SH1 – Auckland to Whangarei	Name of Project Manager & Region:	Jim Sephton, Auckland	
Business case purpose:	To develop a programme of works to strengthen the transportation links between Northland and Auckland, as a gateway to the international airport, port and remaining markets in New Zealand. A 30 year time horizon for this programme has been identified.			
Programme 8 – Stakeholder developed programme				
Alternative description:	<p>This programme provides a suite of operational and physical interventions to meet all three of the investment objectives.</p> <p>This programme is a variant on the Resilience programme with some changes to better address corridor efficiency and safety. The investment includes offline investment in one key areas; The Brynderwyns with online intervention on the remainder of the corridor.</p> <p>A number of operational enhancements for safety purposes are also proposed, including a license assistance programme.</p> <p>Dependencies : None</p>			
Estimated total public sector funding requirement:		Lower	Upper	
	Capital cost (\$m):	\$821 million	\$1,313 million	
	Present value of cost to govt. (\$m):	\$517 million	\$827 million	
Estimated BCR range:		0.8	0.5	
Timing of need:	Optimal programme:		Likely:	
IAF profile:	Strategic fit:	H/M/L	Effectiveness: H/M/L	Efficiency: H/M/L

MULTI CRITERIA ASSESSMENT – PROGRAMME 8

Criterion	Score	Discussion
Objective 1: Resilience	+++	This option provides significant improvements to the resilience through increased safety performance and provision of offline solutions (resilience this capacity provides for vehicles moving past incidents). The programme scores a +++ rating.
Objective 2: Safety	++	The option performs strongly from a safety perspective. It is considered that the medium rating is achieved most sections, but does not treat all sections on the corridor giving a strong ++ score.
Objective 3: 90km/h	++	This option provides improved capacity and therefore speed focused on sections which operate poorly presently giving a programme that results in a 90km/hr average speed environment, giving it a ++ score.
Feasibility:	-	<p>This option scored a – overall. This was largely due to a combination of adverse impacts, ranging from 0 to ---. This implies there are considerable implementation risks, however these are manageable.</p> <p>The programme was considered straightforward to implement, being well understood. No innovative technologies are proposed and some hazards were considered associated with the programme.</p> <p>The programme is off line over large sections so there will be property impacts. No significant 'other' infrastructure is impacted.</p> <p>Considerable consenting risk is likely for the offline upgrades especially in areas such as the Brynderwyns.</p> <p>No substantive change in maintenance is envisaged, although additional infrastructure will be developed and wire rope sections increase maintainance costs over some sections.</p>
Affordability:	-	<p>This programme scored a – overall. This was largely due to a combination of adverse impacts, ranging from 0 to -. This implies there are some affordability risks.</p> <p>Given the likely economic efficiency of this programme, this programme will require a small portion of alternative funding.</p> <p>Operating costs are not likely to be a risk for this programme, with fairly standard options proposed.</p>
Public / Stakeholders:	+	The programmes have not been made public and it has been assessed that there will be a largely positive reaction to the programme from stakeholders due to the increase in capacity resilience.
Safety:	++	The programme will improve safety, meeting the medium rating target set in the investment objectives. The benefits will largely relate to motor vehicles and not all modes.

Economy:	++	<p>This option will enable the forecast traffic forecasts to be met. Journey times will increase and travel time reliability is assessed to be improved. This programme is offline over some sections but most of the townships along the route remain online.</p> <p>The freight supply chain will be improved as significant changes in grade and congestion points are targeted with this programme.</p> <p>The programme has been assessed as providing an improvement to access along the corridor in regards to assisting in the development of adjacent land use. This programme would be largely consistent with the ONRC for the route.</p>
Environmental and social:	-	<p>There would be some potential impact of the offline roading options on sites of significance to Māori and heritage sites, particularly in the area south of Whangarei and in the Brynderwyns.</p> <p>Similarly, the offline options are likely to have some impact on ecology, as well as freshwater and marine systems.</p> <p>Greater visual and landscape impacts around the Brynderwyns including on outstanding landscapes.</p> <p>The bypassing of selected communities along State Highway 1, including Wellsford and Te Hana, would improve the amenity of these settlements and local connectivity and cohesion (for example, it would improve cycling and walking). Although there would be an economic impact on activities dependent on passing traffic.</p> <p>Much greater land take and impact on land use required.</p>
Environmental opportunities		<p>Offline options would present opportunities for environmental mitigation, particularly to offset potential impacts on the Brynderwyns.</p> <p>They would also present opportunities for enhancing other modes of transport, either through an integrated approach to multimodal design of bypasses and/or for local roads and connections when State Highway traffic is removed.</p> <p>Opportunities for town centre/main street improvements for towns which are bypassed.</p>
Social opportunities		<p>This programme provides for the opportunity to make something of the improved access to towns along the route through an increased performance of SH1.</p> <p>The social improvement aspects of the programme (driver licensing) provides an opportunity for greater community benefit,</p>
Rationale for selection or rejection of alternative:		<p>This option ranked 5th of the 10 programmes that have been developed.</p>

PROPOSAL DETAILS			
Business case name:	SH1 – Auckland to Whangarei	Name of Project Manager & Region:	Jim Sephton, Auckland
Business case purpose:	To develop a programme of works to strengthen the transportation links between Northland and Auckland, as a gateway to the international airport, port and remaining markets in New Zealand. A 30 year time horizon for this programme has been identified.		
Programme 9 – Stakeholder developed programme			
Alternative description:	<p>This programme provides a suite of operational and physical interventions to meet all three of the investment objectives in a balanced and economically efficient manner.</p> <p>This programme is a variant on the Resilience programme with some changes to better address corridor efficiency and safety. The investment includes offline investment in two key areas; The Brynderwyns and Whangarei South to Oakleigh, with online intervention on the remainder of the corridor.</p> <p>The programme includes upgrades to detour routes to enhance resilience and also provides township improvements in Kaiwaka, as well as truck stops and rest areas to address fatigue related crashes.</p> <p>A number of operational enhancements for safety purposes are also proposed, including a license assistance programme.</p> <p>Dependencies : None</p>		
Estimated total public sector funding requirement:		Lower	Upper
	Capital cost (\$m):	\$848 million	\$1,348 million
	Present value of cost to govt. (\$m):	\$534 million	\$874 million
Estimated BCR range:		1.0	0.6
Timing of need:	Optimal programme:		Likely:
IAF profile:	Strategic fit: H/M/L	Effectiveness: H/M/L	Efficiency: H/M/L

MULTI CRITERIA ASSESSMENT – PROGRAMME 9

Criterion	Score	Discussion
Objective 1: Resilience	+++	This programme improves resilience through increased safety performance and provision of 2+2 and offline solutions. Divided carriageways means that contra flow arrangements can be implemented during incidents. Offline options provide an alternative route in the event of a closure on the mainline. The programme scores +++ rating.
Objective 2: Safety	++	The programme performs strongly from a safety perspective. It is considered that the medium rating is achieved most sections, but does not treat all sections on the corridor giving a strong ++ score.
Objective 3: 90km/h	++	This programme increases capacity and therefore speed, focused on sections that operate poorly presently giving a programme that results in a 90km/h average speed environment, giving it a ++ score.
Feasibility:	-	<p>This option scored a - overall. This was largely due to a combination of adverse impacts, ranging from 0 to ---. This implies there are some implementation risks, however these are manageable.</p> <p>The programme was considered straightforward to implement, being well understood. No innovative technologies are proposed and some hazards were considered associated with the programme.</p> <p>The programme is two offline alignments are proposed and it is expected that there will be risks associated with property acquisition. The Whangarei urban four-lane section will affect a number of properties adjacent to the road. This will need to be sensitively addressed. No significant 'other' infrastructure is impacted.</p> <p>Consenting risk is likely for the offline upgrades especially in the Brynderwyns.</p> <p>No substantive change in maintenance is envisaged, although additional infrastructure will be developed and wire rope sections increase maintenance costs over some sections.</p>
Affordability:	0	<p>This programme scored 0 overall. This implies the programme provides a balance of costs and benefits. Given the likely economic efficiency of this programme, the majority of projects within the programme will meet RLTP funding thresholds.</p> <p>Operating costs are not likely to be a risk for this programme, with fairly standard options proposed.</p>
Public / Stakeholders:	+	The programmes have not been made public and it has been assessed that there will be a largely positive reaction to the programme from stakeholders due to the increase in capacity resilience.

Safety:	++	The programme will improve safety, meeting the medium rating target set in the investment objectives. The benefits will largely relate to motor vehicles and not all modes.
Economy:	++	<p>This programme will enable the forecast traffic forecasts to be met. Journey times will increase and travel time reliability is assessed to be improved. This programme is offline over some sections but most of the townships along the route remain online.</p> <p>The freight supply chain will be improved as significant changes in grade and congestion points are targeted with this programme.</p> <p>The programme has been assessed as providing an improvement to access along the corridor in regards to assisting in the development of adjacent land use. This programme would be largely consistent with the ONRC for the route.</p>
Environmental and social:	-	<p>There would be some potential impact of the offline roading options on sites of significance to Māori and heritage sites, particularly in the area south of Whangarei and in the Brynderwyns.</p> <p>Similarly, the offline options are likely to have some impact on ecology, as well as freshwater and marine systems.</p> <p>Greater visual and landscape impacts around the Brynderwyns including on outstanding landscapes.</p> <p>Bypassing communities along Sh1, including Wellsford and Te Hana, would improve the amenity of these settlements and local connectivity and cohesion (for example, it would improve cycling and walking). Although there may be an economic disbenefit for activities dependent on passing traffic.</p>
Environmental opportunities		<p>Offline options present opportunities for environmental mitigation, particularly to offset potential impacts on the Brynderwyns.</p> <p>The programme presents opportunities for enhancing other modes of transport, either through an integrated approach to multimodal design of bypasses and/or for local roads and connections when State Highway traffic is removed.</p> <p>Opportunities to enhance the amenity of towns that are bypassed.</p>
Social opportunities		<p>This programme provides the opportunity to improve access to towns along the route through an increased performance of SH1.</p> <p>The social improvement aspects of the programme (driver licensing) provides an opportunity for greater community benefit,</p>
Rationale for selection or rejection of alternative:		This option ranked 4 th of the 10 programmes that have been developed. The Programme is also the best performing option from an economic efficiency perspective.

PROPOSAL DETAILS				
Business case name:	SH1 – Auckland to Whangarei	Name of Project Manager & Region:	Jim Sephton, Auckland	
Business case purpose:	To develop a programme of works to strengthen the transportation links between Northland and Auckland, as a gateway to the international airport, port and remaining markets in New Zealand. A 30 year time horizon for this programme has been identified.			
Programme 10 – Stakeholder developed programme				
Alternative description:	<p>This programme provides a four-lane expressway standard corridor between Puhoi and north of the Brynderwyns and between Oakleigh and Whangarei. A section of 2+1 online improvement is provided between the Brynderwyns and Oakleigh.</p> <p>This programme delivers a very high standard intervention along the majority of the corridor as well as a suite of operational interventions to meet all three of the investment objectives.</p> <p>This programme is a variant of the economic efficiency programme with some changes to better fit the solution to the problems and address corridor reliability and safety.</p> <p>A number of operational enhancements for safety purposes are also proposed, including a driver license assistance programme.</p> <p>Dependencies : None</p>			
Estimated total public sector funding requirement:		Lower	Upper	
	Estimated cost (\$m):	\$1,723 million	\$2,454 million	
	Present value of cost to govt. (\$m):	\$1,085 million	\$1,546 million	
Estimated BCR range:	0.5		0.4	
Timing of need:	Optimal programme:		Likely:	
IAF profile:	Strategic fit:	H/M/L	Effectiveness: H /M/L	Efficiency: H/M/L

MULTI CRITERIA ASSESSMENT – PROGRAMME 10

Criterion	Score	Discussion
Objective 1: Resilience	+++	This option provides significant improvements to the resilience through increased safety performance, and the additional capacity provided (and the resilience this capacity provides for vehicles moving past incidents) giving a +++ rating
Objective 2: Safety	+++	The option performs strongly from a safety perspective. It is considered that the medium rating is achieved on all sections giving a strong +++ score
Objective 3: 90km/h	+++	This option provides improved capacity and therefore speed focused on sections that operate poorly presently giving a programme that results in a 90km/hr average speed environment, giving it a +++ score
Feasibility:	-	<p>This option scored a - overall. This was largely due to a combination of adverse impacts, ranging from 0 to ---. This implies there are considerable implementation risks, however these are manageable.</p> <p>The programme was considered straightforward to implement, being well understood. No innovative technologies are proposed although some hazards are associated with the programme.</p> <p>The programme is off line over large section so there will be property impacts. No significant 'other' infrastructure is impacted.</p> <p>Considerable consenting risk is likely for the off line upgrades especially in areas such as the Brynderwyns and between Te Hana and Kaiwaka.</p> <p>No substantive change in maintenance is envisaged, although additional infrastructure will be developed and wire rope sections increase maintainance costs over some sections.</p>
Affordability:	-	<p>This programme scored a - overall. This was largely due to a combination of adverse impacts, ranging from 0 to --. This implies there are some affordability risks.</p> <p>Given the likely economic efficiency of this programme, this programme does not meet the minimum requirements for funding from the NLTF and will therefore require alternative funding.</p> <p>Operating costs are not likely to be a risk for this programme, with fairly standard options proposed.</p>
Public / Stakeholders:	+	The programmes have not been made public and it has been assessed that there will be a largely positive reaction to the programme from stakeholders due to the increase in capacity resilience.

Safety:	++	The programme will improve safety, meeting the medium rating target set in the investment objectives. The benefits will largely relate to motor vehicles and not all modes.
Economy:	++	<p>This option will enable the forecast traffic forecasts to be met. Journey times will increase and travel time reliability will improve. This programme is offline over most of the corridor providing benefits to through traffic but a reduction to passing trade within the towns.</p> <p>The freight supply chain will be improved as significant changes in grade and congestion points are targeted with this programme.</p> <p>The programme has been assessed as providing an improvement to access along the corridor in regards to assisting in the development of adjacent land use. This programme would be largely consistent with the ONRC for the route.</p>
Environmental and social:	-	<p>There would be some potential impact of the offline roading options on sites of significance to Māori and heritage sites, particularly in the area south of Whangarei and in the Brynderwyns.</p> <p>Similarly, the offline options are likely to have some impact on ecology, as well as freshwater and marine systems.</p> <p>Greater visual and landscape impacts around the Brynderwyns including on outstanding landscapes.</p> <p>The bypassing of selected communities along State Highway 1, including Wellsford, Te Hana, Kaiwaka, would improve the amenity of these settlements and local connectivity and cohesion (for example, it would improve cycling and walking). Although there would an economic impact on activities dependent on passing traffic.</p> <p>Some additional noise and impact on amenity values to areas close to the offline options.</p> <p>The offline options would improve resilience to natural hazards, particularly flooding south of Whangarei.</p> <p>Much greater land take and impact on land use required.</p>

<p>Environmental opportunities</p>	<p>Offline options would present opportunities for environmental mitigation, particularly to offset potential impacts on the Brynderwyns.</p> <p>They would also present opportunities for enhancing other modes of transport, either through an integrated approach to multimodal design of bypasses and/or for local roads and connections when State Highway traffic is removed.</p> <p>Opportunities for land development on the old State Highway in the case of an offline alignment in the south of Whangarei.</p> <p>Opportunities for town centre/main street improvements for towns which are bypassed.</p>
<p>Social opportunities</p>	<p>This programme provides for the opportunity to make something of the improved access to towns along the route through an increased performance of SH1.</p> <p>The social improvement aspects of the programme (driver licensing) provides an opportunity for greater community benefit</p>
<p>Rationale for selection or rejection of alternative:</p>	<p>This option ranked 2nd of the 10 programmes which have been developed.</p>

APPENDIX I – IMPLEMENTATION PLAN

Section	Investigation	Implementation	Lead	Support
Inland Freight Route	DBC 2017 – Determine scope and scale of upgrades to the route	2019 – Construction of upgrade completed	Transport Agency	WRC, WDC
Whangarei urban	IBC-DBC 2018/19 – Determine best option for multi-modal solution (SH14 to Toetoe)	2020/2021 – Construction of upgrade completed	Transport Agency	WRC, WDC
Toetoe to Oakleigh	IBC-DBC 2017/18 – Determine best option, including online consideration	2019/2020 – Construction of upgrade completed	Transport Agency	WRC, WDC
Oakleigh to SH15 (including SH15/1 intersection)	IBC-DBC 2018/19 – Undertaken with Toetoe to Oakleigh for best combined solution to SH15	2022/2024 – Construction of upgrade completed (intersection as required)	Transport Agency	WRC, WDC
SH15 to Brynderwyn Hills	DBC 2024/25	2026/2027 – Construction of upgrade completed	Transport Agency	KDC, WDC
Brynderwyn Hills	IBC-DBC 2018/19 – Determine most appropriate bypass option	2024/2026 – Construction of upgrade completed	Transport Agency	KDC
Brynderwyn Hills to Te Hana – SH1 Alignment	IBC-DBC 2023/24	2025/2026 – Construction of upgrade completed	Transport Agency	KDC, AT
Brynderwyn Hills to Te Hana – Kaiwaka town centre	IBC-DBC 2018/19	2020 – Construction upgrade completed	Transport Agency	KDC
Brynderwyn Hills to Te Hana – Detour routes	IBC-DBC 2017/18	2019/20 – Construction upgrade completed	Transport Agency	KDC, AT
Te Hana to Warkworth RONS	DBC 2017/18 – Route protection for preferred option	As per current implementation plans for RoNS	Transport Agency	AT, AC
Te Hana to Warkworth Dome Safety	DBC 2017 – Preferred option identification	2018 – Construction of upgrade completed	Transport Agency	AT

Section	Investigation	Implementation	Lead	Support
Warkworth to Puhoi Park and Ride	IBC-DBC 2019/20	2021 – Complete for opening of PPP	Transport Agency	AT, AC
Driver education and enforcement <ul style="list-style-type: none"> • Licence assistance • Alcohol education programme • Courtesy shuttles • Increased police enforcement 	BC - 2017/18	2019 – Complete and operational	Police	Transport Agency, WDC, AT, KDC
Wayfinding <ul style="list-style-type: none"> • Tourist signage • Travel time signage • VMS detour advance warning 	BC - 2017/18	2019 – Complete and operational	Transport Agency	AT, AC, AMA, KDC, WDC, NRC, WRC