

# Programme Business Case

East West Link



20 March 2014

## Approval

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DATE: 20 MARCH 2014	DATE:	DATE:	DATE:

### Revision Status\*

REVISION NUMBER:	IMPLEMENTATION DATE:	SUMMARY OF REVISION
1	20 March 2014	Draft Issued to P&I

Delete Revision Status Table on production of final version

### Template Status

REVISION NUMBER:	IMPLEMENTATION DATE:	SUMMARY OF REVISION

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## Supporting Documents

1. Strategic Case – Multi Modal East West Solution, March 2013 – Auckland Transport, Council and NZTA
2. An Economic Assessment of the East West Link Study Area, 25 October 2013 –Ascari, Berl, Richard paling Consulting.
3. East West Link Transport Options Report, March 2014 – Auckland Transport and NZTA
4. East West Link: IBD Workshop Outcomes Report; December 2013 – Urbanism+
5. East West Link: Post IBD Workshop Traffic Modelling and Economic Evaluation Report, 17 March 2014 - Beca

## Glossary of Terms

AC	Auckland Council
AMA	Auckland Motorway Alliance
AMETI	Auckland Manukau Eastern Transport Initiative
AP	Auckland Plan
AT	Auckland Transport
CBD	Central Business District
CCO	Council Controlled Organisation
EMA	Employers and Manufacturers Association
FTN	Frequent Transit Network
GDP	Gross Domestic Product
GPS	Government's Policy Statement on Land Transport Funding 2012/13–2021/22 July 2011
HCV	Heavy Commercial Vehicles
IBD	Investigation by Design
IRS	Investment Revenue Strategy
IEG	Implementation Executive Group
ITP	Integrated Transport Programme (Draft)
JTOC	Joint Transport Operations Centre
KPI	Key Performance Indicator
LB	Local Board
LTMA	Land Transport Management Act
LTP	Long Term Plan
MMEWS	Multi Modal East West Solution
NRC	National Road Carriers
NZTA	New Zealand Transport Agency
NZTS	New Zealand Transport Strategy
OBL	Onehunga Branch Line
PBC	Programme Business Case
PT	Public Transport
RLTP	Regional Land Transport Programme
RLTS	Regional Land Transport Strategy
RTN	Rapid Transit Network
SH(#)	State Highway (#)
SMART	South Western Multimodal Airport Transit project
TEU	Twenty-Foot Equivalent Unit
Vpd	Vehicles per day



## Executive Summary

The EWL is a project identified in the Auckland Plan. The Auckland Plan has included directive 13.5 which states: “Jointly progress planning for AMETI and the East-West Link and implementation by 2021.”

Figure 1 below illustrates the AMETI project area as well as the project area covered by the EWL.

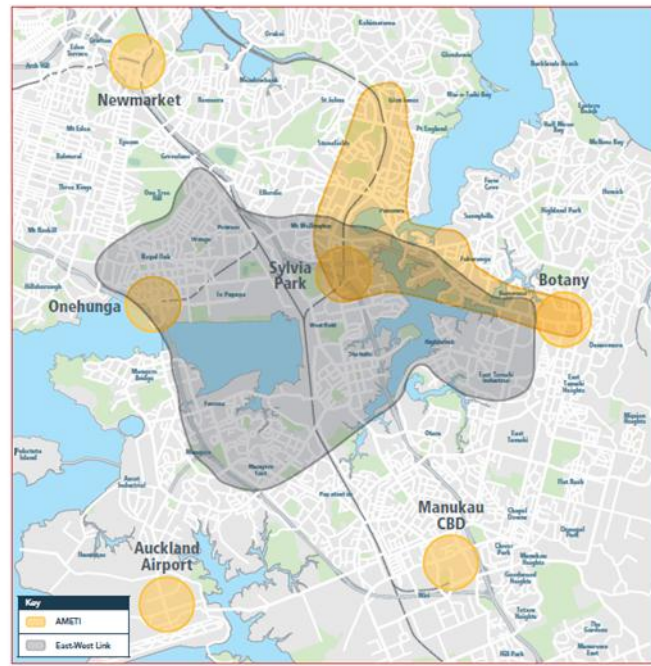


Figure 1: AMETI and East West Link Project areas

This directive flows through to the Integrated Transport Programme V1 (ITP) and the project is identified as part of the transport programme to deliver the Auckland Plan.

Together with AMETI it is identified as the second highest priority for transport infrastructure investment in the region. This business case argues for an infrastructure investment programme that focuses on providing efficient freight movements between SH20 and SH1, and between industrial areas and the port and airport.

The Prime Minister outlined in his speech on 28 June 2013 the Government’s intent to accelerate various transport projects within Auckland. The EWL was included in that list.

The overarching objective for the EWL is to enhance the multi-modal access and connectivity in the geographical area between the SH1 and SH20 corridors in the general vicinity of the Mangere Inlet.

The high level project objectives are to:

- Support industrial land use within Auckland’s industrial belt by improving inter-regional and intra-regional freight travel times and reliability.
- Support industrial land use within Auckland’s industrial belt by improving the productivity of industrial and business land.
- Improve the resilience of Auckland’s strategic transport network.
- Increase the accessibility function of Neilson-Church corridor.

- Improve the development of liveable communities by providing safer and better access and also improve the quality of multi-modal transport choices for people to areas where commercial and employment activity is to be encouraged/supported.

A Strategic Case was developed during March 2013 between NZ Transport Agency, Auckland Transport (AT), and Auckland Council. The Strategic Case confirms that there is a case for investment, which needs to be further analysed and assessed in terms of scale and significance through a Programme Business Case. The Strategic Case has been reviewed and endorsed by senior management from NZTA, AT, and Council.

## Problem Identification

In order to gain a better understanding of the nature and scale of transport problems currently experienced in the area, a facilitated Investment Logic Mapping (ILM) workshop was held on 8 November 2012. The workshop included representation from senior management from NZTA, AT and Council and several key stakeholders, including Port of Tauranga, KiwiRail, and National Road Carriers. The stakeholder panel identified and agreed the following key problems:

- Problem One: Inefficient transport connections increase travel times and constrain the productive potential of Auckland and the upper north island (45%).
- Problem Two: A lack of response to changes in industry's supply chain strategies contributes to greater network congestion, unpredictable travel times and increased costs (30%).
- Problem Three: The quality of transport choices is inadequate and hinders the development of liveable communities (25%).

## Benefits

The benefits sought to be realised through successfully investing to address the identified problems are as follows:

- Benefit One: Greater business connectivity (25%)
- Benefit Two: Greater economic throughput in and out of the area (20%)
- Benefit Three: Greater control over congestion (20%)
- Benefit Four: More predictable travel times and lower average travel times (15%)
- Benefit Five: Improved safety (10%)
- Benefit Six: Improved accessibility (10%)

## Issues and options

The EWL economic study area extends from Onehunga and the Airport to Highbrook and East Tamaki. The area forms the main industrial, transport and distribution location within Auckland and is also significant in an Upper North Island context.

### *Major manufacturing hub*

The area is a major manufacturing hub containing almost 40 per cent of Auckland's manufacturing employment. While employment in this sector has fallen from 2001, the decline has been much smaller in this area than for the Region as a whole.

The area's economic structure is also evolving, becoming more service oriented in parts, where an employment profile more reflective of the region in general is emerging. While the continuing trend is that the economy of the EWL area may to some extent transform from manufacturing to business services, the Proposed Auckland Unitary Plan has made a concerted effort through its zoning and planning provisions to protect this area for industries such as manufacturing and distribution and prohibit any further business service activities (via non-complying activity status).

### *Transport patterns*

A survey of firms carried out as part of this study highlighted a number of advantages of the EWL area which may influence future patterns of development and consequentially transport patterns. The main benefits were seen to be its central location in relation to the main industrial areas of the City, proximity to customers and suppliers, proximity to good transport links and the availability of



greenfield development sites in East Tamaki and around the airport. As the number of businesses within this area has grown, the comparative advantages of the EWL study area have increased and the linkages between businesses, and their suppliers and customers have grown in importance.

#### *Road/rail interface*

The area provides the most important interface between road and rail freight in Auckland. It contains the MetroPort inland port serving the Port of Tauranga, the adjacent Southdown KiwiRail and Toll Freight terminal and is increasingly acting as a rail served inland port. In addition to these intermodal activities, the area accommodates a large number of other major distribution and logistics facilities serving the Auckland region. They have located here to take advantage of proximity to key markets and suppliers and the access to the strategic road network. Supporting these activities and the supply chains that they underpin is important to the economic prosperity of the region and the potential for future growth.

#### *Congestion issues*

There are significant congestion problems at both the eastern and western ends of the Neilson - Church Street corridor, particularly on the approaches to SH1 and SH20. Travel time variability is a problem throughout much of the day for eastbound traffic and in the later part of the day for westbound movements.

This problem is compounded for traffic travelling to and from SH1 south due to a convoluted route and a number of traffic signals.

The high traffic flows on Neilson Street make turning movements across the corridor difficult and create delays for traffic flows in and out of major access points, like MetroPort.

The growth in many of these operations has compounded the problem. For example, MetroPort opened in 1999 and by 2012 generated 2,000-2,500 heavy vehicle trips per day and around 200,000 TEU movements per year. Network development has not kept pace with land use changes like this and this is now leading to less efficient supply chains.

The SH20-SH1 was generally perceived to be the more reliable choice. However, traffic surveys identified the SH1/SH20 connection at Manukau as a pinch point in the network which is often congested in the afternoon peak. Around 65 percent of heavy vehicles travelling between SH20 and SH1 turned north at this junction. In its current configuration this is an inefficient connection for traffic (including the 35 percent of heavy vehicles) wishing to head from SH20 to SH1 southbound. The interchange experience congestion (especially during the afternoon peak). Travel times can slow down to 7 km/h and travel time variability of 20 minutes within the same peak was recorded.

#### *Planned growth*

These transport pressures are likely to grow due to economic expansion in the area. Employment growth will likely lead to an increase in the number of car based commuters, as the area has a high proportion of industries with low employment density and a reliance on shift work.

Economic growth is also likely to generate an increase in transport demand as the volume of inputs and outputs increases. It may also result in more transport operators considering the East Tamaki, Airport and Mangere Bridge areas as an attractive business location.

Increasing distribution activity will be a function of both economic and population growth within the region. This will be particularly significant around the Airport, in East Tamaki and on the connections between them. It will also lead to greater movements of heavy vehicles through the area. In addition, transport and distribution companies are employing more hub and spoke operations with shuttle vehicles, to work around increased congestion. The growth in transport and distribution is expected to offset any effects of a decline in manufacturing.

### **Recommended programme for investment**

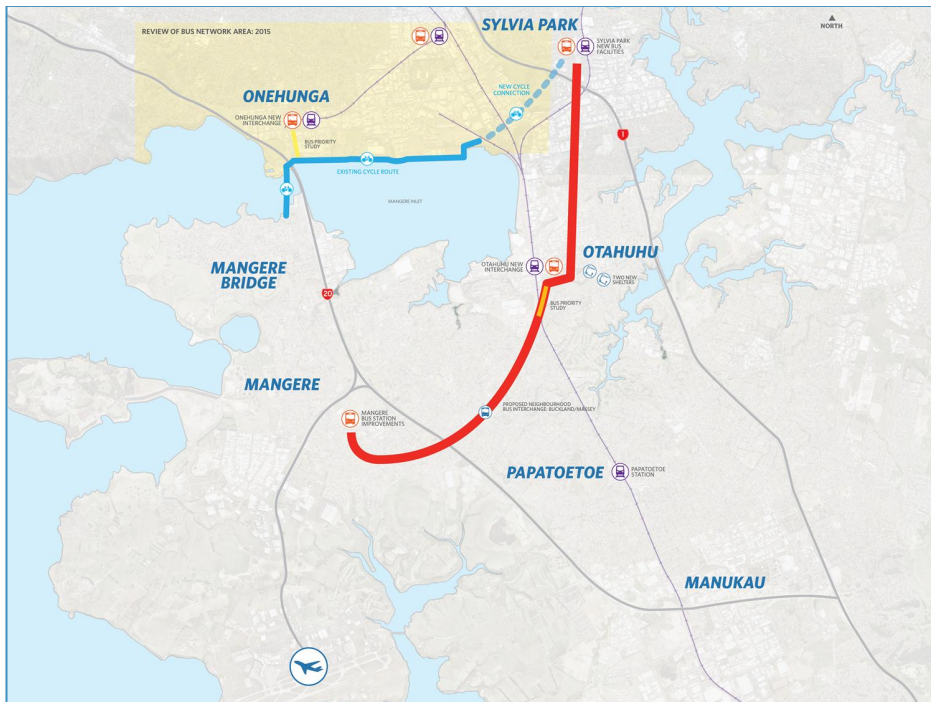
The option development process was both iterative and comprehensive. It was grounded on an understanding of the problems, benefits and investment objectives identified by the ILM process and the subsequent collation of evidence. The option development was completed through an 'Inquiry by Design' workshop process which gradually reduced a long list of potential options to a group of shortlisted programmes for the final evaluation phase.

Programme option 2, as described in this business case has been assessed as the preferred programme. Some elements within this programme provide a response to the immediate transport issues in the Onehunga/Penrose area. The recommended approach is therefore to progress those elements of the programme further to the indicative/detailed business case stage.

The nature and scale of the elements that respond to the immediate transport issues in the Onehunga/Penrose area are illustrated in the figure below.



The recommended approach also includes investment in public transport and walking and cycling improvements to address immediate issues. The PT improvements are focused on improving the Mangere to Sylvia Park FN corridor that forms part of Auckland Transport’s ‘New Network’. More frequent services are programmed to commence in 2015 along this route. The cycling investment focuses on completion of the cycle metro between Onehunga Bridge and Sylvia Park. These are illustrated in the diagram below.



Beyond the immediate response it has been identified that there is a need to support further transport investment in the East West study area. This is in response to the longer term issue of Auckland’s

anticipated growth and the likely impact on the transport network in the area. Further investigation will be required to determine the form, scale and timing of any future investment in the study area.

Auckland's freight supply chain is also dependent on the North Island Main Trunk (NIMT) rail line being triple tracked with a matter of urgency. Anticipated growth in rail-based freight movements between Ports of Auckland and their inland port in Wiri as well as into and out of the Southdown Rail Freight Terminal is likely to be constrained by the ability of the rail network to accommodate the increased movements.

The rail corridor between Wiri and Southdown is currently coming under increasing pressure, which will only be further exacerbated by the demand for increased rail based freight movements and increased frequency of passenger train movements on the same network. A separate business case (by the appropriate entity) will be required to justify investment in a third rail line on the NIMT to maintain the efficiency of the freight supply chain.

## Financial impact

The indicative cost range for the entire programme (Programme Option 2) amounts to \$935m - \$1,127m. The elements of the accelerated programme to progress to indicative/detailed business case stage amounts to \$590m - \$709m.

It is expected that on an accelerated programme, delivery of improvements to the north of Mangere Inlet would cost approximately \$552m - \$662m, with completion by 2019/20.

The proposed Southdown Link to SH1 could be delivered by either NZTA or AT. It is recommended that this link be declared a new state highway for the following reasons:

- The link meets the appropriate criteria for declaring new state highways; and
- Delivery of this link by NZTA reduces the risk of delayed delivery and allows for a better outcome to be developed in coordination with AT.

The elements within this package are illustrated in the table below (cost ranges are based on P50 to P95 estimates).

Item	Programme Element	State Highway Cost range (\$M)	Local Road Cost range (\$M)	Cumulative
<b>Freight Improvement package north of Mangere Inlet (accelerated package)</b>				
1	SH20 Improvements Gloucester Park Interchange to Queenstown Rd	44 - 53		44 - 53
2	Onehunga Mall intersection improvement		31 - 37	75 - 90
3	SH1 Mt Wellington I/C access Improvements	169 - 203	-	244 - 293
4	Southdown Link to SH1	247 - 296*		491 - 589
5	Neilson St upgrade	-	34 - 41	525 - 630
7	New local roads south of Neilson Street		27 - 32	552 - 662

The recommended approach to align investment to support the new network in the south (the Mangere Town Centre - Otahuhu - Sylvia Park route) would cost approximately \$40m - \$47m, with completion by 2016/17.

The elements within this package are illustrated in the table below (cost ranges are based on P50 to P95 estimates).

Item	Programme Element	State Highway Cost range (\$M)	Local Road Cost range (\$M)	Cumulative
<b>PT and active mode improvement package (short term)</b>				
8	Otahuhu Bus/Rail Interchange		22 - 26	22-26
9	Mangere T/C to Sylvia Park FN upgrade		18 -21	40-47

The expected implementation programme for the entire Programme Option 2 (accelerated and longer term) are illustrated in the diagram below.

	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25
<b>Freight Improvements</b>											
SH20 Improvements Gloucester Park Interchange to Queenstown Rd											
Onehunga Mall Intersection improvement											
SH1 M Wellington TC access Improvements											
Southdown Link to SH1											
Nelson St upgrade											
New local roads south of Nelson Street											
Highbrook Dr Improvements											
Third freight main											
<b>Public Transport Improvements</b>											
- Otahuhu Bus Rail Interchange											
- Mangere - Sylvia Park FN Improvements (key bottlenecks)											
- Mangere - Sylvia Park FN Improvements (remainder of corridor)											
- Mangere to Onehunga FN Improvements											
- Onehunga to Sylvia Park FN Improvements											
Walking and Cycling components											
DBC = Detailed Business Case											
PI = Pre-Implementation (Detailed Design, Consents and Property)											
I = Implementation (Construction)											

## Economic Benefits

The economic analysis is described in full in the accompanying traffic modelling and economic analysis report. The evaluation was developed based on the high level cost estimates and transport benefits and transport benefits were derived through a high level traffic model with 2026 and 2041 horizons. Agglomeration benefits were also assessed as 36% of transport benefits.

The provisional modelling and economic analysis indicate a BCR of 2.1 for the entire programme option 2.

# PART A – THE STRATEGIC CASE

## 1 Introduction

The AWL is a balanced, multi-modal transport programme including road, rail, bus, walking and cycling investments, planned for the area of Auckland between Penrose, Onehunga, the Airport and East Tamaki.

A Strategic Case was approved during 2013 following the development of an Investment Logic Map that articulates the problems and benefits.

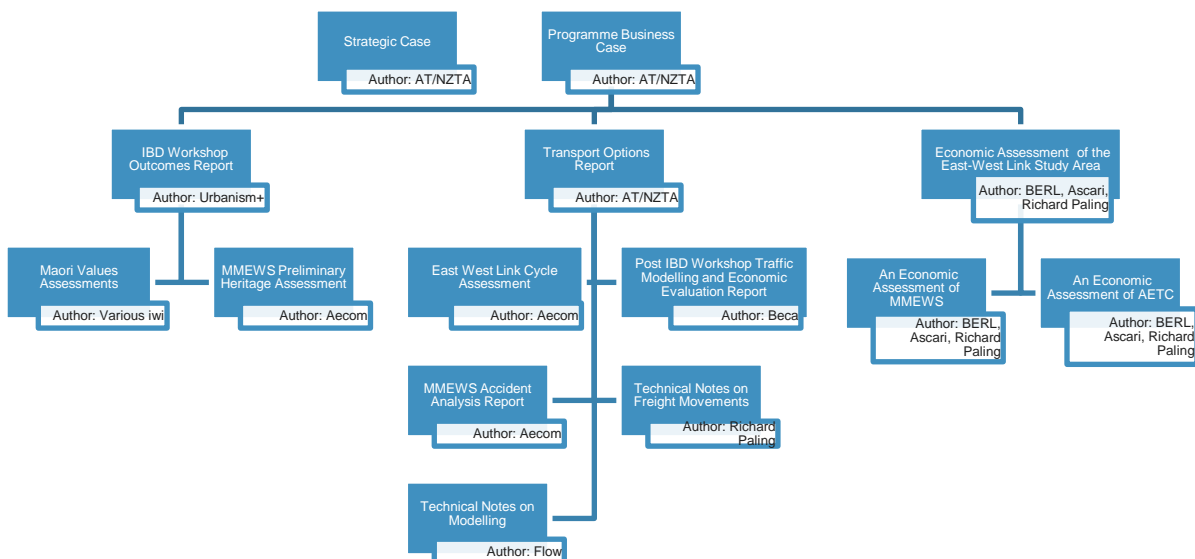
Part A of this business case briefly revisits the strategic case following extensive evidence collection and analysis to support the programme development.

Part B discusses the development of the EWL programme, the recommended programme and its financial case.

This programme business case is supported by the following key documents:

- Strategic Case – Multi Modal East West Solution, March 2013 – Auckland Transport, Council and NZTA
- An Economic Assessment of the East West Link Study Area, 25 October 2013 –Ascari, Berl, Richard paling Consulting.
- East West Link Transport Options Report, March 2014 – Auckland Transport and NZTA
- East West Link: IBD Workshop Outcomes Report; December 2013 – Urbanism+
- East West Link: Post IBD Workshop Traffic Modelling and Economic Evaluation Report, March 2014 - Beca

Their relationship with the business case and each other is illustrated in the diagram below:



## 2 Partners and Key Stakeholders

Auckland Transport and NZTA are the primary partners in the development of the EWL. Auckland Council also participated in the development of the programme.

### 2.1 Project Partners

Auckland Transport and NZTA are jointly leading the development of the EWL study and as such are primary partners in this endeavour.

#### *Auckland Transport*

Auckland Transport is responsible for all of the region's transport services (excluding state highways) - from roads and footpaths, to cycling, parking and public transport. Its main tasks are:

- To design, build and maintain Auckland's roads, ferry wharves, cycle ways and walkways.
- Co-ordinate road safety and community transport initiatives such as school travel
- Plan and fund bus, train and ferry services across Auckland.

The principal function of Auckland Transport is to give effect to the Auckland Plan and Auckland Transport is funded to undertake this role by the Auckland Council and NZTA.

#### *NZ Transport Agency.*

The NZ Transport Agency has the following relevant responsibilities assigned to it through the Land Transport Management Act 2003 (amended 2008):

- Contribute to an effective, efficient and safe land transport system in the public interest;
- Manage the state highway system, including planning, funding, design, supervision, construction and maintenance operation; and,
- Manage funding of the land transport system, including auditing the performance of organisations receiving land transport funding.

NZTA undertakes these responsibilities through the core business functions of:

- Planning the land transport networks;
- Investing in land transport;
- Managing the state highway network; and
- Providing access to and use of the land transport system.

### 2.2 Key Stakeholders

#### *Auckland Council*

The Auckland Council is a territorial authority for Auckland and has, in relation to Auckland, the responsibilities, duties, and powers of a regional council.

The Auckland Council has a shared vision - to be the world's most liveable city. The Auckland Plan (adopted in March 2011) will guide Auckland's future over the next 30 years on issues such as:

- transport and housing shortages
- giving children and young people a better start
- creating more jobs
- protecting the environment.

A number of key stakeholders external to AT, NZTA and Council also have influence on the project outcomes. These organisations and their anticipated role and interest in the project are summarised below:

**Local Boards (Howick, Maungakiekie-Tamaki, Mangere-Otahuhu and Otara – Papatoetoe):** The Local Boards are part of Auckland Council and have been crucial in providing input into how any proposals and options may impact on the local communities directly affected by the EWL study.

**KiwiRail Group (KRG):** The current and future operations of Kiwirail's Southdown freight terminal play an important role in the finalisation of the preferred programme.

**Port of Auckland:** The Port of Auckland is a significant trip generator and a key property owner in the study area.

**Port of Tauranga:** Port of Tauranga is a key trip generator in the area as owners of the MetroPort inland port, which is centrally located in the study area.

**Auckland Business Forum:** The business community has identified the improvement of east west connectivity in the study area as one of their highest priority issues and their members made valuable contributions in understanding the nature and scale of the problem, and the potential benefits of investment in the area.

**National Road Carriers (NRC):** Like the Auckland Business Forum, the NRC has long advocated for improvements to the transport network in the EWL study area, including the provision of a new link between SH1 and SH20. The working knowledge of the day-to-day operation of the transport network, as understood through their collective membership of operators, was highly valuable in understanding the nature and scale of the transport problem, and the potential benefits of investment in the area.

**Mana whenua:** The investment programme requires new alignment options, and these could be located within areas of cultural and environmental importance to Mana Whenua (Iwi) (for example Manukau Harbour, Tamaki Basin and tupuna maunga-volcanic cones).

### 3 Strategic Assessment - Outlining the Need for Investment

It is vital for the region's economy that reliable and resilient transport infrastructure is in place to support the on-going growth and expansion of industry and related activities now and into the future.

#### 3.1 Defining the Problem

The EWL is located in a diverse area of Auckland with a very high level of industrial activity, a growing business services sector, significant areas of residential concentration and the international airport. The area has competing interests between industrial, commercial, air passenger and residential growth in an already developed area.

It is vital for the region's economy that reliable and resilient transport infrastructure is in place to support the on-going growth and expansion of industry and related activities now and into the future.

A facilitated Investment Logic Mapping workshop was held with key stakeholders on 8 November 2012 to gain a better understanding of the nature and scale of transport problems affecting the study area. The stakeholder panel<sup>1</sup> participated in workshops to identify and agreed the following three key problems.

<b>Problem 1</b>	Inefficient transport connections increase travel times and constrain the productive potential of Auckland and the upper north island (45%).
<b>Problem 2</b>	A lack of response to changes in industry's supply chain strategies contributes to greater network congestion, unpredictable travel times and increased costs (30%)
<b>Problem 3</b>	The quality of transport choices is inadequate and hinders the development of liveable communities (25%).

#### 3.2 The Benefits of Investment

The potential benefits that could be realised through successful investing to address the identified problems were also identified through a facilitated Benefit Mapping workshop held on 26 November 2012. The stakeholder panel identified and agreed the following potential benefits for the proposal, including the relative weighting in brackets which indicates the relative importance of fully realising the benefit:

<b>Problem 1</b>	Benefit 1: Greater business connectivity (25%).
	Benefit 2: Greater economic throughput in and out of the area (20%).
<b>Problem 2</b>	Benefit 3: Greater control over congestion (20%)
	Benefit 4: More predictable travel times and lower average travel times (15%).
<b>Problem 3</b>	Benefit 4: More predictable travel times and lower average travel times (15%)
	Benefit 5: Improved safety (10%)
	Benefit 6: Improved accessibility (10%).

<sup>1</sup> included senior management from NZTA, AT, Auckland Council as well as, KiwiRail, Port of Tauranga, Employers & Manufacturers Association



## 4 Strategic Context

The Auckland Plan identifies the EWL (in conjunction with AMETI) as one of the three priority projects for Auckland, and expresses a desire to have it implemented by 2021.

### 4.1 Organisational Outcomes, Impacts and Objectives

The Auckland Plan identifies the EWL (in conjunction with Auckland Manukau Eastern Transport Initiative - AMETI) as one of the three priority projects for Auckland, alongside the City Rail Link and the additional Waitemata Harbour Crossing.

The Auckland Plan describes the EWL area as having a critical gap in Auckland’s transport network. The Plan has indicated a need for greater efficiency of freight movements between the industrial areas within the Onehunga/Penrose area and the surrounding areas.

There are also concerns around the lack of adequate provision of public transport, walking and cycling facilities to enhance the liveability of the area.

### 4.2 Alignment to Existing Strategies/Organisational Goals

The EWL project aligns well with the strategies and goals of the project proponents (NZTA and AT). At its core it responds to the strategic direction of the Auckland Plan. This is reflected by the region ranking the project as its second highest priority.

The three tables below illustrate how the EWL programme aligns with strategic direction of the Auckland Plan, the GPS<sup>2</sup> and with local and regional plans including AT’s Integrated Transport Programme (V1) and Statement of Intent.

Objectives and wider strategic context in which AT/NZTA operate		The problem or business need that is causing AT/NZTA to consider a new investment	
Strategic document	Targets / directives /impacts and priorities		
Road network improvements	Auckland Plan	Reduce congestion levels on the strategic freight network to at or below the average of 2006-2009 levels by 2021 (average daily speed of 45 km/h)	<p>The Onehunga Mall/ Gloucester Park interchange is currently a significant bottleneck on the strategic freight network.</p> <p>The traffic in the Onehunga / Penrose area has a very convoluted route to gain southbound access onto the southern motorway.</p> <p>East Tamaki has no direct route to connect this industrial area with the Airport / business area at the airport.</p> <p>The Southdown Freight terminal, located in this area, including Metroport is handling approximately 270,000 Twenty-foot Equivalent Unit (TEU), making it the third busiest freight terminal in New Zealand after Ports of Auckland and Port of Tauranga.</p> <p>The programme is therefore targeted at finding optimum investment requirements aimed at reducing the travel time and improving journey time reliability for freight in the study area to optimise the overall operation and utilisation of the freight supply chain both for movements into and out of the area and longer distance strategic movements.</p> <p>It targets improved connections to and from the inland port and freight terminal at both a local level (access onto Nelson Street) and a more strategic level.</p> <p>It also aims to improve east west connectivity through Auckland’s industrial belt (Onehunga/Penrose/Mt Wellington/East Tamaki), and improve connectivity between East Tamaki and the Auckland Airport.</p> <p>Unforeseen events on the state highway (especially crashes in peak hour) can significantly delay journey times for commuters and freight. Improving the linkages between SH20 and SH1 would strengthen the ability for SH20 and SG20 to support each as a network to accommodate unforeseen events.</p>
	Auckland Transport (AT) – Statement of Intent AT - Integrated Transport Plan	Transport network moves people and goods efficiently	
	Government’s Policy Statement on Transport.	Improvements in journey time reliability	
		Easing of severe congestion	
		More efficient freight supply chains	
		Better access to markets, employment and areas that contribute to economic growth	
	Onehunga Precinct Plan (Key Outcome by 2050)	A secure and resilient transport network	
		Work with NZTA to achieve an upgrade of the interchange to SH20.	
	Otauhu – Mangere Area Plan	Work with NZTA regarding a state highway connection between SH20 and SH1 to ensure positive outcome for Onehunga community.	
		Put in place transport initiatives to make the existing transport network and freight movements more effective, particularly on local arterial roads.	
East Tamaki Business Precinct Plan (Outcomes)	Provide a strategic ‘east-west’ dedicated road link for freight that links East Tamaki and southwestern motorway to the airport.		
	Connections are provided that promote business to business activities and land uses both within the precinct and beyond.		
	The efficient movement of both goods and people is facilitated.		

<sup>2</sup> Government Policy Statement on Land Transport Funding (2012/13 – 2021/22)

Objectives and wider strategic context in which AT/NZTA operate		The problem or business need that is causing AT/NZTA to consider a new investment	
Strategic document	Targets / directives /impacts and priorities		
Public Transport Improvements	Auckland Plan	Double public transport trips by 2022 and increase PT's share of trips into the CBD to 70% by 2041.	
	Auckland Transport (AT) – Statement of Intent AT - Integrated Transport Plan	Increase access to wider range of transport choices	
	Government's Policy Statement on Transport	More transport choices, particularly for those with limited access to a car	
	Onehunga Precinct Plan (Key Outcome by 2050)	Advocate to KiwiRail to designate land to protect future rail routes to the Airport and Avondale, including provision for double tracking.	These routes currently have a low level to non-existent infrastructure to support FTN type routes, and also have very limited facilities to support integration between the FTN and rail stations.
		Short term - Improve pedestrian facilities between existing Onehunga bus station and Onehunga Rail station. In long term – co-locate bus and rail interchange facilities.	Investment is required to ensure the reliability of bus travel times along these routes, as well as to enhance the attractiveness and ease of use. For example, congestion at the Gloucester Park interchange provide a reliability issues to bus schedules whilst a large number of bus stops on these routes have no bus shelters or seating.
		Provide an appropriate park and ride facility for passenger transport users	Integration between bus and rail is also difficult due to placement of bus stops relative to rail stations, and the quality / type of infrastructure to support transfers between these modes.
	Onehunga Precinct Plan (Key Outcome by 2050)	Provide a new rail network link from Onehunga to the Airport	The SMART project is also considering the expansion of RTN services from the airport to Onehunga, and these would have an impact on the operations along the Onehunga Branch Line.
Provide frequent bus services from Onehunga, Mangere Bridge, Mangere Town Centre and Olahuu to the Airport			
East Tamaki Business Precinct Plan (Outcomes)	Identify amenity improvements to walking and cycling connections to support the provision of public transport services.		
	Undertake a service review to ensure public transport provision maximises opportunities to serve demand and reflect work patterns		

Objectives and wider strategic context in which AT/NZTA operate		The problem or business need that is causing AT/NZTA to consider a new investment
Strategic document	Targets / directives /impacts and priorities	
Safety Improvements	Auckland Plan	Reduce road crash fatalities and serious injuries to no more than 410 by 2020.
	Auckland Transport (AT) – Statement of Intent AT - Integrated Transport Plan	Improve safety on Auckland's transport system
	Government's Policy Statement on Transport	Reductions in deaths and serious injuries as a result of road crashes
	Onehunga Precinct Plan (Key Outcome by 2050)	Improve pedestrian safety at intersections of Onehunga mall with Arthur Street, Church Street and princess Street
Improve traffic safety at the intersections of Selwyn Street with Arthur Street and of Church Street with Neilson Street.		There are also a large number of at-grade level crossings on the Onehunga Branch line. These have been associated with 1 fatal and 1 serious injury crash over the last 5 years. The number of incidents recorded at the level crossings has however more than doubled after more frequent services has been introduced on the OBL.

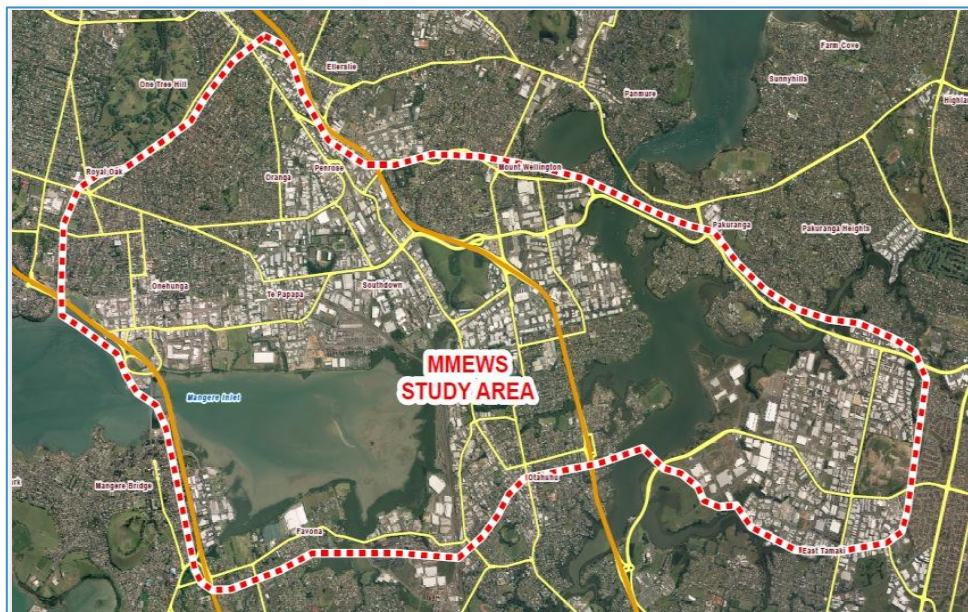
## 5 Changes/Updates to the Strategic Case

Evidence collected resulted in the need to extend the study area. The original study was focussed on the Neilson Street/Church Street corridor and connections to Highbrook/East Tamaki. The scope of the study area was extended to encompass the area south of the Manukau Harbour between Mangere Bridge, the airport and East Tamaki.

### 5.1 Study Area

The original approach to the study of the EWL was focussed on the conditions in the Neilson Street/Church Street corridor and its connections to SH20 to the west and SH1 and Highbrook to the east. This was described as the Multi-Modal East-West Solution (MMEWS).

**Figure 5.1 Initial MMEWS Study Area**



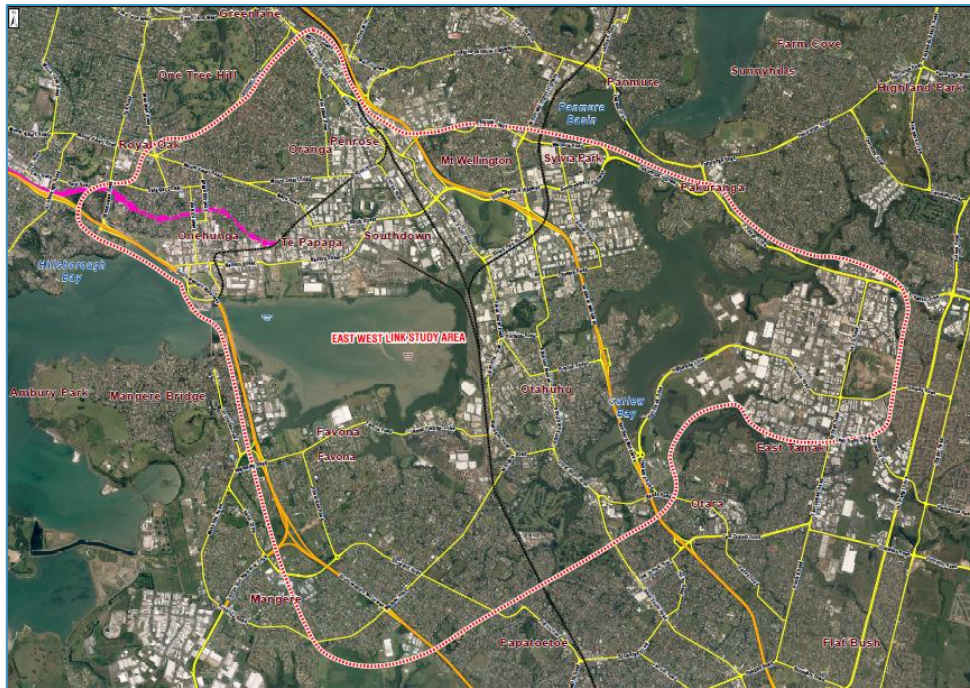
A considerable level of data collection and analysis was undertaken to understand the traffic conditions in this corridor and the economic and land use background. This comprised:-

- Interviews with key freight stakeholders
- Review of existing traffic information
- An extensive programme of additional data collection to understand traffic conditions and patterns
- A study of the economic context of MMEWS area.
- Modelling the impact of planned growth.

As the study progressed, it became clear from the evidence that the proposals to relieve the issues identified to the north of the Mangere Inlet needed to be reviewed and considered in the context of the traffic conditions and economic background for areas to the south, reaching as far as the airport. In essence the two areas need to be assessed as one.

As a result the scope of the project study area was extended to encompass the area south of the Mangere Inlet between Mangere Bridge, the airport and East Tamaki. Consequently, the project study area expanded to the wider area set out in Figure 5.2.

**Figure 5.2 EWL Study Area**



Whereas the initial study area was characterised by a significant level of industrial activity, the extended area includes a central core with a much greater residential focus. Therefore, the links to employment and other opportunities for workers and others resident in the area through improved public transport and walking and cycling links as well as improved road connections has become a relevant consideration for the study.

The extension of the study area raises issues of the importance of freight linkages between the airport and surrounding business district and the Onehunga–Penrose area as well as between the airport and the Highbrook area to the east.

It also raised the importance of good public transport linkages between the key town centres in the area, these being Onehunga Town Centre, Māngere Town Centre, Otahuhu Town Centre and Sylvia Park.

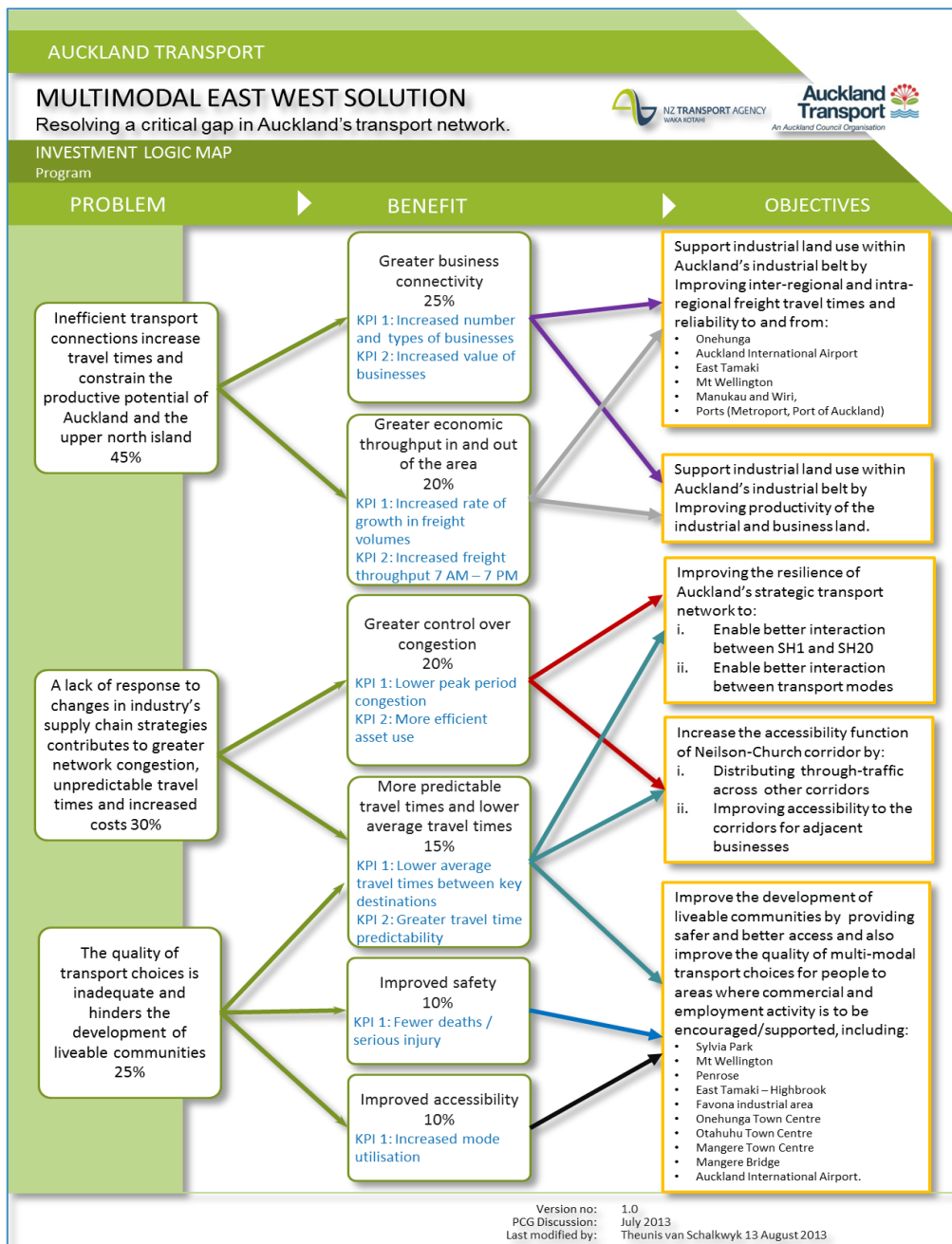
Further work was therefore undertaken to collect information on traffic conditions and the economic structure and performance in the southern extension to the study.

## 6 Investment Objectives

Investment objectives were developed based on the ILM outputs (Problems and Benefits).

### 6.1 Investment Objectives

Setting investment objectives is part of the case for change and will inform the assessment of potential options. Further work has therefore been undertaken since the initial ILM workshops to identify investment objectives for the EWL. The objectives help to specify clearly the desired outcomes for the proposed investment and focus on what the organisations (NZTA and AT) wants to achieve from the investment proposal. These were agreed to by the Project Control Group and are listed below.



## PART B – DEVELOPING THE PROGRAMME

### 7 Programme context and need for investment

Overall the evidence demonstrated both compromised local access and poor east-west connectivity in the EWL area and this does have an impact on the productive potential of the area's economy, particularly because of the additional cost and travel time incurred by businesses.

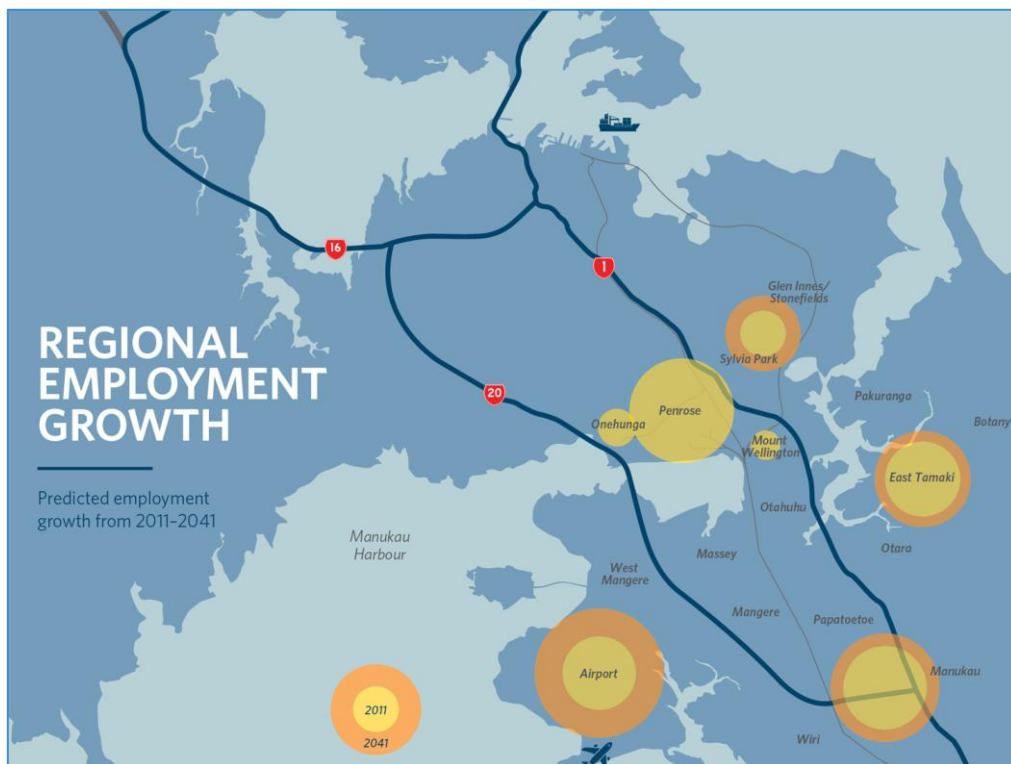
Reductions in congestion in the EWL area would generally result in businesses becoming more efficient through faster travel times, reduced cost and overall increased competitiveness. This indicates that improving connectivity and reducing congestion for these businesses will increase the productive potential for the area.

#### 7.1 Economic context

The area forms the main industrial, transport and distribution location within Auckland and is also significant in an Upper North Island context. It is a major manufacturing hub containing almost 40<sup>3</sup> per cent of Auckland's manufacturing employment.

The Proposed Auckland Unitary Plan has made a concerted effort through its zoning and planning provisions to protect this area for industries such as manufacturing and distribution and prohibit any further business service activities (via non-complying activity status).

Planned economic and population growth within the region, particularly around the Airport and East Tamaki will lead to greater movements of heavy vehicles through the area. The anticipated employment growth is illustrated in the figure below. In addition, transport and distribution companies began to employ more hub and spoke operations with shuttle vehicles, to work around increased congestion.



<sup>3</sup> Economic Assessment of the East West Link Study Area – Ascari, Berl, Paling – Oct 2013

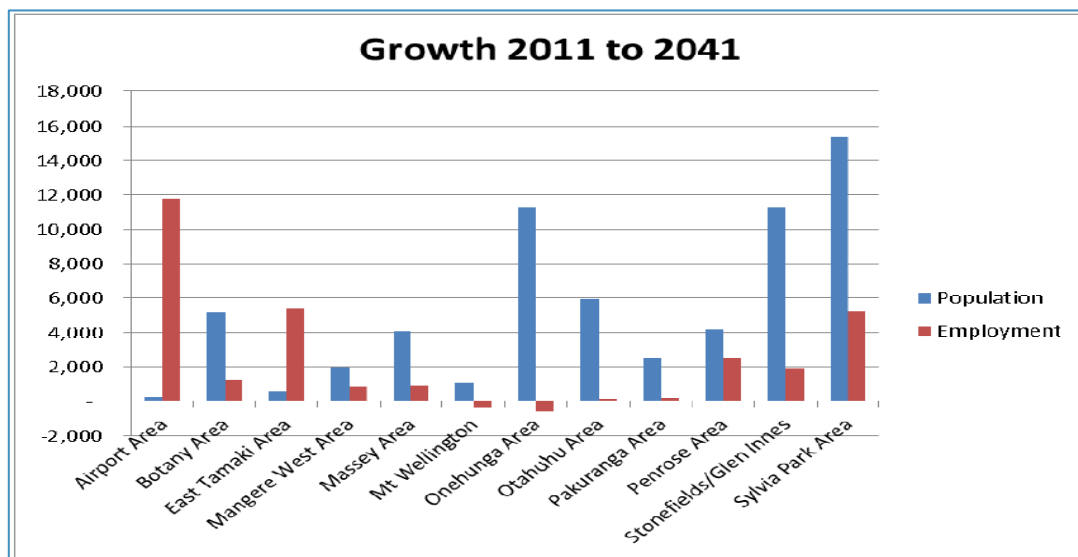
A survey of firms carried out as part of this study highlighted a number of advantages of the EWL area. The main benefits were seen to be; its central location in relation to the main industrial areas of the City, proximity to customers and suppliers, proximity to good transport links and the availability of greenfield development sites in East Tamaki and around the airport.

As the number of businesses within this area has grown, the comparative advantages of the EWL study area have increased and the linkages between businesses, and their suppliers and customers have grown in importance.

Overall the evidence demonstrated both compromised local access and poor east-west connectivity in the EWL area and this does have an impact on the productive potential of the area's economy, particularly because of the additional cost and travel time incurred by businesses.

Reductions in congestion in the EWL area would generally result in businesses becoming more efficient through faster travel times, reduced cost and overall increased competitiveness. This indicates that improving connectivity and reducing congestion for these businesses will increase the productive potential for the area.

Transport pressures are however predicted to grow due to economic expansion in the area. Employment growth will be likely to lead to an increase in the number of car based commuters, as the area has a high proportion of industries with low employment density and a reliance on shift work. The magnitude of the planned population and employment growth is illustrated in the figure below.



## 7.2 Transport context – north of the Mangere Inlet

The Onehunga/Penrose area provides the most important interface between road and rail freight in Auckland. It contains the MetroPort inland port, the adjacent Southdown KiwiRail and Toll Freight terminal and is increasingly acting as a rail served distribution hub for Auckland.

In addition to these intermodal activities, the area accommodates a large number of other major distribution and logistics facilities serving both the Auckland region and wider areas of New Zealand, taking advantage of proximity to key markets and suppliers and the access to the strategic road and rail networks. This area has a national function supporting supply chains that underpin the economic prosperity of the region and the potential for future growth.

Neilson Street/Church Street corridor connects SH20 and SH1/Great South Road and links with south eastern arterial in the east. The Neilson Street/Church Street corridor route primarily serves the local access needs of the industries located within the corridor. It also acts as a through route for both freight and general vehicles with 20-30 percent of movements on the corridor being through traffic.

The Neilson-Church Street corridor carries high traffic volumes for an arterial road, ranging from 22,000 vehicles over 12 hours near Onehunga Mall to the west to 38,000 in Church Street to the east.

These flows include a very high proportion of heavy commercial vehicles reflecting the large number of manufacturing and distribution activities in the area. Surveys observed approximately 4,000 heavy vehicles (18-20% of all traffic) at the eastern end and 6,200 (16% of all traffic) at the western end over a 12 hour period (6am-6pm). This average proportion of heavy vehicles for the Auckland network as a whole is 4.2 percent. This shows the importance of freight in the core EWL area. The data is summarised in the table below.

**Traffic Counts at Selected Locations November 2012 (12 hour counts)**

Location	Heavy Vehicles	Total Vehicles	Heavy Vehicle Proportion
Neilson Street East of Victoria Street	4,100	22,900	18%
Neilson Street East of Angle Street	3,700	18,200	20%
Church Street West of Great South Road	6,200	38,500	16%

Source November 2012 Surveys

**7.3 Transport context – south of the Mangere Inlet and east-west movements (including Airport – East Tamaki)**

Manufacturing and wholesale trade dominates employment in East Tamaki and these activities generate high freight flows. Overall employment in potentially freight generating activities represents about 60 percent of the total for the area. The airport area is also supporting approximately 22,310 employees<sup>4</sup> with almost half of those (10,420) in transport and distribution.

The traffic data shows that a strong linkage exists between Onehunga/Penrose and the airport precinct. Available eRUC<sup>5</sup> data revealed 84% of heavy vehicles travelling west from Neilson Street cross the Manukau Harbour and 25% of all Neilson Street traffic has a destination at the airport business precinct (south of Kirkbride Road).

Analysis of the origin-destination of traffic on Church Street indicates 19% of all westbound heavy vehicles had a origin east of the Tamaki River, implying a reasonable level of interaction between Onehunga and East Tamaki.

An important factor to bear in mind when considering these proportions, particularly for the logistics centres round the airport, is that the volumes of freight generated are not necessarily related to the numbers employed and many of the logistics centres being developed particularly around the airport may, because of their use of advanced handling systems, have high throughputs and generate high freight volumes with relatively low staffing levels.

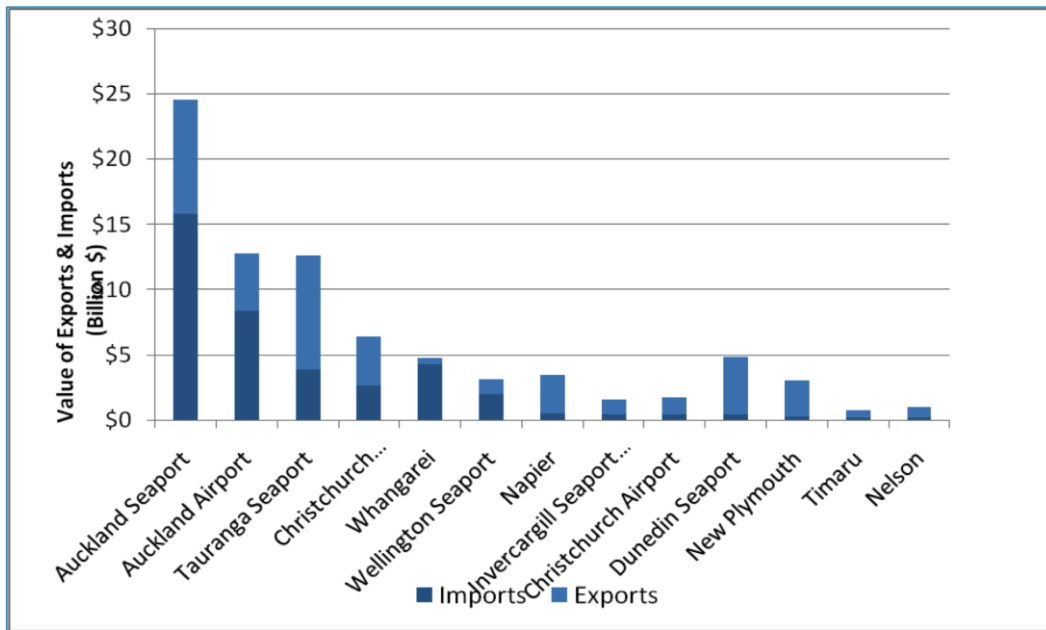
The Airport is further an important international gateway for freight as well as passengers and in value terms the airport ranks as New Zealand’s third largest port. Eighty percent of all visitors to New Zealand enter the country via the Auckland International Airport and this airport accounts for over 45% by value of all imports into New Zealand (Auckland Regional Council, 2010a). The figure below shows the value of exports and imports by New Zealand ports.

<sup>4</sup> An Economic Assessment of AETC – Ascari, Berl, Paling – July 2013 – Table 3.2

<sup>5</sup> Technical Note 20



**Value of trade by port**



\*Based on 2009 – 2010 Financial Year. Source: Statistics NZ and POAL, 2010

**7.4 Problems**

Overall, the detailed problem analysis supports and confirms the validity of the three ILM problem statements. These are discussed below.

*Problem statement 1: Inefficient transport connections increase travel times and constrain the productive potential of Auckland and the upper north island (45%)*

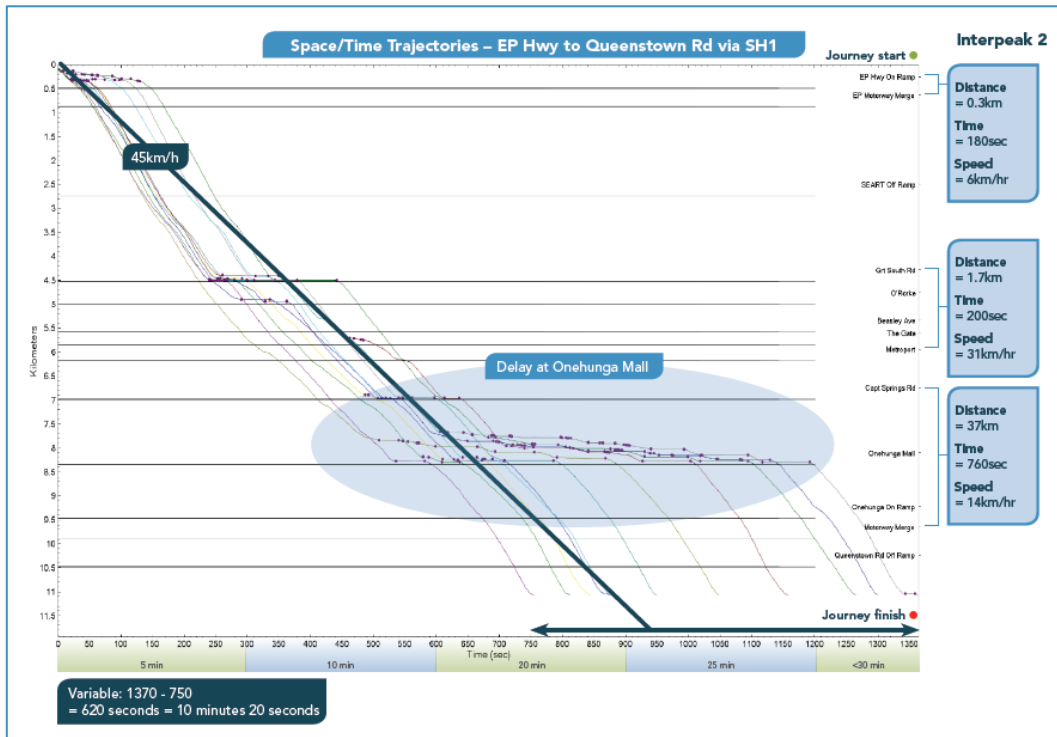
There are significant congestion problems at both the eastern and western ends of the Neilson Church Street corridor now, particularly on the approaches to State Highway 1 and State Highway 20.

This problem is compounded for traffic travelling to and from SH1 south due to a convoluted route and a number of traffic signals. Firms interviewed generally felt that east-west connections through the area are limited and do not provide particularly high quality routes as illustrated below.

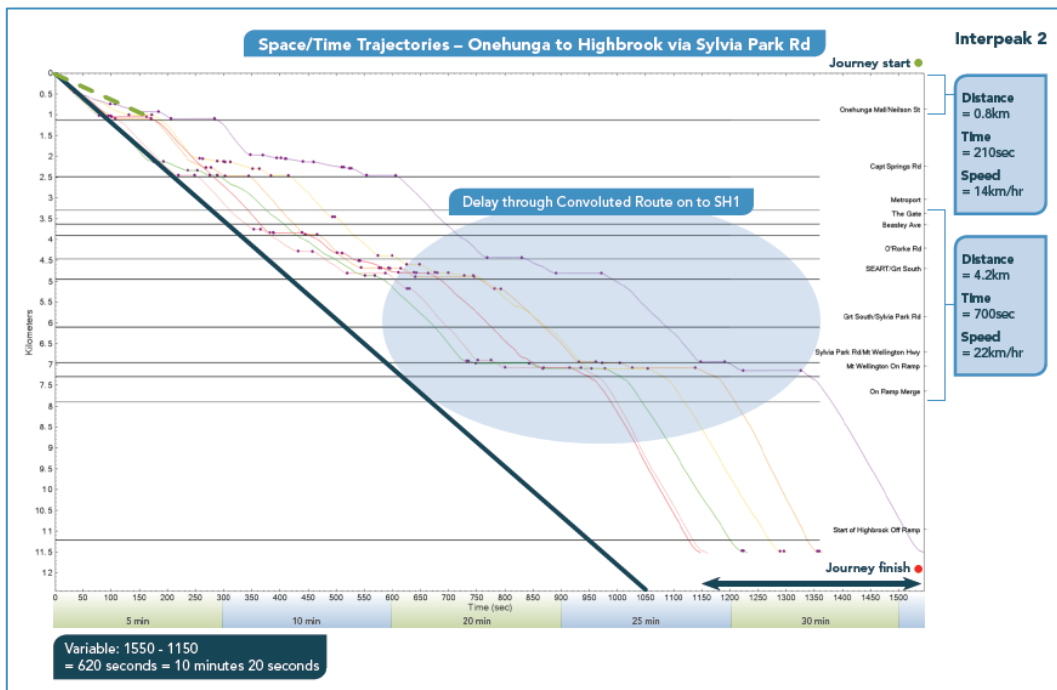


GPS surveys carried out during 2012 illustrates significant delays for westbound vehicles passing through the Onehunga Mall intersection. This intersection could add an additional 10 minutes to the journey time for vehicles accessing SH20 over a relative short distance (3.7km). The average speed

slows down to 14 km/h in the interpeak. Results from this survey are illustrated in a space/time trajectory below.



The GPS data also shows the convoluted route between Southdown and SH1 to slow speeds down to 22 km/h over this 4 km length. Again illustrated in the space/time trajectory.



To the south of the Mangere Inlet there are also congestion problems and/or convoluted routes for getting between SH1 and SH20. Firms interviewed generally used either Massey Road or Favona Road or the SH1/SH20 connection to get between the airport and East Tamaki and Mount Wellington.

The SH20-SH1 was generally perceived to be the more reliable choice. However, traffic surveys identified the SH1/SH20 connection at Manukau as a pinch point in the network which is often congested in the afternoon peak<sup>6</sup>. Around 65 percent of heavy vehicles travelling between SH20 and SH1 turned north at this junction. In its current configuration this is an inefficient connection for traffic (including the 35 percent of heavy vehicles) wishing to head from SH20 to SH1 southbound. The interchange experience congestion (especially during the afternoon peak). Travel times can slow down to 7 km/h and travel time variability of 20 minutes within the same peak was recorded.

Along Favona Road the section between Tui Street/James Fletcher intersection and SH20 is contributing the most to unpredictability along this route. Travel times<sup>7</sup> are well below 20 km/h over this approximately 3.6 km section. Travel time variances within the inter-peak of up to 20 minutes for routes through this corridor.

Massey Road’s section between Great South Road and SH20 is contributing the most to the unpredictability along this route. Travel times<sup>8</sup> are also well below 20 km/h over this approximately 5.8 km section. Travel time variances of 20 minutes are again observed within the inter-peak).

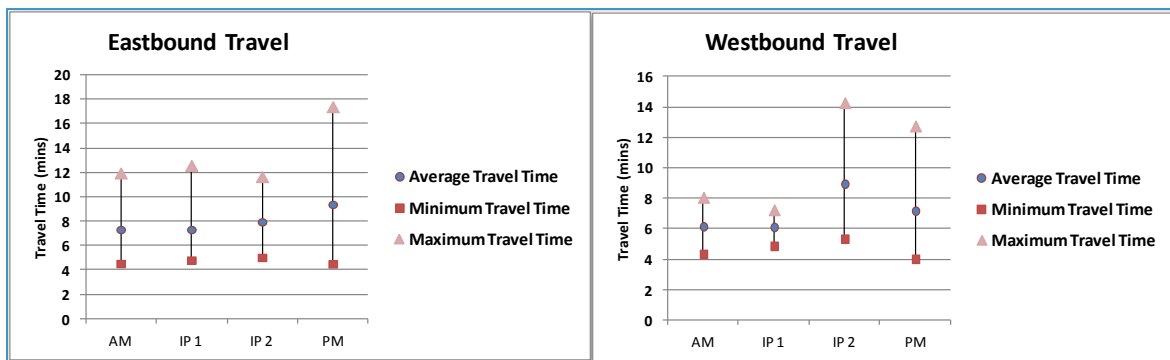
*Problem statement 2: A lack of response to changes in industry’s supply chain strategies contributes to greater network congestion, unpredictable travel times and increased costs (30%)*

A general observation within the area is that the way in which goods are moved has evolved and the transport infrastructure has not kept pace with the changes in the industry’s supply chain strategies and the changing land uses in the area.

Long-distance rail has become more economically viable and this has resulted in a growing attractiveness of the road rail interchange at the MetroPort / Southdown area. This is a practical example of the changing nature of the logistical supply chain, with some specialisation now emerging around road/rail freight.

The needs of the growing traffic to and from the MetroPort / Southdown area have not been recognised. The heavy flows into MetroPort for example have no signalised access to enter or exit into the heavy flows on Neilson Street. The growth in many of these operations has compounded the problem. For example, MetroPort opened in 1999 and by 2012 generated 2000-2500 heavy vehicle trips per day and around 200,000 TEU movements per year. Network development has clearly not kept pace with developments like these and this is impacting the entire freight supply chain.

The lack of infrastructure response has not only resulted in slow travel times but also variable travel times. The levels of variability along Neilson Street are set out in the figure below.



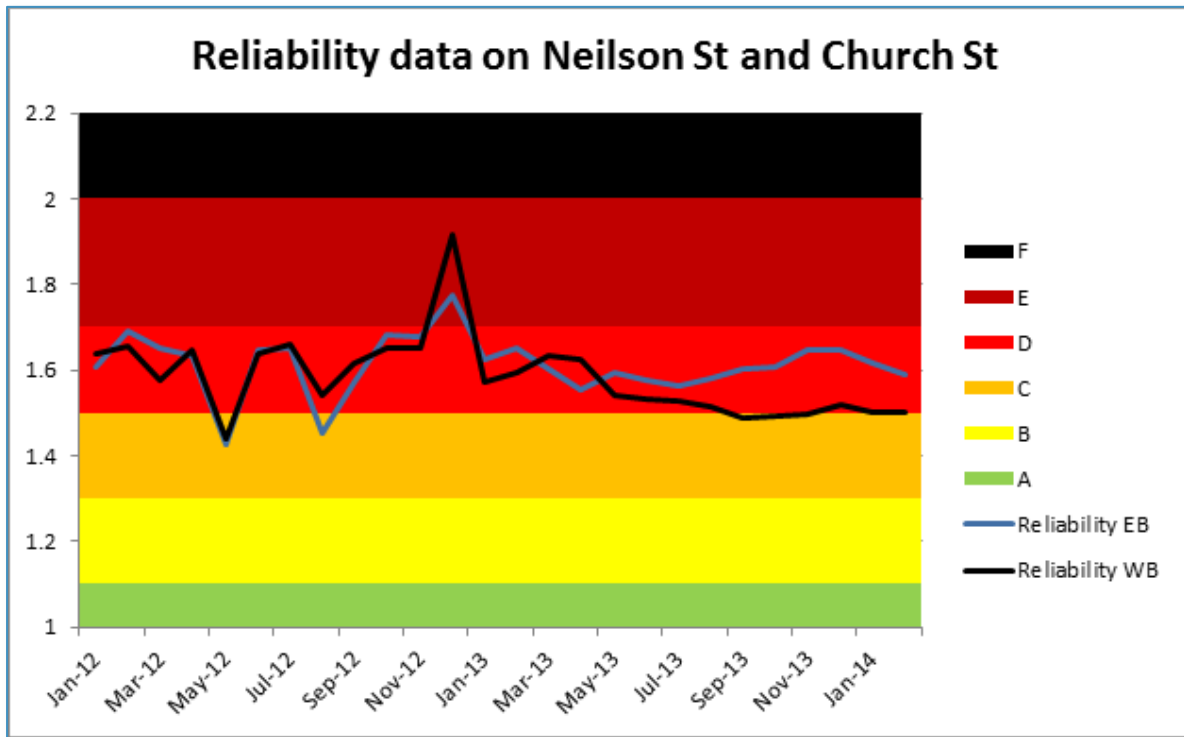
Travel time variability is particularly high in the evening peak in both directions. Westbound movements are also affected by the congestion on the approaches to Onehunga mall from the west which often starts in the early afternoon and continues well into the evening peak period. This variability makes logistics planning very difficult for freight operators and hinders the efficient use of transport resources.

<sup>6</sup> Second GPS Survey – Nov 2012 – p47

<sup>7</sup> Third GPS Survey – April 2013 – P25

<sup>8</sup> Third GPS Survey – April 2013 – P41

The Neilson/Church corridor is one of the four SOI (Statement of Intent) routes Auckland Transport monitors on a monthly basis. The graph below illustrates the monthly tracking for travel time variability during the interpeak, and from the graph it is clear that the inter-peak operates constantly within a LOS D<sup>9</sup> and occasionally in LOS E.



For the southern area, the growth of the wholesale, storage and transport sectors is clearly reshaping the economic and spatial structure. The growth of these sectors is not evenly distributed, with East Tamaki and the Airport, having significantly increased their distribution and logistics activities in their areas, as well as the rest of Auckland. The volume of freight travelling through this area is expected to increase over time due to the business growth on either end at the Airport Business District and in East Tamaki.

Favona and Massey Roads also experience levels of congestion that contribute to variability in travel time as is illustrated through the GPS surveys supporting the analysis.

*Problem statement 3: The quality of transport choices is inadequate and hinders the development of liveable communities (25%)*

The nature of the workplaces in the EWL area, the sparse public transport offering and the lack of availability of personal, health and education services in proximity to employment is such that a very high proportion of workers (78 percent) drive private cars or company cars, vans or trucks to work. This compares with the Auckland average of 63 percent to 65 percent.

Overall, because of the high volumes of commuter traffic, good public transport links along the routes connecting these areas are important.

Firms interviewed in the EWL area in general felt public transport were unreliable, expensive, time-consuming and inflexible. Employers indicated that as would be expected given the perception of public transport, the majority of their employees drive to work.

Shift work, including 24-hour business operations makes it difficult for employees to use public transport and active modes in this area. Particularly in sectors such as transport and logistics, storage, hospitality and manufacturing. It was felt by respondents that public transport would need to

<sup>9</sup> (LOS D represents network conditions that vary the travel time by more than 5 minutes when compared to average travel time)

be cheap, easily available and convenient for people in the study area to use if it was to become a viable alternative to the private car.

Auckland transport has consulted on, and will implement a 'New Network' for this area to address some of these issues. The network will provide more frequent services between the main town centres (at least 15 mins 7AM – 7PM). However, some of the routes run along corridors with congestion issues (e.g. Massey Road) and this will hinder the ability to provide reliable services on these corridors. The Options Report illustrates significant variability in travel time for buses running along Massey Road – especially in the early afternoon.

## 7.5 Opportunities

The opportunities arising from investment in the transport network within the EWL area are driven strongly by the potential to support the economic development of the area in a way which is consistent with the direction and aspirations set out in the Auckland Plan. This includes the opportunity to support:

- The continued pattern of industrial land use within the Nielson Street/Southdown area, rather than creating a situation where these activities are displaced to other, less suitable locations within Auckland.
- The use and effectiveness of inland ports - the area provides the most important interface between road and rail freight in Auckland and New Zealand.
- Concentration of business service jobs in centres where access by passenger transport is more viable.
- Better integration between bus and rail services to ensure enhanced customer experience along the entire journey.

## 7.6 Issues and constraints

The key economic, social, environmental, transport, stakeholder and other issues which could have an effect on the scope of the project outcomes and outputs include:

- The capacity of the rail network for additional freight movements to/from Southdown is an issue that requires further investigation as part of an integrated rail development plan for Auckland, as this could be either a significant driver of, or constraint on, the growth of road freight movements in the Southdown area.
- The outcome of the Auckland Unitary Plan process and the implications for land use designations in the EWL area.
- The speed of transformation of the Auckland economy towards a more service based economy with less reliance on local manufacturing and higher propensity to import consumer and capital goods into the region.
- The change in the relationship between growth in traffic volumes (VKT), GDP and other indicators, as what appears to be a structural change in the patterns of transport demand makes its presence felt.
- Unpredictability of supply chain development due to the increasing popularity of online shopping and associated shipping requirements, through websites such as TradeMe and ETSY [peer to peer].

The key constraints which could have an effect on the scope of the project outcomes and outputs include:

- Environmental considerations, including the effect on the Manukau Harbour
- Maori Cultural Heritage considerations including areas of waahi tapu and sites or areas of significance, such as the Otahuhu portage route.
- Community concerns around noise, severance and lack of perceived local benefits from scheme options.
- Affordability to all project funders.

## 8 Stakeholders

A targeted consultation process has been undertaken throughout the development of the EWL programme. Consultation has involved Local Boards, Mana Whenua, community groups, business associations and local firms. This process has provided a rich understanding of issues and opportunities from a wide range of stakeholder perspectives, which has been used to inform the development of the preferred programme.

### 8.1 Consultation and Communication Approach

The consultation and communication undertaken during the development of the Programme Business Case was a comprehensive approach used to provide a wide range of relevant views on the issues and opportunities within the project area and specific feedback on options:

The key stakeholders identified for consultation represented the key stakeholders and business associations and Iwi in the affected area. They included:

- The four Local Boards that are covered by the project area.
- Community Groups
- Mana Whenua via a specific Mana Whenua Workshop (Dec 2013)
- Business associations
- Firms<sup>10</sup> in the area

### 8.2 Professional Engagement Process

The main component of the professional engagement process focused on option development and project selection. It involved a series of 'Investigation by Design' workshops, facilitated by Urbanism Plus. These are described in more detail in the accompanying report (UrbanismPlus Dec 2013)

The workshop received professional advice from a team of urban designers, environmental planners, transport planners, economists and social scientists and involved specialists in the environment, ecology, community, heritage, cultural affairs, economics, transport, planning and urban design.

### 8.3 Stakeholder Views

The Stakeholder views were elicited at various points in the process and in relation to both general views, and specific options.

**Local Boards:** Engagement included the 4 local boards of Howick, Tamaki Maungakiekie, Mangere Otahuhu and Otara Papatoetoe. On the 2nd September a joint local board forum was held where the 4 local boards were given an opportunity to feedback to the project team on the initial high level options. The advantage of this joint session was that each local board could hear each other's point of views.

At the meeting there was a consensus on the importance of the project. There was support for the process on engagement with the Local Boards to date and support for this collaborative approach to continue.

**Mana Whenua:** Auckland Transport's Maori Engagement Framework has been adopted in this project. An initial hui with Mana Whenua to consider EWL proposals was held in September 2013. High level Maori Value Assessments have been received from Mana Whenua outlining their values in the proposed areas.

The development of the Otahuhu-Mangere Area Plan included extensive consultation with Mana Whenua and Mataawaka between Feb-June 2013 (refer to internal report from Te Waka Angamua on findings). This provides information relating specifically to: treaty settlement outcomes (e.g. maunga address), kaitiakitanga and the natural environment, sites and areas of significance to Maori, transport and network infrastructure, marae development, housing and lifting Maori social wellbeing.

<sup>10</sup> Linfox; Toll; Courier Post; DHL; Seamount; Fisher & Paykel Healthcare; Pacific Steel; Tip Top; CocaCola; Buckley Systems; Progressive; OfficeMax; MG

In addition to the local board, Mana Whenua and other stakeholder involvement, members of the EWL Project Team interviewed a significant number of major employers and transport users in the study area during the course of developing the EWL programme, to ascertain feedback on options and better understand the transport needs of these businesses.

**Businesses and Business Associations:** Several workshops were also held with Business Associations (Otahuhu, Penrose/Onehunga and Greater East Tamaki) to get a better understanding of the issues facing those businesses which are located within the area.

## 9 Alternative and Option Assessment

The existing transport network can be improved, but not to the extent that it will be able to meet the transport needs of the EWL area now, or in the future. New infrastructure is required to address the problems and unlock the opportunities of the area.

Over time, a number of studies have considered alternatives and options for addressing transport issues in the EWL area. These are documented in a separate options report<sup>11</sup> that informed the consideration of alternatives for this programme business case.

### 9.1 Alternatives Analysed

The development of the EWL alternatives followed an integrated investment programme approach based on the four stage intervention process from the Integrated Transport Plan (ITP). This assisted in determining the ‘balance’ of alternative interventions to address the scale of the defined problem

The alternatives ranged from optimising existing infrastructure (the ‘do minimum’) through to high investment options such as expanding the strategic road network.

Three alternative approaches were considered in addition to the do minimum scenario. These were:

- Shift the demand to Public Transport (Programme B and C1 and C2)
- Improve connections to the Strategic Network (D1 and D2 and D3)
- Expand the strategic Network (E1 and E2)

The diagram below illustrates the alternatives that were considered.

#### Summary of alternative interventions to address the defined problem

Potential programmes	4 Stage intervention process as identified in ITP				
	A	B	C	D	E
	The focus of this programme is to represent projects already budgeted for in the LTP	The focus of this programme is to invest as little as possible to prevent further deterioration of the network	Focus is to move commuters from private cars to alternative modes to free up strategic network for business trips	Focus is to improving the connectivity of the business areas with the SH network	The focus is on expanding the regional strategic network
	A1	B1	C1 + C2	D1 + D2 + D3	E1 + E2
1. Improve attraction of non car modes	25%	10%	50%		25%
2. Technology	25%	40%	10%	10%	
3. Better use of existing capacity	40%	40%	30%	20%	25%
4. Provide additional capacity				50%	30%
5. Integrate land-use with transport			10%		20%
6. Improve organisational capacity	10%	10%		20%	

The three alternatives are discussed in further detail below.

<sup>11</sup> East West Link Transport Options Report – March 2014 – AT/NZTA



### *Shift the demand to Public Transport (Programme B and C1 and C2)*

This approach avoids major upgrades to the strategic road network by moving commuters from private car to alternative modes (public transport and active modes) to free up the strategic network for business and freight trips, particularly during peak traffic periods.

Potential interventions range from optimising the existing network e.g. simple bus and cycle priority at intersections through to significant infrastructure investment e.g. expansion of the rail rapid transit network and cycle network.

It also included some consideration for investment in roading solutions to remove bottlenecks.

### *Improve connections to the Strategic Network (D1 and D2 and D3)*

This approach aims to unclog bottlenecks at the approaches to the State Highway Interchanges as well as the interchanges themselves. The focus is on making better connections to the State Highway for freight and business travel. Potential interventions range from optimising the existing network where possible e.g. freight priority at intersections through to investing in new infrastructure e.g. new local road connections, upgrade interchanges etc.

It still includes improvement in public transport and active modes to help address the demand from commuters. Specifically an investment in the frequent bus network and the regional cycle network (cycle highways and the 2nd tier connectors) with key principles being:

- Bus - Frequent, Reliable and predictable travel times, Competitive travel times compared to cars, Minor interchange penalty between modes
- Cycling - Legible routes, Safe routes, Direct routes between key centres

### *Expand the strategic Network (E1 and E2)*

This approach aims to create a more resilient east-west strategic network to take the pressure off the existing road network which is severely congested both to the north and south of Mangere Inlet.

While this level of intervention is in the 4th stage (invest in new infrastructure) of the ITP intervention process, it ranges from upgrades to existing roads to turn them into more strategic east west roads through to the provision of new roads so in this regard there is a sliding scale of investment.

It also includes investment in public transport and active modes to help address the demand from commuters.

## **9.2 Initial Assessment**

The assessment indicated that optimising the existing transport network and managing demand in the area more efficiently would be necessary but insufficient to address the problems. The problems in the study area are of such a magnitude that further investment in new infrastructure on the transport network (road, public transport and active modes) will be required.

Assessing the three alternative approaches against the problem statements in the ILM are discussed below.

### *Theme 1: Shift the demand to Public Transport and Active Modes*

The evidence shows that attempting to address the area's problems by focusing investment in public transport and active modes alone will not be successful. Modelling indicates that even with a significant capital investment in public transport and active modes (rail to the airport and double tracked Onehunga Branch Line) there will be little change in traffic flows, congestion, reliability and travel time on corridors such as Church, Neilson and Massey Road. A response that focuses only on shifting to public transport is therefore considered inadequate to address both problems 1 and 2.

### *Theme 2: Improve connections to the Strategic Network (D1 and D2 and D3)*

Connections to the State Highway network are constrained at both ends of the area's east west routes. At the same time many east west movements are on corridors which serve a vital local access function rather than a through function.

Because the connections to the State Highway are improved without providing a suitable alternative link for through traffic passing between State Highway 1 and 20 the traffic volume on these existing east west corridors will actually increase against a do minimum scenario as they become even more attractive to through traffic thereby exacerbating the problem.

Therefore, an emphasis on improving the connections without addressing the wider strategic east west through movements will only partially address the scale of both problems 1 and 2.

*Theme 3: Expand the strategic Network (E1 and E2)*

Expanding the strategic network is likely to more fully address the defined problems, particularly providing greater network resilience and taking through traffic pressure off existing congested corridors. But a key issue with providing additional capacity through the Neilson/Church Street corridor is that it plays an important role for access to local businesses including MetroPort. To address the problems, particularly around local vs. through traffic, the strategy for the East West Link should therefore consider improving the transport network’s resilience whilst also reducing pressure on the existing corridors servicing the industrial belt. This could be achieved by providing viable transport choice and additional strategic links that direct as much traffic away from these ‘congestion spots’ as possible.

Expansion of the strategic road network will however require careful consideration, given the likely level of investment required and potential impacts on established business and residential communities.

Assessing the three alternative approaches against the objectives in the ILM revealed the following:

*Against investment objectives*

Investment Objectives	Alternatives			
	Do nothing (Programme A)	Shift demand to public transport and active modes (B, C1, C2)	Improve Connections to the strategic Network (D1, D2, D3)	Expand the strategic Network (E1, E2)
Support industrial land use within Auckland’s industrial belt by improving inter-regional and inter-regional freight travel times and reliability.	No	No	Partial	Yes
Support industrial land use within Auckland’s industrial belt by improving productivity of the industrial and business land.	No	Partial	Yes	Yes
Improving the resilience of Auckland’s strategic transport network.	No	Partial	Partial	Yes
Increase the accessibility function of Neilson-Church corridor.	No	No	Partial	Yes
Improve the development of liveable communities by providing safer and better access and also improve the quality of multi-modal transport choices for people to areas where commercial and employment activity is to be encouraged/supported.	No	Yes	Yes	Yes
Progress to further option consideration	No	Partially	Yes	Yes

(Note: See Options Report for supporting evidence)

Options were further developed for alternatives that ‘meet’ or ‘partially meet’ all of the Investment Objectives. These include “Improved Connections” or “Expand the Strategic Network”. Programmes that respond to these alternatives are discussed in the next section.

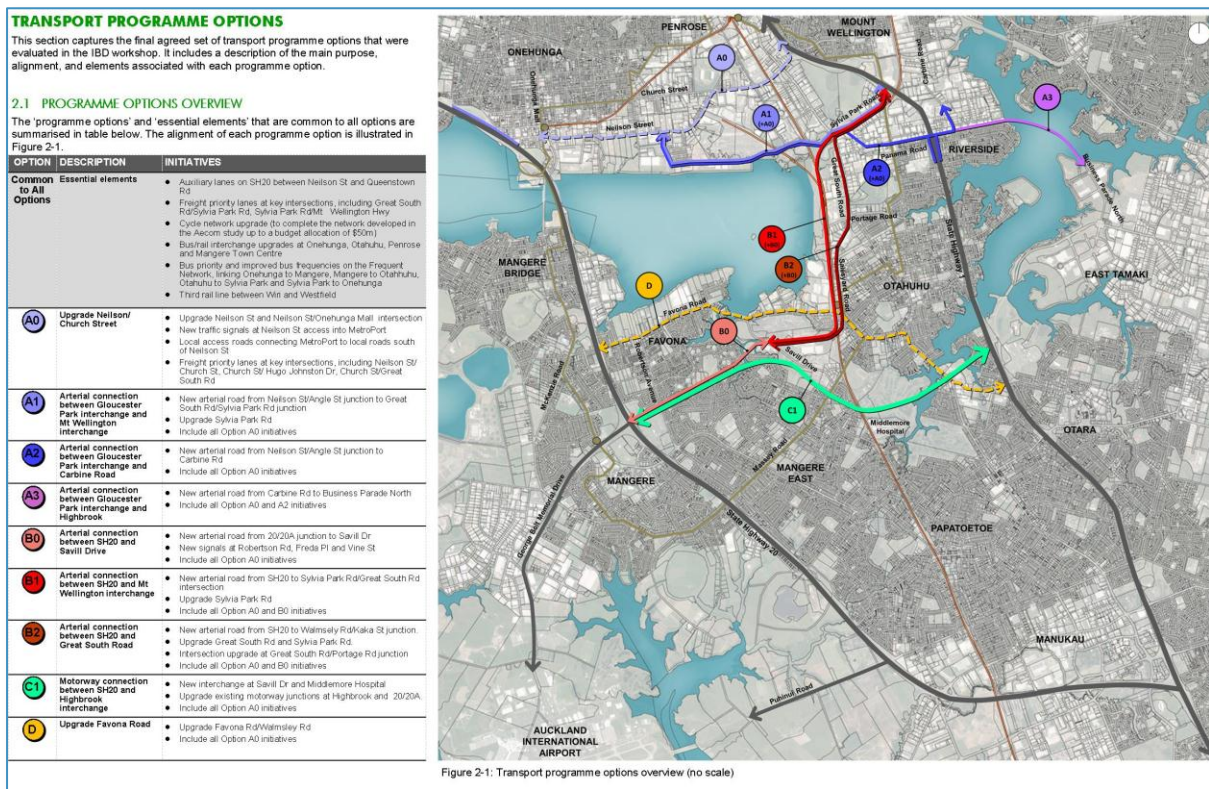
# 10 Programme Options Development and Assessment

The programme option development process was both iterative and comprehensive. It was firmly grounded on an understanding of the problems and opportunities revealed by the ILM process.

Feedback from stakeholders was then taken into consideration and the risks to a number of other Auckland Plan outcomes were explored through a comprehensive 'Investigation by Design' workshop process. This process rigorously tested programme options against a wide range of criteria and from a wide range of perspectives. The outputs from this were fed directly into the development of the preferred programme

## 10.1 Programme Development

The long list of options were narrowed down and grouped into six programme options. These options were derived from various distinct elements A, B, C and D, shown on the map below. The UrbanismPlus report describes the options in full detail:



The six programme options are:

- Programme 1: Option D
- Programme 2: Option A0 + A1
- Programme 3: Option A0 + A2 + A3

- Programme 4: Option A0 + A1 + B0 + B1
- Programme 5: Option A0 + A1 + B0 + B2
- Programme 6: Option A0 + A1 + C1

## 10.2 Do minimum

Description: A Do Minimum scenario was created to assess the programme options against. This scenario represents the expected baseline if none of the Programme Options were implemented in this study area. That scenario does not represent the existing 'current day' situation, as it includes significant land use growth and significant investment in the transport system across the Auckland Region.

Although this broader study area includes the AMETI project, the core components of AMETI have been developed, designed and evaluated separately and so were included in the Do Minimum rather than as part of the Programme Options.

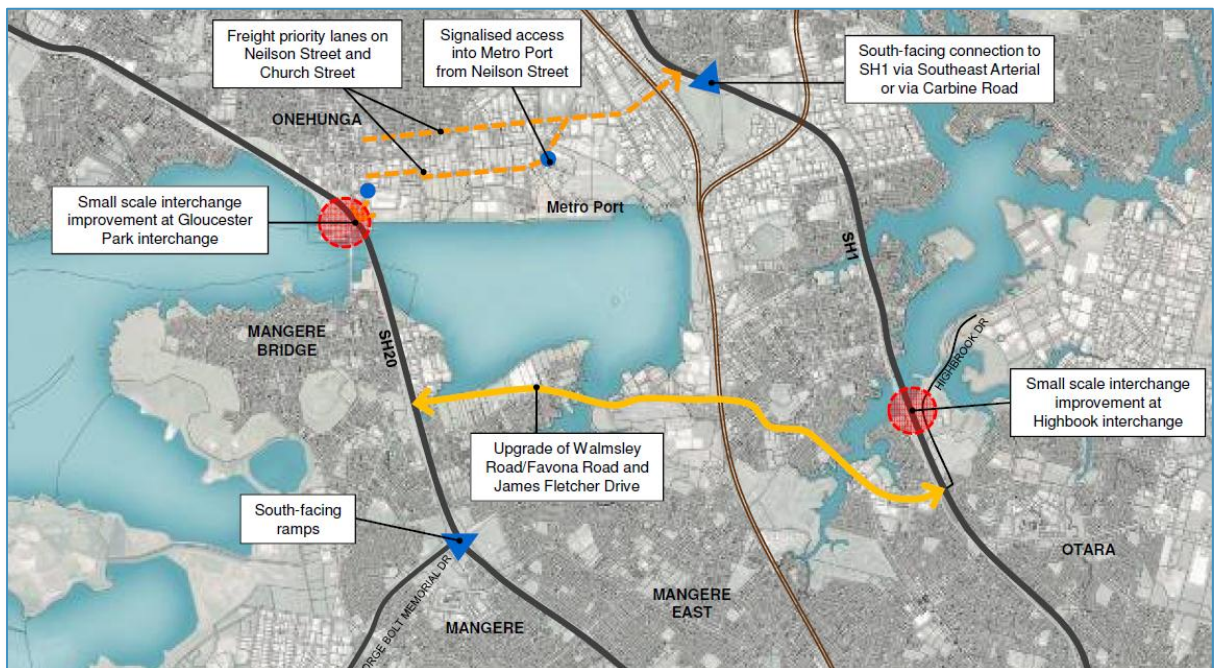
Similarly, the SMART study has separately been investigating improvements in access to and within the general Airport Precinct, and the core elements of that have been included in the Do Minimum.

Significant regional infrastructure and service upgrades have been included in the Do Minimum such as the Central Rail Link, Waterview Connection, an Additional Waitemata Harbour Crossing and the new public transport network pattern currently being progressed by AT.

As well as assumptions on expected future economic inputs to the models (such as fuel price, parking costs, GDP growth etc.), the Do Minimum models include assumptions around the success of various travel demand management (TDM) policies. The assumptions included in the models are documented in a separate report<sup>12</sup> prepared by Beca.

### 10.3 Programme 1 (Option D)

Description: This programme focuses on improving conditions along Neilson Street by upgrading it to a 4 lane corridor, whilst strengthening the access to SH 20 through the removal of the bottleneck at Onehunga Mall intersection. Improved accessibility to SH1 is achieved by diverting southbound traffic onto the South Eastern Arterial, then Carbine Road with a new connection from Carbine Road onto SH1 through the provision of south facing ramps. It further attempts to divert through traffic away from Neilson Street by providing additional capacity on the Favona-Walmsley Road corridor. The programme also includes improvements to support the FN network between the four main town centres within the wider area as well as the completion of key cycle routes.



**How it delivers against the outcomes:** The option would decrease the travel time for freight between 1.6min and 6.6min at the SH20 connection and increase the throughput of freight at this location by an estimated 100 vehicles per day by 2026. At the eastern end it reduces the travel time from Southdown to Highbrook by between 2.2min and 5.4min. The programme reduces the freight volumes through Mt Wellington Interchange by 1,300 heavy vehicles per day as it shifts it on to a new link from the Carbine Road side. The programme will improve journey time for PT users by and estimated 6.7min between Onehunga and Sylvia Park and 10 minutes between Mangere Town Centre and Sylvia Park.

<sup>12</sup> East West Link – Post IBD Workshop Traffic Modelling and Economic Evaluation Report – Beca – 17 March 2014 (section 4)

**How much will it cost?** The P50 estimate for the programme amounts to \$873m with a BCR (including WEBs) of 2.0.

**Risks:**

*Maori, culture and heritage values:*

- Need to avoid significant volcanic features including Te Hopua (Gloucester Park).
- Structural issues for heritage buildings/Waikaraka basalt wall with increased traffic numbers.
- Heritage sensitivity in the Onehunga area including historic stream, scheduled trees (Galway Street), scheduled buildings, historic railway (1878), archaeological sites, scheduled geological features (Bycroft Stream and Hopua explosion crater).

*Community and social:*

- Increases severance of the coast from the Onehunga and Favona community.
- Walking and cycling facilities will be difficult to next to freight traffic along Neilson/Church Street.

*Natural environment:*

- Increased runoff and contamination due to increase in vehicular (especially freight) volumes on SH20.
- Freight along Waikaraka Park eastern and southern edge (designation) will impact coastal amenity and enjoyment of the space.
- Impact on ecology of coastal flora and fauna due to its proximity to the coast. Increases freight movement around Hamlins Hill making it more difficult to access, diminishes the use and amenity of the park.

*Built form and urban design:*

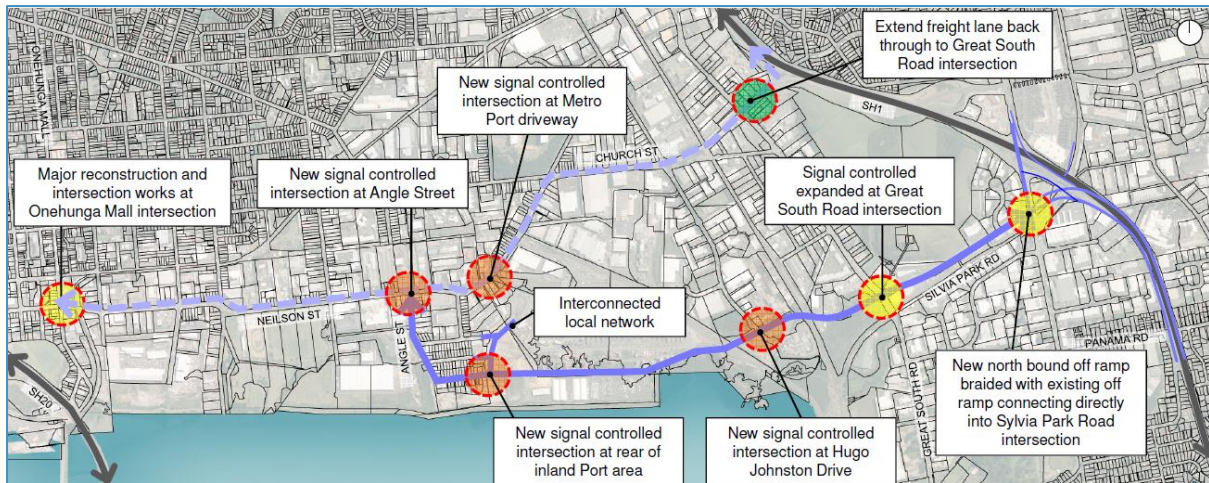
- Negative impacts on walking and cycling facilities along Neilson/Church Street and Favona due to increase in traffic.
- Reduces north-south connectivity across Neilson/Church Street and Favona Road.

*Economic and employment:*

- Reduces the quality of the land use and Neilson/Church corridor interface and quality of the built environment.

**10.4 Programme 2 (Option A0 + A1)**

**Description:** This programme focuses on the strengthening of access from both SH1 and SH20 to the Onehunga/Penrose industrial area. It proposes removal of the bottleneck at Onehunga Mall intersection and the provision of additional lanes on SH20 between Gloucester Park Interchange and Queenstown Road. Connectivity to SH1 will be improved through a new link between the Southdown Freight Terminal and SH1 at Mt Wellington Interchange with associated improvements on SH1 between Mt Wellington Interchange and Princess Street. Neilson Street will be four laned with additional signalised intersections at Angle Street and MetroPort entrance to improve safer access to these areas from Neilson Street. It further includes improvement to support the new FN network between the four main town centres within the wider area as well as completion of key cycle routes – notable the Mangere Bridge to Sylvia Park route along the foreshore.



**How it delivers against the outcomes:** The option would decrease the travel time for freight between 1.1 min and 5.5min at the SH20 connection and as a result increase the throughput of freight by an estimated 300 vehicles per day by 2026. At the eastern end it reduces the travel time from Southdown to Highbrook by between 6.4min and 9.0min resulting in an additional 1,800 heavy vehicles per day through the Mt Wellington interchange. The programme will improve journey time for PT users by and estimated 6.7min between Onehunga and Sylvia Park and 10 minutes between Mangere Town Centre and Sylvia Park.

**How much will it cost?** The P50 estimate for the programme amounts to \$935m with a BCR (including WEBS) of 2.1.

**Risks:**

*Maori, culture and heritage values:*

- Need to avoid significant volcanic features including Te Hopua (Gloucester Park).
- Structural issues for heritage buildings/Waikaraka basalt wall with increased traffic numbers.

*Community and social:*

- Upgrades in the vicinity of Onehunga town centre may adversely impact on the character of the centre.

*Natural environment:*

- Potential impacts on freshwater streams that have been modified and covered.
- The Onehunga aquifers may also be impacted.
- Inability of highly modified land with a predominance of hard surfaces (concrete, tarmac, buildings) to compensate for increased road runoff.
- Overloading existing stormwater infrastructure which drains into the Mangere Inlet.
- Issues of existing contamination and disturbing the existing contaminants. Impacts on Ann's Creek which is a unique estuarine/salt marsh ecosystem with no possible biodiversity offset.
- Negative impacts from noise and light pollution on wildlife.
- Significant negative impacts on the remaining ecology/biodiversity of the area during construction phase.
- Protect and enhance significant geological values, such as view shafts within the landscape - maunga to maunga, land to coast, (beyond RMA protection).

*Built form and urban design:*

- Upgrades in the vicinity of Onehunga town centre may adversely impact on the

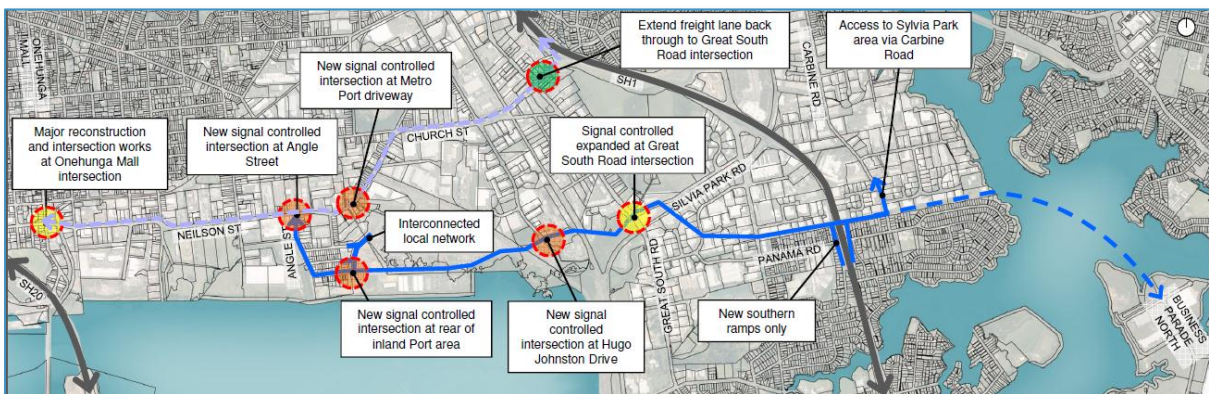
character of the centre.

*Economic and employment:*

- Potential change in activity from light industrial use to higher value uses (such as large format retail) as the area becomes more attractive by way of vehicular accessibility.
- Land acquisition between Hugo Johnston Drive and Great South Road to accommodate the new road.

**10.5 Programme 3 (Option A0 + A2 + A3)**

Description: This programme is very similar to Programme 2 with two key differences. Firstly the connection to SH1 is strengthening via a new link from the Southdown Freight Terminal via Panama Road with south facing ramps at Panama Bridge (rather than at Mt Wellington Interchange as per Programme 2). Secondly, it proposes an additional Tamaki River Crossing to strengthen the Onehunga/Penrose connection with East Tamaki.



**How it delivers against the outcomes:** The option would decrease the travel time for freight between 1.1 min and 5.4min at the SH20 connection and as a result increase the throughput of freight by an estimated 400 vehicles per day by 2026. At the eastern end it reduces the travel time from Southdown to Highbrook (via SH1) by between 4.1 min and 6.7min resulting in an additional 2,700 heavy vehicles per day through the Mt Wellington interchange. The travel times between Southdown and Highbrook reduce by more than 10 minutes if utilising the new A3 link. The programme will improve journey time for PT users by an estimated 6.7min between Onehunga and Sylvia Park and 10 minutes between Mangere Town Centre and Sylvia Park.

**How much will it cost?** The P50 estimate for the programme amounts to \$1,444m with a BCR (including WEBs) of 1.5.

**Risks:**

*Maori, culture and heritage values:*

- Need to avoid significant volcanic features including Te Hopua (Gloucester Park).
- Structural issues for heritage buildings/Waikaraka basalt wall with increased traffic numbers.

*Community and social:*

- Upgrades in the vicinity of Onehunga town centre may adversely impact on the character of the centre.
- Significant potential impacts on existing residential and business communities along the new route (Panama Road).
- Loss of existing residential areas and amenity.
- Loss of local employment land.
- Significant severance impact on existing Riverside residential community.

*Natural environment:*

- Potential impacts on freshwater streams that have been modified and covered.
- Some species are attempting to recolonise parts of their former range in

- The Onehunga aquifers may also be impacted.
- Inability of highly modified land with a predominance of hard surfaces (concrete, tarmac, buildings) to compensate for road runoff.
- Overloading existing stormwater infrastructure which drains into the Mangere Inlet.
- Issues of existing contamination of land and disturbing the contaminants, both on land and within Mangere Inlet.
- Proximity to coastline and impacts on Ann's Creek which is a unique estuarine/salt marsh ecosystem with no possible biodiversity offset.
- Negative impacts from noise and light pollution on wildlife.
- Significant negative impacts on the remaining ecology/biodiversity of the area during construction phase.
- Protect and enhance significant geological values, such as view shafts within the landscape - maunga to maunga, land to coast, (beyond RMA protection).
- Proximity to wildlife habitat on adjacent coast line and Ann's Creek.
- the Mangere, Onehunga area.
- Noise and vibration will impact the ability of these species to recolonise (wrybill, royal spoonbill, white heron, bar-tailed godwit, oyster catcher, pied stilt).
- Length of bridge is likely to have substantial ecological impacts.
- Marine ecological values of Tamaki River/Estuary and Pakuranga Creek are higher than Mangere Inlet.
- Marine footprint (location, bulk, materials) of bridge needs to be constructed with minimal ecological and environmental impact.
- Consideration for water recreational opportunities (sailing, rowing course) already exists and will need to be provided for in any design.
- Significant visual impacts of a bridge 1.5km in length from many viewpoints. Maunga view shafts will be impacted.
- A large bridge will change the ambiance of the Tamaki River which currently exists in its natural form with a topography of an extended and meandering tidal estuary.

*Built form and urban design:*

- Upgrades in the vicinity of Onehunga town centre may adversely impact on the character of the centre.
- Removes residential areas along Panama Road and reduces potential for increased population through intensification close to public transport.

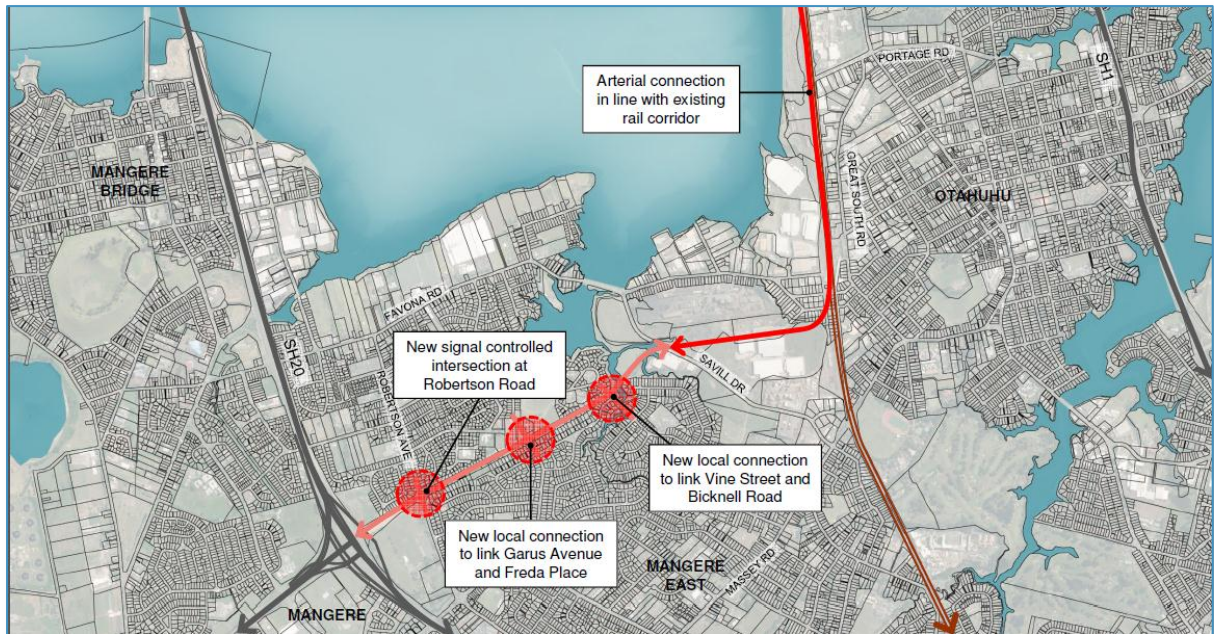
*Economic and employment:*

- Potential change in activity from light industrial use to higher value uses (such as large format retail) as the area becomes more attractive by way of vehicular accessibility.
- Employment land acquisition between Hugo Johnston Drive and Carbine Road to accommodate the new road.
- Significant disruption to local businesses.

## 10.6 Programme 4 (Option A0 + A1 + B0 + B1)

Description: This programme focuses on strengthening of access from both SH1 and SH20 to the Onehunga/Penrose area in a similar way to Programme Option 2. However in addition to those improvements it also attempts to provide additional capacity to the south of the Mangere Inlet to divert through movements away from Neilson Street. This is achieved through the provision of a new arterial between SH20A/SH20 interchange and the Mt Wellington Interchange via Otahuhu. It also includes similar improvements to the FN Network and cycle network as proposed in Programme Option 2.





**How it delivers against the outcomes:** The option would decrease the travel time for freight between 1.2min and 5.8min at the SH20 connection and the new road links to the south has the effect of reducing freight volumes through Onehunga Mall by 1,900 heavy vehicles per day by 2026. At the eastern end it reduces the travel time from Southdown to Highbrook by between 6.4min and 8.9min resulting in an additional 1,800 heavy vehicles per day through the Mt Wellington interchange. The programme will improve journey time for PT users by an estimated 6.7min between Onehunga and Sylvia Park and 10 minutes between Mangere Town Centre and Sylvia Park.

**How much will it cost?** The P50 estimate for the programme amounts to \$2,337m with a BCR (including WEBS) of 1.1.

**Risks:**

*Maori, culture and heritage values:*

- Need to avoid significant volcanic features including Te Hopua (Gloucester Park).
- Structural issues for heritage buildings/Waikaraka basalt wall with increased traffic numbers.

*Community and social:*

- Upgrades in the vicinity of Onehunga town centre may adversely impact on the character of the centre.
- Loss of significant amount of housing in the Mangere East area.
- Disruption to local residential community during the construction phase.
- Air quality issues.

*Natural environment:*

- Potential impacts on freshwater streams that have been modified and covered.
- The Onehunga aquifers may also be impacted.
- Inability of highly modified land with a predominance of hard surfaces (concrete, tarmac, buildings) to compensate for increased road runoff.
- Overloading existing stormwater infrastructure which drains into the Mangere Inlet.
- Issues of existing contamination and disturbing the existing contaminants.
- Impacts on Ann's Creek which is a
- It is critical to retain the mangrove fringe around the southern margin of Mangere Inlet as this estuarine ecosystem serves the ecosystem service of filtering and containing contaminants that flow from the land and halt their passage into the marine receiving environment.
- Significant negative impacts on ecology if mangroves removed.
- Negative impacts on the geological significant areas of Favona and Mangere such as Boggust park explosion crater.
- Negative impacts on wildlife habitat on coastline of Mangere Inlet, Tararata and

- unique estuarine/salt marsh ecosystem with no possible biodiversity offset.
- Negative impacts from noise and light pollution on wildlife.
- Significant negative impacts on the remaining ecology/biodiversity of the area during construction phase.
- Protect and enhance significant geological values, such as view shafts within the landscape - maunga to maunga, land to coast, (beyond RMA protection).
- Increased runoff from roading construction into Tararata and Harania Creeks will exacerbate the contamination levels within the Mangere Inlet.

- Harania Creeks.
- Disturbance to contaminated soil.
- Increased runoff and requirement to divert contaminants to land based treatment.
- Retain established mangrove forest along this coastline.
- Ann's Creek is a critically threatened saltmarsh ecosystem and should be avoided.
- Visual linkages to Maunga to be protected.

*Built form and urban design:*

- Upgrades in the vicinity of Onehunga town centre may adversely impact on the character of the centre.

- Does not connect with existing centres.
- Ability to increase density and access to public transport along the corridor is limited.

*Economic and employment:*

- Potential change in activity from light industrial use to higher value uses (such as large format retail) as the area becomes more attractive by way of vehicular accessibility.
- Land acquisition between Hugo Johnston Drive and Great South Road to accommodate the new road.
- Development of a new local centre does not align with the Auckland Plan.

- Impacts directly on rail sidings which could have negative impact on associated employment opportunities.
- It also limits the capacity of the area to accommodate future growth in rail freight movements. Potential adverse impact on the operation of Pacific Steel.

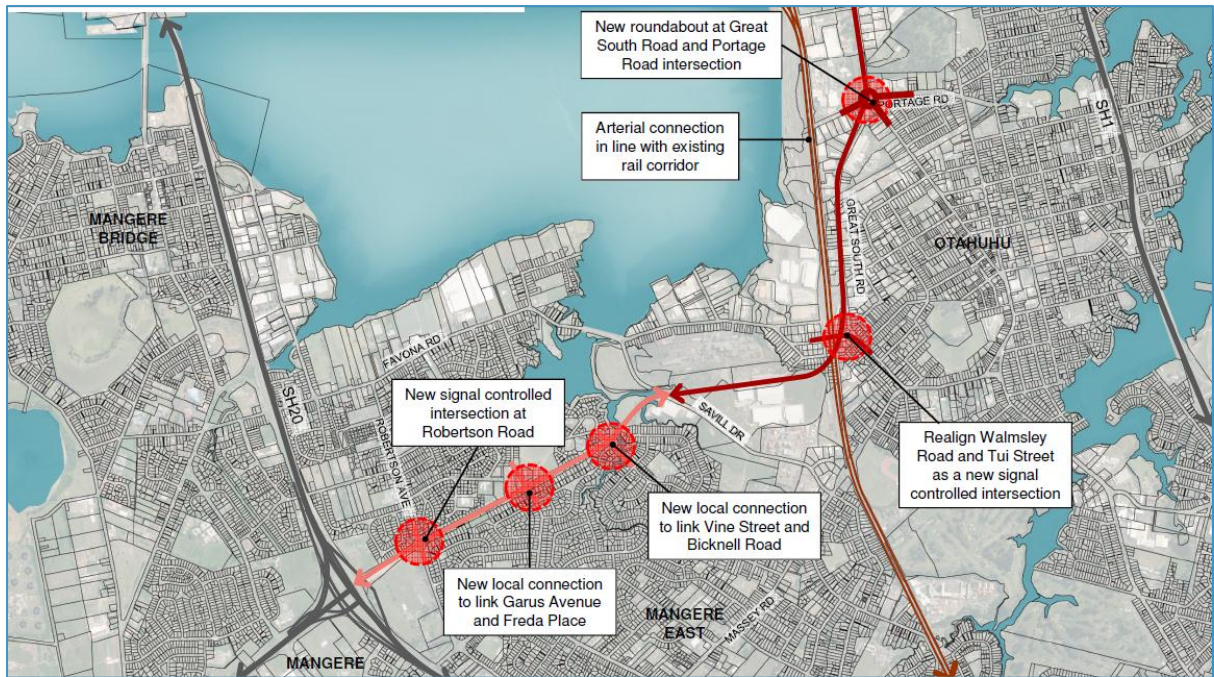
*Transport:*

- Increases demand on the Great South Road and Sylvia Park Road intersection, which could require capacity improvements.

- CPTED issues associated with new coastal walkways will need to be resolved through detailed design.

## 10.7 Programme 5 (Option A0 + A1 + B0 + B2)

Description: This programme is very similar to Programme 2 with one key difference. The connection between Otahuhu and Mt Wellington Interchange is achieved through an upgrade of Great South Road and Salesyard Road rather than providing a new link above the rail corridor.



**How it delivers against the outcomes:** The option would decrease the travel time for freight between 1.2min and 5.7min at the SH20 connection and the new road links to the south has the effect of reducing freight volumes through Onehunga Mall by 1,800 heavy vehicles per day by 2026. At the eastern end it reduces the travel time from Southdown to Highbrook by between 6.4min and 9.1 min resulting in an additional 1,600 heavy vehicles per day through the Mt Wellington interchange. The programme will improve journey time for PT users by an estimated 6.7min between Onehunga and Sylvia Park and 10 minutes between Mangere Town Centre and Sylvia Park.

**How much will it cost?** The P50 estimate for the programme amounts to \$1,471 m with a BCR (including WEBs) of 1.7.

**Risks:**

*Maori, culture and heritage values:*

- Need to avoid significant volcanic features including Te Hopua (Gloucester Park).
- Structural issues for heritage buildings/Waikaraka basalt wall with increased traffic numbers.

*Community and social:*

- Upgrades in the vicinity of Onehunga town centre may adversely impact on the character of the centre.
- Loss of significant amount of housing in the Mangere East area.
- Disruption to local residential community during the construction phase.
- Increase traffic volume on Great South Road and impact on walking and cycle safety, particularly around the Otahuhu Town Centre where pedestrian activity is high.
- More difficult to make east-west crossings along Great South Road.
- Negative impact on air quality due to increased traffic volume on Great South Road.

*Natural environment:*

- Potential impacts on freshwater streams that have been modified and covered.
- The Onehunga aquifers may also be impacted. Inability of highly modified land with a predominance of hard surfaces (concrete, tarmac, buildings) to compensate for increased road runoff.
- Overloading existing stormwater
- Significant negative impacts on ecology if mangroves removed.
- Negative impacts on the geological significant areas of Favona and Mangere such as Boggust park explosion crater.
- Negative impacts on wildlife habitat on coastline of Mangere Inlet, Tararata and Harania Creeks.

- infrastructure which drains into the Mangere Inlet.
- Issues of existing contamination and disturbing the existing contaminants. Impacts on Ann's Creek which is a unique estuarine/salt marsh ecosystem with no possible biodiversity offset.
- Negative impacts from noise and light pollution on wildlife.
- Significant negative impacts on the remaining ecology/biodiversity of the area during construction phase.
- Protect and enhance significant geological values, such as view shafts within the landscape - maunga to maunga, land to coast, (beyond RMA protection).
- Increased runoff from roading construction into Tararata and Harania Creeks will exacerbate the contamination levels within the Mangere Inlet.
- It is critical to retain the mangrove fringe around the southern margin of Mangere Inlet as this estuarine ecosystem serves the ecosystem service of filtering and containing contaminants that flow from the land and halt their passage into the marine receiving environment.
- Proposed alignment runs through areas of highly degraded terrestrial environment with very little ecological value remaining.
- Contamination from road runoff and air pollution is high which currently impacts on any remaining biodiversity in the area.
- Construction of the new arterial road will further exacerbate the degradation of the terrestrial environment.
- The alignment being set back from the coastal edge provides very little coastal amenity for the local community.
- However, this could be improved with green links from Great South Road to the eastern edge of the Mangere Inlet.
- Noise and vibration impacts

*Built form and urban design:*

- Upgrades in the vicinity of Onehunga town centre may adversely impact on the character of the centre.

*Economic and employment:*

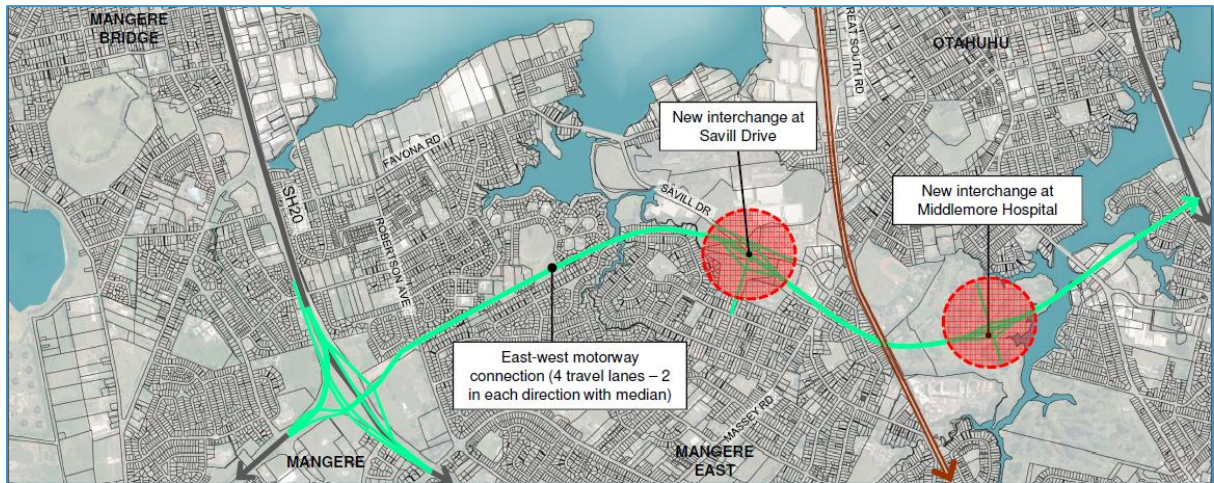
- Potential change in activity from light industrial use to higher value uses (such as large format retail) as the area becomes more attractive by way of vehicular accessibility.
- Land acquisition between Hugo Johnston Drive and Great South Road to accommodate the new road.
- Development of a new local centre does not align with the Auckland Plan.
- Disruption to local businesses during the construction phase, particularly along Salesyard Road and Great South Road (Otahuhu Town Centre).

*Transport:*

- Increase traffic volume on Great South Road and impact on east west connectivity.

## 10.8 Programme 6 (Option A0 + A1 + C1)

Description: This programme focuses on strengthening of access from both SH1 and SH20 to the Onehunga/Penrose area in a similar way to Programme Option 2. However in addition to those improvements it also attempts to provide additional capacity to the south of the Mangere Inlet to divert through movements away from Neilson Street as well as improving the connectivity between East Tamaki, Middlemore and the Airport. This is achieved through the provision of a new motorway between SH20A/SH20 interchange and the Highbrook Drive interchange. The link includes two new interchanges, one at Middlemore Hospital and one at Pacific Steel. It also includes similar improvements to the FN Network and cycle network as proposed in Programme Option 2.



**How it delivers against the outcomes:** The option would decrease the travel time for freight between 1.3min and 6.3min at the SH20 connection and the new road links to the south has the effect of reducing freight volumes through Onehunga Mall by 2,000 heavy vehicles per day by 2026. At the eastern end it reduces the travel time from Southdown to Highbrook by between 6.4min and 9.9min resulting in an additional 3,100 heavy vehicles per day through the Mt Wellington interchange. The programme will improve journey time for PT users by an estimated 6.7min between Onehunga and Sylvia Park and 10 minutes between Mangere Town Centre and Sylvia Park.

**How much will it cost?** The P50 estimate for the programme amounts to \$2,022m with a BCR (including WEBs) of 1.5. (The BCR increases to 1.7 when implementation is staged over 20 years)

**Risks:**

*Maori, culture and heritage values:*

- Need to avoid significant volcanic features including Te Hopua (Gloucester Park).
- Structural issues for heritage buildings/Waikaraka basalt wall with increased traffic numbers.
- Built heritage assets in the proximity of the motorway alignment include, Kings College, Middlemore Hospital, Otahuhu College and a variety of historical residences and retail buildings.

*Community and social:*

- Upgrades in the vicinity of Onehunga town centre may adversely impact on the character of the centre.
- Loss of significant amount of housing in the Mangere East area.
- Part of the motorway alignment run parallel to the southern boundary of 'The Global Indian International School' located in Favona.
- Negative air quality and vibration impacts during and post construction.
- Disruption to existing communities during the construction phase.
- Significant severance between the Favona community and Mangere East community to the south. Significant loss of existing open space reserve area and reserve sports area.

*Natural environment:*

- Potential impacts on freshwater streams that have been modified and covered.
- The Onehunga aquifers may also be impacted.
- Inability of highly modified land with a predominance of hard surfaces (concrete, tarmac, buildings) to compensate for increased road runoff.
- Overloading existing stormwater infrastructure which drains into the Mangere Inlet.
- Issues of existing contamination and
- Potential impact on the upper reaches of the Tamaki River; especially the Laureston/Halcyon Esplanade Reserve.
- Construction of the motorway will also involve substantial earth moving and marine estuarine disruption, and impact upon the terrestrial and marine environments.
- Important to avoid any further contamination of the Tamaki River marine receiving environment.
- Negative impact on the remaining

- disturbing the existing contaminants.
- Impacts on Ann's Creek which is a unique estuarine/salt marsh ecosystem with no possible biodiversity offset.
- Negative impacts from noise and light pollution on wildlife.
- Significant negative impacts on the remaining ecology/biodiversity of the area during construction phase.
- Protect and enhance significant geological values, such as view shafts within the landscape - maunga to maunga, land to coast, (beyond RMA protection).

- biodiversity that retain populations in the reserve and open space areas of, Laureston/Halcyon Esplanade Reserve, The Auckland Golf Course, The Grange Golf Course and other reserves and parks.
- Impose upon the view shafts of the maunga and Tamaki River.

*Built form and urban design:*

- Upgrades in the vicinity of Onehunga town centre may adversely impact on the character of the centre.
- Potential to undermine Mangere Town Centre if no access is provided to motorway network from the centre.
- Limited opportunity to improve built form environment, creates further separation of community if not underground and does not replace housing/ community/ recreational assets for community.
- If not underground then severely negative.

*Economic and employment:*

- : Potential change in activity from light industrial use to higher value uses (such as large format retail) as the area becomes more attractive by way of vehicular accessibility.
- Land acquisition between Hugo Johnston Drive and Great South Road to accommodate the new road.

*Transport:*

- Increases vehicle movement around new motorway interchanges at Savill Drive and Middlemore Hospital.
- Increase access for car borne traffic and car dependency over the immediate medium term.

## 10.9 Assessment of options

The programme options were assessed against the following criteria:

- A qualitative assessment of each programme's ability to deliver the benefits listed within the ILM.
- A quantitative analysis of the transportation benefits to determine if higher cost programme options are economically justified over lower investment options.
- The programmes were further assessed through the IBD workshop process based on how each programme:
  - Supporting better social outcomes;
  - Supporting better environmental outcomes;
  - Increased the availability of quality transport options
  - Provide a more efficient transport network;
  - Support growth and a quality urban form;
  - Support economic growth and enhanced productivity;
  - Provide value for money.
  - Reflecting Maori values

## 10.10 Qualitative assessment to deliver the benefits listed within the ILM

The project team assessed each programme against the six benefit statements listed in the ILM. The worksheets for this assessment are attached as Appendix A and are summarised in the table below. This assessment indicates that programme options that expand the strategic road network has the

ability to deliver a higher proportion of the benefits sought in the ILM than programme options that only improve connectivity to the area.

### Summary of Assessment against Benefit Statements

Programme	1 Option D	2 Option A0 + A1	3 Option A0 + A2+ A3	4 Option A0 + A1 + B0 + B1	5 Option A0 + A1 + B0 + B2	6 Option A0 + A1 + C1
Greater business connectivity (25%)	25%	60%	70%	75%	85%	90%
Greater economic throughput in and out of the area (20%)	40%	65%	75%	85%	80%	95%
Greater control over congestion (20%)	25%	70%	70%	80%	75%	90%
More predictable travel times and lower average travel times (15%)	10%	60%	70%	75%	75%	90%
Improved safety (10%)	30%	40%	55%	60%	70%	85%
Improved accessibility (10%)	30%	75%	80%	85%	85%	75%
<b>Percentage of full benefit to be delivered</b>	<b>27%</b>	<b>63%</b>	<b>71%</b>	<b>78%</b>	<b>77%</b>	<b>89%</b>

Programme Option 1's achievement has been assessed unsatisfactorily against the outcomes sought in the ILM. All other programmes were rated as achieving satisfactorily against these outcomes with options that introduce a full strategic link between the two state highways contributing significantly towards the outcomes.

The strategic link options do however all come with a significant risk envelope as well - with Programme Option 2 viewed as the lowest risk option.

### 10.11 Cost benefit analysis

High-level estimates were prepared for each of the various Programme Options. Estimates were done to a level suitable to the conceptual nature of the project design and appropriate to a Programme Business Case. Estimates were based on simplified concept diagrams and high-level assessments of general quantities.

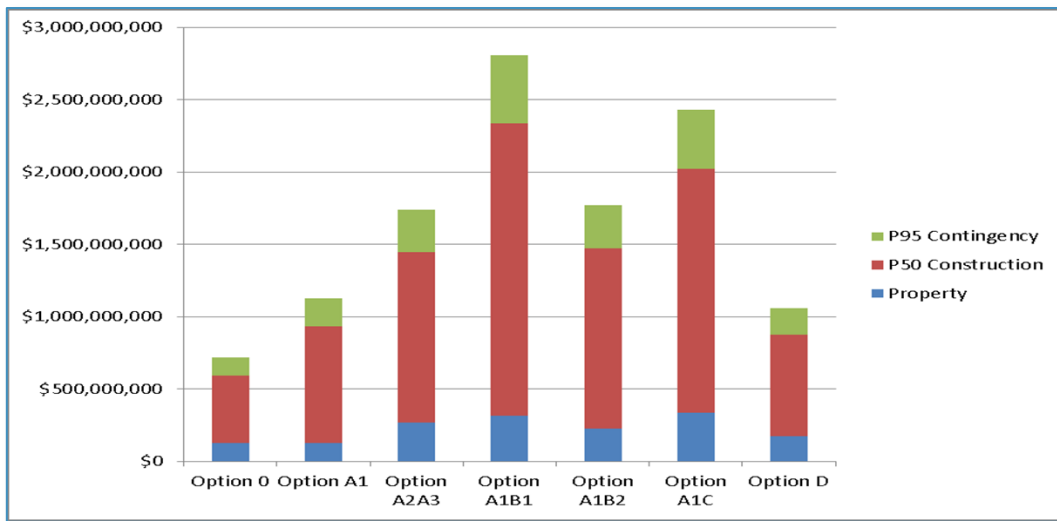
Allowances for investigation, design, consenting and construction supervision fees were included through broad percentage values. Contingencies (as approved by VAC) were added to the base estimates to get 50th percentile (P50) estimates, while additional contingencies of 20% were then added to get estimated 95%ile (P95) values.

A value of \$50million was allowed for walking and cycling initiatives and a further \$35 million for completing of the 3rd rail line, Wiri - Westfield, (electrified). These were adopted for all programme options.

The cycle initiatives included investment in the following routes:

- Waikaraka cycleway connection (Mangere bridge to Sylvia Park)
- Mount Smart Road connection to Penrose Road
- Church Street connection to existing SEART cycleway
- Favona Road cycle option
- Buckland Road and Massey Road cycle option

The estimates are illustrated in the chart below.



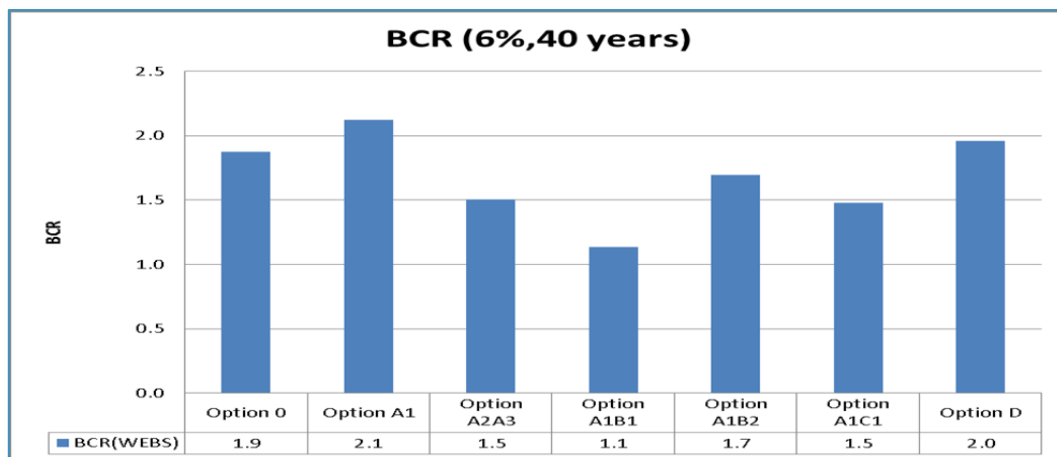
An economic evaluation was then undertaken based on models for 3 peak periods (AM, inter and PM peaks), for the 2026 and 2041 horizons. The economic evaluation has been undertaken in accordance with the NZ Transport Agency Economic Evaluation Manual (EEM), as updated in 2012.

The key aspects of this evaluation include:

- Vehicle travel time and vehicle operating cost benefits have been taken from the traffic model
- Public transport user benefits have been taken from the demand and generalised costs in the ART3 model;
- Decongestion as a result of motorists switching to public transport has been based on the predicted reduction in vehicle kilometres travelled (VKT) and assessed at a rate of \$1.56/km, as derived from the EEM ;
- Reliability benefits have been estimated from travel time benefits at 8% for vehicles and 30% for public transport;
- Cycle benefits have been estimated at \$1.45/km and growing from 100/day to 300/day in 2041
- PT user benefits are based on the same value of time as car drivers;
- The evaluation has used a 40-year analysis period and a 6% discount rate.

Wider Economic Benefits (WEBs), including agglomeration, for 2041 were calculated using economic inputs and outputs from the traffic models related to travel costs. The agglomeration was applied to the economic analysis as a % of the transport benefits, based on the initial 2041 agglomeration work.

The figure below shows the benefit cost ratio for each programme.





A quantitative analysis of the transportation benefits were then undertaken to determine if higher cost programme options are economically justified over lower investment options.

This followed the incremental BCR analysis methodology. The incremental analysis has been done in two different ways,

- Firstly by assessing the BCR’s of the options against two different base scenarios namely:
  - A programme that includes all common elements across all programmes – referred to as Option 0
  - Option A1
- Secondly, the more traditional incremental analysis where the options are assessed from lowest-to-highest cost order, with the base for each assessment depending on where the previous assessment exceeded the incremental BCR threshold value. An incremental BCRs threshold of 1.0 is used to indicate if the higher-cost option is justified.

The assessments with Option 0 and Option A1 as the base are shown in the table below.

Base	Option A1	Option A2A3	Option A1+B1	Option A1 + B2	Option A1 + C	Option D
Option 0	2.8	1.2	0.8	1.5	1.3	2.2
Option A1	n/a	0.4	0.5	0.9	0.9	n/a

This analysis suggests that Programme 4 (Option A1B1) is not economically justified over the common elements of Option 0, but all other options being economically worthwhile. The analysis using Programme 2 (Option A1) as a base shows that the extra cost of Programme 3 (Option A2A3) and Programme 4 (Option A1B1) is not indicated as being justified over just having Option A1.

Programme Options 5 and 6 could potentially be justified over Programme Option 2.

The more traditional incremental assessment is tabulated below. It shows the following:

- Programme 1 (Option D) is strongly justified over the Do Minimum (Option 0)
- Programme 2 (Option A1) is strongly is justified over Programme 1 (Option D)
- Programme 3 (Option A3) is NOT justified over Programme 2 (Option A1)
- The incremental cost for proceeding to Programme 5 (Option A1B2) or Programme 6 (A1C1) marginally exceeds the incremental benefits (with incremental BCRs of 0.9 for each). Further work is recommended before concluding its justification given the high level nature of cost and benefit assessment to date.
- Programme 4 (Option A1B1) is NOT justified over Programme 2 (Option A1) given the significant gap to close to achieve an incremental BCR of 1.0.

This suggests that Programme 2 (Option A1) is the economically preferred option.

Step	Base Cost for Comparison			Next Higher Cost Option			Incremental Analysis				Base Option for next step
	Option	Costs	Road User Benefits	Option	Costs	Road User Benefits	Incremental Costs	Incremental Benefits	Incremental BCR	NPV	
1	Option 0	535.442	1004.887	Option D	705.94	1383.91	170.49	379.02	2.2	208.5	Option D
2	Option D	705.936	1383.907	Option A1	737.64	1567.02	31.71	183.11	5.8	151.4	Option A1
3	Option A1	737.643	1567.016	Option A2A3	1147.09	1727.87	409.45	160.85	0.4	-248.6	Option A1
4	Option A1	737.643	1567.016	Option A1B2	1160.87	1967.12	423.23	400.11	0.9	-23.1	Option A1
5	Option A1	737.643	1567.016	Option A1C1	1591.87	2351.13	854.23	784.11	0.9	-70.1	Option A1
6	Option A1	737.643	1567.016	Option A1B1	1816.14	2058.33	1078.50	491.31	0.5	-587.2	Option A1

Sensitivity to the discount rate was tested for and had no effect on the ranking of Options. Sensitivity to growth assumptions was not explicitly tested for. Most projects at detailed business case will

consider sensitivity to growth, often just via testing the economic spreadsheet and it is rare for full modelling of multiple land use scenarios to be undertaken. The modelling for the EWL uses a land use scenario that is common for all transport modelling in Auckland.

## 10.12 Assessment of options through the IBD workshop process

Urbanismplus Ltd was commissioned to facilitate the East West Link workshop using an integrated urban design approach to transportation design and evaluation. Within a collaborative framework, the workshop involved relevant NZTA, Auckland Transport, Auckland Council (AC), consultant participants and Iwi participants.

Using an interactive inquiry-by-design process, the East West Link workshop ultimately sought to:

- Achieve a deeper understanding of the complexities of the project and in particular, the strategic freight and other movement demands.
- Better integration of the diverse range of relevant issues including local context and environmental considerations around options development.
- A high level understanding of the staging ability, cost implications and value benefits of different transport options.
- To equitably accommodate both land use and transport objectives in option development.
- Identify an agreed set of transport options that represent the various characteristics of the study area and the technical challenges within it.

The East West Link workshop had representation and involvement from government agencies and consultants. Senior officers from NZTA, Auckland Transport, and Auckland Council formed the core technical team and Client group involved Mana Whenua. Invited external consultant specialists included nominated representatives of BECA (technical transport engineering and modelling), Ascari Partners Ltd (Economic and Business Case development) and Richard Paling Consulting Ltd (Economic development advice).

The workshop consultant team included representatives of Urbanismplus (urban design), Jim Higgs of TTM Consulting Pty Ltd (integrated transport specialist), and Craig Pocock of Pocock Design: Environment Ltd (landscape and sustainability specialist).

In broad terms the workshop had multi-disciplinary representation within the following broad skill sets:

- Strategic transport planning (city and region wide);
- Passenger transport planning;
- Urban design;
- Urban planning;
- Community planning;
- Economic development strategy;
- Open space planning, ecology and landscape architecture;
- Mana Whenua and heritage values.

The final options evaluation framework includes eight discipline themes of assessment and respective criteria are detailed in Appendix B to this report (and more detail in Urbanism+ report).

- Reflecting Maori values (subject to separate Mana Whenua reporting)
- Supporting better social outcomes
- Support better environmental outcomes
- Increased availability of quality transport options
- A more efficient transport network
- Support growth and a quality urban form
- Support economic growth and enhanced productivity
- Value for money

At the workshop, discipline-specific themes as well as multi-disciplinary groups debated the options and provided direct feedback against the criteria. The result is a partially quantitative, partially qualitative and overall judgement-based (subjective) comparison between the options.

## 11 Recommended Programme

Programme 2 is recommended to progress further to indicative/detailed business case stage. This programme responds to the immediate transport issues in the Onehunga/Penrose area by providing more efficient and reliable connections to the state highways.

The programme also addresses the immediate issues to AT's 'New Network' along Massey Road to provide infrastructure to ensure a faster more reliable service between Mangere Town Centre - Otahuhu and Sylvia Park.

Beyond the immediate response it has been identified that there may be a need to support further transport investment in the East West study area. This is in response to the longer term issue of Auckland's anticipated growth and the likely impact on the transport network in the area. Further investigation will be required to determine the justification for additional investment in Programme 5 or 6.

### 11.1 Core elements of the programme

The recommended strategy for progressing the EWL is a package that directly responds to the immediate freight access issues at either end of the Neilson / Church corridor and the public transport issues between Mangere - Otahuhu and Sylvia Park. Further work is still required prior to confirming the need to invest beyond this package. Appendix C summarises the recommended response to the immediate transport issues.

Programme Option 2 (A0+A1) was identified as the priority for implementation, accompanied by the essential improvements:

- Roading improvements focused on upgrades (as part of A0) and better connections to state highways (included as part of Option A1).
- Investment in public transport and cycling. Public transport interchanges and frequent network routes upgraded - potential bus priority, bus lanes.
- New or upgraded cycle links between centres public transport and cycling investment alone not enough to deal with congestion.

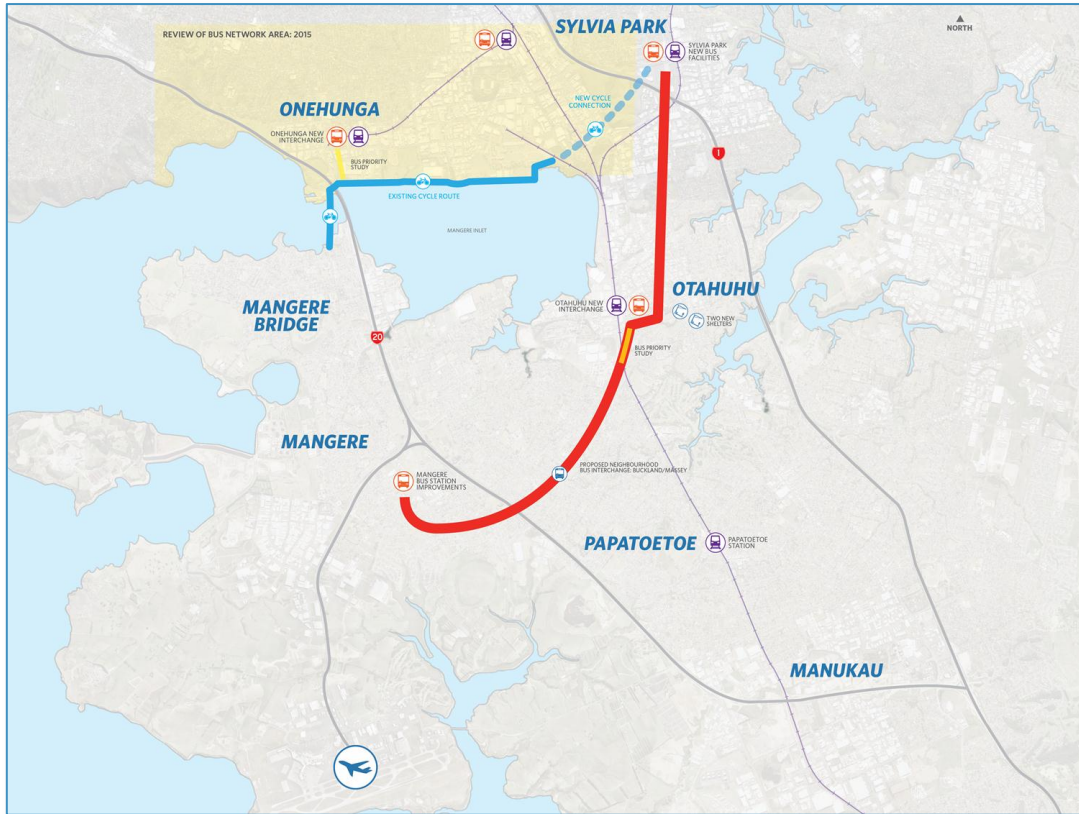
The following essential (core) freight improvements were identified to be progressed to detailed business case stage (illustrated in the figure below):



These improvements include the following:

- Local access roads connecting MetroPort to local roads south of Neilson St (the form of this changes with option A1)
- Freight priority lanes at key intersections (A0), including Neilson Church, Church/ Hugo Johnston, Church/Gt South Rd, Gt South/Sylvia Park, Sylvia Park Road/Mt Wellington Highway (the extent of these lanes does differ with some of the other options)
- Traffic signals at Neilson St/MetroPort (A0)
- Intersection upgrade (widening) at Neilson St/Onehunga Mall
- Auxiliary lanes on SH20 between Neilson St and Queenstown Road

The following essential (core) public transport and active mode improvements were identified to be progressed to detailed business case stage (illustrated in the figure below): (*The Otahuhu bus/rail interchange to progress to pre implementation business case*).



These improvements include the following:

- Completion of the Mangere Bridge to Sylvia Park cycle metro
- Completion of the Otahuhu bus/rail interchange
- Improvement of the Mangere Town Centre – Otahuhu – Sylvia Park FN route. This requires bus priority where needed<sup>13</sup>, improved bus stop amenity, neighbourhood interchange and improvements to the Mangere Town Centre stops.

Progressing the freight elements provide a response to the immediate issues in the Onehunga/Penrose area and delivers benefits to the industry in this area. AT will roll out services on its new frequent network in mid 2015 and improvements along the Mangere – Sylvia Park PT route is essential to ensure a quality service to its customers.

The preferred programme for delivery would cost approximately \$935m-1,120m and is detailed in Section 13 of the business case.

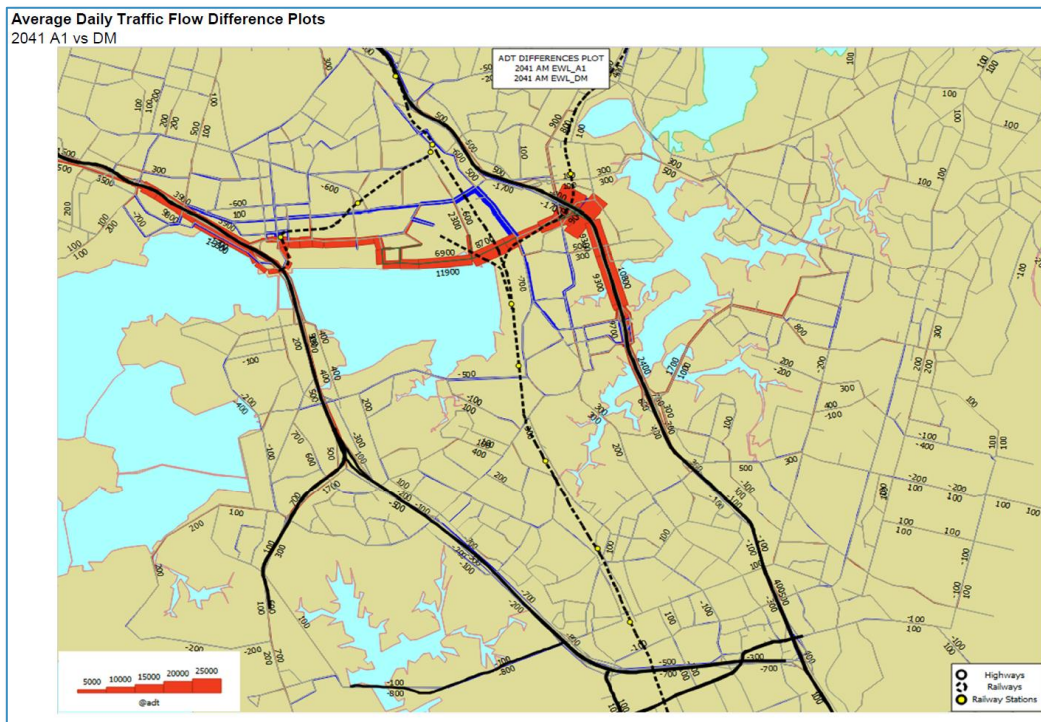
## 11.2 Benefits of the programme

Programme 2 has the following benefits on the transport network:

- It improves accessibility to the Onehunga Penrose area. To the west it removes the bottleneck at Onehunga Mall intersection and this has the benefit of reducing travel times for freight entering the state highway network by up to 6 minutes.
- To the east it introduces a new road link. The new connection between the Southdown Freight Terminal and SH1 will bypass 5 signalised intersections and has the potential to reduce travel times for freight by up to 9 minutes.
- The travel time benefits were assessed to provide approximately \$52 million per annum by 2026, increasing to \$116m per annum by 2041.
- The improvements along the Mangere-Otahuhu-Sylvia Park PT corridor is expected to deliver a journey time that represents an average of 30 km/h. It will also reduce the variability in travel time making the bus rail integration at Otahuhu work more efficiently.

<sup>13</sup> Options report express desire to improve journey times to 13mins between Mangere and Otahuhu and 7 mins between Otahuhu and Sylvia Park -

- Completing the cycle metro will make it possible to cycle from Mangere Bridge to Sylvia Park on a route entirely separated from traffic and freight – providing a safer option to encourage uptake of this mode along this route.
- The new roading connections proposed as part of Programme 2 also have the benefit of reducing rat running through residential streets in Onehunga and Oranga as illustrated in the diagram below (blue colour depicts reductions in flow whilst red shows increase in flows). It therefore contributes to safer streets and more liveable communities within this area.
- The programme is expected to reduce the vehicle flow along Great South Road (between Church and Sylvia Park Roads), by removing the through traffic component in this area. This again reduce the through vs. accessibility conflict along this stretch of road.
- Heavy vehicle flows are also expected to reduce along Favona Road and through the Otahuhu town centre.



### 11.3 Programme Implementation Strategy & Trigger Points

The indicative programme implementation approach is comprised of three steps:

- Improvements targeted at the connectivity of freight to Onehunga/Penrose to be implemented first with targeted completed by 2019.
- Initial to remove PT bottlenecks along Massey Road will also be considered to align with the new network opening in 2016.
- The remainder of the PT investment and cycle improvements were considered in the period between 2020 and 2025.
- Improvements to freight along Highbrook Drive also considered in the period between 2020 and 2025.
- Further consideration is required to determine the need for additional investment in Programme 5 or 6. Further east-west connectivity to address conflicts between through and local traffic due to planned growth at the Airport and East Tamaki to be implemented post 2025.

Diagram below illustrates the anticipated programme for implementation.

	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25
<b>Freight Improvements</b>											
SH20 Improvements Gloucester Park Interchange to Queenstown Rd											
Onehunga Mall Intersection Improvement											
SH1 Mt Wellington IC access Improvements											
Southdown Link to SH1											
Nelson St upgrade											
New local roads south of Nelson Street											
Highbrook Dr Improvements											
Third freight main											
<b>Public Transport Improvements</b>											
- Otahuhu Bus Rail Interchange											
- Mangere - Sylvia Park FN Improvements (key bottlenecks)											
- Mangere - Sylvia Park FN Improvements (remainder of corridor)											
- Mangere to Onehunga FN Improvements											
- Onehunga to Sylvia Park FN Improvements											
Walking and Cycling components											
DBC = Detailed Business Case											
PI = Pre-Implementation (Detailed Design, Consents and Property)											
I = Implementation (Construction)											

## 11.4 Further consideration

Over the longer term, the evidence clearly indicates that traffic growth in the next three decades will justify further investment to separate the flow of local and through traffic that would otherwise use the Nielson St corridor, as increasing conflicts will serve to reduce the level of accessibility for local business along the corridor.

The further investigation of Programmes 5 and 6 (Options B and C) is primarily intended to address these longer-term problems associated with the deficiencies in the transport network hierarchy in the EWL area and the need for further east-west connectivity to address growing conflicts between through and local traffic. This will need to take account of the complex social, environmental and economic characteristics of the area. Further investigation and community consultation is now required to determine how this is to be achieved. Consultation on this phase is expected to commence in 2014. Also, in order to support recent changes in supply chain strategies, there is a need to undertake further investigation to ensure sufficient rail capacity is provided in coordination with the additional road capacity within Programme 2 (A0 + A1).

Anticipated growth in rail-based freight movements between Ports of Auckland and their inland port in Wiri as well as into and out of the Southdown Rail Freight Terminal is likely to be constrained by the ability of the rail network to accommodate the increased movements. The rail corridor between Wiri and Southdown is coming under increasing pressure, which will only be further exacerbated by the demand for increased rail based freight movements and increased frequency of passenger train movements on the same network. Auckland's freight supply chain is increasingly dependent on the North Island Main Trunk (NIMT) rail line being triple tracked. A separate business case (by the appropriate entity) will be required to justify investment in a third rail line on the NIMT to maintain the efficiency of the freight supply chain.

## 12 Recommended Programme – Assessment

The preferred programme was subjected to an initial assessment using NZTA’s assessment framework and scored H/H/M.

### 12.1 Assessment Profile

The programme was assessed using the latest NZTA Investment and Revenue Strategy profiles. An assessment profile of H/H/M has been determined for the programme using the NZTA’s process as detailed below:

The NZTA’s IRS is a tool which guides investment decisions in giving effect to the GPS 2012. It enables smarter decisions by ensuring investment is directed to the activities which will be most effective in delivering on national priorities and long term outcomes. In short, it helps to invest in the right things, at the right time, delivered in the right way and for the best possible price.

The EWL project addresses or responds to the IRS in the following ways:

	IRS Assessment Criteria	EWL programme option
<b>Strategic Fit (High)</b>	<p>New and improved infrastructure for state highways/local roads; potential for a nationally significant contribution to economic growth and productivity through significant improvements to (one or more):</p> <ul style="list-style-type: none"> <li>• Journey time reliability</li> <li>• Easing of severe congestion in major urban areas</li> <li>• Relieving capacity constraints</li> <li>• More efficient freight supply chains</li> <li>• A secure and resilient transport network</li> </ul>	<p>The recommended programme delivers improvements to known areas of congestion along high volume strategic urban routes. It targets first and foremost greater journey time reliability for freight, and providing improved connectivity especially along strategic freight routes and for strategic freight movements. Improvements to the linkages in the transport network will provide for greater network resilience of Auckland’s key supply chains, both for goods coming into the region and national and international exports from Auckland.</p>
<b>Effectiveness (High)</b>	<ul style="list-style-type: none"> <li>• Is a key component of an NZTA supported strategy, endorsed package, programme or plan</li> <li>• Is part of a whole of network approach</li> <li>• Improves integration between transport modes</li> <li>• Provides a solution that successfully integrates land transport, land use, other infrastructure and activities</li> <li>• Supports networks from a national perspective</li> <li>• Provides a solution that significantly contributes to multiple GPS impacts</li> <li>• Is optimised against multiple transport outcomes and objectives</li> </ul>	<p>The programme takes a one-system approach; is a joint AT/NZTA project considering potential state highway and local road solutions; considers better utilisation of the public transport network; and considers cycle connectivity and pedestrian safety and amenity. The project seeks to address the poor quality of transport choices to/from and within the study area, which is potentially hindering the development of liveable communities.</p>
<b>Efficiency (Medium)</b>	<p><b>High:</b> BCR greater than or equal to 4 Benchmarking shows above-average efficiency (of cost-effectiveness)</p> <p><b>Medium:</b></p>	<p>An economic evaluation has been undertaken in accordance with the NZ Transport Agency Economic Evaluation Manual (EEM), as updated in 2012.</p> <p>These were based on models for 3 peak periods</p>



	<p>BCR greater than or equal to 2 and below 4          Benchmarking shows average efficiency (of cost-effectiveness)</p> <p><b>Low:</b>          BCR greater than or equal to 1 and below 2          Benchmarking shows below-average efficiency (of cost-effectiveness)</p>	<p>(AM,inter and PM peaks), for the year 2041 and also include a horizon for the year 2026.          Wider Economic Benefits (WEBs), including agglomeration, for 2041 were using economic inputs and outputs from the traffic models related to travel costs.          The recommended programme (programme 2) achieved a BCR of 2.1.</p>
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## 13 Programme Financial Case

### 13.1 Indicative cost

A high-level estimate of the various individual elements within the recommended programme was assessed. Estimates were done to a level suitable to the conceptual nature of the project design and appropriate to a Programme Business Case. It was based on simplified concept diagrams and high-level assessments of general quantities.

Allowances for investigation, design, consenting and construction supervision fees were included through broad percentage values. As approved by VAC, were added to the base estimates to get 50th percentile (P50) estimates, while additional contingencies of 20% were then added to get estimated 95th percentile (P95) values.

The high level breakdown for the programme is summarised below

	Programme option 2
Property	\$126m
Construction	\$809m
P50	\$935m
P95	\$1,127m

These estimates are made up of nine elements, consisting of freight improvements, PT improvements and walking and cycling initiatives. A value of \$50million was adopted for walking and cycling initiatives and \$35 million was also included for completing the section of the 3rd freight main - the section between Wiri - Westfield, (electrified).

#### Elements within the package and cost ranges (P50 - P95)

Item	Programme Element	State Highway Cost range (\$M)	Local Road Cost range (\$M)	Cumulative
<b>Freight Improvement package north of Mangere Inlet (accelerated package)</b>				
1	SH20 Improvements Gloucester Park Interchange to Queenstown Rd	44 - 53		44 - 53
2	Onehunga Mall intersection improvement		31 - 37	75 - 90
3	SH1 Mt Wellington I/C access Improvements	169 - 203	-	244 - 293
4	Southdown Link to SH1	247 - 296*		491 - 589
5	Neilson St upgrade	-	34 - 41	525 - 630
7	New local roads south of Neilson Street		27 - 32	552 - 662
<b>PT and active mode improvement package (short term)</b>				
8	Otahuhu Bus/Rail Interchange		22 - 26	574 - 688
9	Mangere T/C to Sylvia Park FN upgrade		18 - 21	592 - 709
<b>Freight, PT and active mode improvement package (longer term)</b>				
6	North Island Main Trunk 3 <sup>rd</sup> rail line (Westfield to Wiri)	**		
8	Highbrook Drive improvements		18 - 21	610 - 730
8	Public Transport Improvements		240 - 288	850 - 1018
9	Walking and Cycling Improvements		50 - 60	900 - 1078
<b>TOTAL</b>				935 - 1,120 ***

*The Southdown Link project could be classified as either nationally strategic or local road.*

*\*\* The cost range for this is \$35 - \$42m.*

*\*\*\* Includes the cost range for completion of the third freight main*

## 13.2 Indicative benefits

The economic evaluation has been undertaken in accordance with the NZ Transport Agency Economic Evaluation Manual (EEM), as updated in 2012. The economic worksheets are included in a separate report<sup>14</sup>. The key aspects of this evaluation include:

- The economic evaluation is based on models for 3 peak periods (AM, inter and PM peaks), for the years 2026 and 2041;
- A Fixed Trip Matrix (FTM) methodology has been used to calculate the vehicle benefits (using the Do Minimum matrices);
- Vehicle travel time and vehicle operating cost benefits have been taken from the traffic model Public transport user benefits have been taken from the demand and generalised costs in the ART3 model;
- Decongestion as a result of motorists switching to public transport has been based on the predicted reduction in vehicle kilometres travelled (VKT) and assessed at a rate of \$1.56/km, as derived from the EEM ;
- Increased public transport operating costs and off-setting increases in fare box revenue has been included in the operating and maintenance costs;
- Reliability benefits have been estimated from travel time benefits at 8% for vehicles and 30% for public transport;
- Cycle benefits have been estimated at \$1.45/km and growing from 100/day to 300/day in 2041
- The time zero date has been assumed to be 1 July 2015;
- Construction costs have been spread over 10 years, except for Option 0 which was spread over 5 years and a test for Programme option 6 spread over 20 years;
- The benefits are assumed to 'ramp up' from year five (that is the benefits start in year five and grow linearly until accruing 100% of 'modelled' value at year 10)
- Benefit values are based on Urban Arterial composite values but separated for light and heavy vehicle classes;
- PT user benefits are based on the same value of time as car drivers;
- Update factors have been applied to EEM values to bring to \$2012
- Agglomeration has also been calculated and included in the BCR;
- The evaluation has used a 40-year analysis period and a 6% discount rate.

Wider Economic Benefits (WEBs), including agglomeration, for 2041 were calculated using economic inputs and outputs from the traffic models related to travel costs.

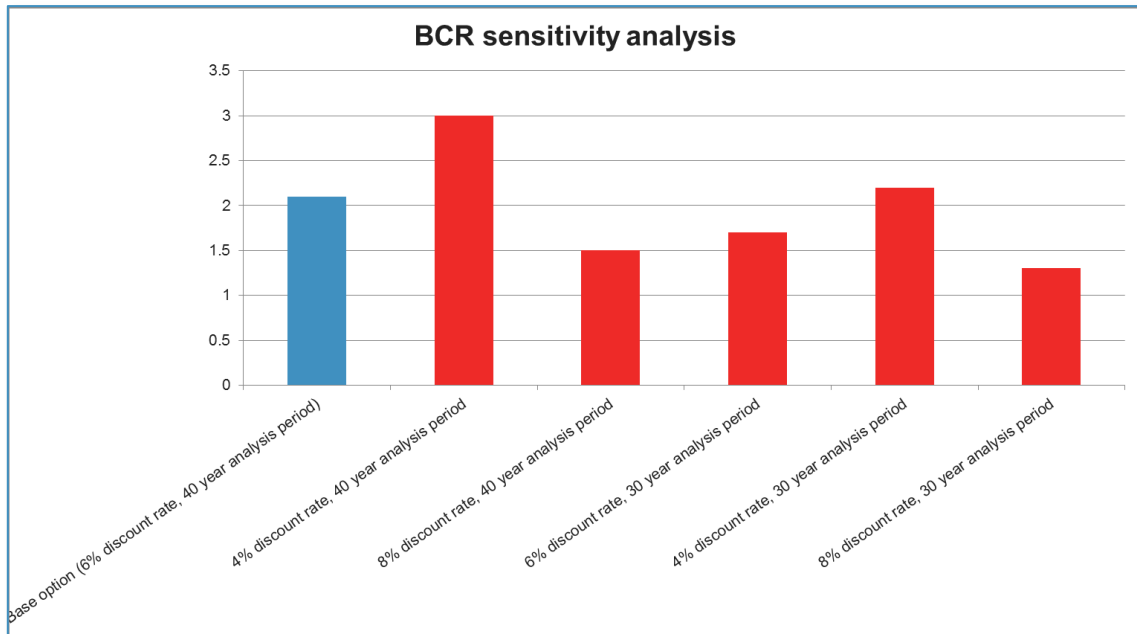
The agglomeration was applied to the economic analysis as a percentage of the transport benefits, based on the initial agglomeration work. The calculated agglomeration benefits for Programme Option 2 amounts to \$414.6m – or 36% of the transport benefits.

The table below displays the results of the economic evaluation.

Benefits (PV, \$m)	Program 2	Costs (PV, \$m)	Program 2
Travel time costs	565.1	Land	122.6
Congestion costs	155.5	Fees	55.0
Trip reliability	45.2	Construction	537.9
Vehicle operating costs	77.5	Annual Maintenance	20.0
Public transport	257.4	Periodic maintenance	2.2
Cyclists	48.6		
CO2	3.1		
PV Transport Benefits	1152.5		
Agglomeration Benefits	414.6		
PV Total Benefits	1567.0	PV of Total costs	737.6
BCR (including agglomeration = 2.1)			

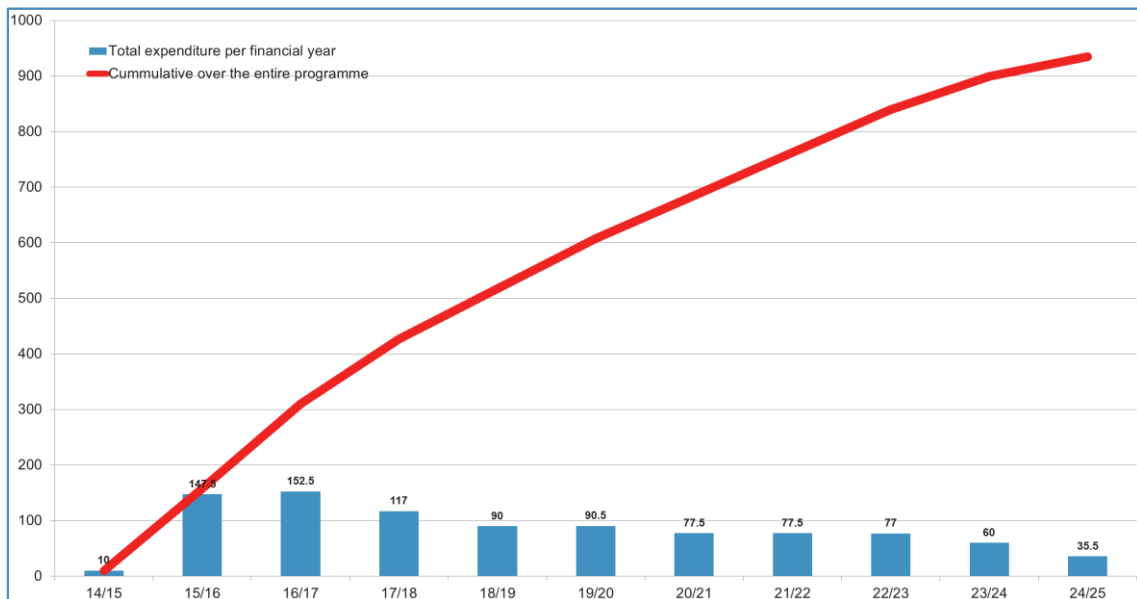
A sensitivity analysis was also prepared on the BCR based on various discount rates and analysis periods. These are illustrated in the chart below. The BCR ranges between 1.3 and 3.0 based on this analysis.

<sup>14</sup> East West Link: Post IBD Workshop Traffic Modelling and Economic Evaluation Report, 17 March 2014 - Beca



### 13.3 Funding arrangements

Funding arrangements for the implementation of the EWL programme have yet to be resolved. This will be addressed during the development of the Detailed Business Case. The indicative cash flow, based on the staging of elements within Programme 2 is shown in the chart below.



It is assumed at this stage that local roading and passenger transport improvements will be subject to the NZTA FAR policy requiring local share to accompany NZTA financial support, rail infrastructure would be funded by government outside of the NLTF and State Highway improvements funded 100% by NZTA.

# PART C – DELIVERING & MONITORING THE PROGRAMME

## 14 Management Case

### 14.1 Project Roles

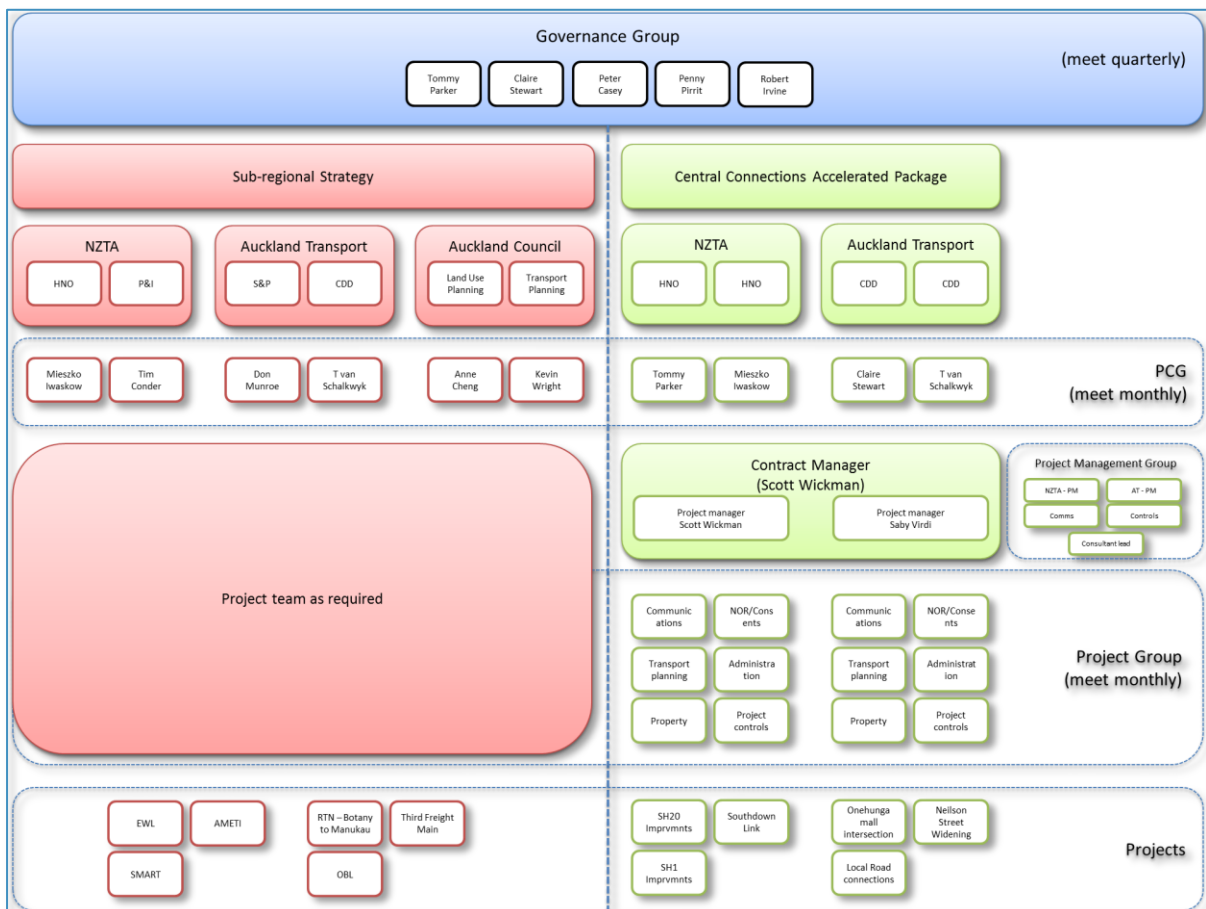
The strategic outcomes, and customer service sought by Auckland Transport and NZTA is this corridor can only be achieved through a co-ordinated approach as the suite of projects, State Highway Local Road, Public Transport and Walking and Cycling are ‘operationally integral’ to each other, and need to be planned and programmed together.

To achieve this we will:-

- Establish a dedicated programme co-ordination team to ensure that all interactions between the projects and with Stakeholders work towards our objective
- Seek to share skill, innovations and experiences across the suite of projects.
- Work in a no surprises environment and proactively communicate between the partner organisations.
- Where appropriate share consultant and contractor resources to reduce overall costs.
- Make all decisions on a ‘best for New Zealand’ basis.

### 14.2 Governance Structure

The project’s governance structure ensures both organisations are involved in making integrated decisions. These will also be co-ordinated with Council through a Governance Group. The governance structure below illustrates the line of accountability for this Project.



### **Project Control Group (PCG)**

For this Project, NZTA and Auckland Transport will appoint a full PCG. The PCG ensures appropriate input into the development process and maintain a high level of communication with all stakeholders.

### **Project Manager**

Each organisation will appoint a Project Manager responsible for delivering the Project. The Project Manager leads and manages the Project team with the authority and responsibility to manage a project on a day-to-day basis.

## List of Appendices:

Appendix A: Assessment Form

Appendix B: IBD Evaluation Summary

Appendix C: Layout of recommended programme

## Appendix A - Assessment Form



# Appendix B – IBD Evaluation Summary

## IBD Workshop (Day 4) - Final Options Evaluation Summary

EAST WEST LINK: OPTIONS EVALUATION ASSESSMENT CRITERIA (Dated 21 November 2015)			OPTION A0	OPTION A1	OPTION A2	OPTION A3	OPTION B0	OPTION B1	OPTION B2	OPTION C1	OPTION D	
Vision: Better Connections and Accessibility supporting Auckland becoming the world's most livable city Enable Māori Aspirations through recognition of the Tiriti o Waitangi/The Treaty of Waitangi and Customary Rights			Upgrade Neilson Street	Arterial connection between Gloucester Park interchange to Mt Wellington interchange	Arterial connection between Gloucester Park interchange to Carbine Road	Arterial connection between Panama Road to Highbrook	Arterial connection between SH20 to Savill Drive	Arterial connection between SH20 to Mt Wellington interchange	Arterial connection between SH20 to Great South Road	Motorway connection between SH20 to Highbrook interchange	Freight priority on Neilson/Church St and upgrade Favona Road	
Ind.	Focus Area	Indicator Description										
<b>A</b>												
<b>Reflecting Māori Values</b>												
A1	Mana Whenua and	To Ao Māori (Māori world view) and kaitiaki is recognised and valued.	No Mana Whenua/Mataawaka evaluation during the workshop.									
A2	Mataawaka	Māori cultural heritage is recognised, protected and conserved.	No Mana Whenua/Mataawaka evaluation during the workshop.									
A3		Māori distinctive identity as a point of difference is recognised and valued through good design principles such as Māori Urban Design.	No Mana Whenua/Mataawaka evaluation during the workshop.									
A4		Enhances Māori and their communities' cultural, environmental, economic and social wellbeing.	No Mana Whenua/Mataawaka evaluation during the workshop.									
<b>B</b>												
<b>Support Better Social Outcomes</b>												
B1	Focus on those in most need	Reduces the proportion of household expenditure on transport for households located in low income areas.										
B2	Improve safety and reduce road trauma	Reduce fatal and serious injuries per capita on roads (per 100,000 population).	Not able to comment in this workshop without additional information									
B3	Personal Security	Improves personal safety and security.										
B4	Community connectivity (1)	Local connections and accessibility is improved (no new severance)										
B5	Community connectivity (2)	Repairs existing severance.										
B6	Public Health	Improves the health and wellbeing of the community										
B7	Local amenity (1)	Retains community amenities, or if relocation / replacement is necessary no net loss of space or quality occurs.										
B8	Local amenity (2)	Quality of life for people living in the study area is improved.										
B9	Heritage	Avoids or minimises impacts on known sites of non-Māori historical/heritage importance.	s									
<b>C</b>												
<b>Support Better Environmental Outcomes</b>												
C1	Energy Efficiency	Improves energy efficiency.										
C2	Air Pollution(1)	Reduces vehicle emissions (CO2 / PM10 etc.) to better meet national and international air quality standards.										
C3	Water Pollution	Minimise the impact of transport infrastructure on water quality in the locality.										
C4	Coastal amenity	Enhances access to the coast and the amenity of the coastal environment.										
C5	Ecology/Biodiversity	Enhances ecological and biodiversity linkages and habitat areas.										
C6	Natural and Built Landscape	Minimises impacts on landscape values.										
C7	Noise/Vibration	Minimises operational noise and vibration impacts on adjacent sensitive land uses.										
<b>D</b>												
<b>Increased Availability of Quality Transport Options</b>												
D1	Network Integration	Maximises connectivity between networks										
D2	Transport Choices - improved ability of people to get around easily, affordably and reliably, with travel options	For non freight traffic, increases the attractiveness of alternatives to cars.										
D3	Access to employment and amenities	Improved public transport and walking and cycling access to key employment areas and essential services.										
D4	Public transport boardings	Increases the number and per capita use of public transport.										
D5	Walking	Increases the number and per capita trips made by walking										
D6	Cycling	Increases the number and per capita trips made by cycling										
<b>E</b>												
<b>A More Efficient Transport Network</b>												
E1	Agreed level of service	Achieves required level of service for freight traffic and increases efficiency of industry supply chains.										
E2	Transport productivity	Increases person throughput per metre of road width on key arterial routes.										
E3	Public transport efficiency	Improves the average bus speed on the Frequent Network during the morning peak.										
E4	Improved PT value for money	Reduces the operating cost for PT per passenger kilometre/cost per person km travelled.										
E5	Strategic network role	Preserves the functionality of the State Highway network										
E6	Induced Traffic	Suppresses induced passenger or commuter traffic.										
E7	Resilience	Improves resilience and security of transport system to recover from disruptive events.										

IBD Workshop (Day 4) - Final Options Evaluation Summary continued.

SAY WEST LANE OPTIONS EVALUATION ASSESSMENT SUMMARY (Issued 21 November 2023)			OPTION A0	OPTION A1	OPTION A2	OPTION A3	OPTION B0	OPTION B1	OPTION B2	OPTION C1	OPTION D
Vision: Better Connections and Accessibility supporting Auckland becoming the world's most liveable city Enable Māori Aspirations through recognition of Te Tiriti o Waikangi/The Treaty of Waikangi and Customary Rights			Upgrade Nelson Street	Arterial connection between Gloucester Park interchange to Mt Wellington interchange	Arterial connection between Gloucester Park interchange to Carbine Road	Arterial connection between Panama Road to Highbrook	Arterial connection between SH20 to Savill Drive	Arterial connection between SH20 to Mt Wellington interchange	Arterial connection between SH20 to Great South Road	Motorway connection between SH20 to Highbrook interchange	Freight priority on Nelson/Church St and upgrade Favona Road
Ref.	Focus Area	Indicator Description									
<b>F</b> Support Growth and a Quality Urban Form											
F1	Support development within existing urban area	Increase density of people in areas that have access to PT public transport.									
F2	Support new development areas/intensive land use (1)	Supports Auckland Plan and Proposed RPS land use and urban growth objectives for industrial and business areas.									
F3	Support new development areas/intensive land use (2)	Supports Auckland Plan and Proposed RPS land use and urban growth objectives for centres, residential and other areas.									
F4	Urban Amenities	Supports place making/inspirations for "liveable" city particularly on existing local streets and arterials, including an equitable allocation of road space to different modes.									
F5	Built environment / Urban Character	Supports a transport function and infrastructure that is proportionate to and improves the built environment character and amenity.									
<b>G</b> Support Economic Growth and Enhanced Productivity											
G1	Regional productivity	Enhances productivity in Auckland region and upper North Island.									
G2	Employment - regional	Enhances job opportunities for the region.									
G3	Employment - local	Enhances job opportunities in the study area.									
G4	Supply chains	Improves ability to integrate between road and rail networks.									
G5	Freight efficiency	Improves average vehicle speed for freight traffic on the Strategic Freight Network.									
G6	Freight reliability	Improves reliability of freight vehicle travel times (variance from average).									
G7	Accessibility for workers	Increases the number of people who can get to key employment/business centres within 30/60 minutes of public transport at peak times and 30 minutes by private vehicle off-peak (see for more)									
<b>H</b>											
H1	Enduring benefits	Ability to have enduring benefits.									
H2	Infrastructure efficiency	Ability to make the most of existing infrastructure									
H3	Staging and timing of investments	Potential to stage delivery to reflect optimised investment path.									
H4	Wider investment integration	Staging and ability to coordinate road investment with other necessary transport network investments (e.g. rail freight capacity) to ensure certainty that intended outcomes will be achieved.									
H5	Value for money	Level of investment is commensurate with the scale of the problem and the risk impacts.									
<b>Key to rating for Options:</b>											
++			Significant positive effects								
+			Moderate positive effects								
✓			Minor positive effects								
~			No effects / similar to existing situation								
-			Minor negative effects								
--			Moderate negative effects								
---			Significant negative effects								

## **Appendix C – Layout of recommended programme (Programme2)**

