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Lake Road Corridor Management Plan

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Document prepared by:

Aurecon New Zealand Limited
Level 4, 139 Carlton Gore Road
Newmarket Auckland 1023
PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
F +64 9 524 7815
E auckland@aurecongroup.com
W aurecongroup.com

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Approval			
Author signature		Approver signature	
Name	Craig Mitchell	Name	Gordon Wemyss
Title	Senior Transport Planner	Title	Technical Director

Executive Summary

Overview

The objective of this project is to develop a Corridor Management Plan (CMP) for the Lake Road corridor. This Plan will take account of Lake Road's function, its primary role in the Devonport to Takapuna and wider North Shore transport system and the place/context design typology for the road segments concerned. The output of this work is a long-term (30+ years) strategic document for the management of this corridor.

This CMP will help bring together a range of projects (for Auckland Transport and the Devonport-Takapuna Local Board) and initiatives in the Devonport Peninsula area as well as provide key material for these and future projects. The Lake Road implementation plan delivered by this CMP will form the basis for future Auckland Transport work programmes.

This study has been conducted in accordance with the approach outlined in Auckland Transport's Corridor Management Plan Guidelines and Simplified Procedure, Version 2 (October 2012).

Network role

The network role of the corridor was determined through a workshop process with technical stakeholders drawn from Auckland Transport, Auckland Council and the NZ Transport Agency.

Cyclists and pedestrians have been identified as the highest priority along the entire length of the corridor given the existing popularity for cycling and walking for recreation and commuting purposes to work and schools, their potential for growth and strategic policies requiring their increased support.

Public Transport has been recognised also as a high priority along the northern half of Lake Road, given its future use as a frequent bus route and the ability for this mode to increase the person carrying capacity of the corridor. South of Old Lake Road this priority drops back to low as this section of Lake Road services few buses (and no frequent route).

Traffic has been identified as medium priority along the length of the corridor. This level is not so much a reflection of existing or future demand, but rather a strategic choice to provide greater focus and support for active modes and public transport to maximise the people moving capacity of the corridor.

Freight is generally identified as low priority as there are comparative minor levels of industrial and commercial activity along the Peninsula.

Strategic direction

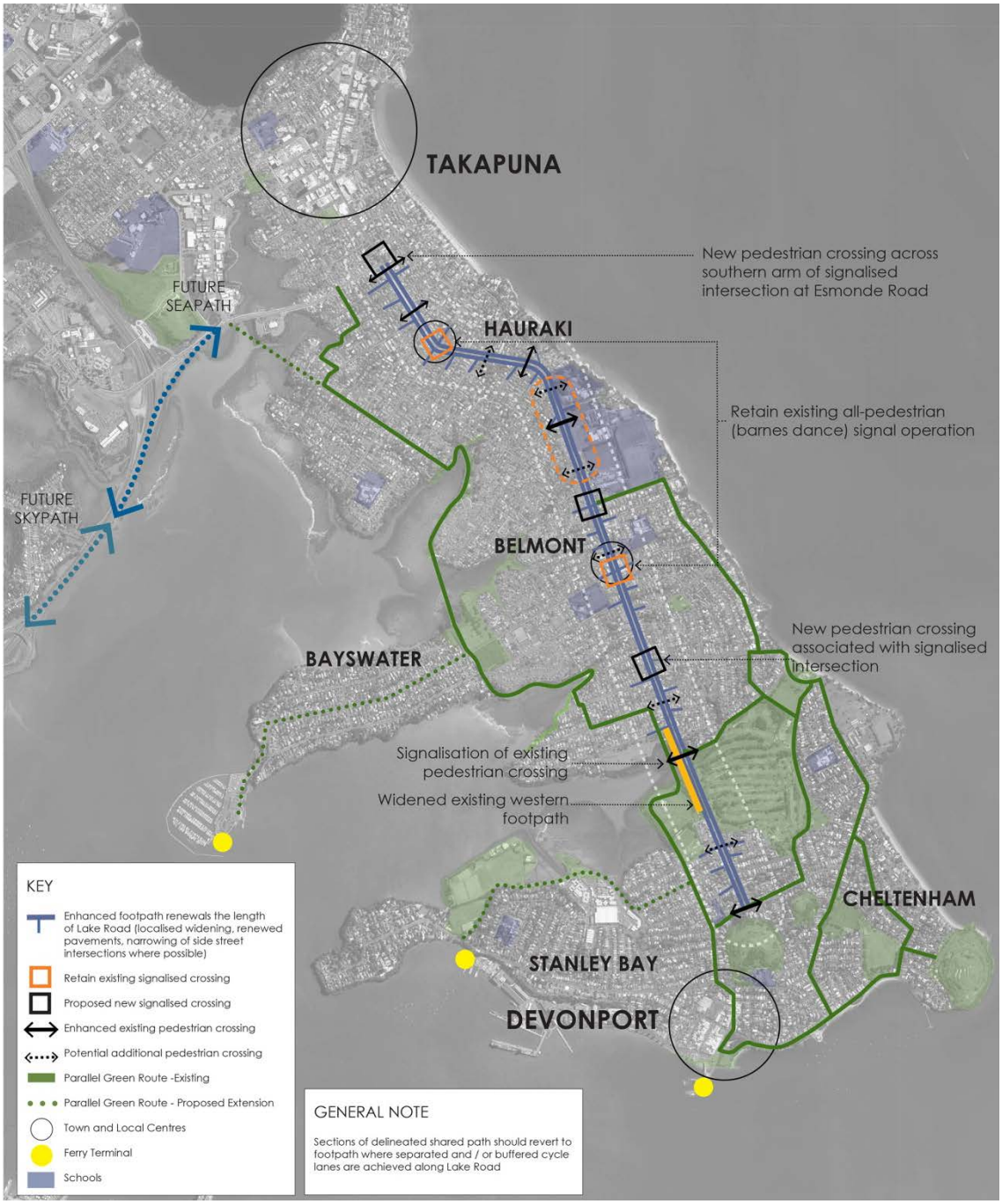
Through the option development, testing and selection process for this CMP, strategies have been developed that provide a logical connected and comprehensive direction for each travel mode. These strategies have been developed in accordance with a light to modest forecast for growth in population and employment on the Peninsula. If actual growth changes significantly from that predicted these strategies and proposed interventions should be reviewed. The strategy for each travel mode is provided in turn below:

Strategy for pedestrians

Walking has been identified as a high transport priority along the full length of the corridor, reflecting the fact that many people that live on or visit the peninsula have to walk along or across Lake Road as part of their journey. A significant proportion of the land is relatively flat and with a well-connected grid of side streets in comparison to many other parts of Auckland.

Lake Road has a wide range of destinations that are often in short proximity to each other and thereby highly walkable distances.The proposed interventions for this travel mode are summarised as follows.

Proposed pedestrian interventions



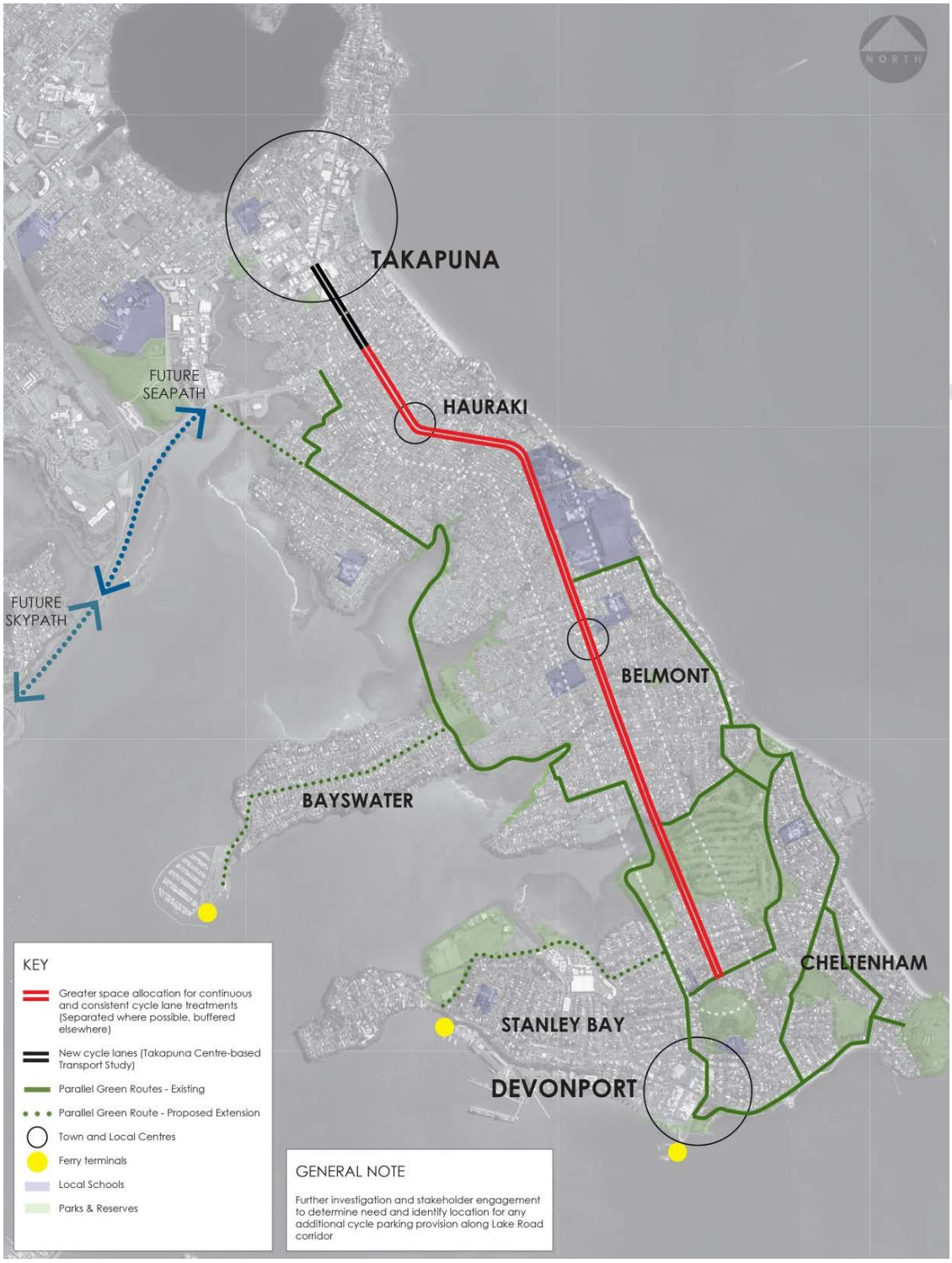
Broadly speaking these interventions include increased frequency and quality of crossing opportunities, widened footpaths where there are current deficiencies, removal of shared path where separated cycle-lanes can be installed and improved amenity elements (tree planting etc).

Strategy for cycling

A clear direction from the technical stakeholder group was the need to recognise and respond to the differing cyclist types, ranging from experienced cyclists and commuters through to less-confident cyclists and school children.

The proposed direction is for a substantial improved offering for cyclists, making use of available width within the existing road reserve. It is envisaged that this will include increased spatial allocation including separated cycle lanes where possible. A summary of the recommended interventions that will support cycling are summarised as follows:

Proposed cycling interventions

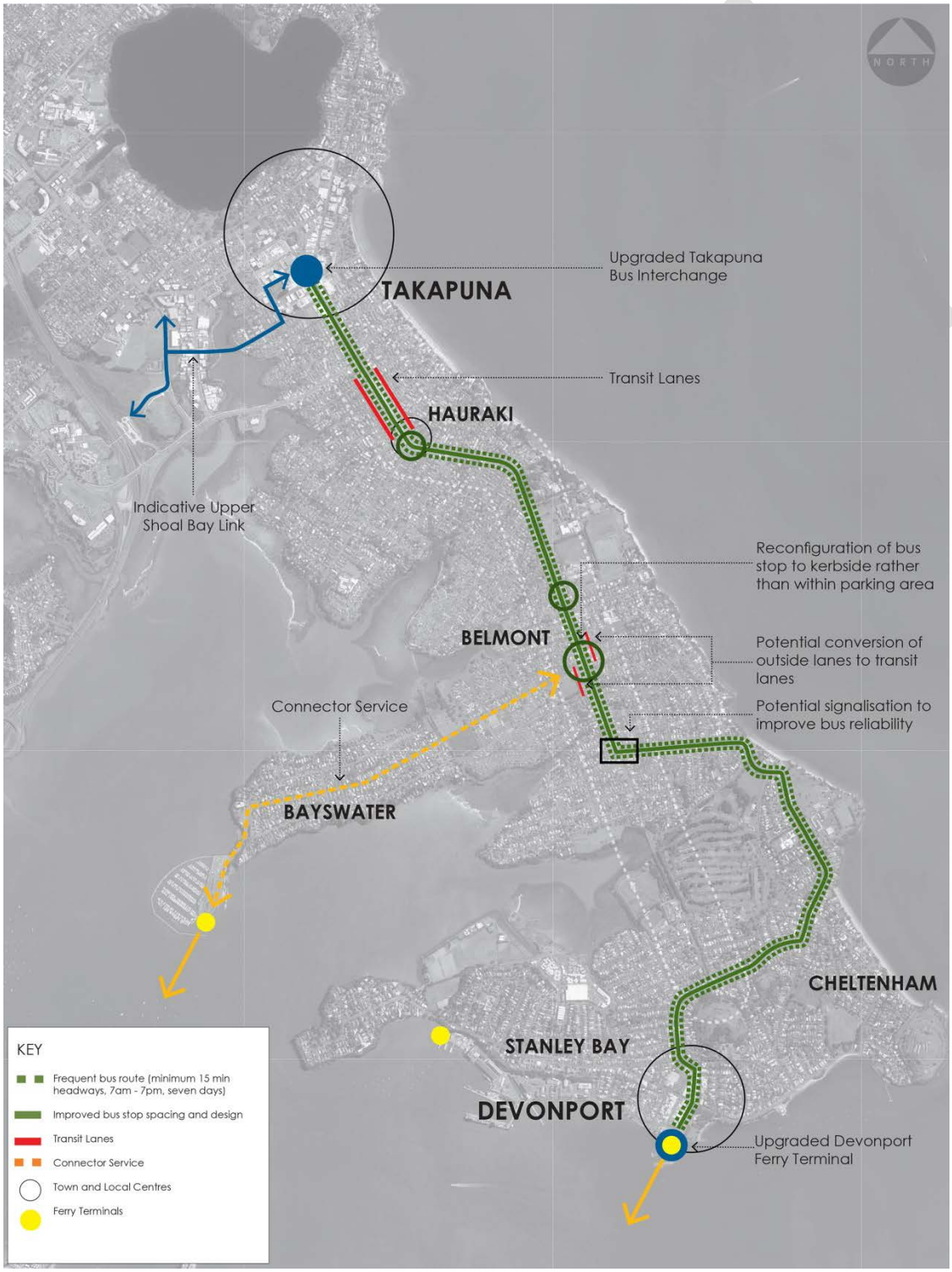


Strategy for public transport

Public transport has been identified as a key mechanism for providing more efficient and greater person movement capacity along the corridor. As such, it has been identified as a high priority transport mode for the length of the corridor that contains a high frequency bus route i.e. north of Old Lake Road.

The preferred direction therefore reflects the above aspects with the main features as follows.

Proposed public transport interventions



This direction is based around the planned frequent bus route along this corridor that will provide an improved service for users. This route will be supported by upgraded infrastructure such as higher quality, spaced and located bus stops and transit lanes at feasible locations. Changes outside the corridor, such as the proposed Takapuna Bus Interchange upgrade and Upper Shoal Bay Link will also benefit Lake Road's public transport users.

Strategy for general traffic and freight

As outlined elsewhere in this report, it is recommended that given the low growth predictions for area, a substantial upgrade to traffic capacity along Lake Road (i.e. through four laning of the section between Jutland Road and Bayswater Avenue) is unlikely to be appropriate. Reasons for this include high costs relative to benefits, adverse spatial implications on cycle lanes and footpaths (required for high priority transport modes), and reduced urban amenity for residents.

The focus of the strategy for general traffic and freight is therefore to get better use of space out of the existing road reserve and infrastructure. This involves improving the person carrying capacity of Lake Road through increased use of public transport, multi-occupancy private vehicles and active modes, as well as undertaking localised optimisation and capacity improvement projects.

It is also important to recognise that improved person carrying capacity would not only help limit congestion on Lake Road itself, but also on the adjacent network which has been identified as having more severe delay and congestion (i.e. Esmonde Road and its interface with State Highway 1 and roads leading to Takapuna). It should also be noted that improvements to these adjacent connections has the potential to improve overall travel times for Lake Road traffic i.e. Additional Waitemata Harbour Crossing could provide additional capacity and performance for journeys between the North Shore and areas south of the Bridge (Auckland CBD etc).

The elements of the preferred direction that relate specifically to general traffic and freight are summarised on the following page.

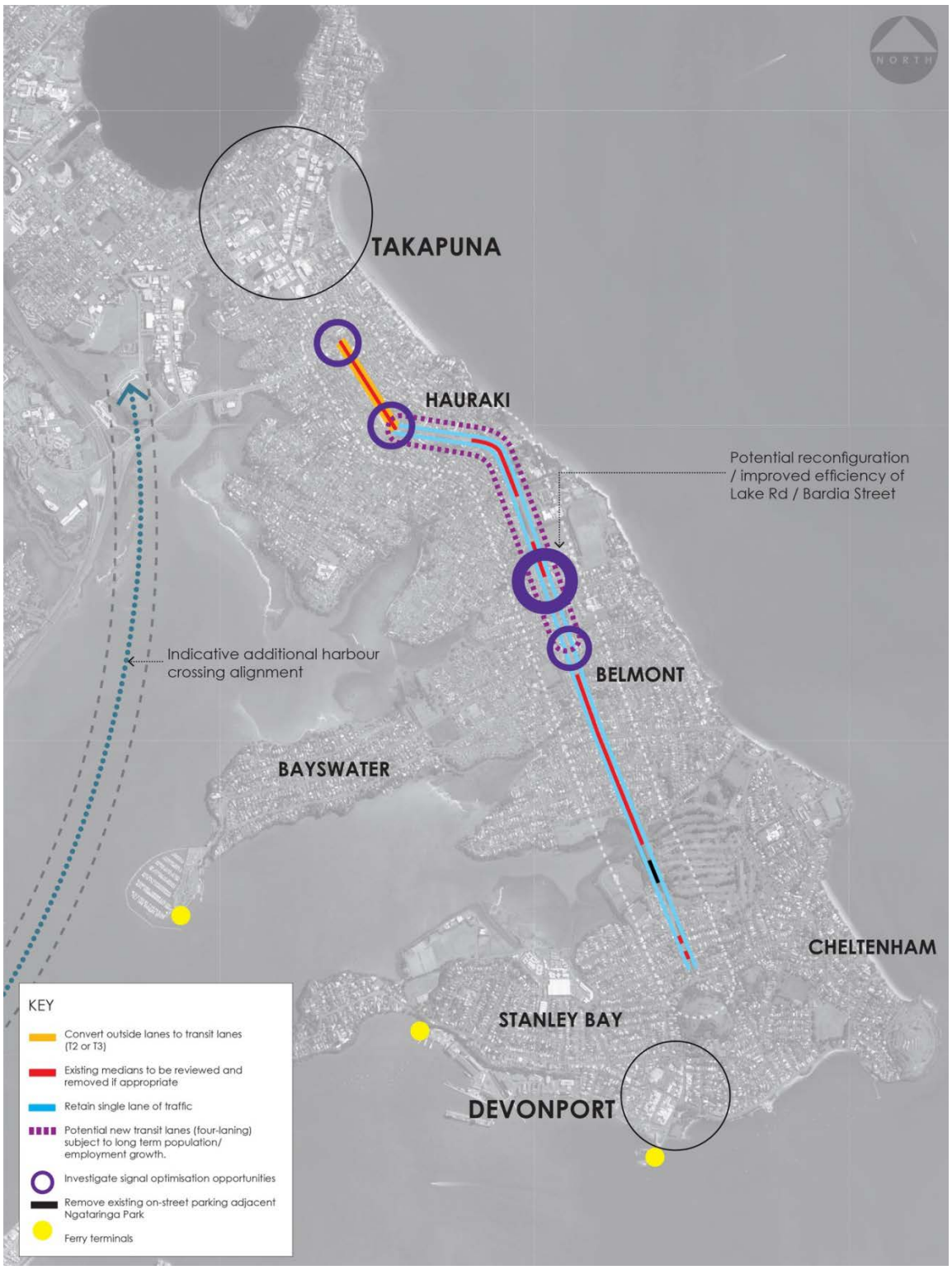
Strategy for parking

Lake Road has relatively small amounts of car parking along its length comparative to many other arterial roads within the Auckland region. At present, there is car parking at the Belmont local centre, as well as along a limited stretch (approx. 140m) of the western kerb along the middle part of the Ngataringa Park frontage.

Given the pass-by function for the Belmont local centre, it is recommended that parking be retained on both sides of Lake Road, to continue to provide support to the economic viability and success of this local centre. That said, the specific design of this parking will need to be balanced and integrated with the objective of achieving continuous cycle lanes through the Belmont shops junction. There is also capacity for parking along the side streets at this local centre.

The only other section of parking along the corridor is adjacent to the Waitemata Golf Course. It is proposed that this car parking be removed, with this space considered to be better used to allow enhanced cycle lane provisions. In total this will result in a loss of a 140m length of parking. This equates to a maximum of approximately 25 parked cars, although anecdotal observations by both the study team and stakeholders suggests that this area is underutilised.

Proposed general traffic interventions



Strategy for urban amenity and place-making

The Devonport peninsula as a whole is strongly defined as a highly attractive and desirable part of Auckland characterised by high levels of residential amenity in close walking proximity to beaches, parks and reserves, schools, local shops and services, community facilities and ferry terminals. These are highly valued and desirable attributes that many other residential parts of Auckland lack.

That said, it is fair to say that as the population and intensity of activity on the peninsula and across Auckland has grown over time, that rising traffic and peak time congestion has taken its toll on the urban amenity and place-making roles of Lake Road itself. Over a period of time, measures that have increased traffic capacity and speed have prioritised the movement functions of Lake Road over its place qualities, adversely affecting the amenity not just for street users but for adjoining properties, particularly for residents.

While some sections of Lake Road, such as its frontage with the Wilson Home and Takapuna Grammar and the heavily treed and highly picturesque green route between Narrow Neck and Mount Victoria, have retained their heritage landscape qualities, the rest of Lake Road would benefit from regular street tree planting noting the need to avoid compromising the footpath width.

This would bring a number of benefits both transport-wise such as visually narrowing the street corridor, thereby slowing traffic, and providing a buffering for footpaths and potentially cycle lanes from moving traffic, as well as greater visual separation and filtering of views that enhances the residential amenity values of properties fronting Lake Road. Street trees would also enhance the local centre functions at Hauraki corner and the Belmont Shops.

Sequencing and implementation plan

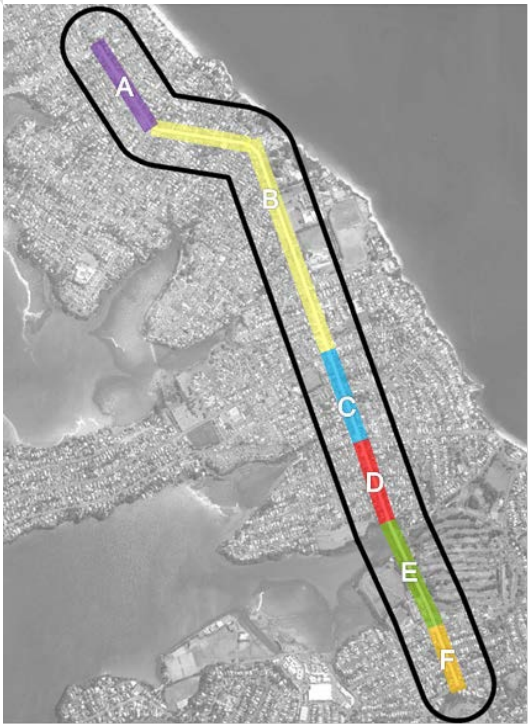
This CMP provides principles and recommendations for implementation of the preferred direction. A sequencing approach has also been developed for the Implementation Plan, based around the following:

- Short term interventions – Generally small-scale or critical interventions that are generally required to support shorter term initiatives, and provide the most immediate value for money. It is intended that these priority interventions are to be implemented over the first 5 year period.
- Medium term interventions – lower priority/ higher magnitude projects, or those that should be delivered in support of other changes. Intended for completion over the 5 to 15 year period.
- Long term interventions – those interventions required to fully deliver the preferred directions, and may be staged over the 30 year horizon.

Timings for the above have been based on implementation. In the case of medium to longer term interventions, earlier lead-in actions (investigation, consultation etc) may also be required.

As well as the staging of the interventions, projects have also been identified by corridor segment (shown below), and by those travel modes that are the primary beneficiaries.

Summary of corridor segments



Short term interventions

The short term and 'quick win' interventions that have been identified for the corridor are presented as follows:

Table 0-1 Identified short term interventions

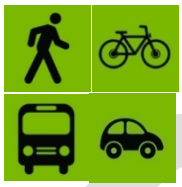
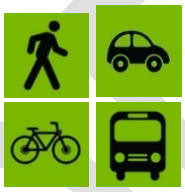
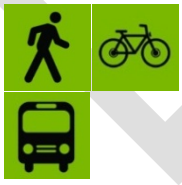
Segment	Benefits	Short term intervention
All		Review suite of identified pedestrian crossing opportunities and implement any 'easy win' outcomes
All		Provide painted buffer outside existing cycle lanes where space allows to begin the re-distribution of carriageway space prior to physical separation projects
All		Installation of Multi modal way-finding signage supported by maps especially linking key PT hubs/stops and cycling/walking routes. Communicating clear and easy options may promote the change to alternative modes of travel.
A, B, C		Implement frequent bus route along Lake Road as part of Regional Public Transport Plan
A, B, C		Investigate opportunities for improved bus stop locations to achieve better balance between reduced stopping delay and maintaining catchment. Implement bus stop upgrades in conjunction with bus stop location optimisation and also consider providing cycle lanes that wrap around the back of bus stops and removal of indentation for stops within Segment A. This may include moving the bus stop from the slip lane at Belmont shops to a Lake Road kerbside position.
B		Investigate and if possible implement painted cycle lanes through the Belmont Shops to create more continuous cycle provision prior to more medium term interventions
E		Investigate signalisation of existing pedestrian refuge south of Seabreeze Road
A, B, C		Signal optimisation review of signalised intersections along the corridor.
B		Install electronic school zone signs to improve safety for children walking and cycling to schools.
B		Review configuration of Lake Road/ Winscombe intersection, and in particular, opportunities to use right turns on Lake Road more effectively.

Segment	Benefits	Short term intervention
E		Widen western footpath between Seabreeze Road and Mozeley Avenue and signalise existing pedestrian crossing south of Seabreeze Road (i.e. including length past Ngataringa Park/ Dacre Park).

Medium term interventions

The following table outlines those interventions that are deemed to be appropriate in the medium term, based on priority of need as well as feasible timeframes.

Table 0-2 Identified medium term interventions

Segment	Benefits	Medium term intervention
All		Implement separated cycle lanes along both sides of the carriageway. Integrate with cycle lane upgrades to north and south of study area.
All		Review suite of identified pedestrian crossing opportunities and implement where feasible (excluding those already delivered as 'easy wins').
All		Review requirements for central medians in line with directions for arterials elsewhere in Auckland and alter if deemed appropriate. In conjunction, consider if banning movements at some side roads may help reduce delay associated with turning vehicles, and also any opportunities for increased tree planning and footpath widening.
A,B,C,D		Implement a strategy of achieving consistent and regularly spaced street tree planting within the footpath adjacent to the kerb edge, along segments A-E as part of a multi-pronged strategy that enhances the amenity and safety of all street users and reduces the negative impacts of traffic on adjacent properties.
A		Implement conversion of outside lanes to transit lanes (T2 or T3). This is likely to extend to the double lane development/ merge south of Jutland Road. In conjunction, consider opportunities to extend this transit lane arrangement
B. C		Reconfigure Lake Road/ Bayswater Avenue intersection and approaches. This may include: ▪ Removal of free left turns ▪ Convert outside northbound lane to transit or separated cycle lane. ▪ Reposition southbound bus stop to kerbside ▪ Separated cycle lane southbound ▪ Potential reconfiguration of car parking to achieve bus and cycle changes above.
C, D		Investigate/ implement signalisation of Lake Road/ Old Lake Road intersection to improve reliability for bus right turns and improve pedestrian accessibility to local shops.

Segment	Benefits	Medium term intervention
F		Upgrade to Lake Road/ Albert Road roundabout to provide improved pedestrian and cyclist facilities, possibly through 'Dutch- style' design.

Long term interventions

Table 8-3 summarises those interventions required to implement the preferred directions. These projects are identified by corridor segment and those travel modes that are the primary beneficiaries.

Table 0-3 Identified long term implementation interventions

Segment	Benefits	Long term intervention
All		Complete Takapuna/Akoranga bus link (also proposed as part of Takapuna Centre Based Transport Study)
All		Relocated and upgraded Takapuna Bus Interchange (also proposed as part of Takapuna Centre Based Transport Study)
B		Review population and employment growth trends and if higher than expected, investigation four laning option

Through the completion of these implementation interventions, the preferred direction will be achieved and will establish the responses required to achieve the goals of the study and wider policy outcomes, as well as providing appropriate support for the planned infrastructure and service investments.

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1 Introduction

1.1 Objective

The objective of this project is to develop a Corridor Management Plan (CMP) for the Lake Road corridor. This Plan will take account of the corridor function, its primary role in the Devonport to Takapuna and wider North Shore transport system and the place/context design typology for the road segments concerned. The output of this work is a long-term (30+ years) strategic document for the management of this corridor.

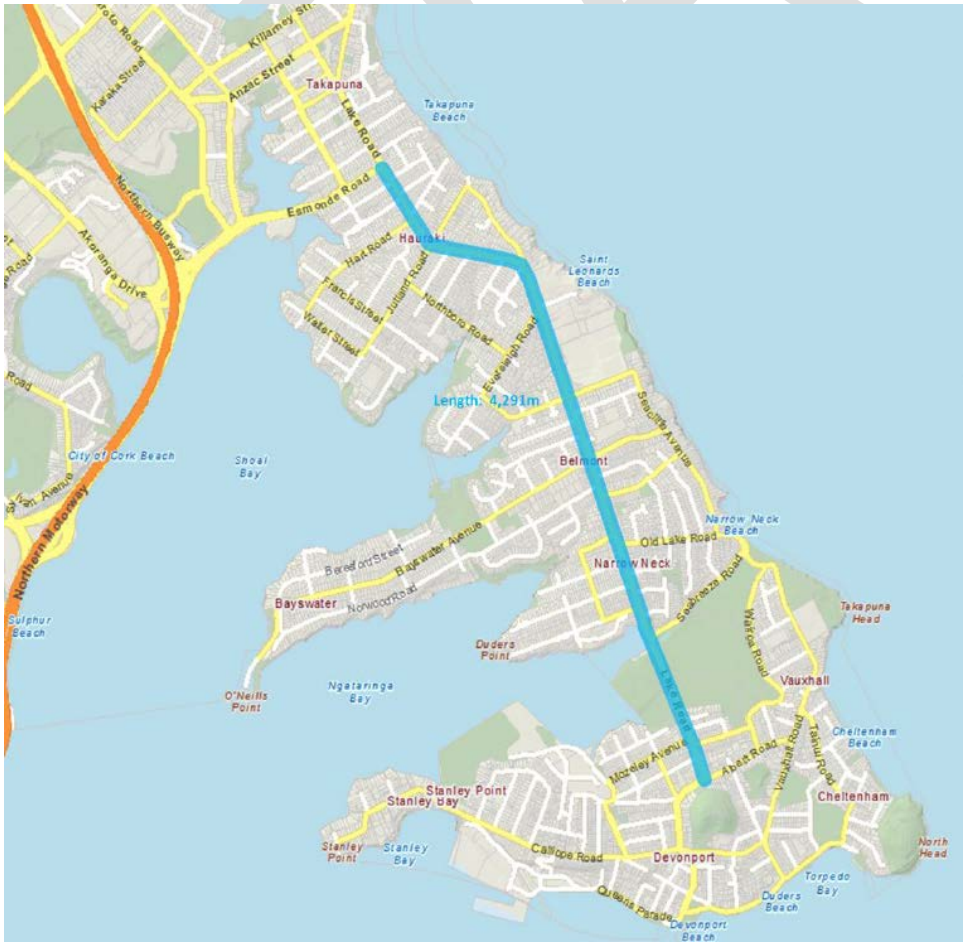
A summary of the CMP process and its strategic fit within the overall planning framework is outlined in **Appendix A**.

1.2 Study area

The study area for this project is Lake Road between Esmonde Road in Takapuna through to Albert Road in Devonport. It passes through the suburbs of Hauraki, Belmont and Narrow Neck. In total the length of this corridor is approximately 4.3km.

While this length of Lake Road is the core scope of the study, it also gives higher level consideration to interactions and implications on the adjacent areas and transport network. The considerations include Esmonde Road and its connection with State Highway 1 (SH1), the main routes through to the Takapuna growth area and metropolitan centre (Lake Road, Barry's Point Road and Fred Thomas Drive), and Devonport town and ferry terminal to the south. The immediate scope of the study area is shown by the blue line in Figure 1-1.

Figure 1-1 Lake Road CMP study area



2 Existing land use and transport context

2.1 Land use overview

The Lake Road corridor is predominantly residential in nature supported by a number of town centre shops, schools and open spaces. The Devonport Peninsula is also home to a number of sites serving the New Zealand Navy who have a permanent and long-established naval base in Devonport.

The Peninsula boasts a number of natural features that are popular tourist attractions including local beaches and volcanic cones. These coastal landscape attractions also ensure the area is in demand for organised sporting and other recreational events.

The latest census data indicates that approximately 23,000 people live within Devonport peninsula, while over 6,000 people work within this area. The activities of these residents and workers create substantive demand for travel (for example, 9,000 residents travel to work each day).

Lake Road is the sole arterial route (and sole connecting road) running along the length of the peninsula and therefore serves a range of important transport functions. These include being a significant traffic route (approx. 30,000 vehicles per day) and accommodating a number of bus routes connecting to Takapuna, the CBD, ferry services and local schools. It is also an important route for a variety of cyclist types including commuters, school children and recreational cyclists and a range of pedestrian functions including a route and crossing point between residential areas and schools, recreational areas and the local centres. Lake Road also forms part of the NZTA's oversized vehicle route along the whole corridor.

In terms of existing form, the majority of Lake Road is a two lane road, with a painted median along approximately half its length. North of Jutland Road, it widens to four lanes, while there is also a short section of four lanes near the intersection with Bayswater Avenue. Bus stops are predominately within the traffic lane but there are half indented stops north of Jutland Road. The majority of the length of Lake Road has painted kerbside cycle lanes and footpaths on both sides of the carriageway.

A more detailed description of the resident population and employment patterns along the Peninsula is provided in **Appendix B** to this report.

2.2 Existing environment and deficiencies

To inform the study, a comprehensive analysis of the existing environment, issues and deficiencies was undertaken. This was achieved through the following

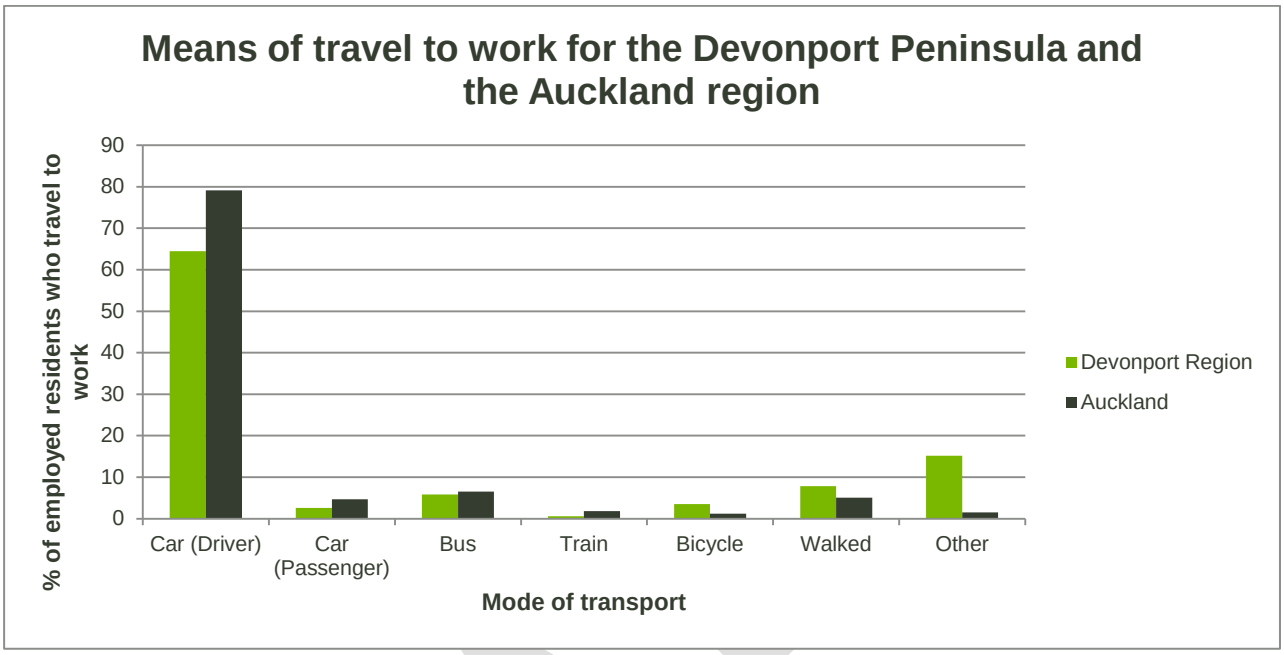
- Input from technical stakeholders across Auckland Transport, Auckland Council and NZ Transport Agency via workshops and meetings.
- Meetings with Devonport-Takapuna Local Board and representatives from a range of residents, business, and interest groups.
- Analysis of available data and plans by the project team.

The issues and deficiencies identified through these forums are presented in full within a number of appendices. Some core elements are however outlined below.

2.2.1 Means of travel

To better understand these travel demands and how they correspond to travel mode behaviour, travel to work data has been obtained from the 2013 Census. This data for the Devonport Peninsula and wider Auckland region is summarised in Figure 2-1 below.

Figure 2-1 Comparison of means of travel to work for the Devonport Peninsula and Auckland Region



The above diagram illustrates several important issues relating to travel with the peninsula. Firstly, private vehicles are easily the most used travel mode by more than 60% of workers. However only 3% of this private vehicle use involves one or more car passengers and this represents a significant opportunity to increase the person carrying capacity of Lake Road.

Both cycling and walking are shown as already having a higher than regional average use. Active modes are however a very a plausible mode of travel for residents who work in either Takapuna or Devonport. With the census indicating approximately 40% of Local Board residents travel to a workplace address within the Local Board area, this represents a significant catchment of people and potential to grow their active mode usage further.

Buses are shown to be used slightly less than the regional average, but this offset by significantly greater use of ferries (main contributor to the 'other' category). There is still however substantial scope for improved use of these modes. For example, the census indicates approximately 25% of workers travel to the city centre, and as per above, there is also significant demand for travel to work within the Local Board. Both of these destinations should be a focus for achieving an improved public transport usage.

Notwithstanding the above, it should be noted that work related travel represents only one component of the travel demand for the area and Lake Road. Schools are a prominent feature of the area, and generate significant travel demands, particularly in terms of walking and cycling as shown in Table 2-1. The dominant mode of travel is dependent on the age of the school children with bus modes of travel higher for high school students and car modes higher for primary school students.

Table 2-1 Peninsula Schools student travel survey results

School	Bus	Walk/Scooter	Cycle	Car
High School	20%	41%	10%	24%
Intermediate School	16%	34%	29%	11%
Primary School	1%	45%	9%	45%

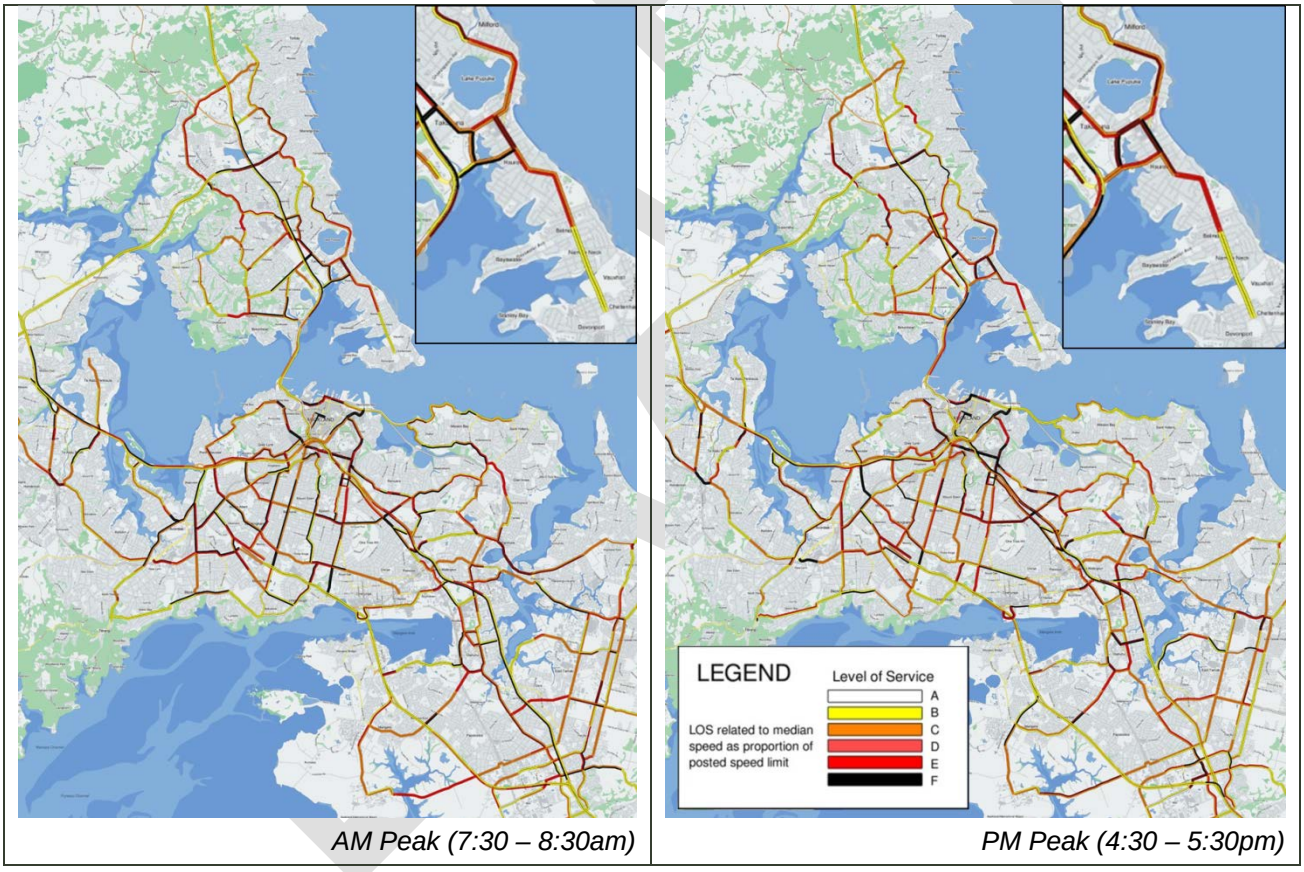
The area is also an important recreational area, owing to its beaches, parks, sports field and other community facilities. This creates demand for all travel modes, and particularly during weekends and holidays.

2.2.2 Vehicle Levels of Service

Information has been collected by Auckland Transport that provides an understanding of the peak period travel times and levels of delay. This allows an assessment of which parts of Lake Road are the most problematic for vehicle movement and at which times, as well as the quantum of the issue relative to Esmonde Road and other arterial routes in Auckland.

Figure 2-2 shows the congestion for the Auckland Region during peak weekday periods, as well as a more detailed inset (top right) of Lake Road and its surrounds. The sections highlighted in black show the heaviest congestion with a LOS F and the road not highlighted in yellow show the more free-flowing sections with a LOS of B.

Figure 2-2 Auckland Transport network weekday congestion maps



AM Peak (7:30 – 8:30am) *PM Peak (4:30 – 5:30pm)*

Examination of this data suggests the following:

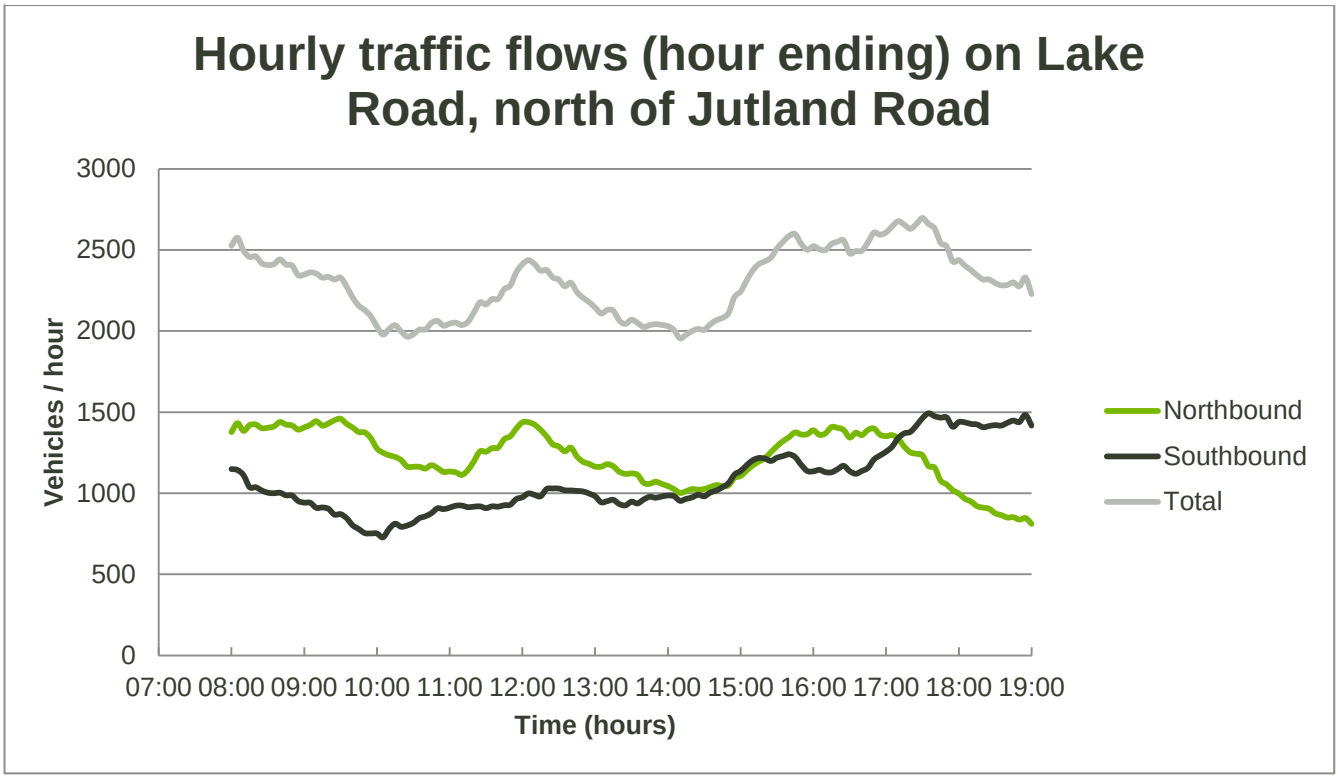
- The level of service for Lake Road south of Bayswater Avenue is relatively good (LOS A/B), indicating comparative modest delay (actual travel time is 70% of posted speed limit or better).
- More severe congestion occurs on Lake Road between Bayswater Avenue and Esmonde Road, ranging between LOS B and D depending on peak period/direction (actual travel time is 40% to 90% of posted speed limit).

- Within this severe congestion area, there was relatively little differentiation in performance between the four lane section (Esmonde to Hauraki) and the two lane section (Hauraki to Bayswater).
- The level of performance of immediately adjacent roads is in some instances particularly poor. Esmonde Road westbound during the morning peak has a LOS F (actual travel time is 30% of posted speed limit or worse). Lake Road to the north of Esmonde Road has a LOS E during both peaks/ direction, excluding southbound during the evening peak which is worse again with a LOS F.
- At a very course level the above information suggests that the level of congestion on Lake Road and its surrounds are not unlike many other major arterial routes within Auckland.

While the above information is not available for the weekend peak periods, traffic count data indicates volumes along Lake Road during these times as being broadly similar to weekday peaks. It would therefore be reasonable to assume broadly similar levels of congestion (excluding when events are occurring).

Traffic counts, collected in June 2014, at intersections along Lake Road show that the traffic flows are relatively equal in both directions during both peak periods. The weekday northbound and southbound flows along Lake Road at the Jutland Road intersection remain relatively consistant throughout the day with a peak at 8:00am, 12:00pm, 3:00pm and 5:00pm.

Figure 2-3 North and south-bound flows at the northern end of Lake Road



Traffic flows along the southern end of Lake Road are lower than in the northern section shown above; however they have a more prominent morning and after-school peak. Further detail of the daily traffic flow north of Albert Road can be found in **Appendix B.**

In addition to this measure of delay/congestion, this data also enables consideration of specific travel times and speeds along various sections of Lake Road as well as Esmonde Road through to State Highway 1. The results in Figure 2-4 and Figure 2-5 are reflective of the congestion mapping shown above and provide a further perspective on the extent and areas of deficiency along this route.

Weekend data was obtained for these segments and is also included below. It is important to note that the posted speed limit is 50 kmph along between Albert Road and Esmonde Road and changes to 60kmph along Esmonde Road, half way between Lake Road and Barrys Point Road.

Figure 2-4 Morning peak travel speed comparison

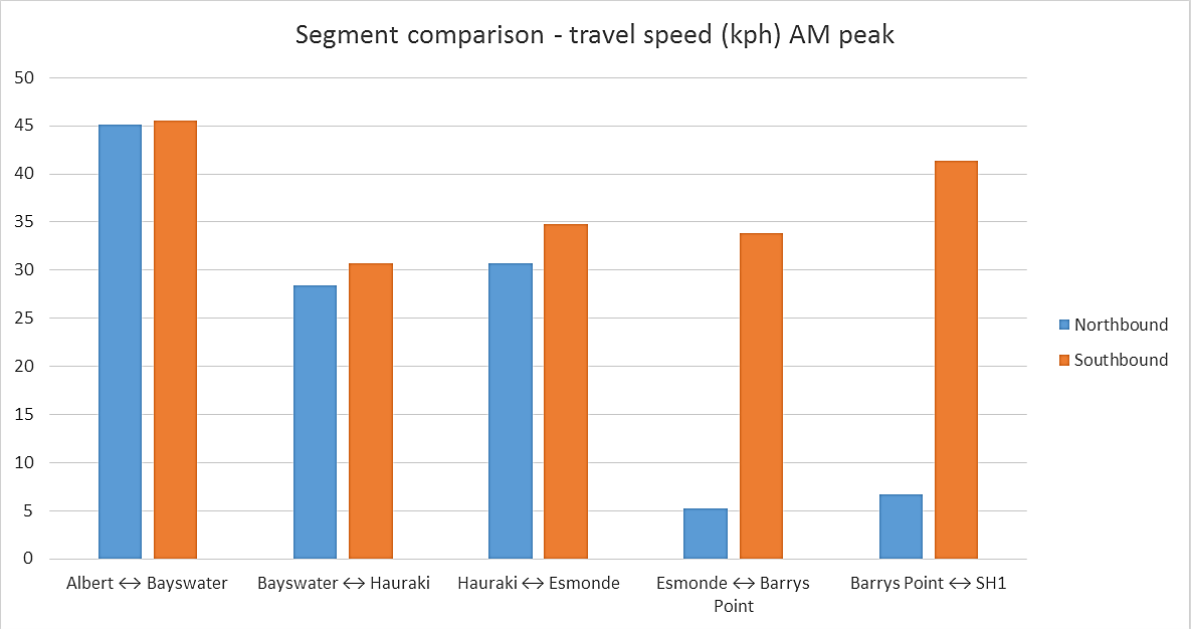


Figure 2-5 Evening peak travel speed comparison

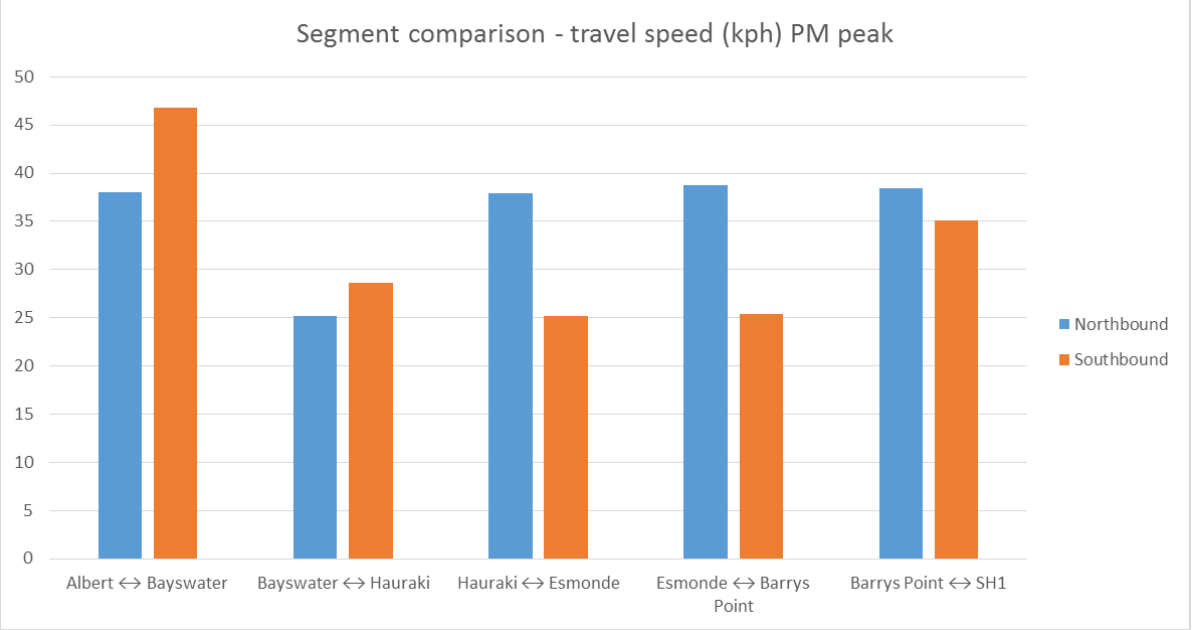


Figure 2-6 Weekend average travel speed comparison

Key points that are presented by this information include:

- The lowest recorded travel speeds were along Esmonde Road during the morning peak. To provide a sense of scale, during this period it takes approximately three times as long to travel the 1.4km distance along Esmonde Road between Lake Road and SH1 than it does to travel the 2.3km distance along Lake Road from Bayswater Avenue to Esmonde Road.
- Collectively the above suggests that for users travelling along the majority of this route the greatest opportunity for substantive change is within the Esmonde Road section. This has important implications on potential directions for Lake Road, as well as downstream benefits that might be able to be achieved for the more congested Esmonde Road section.
- During the PM peak, the lowest travel speeds are southbound along Esmonde Road, east of Barrys Point, and Lake Road between Esmonde Road and Hauraki Road, as well as Lake Road northbound between Bayswater and Hauraki.
- Travel speeds along the section of Lake Road south of Bayswater Avenue range between 38 and 47km/h, which are relatively close to the posted speed, again suggesting minimal congestion or delay for vehicles.
- Weekend travel speeds are generally higher than weekday peak periods with the exception of between Esmonde Road and Hauraki Road where the average southbound travel speed is lower than the weekday PM peak.

2.2.3 Public transport

Auckland Transport Hop card data shows that Devonport Ferry Terminal has the highest Ferry Patronage of 85% with Stanley Bay and Bayswater accounting for the remaining 15%.

All public bus services interchange with a ferry terminal and provide services that connect with an incoming or outgoing ferry service. Along Lake Road the highest number of boardings occur at bus stops at Belmont shops and outside Takapuna Grammar School.

A more detailed summary of the existing Auckland Transport public transport services, facilities and patronage is provided in **Appendix B** to this report.

2.2.4 Pedestrians and cyclists

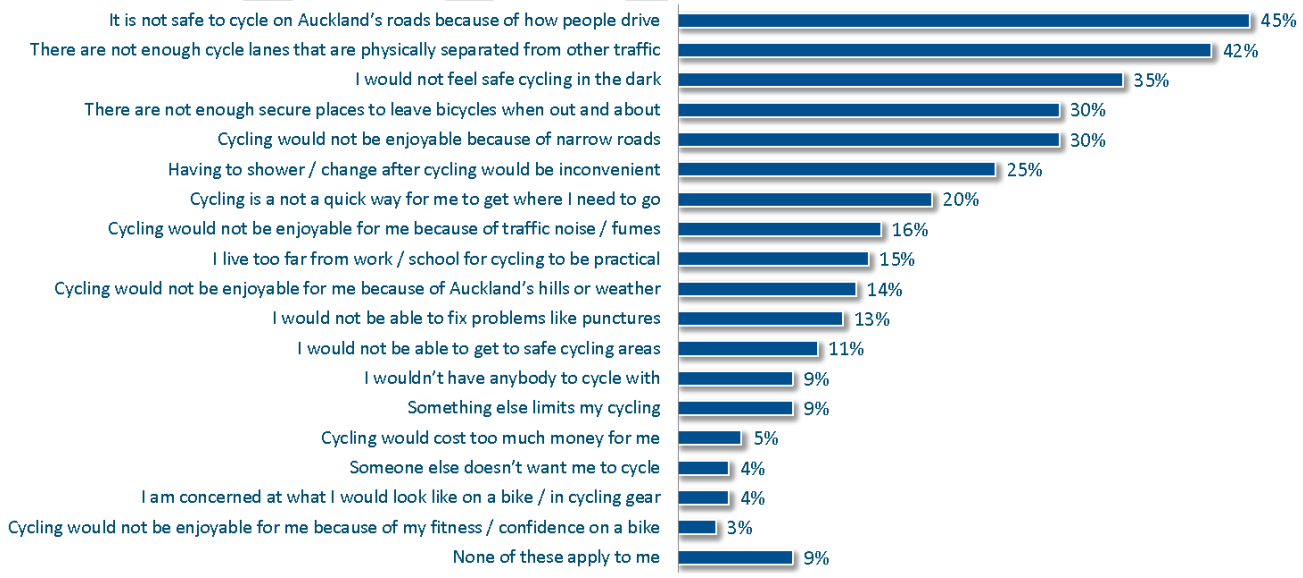
The preceding data gives some indication of the level of deficiencies for vehicles, but it should also be noted that there are existing issues for both pedestrians and cyclists.

In terms of walking, issues include poor provision of pedestrian crossing opportunities (both in the distance and distribution between crossing points and in the perceived safety and quality of uncontrolled crossing opportunities) and reduced urban amenity resulting from the substantial traffic movement function of Lake Road. Further factors, such as the general lack of street tree planting, further contribute to a low amenity walking environment along Lake Road.

Kerbside painted cycle lanes are provided along much of the corridor, however these are often narrow and in general are now not considered to sufficiently separate or buffer cyclists from traffic on a heavily trafficked arterial route such as Lake Road. This is likely holding back the potential level of cycling along Lake Road by many potential users. This is supported by anecdotal observations by stakeholders that indicate many cyclists are uncomfortable with using these lanes and instead prefer to cycle on the footpath and/or shared paths. The presence of both shared paths and cycle lanes alongside each other also contributes to a less than ideal provision for both pedestrians and cyclists.

It is considered that there is scope to increase use of cycling, particularly among those that do not have confidence to use the existing infrastructure. While cycling behaviour data is not available for Lake Road, Auckland Transport have undertaken more general cycling behavioural surveys, which identified reasons why people who are potentially keen to cycle are deterred. These reasons are summarised in Figure 2-7 as follows:

Figure 2-7 Results from an Auckland Transport cycling behaviour survey (Source: AT Active Modes Research Report, June 2014)



Clearly there are infrastructure responses (e.g. increased separation, Crime Prevention Trough Environmental Design (CPTED) elements, and parking) that could help reduce these impediments to active travel.

2.2.5 Safety

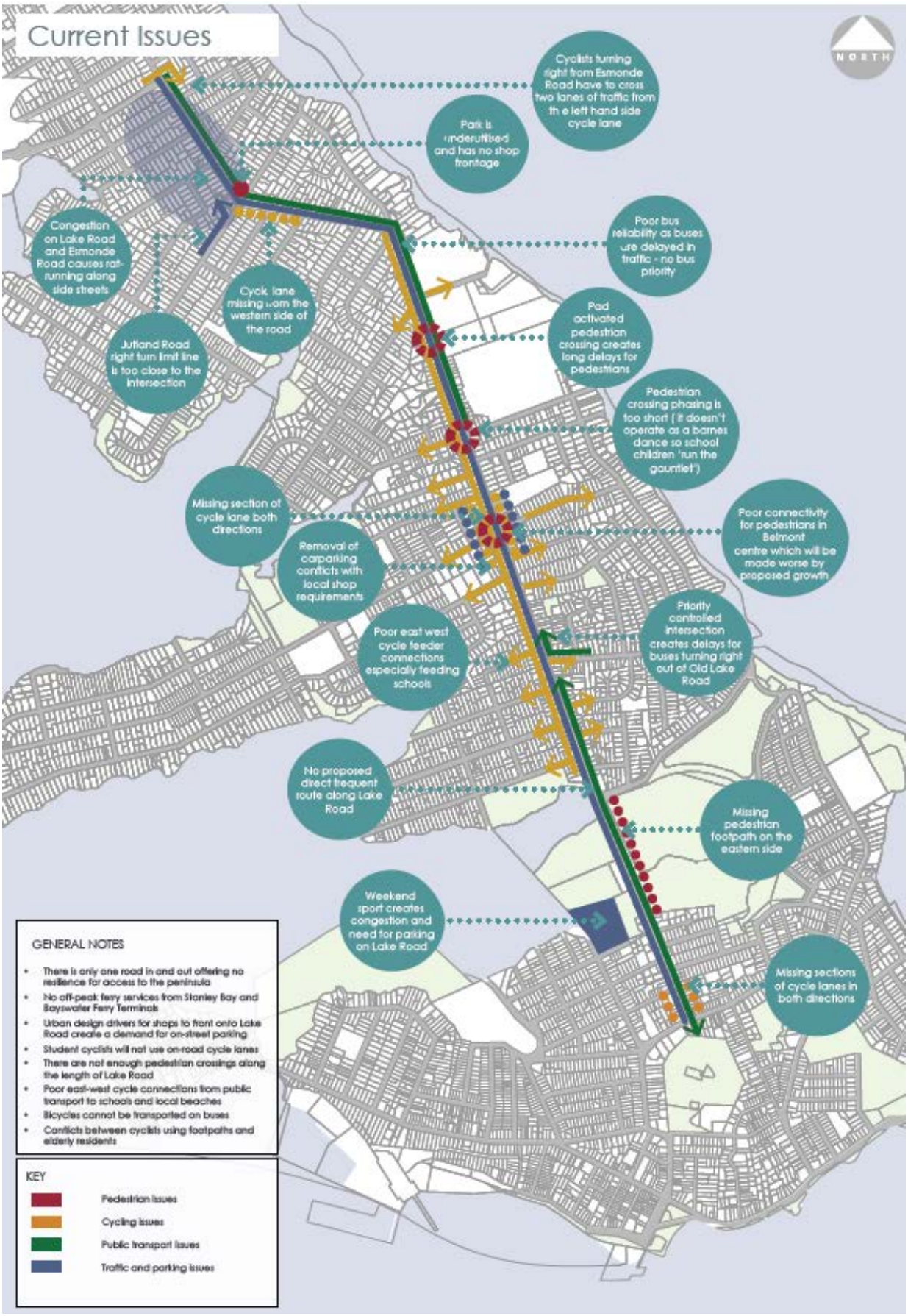
A search of the New Zealand Transport Agency's Crash Analysis (CAS) for the most recent complete five year period from 2009 to 2013 reported 222 crashes with no fatalities. The most common type of accident is rear-end type crashes with the highest concentration of these being outside Takapuna Grammar School. The most common accident involving cyclists were a result of cyclists being sideswiped or being hit cars turning right and failing to see oncoming cyclists.

A more detailed summary of the CAS statistics for Lake Road is provided in **Appendix B** to this report.

2.2.6 Summary of issues identified by technical stakeholder

During the first workshop in the corridor management process, a range of issues were identified by technical stakeholders from Auckland Transport, Auckland Council and NZTA, these are summarised in Figure 2-8.

Figure 2-8 Current issues summary



3 Future land use and transport context

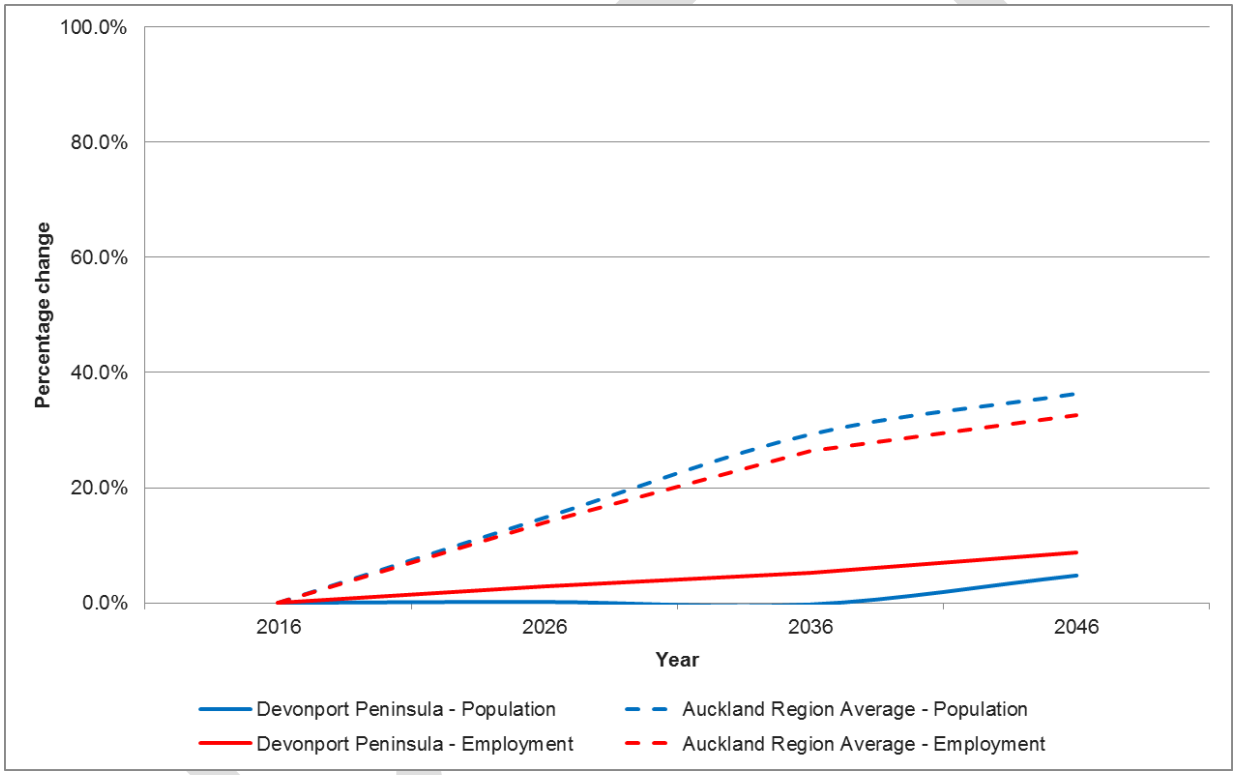
3.1 Forecast growth

3.1.1 Land use forecasts

In order to obtain an understanding of the trends for travel demand, the underlying fundamentals of population and employment growth have been examined. For this purpose, forecasts from the Auckland Regional Transport (ART3) model have been obtained, for a land use scenario that is reflective of the Auckland Plan.

Equivalent information for the Auckland region has also been obtained, with comparative forecasts for population and employment shown in Figure 3-1 below.

Figure 3-1 Forecast population and employment growth (Source: ART3)



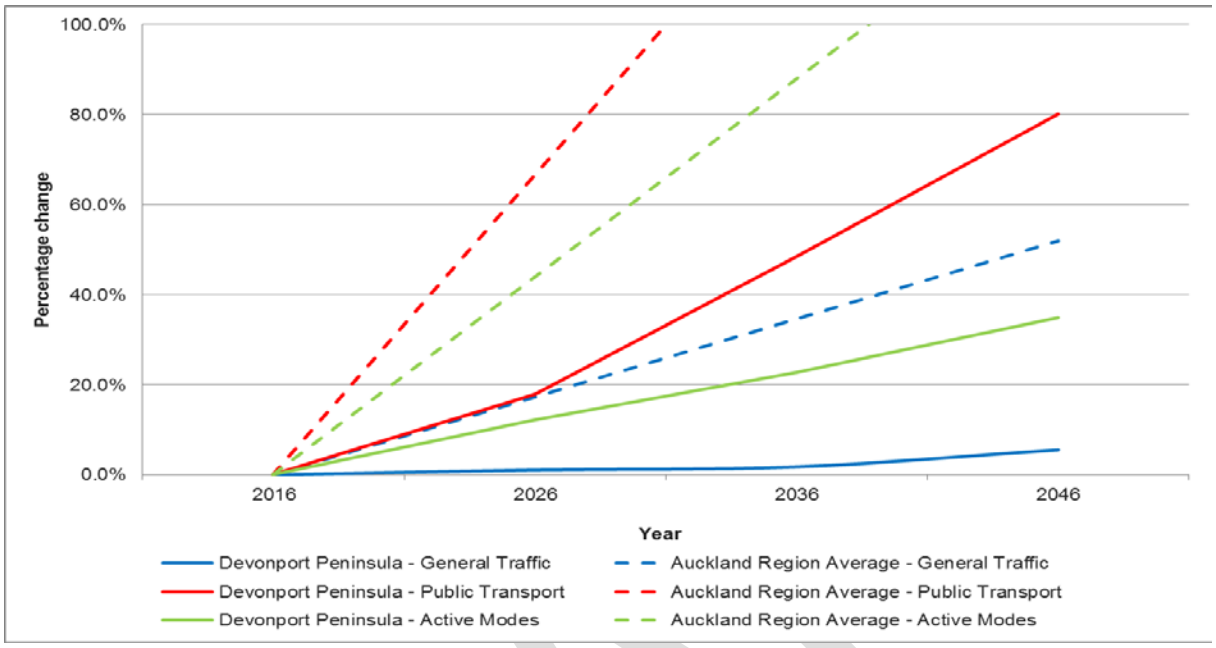
As shown, land use forecasts suggest that the Devonport Peninsula will see negligible population growth in the short to medium term, with a slight increase through to 2046. This level of population growth is however far outstripped by that expected for the greater Auckland region.

Modest but steady employment growth is expected within the peninsula over the next 30 years. Again, this is however significantly more minor than the equivalent employment growth for the Auckland region.

3.1.2 Travel demand forecasts

The ART3 model also provides an indication of future travel growth by mode shown in Figure 3-2.

Figure 3-2 Forecast morning peak travel demand percentage growth rate, (Source: ART3)



Both public transport and active modes are predicted to show more substantive growth rate, although it should be recognised that this growth occurs from relatively more moderate existing volumes.

General traffic growth rate is forecast to be minor over the next 30 years, which suggests that existing congestion levels within Lake Road are unlikely to exacerbate to any significant extent.

These forecasts for travel growth on the peninsula reflect the underlying population and employment change characteristics, with lower growth for all travel modes comparative to the regional average. Further comparison of forecast demands for vehicular based travel is shown in Figure 3-3. The demands are based on an average over 6 points along the Lake Road corridor.

Figure 3-3 Forecast morning peak travel demand growth rate, (Source: ART3)

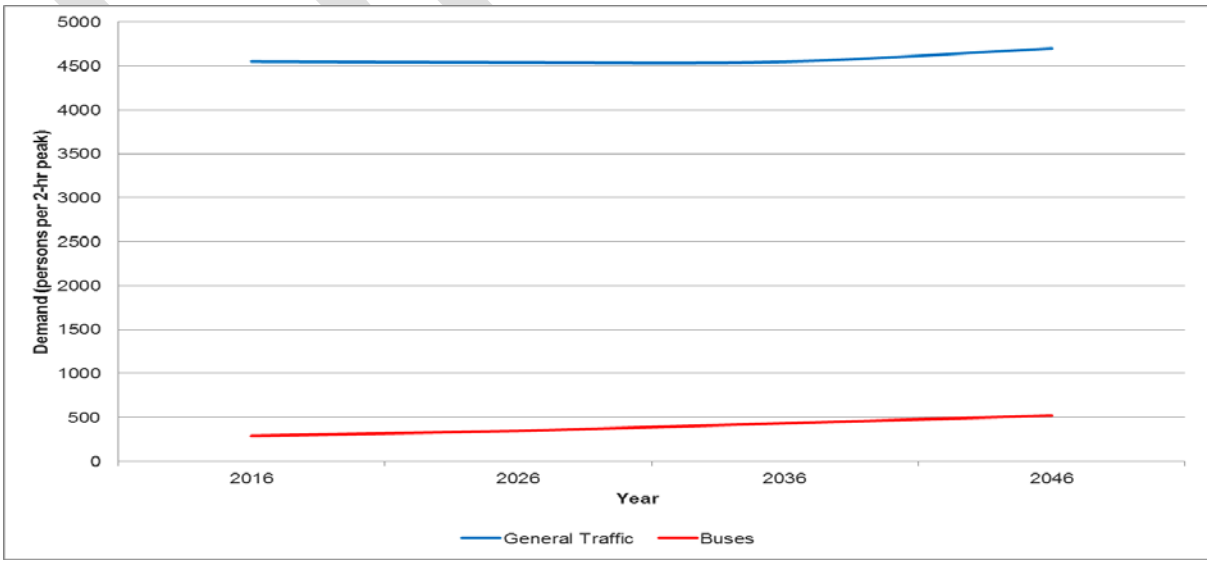


Figure 3-2 demonstrates the current predominance of general traffic for vehicular travel along the corridor, and this should be acknowledged. It does however again reflect the relative plateauing of this travel mode.

Buses show some growth but are still predicted to accommodate demand far below that of private traffic. This is both a challenge, in terms of achieving better utilisation of this mode but also an opportunity in the increased corridor capacity that could be unlocked if this mode was more effectively used.

While peak demands are not available for active modes, daily volumes are predicted in ART3 to increase from 8,500 to 11,700 people per day between now and 2046.

3.1.3 Summary of existing issues and growth trends

The relatively low percentage of forecast growth in population and employment in the Devonport Peninsula has a number of implications on the strategic direction for the Lake Road arterial corridor including:

- It is unlikely that existing congestion within Lake Road will worsen significantly.
- Pressures on other parts of the transport network will comparatively increase relative to Lake Road.
- Notwithstanding the above, and as outlined earlier, there is significant existing congestion along the northern half of Lake Road and interventions are required to help alleviate this, as well as improving other aspects of the corridor.
- In addition to Lake Road itself, the adjacent arterial route Esmonde Road (and interface with State Highway 1) have major existing congestion problems, which could be further exacerbated by growth within the Takapuna metropolitan centre. Interventions for Lake Road that could help alleviate Esmonde Road are therefore an important opportunity.

Finally, if actual growth along the peninsula starts to exceed predictions, more significant transport interventions may be required.

3.2 Strategic planning considerations

3.2.1 Auckland Plan

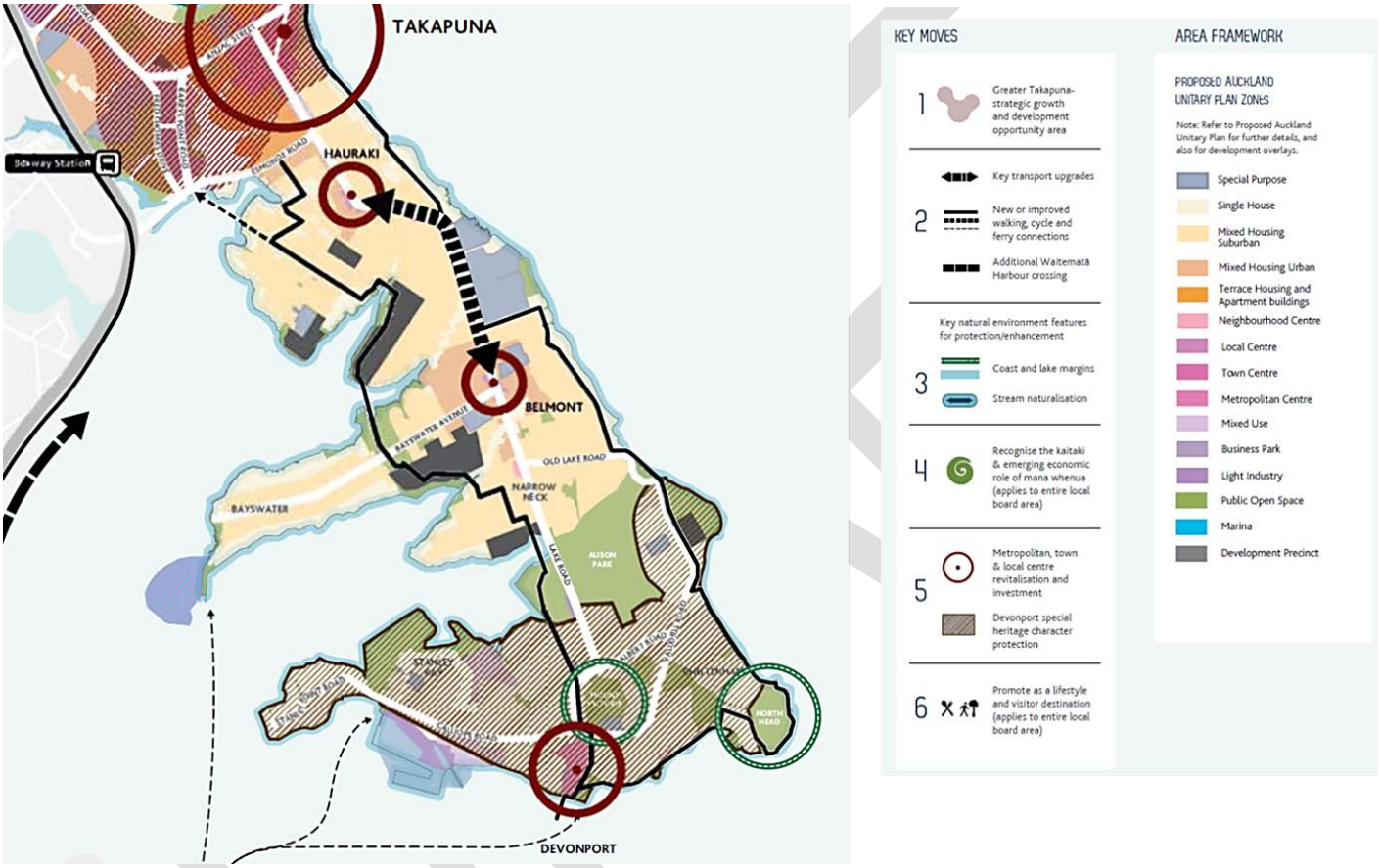
a) Devonport – Takapuna Area Plan (Draft)

Auckland Council and the Devonport-Takapuna Local Board have prepared and adopted the draft Area Plan for the Local Board area. The Area Plan shows how the area may change over the next 30 years and contributes to making Auckland the world's most liveable city. The plan is guided by the Auckland Plan and will help implement it at a local level.

From a land use change perspective, the plan identifies that incremental change from the status quo is likely, given the predominantly heritage residential zoning of the southern end of the peninsula around Devonport, Stanley Point and Cheltenham, and the continuation of suburban residential zoning across much of the rest of the peninsula. The most significant development opportunity is the redevelopment of existing Navy-owned land by Ngati Whatua for residential purposes. This is a significant opportunity that will be progressively realised over the medium to long term.

The Area Plan also contains a number of 'Key Moves', Figure 3-4. These highlight the role of the Belmont and Hauraki neighbourhood centres and that a transport upgrade along Lake Road between these centres is a transport priority. Council (including Local Board) have agreed that PT improvements and an increase in people moving capacity should be a key component of such an upgrade. New and improved walking and cycle connections are also identified along the coastal edges of the peninsula, including a potential new bridge connection between Francis Street and Esmonde Road.

Figure 3-4 Key Moves, Devonport – Takapuna Area Plan (Draft)



The Area Plan also highlights the significant potential for widespread change across the extended Takapuna area encompassing both the metropolitan centre and the adjoining areas of Shakespeare-Taharoto, Akoranga and Smales Farm up to the northern motorway. More intensive development in these locations will impact upon the transport connections in and out of the Devonport peninsula, particularly at Esmonde Road.

b) Auckland Design Manual and Te Aranga Māori Urban Design Principles

The Auckland Design Manual includes Te Aranga Māori Urban Design Principles. Further design will be shaped in collaboration with Mana Whenua who will provide a translation of these principles specifically for the Lake Road corridor.

Mana Whenua to provide further detail at a later date.

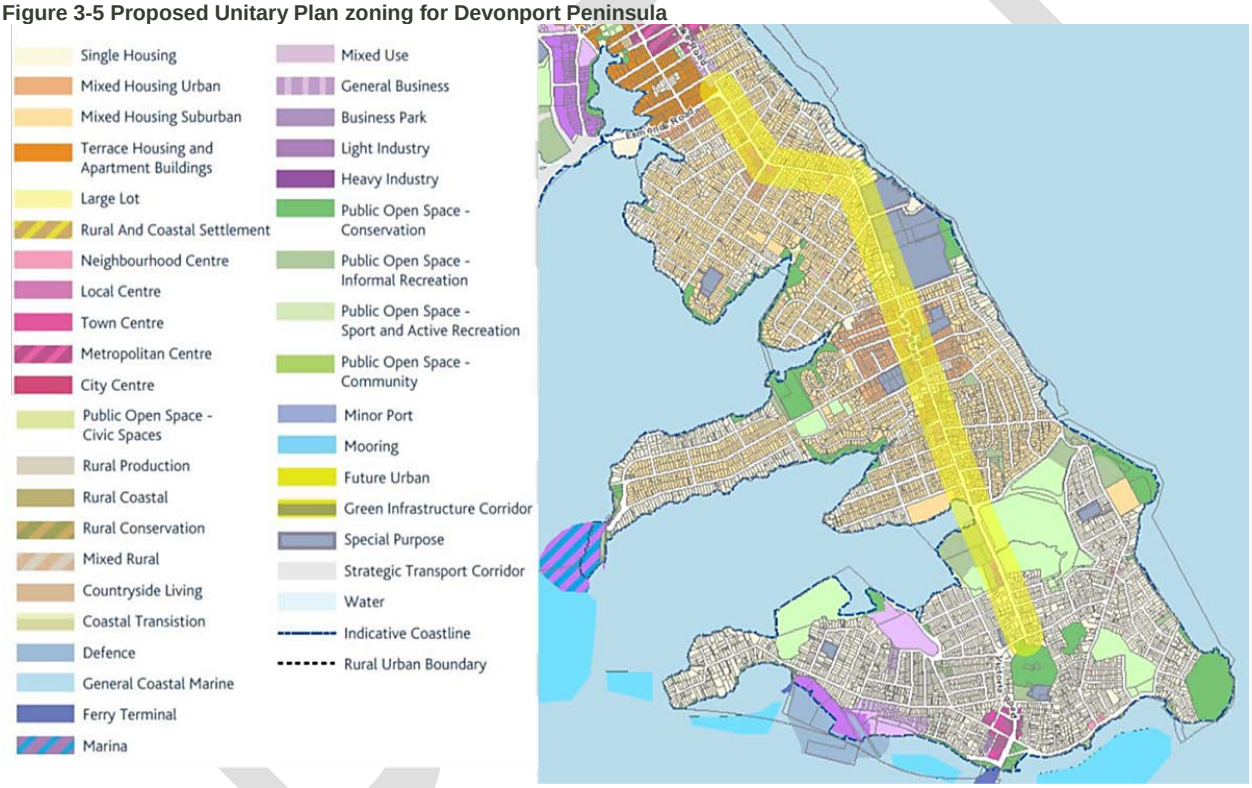
3.2.2 Proposed Auckland Unitary Plan

The Proposed Auckland Unitary Plan (PAUP), Figure 3-5, provides for some further development opportunities in relation to existing residential zones on the Devonport Peninsula. When taken as a whole, the level of intensification and land use change is considered modest and incremental.

The southern third of the peninsula around Devonport, Stanley Point and Cheltenham is largely Single Housing zone recognising its heritage status. Belmont, Bayswater and Hauraki are a mix of Single Housing along the coastal edge and Mixed Housing Suburban with a concentration of the slightly higher density Mixed Housing Urban around the Belmont neighbourhood centre and behind the Hauraki shops to the west of Lake Road.

The PAUP does provide for significant upzoning and development potential in the wider Takapuna area to the north of the study area. This includes Terrace Housing and Apartment Buildings between Esmonde Road and the metropolitan centre which have an interrelationship with the Devonport peninsula including transport network considerations as they relate to the role and function of Esmonde Road which is a vital access link for the peninsula.

Figure 3-5 Proposed Unitary Plan zoning for Devonport Peninsula



a) Mana Whenua Overlay

The following map shows the relative location of identified sites and places of significance or value to Mana Whenua in the PAUP.

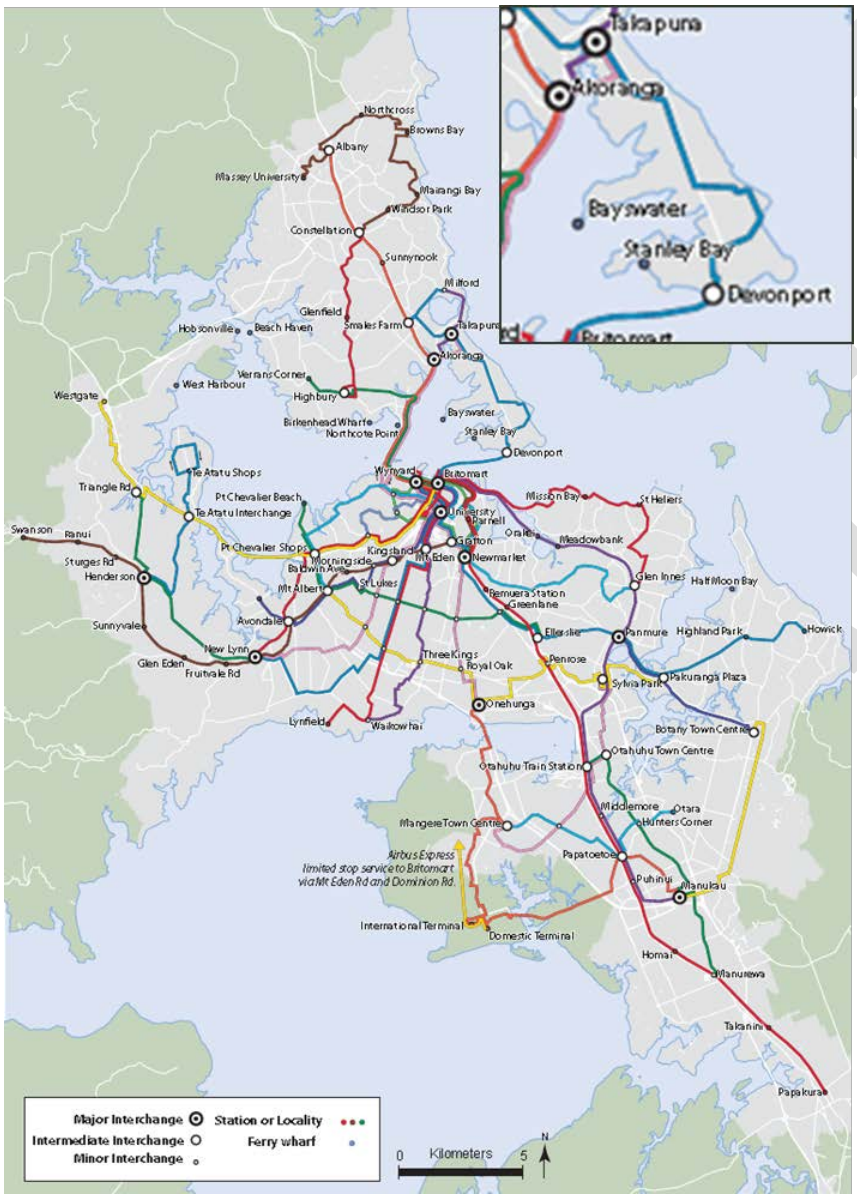
b) Historic Places Overlay

The following map shows Historic heritage places and the extent of historic heritage places identified by the PAUP. Planning approval will be required to undertake any work within proximity of these sites.

3.2.3 Regional Public Transport Plan

The Regional Public Transport Plan (RPTP) describes the public transport services that Auckland Transport proposes for the region over the next 10 years. In particular, it will introduce a new, simpler and better-connected public transport network, based around a frequent route network. The frequent route network is shown below in Figure 3-6.

Figure 3-6 Proposed Frequent Bus Network



As shown Lake Road to the north of Old Lake Road will cater for a frequent service between Milford and Devonport (via Takapuna). It will also connect with the Devonport ferry service, which will also be a frequent route. This frequent status means these routes will operate at least every 15 minutes between 7am and 7pm, seven days a week.

In comparison to the existing service, this means as a minimum an increased frequency during off-peak periods and weekends (which is currently 30 minutes during these times). In addition, the improvements achieved elsewhere in the network will also provide opportunity to access other destinations across Auckland.

The northern part of the Auckland bus network (including the study area) will undergo consultation during 2015, with implementation scheduled for 2016.

3.2.4 Auckland Cycle Network

The Auckland Cycle Network (ACN) is a layer within the One Network approach described within the ITP. It shows current and proposed new cycle routes throughout the region, Figure 3-7.

The whole extent of Lake Road is identified as a Cycle Connector route, a priority exceeded only by the cycle metro network. Lake Road also connects with Bayswater Avenue, also a cycle connector, as well as a number of cycle feeder routes.

Figure 3-7 Auckland future cycle network

The proposed SkyPath and SeaPath as shown by the Cycle metro line across the Waitemata Harbour in Figure 3-7 will complete the missing link in the cycle network connecting the CBD with the North Shore.

3.3 Strategic projects

3.3.1 Additional Waitemata Harbour Crossing

The additional harbour crossing is one of three transport projects that have been identified by the Auckland Plan as critical to future growth (along with City Rail Link and AMETI/ East West Connections). In June 2013 the government announced its support for a tunnel, with a current intent for the additional crossing to be completed by approximately 2030.

The planned project involves a new tunnel crossing running west of the city centre from Esmonde and Onewa Roads on the North Shore through to Wynyard Quarter and then emerging around Wellington Street. An indicative lay-out is shown in Figure 3-8. Together, the existing Auckland Harbour Bridge and additional crossing will provide 14 lanes for general traffic, public transport and walking and cycling.

Through this, the additional crossing will enable better public transport connection between the Devonport Peninsula and the CBD (via Takapuna), and potentially help alleviate congestion at the Esmonde Road on-ramp.

Figure 3-8 Additional harbour crossing

3.3.2 Devonport Ferry Upgrade

The Devonport Ferry Terminal is undergoing an upgrade to improve the wharf and terminal facilities, which is programmed for completion in 2015. This upgrade will increase the number of bus stops from three to four, provide additional scooter and cycle parking spaces and reduce the number of long-term car parks. Car-pooling priority spaces will be provided.

Figure 3-9: Devonport Ferry Upgrade

This upgrade will provide improved facilities and amenity for users, and would be expected to result in its increased use. In addition, the increased support for active and public transport connections, and reduced car parking should see a change in the type of multi-modal trips by ferry users. These changes will clearly have implications and provide opportunities for change in terms of the use of Lake Road.

3.3.3 Takapuna Centre Based Transport Study

The Takapuna Centre Based Transport Study, completed in March 2014, was tasked with assessing the future transport demands for the Takapuna area and the strategy and projects required to respond to these demands.

A number of the recommendations from this study are relevant to the Lake Road study area, including:

- Greater emphasis must be given to public transport to enable Takapuna to meet its strategic objectives as a successful, dynamic Metropolitan Centre.
- Parking management is required with an element of parking restraint to be introduced over time, sufficient to discourage some commuters from driving to work, but flexible enough to continue to attract shoppers, visitors and essential business trips.
- Road capacity should generally be retained on the main routes to and from Takapuna, to provide a satisfactory level of service for most of the day, accepting that congestion can be expected in the peak periods

The study also recommends three longer term' transformational projects' for the area, two of which have particular implications for public transport using the Lake Road study area. These comprise of a new (relocated) bus station in central Takapuna, as well as a potential direct connection between

Akoranga Station and Takapuna Centre. One of the options proposed provided a possible link across Upper Shoal Bay. The collective concept for public transport is shown in Figure 3-10 below.

Figure 3-10 Recommended Public Transport Solution (Source: Takapuna Centre Based Transport Study)

3.3.4 Summary

The above plans and projects provide the context for growth and the aspirations of the Local Board. Further detail of the strategic plans and projects is provided in **Appendix B** to this report.

They also demonstrate a number of significant transport interventions and strategies that will affect Lake Road both directly and also as part of the wider transport network. To ensure value for money and an integrated travel system, it is important that the changes proposed by this CMP both complement and enhance these other projects.

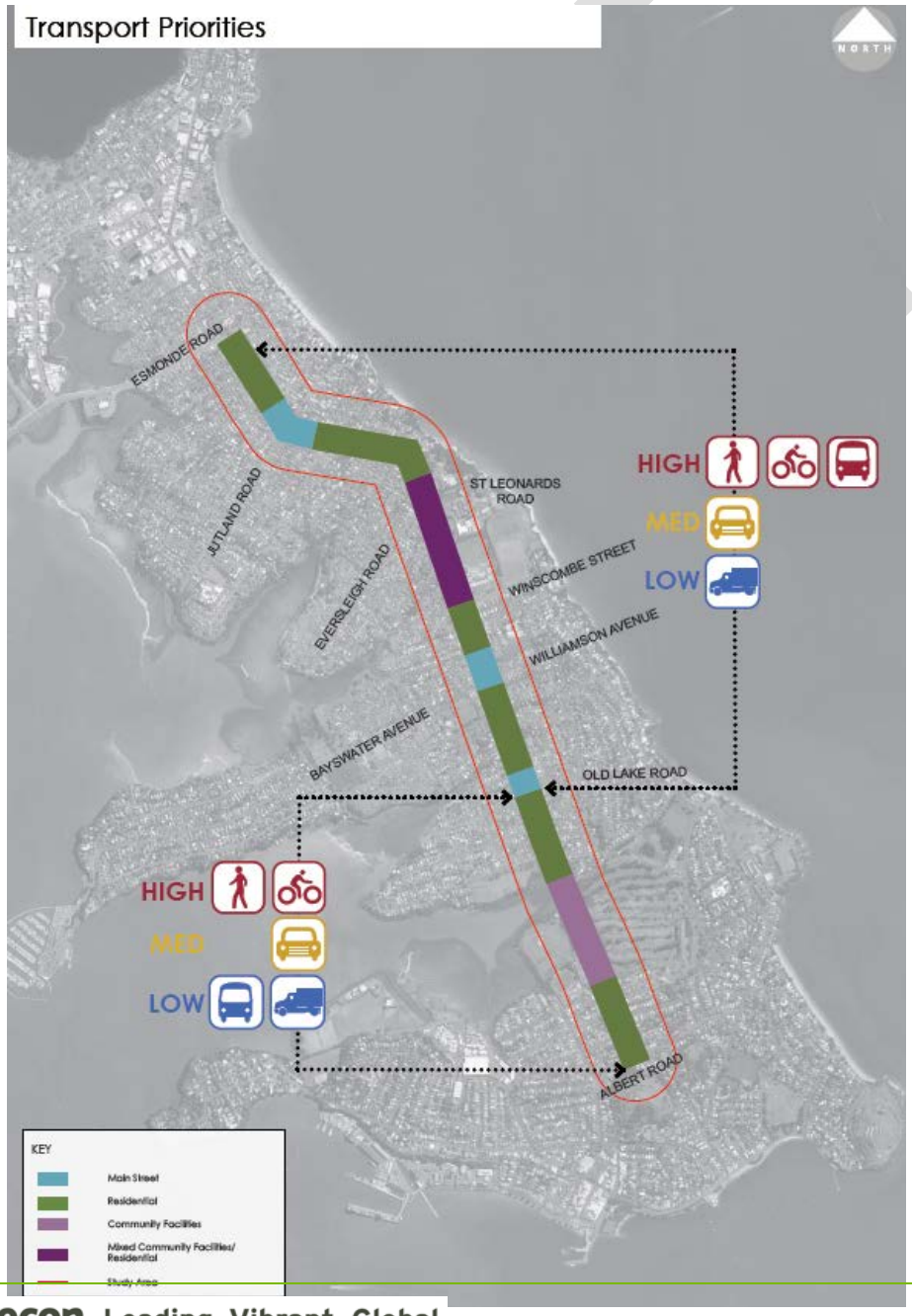
4 Key corridor functions and points of tension

4.1 Network role and priorities

In order to obtain clarity on the strategic direction for the corridor, transport priorities have been identified. This has been developed through consultation with technical stakeholders.

Assessment of the transport priorities along each section of Lake Road has identified general consistency for the full length of the corridor. This involves assigning a high, medium or low level of priority to each mode of travel. This assignment allows the level of intervention required to be considered in comparison between each mode, this is very useful when it comes to the allocation of road space. This also remains the case across different time periods i.e. weekday peak, off-peak and weekends. A summary of these transport priorities is illustrated in Figure 4-1 below, and detailed rationale is provided in the **Appendix E**.

Figure 4-1 Identified typologies and transport mode priorities



4.2 Key locations of tension

Following the identification of the network role for the corridor, as well as initial stakeholder meetings, a number of points of tension were identified. A summary of these tensions is provided in Table 4-1.

Table 4-1 Key locations of tension

Sections	Point of tension	Description
All	Redirecting corridor priorities while managing traffic capacity	The proposed network role, with general traffic and freight as a lower priority than public transport and active modes is generally the inverse of the current operation of the corridor. Directing corridor priorities will therefore likely require some reduced provision or priority for general traffic.
All	Public transport network catchments and connections	The proposed frequent bus route through the peninsula runs through to Devonport Ferry Terminal via Old Lake and Vauxhall Roads. While the route provides accessibility to a greater catchment area it provides a less direct route for passengers travelling between areas further north and the ferry terminal. At its northern end, this frequent route runs past Takapuna. While providing a good connection to this metropolitan centre, customers south of Belmont will need to transfer at Takapuna to access the city centre, which will generate travel time delay. Finding the best balance between the needs for these customer types will be an important consideration in maximising public transport usage.
All	Capacity for movement and crossing opportunities	There is a strong stakeholder desire to reduce delays associated with movement along the corridor, however it is also recognised that there is a need to reduce the severance effects of Lake Road, particularly for pedestrians. Achieving one of these ambitions may be to the detriment of the other.
All	Footpath use	It is understood that there is widespread use of footpaths by students cycling to/from school, including areas not marked as shared space. There is tension between this footpath use and its use by pedestrians, and particularly elderly and mobility impaired residents.
2, 4, 5, 7	Shared paths	Parts of the corridor have both on-road and off-road cycle lanes along the same side of the road. While this allows cyclists to choose their preferred cycle facility, it is potentially space inefficient given other modal requirements.
5	Car parking spatial requirements at Belmont shops	On street car-parking at Belmont Town Centre is currently provided. The requirements to support PT and active modes may warrant increased corridor space and allocation, and could be in tension with the existing car parking use.

Each of these tension points has been considered extensively through the option development stage of the CMP process. How the strategic direction which manages and in some cases resolves these tensions, is provided later in this report.

5 Strategic direction

5.1 Overarching goals

Taking into account the place/ context typologies and transport priorities, a set of provisional goals have been developed. These have been used to guide the development and selection of preferred corridor directions.

Figure 5-1 Overarching corridor goals

Through the option development, testing and selection process for this CMP, strategies have been developed that provide a logical, connected and comprehensive direction for each travel mode. The strategy has also given specific consideration to how the town centres could be better supported and integrated with the various transport initiatives.

A summary of the priority level, rationale and the overall strategic direction is outlined in the green box and is followed by a list of interventions. Interventions include investigations, recommended design approaches and specific projects. Several alternative strategies or assessments are outlined in grey boxes.

These strategies are discussed for the town centres and each travel mode in turn below.

5.2 Strategy for walking

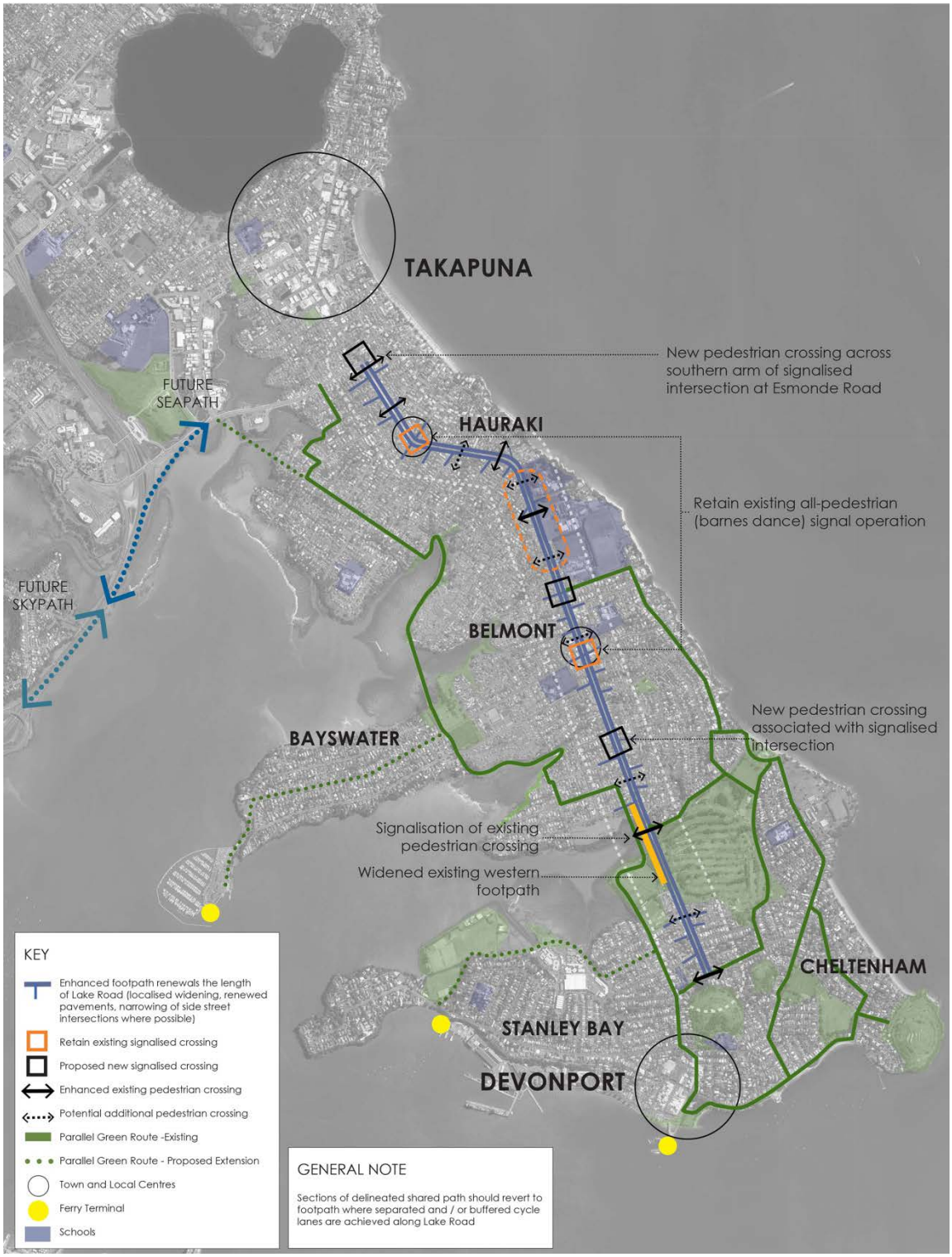
Walking has been identified as a high transport priority along the full length of the corridor, reflecting the fact that many people that live on or visit the peninsula have to walk along or across Lake Road as part of their journey. Lake Road has a wide range of destinations that are often in short proximity to each other and thereby highly walkable distances. The land is relatively flat and with a well-connected grid of side streets in comparison to many other parts of Auckland.

In particular, walking has been identified as a priority to reflect the high concentration of local schools along and just off Lake Road, This also reflects the fact the wider Devonport Peninsula – including Lake Road - experiences high levels of recreational use not just by local residents but as a regional destination by Aucklanders and tourists, particularly at evenings, weekends and the peak summer period. It is also important to recognise that public transport users boarding/ alighting at stops on Lake Road, and people parking at the town centres, become pedestrians for part of their journey. The proposed interventions for this travel mode are summarised as follows.

- Review footpath widths and qualities along the length of Lake Road and seek to widen footpaths where widths are sub-optimal and grass berm space is available. In any case greening of a busy arterial street such as Lake Road is more appropriately achieved through street tree planting, rather than grass berms.
- Likewise, providing for wider footpaths and enhanced street amenity including street trees and planting and opportunities to sit, pause or linger in association with bus stops, school zones and other community facilities will increase the attractiveness of walking as a transport option along Lake Road.
- Removal of existing sections of delineated shared path along Lake Road where they are replaced with separated or buffered cycle lanes, to return this space to pedestrian-only usage reflecting the sub-optimal width and inappropriate context for shared path facilities.
- Look to achieve more regular and continuous street tree planting along the length of Lake Road as a core part of a strategy that makes walking safer and more attractive (refer Section 5.7: Strategy for Urban amenity and placemaking).
- Recognise the significant impact that the numerous residential side streets make to the overall quality or otherwise of the pedestrian environment along Lake Road. Investigate measures to narrow these intersections with site streets to provide for reduced crossing distances and a safer, high quality pedestrian crossing experience walking the length of Lake Road. Measures such as narrowing of side street lane widths and tightening of corner radii. Such measures would also be of benefit to cycle lanes on Lake Road.
- Longer term, pedestrian movement along the length of Lake Road could be further enhanced through achieving design measures that provide greater continuity of the Lake Road footpath across these intersections, giving informal priority to pedestrians over turning traffic. Such measures are still in their infancy in Auckland and have yet to be implemented for streets with two-way traffic.
- Review and seek to reduce where possible pedestrian wait times and crossing distances at traffic signals, and remove slip lanes that adversely affect the safety of walking by putting pedestrians into conflict with turning traffic.
- Review and seek to improve existing street lighting and way-finding signage.

- Investigate opportunities for enhanced and additional pedestrian crossing opportunities (refer Section 7.2) to enhance the actual and perceived safety and attractiveness of walking across Lake Road. This is particularly so in relation to the existing refuge islands that are considered sub-standard and not the appropriate level of provision for a busy and heavily trafficked arterial road of this nature.

Figure 5-2 Proposed walking interventions



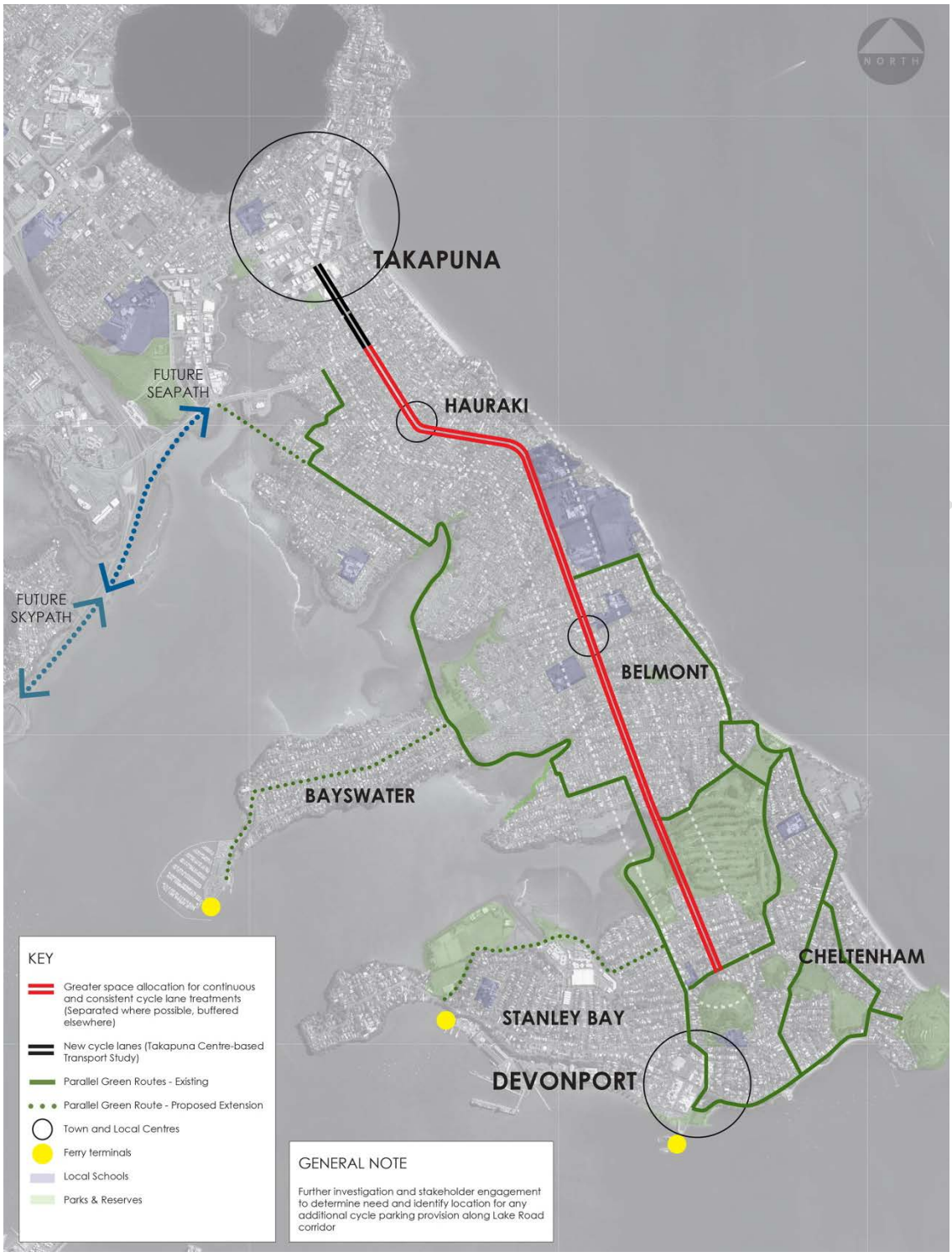
5.3 Strategy for cycling

A clear direction from the technical stakeholder group was the need to recognise and respond to the differing cyclist types, ranging from experienced cyclists and commuters through to less-confident cyclists and school children.

The proposed direction is for a substantial improved offering for cyclists, making use of available width within the existing road reserve. The recommended interventions that will support this direction are summarised as follows:

- Additional corridor width allocated to cycle lanes along the full length of the corridor
- Where feasible, implement separated cycle lane treatments.
- Use of buffered lanes or specific vehicle crossing treatments where full separation is not possible (further discussion on this is provided elsewhere in this report). As much consistency as possible should be sort.
- Maximise consistency and connection with the surrounding road network, including:
    - Lake Road, north of Esmonde Road. The Takapuna Centre Based Transport Plan proposes painted kerbside cycle lanes for this road but it is suggested that buffering or separation treatments are also considered.
    - Links to future proposed SkyPath and SeaPath walking/ cycling connections across the Harbour Bridge and between Shoal Bay/ Takapuna respectively.
    - The proposed Green Route running along the western part of the peninsula, from Esmonde Road (via a proposed new bridge) through to Devonport.
    - The Te Araroa walkway
- New cycle parking at key destinations i.e. Hauraki and Belmont local centres and other locations as identified by the Local Board and key stakeholder groups;
- Consideration of cycle lane provision through the Albert Road roundabout (refer to Section 7.3).

Figure 5-3 Proposed cycling interventions

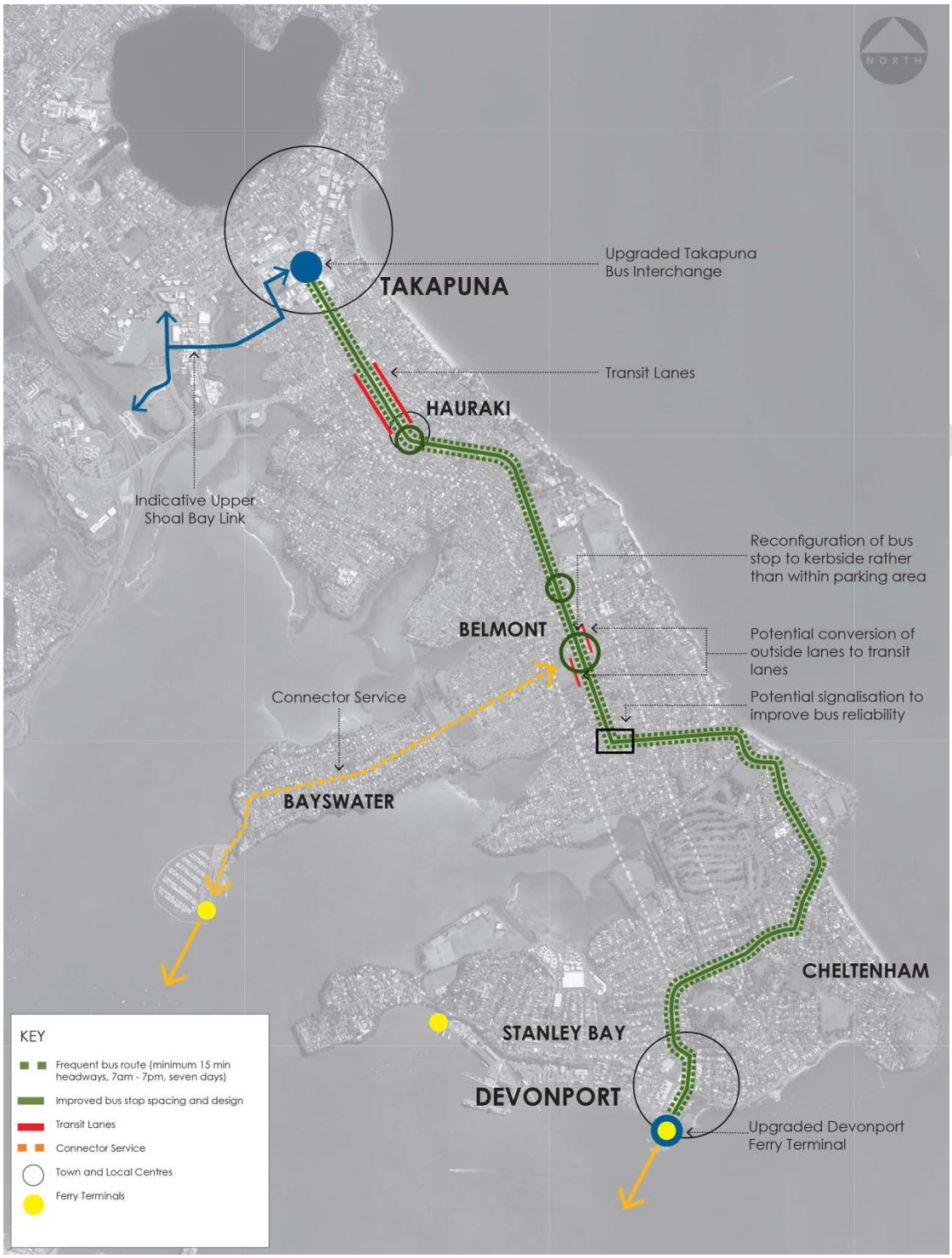


5.4 Strategy for public transport

Public transport has been identified as a key mechanism for providing more efficient and greater person movement capacity along the corridor. As such, it has been identified as a high priority transport mode for the length of the corridor that contains a high frequency bus route i.e. north of Old

Lake Road. The preferred direction therefore reflects the above aspects with the main features as follows.

Figure 5-4 Proposed public transport interventions



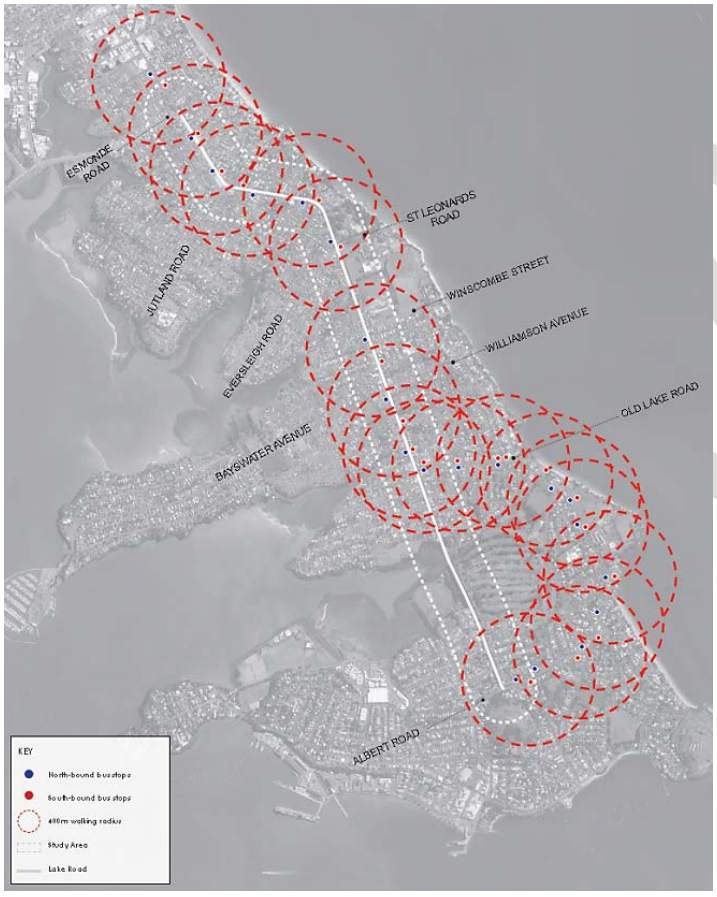
- Under the Regional Public Transport Plan, a high frequency bus route will run along Lake Road through to Takapuna and Devonport. This service will have a have a minimum frequency of 15 minutes from 7am to 7pm, 7 days a week. This represents an improved frequency, particularly during off-peak weekdays and weekends, offering a more substantial choice for all users.

- This frequent route and the study area will also benefit from the collective uplift in the service quality, connections and patronage resulting from the new frequent bus network being rolled out over 2016.

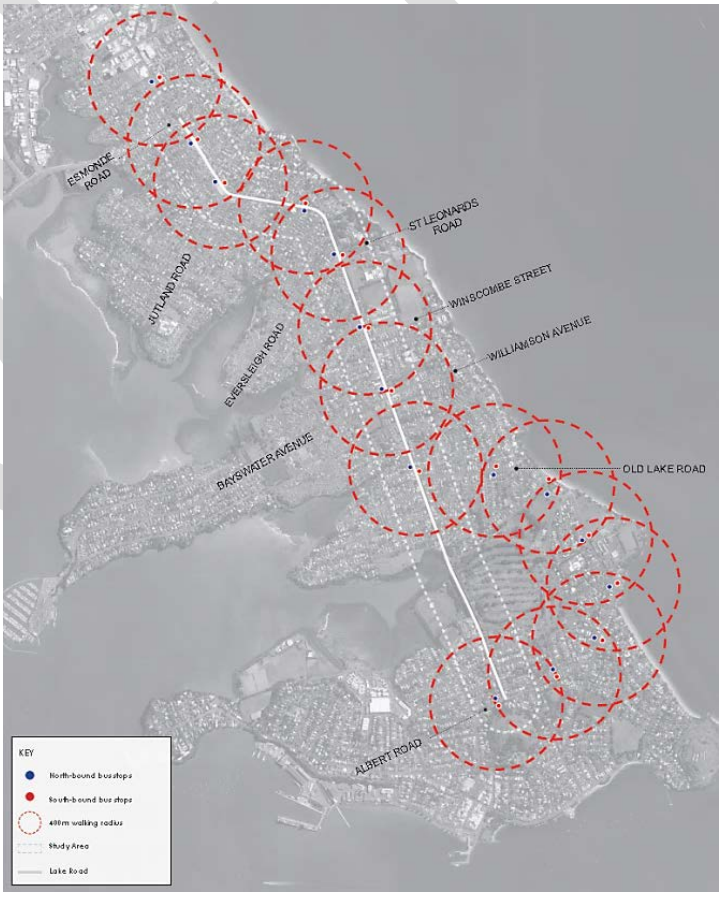
This service improvement should be supported by infrastructure changes including:

- Improved bus travel time reliability of the existing four lane section of Lake Road (north of Jutland Road) by converting a lane in each direction to transit lanes. In the northbound direction, it is proposed that this transit lane be commenced where the double lane commences, approximately north of Onepoto Road.
- It is also proposed that bus stop locations be rationalised to more even and wider spacing (400 to 500m approximately) along the full length of the frequent bus route running through Lake Road. At present stops are unnecessarily close, particularly along Old Lake Road. This change will minimise delay due to bus stopping while maintaining accessibility to a large catchment. The concept behind this rationalisation, as well as preliminary suggested placement for this is shown graphically below.

Existing



Proposed



- Provision of new high quality bus stop shelters, lighting and other furniture in conjunction with bus stop rationalisation.
- Removal of indentation for bus stops north of Jutland Road.
- The Takapuna Centre Based Transport Study has proposed an Upper Shoal Bay Link and relocated/ upgraded Takapuna Bus Interchange. These projects would not only benefit Takapuna Centre but also many users of Lake Road, and are therefore also recommended by this study. Collectively they would provide a better customer experience at the terminus of the Lake Road

frequent bus route, and also a quicker onward journey to Akoranga Station and the rapid transit network (i.e. northern busway).

Alternative public transport strategies

The study gave consideration to a number of modifications or alternatives to the public transport network planned for Lake Road and the Devonport peninsula.

This includes consideration of a more direct bus route between the northern part of the peninsula and Devonport through use of the southern part of Lake Road rather than looping around Old Lake, Vauxhall and Albert Roads. Feedback from AT's public transport operations team has however indicated such a service would suffer from a reduced catchment compared with the existing frequent route, while providing both service routes would have negative implications on operating costs and/or frequency.

Use of smaller shuttle buses has also been considered, i.e. to provide shuttle services to the ferry terminals and increased coverage to other parts of the peninsula. It is however considered that such services would be contrary to the Regional Public Transport Plan aspirations to a simpler, more legible and connected public transport network, which has fewer different services but with increased frequency. Many of the costs of regular bus services would also be present for shuttles i.e. driver wages, vehicle operating costs, without the person capacity and efficiency of larger, regular buses.

Alternative public transport systems were also considered such as such as light rail or personal rapid transit systems. The view of both technical stakeholders and the project team was that such systems would be difficult to justify given the likely costs and possible road widening requirements, particular given the relatively low density nature of the peninsula. It is reasonable to conclude that other corridors within Auckland would make better locations for trial cases for alternative public transport technologies. Notwithstanding the above, it is also recommended that consideration of such systems is best addressed through a more a regional based assessment, rather than at a CMP level.

5.5 Strategy for general traffic and freight

As outlined elsewhere in this report, it is recommended that given the low growth predictions for area, a substantial upgrade to traffic capacity along Lake Road (i.e. through four laning of the section between Jutland Road and Bayswater Avenue) is unlikely to be appropriate. Reasons for this include high costs relative to benefits, adverse spatial implications on cycle lanes and footpaths (required for high priority transport modes), and reduced urban amenity for residents.

The focus of the strategy for general traffic and freight is therefore to get better use of space out of the existing road reserve and infrastructure. This involves improving the person carrying capacity of Lake Road through increased use of public transport, multi-occupancy private vehicles and active modes, as well as undertaking localised optimisation and capacity improvement projects. This also involves education and promotion of the use of these lanes and the advantages of car-pooling.

It is also important to recognise that improved person carrying capacity would not only help limit congestion on Lake Road itself, but also on the adjacent network which has been identified as having more severe delay and congestion (i.e. Esmonde Road and its interface with State Highway 1 and roads leading to Takapuna). It should also be noted that improvements to these adjacent connections has the potential to improve overall travel times for Lake Road traffic i.e. Additional Waitemata Harbour Crossing could provide additional capacity and performance for journeys between Devonport Peninsula and areas to the south (Auckland CBD etc).

The elements of the preferred direction that relate specifically to general traffic and freight are summarised as follows:

- Where current four laning exists to the north of Jutland Road, convert the outside lanes to transit lanes to support increased use of public transport and private vehicle sharing.
- Retain a single lane of traffic in each direction south of Jutland Road.
- Review configuration for the Lake Road/ Winscombe Street signalised intersection, which has been referenced as a key location of congestion and delay. Traffic surveys indicate that the right turns from Lake Road (north and south) have minimal demand but are each allocated specific right turn bays. It is suggested that alternative arrangements be explored to provide an additional through lane northbound (localised at the intersection) through reallocation of space, perhaps through banning the right turns or having a shared through/right turn lane.
- Review opportunities for bus/ transit priority at Bayswater Avenue/ Lake Road intersection. In particular the two lane southern approach could be altered to provide a kerbside transit lane.
- Undertake signal optimisation review to identify and implement instances where intersection configuration and phase arrangement/ timings could enable improved capacity (while maintaining appropriate level of service for other travel modes), currently underway by Auckland Transport.
- Review requirements and appropriate locations for central medians and turning bays.
- Consider the benefit/ justification for potentially banning turns at some side roads to improve through movement.
- Continue to discuss any potential travel planning improvements with the Royal New Zealand Navy, as the largest single employer within the peninsula.
- Support investigations into improving the person carrying capacity of the adjacent transport network i.e. improvements to Esmonde Road, Additional Harbour Crossing.
- Improvements to alternative, more efficient travel modes will help reduce demand for private vehicle travel (particularly single occupancy vehicles), having a beneficial impact on those people that still need to travel by this mode.

Assessment of tidal flow operation

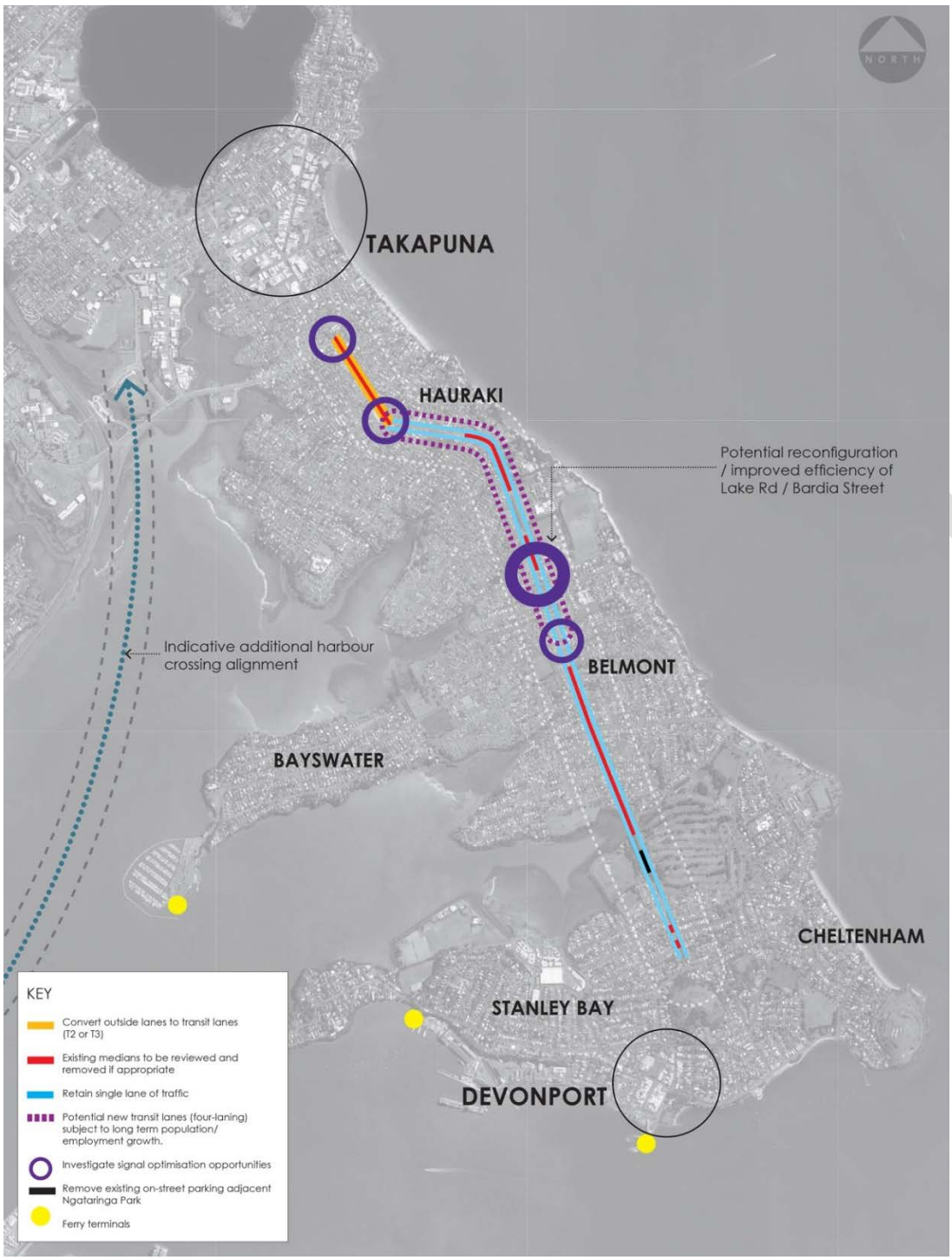
As well as more conventional approaches, tidal flow operation has been raised as an option to consider for Lake Road.

Analysis of traffic survey information suggests that there is not a significant difference between northbound and southbound traffic during any of the peak periods. For example, the split between the two directions (northbound and southbound respectively) during the morning peak ranges from 57%/43% north of Jutland Road to essentially 50%/50% north of Bayswater Ave. The evening peak is even more equally split, with the greatest difference north of Bayswater Ave being 47%/53% (located north of Jutland Road). A clear justification for tidal flow is not therefore provided by the demands and would therefore need to relate to an alternative strategy prioritisation.

Other challenges with the implementation of a tidal flow system is the how to operate and communicate the system given the number of number of side roads and individual property vehicle crossings i.e. a movable barrier would restrict right turns, while a painted line separation (i.e. as per Pakuranga Bridge) would require significant communication systems to clearly explain the current operating directions to vehicles entering the tidal system from side roads and vehicle crossings.

Given the challenges identified above, it is recommended that a tidal flow solution is not appropriate at this location.

Figure 5-5 Proposed general traffic and freight interventions



5.6 Strategy for parking

Lake Road has relatively small amounts of car parking along its length comparative to many other arterial roads within the Auckland region. At present, there is car parking at the Belmont local centre, as well as along a limited stretch (approx. 140m) of the western kerb along the middle part of the Ngataringa Park frontage.

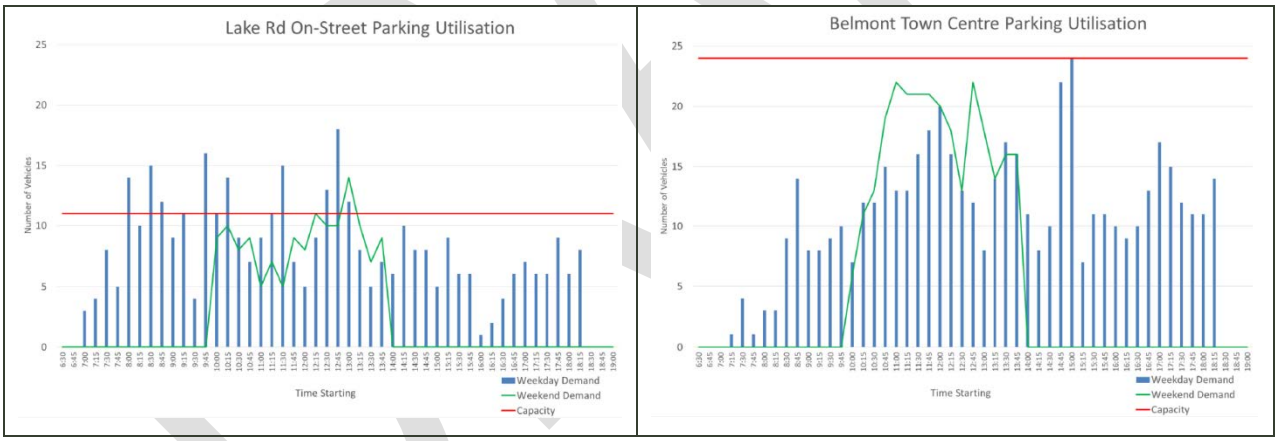
A clear message provided by technical stakeholders and business representatives was the importance of parking for pass-by traffic in supporting the economic vitality of the Belmont shops. Given this pass-by function, it is recommended that parking be retained on both sides of Lake Road. That said, this needs to be balanced with the objective of achieving continuous cycle lanes through the Belmont shops junction.

The only other section of parking along the corridor is adjacent to the Waitemata Golf Course. It is proposed that this car parking be removed, with this space considered to be better used to allow enhanced cycle lane provisions. In total this will result in a loss of a 140m length of parking. This equates to a maximum of approximately 25 parked cars, although anecdotal observations by both the study team and stakeholders suggests that this area is underutilised.

Recent parking survey data at Belmont shops underlines this pass-by function by showing parking demand for both sides of Lake Road, as well as the predominance of short stay parking durations (between 53% and 90% of stops are less than 15 minutes during weekday and weekends respectively)

The parking utilisation rate, shown in Figure 5-6 for the western kerbside spaces is high, with an average occupancy of 79% during core weekday business hours and 80% over the Saturday peak. However the utilisation rate of the larger, eastern parking area is more modest, with an average occupancy of 53% during core weekday business hours and 70% over the Saturday peak. It should also be noted that further parking off the eastern side of Lake Road is available on School Road, with surveys suggesting this area has current spare capacity.

Figure 5-6 Parking surveys for Belmont Local Centre



Collectively, this suggests that an opportunity may be available to reconfigure the eastern car park to provide better bus stopping facilities and space for improved urban design elements.

5.7 Strategy for urban amenity and place-making

The Devonport peninsula as a whole is strongly defined as a highly attractive and desirable part of Auckland characterised by high levels of residential amenity in close walking proximity to beaches, parks and reserves, schools, local shops and services, community facilities and ferry terminals. These are highly valued and desirable attributes that many other residential parts of Auckland lack.

That said, it is fair to say that as the population and intensity of activity on the peninsula and across Auckland has grown over time, that rising traffic and peak time congestion has taken its toll on the urban amenity and place-making roles of Lake Road itself. Over a period of time, measures that have increased traffic capacity and speed have prioritised the movement functions of Lake Road over its

place qualities, adversely affecting the amenity not just for street users but for adjoining properties, particularly for residents.

While some sections of Lake Road, such as its frontage with the Wilson Home and Takapuna Grammar and the heavily treed and highly picturesque green route between Narrow Neck and Mount Victoria, have retained their heritage landscape qualities, the rest of Lake Road would benefit from regular street tree planting. This would bring a number of benefits both transport-wise such as visually narrowing the street corridor, thereby slowing traffic, and providing a buffering for footpaths and potentially cycle lanes from moving traffic, as well as greater visual separation and filtering of views that enhances the residential amenity values of properties fronting Lake Road. Street trees would also enhance the local centre functions at Hauraki corner and the Belmont Shops.

Potential elements of a strategy to enhance the urban amenity and place-making qualities of Lake Road are identified below:

- Retain and enhance the heritage landscape aspects of Lake Road that include the original tram shelters, other scheduled heritage items within and adjacent to the road reserve;
- Retain and enhance the heritage qualities of the existing protected trees and treed landscape frontage conditions along the Wilson Home, Takapuna Grammar, and the Narrow Neck stretch of Lake Road that also serves a war memorial function;
- Removal of overhead lines to reduce physical and visual street clutter and enhance visual amenity;
- Maintain and/or enhance Mana Whenua principles (to be provided by Mana Whenua for this CMP);
- Potential to incorporate stormwater upgrades and improved treatment facilities with urban amenity and streetscape upgrades;
- Seek to achieve regular street tree planting along Lake Road with any future streetscape works. Street trees should be planted kerbside to maximise their role in visually defining the road corridor and delineating the street edge between the carriageway and footpath. Existing location and any potential relocation of existing underground services will be a consideration.
- Widening of footpaths where they are sub-standard in width and could be widened through narrowing or removal of grass berms against the property or kerblines.
- Recognise that providing safer and more attractive pedestrian crossing opportunities, and wider footpaths where possible supports enhanced interface with and place qualities for Lake Road, in relation to adjoining and nearby local centres, schools, community facilities, parks and reserves and other destinations and activity generators that support community life in and around the peninsula.
- Likewise, measures that promote greater cycling use, and greater patronage of public bus services, should be regarded as having additional benefits in generating additional pedestrian numbers and patronage of local shops and services, bringing increased public life to Lake Road.

5.8 Summary

By way of a summary, how the preferred directions will support and achieve the overarching goals set for the corridor is provided in the table below.

Table 5-1 Summary of preferred direction against overarching goals

Goal	Performance	
Supports improved urban design outcomes for local centres, community facilities and residential areas	✓	The preferred direction includes a range of measures intended to support the local centres, provide access to community facilities and avoid further reductions in the urban amenity of the corridor.

Goal	Performance	
Provides safe and high quality footpaths and pedestrian crossing opportunities	✓	Areas with deficient footpath widths (i.e. opposite Ngataringa Park) will be improved. A range of pedestrian crossing improvement opportunities have also been identified. Finally, lack of road widening avoids an increase in pedestrian crossing time increases or loss of amenity. Overall, the preferred direction is considered to provide an uplift in facilities for pedestrians across the full study area.
Fosters increased and safer use by all cycling user groups.	✓	This CMP proposes a significant improvement in the provision for cyclists. This is principally through the introduction of increased corridor spatial allocation for this mode and potential separation. It is expected that this will provide safety and amenity benefits and encourage a greater number and wider range of people to use cycling as a means of travel through the area.
Delivers a reliable, frequent and integrated public transport network	✓	The proposed network changes will see improved frequency along this corridor and across the wider public transport network. The CMP proposes to support this through a range of infrastructure interventions i.e. priority transit lanes, better located/ spaced bus stops and external improvements such as Takapuna Interchange upgrade. These measures will improve reliability, reduce delay and provide a better overall customer experience. It is expected that this will support and encourage increased public transport use and better person carrying capacity.
Maintains an appropriate level of traffic capacity and accessibility	✓	The majority of the corridor will retain a similar level of capacity, reflecting limited forecast traffic growth. Increased focus on encouraging higher occupancy private vehicles, buses and active modes will improve person-carrying capacity of the corridor, helping to alleviate current congestion issues. Improvements outside Lake Road itself may also improve overall journey times, for example through the Additional Harbour Crossing and Esmonde Road upgrades and/ or Shoal Bay Public Transport Link.
Accommodates increased travel demand associated with recreational activities	✓	The increased person carrying capacity of the corridor, outlined above would also allow a better response to spikes in travel demand resulting from recreational activities, holiday peaks, and events.

These strategies put forward will help address the deficiencies identified in the Regional Arterial Road Plan(RARP). In some instances these are addressed above their identified priority levels (such as cycling). This means that although they may only be a priority two along that section, the level of intervention is higher than its priority status.

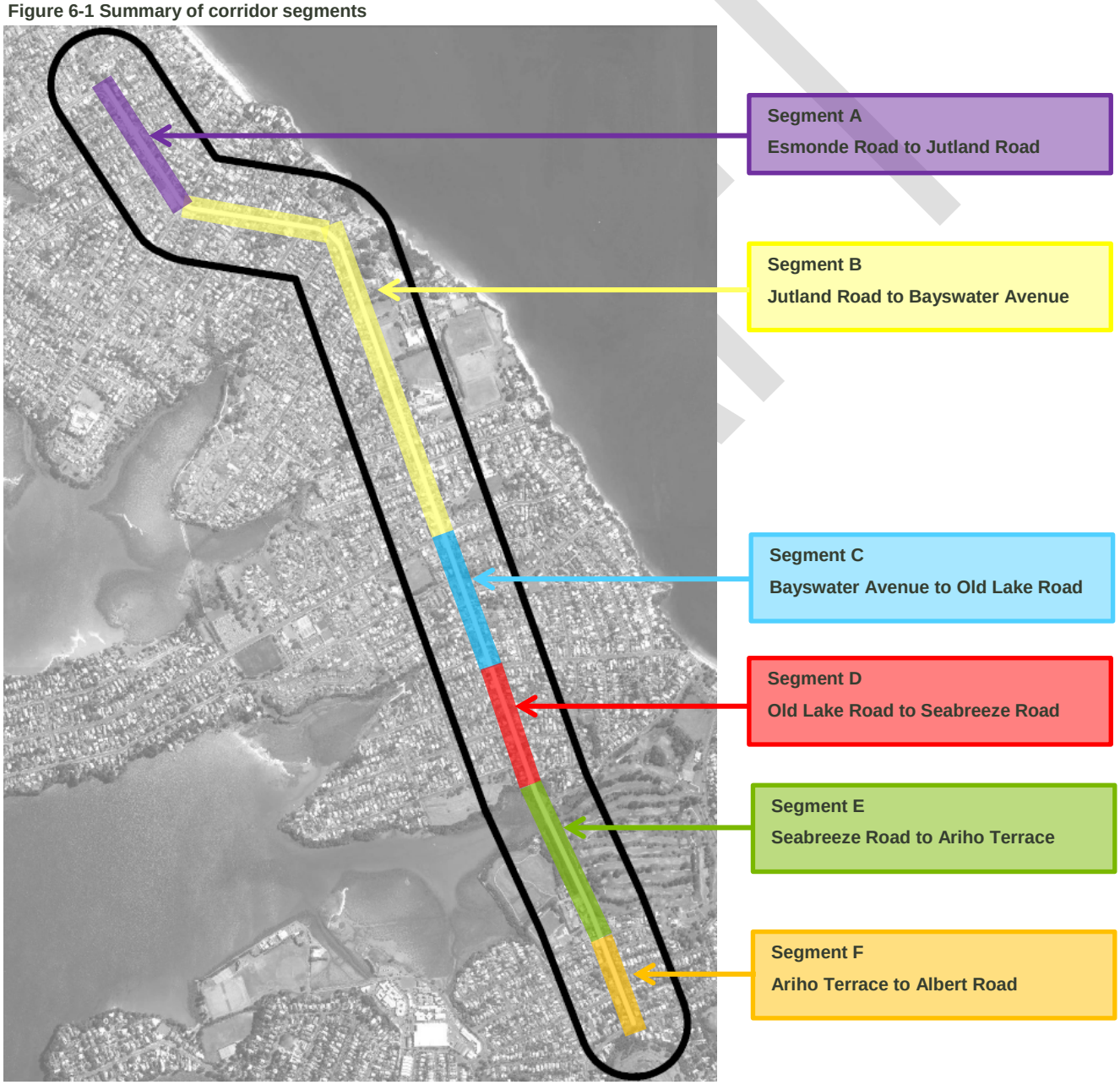
The key roles of the segment that it connects Devonport with Takapuna and the rest of the road network forms part of the Frequent Network route, cycle connector route, and over-dimension route, with schools located along the corridor remain unchanged. Additional key roles could be added to this such as: Lake Road's connection and fostering of Local Centres and promoting an increase in active travel mode participation.

6 Strategy by corridor segment

6.1 Corridor segments

Lake Road has been divided into six distinctive segments based on similar traffic demands and challenges. These reflect the changing land-use typologies and transport mode demands along the corridor rather than the individual typologies introduced in **Appendix E**. Strategies pertaining to each segment have been developed based on this rationale and are summarised in the diagram and proceeding sections below.

Figure 6-1 Summary of corridor segments



Segment A Esmonde Road to Jutland Road

This segment of the carriageway was upgraded in 2010/2011 and widened to provide a central median, cycle lanes and half indented bus stops. It carries the highest volume of traffic along the corridor and is mainly residential in nature and has a wide road reserve of 24.3m. It forms part of the future frequent bus route as well as a number of other school and public bus routes.

Segment B Jutland Road to Bayswater Avenue

The segment between Jutland Road and Bayswater Avenue also carries a high volume of traffic and is part of the future frequent bus route. The land use is mainly residential with a cluster of schools along the eastern side and a local centre at Belmont. The road reserve is 20.1m however the cross section varies along the length of the segment by the presence or absence of a central median.

Segment C Bayswater Avenue to Old Lake Road

This segment between Bayswater Avenue and Old Lake Road is residential in nature and also forms part of the future frequent bus route. South of Bayswater Avenue the traffic demands are reduced as the total catchment size decreases. The road reserve is 20.1m along the length of the segment.

Segment D Old Lake Road to Seabreeze Road

The segment between Old Lake Road and Seabreeze Road is of a similar nature to that of segment D however it does not serve the future frequent bus route. This segment currently serves a small number of peak only and school bus services. The southern part of this segment forms part of the Peninsula's 'green-route' cycling trail. The road reserve is 20.1m along the length of the segment.

Segment E Seabreeze Road to Ariho Terrace

This segment of the carriageway is distinctive in its park-like nature. The surrounding land use is recreational with a short section of light industry at the southern end. This segment has similar vehicle and public transport demands as segment D. The road reserve along this segment widens out to 30.2m through the park.

Segment F Ariho Terrace to Albert Road

The southernmost segment is distinctive in its lack of driveways that exit directly onto Lake Road. The road reserve widens out to 30.9m and accommodates slip lanes on either side that provide property access for residents. This segment is predominately residential in nature.

A full suite of the options analysed and the feedback on these options from the Technical Stakeholder Workshop is provided in **Appendices F** and **G** respectively.

6.2 Segment A: Esmonde Road to Jutland Road

6.2.1 Overview

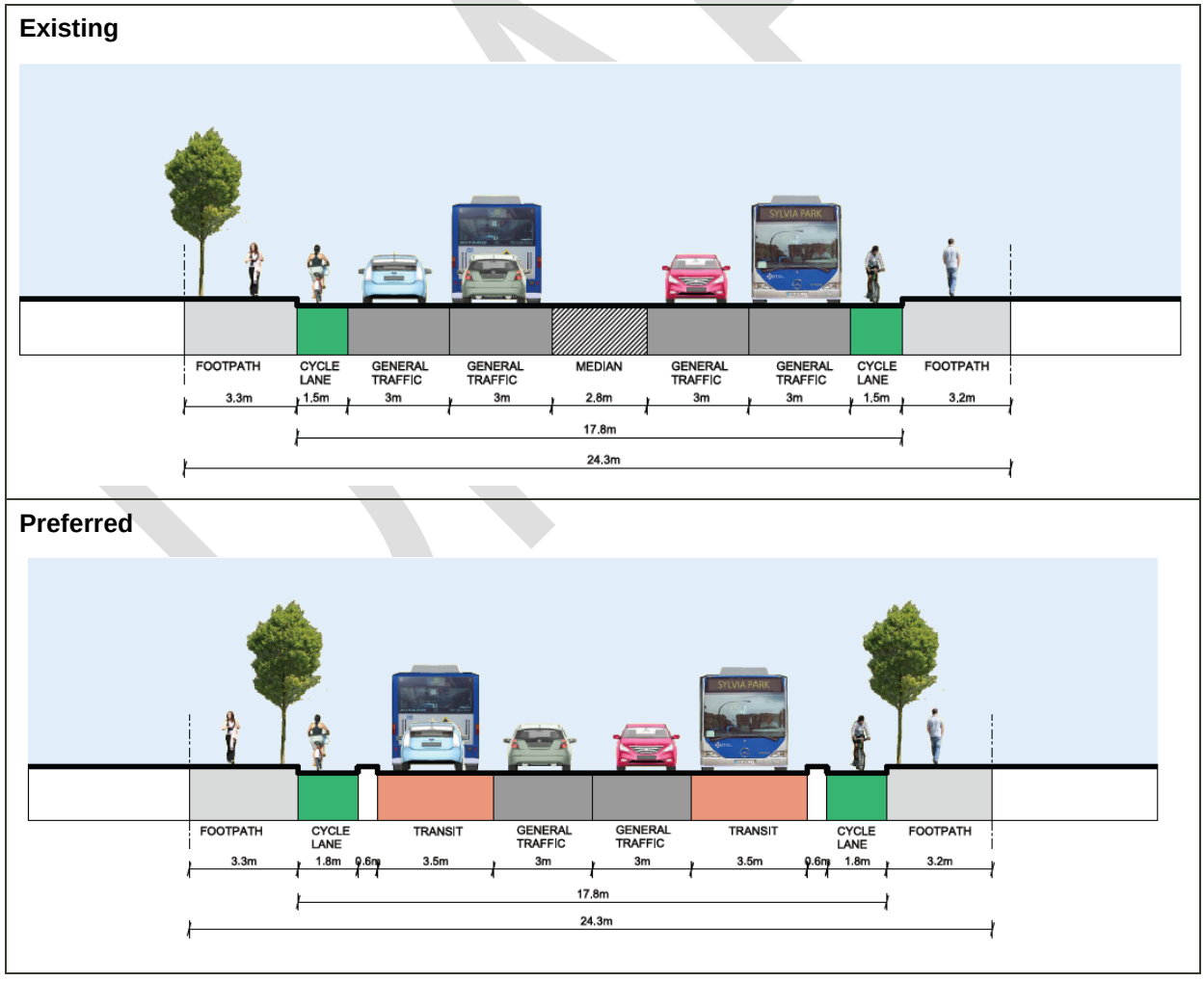
The predominant land use along this segment is low density residential. The typology along this segment was identified as 'Living' under the standard typologies prescribed by the CMP Guidelines with a localised exception at the southern end, the Hauraki Corner Shops. At this end, the typology is deemed to be 'Community Focal Point – Main Street'. Refer to **Appendix D** for a description of these typologies.

The strategic direction for this segment is to continue to provide a road that reflects the existing residential nature along an arterial road, whilst improving its person carrying capacity through increased vehicle occupancy and improving the reliability and priority for buses as well as improving the safety and amenity for cyclists.

6.2.2 Preferred spatial allocations

The preferred direction for this corridor requires some changes in spatial allocation, to achieve transit lanes and separated cycle lanes, and includes the removal of the central median. This change is shown in terms of existing and preferred cross sections as presented below.

Figure 6-2 Existing and preferred corridor allocations for Segment A



The preferred direction for segment A involves the following:

- Retain the existing spatial allocation of the pedestrian footpaths and kerbline.
- Provide transit lanes in each direction. It is envisaged that these lanes will operate as T2 or T3.
- Provide separated cycle lanes in each direction

6.2.3 Performance against network role

The preferred direction has been assessed against the overarching network role for the corridor to confirm how it will perform against these requirements. This assessment is provided as follows:

Table 6-1 Performance of preferred direction for Lake Road from Esmonde Road to Jutland Road

Mode	Priority	Performance	
Walking	High	✓	Pedestrians will enjoy an improved experience with the separated cycle lane also providing greater separation from the live lanes for pedestrians.
Cycling	High	✓	Dedicated, separated cycle facilities will encourage increased use of cycling as a mode of travel in this area.
Public transport	High	✓	Localised treatments will support more effective bus stops, while specific transit lanes will improve reliability and priority for buses.
General traffic	Medium	✓	A single lane of traffic plus a transit lane will be provided in each direction which retains accessibility but also responds to strategic direction to achieve higher vehicle occupancy and person-carrying capacity.
Freight	Low	✓	Capacity is appropriate for the expected level of demand.

Overall, the strategic direction is considered to support the overarching network role for this segment, and responds to its specific requirements.

6.3 Segment B: Jutland Road to Bayswater Avenue

6.3.1 Overview

The land-use along this segment of the corridor is a mixture of low density residential, local centres and educational. South of the Jutland Road intersection the 'Community Focal Point – Main Street' typology is continued until Bayview Road where the typology becomes 'Living'. Past Northumberland Avenue the 'Living' typology continues along the western side of Lake Road and the eastern side is deemed 'Community Facilities' until Westwell Avenue. South of Westwell Avenue the Belmont Town Centre begins giving rise to a 'Community Focal Point – Main Street' typology.

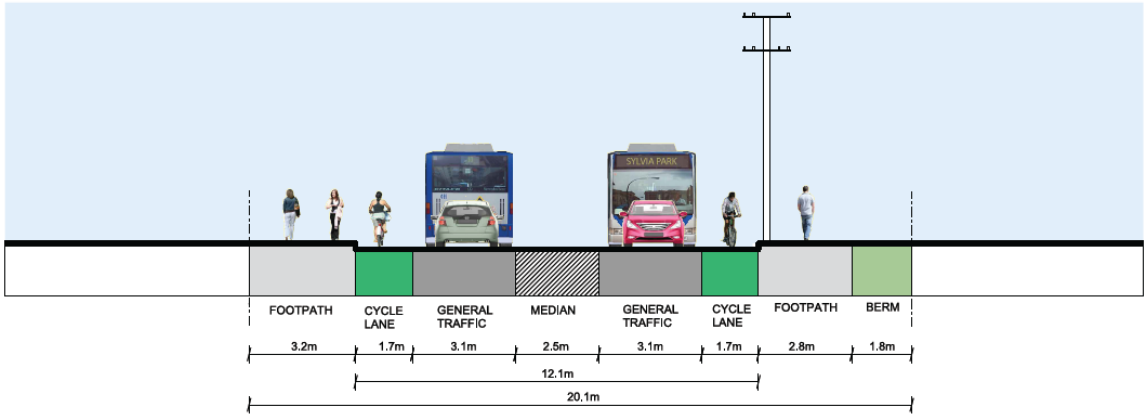
The strategic direction for this segment is to retain the existing road service but make better use of space to provide improved amenity and safety for pedestrians and cyclists while also enhancing provisions for public transport where possible. Provision for general traffic is to retain similar to the existing arrangement, but the intent is improve conditions by promoting increased use of more efficient modes.

6.3.2 Preferred spatial allocations

The preferred direction for this corridor requires some minor changes in spatial allocation, which is shown in terms of existing and preferred cross sections as presented below.

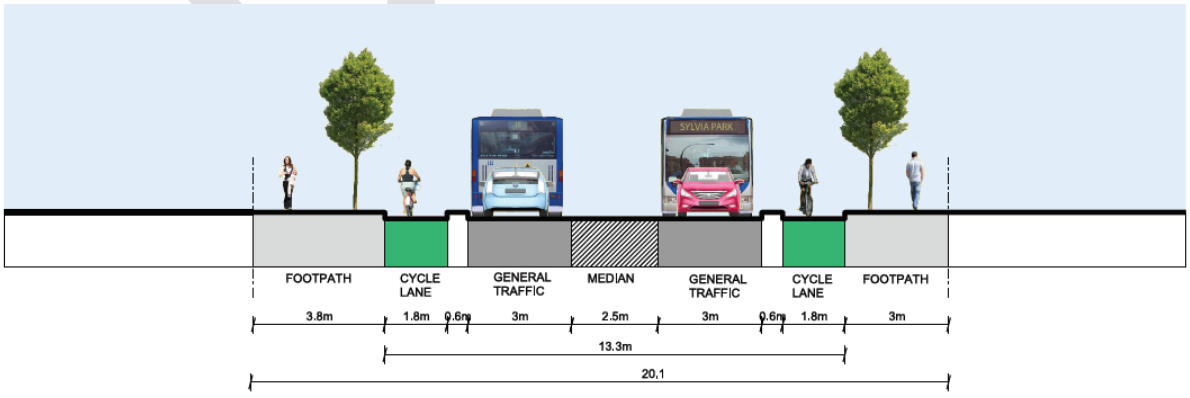
Figure 6-3 Existing and preferred corridor allocations for Segment B

Existing



***** Central median is only present in the cross section along 60% of the segment

Preferred



The preferred direction for segment B involves the following:

- Improvements to streetscaping and urban amenity, removing berms and widening footpaths along both sides of the carriageway where possible. Under-grounding of power/phone lines should be incorporated into these improvements to provide a less cluttered pedestrian environment.
- Separated cycle lanes in each direction improve the safety and priority for cyclists.
- Retain one lane in each direction, separated by a central median.
- Optimise bus stop locations and improve stop facilities to minimise delay and maximise accessibility.
- Increase and improve the number of formal pedestrian crossing opportunities.

It should be noted that the above proposed direction has been developed partially in light of the modest forecast growth in population/ employment and associated vehicle demands. If the actual or forecast growth changes significantly from that currently predicted, then the possibility of four laning this segment of Lake Road should be revisited.

Further discussion of elements of the proposed direction for this segment, including the central median and separated cycle lane aspects are discussed further in the following chapter of this report.

6.3.3 Performance against network role

The preferred direction has been assessed against the overarching network role for the corridor to confirm how it will perform against these requirements. This assessment is provided as follows:

Table 6-2 Performance of preferred direction for Lake Road from Jutland Road to Bayswater Avenue

Mode	Priority	Performance	
Walking	High	✓	Pedestrians will be supported by footpath upgrades, high quality streetscaping and improved crossing opportunities at appropriate locations.
Cycling	High	✓	Dedicated, separated cycle facilities will further encourage cycling as a mode of travel in this area. Treatments at Belmont town centre Junction will improve the safety and priority of cyclists through this inter-segment.
Public transport	High	✓	Rationalisation and localised treatments of bus stops will improve their accessibility and efficiency.
General traffic	Medium	✓	Retention of a single lane of traffic in each direction and a central median will maintain vehicle capacity and accessibility without increasing existing congestion.
Freight	Low	✓	Freight is not expected to be an important function along this corridor. A single traffic lane in each direction is appropriate for the expected level of demand.

Overall, the strategic direction supports the overarching network role for this segment, while also responding to the specific requirements of different parts of this segment.

6.4 Segment C: Bayswater Avenue to Old Lake Road

6.4.1 Overview

The predominant land use typology along this segment is also low density residential. The typology along this segment was identified as 'Living' under the standard typologies prescribed by the CMP Guidelines with two small localised exceptions at Belmont shops and at Old Lake Road shops. The typology at these locations is deemed to be 'Community Focal Point – Main Street'.

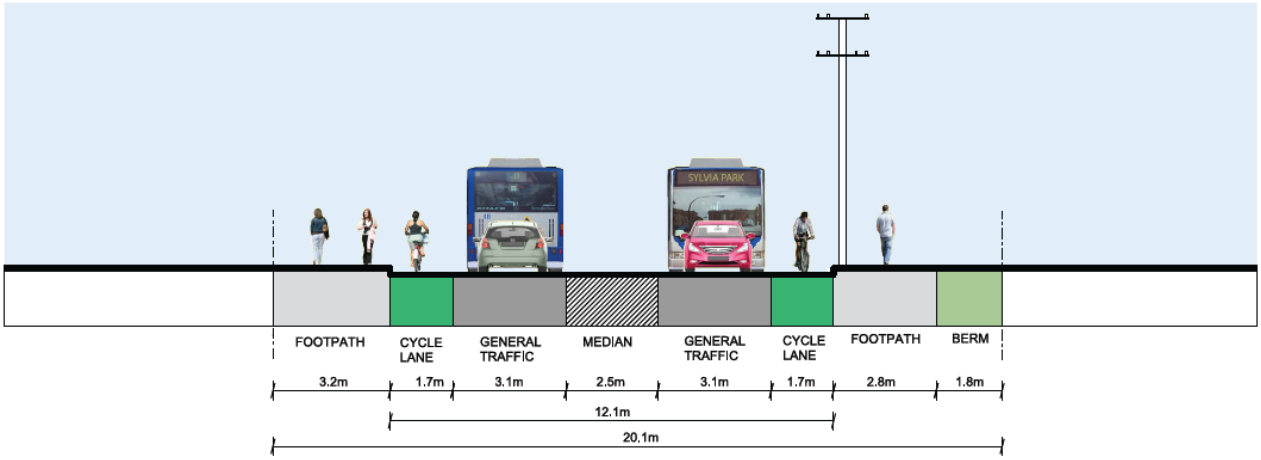
The strategic direction for this segment is to retain the existing road service but make better use of space to provide improved amenity and safety for pedestrians and cyclists while also enhancing provisions for public transport where possible. Provision for general traffic is to retain similar to the existing arrangement, but the intent is improve conditions by promoting increased use of more efficient modes to be maintained at an appropriate level.

6.4.2 Preferred spatial allocations.

The preferred direction for this corridor requires some minor changes in spatial allocation, which is shown in terms of existing and preferred cross sections as presented below.

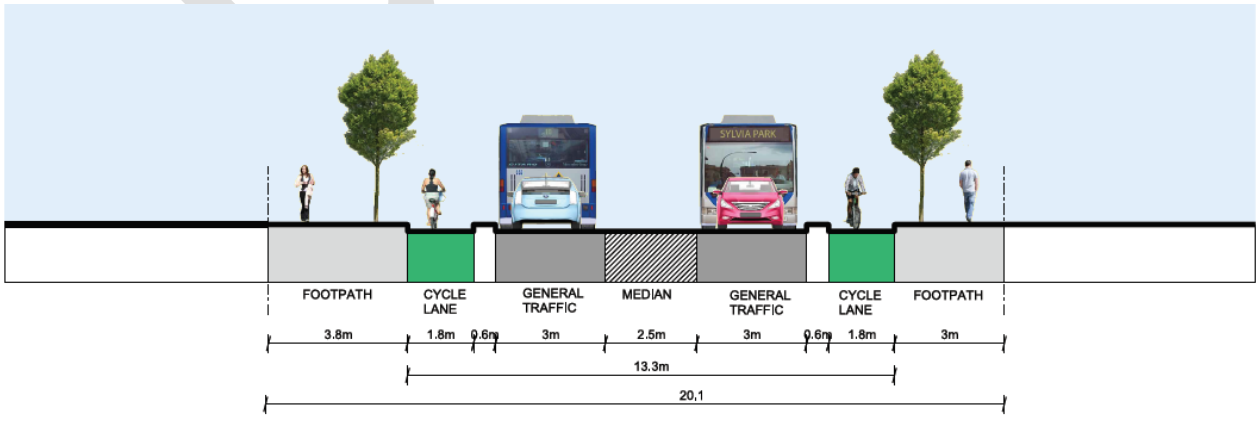
Figure 6-4 Existing and preferred corridor allocations for Segment C

Existing



***** Central median is only present in the cross section along 70% of the segment

Preferred



The preferred direction for segment C involves the following:

- Improvements to street-scaping and urban amenity, removing berms and widening footpaths along both sides of the carriageway where possible. Under-grounding of power/phone lines should be incorporated into these improvements to provide a less cluttered pedestrian environment.
- Separated cycle lanes in each direction improve the safety and priority for cyclists.
- Retain one lane in each direction, separated by a central median.
- Optimise bus stop locations and improve stop facilities to minimise delay and maximise accessibility. Signalisation of the Old Lake Road Intersection is proposed to improve bus priority at this junction.
- Increase and improve the number of formal pedestrian crossing opportunities.

6.4.3 Performance against network role

The preferred direction has been assessed against the overarching network role for the corridor to confirm how it will perform against these requirements. This assessment is provided as follows:

Table 6-3 Performance of preferred direction for Lake Road from Bayswater Avenue to Old Lake Road

Mode	Priority	Performance	
Walking	High	✓	Pedestrians will be supported by footpath upgrades, high quality street-scaping and de-cluttering of the kerbside. More formalised crossing opportunities will improve pedestrian safety.
Cycling	High	✓	Dedicated, separated cycle facilities will further encourage cycling as a mode of travel in this area.
Public transport	High	✓	Rationalisation and localised treatments of bus stops will improve their accessibility and efficiency. Improvements to the Old Lake Road intersection will benefit public transport reliability.
General traffic	Medium	✓	Retention of a single lane of traffic in each direction will maintain existing vehicle capacity and accessibility.
Freight	Low	✓	Freight is not expected to be an important function along this corridor. A single traffic lane in each direction is appropriate for the expected level of demand.

Overall, the strategic direction supports the overarching network role for this segment, while also responding to the specific requirements of different parts of this segment.

6.5 Segment D: Old Lake Road to Seabreeze Road

6.5.1 Overview

Land use along this segment is low density residential. The typology along this segment was identified as 'Living' under the standard typologies prescribed by the CMP Guidelines with the exception at Old Lake Road shops as described above.

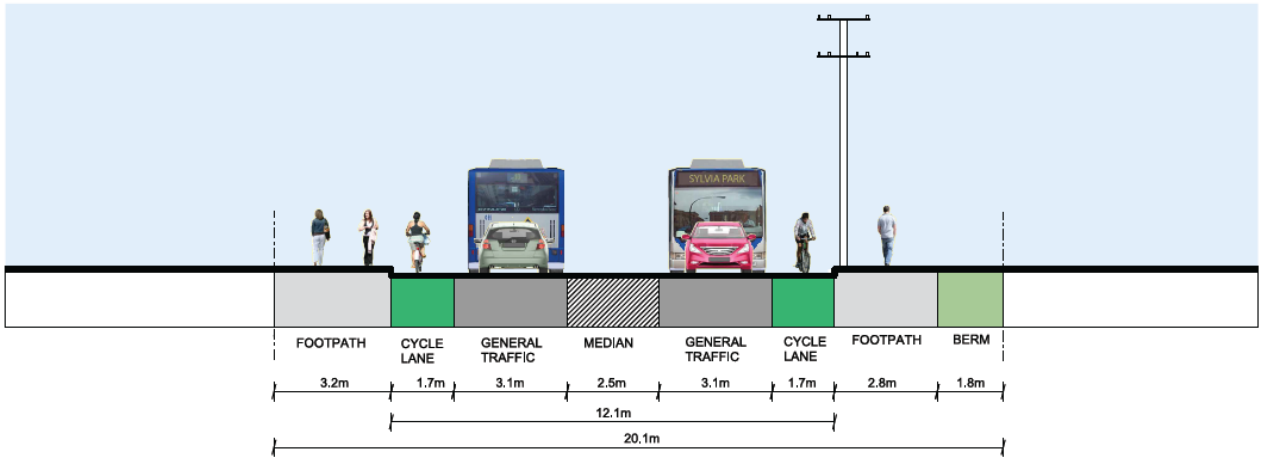
The strategic direction for this segment is to provide continuity with the adjoining cross sections by aligning the proposed improvements with those in segments C and E. This involves improved priority and safety for pedestrians and cyclists, while maintaining capacity for general traffic.

6.5.2 Preferred spatial allocations

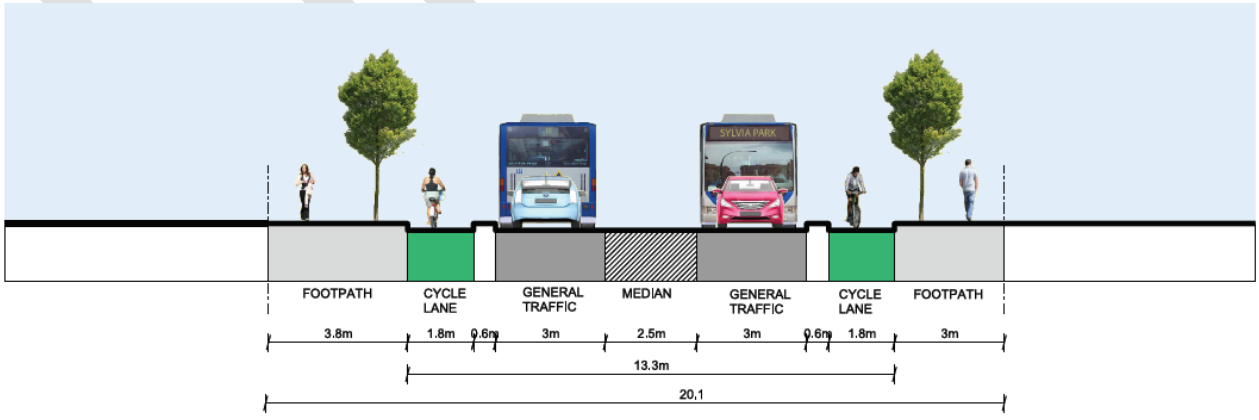
The preferred direction for this corridor requires some minor changes in spatial allocation, which is shown in terms of existing and preferred cross sections as presented below.

Figure 6-5 Existing and preferred corridor allocations for Segment D

Existing



Preferred



The preferred direction for segment D involves the following:

- Improvements to street-scaping and urban amenity, removing berms and widening footpaths along both sides of the carriageway where possible. Under-grounding of power/phone lines should be incorporated into these improvements to provide less cluttered pedestrian environment.
- Separated cycle lanes in each direction.
- Retain one lane in each direction, separated by a central median.
- Optimise bus stop locations and improve stop facilities to minimise delay and maximise accessibility. Signalisation of the Old Lake Road Intersection will improve pedestrian crossing opportunities at this junction.
- Increase and improve the number of formal pedestrian crossing opportunities.

6.5.3 Performance against network role

The preferred direction has been assessed against the overarching network role for the corridor to confirm how it will perform against these requirements. This assessment is provided as follows:

Table 6-4 Performance of preferred direction for Lake Road from Old Lake Road to Seabreeze Road

Mode	Priority	Performance	
Walking	High	✓	Pedestrians will be supported by footpath widening, high quality street-scaping and de-cluttering of the kerbside.
Cycling	High	✓	Dedicated, separated cycle facilities will further encourage cycling as a mode of travel in this area. These will especially benefit cyclists in northbound uphill sections of the road.
Public transport	Low	✓	Only a small number of peak services and school buses are expected to use this segment therefore bus priority is not required.
General traffic	Medium	✓	Retention of a single lane of traffic in each direction and a central median to aid turning movements will maintain vehicle capacity and accessibility.
Freight	Low	✓	Freight is not expected to be an important function along this corridor. A single traffic lane in each direction is appropriate for the expected level of demand.

Overall, the strategic direction supports the overarching network role for this segment, while also responding to the specific requirements of different parts of this segment.

6.6 Segment E: Seabreeze Road to Ariho Terrace

6.6.1 Overview

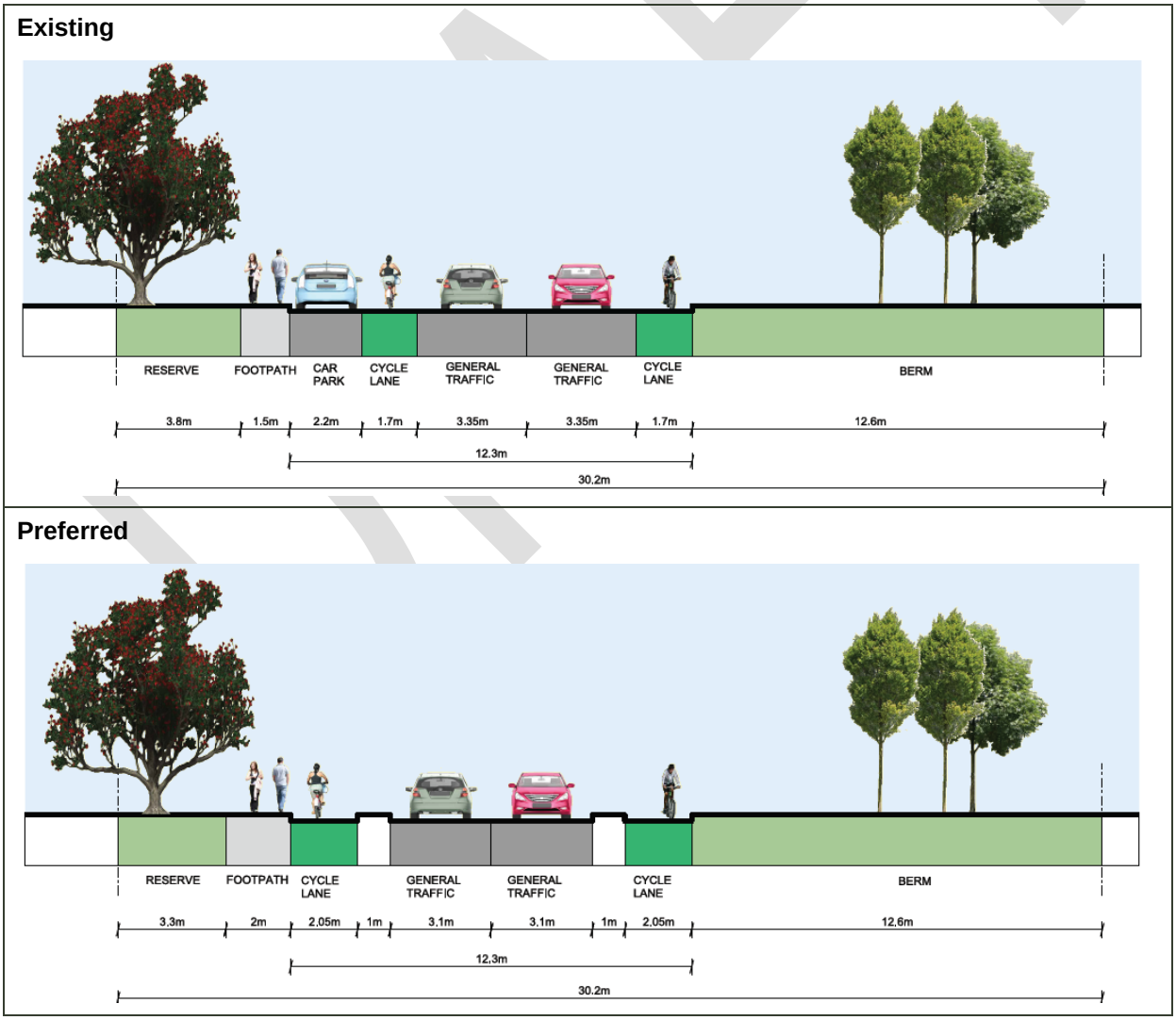
This segment has a distinctive park nature and has been identified as 'Community Facilities' under the standard typologies prescribed by the CMP Guidelines. This segment provides access to Ngataringa Park, forms part of the cycle 'Green Route' as well as providing a memorial function commemorating men from the area who lost their lives in the Second World War.

The strategic direction is to continue to embrace the memorial and recreational nature of this segment of arterial road and to maximise the synergy between this land use and more active modes, as well as the convergence of the proposed Green Route. Capacity for general traffic is to be maintained at an appropriate level, but parking is seen as being better accommodated by side streets and off-street facilities.

6.6.2 Preferred spatial allocations

The preferred direction for this corridor requires a change to its spatial allocation. This change is shown in terms of existing and preferred cross sections as presented below.

Figure 6-6 Existing and preferred corridor allocations for Segment E



The preferred direction for segment E involves the following:

- Improvements and widening of the western footpath to cater for the recreational environment.
- Separated cycle lanes in each direction provide a safe enjoyable environment for cyclists.
- Retain one narrower lane in each direction.
- Removal of parking along the western kerb.
- Improve the northern pedestrian crossing to increase priority and safety for pedestrians crossing to the opposite footpath when the eastern footpath finishes.

6.6.3 Performance against network role

The preferred direction has been assessed against the overarching network role for the corridor to confirm how it will perform against these requirements. This assessment is provided as follows:

Table 6-5 Performance of preferred direction for Lake Road from Seabreeze Road to Ariho Terrace

Mode	Priority	Performance	
Walking	High	✓	Pedestrians will enjoy a pleasant and enhanced environment along this segment supported by widening of the western footpath.
Cycling	High	✓	High quality dedicated, separated cycle facilities will further encourage recreational cycling and as a mode of travel. Safety and spatial allocation for cyclists will be supported by the removal of parallel parking.
Public transport	Low	✓	Only a small number of peak services are expected to use this segment and congestion levels are comparatively minor. It is considered appropriate for buses to share general traffic lanes.
General traffic	Medium	✓	Narrowing of the existing lanes will encourage slower speeds improving safety for all modes. A single traffic lane in each direction will maintain vehicle capacity and accessibility.
Freight	Low	✓	A single traffic lane in each direction is appropriate for the expected level of freight demand.

6.7 Segment F: Ariho Terrace to Albert Road

6.7.1 Overview

The predominant land use typology along this segment is also low density residential. The typology along this segment was identified as 'Living' under the standard typologies prescribed by the CMP Guidelines. Refer to **Appendix D** for a description of these typologies.

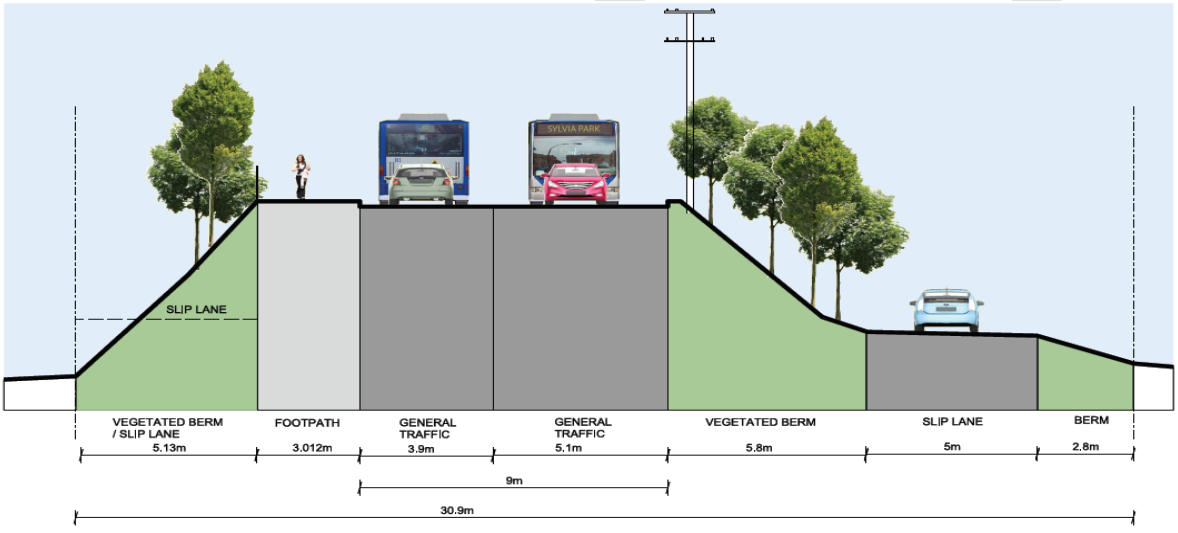
The strategic direction for this segment is to continue to provide a road that reflects the existing residential nature whilst encouraging active modes of transport and improving the safety of cycling facilities.

6.7.2 Preferred spatial allocations

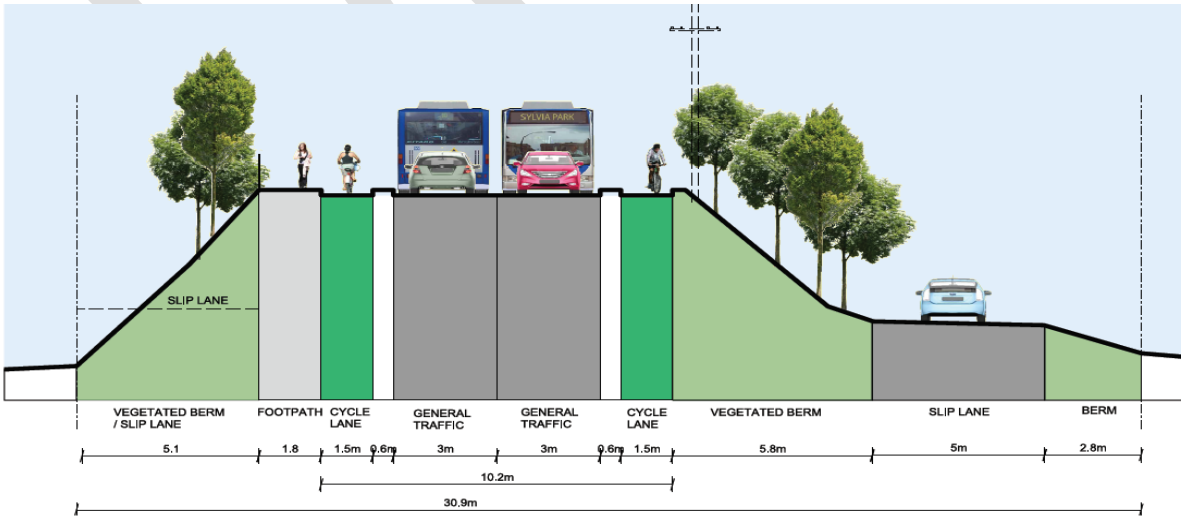
The preferred direction for this corridor requires a change to its spatial allocation. This change is shown in terms of existing and preferred cross sections as presented below.

Figure 6-7 Existing and preferred corridor allocations for Segment F

Existing



Preferred



The preferred direction for segment F involves the following:

- Reducing the western footpath to 1.8wide, the minimum under ATCoP guidelines.
- Separated cycle lanes in each direction provide a safe enjoyable environment for cyclists, although not to ATCoP guidelines due to width constraints, separator widths and types may vary.
- Retain one lane in each direction.
- Improvements to the Albert Road roundabout including narrowing of approaches and providing cycling facilities will provide safer pedestrian crossing opportunities and better connections at this junction.

6.7.3 Performance against network role

The preferred direction has been assessed against the overarching network role for the corridor to confirm how it will perform against these requirements. This assessment is provided as follows:

Table 6-6 Performance of preferred direction for Lake Road from Ariho Terrace to Albert Road

Mode	Priority	Performance	
Walking	High	✓	Pedestrians will continue to enjoy a pleasant environment along this segment.
Cycling	High	✓	High quality dedicated, separated cycle facilities will further encourage recreational cycling and as a mode of travel.
Public transport	Low	✓	Only a small number of peak services are expected to use this segment and congestion levels are comparatively minor. It is considered appropriate for buses to share general traffic lanes.
General traffic	Medium	✓	Retention of a single lane of traffic in each direction will maintain vehicle capacity and accessibility.
Freight	Low	✓	A single traffic lane in each direction is appropriate for the expected level of freight demand.

7 Matters requiring further consideration

While the general directions for the corridor have been outlined in the two previous chapters of this report, there are a number of specific matters that warrant further discussion. This is provided in turn below.

7.1 Spatial requirements for median

Discussions with the internal stakeholder group through the development of this CMP have identified that there are pros and cons associated with retaining the existing flush medians that are widely used along the length of Lake Road.

Currently south of Jutland Road (Segment A), Lake Road typically alternates between stretches with and without a flush median. This reflects the high demand for right turning movements into side streets and the high number of residential and other properties with access directly off Lake Road. This has benefits for traffic safety and also benefits traffic flow along Lake Road outside of peak hours.

It is also likely a contributor to higher vehicle speeds when traffic is free flowing, given the resultant loss of side friction and has a useful resilience function in instances of road works and accidents, given that Lake Road is the only arterial on the Peninsula.

Where medians increase the width of the carriageway they correspondingly increase the pedestrian crossing distance, and while they provide the opportunity for refuge islands as a staggered pedestrian crossing opportunity, these are not considered an ideal outcome from a perceived pedestrian safety perspective on busy multi-lane arterial routes such as Lake Road. From a street amenity perspective, they also increase the expanse of road surface dedicated to vehicle movement, increasing the perception of a traffic-dominated street environment that emphasises through traffic.

Consideration has been given to the on-going need for and spatial requirements of a median along the length of Lake Road.

Overall the strategic direction recommends retaining a flush median in Segments B-D south of Jutland Road and Seabreeze Road. In recommending this direction, it is noted that the preferred outcome is to retain the status quo along these stretches i.e. a single traffic lane in each direction to accommodate general traffic including public transport and school bus services and other high-occupancy vehicles.

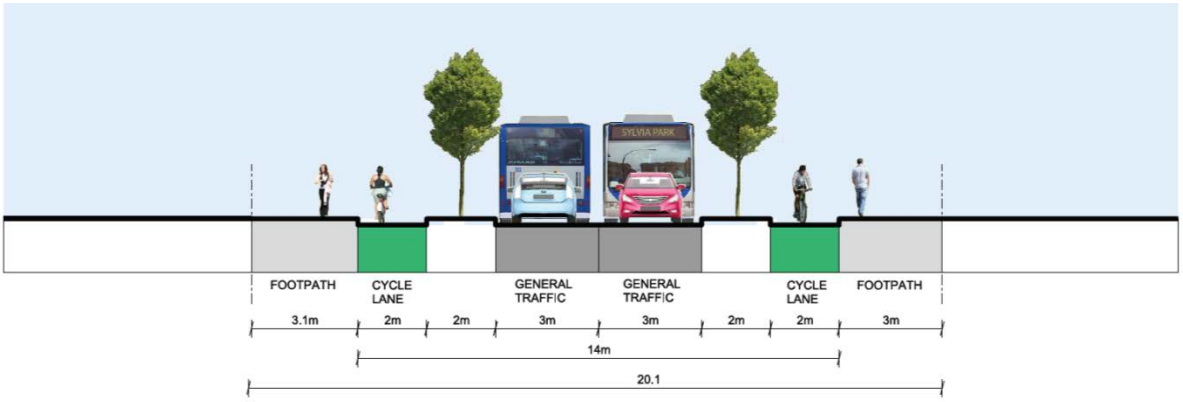
It is also considered that in general terms the space allocated to the median is not required for other transport purposes .e.g. for the use of additional traffic lanes, parking, cycle lanes or additional footpath width.

From a street amenity and land use integration perspective additional width would be beneficial to deal with the interface between adjoining properties, the footpath, cycle lanes and edge of the carriageway. Such an approach could provide additional separation of the cycleway from passing traffic and a consistent zone for street tree planting along Lake Road between the cycle lane and traffic lane. This would considerably enhance the street amenity of the corridor, as well as enhance the amenity and safety for people walking and cycling as shown in Figure 7-1.

Such an outcome was canvassed during the option development phase of the CMP, and received widespread support from the internal stakeholders for its benefits to pedestrians and cyclists and enhanced amenity for all street users and adjoining properties. It is noted that this outcome is a high intervention scenario, given that it would require the shifting of kerb lines, drainage, likely undergrounding of power lines, and possible implications for underground services amongst other considerations. Nevertheless, in the long term such a high intervention outcome could be achieved, consistent with the overall strategy and preferred direction by corridor segment subject to further

consideration of the impacts on traffic safety and function associated with the removal of the flush median.

Figure 7-1 Alternative preferred direction with enhanced urban amenity for segments B - D



7.2 Improved pedestrian crossing opportunities

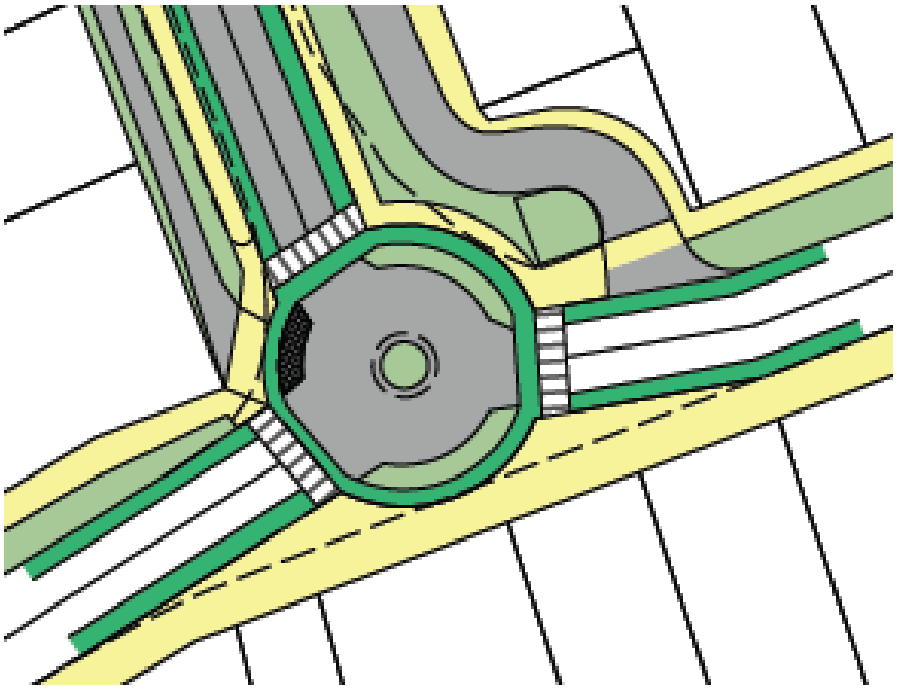
In stating the retention of the flush median as the preferred direction it is recommended that further consideration be given to identifying short term and low-intervention opportunities to improve pedestrian crossing opportunities across Lake Road. Further consideration should be given to both enhancements to existing pedestrian crossing opportunities to address the attractiveness and actual and perceived pedestrian safety (i.e. reduce the feeling of vulnerability associated with using existing refuge island crossings) and also to identify any potential crossing opportunities.

Existing and potential additional pedestrian crossing opportunities that require further consideration include:

- Further investigation of possible improvements for pedestrian crossings at the intersection of Lake Road and Esmonde Road that reduces pedestrian severance and wait times while maintaining and/or enhancing pedestrian safety.
- Consideration of a potential crossing relocation between Esmonde Road and the Hauraki Corner.
- Potential removal of slip lane on eastern side of Lake Road at Hauraki Road corner, and resultant tightening of corner radii to reduce pedestrian crossing distances and conflict with moving vehicles.
- Consideration of additional pedestrian crossing opportunities along the 510m stretch between Hauraki Shops and Clifton Road.
- Upgrade of the existing refuge island crossing north of the Clifton Road intersection. Consideration is required as to possible controlled zebra or signalised crossing opportunity or enhanced refuge island crossing (possibly combined with zebra crossings across each lane as per existing crossing south of Old Lake Road) that increases the separation of waiting pedestrians from traffic through larger/longer raised median islands that incorporate low planting.
- Consideration of possible zebra crossings or other means of improving pedestrian movement for pedestrians moving along Lake Road across the Clifton Road intersection such as lane narrowing, tighter corner radii or realignment of Clifton Road intersection.
- Consideration of additional pedestrian crossing opportunities along the 420m stretch between Clifton Road and the existing signalled crossing at Takapuna Grammar south of St Leonards Road.

- Consideration of potential enhancements to existing signalised pedestrian crossing outside Takapuna Grammar, including signal operation and timing, width of crossing and standing room to each side.
- Potential additional school crossing (ideally a controlled zebra or signalised crossing or otherwise enhanced raised median / refuge island crossing) in proximity to the Belmont Intermediate Lake Road entrance.
- Potential additional controlled pedestrian crossing opportunity at the northern end of the Belmont shops on or near alignment with School Road intersection to reduce severance between the shops on each side of Lake Road and provide an additional crossing point at a desire line between the primary school and shops on the western side.
- Potential removal of slip lanes on both Bayswater Avenue and Williamson Avenue arms of the signalised intersection of Lake Road at the Belmont shops. Resultant tightening of corner radii to reduce pedestrian crossing distances and conflict with moving vehicles.
- Upgrade of existing refuge island crossing to north of Montgomery Avenue; consideration required as to possible controlled zebra crossing opportunity or enhanced refuge island crossing (or combination of the two as per the existing crossing south of Old Lake Road) that increases the separation of waiting pedestrians from traffic through larger/longer raised median islands that incorporate low planting.
- Consideration of additional pedestrian crossing opportunities along the 600m stretch between the zebra crossing to south of Old Lake Road and Seabreeze Road;
- Upgrade of existing refuge island crossing south of Seabreeze Road. Further consideration required as to possible zebra crossing, enhanced refuge island crossing (or combination of two as per existing crossing south of Old Lake Road), or signalised crossing that ideally provides controlled pedestrian priority and at a minimum increases the separation of waiting pedestrians from traffic through larger/longer raised median islands that incorporate low planting.
- Additional crossing for pedestrians and possibly cyclists across Lake Road between Seabreeze Road and the existing signals south of Allenby Avenue (Segment E), to reduce severance and provide for safe pedestrian movement between the eastern side of the peninsula and the recreational routes and green space along the western coastal edge. This should be considered in context of planned green route enhancements and the likely future construction of SkyPath and SeaPath that will increase use of this recreational route for pedestrians and cyclists.
- Consideration of potential measures to improve pedestrian crossing experience across Mozeley Avenue intersection along the western side of Lake Road. Possible considerations include narrowing of the intersection which could be achieved through reduction from two to one lane turning onto Lake Road from Mozeley, lane narrowing, tighter corner radii or realignment of Mozeley Avenue at this intersection.
- Further investigation required of potential improved provision for more direct, safer and higher quality walking and cycling across each arm of the Albert Road roundabout including pedestrian priority across slip lane entrances, as indicated in Figure 7-2.

Figure 7-2 Albert Road roundabout cycling provision



It is recognised that a number of these crossing interventions will have implications on movement along the corridor. A careful balance will therefore need to be achieved a satisfactory outcome between these two corridor purposes.

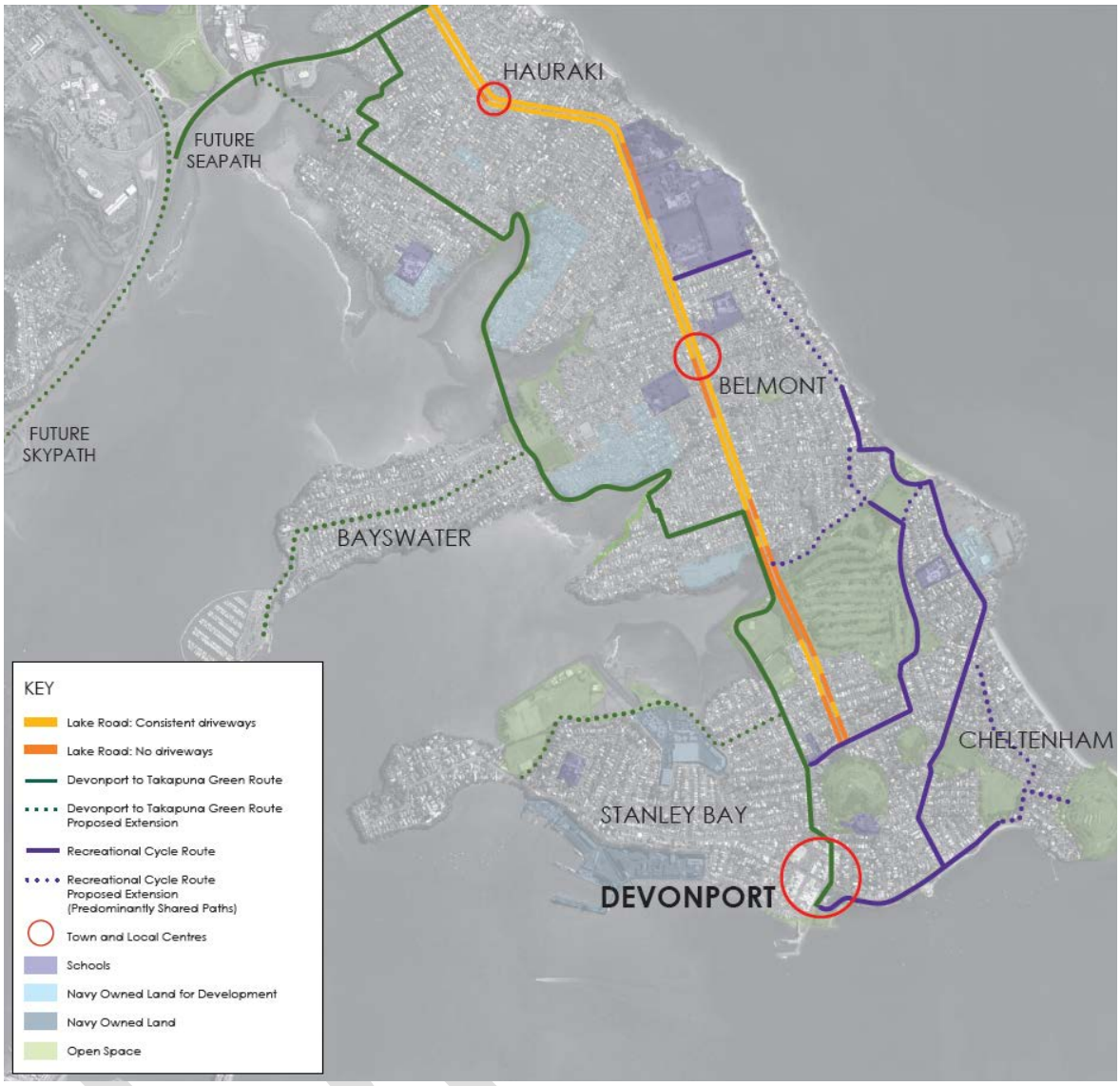
7.3 Cycle lane improvements

There is a clear strategic direction to improve the safety and quality of existing cycle lanes along the length of Lake Road between Esmonde and Albert Roads, as outlined in the Strategy for Cycling (6.4).

The main recommendation appropriate to identify at a CMP level is the allocation of additional space within the carriageway to provide for greater separation of cycle lanes from moving vehicular traffic.

As noted in the strategy for cycling, the frequency of residential driveway crossings is a reality of Lake Road that will need to be addressed in advancing any improvements to the existing provision of painted cycle lanes. Figure 7-3 below has been prepared to provide a very high level indication of those areas that are characterised by few or no vehicle crossings versus those with a consistent regular interruption of driveways.

Figure 7-3 Locations of vehicle crossings along Lake Road



This will influence the extent to which segments of separated cycle lane can be provided and will mean that north of Seabreeze Road, stretches of separated cycle lane will need to alternate with buffered lanes and marked vehicle crossing treatments. It is also important that additional width for cyclists should be considered on uphill sections and sections with expected high volumes of cyclists where the desired minimum width should be 2.1m to allow cyclists to pass each other.

This serves to highlight the importance of achieving a consistent space allocation for both cycle lane width and the separator width between cycle lane and traffic lane irrespective of whether buffered or separated lanes are being achieved in any given stretch. Such an approach is an important consideration in realising a consistent and continuous quality of approach to cycle infrastructure along the length of Lake Road despite the variation in the level of separation provided.

There are a number of further potential considerations identified that will need to be taken into account to advance separated and/or buffered cycle lanes along Lake Road:

- Further analysis of the number and spacing of vehicle crossings along the length of Lake Road, including factors such as sightlines and distance from intersections, in order to define the extent of segments where separated cycle lanes would be achievable as distinct from buffered cycle lanes.

- Painted markings that clearly delineate the cycle lane across all intersections and major vehicle crossings such as publicly accessible car park entrances for shops, schools, and community facilities;
- Cycle lanes to wrap around the back of bus stop boarding zones at the level with the footpath but clearly delineated with markings and/or coloured surface treatment, consistent with the emerging preferred solution of Auckland Transport now being implemented elsewhere.

Figure 7-4 indicatively shows how a mix of separated and buffered cycle lanes can be achieved depending on the number and frequency of vehicle crossings along Lake Road.

Figure 7-4 Separated and buffered cycle lane treatments

In addition there are a number of further measures that have been identified that if implemented would further strengthen the provision of safe and attractive cycling along Lake Road by people of all ages and abilities. These items include:

- Interim painted buffer zones on the outside of existing cycle lanes where space allows, to begin the re-distribution of carriageway space and to better support active modes sooner.
- Edge marker posts may be considered for long stretches of buffered cycle lanes to add an element of vertical delineation that has been proven to be effective in positively influencing driver behaviour and improve the perceived safety and attractiveness of buffered lanes by more strongly buffering them from passing traffic (note: marker posts are not required for separated lanes).
- Investigate opportunities to add cycle crossing phases at existing and any future signalised intersections (to operate in tandem with pedestrian crossing phases) to allow for safe, functional and direct opportunities for cyclists to cross Lake Road at logical crossing points, particularly those intersections adjacent to schools.
- Investigate measures to tighten the throats of uncontrolled intersections with the numerous residential side streets through measures such as narrowing of site street lane widths and tightening of corner radii that would reduce the length of the crossing distance for cyclists and slow traffic turning across the cycle lane. This could be further enhanced through design measures that continue the Lake Road footpath across these intersections, giving informal priority to pedestrians

over turning traffic. Such measures are still in their infancy in Auckland and have yet to be implemented for streets with two-way traffic.

In addition to the above there are a number of practical considerations for Auckland Transport and other utility providers to be addressed in implementing separated cycle lanes. Wind-blown leaves and other debris commonly collect in these lanes particularly when vertical kerbs are used. Bike space needs to be implemented with clear maintenance programmes and budgets to ensure the new space is maintained including refuse/glass collection and drainage consideration.

7.4 Considerations in relation to the Belmont shops

The Belmont shops are a moderately-sized concentration of local shops and services located at the approximate mid-point of the Devonport Peninsula and thereby in reasonable proximity to residents of the whole of peninsula, particularly those in the middle suburbs of Bayswater, Belmont and Narrow Neck that are some distance from the major centres of Takapuna or Devonport to the north or south. The convenience-based nature of most of the businesses also reflects the additional commercial viability that the high number of passing motorists on Lake Road brings.

That said, as a local centre the Belmont shops suffer from the high level of passing through-traffic that creates a significant severance issue for people wishing to cross Lake Road on foot between shops and/or carparks on either side of the road. The only pedestrian crossing opportunities are provided to the south of the main shops at the Bayswater/Williamson intersection.

Currently cycle lanes do not continue through the shops and additional traffic lanes are added in both directions through this intersection. Southbound buses are diverted into the slip lane car parking arrangement that separates the shops on the eastern side from Lake Road itself.

This all creates a challenging and sub-optimal environment for pedestrians, cyclists and bus passengers moving through and utilising the shops and services, which are also in proximity to Bayswater Primary School.

In principle the ideal outcome for Lake Road through the Belmont Shops is to achieve continuity of approach with the preferred direction to either side of shops while supporting the local centre function and enhancing the place-making potential of the local centre where possible.

Through the option development and evaluation process a wide range of potential interventions were identified and canvassed with the internal stakeholder group. The stakeholders considered that many of these considerations related to locations and matters somewhat “offline” to the Lake Road corridor itself and so could be considered as future initiatives somewhat independently from the CMP, and that the preferred direction would not preclude such local centre improvements in future.

At this stage there are several matters for further consideration that have been identified:

- Potential for an additional pedestrian crossing opportunity at the northern end of the shops, on or near alignment with the School Road intersection. Such a crossing would reduce severance between the shops on each side of Lake Road and provide an additional crossing point on a desire line between the primary school and shops on the western side.
- The ability to retain an element of on-street parking on the western side of Lake Road, while balancing this with possible provision of a northbound cycle lane and ensuring there is sufficient buffered separation for a door zone between parallel parking and a cycle lane along this stretch. It is recommended that retaining an element of parking on this side of the road is highly desirable to continue to service the convenience-based nature of the shops on this side of the road.

- Opportunity to better utilise the space currently allocated to a second northbound traffic lane between Roberts Avenue and Bayswater Avenue (adjacent McDonalds restaurant) for alternative transport uses. Options identified being either an 'advance' transit lane that gives buses and higher occupancy vehicles priority through the intersection during periods of peak congestion; or alternatively, to achieve a combination of buffered and separated cycle lanes along this approach to the intersection that would not require cyclists diverting up onto the shared path above the retaining wall, Drawings setting out these two opportunities are set out below in Figure 7-6and Figure 7-5.

Figure 7-5 Belmont Local Centre spot plan - advance transit lane option

Figure 7-6 Belmont Local Centre spot plan - continuous cycle lane option

Irrespective of these items, the following should be considered constants to be achieved in any future works on Lake Road through the Belmont shops:

- Consistent with the preferred direction for Segments B and C, Lake Road should continue to provide separated cycle lanes through the shops, recognising that these types of environments where a relatively small number of local shops are clustered along a busy and heavily trafficked

arterial road are not really centres in the true sense of the word where it is reasonable to assume that traffic will always be slow moving and it is safe for cyclists to share the road with other users. Such an approach would also recognise that these moments of intensity along an arterial road corridor are a significant point of tension and conflict between cyclists and other road users including the manoeuvring of parked cars and buses to the north of the traffic lights.

- Buses to stop in lane heading in both directions along Lake Road, thereby removing bus movements and stops from the slip lane car park arrangement on the eastern side. This presents the opportunity to re-configure this space between Lake Road and the shops/rose gardens, for improved operation of car parking and potentially enhanced space for place-making opportunities associated with the local centre function such as outdoor dining, street trees and planting, seating opportunities, and artwork.
- Cycle lane on eastern side is to wrap around the bus stop boarding zone, to be taken account of in any reconfiguration of the slip lane environment.
- Changes to the Bayswater/Williamson signalised intersection to enhance safety for pedestrian and cyclists including removal of slip lanes to avoid conflict with turning traffic and reduce pedestrian wait times and crossing distances.

8 Sequencing and Implementation Plan

8.1 Introduction

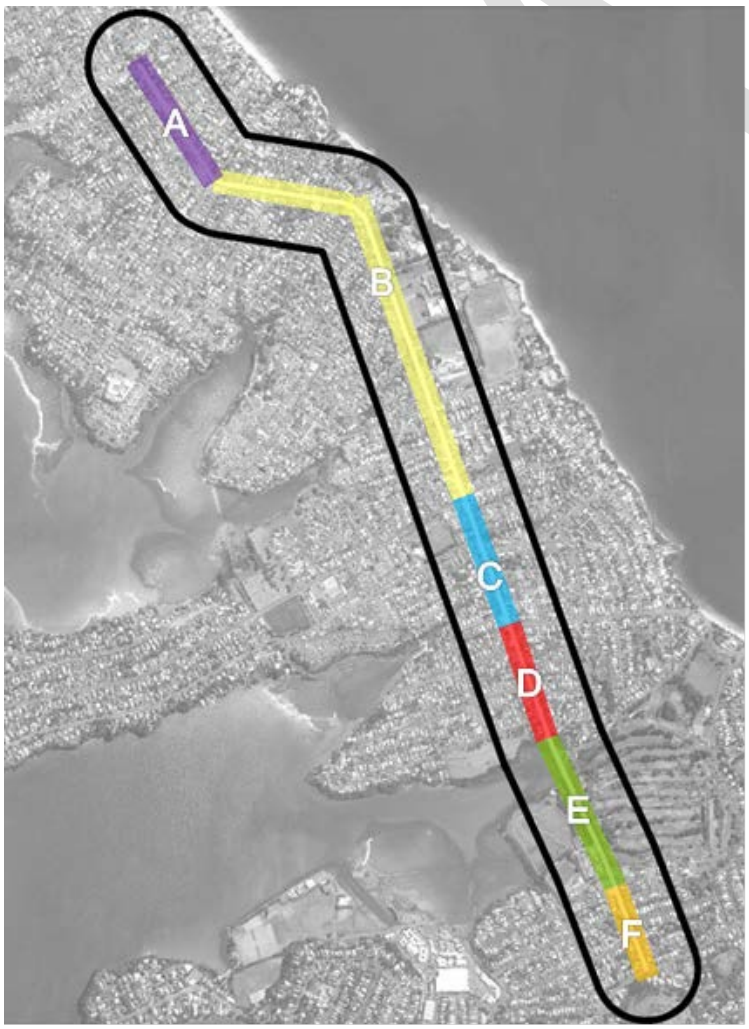
The following section of this report provides principles and recommendations for implementation of the preferred direction. The approach to the Implementation Plan is as follows:

- Short term interventions – Generally small-scale or critical interventions that are generally required to support shorter term initiatives, and provide the most immediate value for money. It is intended that these priority interventions are to be implemented over the first 5 year period.
- Medium term interventions – lower priority/ higher magnitude projects, or those that should be delivered in support of other changes. Intended for completion over the 5 to 15 year period.
- Long term interventions – those interventions required to fully deliver the preferred directions, and may be staged over the 30 year horizon.

Timings for the above have been based on implementation. In the case of medium to longer term interventions, earlier lead-in actions (investigation, consultation etc) may also be required.

As well as the staging of the interventions, projects have also been identified by corridor segment (shown below), and by those travel modes that are the primary beneficiaries.

Figure 8-1 Summary of corridor segments



8.2 Short term interventions

The short term and 'quick win' interventions that have been identified for the corridor are presented as follows:

Table 8-1 Identified short term interventions

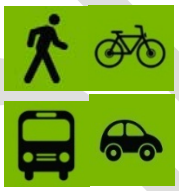
Segment	Benefits	Short term intervention
All		Review suite of identified pedestrian crossing opportunities and implement any 'easy win' outcomes
All		Provide painted buffer outside existing cycle lanes where space allows to begin the re-distribution of carriageway space prior to physical separation projects
All		Installation of multi-modal way-finding signage supported by maps especially linking key PT hubs/stops and cycling/walking routes. Communicating clear and easy options may promote the change to alternative modes of travel.
A, B, C		Implement frequent bus route along Lake Road as part of Regional Public Transport Plan
A, B, C		Investigate opportunities for improved bus stop locations to achieve better balance between reduced stopping delay and maintaining catchment. Implement bus stop upgrades in conjunction with bus stop location optimisation and also consider providing cycle lanes that wrap around the back of bus stops and removal of indentation for stops within Segment A. This may include moving the bus stop from the slip lane at Belmont shops to a Lake Road kerbside position.
B		Investigate and if possible implement painted cycle lanes through the Belmont Shops to create more continuous cycle provision prior to more medium term interventions
E		Investigate signalisation of existing pedestrian refuge south of Seabreeze Road
A, B, C		Signal optimisation review of signalised intersections along the corridor.
B		Install electronic school zone signs to improve safety for children walking and cycling to schools.
B		Review configuration of Lake Road/ Winscombe intersection, and in particular, opportunities to use right turns on Lake Road more effectively.

Segment	Benefits	Short term intervention
E		Widen western footpath between Seabreeze Road and Mozeley Avenue and signalise existing pedestrian crossing south of Seabreeze Road (i.e. including length past Ngataringa Park/ Dacre Park).

8.3 Medium term interventions

The following table outlines those interventions that are deemed to be appropriate in the medium term, based on priority of need as well as feasible timeframes.

Table 8-2 Identified medium term interventions

Segment	Benefits	Medium term intervention
All		Implement separated cycle lanes along both sides of the carriageway. Integrate with cycle lane upgrades to north and south of study area.
All		Review suite of identified pedestrian crossing opportunities and implement where feasible (excluding those already delivered as 'easy wins').
All		Review requirements for central medians in line with directions for arterials elsewhere in Auckland and alter if deemed appropriate. In conjunction, consider if banning movements at some side roads may help reduce delay associated with turning vehicles, and also any opportunities for increased tree planning and footpath widening.
A,B,C,D		Implement a strategy of achieving consistent and regularly spaced street tree planting within the footpath adjacent to the kerb edge, along segments A-E as part of a multi-pronged strategy that enhances the amenity and safety of all street users and reduces the negative impacts of traffic on adjacent properties.
A		Implement conversion of outside lanes to transit lanes (T2 or T3). This is likely to extend to the double lane development/ merge south of Jutland Road. In conjunction, consider opportunities to extend this transit lane arrangement
B. C		Reconfigure Lake Road/ Bayswater Avenue intersection and approaches. This may include: ▪ Removal of free left turns ▪ Convert outside northbound lane to transit or separated cycle lane. ▪ Reposition southbound bus stop to kerbside ▪ Separated cycle lane southbound ▪ Potential reconfiguration of car parking to achieve bus and cycle changes above.

Segment	Benefits	Medium term intervention
C, D		Investigate/ implement signalisation of Lake Road/ Old Lake Road intersection to improve reliability for bus right turns and improve pedestrian accessibility to local shops.
F		Upgrade to Lake Road/ Albert Road roundabout to provide improved pedestrian and cyclist facilities, possibly through 'Dutch- style' design.

8.4 Long term interventions

Table 8-3 summarises those interventions required to implement the preferred directions. These projects are identified by corridor segment and those travel modes that are the primary beneficiaries.

Table 8-3 Identified long term implementation interventions

Segment	Benefits	Long term intervention
All		Complete Takapuna/Akoranga bus link (also proposed as part of Takapuna Centre Based Transport Study)
All		Relocated and upgraded Takapuna Bus Interchange (also proposed as part of Takapuna Centre Based Transport Study)
B		Review population and employment growth trends and if higher than expected, investigation four laning option

8.5 Implementation plan

Indicative cost estimates are provided in the Implementation Plan in Appendix H. These estimates are based on high level assessments of each intervention but consider the interdependencies of multiple proposed interventions along the same segment.

A number of medium and long term projects have been identified as having a significant external impact on the nature of this implementation strategy however have been excluded from this implementation plan as they are outside of the Lake Road corridor scope of work. These include:

- Proposed Takapuna Bus Interchange and potential link with Akoraga Station
- Proposed Additional Waitemata Harbour Crossing
- SkyPath and SeaPath

8.6 Implementation plan triggers and interdependencies

There are no specific major developments that will trigger these interventions with the exception of Peninsula population growth. In the case that this changes significantly from the forecast medium growth scenario, further investigation and potential implementation of four-lanning between Hauraki Road and Bayswater is likely to be triggered.

The roll out of the New Network Plan in 2016 will trigger the improvement of bus stops and rationalisation of their spacing. In the medium term with increasing bus frequency, this is likely to

trigger bus priority measures at intersections including signalisation of the Lake Road/Old Lake Road intersection. Bus stop facility improvements are likely to also trigger improvements to existing and implementation of new, pedestrian crossing facilities.

Cycle network improvements across the North Shore and upgrades of the Devonport and Bayswater Ferry Terminals with improved cycle storage are likely to trigger; initially painted separation of the on-road cycle lanes, followed by the installation of physically separated cycle lanes along the length of Lake Road.

Street-scaping and footpath upgrades are likely to be triggered in conjunction with the undergrounding of power/phone line s and storm water upgrades required along Lake Road.

Appendices

Appendix A
CMP process and strategic context

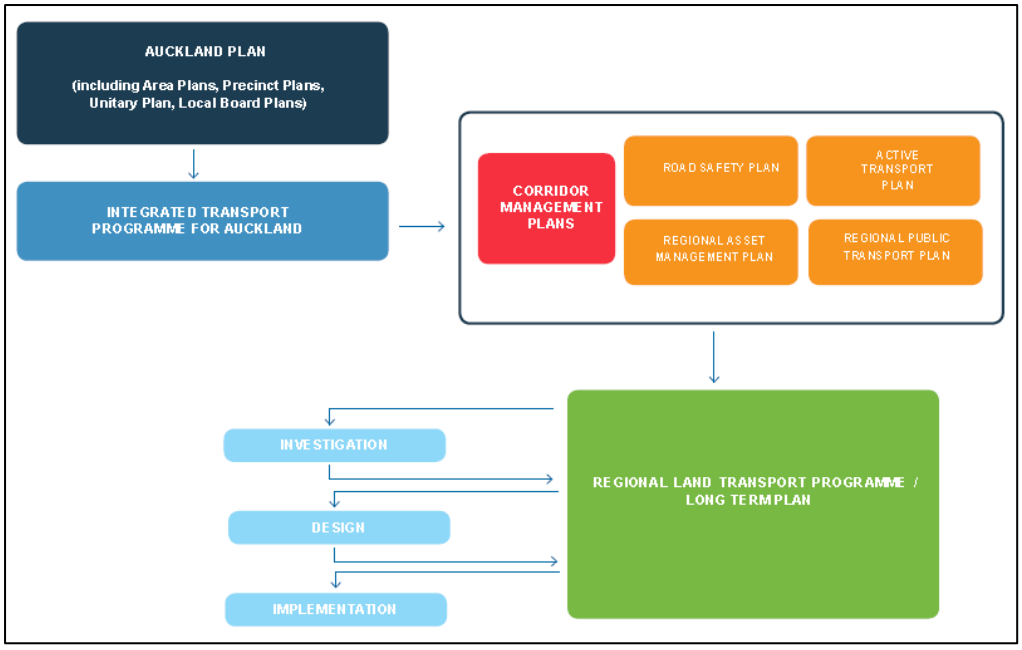
Appendix

CMP Process and Strategic Context

1. Strategic fit

CMPs are non-statutory supporting documents which fit into the overall planning framework as shown in Figure 0-1**.** below.

Figure 0-1 Strategic fit of Corridor Management Plans



As shown, this CMP is informed and directed by the Integrated Transport Programme, which in itself supports the Auckland Plan. The Auckland Plan, adopted in March 2012, provides the strategic direction for Auckland's development and infrastructure.

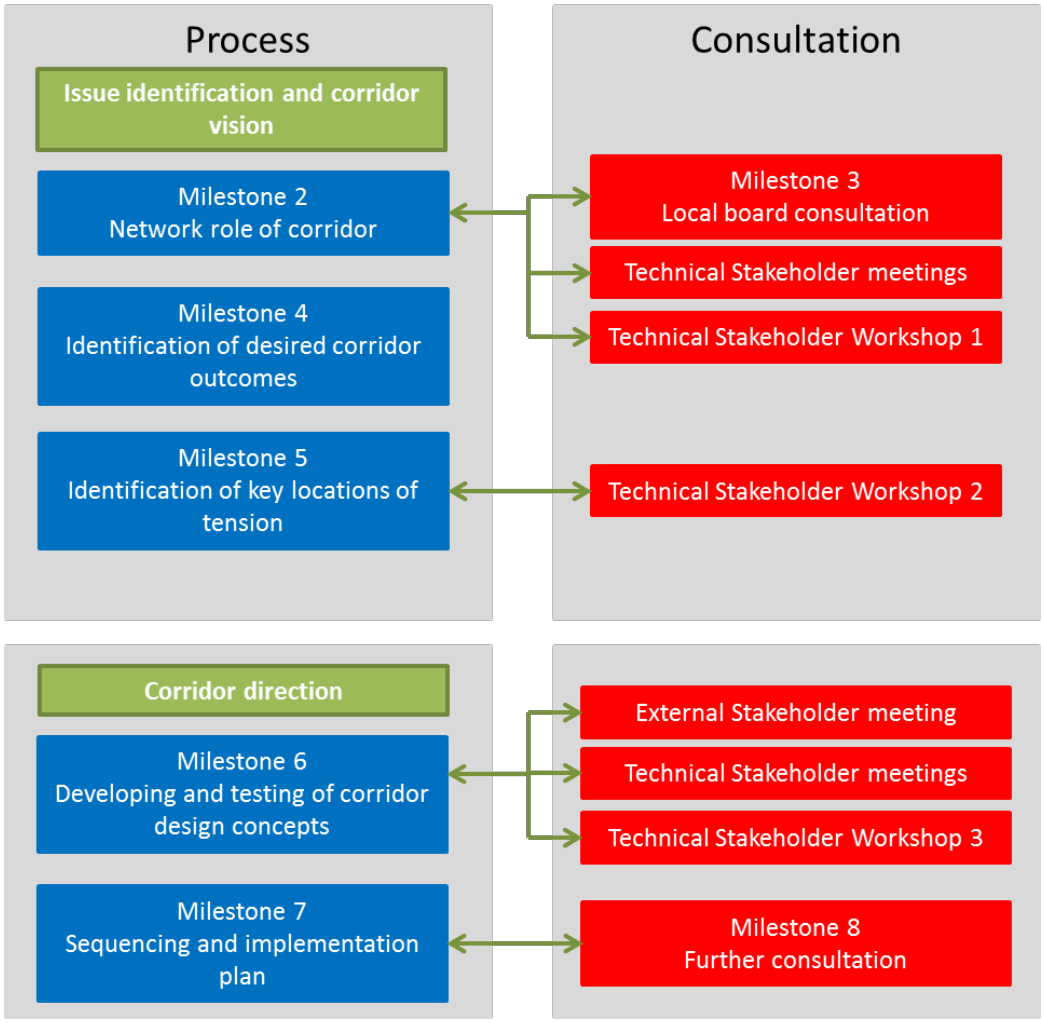
The CMP in turn recommends projects and outcomes that feed through to the Regional Land Transport Programme and Long Term Plan, and suggests their associated investigation, design and implementation work streams. These programmes will help deliver the Auckland Plan's transformational shift to 'move to outstanding public transport within one network' and to ensure that transport networks are integrated with the planned growth.

2. Process

This study has been conducted in general accordance with the approach outlined in Auckland Transport's Corridor Management Plan Guidelines and Simplified Procedure, Version 2 (October 2012).

As such, the study has employed both a robust and structured process, as well as extensive consultation with technical stakeholders across Auckland Transport, Auckland Council and NZ Transport Agency, as well as meetings with the Devonport-Takapuna Local Board and external stakeholders (i.e. business association/ groups, community committees and Bike Devonport). A summary of this process and consultation is provided in Figure 0-2 below.

Figure 0-2 Lake Road CMP process and consultation



Appendix B
Existing transport context

Aurecon New Zealand Limited
Level 4, 139 Carlton Gore Road
Newmarket Auckland 1023
PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
F +64 9 524 7815
E auckland@aurecongroup.com
W aurecongroup.com

Technical Note

To	**Jennifer Estong**	From	Cassandra Kenworthy
Date	**22 September 2014**	Reviewed by	Craig Mitchell
Project	**Lake Road Corridor Management Plan**	Reference	243329
Subject	**Land use and transport context**		

1 Introduction

Lake Road forms the central spine to the Devonport Peninsula, which is surrounded on the eastern southern and western sides by the Waitemata Harbour. Lake Road is classified as a Primary (Regional) Arterial with sole connectivity to the urban areas of Devonport and Belmont. The nature of this singular Peninsula access means that while the study area for this Corridor Management Plan (CMP) comprises Lake Road between Esmonde Road and Albert Road, the travel characteristics of the whole peninsula are relevant and have been considered in this note.

This technical note summarises the existing and future context of Lake Road and the surrounding Peninsula in terms of the land use and transport situation. It is intended to provide a high level analysis to inform the CMP study and technical stakeholders.

2 Existing Context

2.1 Land Use

The Lake Road corridor is predominantly residential in nature supported by a number of town centre shops, schools and open spaces. The peninsula is also home to a number of sites serving the New Zealand Navy who have a permanent and long-established naval base in Devonport.

The Peninsula boasts a number of natural features that are popular tourist attractions including local beaches and volcanic cones. These coastal landscape attractions also ensure the area is in demand for organised sporting and other recreational events.

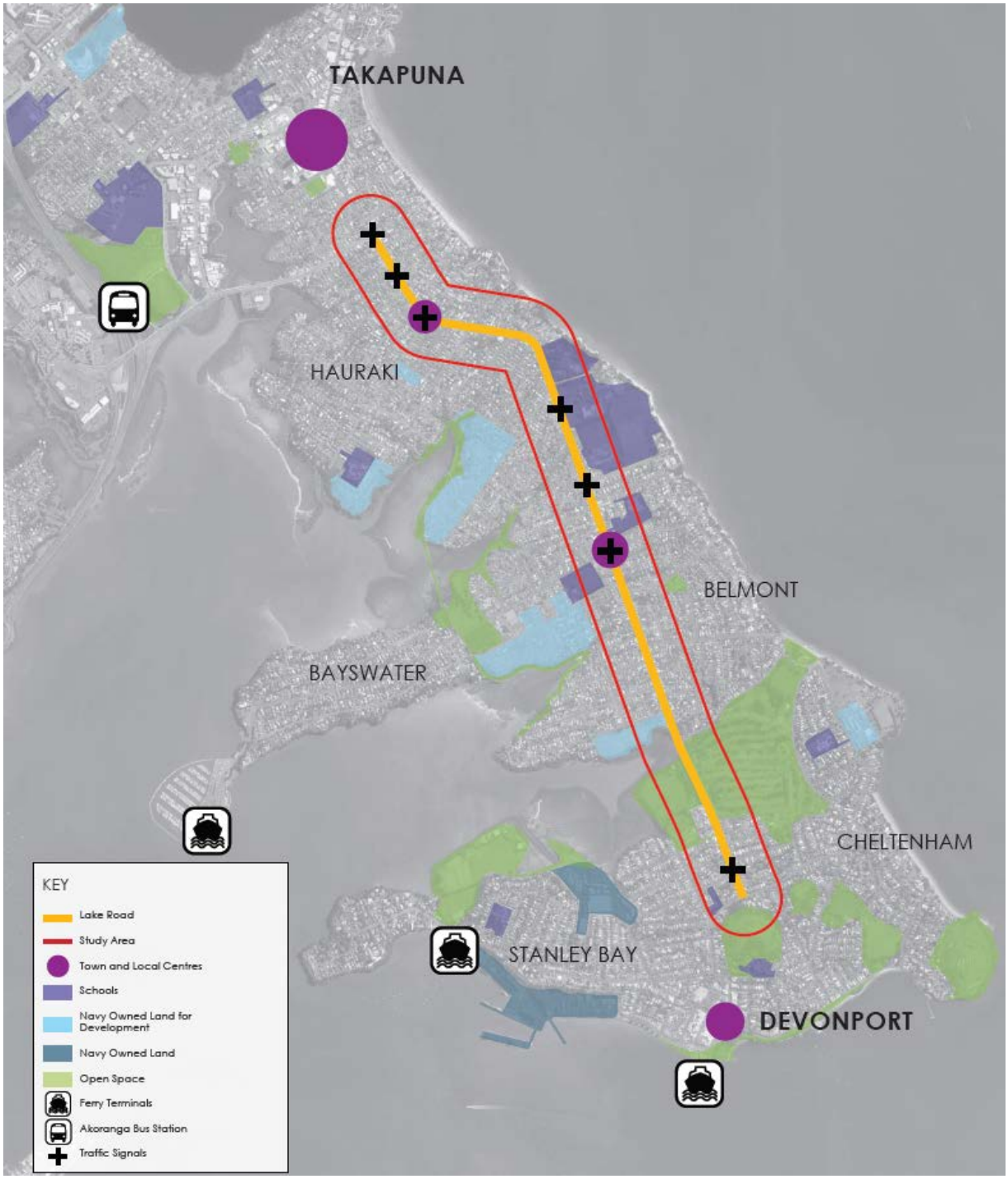
A summary of the study area and the surrounding land-use is provided in Figure 2-1 on the following page.

2.1.1 Population

The resident population of the Lake Road study area is approximately 23,000 according to the 2013 Census, of which, approximately 5,000 people are under the age of 15 and 3,000 people are over the age of 65. These values correspond with averages across the Auckland Region of 21% of people under 15 and 13% over the age of 65.

The population count for the 2013 census indicated that almost 65% of the residential population are New Zealand born and 32% are overseas born. Of the resident population 15 years and over, almost 9,500 own or partly own their usual residence, 8,000 people have a qualification at Level 5 Certificate or Level 6 Diploma or higher and 2,700 are undertaking full or part time study.

Figure 2-1 Major Land uses along the study area



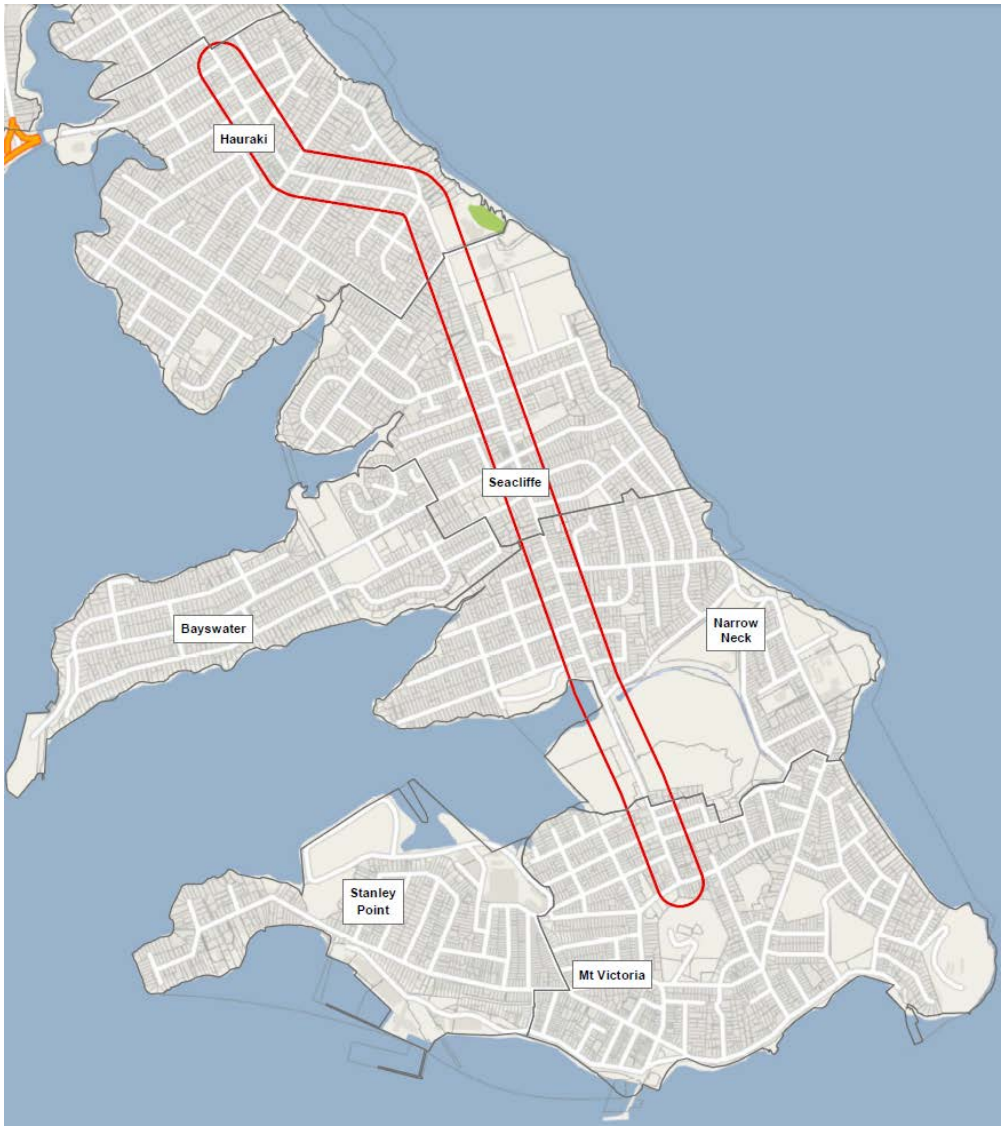
2.1.2 Employment

12,000 residents of the Peninsula aged 15 and over, are employed in full or part-time work. Over half (6,500) of the employed resident population are Managers or Professionals suggesting their commuting movements will focus on commercial areas such as Takapuna, Smales Farm and the Auckland CBD.

Of the 6,200 people within the Auckland Region whose workplace address is within the study area, over 58% are employed within the Mt Victoria (1,850) and Stanley Bay (1,800) area units. These areas contain Devonport Town Centre, the main employment centre on the Peninsula, as well as the Devonport Naval Base which employs a large number of defence and civilian personnel. The area unit with the lowest employment is Bayswater with only 310 people listing it as their work address. There is no local centre within this area unit; however a large proportion of this employment can be attributed to the 123 people who responded as 'working from home'.

These aforementioned area units are prescribed by Census New Zealand. The unit boundaries and associated area names are displayed in Figure 2-2.

Figure 2-2 Devonport Peninsula Census Area Units



2.2 Transport

The Devonport Peninsula has a wide variety of transport options including walking, cycling, bus, ferry and private motor vehicles.

2.2.1 Modal Split

The main means of travel to work for the resident population of the study area are summarised in Table 2-1 below. It should be noted that this table shows the main means of transport to area of employment and does not however take into account the multi-modal journeys that people may use such as cycle and ferry, private vehicle and ferry, etc.

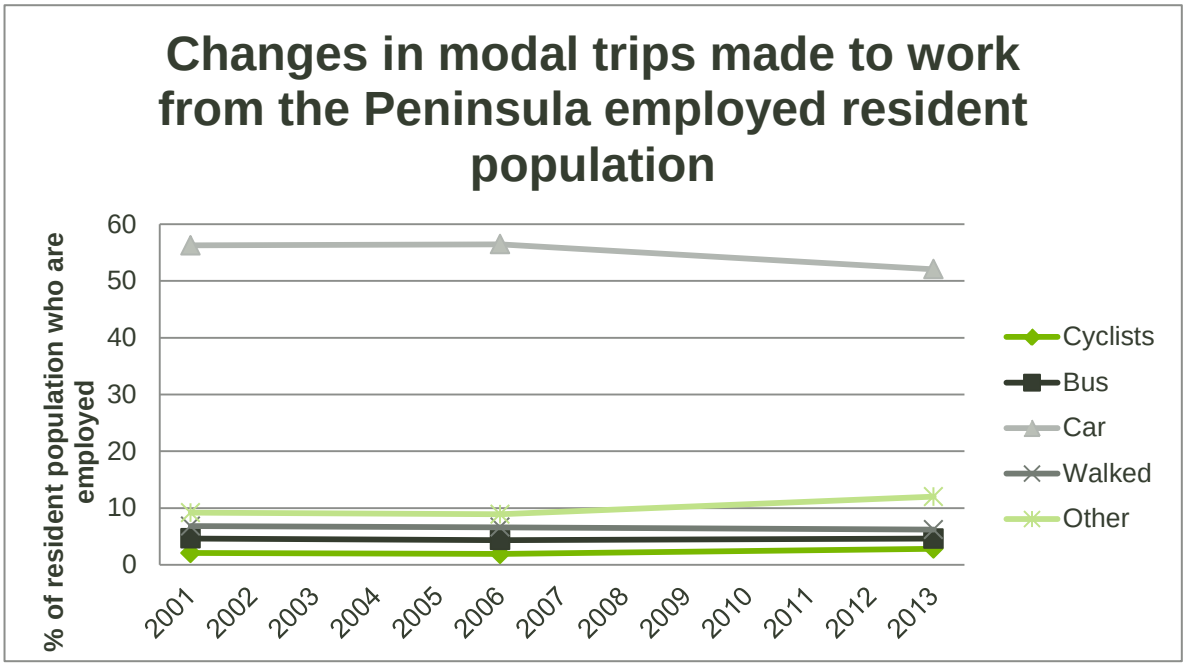
Table 2-1 Main means of travel to work of resident population by percentage (Source: Census 2013)

Main Means of Travel (%)	Worked at Home	Private Car	Car Passenger	Bus	Train	Bicycle	Walked	Other (incl. Ferry)
Auckland Region	7%	65%	4%	5.4%	2%	1%	4%	1%
Devonport Peninsula	10%	50%	2%	4.6%	Less than 1%	3%	6%	12%

The Peninsula has a higher percentage (9%) of people who travel to work by active modes (cycling and walking) than the regional average of 5%. There is also a distinctively high value of 'Other' modes of transport than the Auckland average, and is expected to relate primarily to ferry use. As a whole, the Peninsula has a lower than average percentage of residents who travel by private vehicle.

The changes in the mode share for journeys to work are shown in Figure 2-3. The most significant changes observed since 2006 are the decrease in the percentage of people travelling by car (either driving or as a passenger) and the increase in percentage of people travelling by 'Other' modes including ferry.

Figure 2-3 Changes in modal share for the resident population's journey to work



The modal split for means of travel to work also differs significantly between the areas within the Peninsula. A summary of the 2013 Census area units and the main means of travel to work by the employed resident population is shown in Table 2-2 below.

Table 2-2 Main means of travel to work of resident population by area unit by percentage (Source: Census 2013)

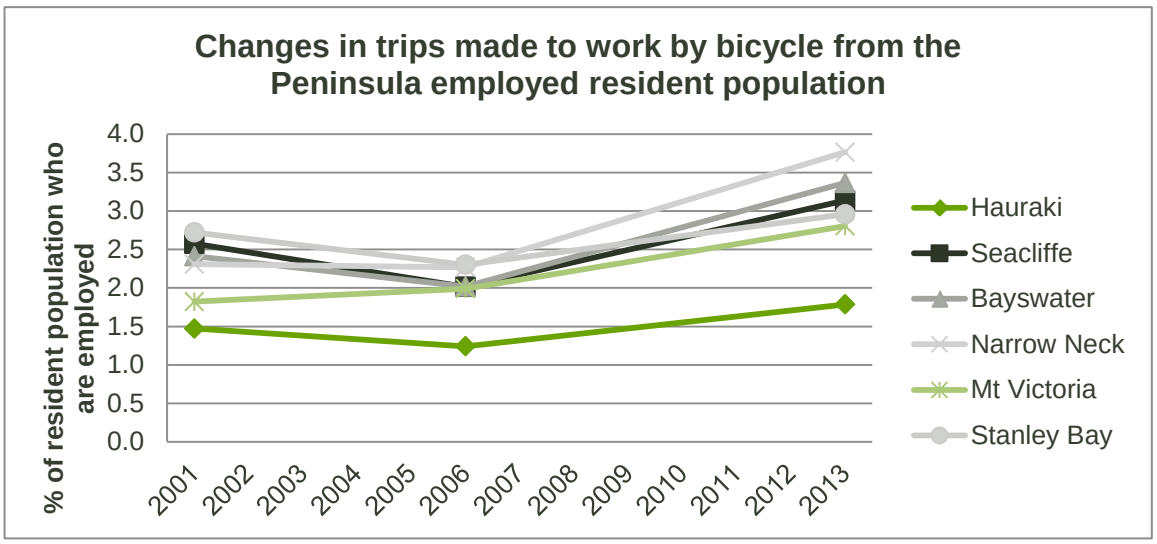
Main Means of Travel (%)	Worked at Home	Private Car	Car Passenger	Bus	Train	Bicycle	Walked	Other (incl. Ferry)
Hauraki	9%	58%	2%	9%	Less than 1%	2%	5%	2%
Seacliffe	6%	57%	2%	6%	Less than 1%	3%	4%	8%
Bayswater	10%	53%	3%	2%	Less than 1%	3%	3%	13%
Narrow Neck	9%	53%	2%	3%	Less than 1%	4%	4%	13%
Mt Victoria	14%	41%	2%	2%	Less than 1%	3%	7%	20%
Stanley Bay	13%	32%	1%	1%	Less than 1%	3%	17%	22%

There are notable differences in the public transport usage in each unit area. Hauraki, the furthest north area unit has the highest mode share by bus with 9% of residents using buses as their primary means of travel to work. This is likely a result of the close proximity of Hauraki residents to the Northern Busway and Akoranga Bus Station. Being the second northern-most area unit, Seacliffe has the next highest bus usage with 6% of residents travelling this way. The four other area units all have less than 3% of residents travelling by bus which is significantly lower than the average for Auckland of 5.4%.

The percentage of people travelling by 'Other' means of transport is significantly higher on the Peninsula compared to the 1% average for Auckland. This percentage is highest in those areas closest to the ferry terminals in Mt Victoria and Stanley Bay, and is likely explained by the number of people who travel by ferry to work (which was not an individual category response option). It is estimated that the number of residents which travel by ferry is over 20% in these area units and 13% in both Bayswater and Narrow Neck.

The bicycle travel mode responses for the Peninsula are lower than expected (321 persons), which may be explained by the Census question format, asking people to state their main mode of travel. This means that people who cycle to the ferry or bus stations may select the public transport modes as their main modes of travel. Despite this, all areas on the Peninsula have a modal share of cyclists higher than the national average of 1%. When compared to past census information the number of people cycling to work has increased since 2006 as shown in Figure 2-4 which may be a result of the improvement in cycle infrastructure.

Figure 2-4 Changes to resident bicycle journeys to work



Approximately 6000 residents, 50% of those employed, drive a private or company vehicle to work. This is significantly lower than the Auckland average of 65%. It is interesting to note that this is despite 80% of households on the Peninsula having one or two motor vehicles, 6% higher than the Auckland Regional average.

There are also marked differences between the area units with the number of people driving a vehicle decreasing substantially in the more southern area units. It is likely that that the remoteness of Mt Victoria and Stanley Bay from the state highway network contributes to this trend of high ferry usage and lower car journeys to work. This trend can also be seen in the percentages of residents who travel as a passenger in a vehicle to work which are approximately half of the Auckland average of 4% and even lower in the southern areas of Mt Victoria (1.5%) and Stanley Bay (1.1%).

Table 2-3 displays the percentage of students who travel to schools on the Peninsula by bus, walking/ scooter, bicycle and car. Fewer primary school age children travel by bus, with walking and car transport being the dominant modes. Cycling and bus modes of travel to school are higher for intermediate and high-school students.

Table 2-3 Peninsula Schools student travel survey results

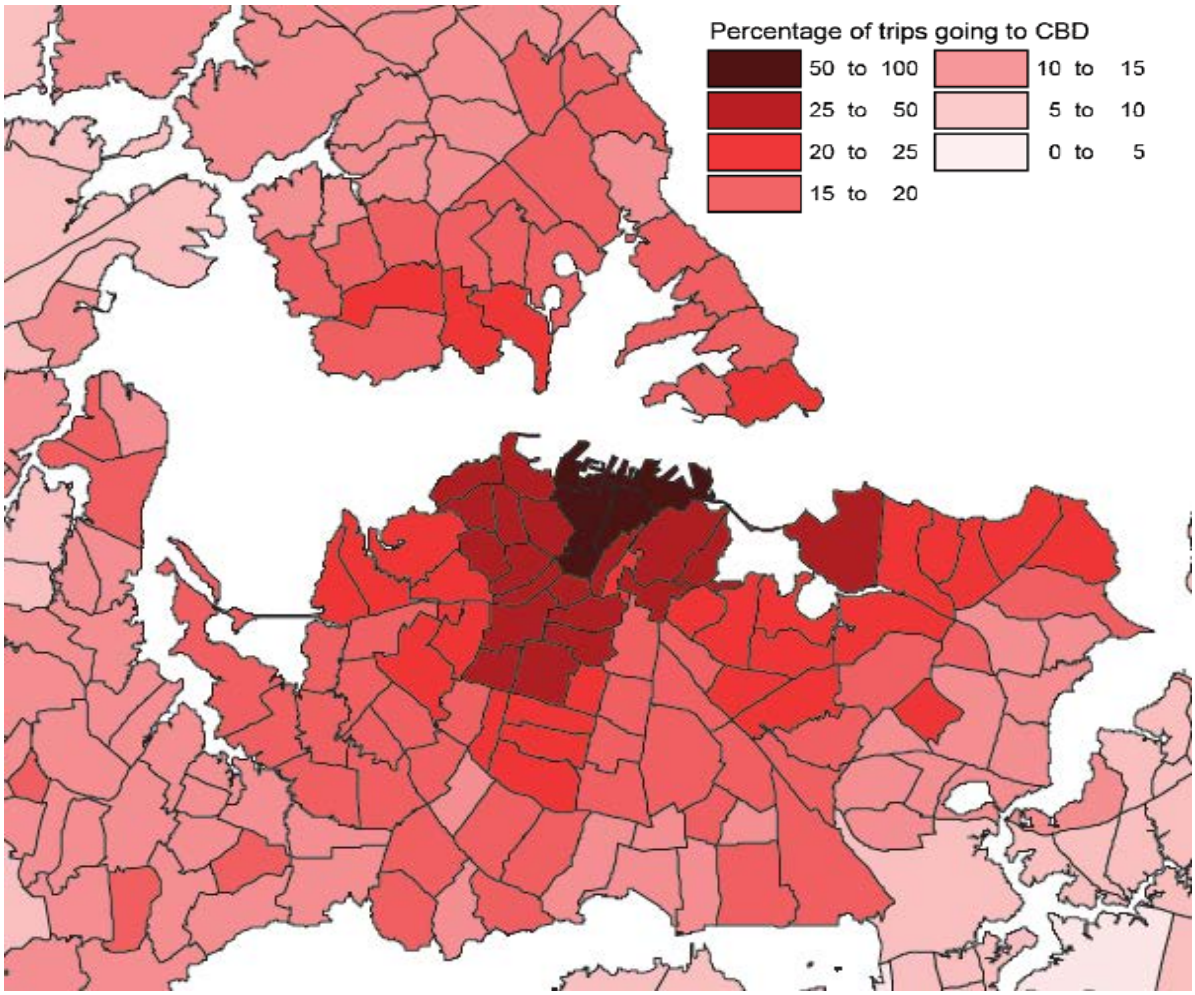
School	Role	Survey Year	Bus	Walk/Scooter	Cycle	Car
Takapuna Grammar	1600	2013	20%	41%	10%	24%
Belmont Intermediate	480	2014	16%	34%	29%	11%
Bayswater Primary	175	2011	4%	41%	8%	45%
Belmont Primary		2014	0%	36%	11%	42%
Vauxhall Primary		2014	0%	36%	16%	37%
Devonport Primary	350	2013	1%	62%	7%	26%
Stanley Bay Primary	269	2013	0%	58%	7%	31%
St Leo's Catholic School	107	2013	1%	34%	6%	51%

2.2.2 Trip Destinations

Analysis of workplace destinations, for residents of the Devonport-Takapuna Local Board area shows: 40% of the population is employed within this Local Board area and 24% are employed within the Waitemata Local Board area which includes the Auckland CBD. The next two largest areas for workplace destinations for Devonport-Takapuna residents are Upper Harbour (8%) and Kaipatiki (4%). This data is not entirely representative of the CMP study area because the Devonport Peninsula only makes up 26% of the employed population within this Local Board area however it provides a good approximation of the main commuter movements.

The percentage of trips going from each area unit on the Peninsula to the Auckland CBD is displayed in Figure 2-5.

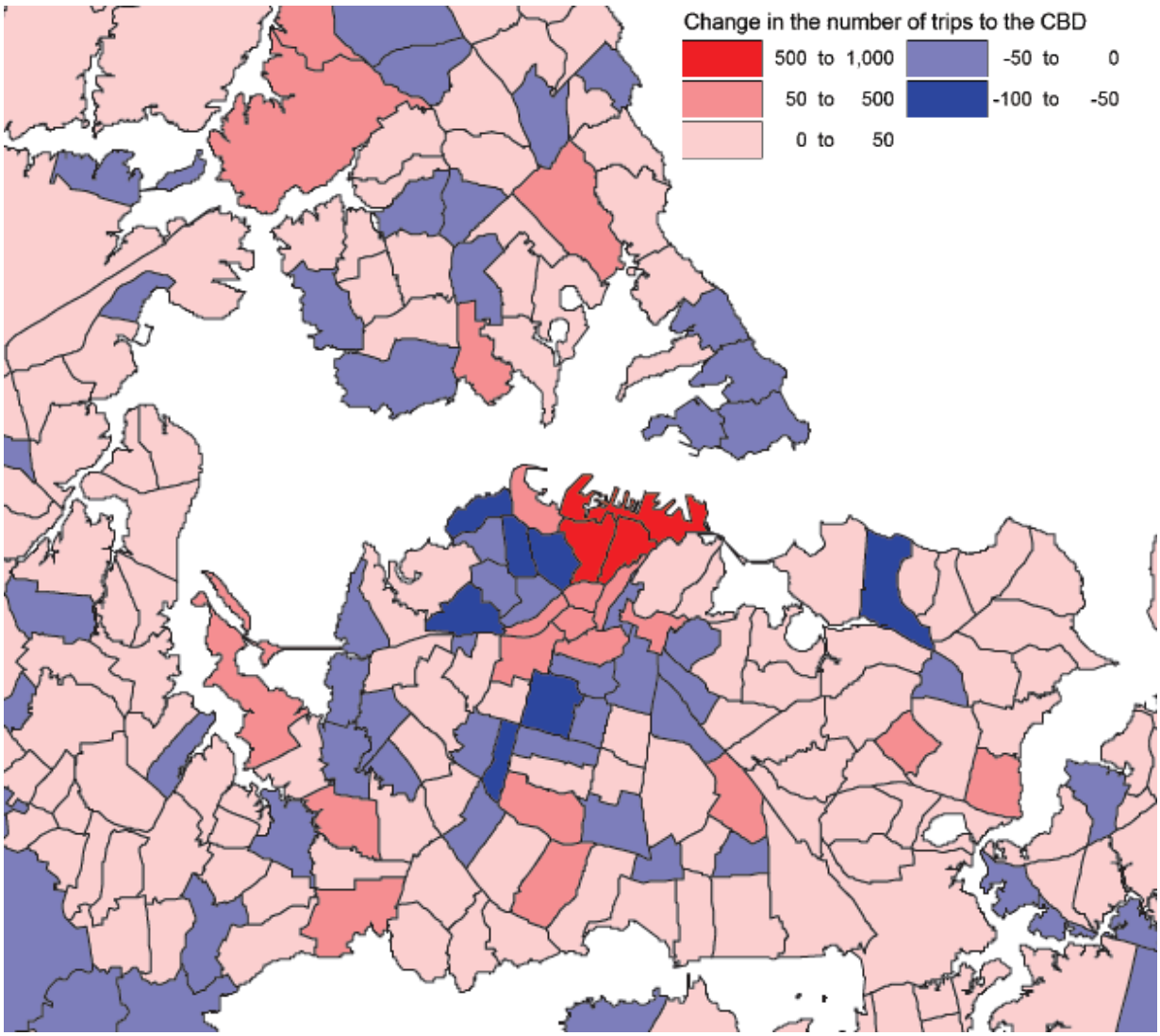
Figure 2-5 Percentage of workers commuting to the CBD by unit area residential population (Source: Journey to Work report, July 2014, Richard Paling Consulting)



This figure shows that the Mt Victoria area unit including the Devonport Town Centre has the highest percentage of trips going to the CBD of between 20-25% of the resident working population. The remaining area units within the Lake Road corridor have between 15-20% of residents working in the CBD. The Peninsula has fewer residents commuting into the CBD for work than those who live in the central suburbs but is similar percentages as the isthmus. As a percentage of resident population, the Peninsula has more CBD bound commuter trips than the more northern parts of the North Shore and West and East Auckland.

Figure 2-6 shows the change in the number of residents commuting into the Auckland CBD from the Peninsula since 2006. This information suggests there has been minimal change in the number of commuters travelling into the CBD between 2006 and 2013.

Figure 2-6 Changes (2006-2013) in trips made into the CBD by residential area unit (Source: Journey to Work report, July 2014, Richard Paling Consulting)



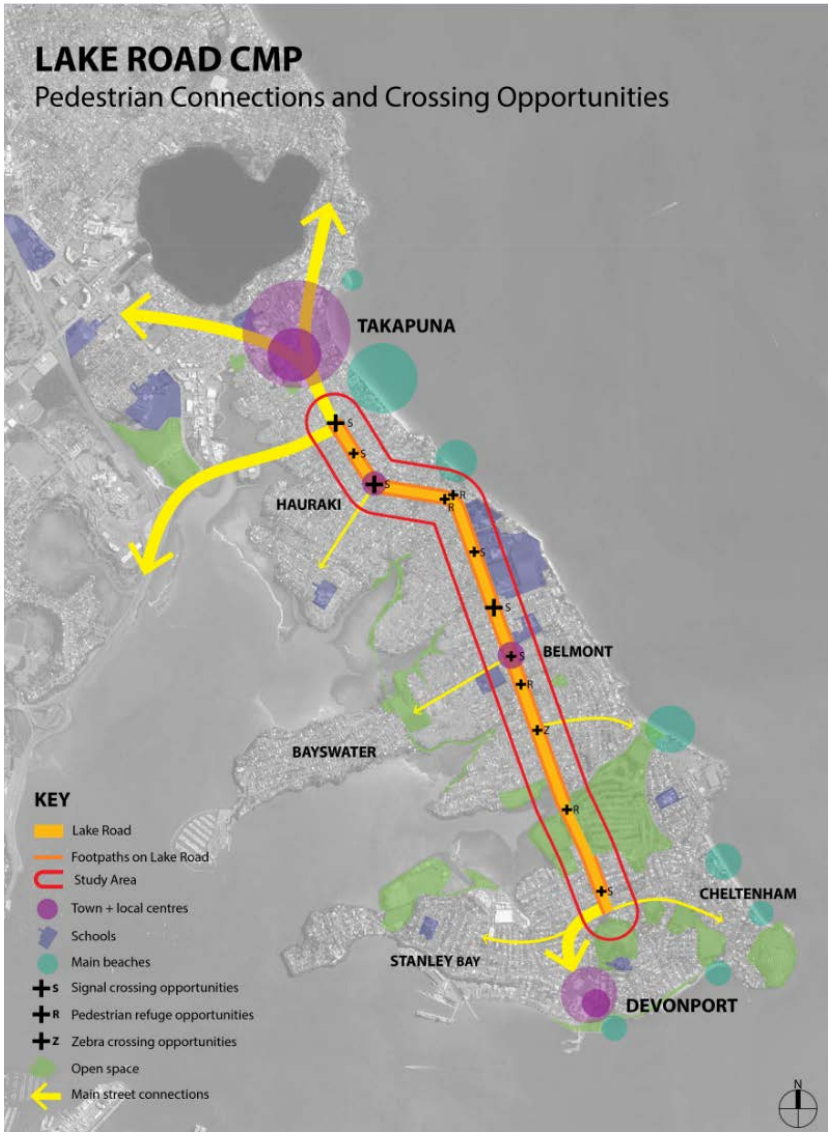
2.2.3 Pedestrians

Lake Road has varying pedestrian facilities along the different sections of the corridor. The pedestrian connection and crossing opportunities along Lake Road are summarised in Figure 2-7 on the following page.

The recently upgraded section between Esmonde Road and Jutland Road has approximately 3m wide footpaths extending from the fence line to the kerb. The width of this path is reduced in places by trees, street lights and bus-stop shelters. There is a signalised pedestrian crossing on the northern arm of the intersection of Lake Road and Esmonde Road and a mid-block signalised crossing between Cameron and Ewen Streets. The intersection of Lake, Jutland and Hauraki Road has signalised pedestrian crossings on each leg (operating as a Barnes dance) and a zebra crossing across the southbound free-right turn into Hauraki Road.

Between Jutland Road and Cliffton Road the footpaths continue on both sides of the road, however the western section becomes a non-delineated shared path with cyclists between Onepoto Road and Jutland Avenue. The path on the western side of Lake Road is against the kerb with a grass berm between it and the adjoining properties. The pedestrian crossing point at Hororata Road is excessively wide approximately 19m creating a challenging environment for pedestrians on Lake Road. There is a pedestrian refuge within the flush median on Lake Road just north of Northumberland Avenue. The poles from the overhead power and phone lines in this section of Lake Road, narrows the footpath in places.

Figure 2-7 Pedestrian connections and crossing facilities along Lake Road



From Clifton Road onwards to Winscombe Road there is a wide delineated shared cycle and pedestrian path on the eastern side of the road and a 1.5m footpath on the western side. There is a narrow berm separating the kerbside footpaths with the adjoining properties. This section has a midblock, signalised, pad activated, pedestrian crossing outside Takapuna Grammar School and signalised pedestrian crossings on each leg of the intersection of Lake Road, Winscombe and Bardia Street.

South of the Winscombe intersection the footpaths continue on both sides of the road. There is another set of signalised pedestrian crossings across all arms of the Lake Road, Bayswater and Williamson Avenue intersection. The free left turns from Williamson Avenue and Bayswater Avenue onto Lake Road have pedestrian zebra crossing facilities. Just south of the intersection of Old Lake Road there is a pedestrian zebra crossing on Lake Road with build-outs on the western side and a pedestrian refuge in the central median.

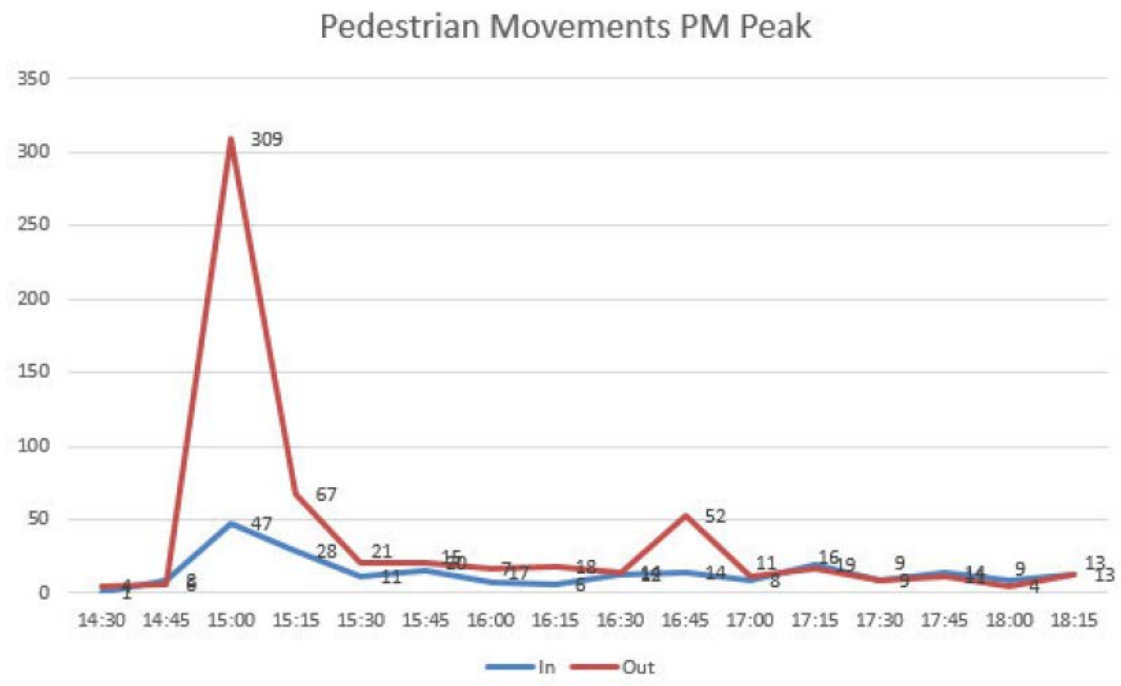
At the intersection with Ngataringa Road, another marked shared cycle and pedestrian path begins on the western side of Lake Road. This shared path continues down into Ngataringa Park, however a pedestrian footpath also continues along Memorial Drive up to the roundabout of Lake Road and Albert Street. The footpath on the eastern side of Lake Road stops at the intersection of Seabreeze

Road and begins again at Ariho Terrace. A second footpath begins on this side of Lake Road separated by a row of trees and continues up to the roundabout. There are no pedestrian crossing facilities at this roundabout however there is a signalised cyclist and pedestrian crossing mid-block approximately 150m north of the roundabout.

Both the morning and afternoon peak periods display significantly higher volumes of pedestrian movements along the corridor. These spikes in demand at school start and end times (08:15-08:30 and 15:00-15:15) are observed along the length of the corridor at each of. The weekend experiences a steady flow of pedestrian movements.

Traffic counts undertaken outside Takapuna Grammar School indicated that over 210 pedestrians crossed Lake Road from the western to eastern side in the morning peak with an average of 71 people per hour. The most significant approach direction to this crossing was northbound movements with 242 people on the western side of the road and 144 people on the right. Notably the afternoon peak actually has two peak periods, as shown in Figure 2-8, with a second peak occurring around 16:45 and appears to relate to afterschool activities.

Figure 2-8 Pedestrian movements into and out of Jutland/Eversleigh/Lake Road intersection in the afternoon peak (Source: Intersection Survey, June 2014, Flow)



2.2.4 Cyclists

Lake Road has on-road cycle lanes along the entire corridor length except for on the northbound approach to the Jutland Road intersection, through Belmont Shops and between Ariho Terrace and Albert Road. In addition to the on-road cycle lanes there are a number of off-road shared paths as mentioned in 2.2.3 above. The shared paths are delineated by a line or by a change in concrete colour. When there is not enough width to segregate cyclists and pedestrians there is no line painted and only signs advising of the shared path. The existing cycle network facilities are summarised on the following map (Figure 2-9).

Figure 2-9 Auckland's existing cycle network

From the percentages shown in Table 2-3, Belmont Intermediate and Takapuna Grammar have approximately 140 and 160 students respectively who cycle to school per day. It is understood that these schools have amongst the highest mode share of cyclists in New Zealand.

The highest on road cycle count was observed during the morning peak with a flow of 119 cyclist in a two hour period. 99 cyclists were recorded in the weekend four hour observed peak period. It is estimated that based on these counts, the AADT for cycling along Lake Road through the Eversleigh Road/Jutland Road intersection is 280 and 325 cyclists during the weekday and weekend periods respectively.

2.2.5 Ferries

There are three ferry terminals that provide ferry services to the Auckland CBD; these are Bayswater, Stanley Bay and Devonport. The frequency of ferry services is highest from the Devonport Ferry

terminal in both the weekend and peak periods. Ferry services to and from Stanley Bay Terminal only operate in the peak periods. A summary of the frequencies of public transport options on the Peninsula is displayed in Table 2-4 below.

Table 2-4 Frequency of ferry services on the Peninsula

PT Service	Peak	Off Peak	Weekends
Devonport	15 mins	30 mins	30 mins
Stanley Bay	25 mins	-	-
Bayswater	30 mins	60 mins	2-3 hours

Devonport Ferry has the highest number of services and patronage on the Peninsula. As can be seen in Table 2-5, more than 85% of the total ferry patronage uses the Devonport Ferry Terminal. Stanley Bay accounts for only 4% of ferry movement on the Peninsula which can likely be attributed to its peak-only service operation. Ferry patronage also appears to be influenced by seasonal effects with higher patronage values observed in the warmer months.

Table 2-5 Total ferry patronage for Peninsula ferry services

Sum of Patronage	1/03/2014	1/04/2014	1/05/2014	Grand Total
Bayswater Ferry	20,977.00	17,145.00	20,140.00	58,262.00
Devonport	168,725.00	136,209.00	135,362.00	440,296.00
Stanley Bay	8,482.00	5,589.00	6,457.00	20,528.00

2.2.6 Buses

The corridor forms part of a number of existing public and school bus routes. The corridor has a frequent number of bus stops along its length however a number of these are for school bus services only. The bus stop facilities along the corridor are a mixture of old and new shelters and indented and kerbside stopping bays. The bus stop spacing along Lake Road is shown in Figure 2-10 however it is important to note that a number of these bus stops are for school buses only.

Figure 2-10 Bus stop locations on Lake Road

All public bus services interchange with a ferry terminal and provide services that connect with an incoming or outgoing ferry service. The frequency of these bus services are shown in Table 2-6 below. The routes for each service are shown in Figure 2-11 Public Transport Service Diagram.

Table 2-6 Frequency of bus services on the Peninsula

PT Service	Peak	Off Peak	Weekends
802X	30 mins	-	-
803	60 mins	60 mins	60 mins
804	60 mins	60 mins	60 mins
813	15 mins	30 mins	30 mins
815	25 mins	-	-
779	30 mins	-	-

As noted from the table above, there is no 779 bus service operating off-peak from the Stanley Bay Terminal and hence no off-peak bus route servicing the area west of Devonport.

Figure 2-11 Public Transport Service Diagram (Source: AT.co.nz)

The 802X is the only bus service that travels into the Auckland CBD. Patronage information shows that approximately 1,700 people a month, (80 people per weekday) board the 802X in the evening peak from the CBD to the Peninsula. The largest patronage boardings for this service in the morning peak occur at bus stops at 1 and 59 Northboro Road and 373 Lake Road with 542, 503 and 337 boardings respectively observed in the month of May 2014.

The bus stops on Lake Road that have the highest number of public bus boardings are located at Belmont shops, 152 and 163 Lake Road. The northbound stop (163 Lake Road) has almost 2,000 boardings a month and the southbound stop (152 Lake Road) has almost 1,500 boardings a month. The next highest number of boardings occurs at 257 Lake Road, opposite Takapuna Grammar School. This bus stop has approximately 900 boardings for public bus services a month; however it is also utilised by school bus services, resulting in an additional 2,000 boardings per month. The Lake Road southbound bus stop outside Takapuna Grammar School has approximately 2,600 school bus service boardings a month, corresponding to approximately 120 students per weekday.

The highest volumes of alightings from public bus services on the Peninsula are at the Takapuna Bus Station Platform 2 with over 4,000 alightings per month and at the Devonport Ferry Terminal with approximately 2,600 alightings per month.

School buses serve a number of schools within the Peninsula as well as onto the Takapuna and Westlake Schools area a summary of these routes are provided in the table below. Many of these services are focused on providing access to Takapuna Grammar and Belmont Intermediate as well as schools north of the Peninsula. There are no school bus services for Stanley Bay Primary, Devonport Primary and Hauraki Primary.

Table 2-7 School Bus Services (Source: AT.co.nz)

Bus route number	am/pm	Route description
017	am	Devonport Library, King Edward, Vauxhall, Hamana, Seacliffe, Williamson, Lake Rd, (Bayswater Primary, Belmont Primary, Belmont Intermediate, Takapuna Grammar), Takapuna, Westlake Schools
017	am	Bayswater Ave, Lake Road, (Belmont Intermediate, Takapuna Grammar), Takapuna, Westlake Schools
080	am	Devonport Ferry Terminal, Victoria, Albert, Vauxhall (Vauxhall Primary), Hamana, Seacliffe, Williamson, Lake Rd, Winscombe (Belmont Intermediate, Takapuna Grammar)
081	am	Stanley Bay Park, Calliope, Victoria, Albert, Lake Rd, Winscombe (Belmont Intermediate, Takapuna Grammar)
082	am	Stanley Bay Park, Calliope, Victoria, Albert, Lake Rd, Winscombe (Belmont Intermediate, Takapuna Grammar)
083	am	Devonport Ferry Terminal, King Edward, Cheltenham, Tainui, Vauxhall (Vauxhall Primary), Hamana, Seacliffe, Williamson, Lake Rd, Winscombe (Belmont Intermediate, Takapuna Grammar)
087	am	Stanley Bay Park, Calliope, Victoria, Albert, Vauxhall, Old Lake Rd (Takapuna Grammar), Lake Rd, Takapuna, Westlake Schools
017	pm	Takapuna Schools, Lake Road (Takapuna Grammar), Bayswater to roundabout and back again, Winscombe, Seacliffe, Hamana, Vauxhall, King Edward, Victoria, Devonport Ferry Terminal
080	pm	Lake Rd (Takapuna Grammar), Winscombe, Seacliffe, Hamana, Vauxhall, Albert, Victoria, Devonport Ferry Terminal
081	pm	Winscombe (Belmont Intermediate), Seacliffe, Williamson, Lake Rd, Albert, Victoria, Calliope, Stanley Bay
082	pm	Lake Rd (Takapuna Grammar), Albert, Victoria, Calliope, Stanley Bay
083	pm	Lake Rd (Takapuna Grammar), Winscombe, Seacliffe, Hamana, Vauxhall, Tainui, Cheltenham, King Edward, Devonport Library
084	pm	Winscombe (Belmont Intermediate), Seacliffe, Hamana, Vauxhall (Vauxhall Primary), Tainui, Cheltenham, King Edward, Vauxhall, Albert, Victoria, Devonport Ferry Terminal
087	pm	Takapuna Schools, Lake Road (Takapuna Grammar),Old Lake Rd, Vauxhall, Albert, Victoria, Calliope, Stanley Bay and back again, Victoria, Devonport Ferry Terminal
089	pm	Lake Rd (Takapuna Grammar), Albert, Victoria, Devonport Ferry Terminal

2.2.7 General Traffic

The existing Lake Road cross-section consists of a single lane in each direction. There is a central median and turning bays along most of the corridor except around Hauraki corner, Belmont shops and towards the Albert Road Roundabout. The northern section between Esmonde Road and Jutland Road is the exception to this with two lanes in each direction.

Traffic counts, collected in June 2014, at intersections along Lake Road show that the traffic flows are relatively equal in both directions during both peak periods and in the weekend. These traffic counts showed weekday and weekend peak flows of approximately 1,000 vehicles per two-hour in each direction at the Albert Road end of Lake Road, increasing to 2,500 vehicles per two-hour in each direction towards Esmonde Road. Unlike typical arterial roads, the weekend two-hour peak was observed to have a higher traffic volume than the weekday peak increasing to almost 3,000 vehicles in two hours, in each direction between Esmonde and Jutland Roads. This partly reflects the importance of the peninsula as a recreational and events area.

As shown in Figure 2-14, the Average Annual Daily Traffic (AADT) is between 20,000 and 30,000 vehicles per day. The most significant turning movements along Lake Road include the left turn from Albert Road northbound onto Lake Road. This movement is made by an excess of 500 vehicles in the morning two-hour peak, 1,500 in the evening two-hour peak and 1,000 in the weekend two-hour peak. Other significant movements include left turns onto Lake Road from Jutland Road and Bayswater Avenue and right turning onto Lake Road from Winscombe Street.

The weekday northbound and southbound flows along Lake Road at the Jutland Road intersection remain relatively consistant throughout the day with a difference of no more than 600 vehicles in each direction, Figure 2-13.

The weekday northbound and southbound flows at the southern end of Lake Road are much lower than those in the northen section described above. The flows along this section are approximately half those observed at the Jutland Road intersection. There is a prominent southbound peak around 8:00, Figure 2-12, which may be a result of people travelling south to the Devonport Ferry Terminal. There is also a peak in northbound traffic between 16:00 and 17:00. The flows remain stable and approximately equal throughout the rest of the day.

Figure 2-13 North and south-bound flows at the northern end of Lake Road

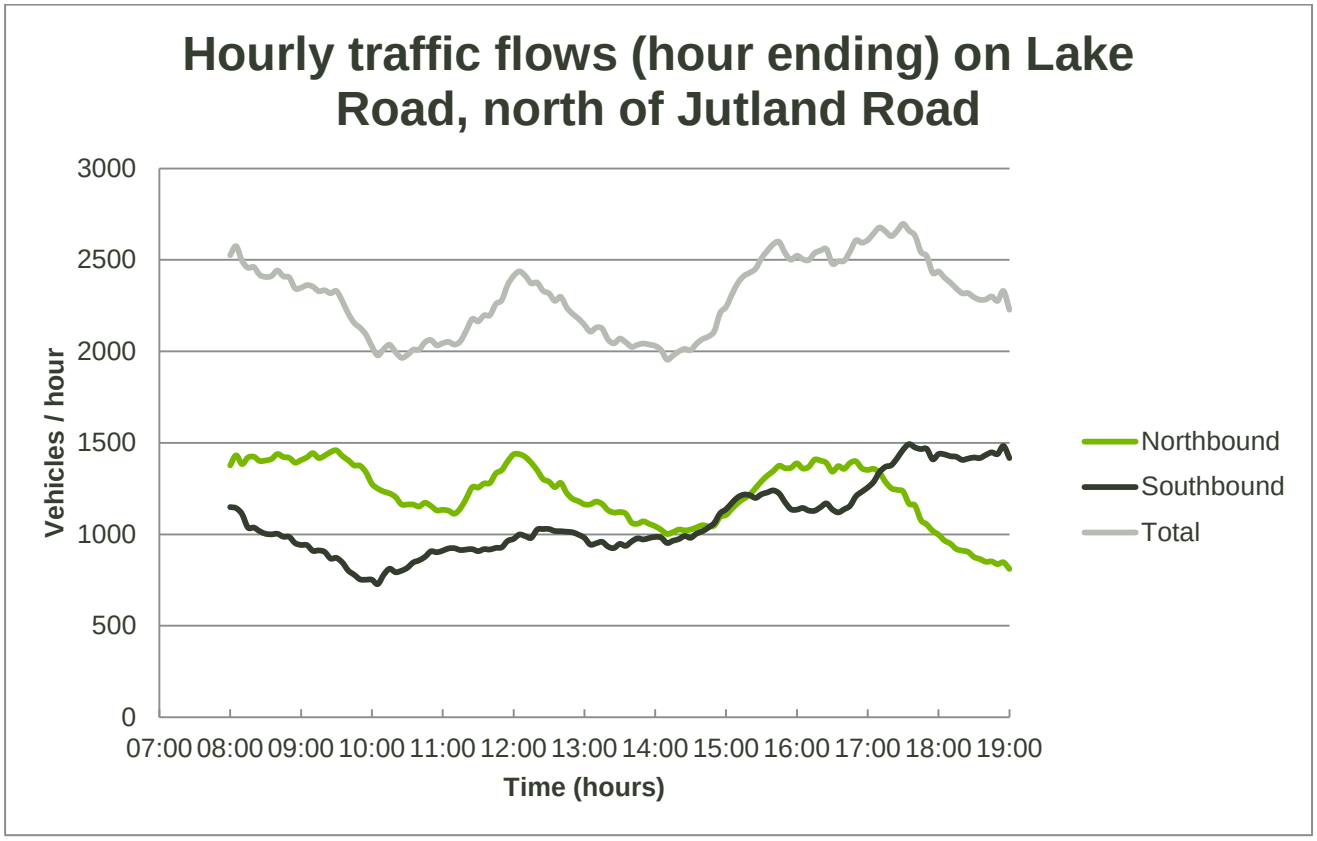


Figure 2-12 North and south-bound flows at the southern end of Lake Road

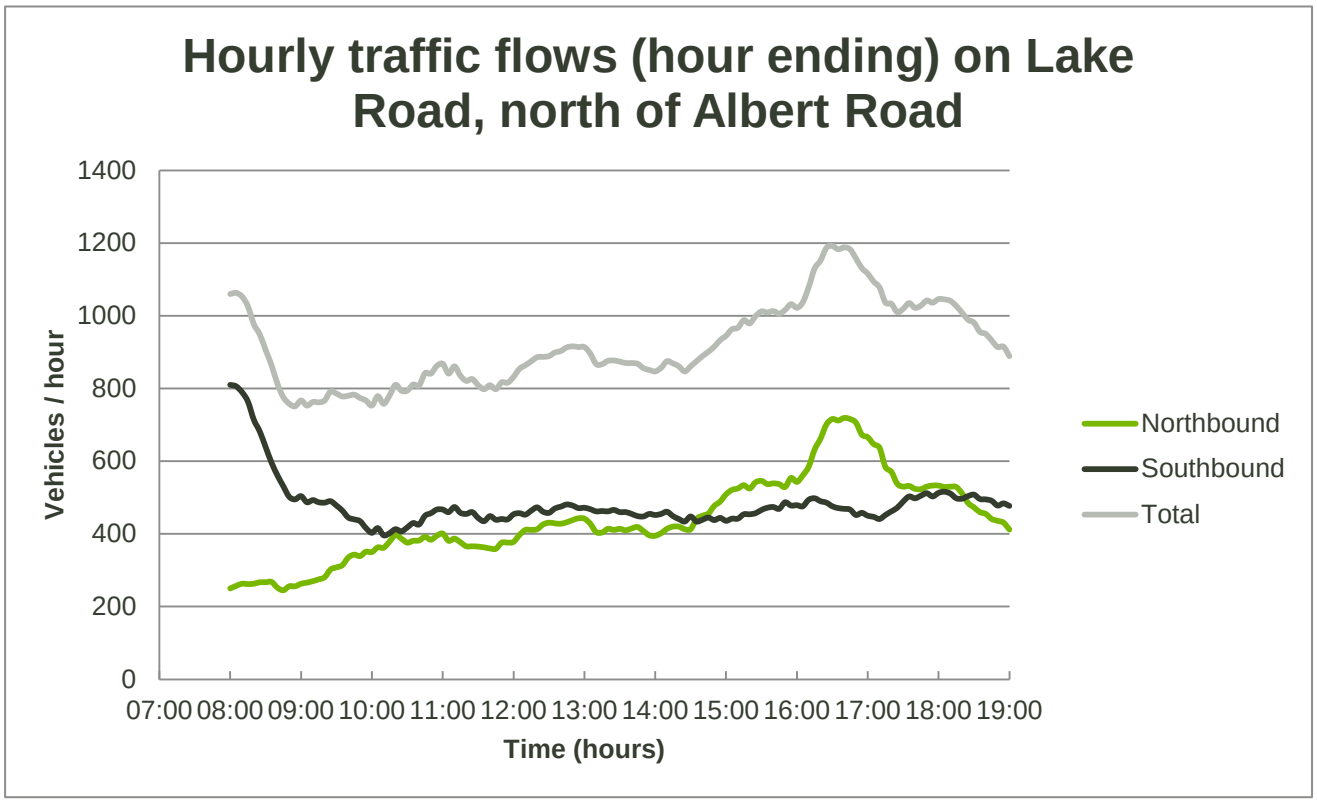
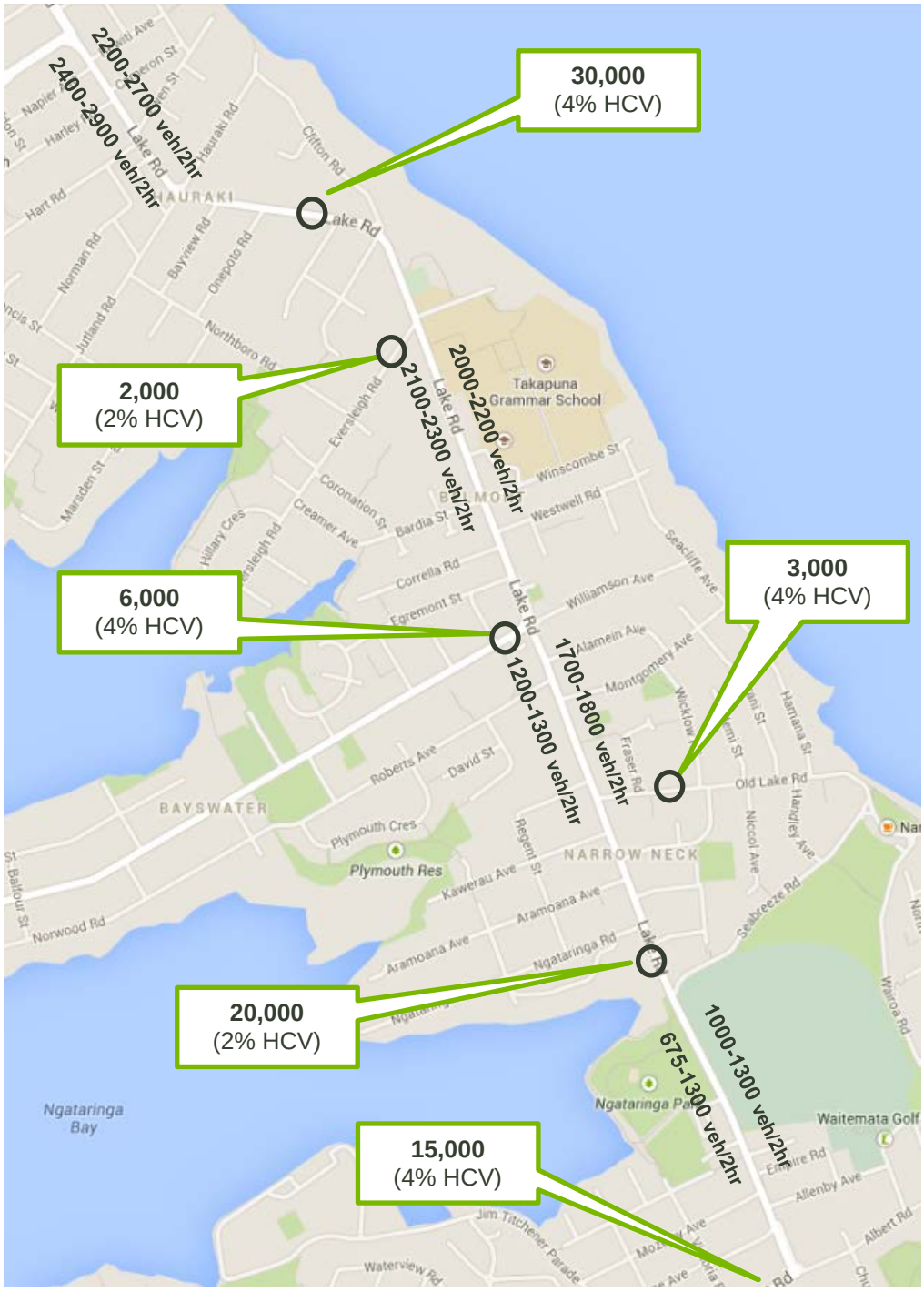
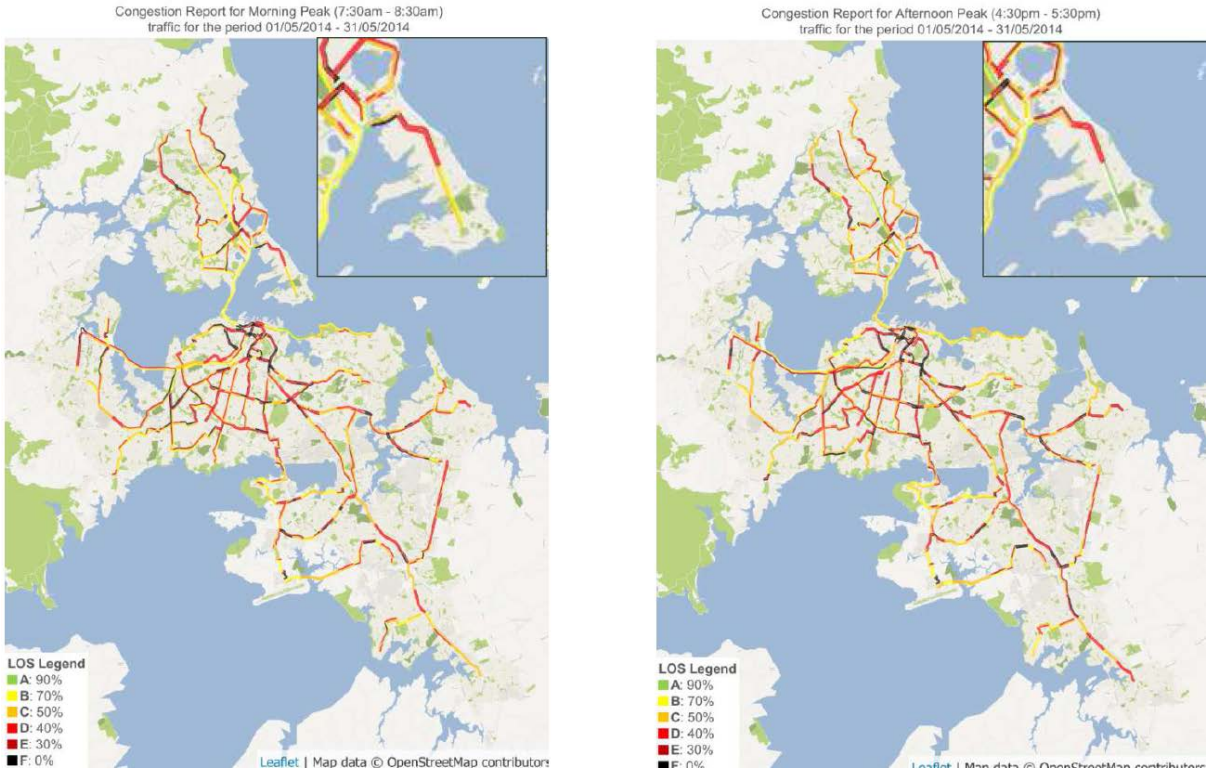


Figure 2-14 5-Day AADT and peak period Flows in both directions



The following congestion maps in Figure 2-15 show the relative congestion along the corridor compared with the rest of the Auckland road network. It is evident that the northern half of Lake Road experiences even congestion in both directions in the peaks. The southern half of Lake Road, from Bayswater Avenue, experiences lower congestion in the morning peak and essentially none in the evening peak. Esmonde Road, running perpendicular to Lake Road in the north, experiences more tidal congestion with a severe reduction in level of service travelling west in the morning peak and east, towards Lake Road, in the evening peak.

Figure 2-15 Peak period congestion maps



2.2.8 Parking

There is limited car parking provided along Lake Road compared with other similar corridors. The three locations that provide parking are: outside Takapuna Grammar School, at Belmont Town Centre and along Memorial Drive. The highest parking demand occurs at Belmont shops. The other two sections are under-utilised except for weekend sport in some instances.

The Belmont Town Centre car park is accessed by a service lane that operates in one direction with entry from the eastern side of Lake Road and exit onto Williamson Avenue and provides 24 parking spaces in total; 18 P120 angle parks, 4 P10 parallel parks and one mobility space. These restrictions operate 8:00 to 18:00 Monday to Sunday.

From parking surveys it was observed that parking demand peaks around midday, aside from another 15 minute peak around 15:00, shown in Figure 2-16. During the weekend, parking demand was generally higher and remained relatively stable between 11:00 and 13:00. Over 50% of the weekday and weekend vehicles were parked for less than 15 minutes.

The on-street parallel parking provided on the western side of Lake Road at Belmont shops has a total of 11 spaces which are P60 8:00 to 18:00 Monday to Sunday. It was observed that there was no discernible peak during the weekday period, shown in Figure 2-17, with demand regularly exceeding the capacity and a number of vehicles parking illegally during this period. During the weekend the demands were generally sustained within the capacity. 55% of vehicles were parked for less than 15 minutes during the weekday and 90% of vehicles parked for less than 15 minutes in the weekend.

Figure 2-16 Belmont Town Centre car park utilisation (Source: Intersection analysis, June 2014, Flow)

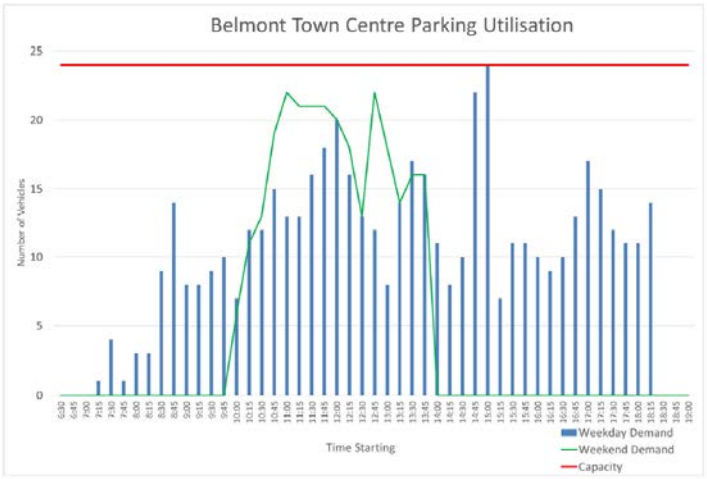
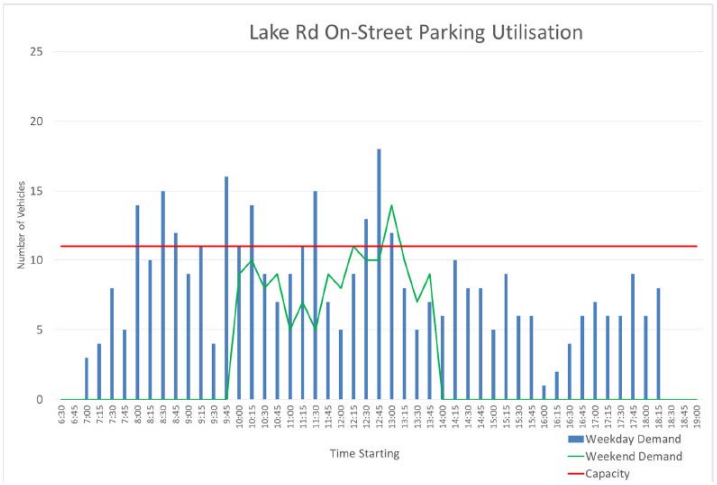
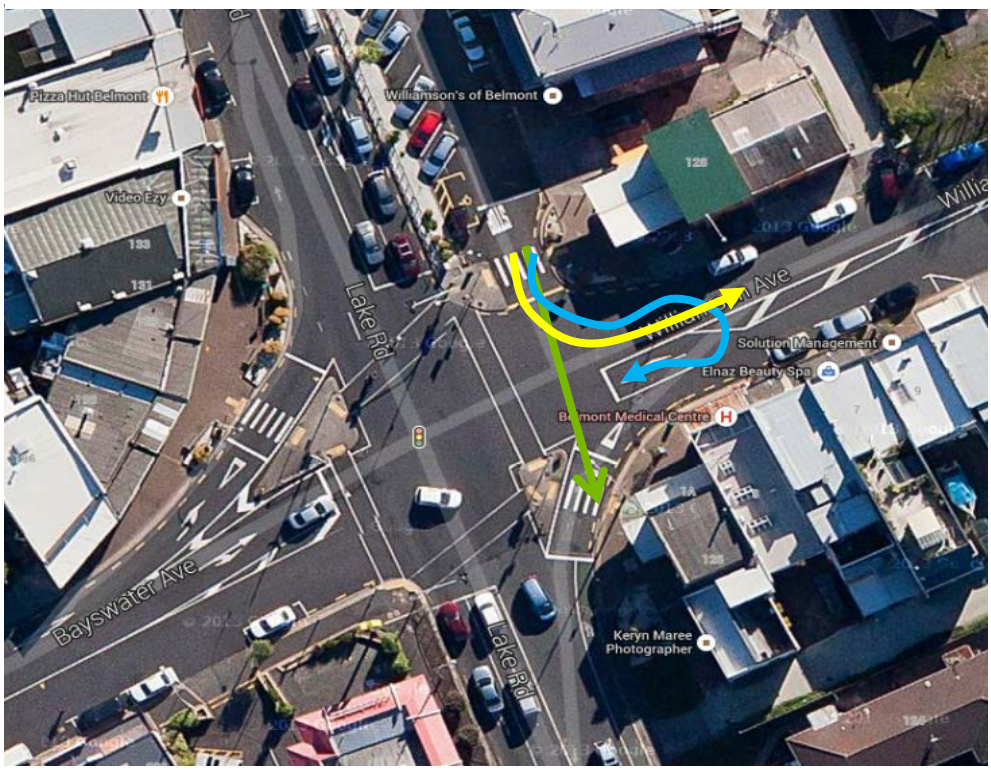


Figure 2-17 Lake Road on-street parking utilisation (Source: Intersection survey, June 2014, Flow)



It was observed during the weekday that when cars exit the Belmont Town Centre service lane, 60% turn left onto Williamson Avenue (yellow line in Figure 2-18), 37% head southwards onto Lake Road (green line) and 16 vehicles (1%) manoeuvre almost 270 degrees (blue line) at the intersection of Williamson Avenue/Bayswater Avenue/Lake Road and turn right and travel northbound on Lake Road or straight through onto Bayswater Avenue. Buses were also observed to make the straight-through movement to head south-bound on Lake Road.

Figure 2-18 Belmont Town Centre car park intersection movements



2.2.9 Freight

There is no freight specific infrastructure along the corridor. The nature of the land-use types and employment on the Peninsula does not generate a high demand for freight vehicles. As shown in Figure 2-14, there are low volumes of heavy commercial vehicles (HCV's) at less than 5% of the total traffic. The volume of HCV's that do occur, can most likely be attributed to those servicing the supermarkets, restaurants and shops within the Peninsula.

Lake Road forms part of the NZTA's oversized vehicle route along the whole corridor. There is no alternative oversized vehicle route on the Peninsula.

2.3 Road Safety

The road safety record in the Lake Road area was investigated by undertaking a search of the New Zealand Transport Agency's Crash Analysis (CAS) for the most recent complete five year period from 2009 to 2013. This search comprised of Lake Road and the connecting intersections.

Across the search area for this period there have been 222 reported crashes with no fatalities. There have been 8 serious injury accidents including three involving motorcycles, one involving a cyclist and one involving a pedestrian. There have also been 71 minor injury accidents.

There have been a high number of rear-end type crashes, the most common accident type. The highest concentration of these, 31%, occurred along the short stretch of Lake Road between Eversleigh Road and Bardia Street outside the school zone. These were a result of the cars following too closely. There were comparatively fewer reported rear-end type accidents between Esmonde Road and Jutland Road despite being the most heavily trafficked and congested section of Lake Road.

The most concentrated crash areas were mid-block type crashes between Eversleigh Road and Bardia Street and between Bayswater Avenue and Old Lake Road.

There have been five crashes involving pedestrians, from which only two resulted in minor injuries. There have also been 23 accidents involving cyclists. These were most commonly a result of cars turning right and failing to see an oncoming cyclist or cyclists being sideswiped.

3 Future Changes

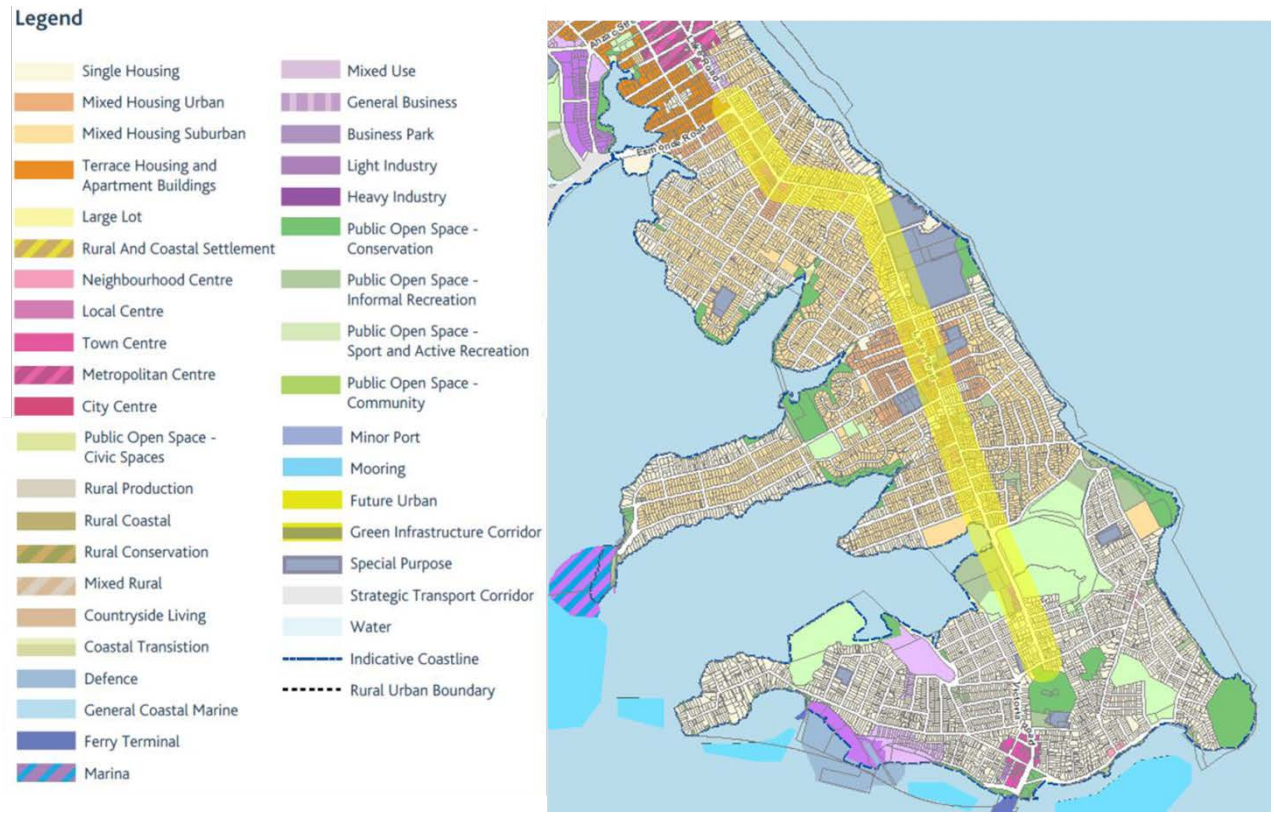
3.1 Proposed Auckland Unitary Plan

The proposed unitary plan provides for some further development opportunity in relation to existing residential zones on the Devonport peninsula. It is considered that taken as a whole, the level of intensification and land use change is considered modest and incremental.

The southern third of the peninsula around Devonport, Stanley Point and Cheltenham is largely Single Housing zone recognising its heritage status. Belmont, Bayswater and Hauraki are a mix of Single Housing along the coastal edge and Mixed Housing Suburban with a concentration of the slightly higher density Mixed Housing Urban around the Belmont neighbourhood centre and behind the Hauraki shops to the west of Lake Road.

The proposed unitary plan does provide for significant upzoning and development potential in the wider Takapuna area to the north of the study area. This includes Terrace Housing and Apartment Buildings between Esmonde Road and the metropolitan centre which have an interrelationship with the Devonport peninsula including transport network considerations as they relate to the role and function of Esmonde Road which is a vital access link for the peninsula.

Figure 3-1 Proposed Unitary Plan zoning for Devonport Peninsula



3.2 Devonport – Takapuna Area Plan (Draft)

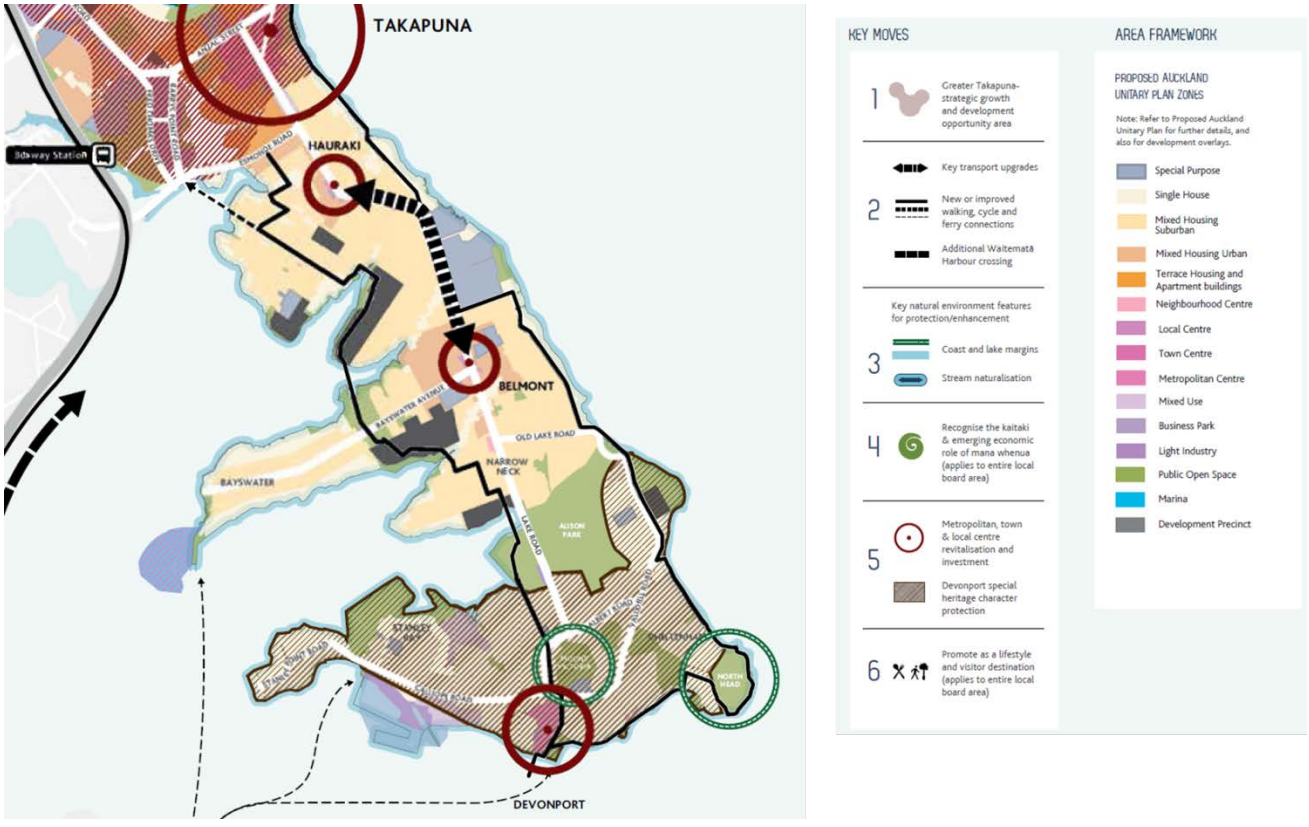
Auckland Council and the Devonport-Takapuna Local Board have prepared a draft area plan for the local board area. The area plan shows how the area may change over the next 30 years and contribute to making Auckland the world's most liveable city. The plan is guided by the Auckland Plan and will help implement it at a local level.

From a land use change perspective, the plan identifies that incremental change is likely from the status quo, given the predominantly heritage residential zoning of the southern end of the peninsula around Devonport, Stanley Point and Cheltenham, and the continuation of suburban residential zoning across much of the rest of the peninsula. The most significant development opportunity is the redevelopment of existing Navy-owned land by Ngati Whatua for residential purposes. This is a significant opportunity that will be progressively realised over the medium to long term.

The area plan also highlights the role of the Belmont and Hauraki neighbourhood centres and that a transport upgrade along Lake Road between these centres is a transport priority. New and improvement walking and cycle connections are also identified along the coastal edges of the peninsula, including a potential new bridge connection between Francis Street and Esmonde Road.

The area plan also highlights the significant potential for widespread change across the wider Takapuna area encompassing both the metropolitan centre and the adjoining areas of Shakespeare-Taharoto, Akoranga and Smales Farm up to the northern motorway. More intensive development in these locations will impact upon the transport connections in and out of the Devonport peninsula, particularly at Esmonde Road.

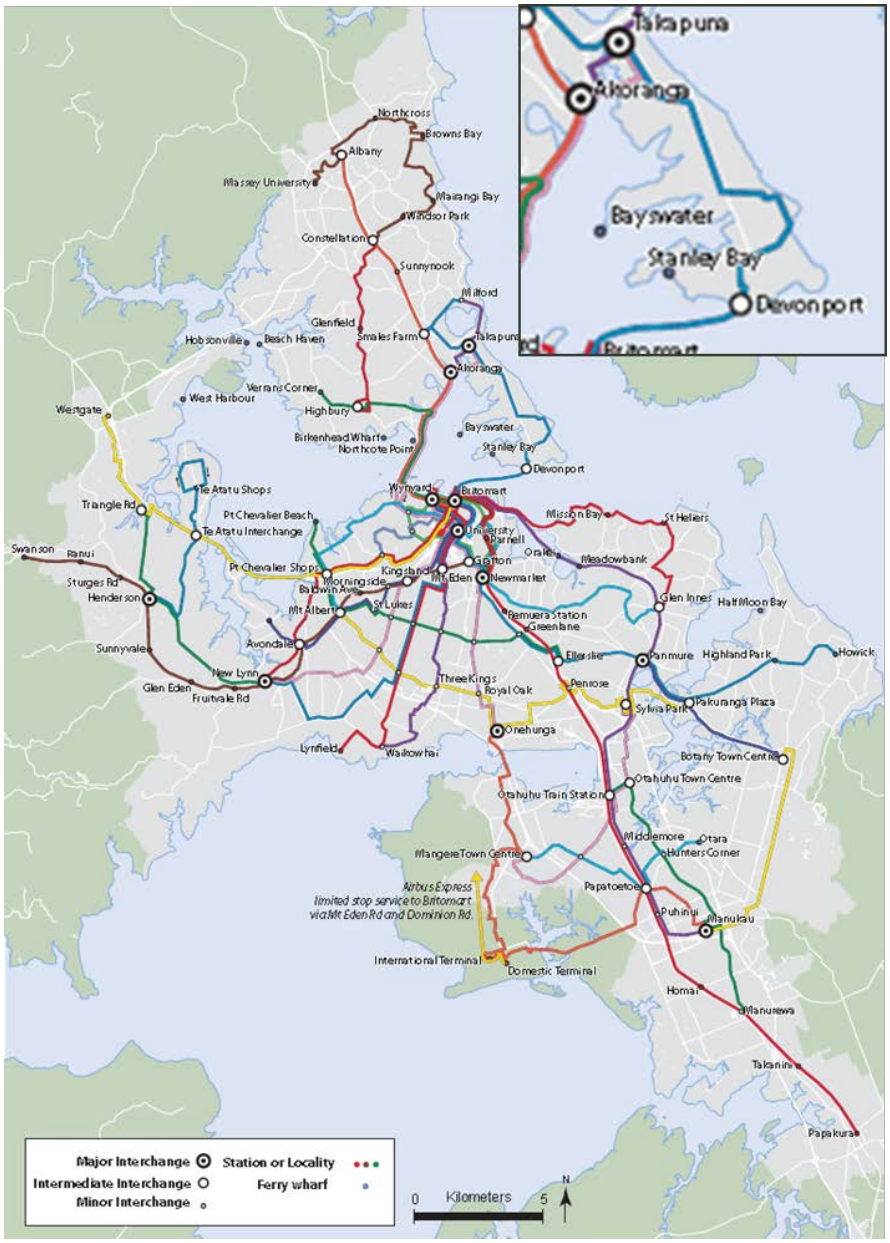
Figure 3-2 Key Moves, Devonport – Takapuna Area Plan (Draft)



3.3 Regional Public Transport Plan

The Regional Public Transport Plan (RPTP) describes the public transport services that Auckland Transport proposes for the region over the next 10 years. In particular, it will introduce a new, simpler and better-connected public transport network, based around a frequent route network. The frequent route network is shown below.

Figure 3-3 Proposed Frequent Bus Network



As shown Lake Road to the north of Old Lake Road will cater for a frequent service between Milford and Devonport (via Takapuna). It will also connect with the Devonport ferry service, which will also be a frequent route. This frequent status means these routes will operate at least every 15 minutes between 7am and 7pm, seven days a week.

In comparison to the existing service, this means as a minimum an increased frequency during off-peak periods and weekends (which is currently 30 minutes during these times). In addition, the improvements achieved elsewhere in the network will also provide additional opportunity to access other destinations across Auckland.

The northern part of the Auckland bus network (including the study area) will undergo consultation during 2014/ 2015, with implementation scheduled for 2015.

3.4 Devonport Ferry Upgrade

The Devonport Ferry Terminal is undergoing an upgrade to improve the wharf and terminal facilities, which is programmed for completion in 2015.

This upgrade will increase the number of bus stops from three to four, provide additional scooter and cycle parking spaces and reduce the number of long-term car parks. The planned upgrade is shown visually below.

Figure 3-4 Devonport Ferry Upgrade

This upgrade will provide improved facilities and amenity for users, and would be expected to result in its increased use. In addition, the increased support for active and public transport connections, and reduced car parking should see a change in the type of multi-modal trips by ferry users. Car pooling priority spaces will be provided along with additional scooter and cycle parking. These changes will clearly have implications and provide opportunities for change in terms of the use of Lake Road.

3.5 Auckland Cycle Network

The Auckland Cycle Network (ACN) is a layer within the One Network approach described within the ITP. It shows current and proposed new cycle routes throughout the region. The future network is shown below.

Figure 3-5 Future cycle network

A shown, the whole extent of Lake Road is identified as a Cycle Connector route, suggesting a priority exceeded only by the cycle metro network. Lake Road also connects with Bayswater Avenue, which is also a cycle connector, as well as a number of cycle feeder routes.

3.6 Takapuna Centre Based Transport Study

The Takapuna Centre Based Transport Study, completed in March 2014, was tasked with assessing the future transport demands for the Takapuna area and the strategy and projects required to respond to these demands.

Included in the recommendations of this study are a number that are relevant to the Lake Road study area, including:

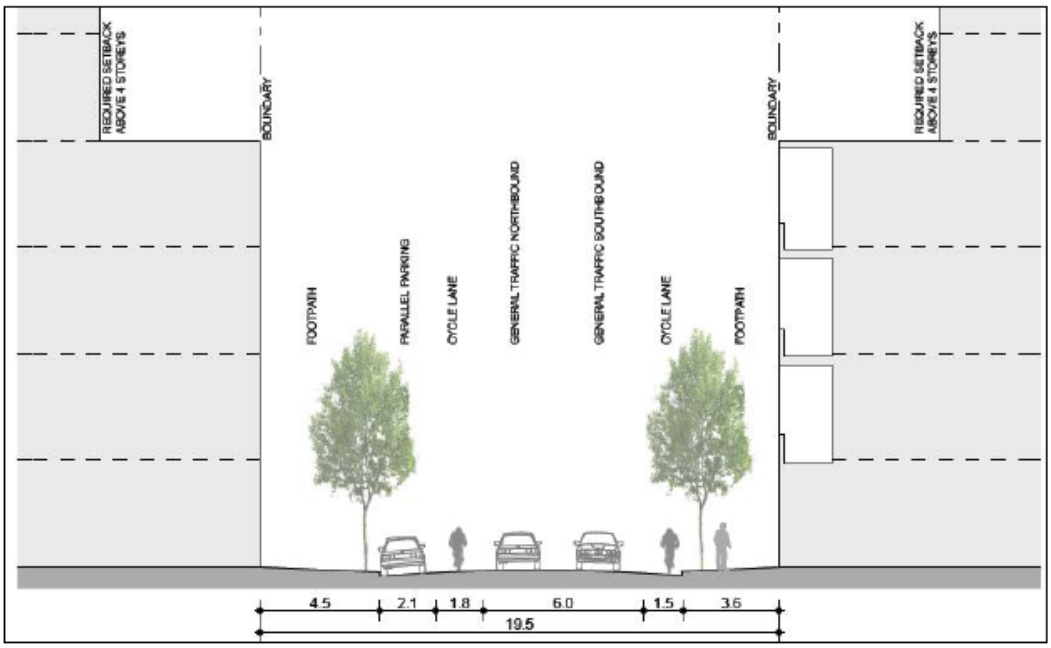
- Greater emphasis must be given to public transport to enable Takapuna to meet its strategic objectives as a successful, dynamic Metropolitan Centre.
- Parking management is required with an element of parking restraint to be introduced over time, sufficient to discourage some commuters from driving to work, but flexible enough to continue to attract shoppers, visitors and essential business trips.
- Road capacity should generally be retained on the main routes to and from Takapuna, to provide a satisfactory level of service for most of the day, accepting that congestion can be expected in the peak periods

The study also recommends three longer term' transformational projects' for the area, two of which have particular implications for public transport using the Lake Road study area. These comprise of a new (relocated) bus station in central Takapuna, as well as a new Upper Shoal Bay link which would connect the new Takapuna bus station more directly with the Northern Busway via Aorangi Station. The collective concept for public transport is shown below.

Figure 3-6 Recommended Public Transport Solution (Source: (Source: Takapuna Centre Based Transport Study)

Finally, the centre based transport study also proposes cycle lanes for Lake Road to the north of Esmonde Road, to be implemented in the medium term. Cross section and plan drawings for the proposed treatments are shown below.

Figure 3-7 Proposed Lake Road Cross Section, North of Esmonde Road (Source: Takapuna Centre Based Transport Study)



How to appropriately integrate of these cycle facilities with the provisions for the Lake Road to the south of Esmonde Road will be considered through the CMP process.

Appendix C
Stakeholder meeting minutes

Aurecon New Zealand Limited
Level 4, 139 Carlton Gore Road
Newmarket Auckland 1023
PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
F +64 9 524 7815
E auckland@aurecongroup.com
W aurecongroup.com

Meeting Record

Project number	**243329**	Meeting date	**25 August 2014**
Project name	**Lake Road Corridor Management Plan**	Recorded by	**C Kenworthy**
Meeting/subject	**Technical Stakeholder Meeting #1 – Strategy/ Planning/Urban Design/Heritage/Stormwater**	Total pages	**2**

Present	Apology	Name	Organisation
☒	☐	Jennifer Estong	Auckland Transport
☒	☐	Alastair Lovell	Auckland Transport
☒	☐	Andrew Smith	Auckland Council
☒	☐	Ross Moffatt	Auckland Council
☒	☐	Catherine Edmeades	Auckland Council
☒	☐	Andy Irwin	Auckland Transport
☒	☐	Brittany Morgan	Auckland Transport
☒	☐	Weiwei Jiang	Auckland Transport
☒	☐	Jackie Zhou	Auckland Council
☒	☐	John Stenburg	Auckland Council
☒	☐	KC Lee	Auckland Transport
☒	☐	David Croft	NZ Transport Agency
☒	☐	Stuart Houghton	Boffa Miskell
☒	☐	Craig Mitchell	Aurecon
☒	☐	Cassandra Kenworthy	Aurecon

Item	Topic	Action by
1.0	**Current Projects**	
1.1	Devonport Warf / Marine Square & Boardwalk Upgrade • Increases bus bays to 4 (from 3) to allow a bus circuit • Marine Square construction – finished Dec -early Jan 2015.	
1.1	No capex spend programmed at Hauraki or Belmont.	
1.2	Upgrade of Lake Rd from Anzac Ave to Byron Ave ($3.4m) • 2018 but may be pushed out (budget constraints) • Improving pedestrian outcomes • Relocating bus stops/ new Takapuna Bus Station	
2.0	**New Developments**	
2.1	• Progressive may want to enlarge Countdown on Hauraki Corner • Residential development/housing proposal on the Western end of the Bayswater Marina	
2.2	Auckland Council Property Limited looking at site opposite the golf course for development • Feasibility study has been undertaken • Unlikely that 27 Lake Rd would become a supermarket (Unitary Plan zoning is one factor in this)	

Item	Topic	Action by
2.3	Navy will vacate some sites in the 5+ year horizon. Potential residential intensification implications.	
3.0	**Takapuna-Devonport Area Plan Draft**	
3.1	• 30 year spatial plan • Emphasis on Takapuna and to the west. • Devonport –town centre but not growth centre • Belmont – pace aspirations as well as growth • Draft will be finalised in October. • Vauxhall Road – Navy have approximately 14-15 years of occupation and right of renewal. • Underlying zoning o Single house zoning o Height restrictions (viewshafts) • Some parties at Belmont concerned about what's happened at Hauraki. o Park area is a result of spare land from widening o Needs to be activated by shop frontages • Hauraki and Belmont have a sleeve of mixed housing / urban around both centres • Additional Harbour Crossing (game changing for area) • RM to provide the draft Area Plan engagement feedback	RM
4.0	**CMP Community Engagement**	
4.1	• Bayswater Community Committee • Belmont / Hauraki Community Association • Devonport Heritage Group • Other interest groups – Cycle Action Auckland • Auckland 2040 group – opposed to UP proposed intensification There is an expectation from community that they are engaged in the CMP.	
5.0	**Cycle lanes**	
5.1	Cycle lanes still under scrutiny • Views of some are that these have made no difference to congestion • Only reduced capacity by 1 lane at the Winscombe St/ Lake Rd intersection	
6.0	**Capacity for Growth Study** - Christine Perrins to provide a copy	JE
7.0	**Stormwater**	
7.1	Little work has been done on catchment planning in the area	
7.2	Issues/solutions supplied to CMP in 2-3 months including: • Overland flow-path issues • Coastal inundation (100 year plan for infrastructure) • Impacts on any improvements from surrounding improvements • Treatment of road stormwater o Which catchment does each cross section drain in to Will not propose cross-sections as they require economic input	
8.0	**NZ Transport Agency**	
8.1	• Need to be aware of performance guidelines/measures and monitoring • All roads in NZ to use this system • Feeds into the Strategic Business Case (CMP will help form)	
9.0	**Events**	
9.1	Regular and Increasing number of events in Devonport putting pressure on area, particularly during the weekend.	

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PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
F +64 9 524 7815
E auckland@aurecongroup.com
W aurecongroup.com

Meeting Record

Project number	**243329**	Meeting date	**25 August 2014**
Project name	**Lake Road Corridor Management Plan**	Recorded by	**C Kenworthy**
Meeting/subject	**Technical Stakeholder Meeting #2 – Public Transport/Parking/Road Corridor Operations**	Total pages	**2**

Present	Apology	Name	Organisation
☒	☐	Jennifer Estong	Auckland Transport
☒	☐	Shweta Rattan	Auckland Transport
☒	☐	Trevor Clark	Auckland Transport
☒	☐	Robert Inman	Auckland Transport
☒	☐	Craig Mitchell	Aurecon
☒	☐	Cassandra Kenworthy	Aurecon

Item	Topic	Action by
1.0	**Parking**	
1.1	• Draft Parking Strategy feedback period is now closed. This feedback is currently being analysed/ reviewed. • Presented to ELT next month (September) • Parking should support the function of Lake Road as an Arterial	
1.2	Existing parking • No reason for parking outside the school to be there • No reason for parking near golf course – could be removed , no demand for it. • Only contentious parking area is around the intersection of Lake / Williamson Ave & Belmont Shops. Neighbouring roads have some P120/P60 at the heads of the roads to some retail shops. • Parking strategy around Belmont may need to be developed showing alternatives if all parking on Lake Road was stripped out • Reduced parking at Devonport Ferry Terminal	
1.3	Navy have a substantial number of people who don't park on site.	
2.0	**Public Transport**	
2.1	• Increased up to at least every 15mins on the frequent route (currently 30min off peak) • Northern New Network into consultation early next year • Existing services often delayed due to congestion. • Stanley Bay upgrade (increased storage for cyclists)	
2.2	• SR to provide public transport patronage data	SR

3.0	**Road Corridor Operations**	
3.1	Plans to widen from Jutland – Bayswater Road. • Initiated an investigation to alternatives to widening • Potential for transit lanes and general traffic lanes within the road width with separate cycle path	
3.2	May warrant consideration of tidal flow lanes	
3.3	Looking into changing the parking entrance to New World (slowing speeds)	

Aurecon New Zealand Limited
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PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
F +64 9 524 7815
E auckland@aurecongroup.com
W aurecongroup.com

Meeting Record

Project number	**243329**	Meeting date	**26 August 2014**
Project name	**Lake Road Corridor Management Plan**	Recorded by	**C Kenworthy**
Meeting/subject	**Technical Stakeholder Meeting #3 – Walking and Cycling/Community Transport**	Total pages	**2**

Present	Apology	Name	Organisation
☒	☐	Jennifer Estong	Auckland Transport
☒	☐	Claire Macky	Auckland Transport
☒	☐	Nicola Maire	Auckland Transport
☒	☐	Martin Dickson	Auckland Transport
☒	☐	Alison Johns	Auckland Transport
☒	☐	Helen Whittal	Auckland Transport
☒	☐	Brian Horspool	Auckland Transport
☒	☐	Jude Tabuteau	Auckland Transport
☒	☐	David Tuson	Auckland Transport
☒	☐	Ben Clark	Boffa Miskell
☒	☐	Stuart Houghton	Boffa Miskell
☒	☐	Craig Mitchell	Aurecon
☒	☐	Cassandra Kenworthy	Aurecon

Item	Topic	Action by
1.0	**Schools**	

1.1	• All are Travelwise schools with safe school travel plans
	• Engineering measures in or around Lake Road to reflect this
	• Belmont Intermediate - 27-29% cycle to school
	  o Encourage safe culture
	  o Safe routes (help feeder schools)
	• Travelwise plans updated quarterly
	• Surveys can provide history of modal split. Potential to get trip origin / destination maps from last year's data
		AJ

1.2	Traction of Walking School Buses depends on parents' availability to run them.	
2.0	**Cycling**	
2.1	• Gaps in the cycle lanes in some points along Lake Road • School children tend to stay on footpaths and some shared paths • BH to provide data on cycle counts along Lake Road • AADT = 500 cyclists • Conflict between elderly residents and cyclists using footpaths	BH
2.2	• Investigation should include physical separation to improve safety • Shared path capacity considerations for cyclists and pedestrians	
2.3	Green Route • A green route connecting Takapuna & Devonport • Proposed Francis St Bridge – planning with Local Board	

Item	Topic	Action by
3.0	**Travel Surveys**	
3.1	Takapuna Beach Business Association on 400 employers	
3.2	Navy travel survey undertaken • 4.00pm leaving work – general community awareness to avoid travel at this time. • To be provided to CMP study team if possible.	
4.0	**Events in Takapuna / Devonport**	
4.1	• Food & Wine Festival • Weetbix Kiwi kids Triathlon • Runs – Shore to Shore, Coast to Coast, Auckland Marathon • Sculpture Festival • Soccer club	
5.0	**Walking / Pedestrians**	
5.1	Cars accelerating out of 40kph zone across zebra crossing southbound on Albert Street (near Devonport Primary)	
5.2	Bayswater Ave / Williamson Ave intersection • Phasing and crossing issues with students getting across the road • Significant historic issue to the Primary School • Currently Barnes dance (in place for 5-6 years?). Only operates in peak?	
5.3	Winscombe / Lake Road • Not a Barnes Dance - observed behaviour of students (Belmont Intermediate and Takapuna Grammar) “running the gauntlet” • Belmont Intermediate investigating a manned kea crossing further down Winscombe Street. • Cyclists for Belmont Intermediate come from Winscombe Street (some potentially go through the College)	
5.4	Takapuna Grammer School • Eversleigh Road upgraded as part of Takapuna Grammer School travel plan (new pram crossings). • Students park in Eversleigh and Winscombe Streets • Concerns that barriers need to extend further to stop students jay-walking • Signalised crossing at Takapuna Grammar School is a pad activated crossing which can cause long delays for pedestrians • Should consider realignment of Eversleigh Road/ St Leonards Road intersection	
5.7	Request by Belmont School for crossing (currently a pedestrian refuge) to be signalised as you have to walk uphill to safely cross at Belmont Shops.	
6.0	**Traffic Issues**	
6.1	• Safety issue with turning from Esmonde Rd cycle path crossing 2 lanes of traffic to turn into Lake Rd • Issues right turning onto Lake Rd from Soccer Club	

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Newmarket Auckland 1023
PO Box 9762
Newmarket Auckland 1149
New Zealand

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E auckland@aurecongroup.com
W aurecongroup.com

Meeting Record

Project number	**243329**	Meeting date	**26 August 2014**
Project name	**Lake Road Corridor Management Plan**	Recorded by	**CK Kenworthy**
Meeting/subject	**Technical Stakeholder Meeting #4 - Road Corridor Ops / Maintenance / Traffic**	Total pages	**2**

Present	Apology	Name	Organisation
☒	☐	Jennifer Estong	Auckland Transport
☒	☐	Kimdon Nguyen	Auckland Transport
☒	☐	Karthi Govindasamy	Auckland Transport
☒	☐	Sayed Omar	Auckland Transport
☒	☐	Kipi Wllbridge-Paea	Auckland Transport
☒	☐	Len van der Harst	Auckland Transport
☒	☐	Craig Mitchell	Aurecon
☒	☐	Cassandra Kenworthy	Aurecon

Item	Topic	Action by
1.0	**Known issues/ projects**	
1.1	Recent project- Esmonde to Jutland widening	
1.2	Issues with rat running • Have banned some movements. • LB expects the rat-running to be addressed as part of CMP • Napier Avenue seen as having greatest issue with this – residents want the road closed off • Harley residents don't want Napier Avenue closed as it will transfer rat runners to their street.	
1.3	Tidal flow discussions however initial thoughts indicate that there is relatively equal flows in each direction, which may not suit this approach.	
2.0	**Initial investigation** Continuing widening from Jutland to Bayswater but would require land take which presents issues on both sides of the road.	
2.1	Risk Assessment – rating of the road, JE to get from Andrew Bell	JE
3.0	**Intersections**	
	Winscombe Intersection is problematic.	
3.1	Bayswater Intersection – not aware of any known discussions around removal of free left turns.	
3.2	Traffic Signals • review of operations is being undertaken by JTOC (it will exclude physical works recommendations) • Expected review completion by June 2015	

Item	Topic	Action by
4.0	**Road Safety**	
	• Installed speed indicator near Seabreeze Road • Jutland Intersection right turn eastern & northern approaches limit line needs to be pulled back. • Potential for a care crossing to be installed on Winscombe Street outside Belmont Primary.	
5.0	No significant works / major rehabilitation on the maintenance programme.	

Appendix D
Corridor design typologies

Part 1: Arterial Street Design Typologies

1. INTRODUCTION

The proposed arterial street design typology is aimed at producing a design which is appropriate for the arterial function of the route and its primary transport role or roles, while adapting the design according to the appropriate "Place" context applying the particular arterial segment. This is aimed at ensuring that the arterial can meet its primary transport functions, while supporting liveability objectives and adjacent land uses.

2. FUNCTION

Regional and Strategic Arterial Road

- Emphasis on moving people and goods between the major centres of the region safely and efficiently, while also supporting Auckland's liveability objectives.
- Design speed 20-40km/h in town centres, 50-70km/h in urban areas, 60-80km/h in rural areas.
- Transport model projections for design year used to assist in determining number of traffic lanes and intersection design requirements, but not on a predict-and-provide basis.

Also:
District Arterial Road
Collector/Connector Road
Local Street

3. PRIMARY TRANSPORT ROLE & DESIGN IMPLICATIONS

Pedestrians
Pedestrian are expected across the network under all movement functions and accordingly, are part of every arterial street. On a project by project basis, pedestrian movement on an arterial (as opposed to pedestrian concentration) may be reflected more strongly in the place function types which in turn give rise to further pedestrian priority. This is often just as much about getting pedestrians across an arterial or its side streets rather than along the midblock.

Primary Transport Role	Design Implications
Public Transport (QTN route or high demand PT route)	• Bus priority measures including bus lanes, peak period initially then permanent long term. Possible central bus lanes where width allows. • A minimum of two general traffic lanes (one per direction). • Wider footpaths (more pedestrian space) at least at bus stops. • Appropriate bus stop infrastructure. • Bus stop spacing approximately 300-350m with location near pedestrian desire lines where feasible. Bus stops and pedestrian crossing locations integrated as far as practicable. • Consideration of the accessible catchment area approximately 400 m.
Cycling (part of the regional or local cycle network or is a high demand route)	• High quality treatments should be provided suitable to accommodate the anticipated users, recognising the range of skill level for cyclists (children, less confident, confident). • Slow speed environments (<30 km/h) may suit cyclists sharing with general traffic.
Freight (part regional freight network or high demand freight route)	• Provision of freight priority measures where appropriate and feasible. • An emphasis on the efficient movement of general traffic on key freight routes through traffic management measures and route upgrading where appropriate.
General Traffic (traffic movement has highest priority)	• Provision of an appropriate number of mid-block traffic lanes, plus appropriate intersection designs (and locations). • Traffic management measures aimed at moving traffic efficiently along the arterial route.

4. PLACE/ CONTEXT PRIORITISATION OF DESIGN ELEMENTS

For a full explanation of the place / context design typologies refer to Part 2 of this Appendix. Please note typologies are based on arterial - land use tensions and not existing activity types, zones or classifications).

Street Type	Essential elements	Priority elements
Main Street	• Minimum lane requirements (agreed with Council) • Speed management to reduce speeds (desirable operating speed 30-40 km/h) • Narrower carriageway • Wider footpaths/berms • Pedestrian crossings at approx. 100-200m intervals	• High priority • On-street parking (possibly indented) • Appropriate cycle facilities if on an identified cycle route plus cycle parking at key people generating locations • Median (where appropriate) - Solid median to control turning movements, provide shelter for pedestrians, and for landscaping. Flush median to accommodate access and cater for pedestrian refuges. Both improve safety. • Priority • Additional edge amenity/high quality landscaping • Street trees
Mixed Use Street	• Minimum lane requirements (agreed with Council) • Narrower traffic lanes • Wider footpaths/berms • Pedestrian crossing facilities related to desire lines	• High Priority • Wide footpaths • Appropriate cycle facilities along the corridor and cycle parking at key locations • On-street parking • Reduced pedestrian crossing distances (kerb extensions, medians/ refuges) • Medians (where appropriate) • Street trees • Priority • Service lanes • Landscaped medians
Living	• Minimum lane requirements (agreed with Council) • Sufficient width footpaths/ berms for pedestrian needs and to provide separation between land uses and traffic • Pedestrian crossing facilities related to desire lines and near schools	• High Priority • Wide footpaths • Traffic signal controlled pedestrian crossings or zebra-type crossings on 2-lane routes or pedestrian refuges depending on circumstances • Flush medians to accommodate traffic turning into or out of driveways • Berms to separate pedestrians from traffic • Appropriate cycle facilities • Priority • Solid medians to prevent turning movements into driveways and/or other management measures to restrict direct access onto arterial • Street trees
Industrial Street	• Lane requirements meeting traffic demands to extent practicable • Accommodating freight vehicles swept paths • Wide traffic lanes • Footpaths	• High Priority • Flush medians to facilitate safe access to/from adjacent properties. • Footpath/ berm widening to provide an improved buffer between pedestrians and traffic , and for amenity purpose • Priority • On-street parking to support land uses and separate pedestrians from industrial traffic • High quality landscaping strips • Appropriate cycle facilities
Commercial Street	• Lane requirements meeting traffic demands to extent practicable • Standard traffic lanes • Sufficient width footpaths/ berms for pedestrian needs and to provide separation between land uses and traffic • Pedestrian crossing facilities (including refuges)	• High Priority • Traffic signal controlled pedestrian crossings or zebra-type crossings on 2-lane routes or pedestrian refuges depending on circumstances • Flush medians to accommodate traffic turning into or out of driveways • Priority • Appropriate cycle facilities • High quality landscaped strips • Solid medians and/or other management measures to limit direct access to arterial

4. PLACE/ CONTEXT PRIORITISATION OF DESIGN ELEMENTS (continued)

Street Type	Essential elements	Priority elements
Rural Arterial	• Two-lane or 4-lane road as appropriate • Design appropriate for the speed of travel along route	• High Priority • Design features appropriate for relatively high speed travel including appropriate sight distances, clearances to obstacles and adequate separation of opposing traffic. • Appropriate cycle facilities or consistent wide shoulders free of pinch points. • Designs that encourage drivers to automatically reduce speeds through townships, past schools etc. • Footpaths near schools and in townships • Priority • Separate pedestrian facilities

Notes:

On-street parking
The Regional Arterial Road Plan supports and encourages the use of parking restrictions on regional arterial roads between town centres to allow the free movement of people and goods and improve the safety and efficiency of the network. It accepts, however, that through town centres it may be appropriate to retain on-street parking as it can support business vitality; enhance amenity; enhance the place function; and, by helping slow traffic down, can also improve pedestrian crossing safety.

Medians
The need for a median and the type of median provided should be carefully considered. While medians have a number of advantages depending on whether they are flush or raised, they take up valuable road space.
Solid medians can improve safety by controlling turning movements, but require provision for u-turns or alternative means of catering for right-turn movements into and out of driveways or minor intersections that are prevented by a raised median.

Part 2: Arterial Place / Context Design Typologies

1. COMMUNITY FOCAL POINT

This category includes main streets and community facilities. It is typified by locations where land uses should be given greater emphasis than movement imperatives.

In the case of main streets this applies over the full length and throughout the day. However, in the case of community facilities, it may apply to only a short length of the arterial or to only at specific times of day when pedestrian activities peak (e.g. school opening and closing times). Consequently the design considerations and design priorities can vary considerably within this category.

1.1 Main Street

Design Considerations

Key objectives of arterial road design on main streets are:

1. To maintain movement along the arterial road while reducing vehicle speeds to improve safety and facilitate pedestrian movement across the road.
2. To support the economic vitality of the main street.
3. To enable the amenity of the main street to be enhanced.
4. To ensure the design and operation of the arterial supports any relevant land use intensification and growth objectives.

Design priorities

1. Providing the minimum traffic lane requirement set by the Council.
2. Encouraging reduced traffic speeds.
3. Facilitating easy and safe pedestrian crossing movements along and across the arterial.
4. Providing for cyclists (speed environments less than 30km/h may enable cyclists to safely share the road with vehicles).
5. On-street parking, interspersed with landscaping/ street trees where feasible.
6. Well designed footpaths providing high pedestrian amenity.
7. Avoiding provision of direct access to the arterial from fronting properties where feasible. Possible means of achieving this include rear site access, amalgamating accesses and proving frontage roads (slip lanes).
8. Minimising vehicle-based nuisance at the carriageway edge (including noise, fumes, wind shear).
9. Creation of settings that will attract and support any land use changes desired by the Council.
10. A low speed environment, ideally between 30km/ hr (preferred) and 40km/hr (maximum).
11. Transition zones at the approach to a main street assist in reducing vehicle speeds prior to entering a low speed environment. They also provide the opportunity to introduce elements (landscaping, narrow traffic lanes etc.) that signal to the driver a change in environment.

During the design of a main street cross section the composition of flow and nature of land use activity should be carefully considered:

- In the busiest arterials where there is no opportunity to disperse flow, there may be an argument to prioritise ‘edge’ land uses towards commercial and business, with more sensitive residential and ‘densification’ activity preferred in streets around but back from the main street.
- On arterials where volumes are less than 16,000vpd through the main street, are projected to remain below 20,00vpd in the future, and are composed primarily of light passenger vehicles it may be more feasible to promote densification and mixed-use residential development directly on the main street.
- On arterials where the cross section width is greater than 25m there may be more opportunity to mitigate and manage vehicle flow nuisance and land use edge amenity, and hence be less sensitivity to ‘mixing’ sensitive land uses with high vehicle flows.

Cross-section Elements

On QTN bus routes or other routes carrying high bus numbers, it should be ensured that through bus movement is relatively unimpeded. This can be difficult to achieve where traffic is reduced to a single lane in each direction. The inclusion of kerbside bus lanes can ensure a good level of service for buses,

but effectively requires a 4-lane road. Where there is potential conflict between the main street and QTN bus route objectives, alternative solutions should be investigated. These could include investigating a possible alternative route for the buses, and investigating other means of giving buses the required priority which avoid the need for bus lanes along the main street, such as giving buses priority at the beginning of the main street.

In situations where it is clearly demonstrated that an acceptable satisfactory alternative cannot be found, it will be necessary to accept that bus lanes must be accommodated along the main street. Whatever solution is adopted, the speeds of any buses travelling along a main street should be low in common with all other traffic and bus stops should be carefully located.

Ideally the main street in a local centre should have a traffic flow of approximately 16,000 and 20,000 vpd. This provides enough traffic to create a sense of vitality and to contribute to an economically successful centre, while enabling the number of traffic lanes to be kept to (or reduced) to one per direction. A traffic flow above approximately 24,000 vpd generally requires two lanes per direction.

The main advantages of a two-lane main street are:

- It can considerably reduce pedestrian crossing distances reducing the severance effect of the arterial road and facilitating social and economic connections on both sides of the street.
- Depending on the arterial street width available (being between property boundaries) and the main street's priorities, the width not required to cater for moving traffic can be used to provide some or all of the following:
  - permanent on-street parking (possibly indented);
  - wider footpaths;
  - a wider median - if, for example, street trees are proposed;
  - street trees (in the footpath/ between parked cars/ in the median);
  - in all instances where landscaping, amenity and buffering is applied this should not promote visual appearance at the expense of pedestrian accessibility and ease of movement.

These advantages are particularly significant where the arterial street width is only 20.1m.

Where traffic flows exceed approximately 20,000 vpd, the ability to reduce traffic flow on the main street through improving an alternative (parallel) route or routes should be investigated. For the largest and busiest centres, a multi-lane main street maybe less of an issue as the scale means that there is less dependence on visitors/shoppers crossing the street.

Permanent on-street parking should be indented into the footpath, or accompanied by kerb extensions at appropriate locations. The parking strip design should ensure that road widths are minimised:

- just after and just prior to intersections to reduce pedestrian crossing distances and/or help reduce traffic speeds;
- at pedestrian crossings (including pedestrian refuges) to reduce pedestrian crossing distances;
- at bus stops to reduce delays to buses (this may be restricted to bus stops on 4-lane roads);
- where they are used, street trees should be prominent. Species should be carefully selected so as not to obscure visibility between 500mm and 1800mm above the road surface. Tree selection should be undertaken in consultation with the Parks Department.

In circumstances where permanent on-street parking is not provided, an alternative means of providing visitor parking on or close to the main street should be identified.

Travel lanes should be narrow to help reduce the width of the carriageway and encourage drivers to travel slowly along the main street.

Pedestrian crossing opportunities should be located at approximately 100m intervals along main streets to facilitate pedestrian movement across the arterial.

Appropriate cycle facilities should be provided. The decision on the appropriate treatment should take into account the speed environment and number of traffic lanes. On multi-lane roads which are key cycle routes, a separate cycle lane between the footpath and the on-street parking may be an appropriate solution.

Wide footpaths can improve pedestrian amenity. They can potentially accommodate seating and tables at cafes and restaurants, street trees, street furniture, bus shelters etc. while providing adequate width for pedestrian movement along the footpath or to stop and look into shop windows.

A median take up valuable road space and its inclusion should be justified in common with other road elements. Flush medians can provide space for

pedestrian refuges (desirable minimum width 1.8m) or shelter for vehicles turning into side roads or driveways (desirable minimum width 2.4m).

Solid medians can be appropriate where the aim is to prevent or restrict right-turn movements into and out of driveways and side roads, and/or to accommodate landscaping opportunities in the centre of the road. A minimum width of 1.8m is desirable to provide a safe place for pedestrians to complete their crossing. The provision of street trees in a median can enhance amenity and may be appropriate in locations where the median width and resulting horizontal clearances are adequate. Horizontal clearance requirements should take into account whether the arterial segment concerned is part of an overdimension route.

'Gateway' treatments at the ends of or approaches to a Main Street are generally appropriate to help signal the change in the speed environment.

1.2 Community Facilities

The community facilities category includes large scale community facilities such as hospitals, technical colleges, university campuses, schools, regional sport and community centres plus smaller scale facilities such as halls and local libraries.

Design Considerations

A number of the large community facilities have tended to be heavily dependent on access by car due to their location and the nature of their activities. However, this is changing and there is an increasing emphasis on access by other modes. In a number of instances moves towards reducing the emphasis on access by car have been driven by pressures on the available car parking and difficulties in increasing the supply of car parking on site or in the surrounding area.

The traffic related design issues for large community facilities are similar to shopping malls in so far as it is necessary to cater for traffic generated by the facility while ensuring that the arterial's primary function of effectively moving people and goods is protected. Careful attention must be given to traffic access location and design. Public transport access requires provision of quality services giving good access to the facility, and well-located bus stops (or station) with direct, safe pedestrian access to the main public entrance or entrances. Ideally public transport should penetrate into the site.

Around schools particular attention needs to be given to the provision of safe, well located and appropriate pedestrian facilities, both for crossing the arterial and for walking along the arterial itself. Bus stops should be conveniently located with adequate width provided at footpaths for peak pedestrian demands in the vicinity of bus shelters as well as adequate length to cater for the appropriate number of buses. Traffic speeds should be reduced. Road narrowing and other "self-explaining" measures that encourage drivers to automatically reduce speed should be introduced where feasible, supported by speed reduction school zone signing. Pick-up/drop-off areas should be carefully located to minimise pedestrian safety risks. Where feasible, such facilities should not be located on the arterial road. Parking by pupils and staff on the arterial road should only be permitted where this does not interfere with the safe and effective functioning of the arterial road. Safe cycle access to the school should be prioritised.

Design Priorities

1. Providing the minimum traffic lane requirement set by the Council.
2. Careful design and location of access to the property ensuring that the primary function of the arterial is protected.
3. Appropriate location of bus stops on the arterial serving the facility with a view to providing safe, direct access by public transport users to the main public entrance(s).
4. Where feasible, the provision of direct public transport close to the entrance to the facility.
5. Safe, convenient access to the site by pedestrians and cyclists.
6. Outside schools pay particular attention to:
   - measures to improve pedestrian crossing safety including appropriate pedestrian crossings at appropriate locations;
   - measures to reduce traffic speeds;
   - the location and design of lick-up/drop-off facilities;
   - bus stop locations and associated footpath design.

Cross-section Elements

Requirements can vary significantly depending on the nature, scale and location of the facility.

2. HIGH SENSITIVITY ENVIRONMENT

This category includes mixed use and high density residential. It is typified by locations where land use and movement imperatives need to be carefully balanced.

2.1 Mixed Use

Mixed use streets are associated with high amenity, high density development which is predominantly but not exclusively residential.

Design Considerations

From the road design perspective, mixed use streets have a number of similarities with main streets. There are, however, two key differences:

1. Four traffic lane designs are likely to be required in most instances (traffic volume dependant).
2. Bus priority measures including bus lanes are required on QTN routes and other selected high frequency bus routes.

Design Priorities

1. Providing the minimum traffic lane requirement set by the Council.
2. Facilitating easy and safe pedestrian crossing movements.
3. Providing appropriate bus priority measures on QTN routes and other selected high frequency bus routes.
4. Providing for cyclists.
5. Well designed footpaths providing high pedestrian amenity.
6. Avoiding provision of direct access to the arterial from fronting properties where feasible. Possible means of achieving this include side street access, rear site access, amalgamating accesses and proving frontage roads. Publicly owned rear lanes can assist in reducing the number of access points onto arterial streets, and can provide opportunities to carry services, and provide for car park access, rubbish collection etc.

Cross-Section Elements

Where bus lanes are provided and operate only during peak periods, on-street parking may be available outside the peak traffic periods. However, this should not be seen as an enduring solution as permanent bus lanes are to be introduced on QTN routes in the longer term. Bus lanes should preferably be 4.2 to 4.5m wide to permit buses and cyclists to share the lane without the need to move into the adjacent lane. Where this is not feasible, bus lanes should be between 3.0 and 3.2m and a separate cycle facility provided (where feasible). Bus lanes between 3.3m and 4.1m should be avoided.

Depending on advice received from the Council, where the arterial street width permits it may be appropriate to include the option of enabling central bus lanes or light rail to be provided in the longer term.

Cyclists are able to use all arterial routes and dedicated facilities are usually preferred to create a safe space for cyclists.

Wide footpaths can improve pedestrian amenity. They can potentially accommodate seating and tables at cafes and restaurants, street trees, street furniture, bus shelters etc. while providing adequate width for pedestrian movement along the footpath or to stop and look into shop windows.

A median takes up valuable road space and its inclusion should be justified in common with other road elements. Flush medians can provide space for pedestrian refuges (desirable minimum width 1.8m) or shelter for vehicles turning into side roads or driveways (desirable minimum width 2.4m).

Solid medians can be appropriate where the aim is to prevent or restrict right-turn movements into and out of driveways and side roads, and/or to accommodate landscaping opportunities in the centre of the road. A minimum width of 1.8m is desirable to provide shelter for pedestrians. The provision of street trees in a median can enhance amenity and may be appropriate in locations where the median width and resulting horizontal clearances are adequate. Horizontal clearance requirements should take into account whether the arterial segment concerned is part of an over dimension route.

Pedestrian crossing opportunities should be provided at no less than a spacing of approximately 200m. Where possible, they should be aligned with key movement desire lines to businesses, community facilities, open spaces, passenger transport interchanges and stops.

Wherever feasible direct access to the arterial should be avoided and access should be located on side roads or from parallel local roads. Other measures to reduce or minimise direct frontage access include amalgamating driveways and provision of service roads.

2.2 High Density Residential

Design Considerations

High density residential streets should be served by quality, high frequency public transport services. To provide high pedestrian amenity, footpath design should facilitate landscaping and place-making.

Design Priorities

1. Providing the minimum traffic lane requirement set by the Council.
2. Facilitating easy and safe pedestrian crossing movements.
3. Providing appropriate bus priority measures.
4. Good, direct pedestrian access to bus stops from the surrounding residential area.
5. Providing for cyclists.
6. Footpath design which can provide a high amenity pedestrian realm.
7. Avoiding provision of direct access to the arterial from fronting properties where feasible. Possible means of achieving this include side street access, rear site access, amalgamating accesses and providing service roads.

Cross-Section Elements

Refer to mixed-use streets.

Pedestrian crossing opportunities should be ideally provided at no more than 200m intervals and should take into account pedestrian desire lines. There should be an emphasis on convenient and direct public transport and community facility access.
In these more predominantly residential environments there is less of an imperative to provide the most convenient access to properties. Left-in/left-out type access with permanent restrictions on right turn movements into or out of property accesses may be appropriate in these environments.

3. LIVING ENVIRONMENT

This category consists of low density residential and medium density residential (defined as up to 3 storeys). Land use considerations influence movement imperatives, but the emphasis is on the arterials movement function.

3.1 Low Density Residential

Design Considerations

Low density residential development on arterial routes typically has direct access to the arterial road. Home businesses can increase the traffic generation and parking requirements. However, on-street parking on the arterial may not be permitted where it reduces the effectiveness of the arterial in moving people and goods or is a safety hazard.

Design Priorities

1. Providing the minimum traffic lane requirement set by the Council.
2. Providing appropriate bus priority measures.
3. Good, direct pedestrian access to bus stops from the surrounding residential area.
4. Providing for cyclists.
5. Footpath and berm design which contributes to quality streetscapes.
6. Providing safe access to fronting properties.
7. The role of private front yards in providing landscaping and visual amenity (in addition to off-street parking) should be acknowledged (although not directly controlled).

Cross-Section Elements

Bus lanes, if required, should preferably be 4.2 to 4.5m wide to permit buses and cyclists to share the lane without the need to move into the adjacent lane. Where this is not feasible, bus lanes should between 3.0 and 3.2m. Bus lanes between 3.3m and 4.1m should be avoided.

The key issues influencing the suitability of shared paths relate to appropriate width and intersecting roads. Higher numbers of pedestrians and cyclists can safely share a path subject to the provision of an appropriate width.

Flush medians can provide space for pedestrian refuges (desirable minimum width 1.8m) or shelter for vehicles turning into side roads or driveways (desirable minimum width 2.4m).

Solid medians can be appropriate where the aim is to improve the efficiency and safety of the arterial route by controlling the locations where right-turn movements into or out of the arterial can take place. A minimum width of 1.8m is desirable to provide shelter for pedestrians or 4.5m to provide a right-turn slip lane plus adequate width for pedestrians.

3.2 Medium Density Residential

Refer to mixed use and low density categories as appropriate.

4. AMENITY WORKING ENVIRONMENT

This category includes commercial/ business uses and town centre fringe development. In these locations land use considerations need to influence movement imperatives.

4.1 General Business

Design Considerations

This type of land use development includes businesses who desire a high visual exposure and with quality frontage/ presentation to the arterial to create a strong presence. Business nodes design should include active street frontage with ground floor commercial space fronting the arterial. Over time these uses are transitioning away from light-industrial type areas towards more premier 'cleaner' and higher-skilled commercial uses. This means that there is often a demand for high amenity street environments that support high-tech, corporate images and highly trained staff looking for a quality of life component in their employment choice.

Good public transport service for employees and visitors reduces reliance on access by car and car parking demands.

Design Priorities

1. Providing the minimum traffic lane requirement set by the Council.
2. Providing appropriate bus priority measures on QTN routes.
3. Providing for cyclists, particularly arterials on the regional cycle network.
4. Footpath widening for active frontage at business nodes and at corners.
5. Avoiding provision of direct access to the arterial from fronting properties where feasible. Possible means of achieving this include side street access, rear site access, amalgamating accesses and providing frontage roads (slip lanes). Publicly owned rear lanes can assist in reducing the number of access points onto arterial streets, and can provide opportunities to carry services, and provide for car park access, rubbish collection etc.
6. A clear view on signage particularly on streets or at front boundaries is required.
7. Carefully coordinating long-term vehicle access between multiple sites where possible and where this will contribute to logical pedestrian crossing opportunities and efficient and safe traffic flow interruptions.
8. Landscaping and street amenity can be significantly provided by land use activities rather than exclusively in the street.

Cross-section Elements

Bus lanes, if required, should preferably be 4.2 to 4.5m wide to permit buses and cyclists to share the lane without the need to move into the adjacent lane. Where this is not feasible, bus lanes shared with bicycles should between 3.0 and 3.2m. Bus lanes between 3.5m and 4.1m should be avoided.

Depending on advice received from the Council, where right-of-way width permits it may be appropriate to include the option of enabling central bus lanes or light rail to be provided in the longer term along arterial sections with high density land use generating high person trip demands.

Flush medians can provide space for pedestrian refuges (desirable minimum width 1.4m) or shelter for vehicles turning into side roads or driveways (desirable minimum width 2.4m).

Solid medians can be appropriate where there are no driveway or side road accesses, or where the aim is to prevent or restrict right-turn movements into and out of driveways and side roads. A minimum width of 1.4m is desirable to provide shelter for pedestrians. The provision of street trees in a median can enhance amenity and may be appropriate in locations where the median width and resulting horizontal clearances are adequate.

Frontage roads (slip lanes) are particularly appropriate in these environments, including 'private' slip lanes coordinated across multiple site frontages.

4.2 Town Centre Fringe

This is described as providing superior business settings close to town centres. It is typified by high density development with ground floor commercial development to provide active street frontage.

Design Priorities

1. Similar to General Business but with a greater emphasis on public transport.
2. Direct access from adjacent properties should be avoided wherever feasible to avoid or minimise

the need to cater for turning vehicles along the arterial.
3. High priority should also be given to catering for cyclists and for bus passengers at bus set down areas.
4. Wide footpaths are appropriate along active frontages.
5. A good supply of on-street short-stay/visitor parking
6. A clear view on signage particularly on streets or at front boundaries is required

Cross-section Elements

Refer to General Business but give higher priority to separate facilities for cyclists and on-street car parking for visitors/customers.

5. TRAFFIC MOVEMENT ENVIRONMENT

This category consists of industrial and out-of-centre retail, these being locations where the land use has minimal influence on the movement function.

5.1 Industrial

Design Considerations

The priority in industrial areas is the efficient movement of freight and the provision of access by freight vehicles into adjacent land uses. Pedestrian numbers are likely to be low, but care should be taken to minimise pedestrian/truck conflicts.

For those industrially zoned areas where office use predominates (as an office park), the priority is typically the efficient movement of vehicles, except for locations on QTN routes. In such areas amenity considerations are of greater importance.

Design Priorities

1. Providing the minimum traffic lane requirement set by the Council. This is likely to be based on projected general traffic demands.
2. Providing medians.
3. Catering for safe cycle movement.
4. Providing adequate width footpaths/berms for amenity purposes and to cater for pedestrian movement including key pedestrian routes to/ from public transport.
5. Consider the use of mountable kerbs and differential turning radii such that large vehicles can take wider turns, but smaller vehicles are encouraged to take tighter, slower turns.
6. Ensuring that there is adequate on-site loading provision and that vehicles, and in particular heavy commercial vehicles do not have to reverse onto the arterial (or from the arterial onto the site).
7. Providing appropriate bus priority measures if/ where required Auckland Transport.

Cross-section Elements

Lane widths, turning radii, kerb crossings etc. are to be appropriate for the design freight vehicle(s) in industrial areas.

Medians will generally be flush and of sufficient width to shelter trucks turning into fronting industrial properties.

A dedicated cycle facility should be provided where feasible.

5.2 Out of Centre Retail

This category includes large format retail and stand alone shopping centres or malls. This type of development is strongly dependent on access by car.

Design Considerations

Large format retail is conventionally associated with arterials whose prime transport function is the movement of general traffic, although there are a number of instances in Auckland where this type of development is located on what is also a QTN route. In such situations it is essential that the needs of general traffic be carefully balanced against public transport considerations. Catering for both forms of transport can result in relatively wide multi-lane roads which can act as a barrier to pedestrian movement.

Care should be taken to avoid creating a layout which discourages pedestrian access, such as locating a large area of off-street parking between the footpath and the entry to the centre. To avoid bus passengers having to weave their way through a large number of parked cars, a pedestrian walkway should be provided between the main bus stop on the arterial serving the centre and the main pedestrian access to the centre.

For large shopping malls, the possibility of re-routing buses into the centre close to a pedestrian entrance should be investigated. Locating a public transport interchanges next to a shopping mall can advantage both public transport and the mall.

As large format retail and shopping malls can generate high traffic volumes, particular care must be taken to ensure that traffic accesses are designed and located to avoid compromising the effectiveness of the arterial as a through traffic route.

Design priorities

1. Providing the minimum traffic lane requirement set by the Council.
2. Careful design and location of access to the property ensuring that the primary function of the arterial is protected.
3. Appropriate location of bus stops on the arterial serving the facility with a view to providing safe,

direct access by public transport users to the main public entrance(s).
4. Where feasible, the provision of direct public transport close to the entrance to the facility.
5. Safe, convenient access to the site by pedestrians and cyclists.

Cross-section Elements

No specific requirements.

6. RURAL

Design Considerations

The primary objective of rural arterial road design is the safe and efficient movement of vehicles. Design speeds vary but typically are intended to accommodate vehicles travelling at speeds up to the open road speed limit of 100km/h. Truck movements can form a high proportion of the traffic in some locations and at various times such as the harvesting of trees near forestry areas. Cyclists can be significant road users, particularly on recreational routes. Pedestrian numbers are generally low and footpaths are generally only provided in village and town centres or near schools located outside town centres.

Design Priorities

1. Providing the minimum traffic lane requirement set by the Council
2. Careful design and location of property access ensuring adequate sight distance. Some sections of state highways may be declared limited access routes.
3. Wide traffic lanes suited to higher speed travel and freight vehicles
4. Hard shoulders, of sufficient width to provide a cycle lane on the main recreational or commuter cycle routes
5. Horizontal and vertical geometry appropriate for the design speed
6. A separation between opposing traffic flows, ideally including a safety barrier
7. Consistent conditions along a route (design speed, cross-section etc)
8. Speed reduction measures at the entrances to any town or village along the route

Townships

A town or village along a rural arterial route should be treated as a rural community focal point. The balance between land use and movement imperatives will vary according the nature and size of the township. Wherever feasible, physical gateway treatments should be implemented at the township entrances supplemented by speed limit signs to encourage motorists to automatically slow down in response to the road narrowing and in recognition of the changed driving environment.

Footpaths should be of adequate width. Appropriate pedestrian crossing facilities should be provided at suitable locations.

On-street parking should be provided where carriageway width and road safety considerations permits. Alternatively well signposted, well laid out, sealed off-street parking should be provided.

Appendix E
Network role of corridor and selected typologies

Appendix
Network role of corridor and selected typologies

Agreed Network Priorities

A summary of these transport priorities and detailed rationale is provided in the Table 0-1.

Table 0-1 Transport priorities for Lake Road CMP

Transport mode	Priority level	Rationale
Pedestrians	High	▪ Important walking route for north-south connections along the peninsula and for east-west trips that require crossing Lake Road ▪ Significant volumes of pedestrian activity associated with schools, both along and across corridor. ▪ Pedestrian activity supports local centres at Hauraki and Belmont. ▪ Further pedestrian demand associated with access to public transport (particularly bus stops)
Cyclists	High	▪ Primary commuter cycle route for the peninsula ▪ Provides a direct link from Takapuna to Devonport with local centres and destinations along its route. Huge potential for short local trips 1-3km to be made by bicycle ▪ Strong school cycling route (both along and across corridor) ▪ Coastal cycle route provides a more recreational type role and is not a suitable alternative for the function provided by Lake Road ▪ Supports a greater active mode catchment for people travelling to Takapuna, Devonport and ferry connections.
Public transport	High (Low, south of Old Lake Road)	▪ Lake Road to the north of Old Lake Road is part of the proposed Frequent Service Network ▪ This planned bus route also provides connection to the Devonport Ferry Service which is further part of the frequent network ▪ Public transport provides an opportunity to relieve congestion through providing more efficient people carrying capacity. ▪ Primary mode for accommodating spiked demand from events. ▪ While Lake Road south of Old Lake Road is not part of the proposed frequent network, it has been identified as an important feeder route to the Devonport ferry terminal.

Transport mode	Priority level	Rationale
General traffic	Medium	▪ Only arterial road connection within peninsula ▪ Provides access for essential services (ambulances, fire service etc.) ▪ Low priority than public transport and active modes, owing to alignment with higher level strategic policies and plans requiring improved use of these more efficient modes.
Freight	Low	▪ Minimal freight generating commercial activities within peninsula ▪ Low heavy vehicle volumes and proportion of total traffic

As outlined above, pedestrians, cyclists and public transport are all identified as being high priority modes along the full length of the Lake Road corridor, with the exception of Public Transport which drops to low priority, south of Old Lake Road as this section does not form part of the frequent network. This reflects and is consistent with current strategic planning policy documents such as the Auckland Plan and Integrated Transport Programme, which emphasises the need to increasingly cater for and support these more sustainable and space-efficient travel modes.

General traffic is identified as being medium priority. This reflects a balance between the strategic importance of active modes and public transport as mentioned above, but also recognising Lake Road as the only arterial route within the peninsula. Freight is considered to be low priority given the low level of demand for this mode and the land use context of the road, however given corridor's status as an over-dimension vehicle route, will influence the final spatial allocations.

Corridor typologies

The place context typology for each corridor cross section has been identified in accordance with Auckland Transport's *Corridor Management Plan Guideline and Simplified Procedure* (October 2012, Version 2). The selected typologies for each selection of the network are listed in Table 0-2 . Further detail on each of the typologies can be found in **Appendix D**.

Table 0-2 Corridor typologies by section

Section		Place context typology
1	Esmonde Road to Hart Road (edge of Hauraki Local Centre)	Living (Low Density Residential)
2	Hauraki Local Centre, Hart Road to Bayview Road	Community Focal Point (Main Street)
3	Bayview Road to Northumberland Avenue	Living (Low Density Residential)
4	Northumberland Avenue to Westwell Road	Community Facilities and Living
5	Belmont Local Centre, Westwell Road to Alamein Avenue	Community Focal Point (Main Street)
6	Alamein Avenue to Seabreeze Road	Living (Low Density Residential)

Section		Place context typology
6a	Old Lake Road Shops, Regent Street to Kawerau Avenue	Community Focal Point (Main Street)
7	Seabreeze Road to Ariho Terrace	Community Facilities
8	Albert Road to Ariho Terrace	Living (Low Density Residential)

As outlined by the table above, the corridor is predominately residential in nature. There are however important community focal points along its length, including localised main street environments at Hauraki and Belmont, and to a lesser extent adjacent to Old Lake Road.

These community focal points also include a substantial recreational area (Ngataringa Park, Dacre Park and Waitemata Golf Course) and a hub of schools (Takapuna Grammar School, Belmont Intermediate, Belmont Primary and Wilson School).

Appendix F
Corridor concept options

To	**Jennifer Estong and Technical Stakeholders**	From	Cassandra Kenworthy
Date	**25 November 2014**	Reviewed by	Craig Mitchell/Gordon Wemyss
Project	**Lake Road Corridor Management Plan**	Reference	243329
Subject	**Corridor Option Development**		

1 Introduction

A number of corridor cross-section concepts have been developed for Lake Road to examine opportunities to support the proposed network role of the corridor sections refined in Workshops 1 and 2. For this purpose, the corridor has been divided into six main segments based on similar traffic demands and challenges, rather than the individual typologies introduced in Table 1 contained in *Technical Note: Network role of corridor 19 September 2014.* These segments and the rationale behind their selection is summarised below:

A **Esmonde Road to Jutland Road**: the existing carriageway has recently been widened to four lanes.

B **Jutland Road to Bayswater Avenue**: consistent road reserve and carriageway width and traffic demands

C **Bayswater Avenue to Old Lake Road:** south of Bayswater the traffic demand begins to decrease

D **Old Lake Road to Seabreeze Road:** the high frequency public transport network does not travel along this segment however the cross section remains consistent

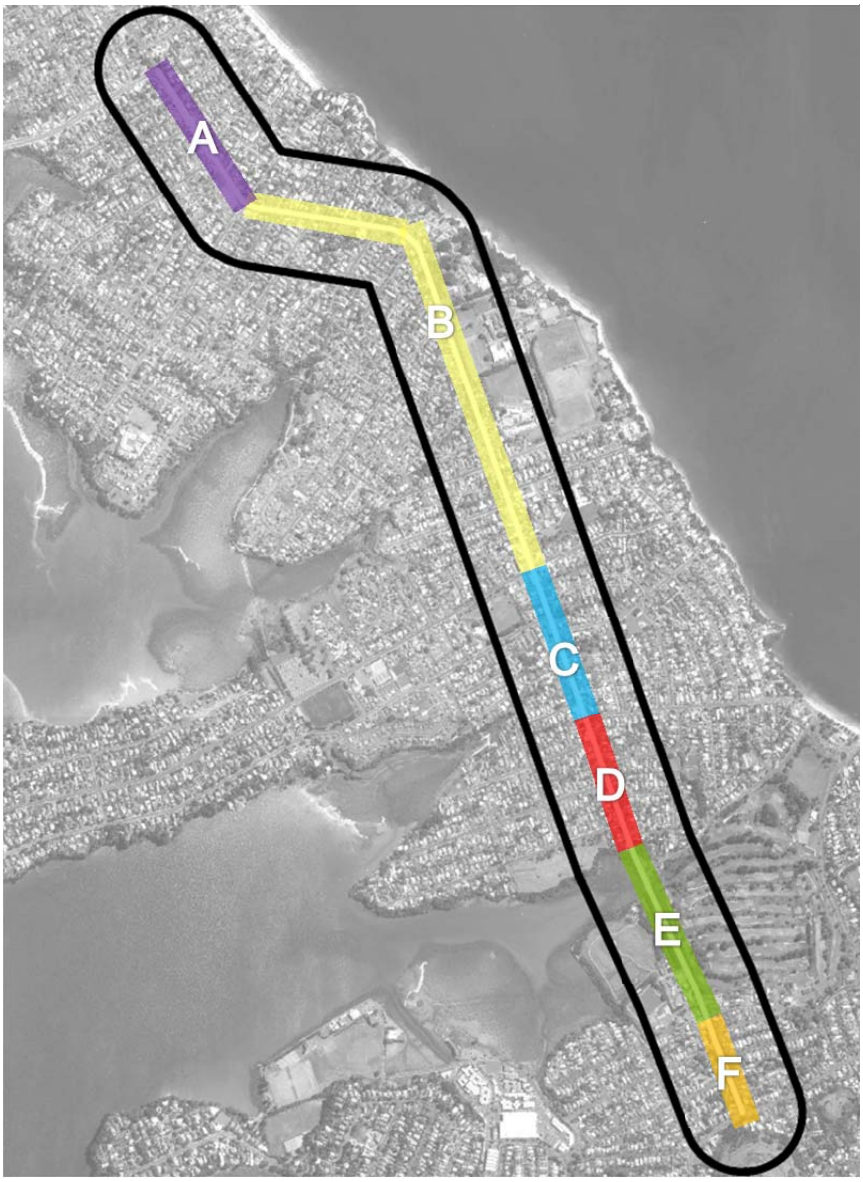
E **Seabreeze Road to Ariho Terrace:** specific cross section that is recreational dominated with no high frequency public transport network requirements

F **Ariho Terrace to Albert Road:** specific slip lane cross-sections along this section

Each segment is presented in the following sections of this technical note. The existing typical cross section, environment and proposed network role of the corridor is described followed by a number of concept options and the strategy behind the option development process for each segment. Specific locations of tension (e.g. town centres and community areas) to be resolved will be also.

These segments are also shown diagrammatically in Figure 1-1.

Figure 1-1 Existing cross-section locations



In addition to the segments there are a number of spot locations that present issues that this Corridor Management Plan also looks to address. These spots include the intersections at Hauraki Corner, Belmont and Albert Road. Options for these spot locations are addressed in Section 3.

Corridor wide elements addressed in Section 4 include: alternative public transport offerings, bus stop design and spacing, pedestrian crossing opportunities and tidal flow operations.

2 Cross Section Option Development

The options for each segment have been developed to provide an increased focus around one or two modes which have been identified as having higher priorities along the corridor. The interventions have been categorised as Low: requiring no change to the kerbline, Medium: requiring kerbline widening within the existing road reserve and High: requiring widening of the road reserve.

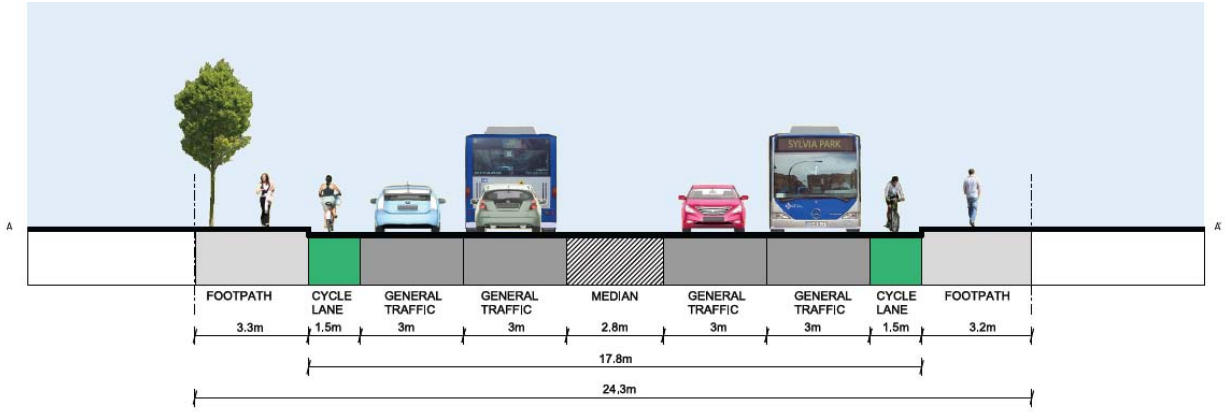
2.1 Segment A: Esmonde Road to Jutland Avenue

The land use surrounding the segment of Lake Road between Esmonde Road and Jutland Avenue is primarily residential with a localised town centre development at the southern end of the segment on the western side of the road. There is a small area of park (public open space) on the north eastern corner of the Lake Road/Jutland Avenue intersection. This section of Lake Road was upgraded from two to four lanes in 2011. This segment now has two 3m lanes in each direction separated by a 2.8m wide, painted central median, shown in Figure 2-1 consistent along its entire length.

Figure 2-1 Lake Road, segment A looking southbound from Esmonde Road

The road reserve is 24.3m wide with over 3m wide footpaths and a carriageway width of 17.8m. This carriageway width includes two traffic lanes in each direction, a flush median and painted 1.5m cycle lanes against each kerb, demonstrated in Figure 2-2.

Figure 2-2 Typical existing cross section along Section A



The northern end forms a large signalised T-intersection with Esmonde Road. There is a signalised pedestrian crossing approximately half way along this segment and another signalised intersection at the southern end where Lake Road intersects Hauraki Road and Jutland Road. There is a short

section of solid median at the approach to the Esmonde Road intersection that prevents right turning out of Napier Avenue and Rewiti Avenue side streets.

There are 4 half indented bus stops each with a shelter along this segment of Lake Road. The only bus priority provided is a short, bus straight-through lane, approach at the intersection with Esmonde Road. There is no stopping at all times (NSAAT) parking along this segment.

The agreed transport roles of this segment are for public transport, cycling and pedestrians to be higher priorities and general traffic to be considered a medium priority. Freight is considered a low priority along the segment.

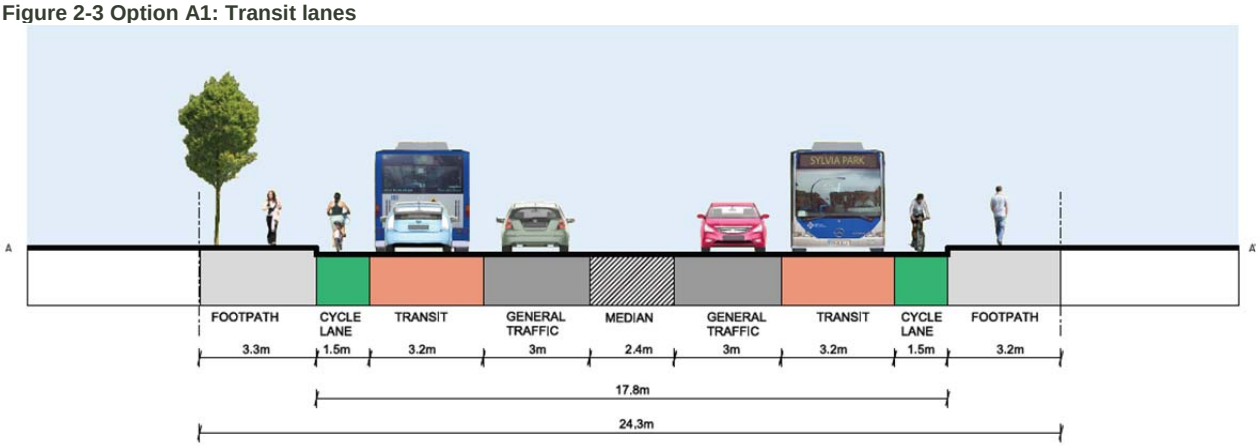
2.1.1 Potential Future Corridor Themes

The themes developed for this segment of the corridor provide a focus on public transport, cycling and pedestrians, with general traffic considered a medium priority.

Option A1: Public Transport Theme – Low intervention

This option aims to provide bus and high occupancy vehicles (HOVs) priority along this segment through the use of transit lanes, reducing delays to public transport services, within the existing kerbline.

Figure 2-3 Option A1: Transit lanes

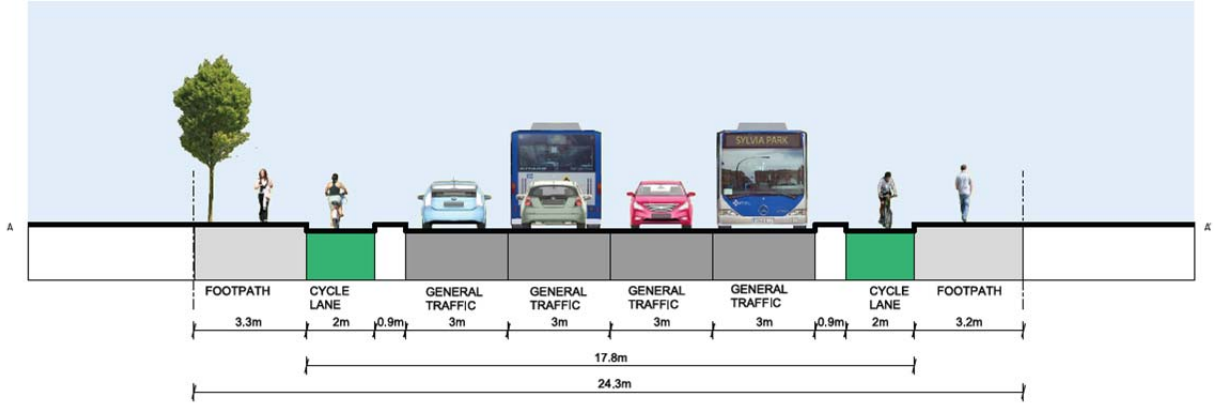


Mode	Provision
General traffic	■ Reduced to one lane for general traffic (non-HOV) in each direction. ■ Central flush median reduced by 0.4m. ■ HOV priority lane provided in each direction.
Public Transport:	■ Buses use transit lanes with buses crossing cycle lanes to access kerbside bus stops
Pedestrians and Cyclists:	■ No change to pedestrian and cyclist facilities.

Option A2: Cycling Theme – Low intervention

This option supports cycling in a high speed and high traffic environment within the existing road corridor.

Figure 2-4 Option A2: Separated cycle lanes

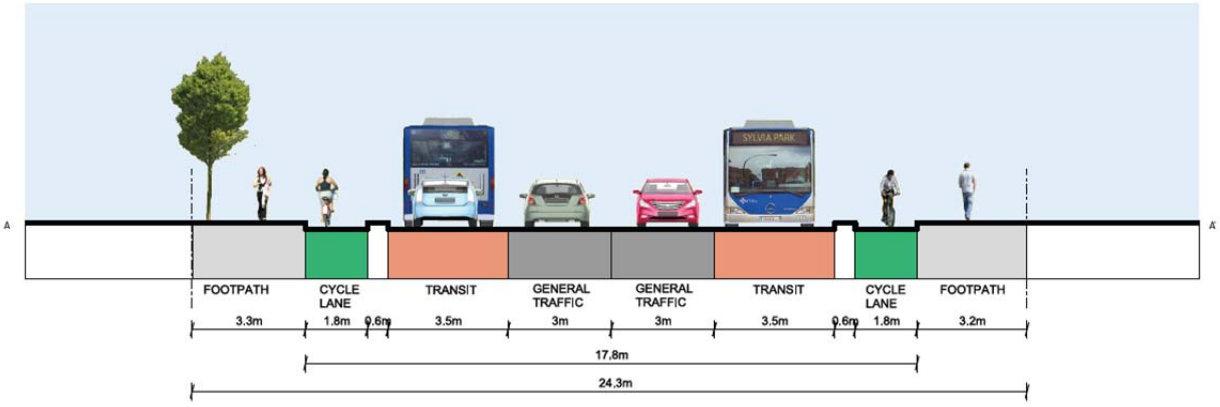


Mode	Provision
General traffic	■ Central flush median removed
Public Transport:	■ Buses share general traffic lanes ■ No dedicated bus facilities
Pedestrians and Cyclists:	■ Wide dedicated separated cycle lanes with wide islands separating cyclists from general traffic. ■ Cycle lanes pass behind bus stops ■ No change to pedestrian facilities

Option A3: Public Transport and Cycling Theme – Low intervention

This option supports both public transport by providing HOV lanes and cycling in a high speed and high traffic environment within the existing road kerbline.

Figure 2-5 Option A3: Transit and separated cycle lanes



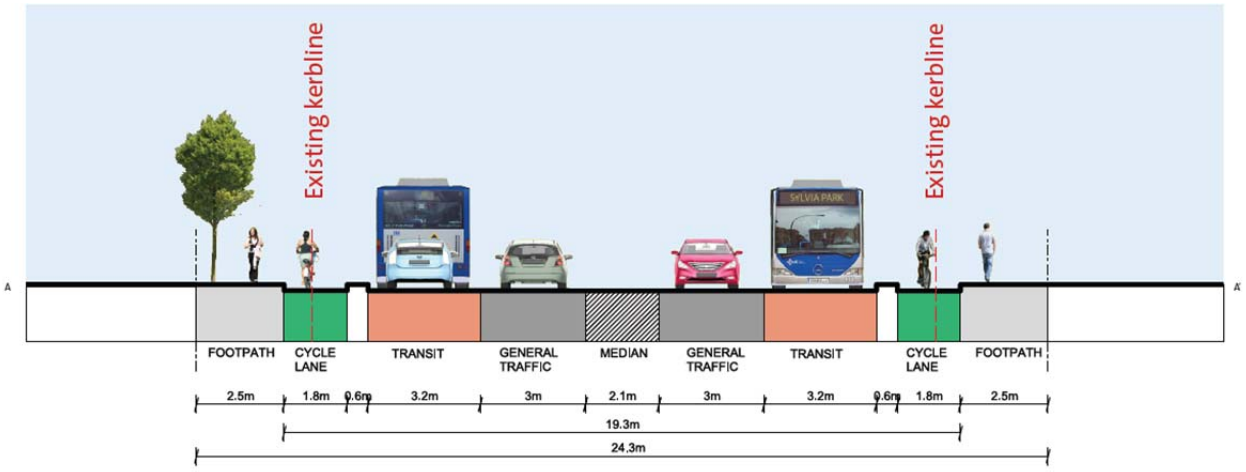
Mode	Provision
General traffic	■ Reduced to one lane for general traffic (non-HOV) in each direction. ■ Central flush median removed ■ HOV priority lane provided in each direction.
Public Transport:	■ Buses use HOV lanes ■ Buses stop in these lanes to access bus stops

Pedestrians and Cyclists:	■ Dedicated separated cycle lanes pass behind bus stops ■ No change to pedestrian facilities

Option A4: Public Transport, Cycling and General Traffic Theme – Medium intervention

This option, like option A3 supports both public transport by providing HOV lanes and cycling in a high speed and high traffic environment however it also maintains a central flush median for turning movements. This option will require 0.5m widening of the existing kerbline however is within the existing road reserve.

Figure 2-6 Option A4: Transit lanes, separated cycle lanes and a central flush median

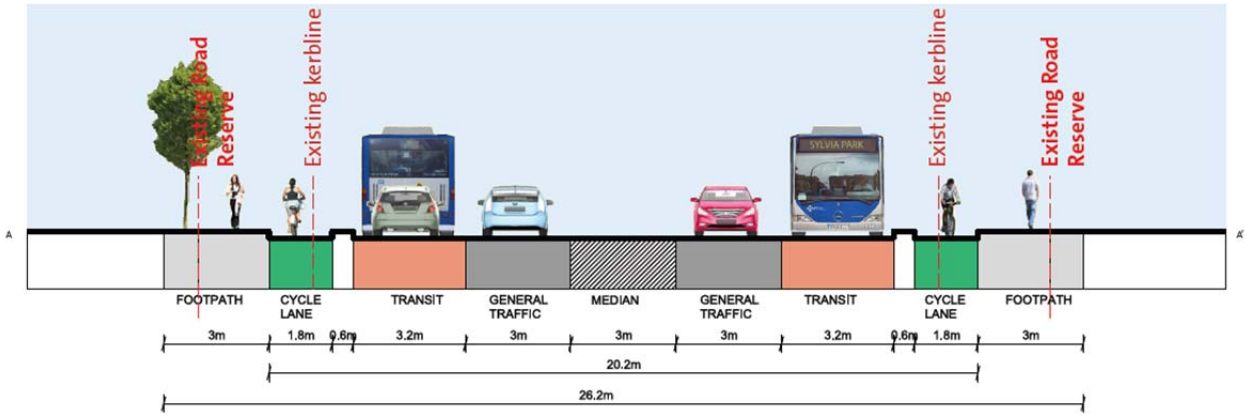


Mode	Provision
General traffic	■ Reduced to one lane for general traffic (non-HOV) in each direction. ■ Central median reduced by 0.7m, however still provides for turning vehicles ■ HOV priority lane provided in each direction.
Public Transport:	■ Buses use HOV lanes ■ Buses would stop in these lanes to access bus stops ■ Buses do not have to cross cycle lanes to access bus stops
Pedestrians and Cyclists:	■ Dedicated separated cycle lanes passing behind bus stops ■ Footpath width reduced to 2.5m. ■ Increased road width for pedestrians to cross

Option A5: ATCoP minimum dimensions – High intervention

This option supports both public transport by providing HOV lanes and cycling in a high speed and high traffic environment whilst maintaining a central flush median for general traffic turning movements. This option will require 2.4m widening of the existing kerbline and 1.9m of road reserve widening to achieve Auckland Transport Code of Practice (ATCoP) recommended minimum dimensions.

Figure 2-7: Option A5: ATCoP minimum dimensions



Mode	Provision
General traffic	■ Reduced to one lane for general traffic (non-HOV) in each direction ■ Central median of 3m provided for turning vehicles ■ HOV priority lane provided in each direction.
Public Transport:	■ Buses use HOV lanes ■ Buses would stop in these lanes to access bus stops
Pedestrians and Cyclists:	■ Dedicated separated cycle lanes passing behind bus stops ■ Footpath widths reduced to 3m. ■ Increased road width to 20.2m making it a long distance for pedestrians to cross without traffic controls.

2.2 Segment B: Jutland Road to Bayswater Avenue

The land use surrounding the segment of Lake Road between Jutland Road and Bayswater Avenue is mainly residential to the north and west. There are 4 schools along the south eastern edge of this segment. The southern end of this segment becomes town centre style mixed land use around the intersection of Lake Road and Bayswater Avenue.

The corridor along this segment is made up of two 4m wide traffic lanes and 1.9m wide cycle lanes in each direction, Figure 2-8. There are sections of flush median dividing the traffic lanes to prevent right turning vehicles delaying through traffic along the corridor, Figure 2-9

The road reserve is generally 20.1m throughout this segment of Lake Road with a road carriageway width of 11.8m, Figure 2-10. The western footpath is approximately 1.5m and separated from adjacent properties by a grassed berm. The eastern footpath is generally up to 3m wide in parts, forming a delineated shared path between Clifton Road and Winscombe Street. Along some small stretches there is also a grass berm on the eastern side. There are overhead power lines with power poles against the kerbline along almost this entire segment, stopping just south of Westwell Road.

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Figure 2-8 Lake Road, segment B, looking southbound

Figure 2-9 Typical existing cross-section along segment B (with median)

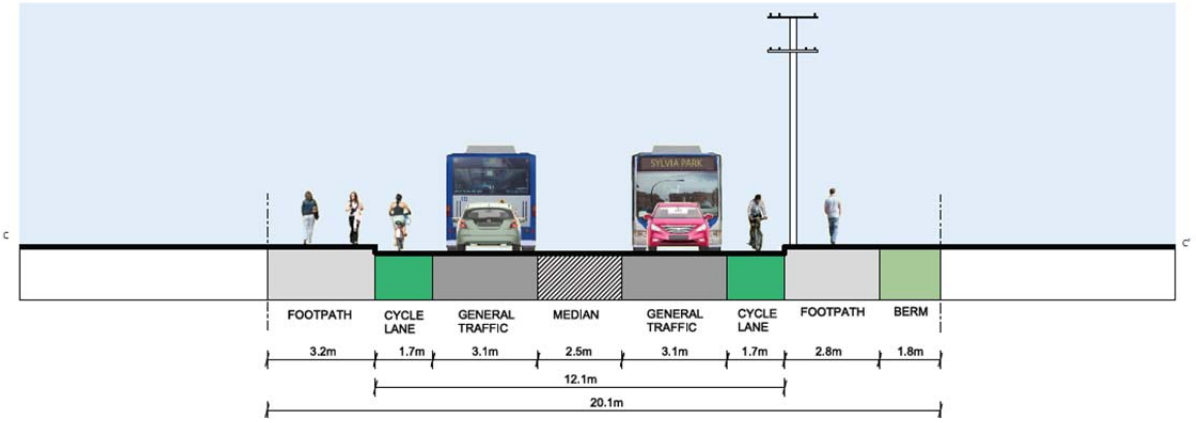
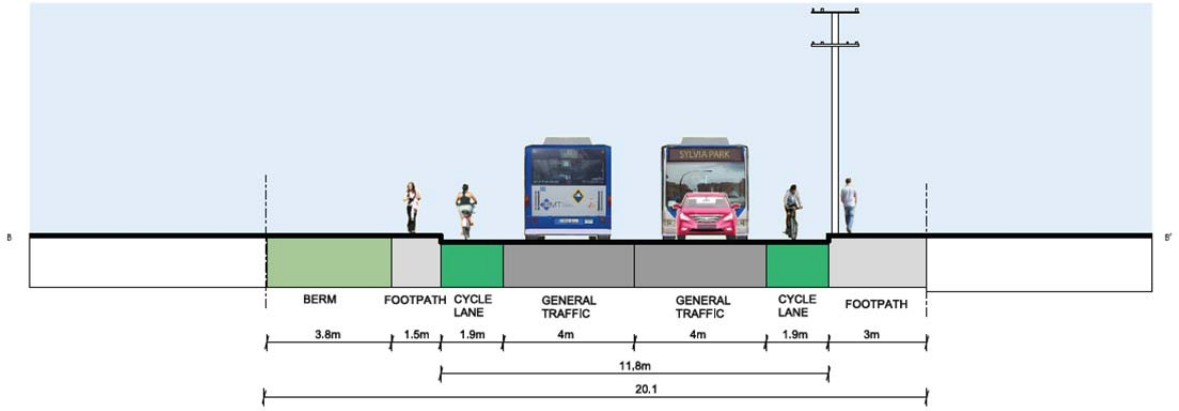


Figure 2-10 Typical existing cross-section along segment B (without median)



There is a pedestrian refuge island in the flush median just prior to the intersection with Clifton Road and a pad activated signalised pedestrian crossing outside Takapuna Grammar School. There are signalised intersections at both Winscombe Street and Bayswater Avenue which also provide pedestrian crossing phases. There are no cycle facilities between Bayswater Avenue and Corella Road where the on-road cycle lane begins. This on-road cycle lane transfers to an off-road shared

path at the northern end of this segment at Onepoto Road. The southbound cycle lane ends at School Road, just prior to the intersection of Bayswater Avenue.

There is NSAAT along both sides of the road in this segment except for small stretches of parallel parks southbound outside Takapuna Grammar School and northbound in front of the shops at Belmont, on the northern side of the Lake Road/Bayswater Avenue intersection. A service-type lane on the eastern side of Lake Road provides additional town centre parking at this intersection. There are a number of bus stops along this segment, some of which are for school services only.

The agreed transport roles of this segment are the same as for segment A. Public transport, cycling and pedestrians are high priorities and general traffic is a medium priority. Freight is a low priority.

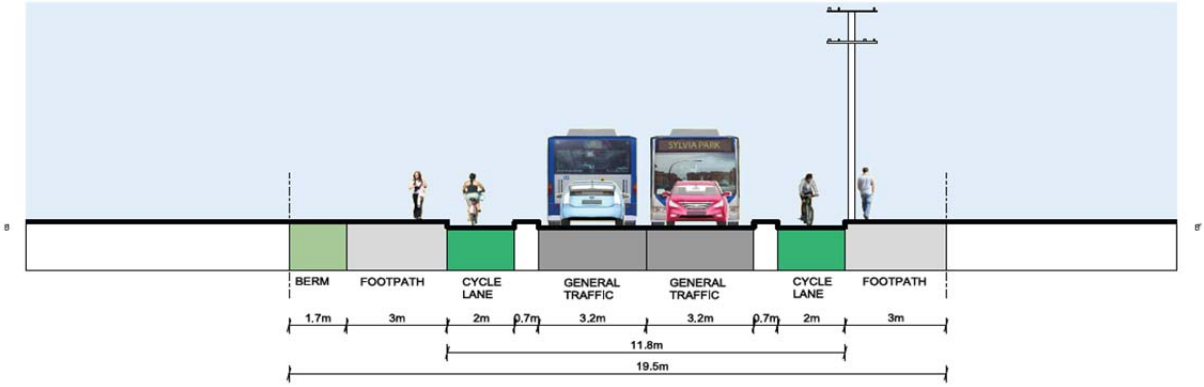
2.2.1 Potential Future Corridor Themes

The themes developed for this segment of the corridor provide an improved provision for public transport, cycling and/or pedestrians, while several options also provide additional general traffic capacity.

Option B1: Cycling and Walking Theme – Low intervention

This option provides improved safety for cycling in a high speed /high traffic environment as well as improving pedestrian provision within the existing kerbline.

Figure 2-11 Option B1: Separated cycle lanes

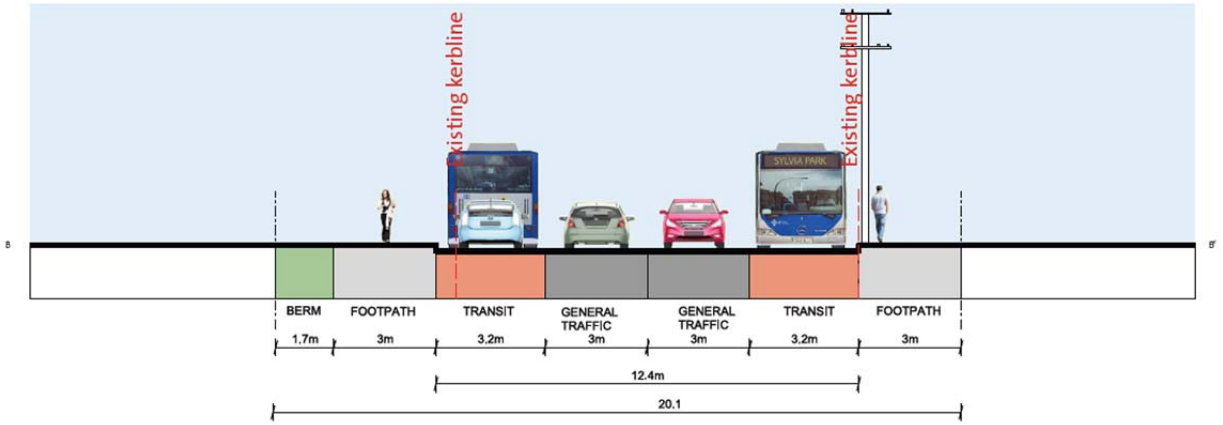


Mode	Provision
General traffic	■ Central flush median is removed ■ Lanes reduced to 3.2m
Public Transport:	■ Buses share general traffic lanes ■ No dedicated bus facilities
Pedestrians and Cyclists:	■ 2.0m dedicated separated cycle lanes with islands separating cyclists from general traffic. ■ Cycle lanes will narrow to pass behind bus stops ■ 3.0m footpaths provided on both sides of the road

Option B2: Public Transport Theme – Medium intervention

This option aims to provide bus and HOVs priority along this segment reducing delays to public transport services. This option will require 0.6m widening of the existing western kerbline however is within the existing road corridor.

Figure 2-12 Option B2: Transit lanes

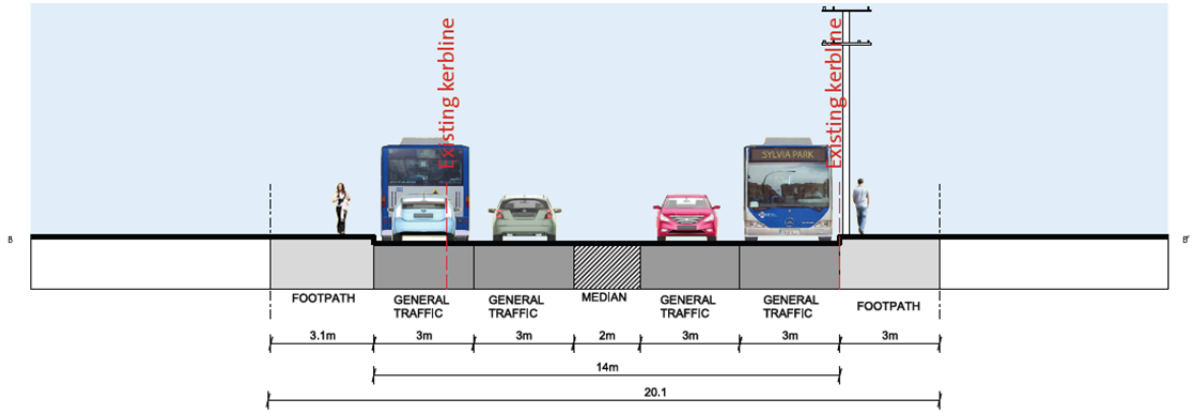


Mode	Provision
General traffic	■ No change in the number of lanes provided for general traffic ■ HOV priority lane provided in each direction. ■ Central flush median is removed
Public Transport:	■ Buses use transit lanes ■ Buses would stop in these lanes to access bus stops
Pedestrians and Cyclists:	■ 3.0m foot paths provided on both sides of the road ■ On-road cycle lanes are removed. ■ Cyclists can use transit lanes

Option B3: General Traffic Theme – Medium intervention

This option supports increasing the number of general traffic lanes to increase the capacity of the road and to provide continuity with segment A. This option requires the western kerb to be widened by 2.2m but is still within the existing road reserve.

Figure 2-13 Option B3: 4-laning with central flush median



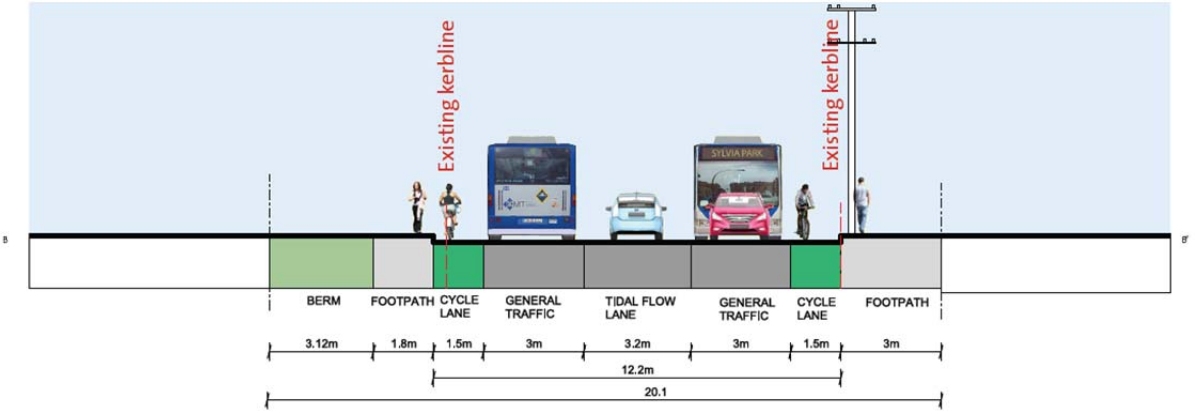
Mode	Provision
General traffic	■ Additional traffic lane in each direction ■ Central flush median retained in places however is reduced to 2.0m

Public Transport:	■ Buses share general traffic lanes ■ No dedicated bus facilities
Pedestrians and Cyclists:	■ Shared path maintained on the eastern side ■ On-road cycle lanes are removed ■ Western footpath width increase to 2.0m

Option B4: General Traffic Theme (alternative) – Medium intervention

This option explores the provision of a central tidal flow lane that can operate in either direction to provide additional capacity for general traffic during peak periods. This option will require movement of the western kerbline by 0.4m however is within the existing road reserve.

Figure 2-14 Option B4: Tidal Flow lane

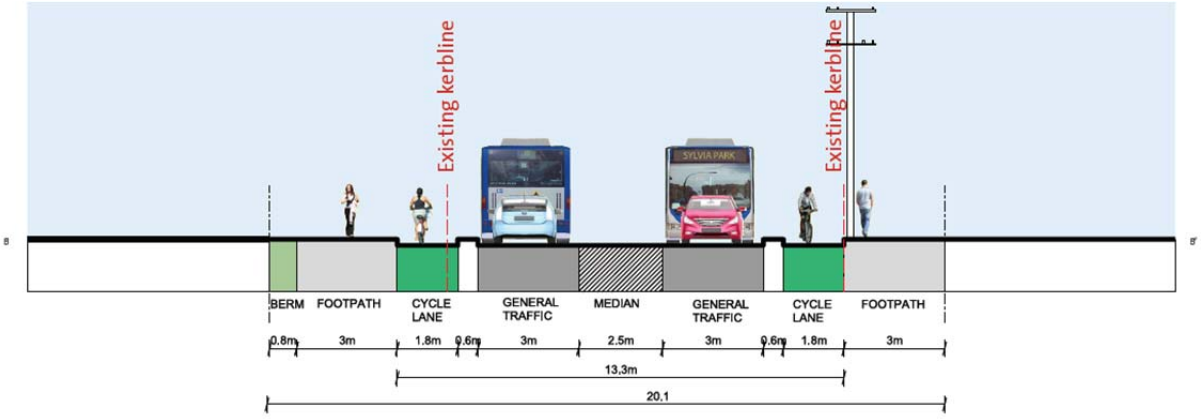


Mode	Provision
General traffic	■ A single central additional traffic lane provided in one direction that is interchangeable as required for peak periods. ■ Central flush median is removed
Public Transport:	■ Buses share general traffic lanes ■ Buses cross cycle lanes to access kerbside bus stops
Pedestrians and Cyclists:	■ Shared path maintained on the eastern side ■ On-road cycle lanes are reduced to 1.5m ■ Western footpath width increased to 1.8m

Option B5: Cycling and Walking Theme – Medium intervention

This option provides improved safety for cycling in a high speed/ high traffic environment as well as improving pedestrian provision. This option will require 1.5m widening of the existing western kerbline however is within the existing road reserve.

Figure 2-15 Option B5: Separated cycle lanes with flush median

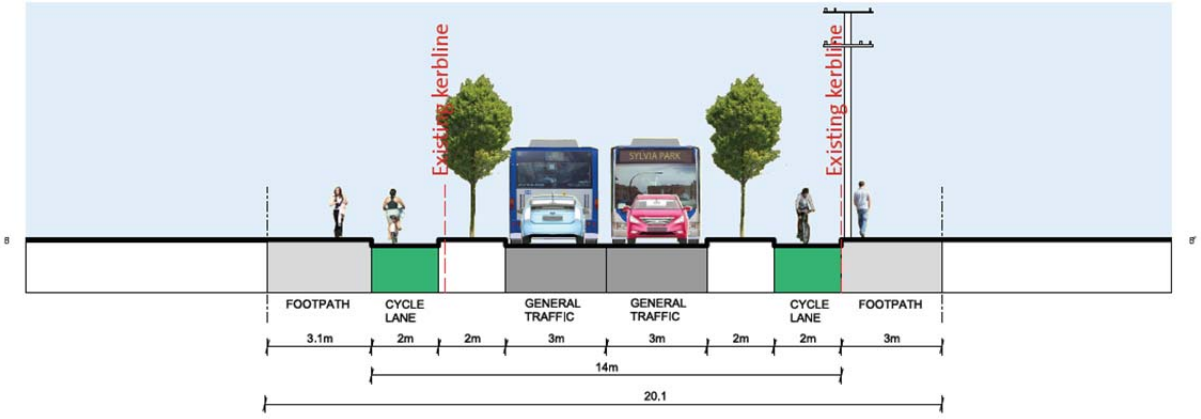


Mode	Provision
General traffic	■ Wide central flush median is retained
Public Transport:	■ Buses share general traffic lanes ■ No dedicated bus facilities
Pedestrians and Cyclists:	■ 1.8m dedicated separated cycle lanes with islands separating cyclists from general traffic. ■ Cycle lanes pass behind bus stops ■ 3.0m footpaths provided on both sides of the road

Option B6: Cycling and Walking Theme (alternative) – Medium intervention

This option further improves safety for cycling by providing vertical and wide horizontal buffers separating cyclists and general traffic. This option improves pedestrian provision and the urban design/place feel of this segment. It will require 2.2m widening of the existing western kerbline however is within the existing road reserve.

Figure 2-16 Option B6: Copenhagen-style separated cycle lanes



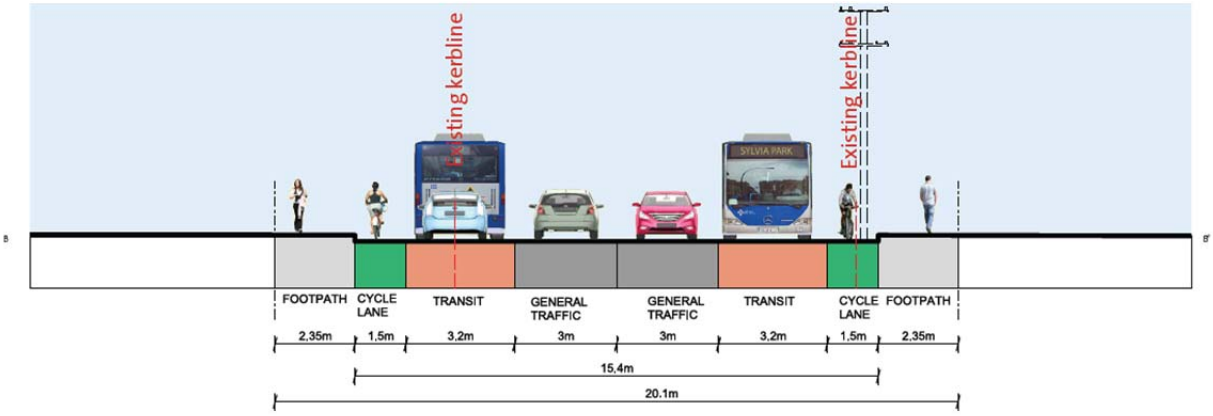
Mode	Provision
General traffic	■ Central flush median is removed
Public Transport:	■ Buses share general traffic lanes ■ No dedicated bus facilities

Pedestrians and Cyclists:	■ 1.8m dedicated separated cycle lanes with islands separating cyclists from general traffic. ■ Cycle lanes pass behind bus stops ■ 3.0m Shared paths provided on both sides of the road ■ Reduced widths for pedestrian to cross but they have to make three crossing movements

Option B7: Public Transport and Cycling Theme – Medium intervention

This option supports public transport by providing HOV lanes, as in B2, while also maintaining the existing cycling lanes. This option will require 3.6m widening of the existing kerbline however this can be achieved within the existing road reserve width.

Figure 2-17 Option B7: Transit and cycle lanes

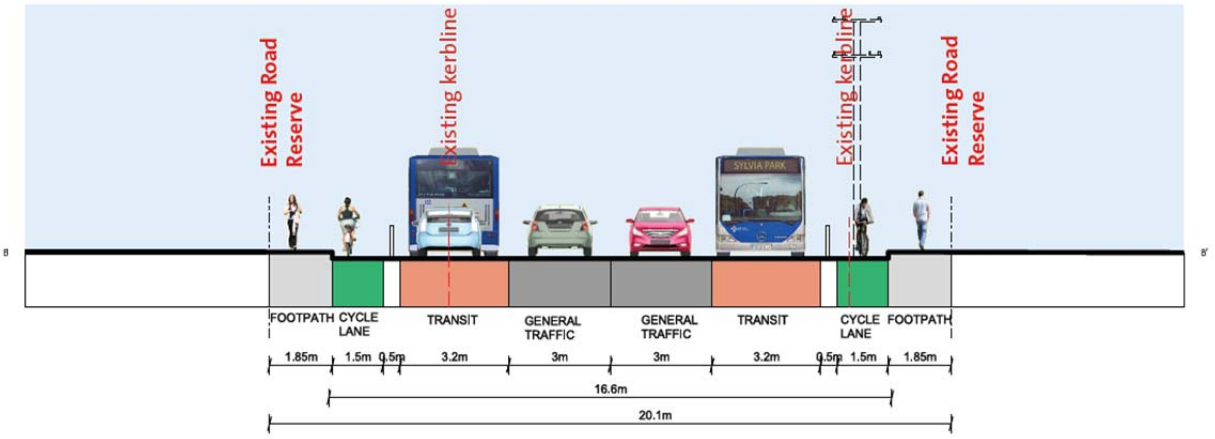


Mode	Provision
General traffic	■ General traffic lanes reduced to 3.0m ■ HOV priority lane provided in each direction. ■ Central flush median removed
Public Transport:	■ Buses use HOV lanes ■ Buses have to cross cycle lanes to access bus stops
Pedestrians and Cyclists:	■ On-road cycle lanes are reduced to 1.5m ■ Pedestrian footpaths widened/reduced to 2.35m

Option B8: Public Transport and Cycling Theme – High intervention

This option is similar to B6 as it supports public transport by providing HOV lanes, but it also provides improved safety for cycling in the high speed/high traffic environment. This option will require 4.8m widening of the existing kerbline and 0.2m of road reserve widening to achieve ATCoP recommended minimum dimensions.

Figure 2-18 Option B8: Separated cycling lanes and transit lanes

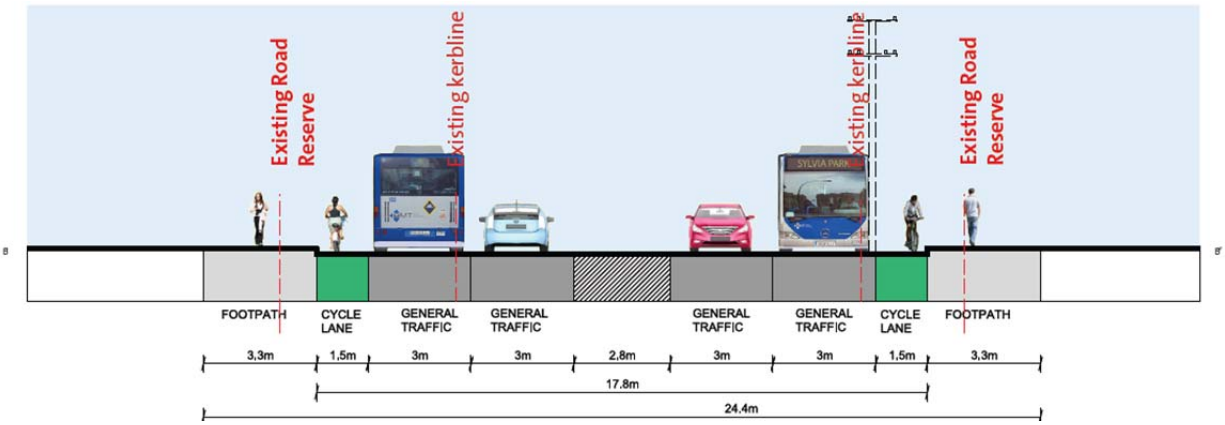


Mode	Provision
General traffic	■ General traffic lanes reduced to 3.0m ■ HOV priority lane provided in each direction. ■ Central flush median removed
Public Transport:	■ Buses use HOV lanes ■ Buses do not have to cross cycle lanes to access bus stops
Pedestrians and Cyclists:	■ 1.5m Dedicated separated cycle lanes passing behind bus stops ■ Pedestrian footpaths reduced to 1.85m ■ Requires under-grounding of overhead lines

Option B9: General Traffic Theme – High Intervention

This option provides improved consistency along the road corridor by providing the same facilities as existing in Segment A. A the road reserve is narrower in segment B than in A, this option will require 6.0m widening of the existing kerbline and 4.3m of road reserve widening to achieve the same dimensions.

Figure 2-19 Option B9: 4-laning and on-road cycle lanes consistent with Segment A-A'

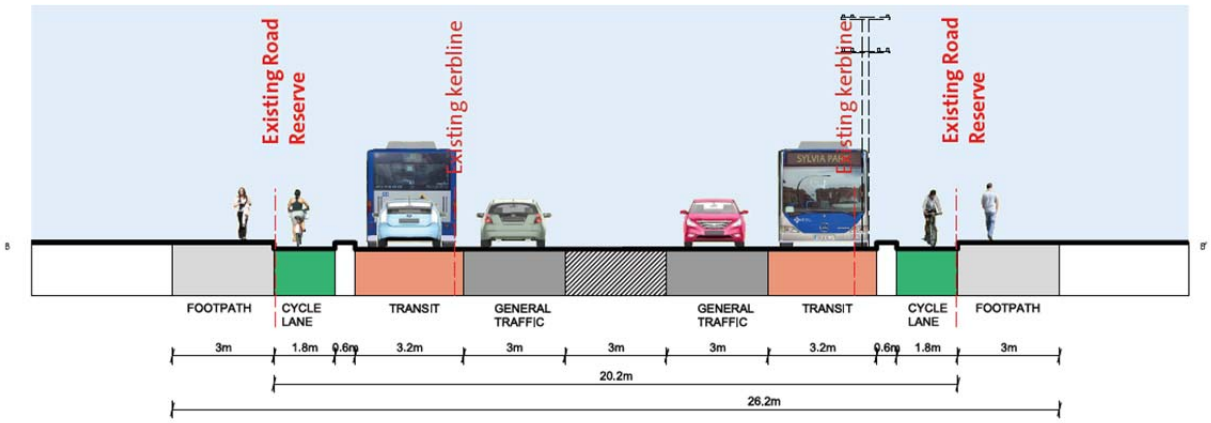


Mode	Provision
General traffic	■ Additional traffic lane in each direction, lanes reduced to 3.0m ■ Wide central flush median is retained in places
Public Transport:	■ Buses share general traffic lanes ■ No dedicated bus facilities ■ Buses cross cycle lanes to access kerbside bus stops
Pedestrians and Cyclists:	■ 1.5m on road cycle lanes provided ■ Footpath widened to 3.3m on both sides of the road ■ Wide road corridor, 17.8m, for pedestrians to cross ■ Requires under-grounding of overhead lines

Option B10: ATCoP minimum dimensions – High Intervention

This option supports both public transport by providing HOV lanes and cycling in a high speed/high traffic environment whilst maintaining a wide central flush median for turning movements. This option will require 8.4m widening of the existing kerbline and 6.1m of road reserve widening to achieve ATCoP recommended minimum dimensions.

Figure 2-20 Option B10: ATCoP minimum dimensions



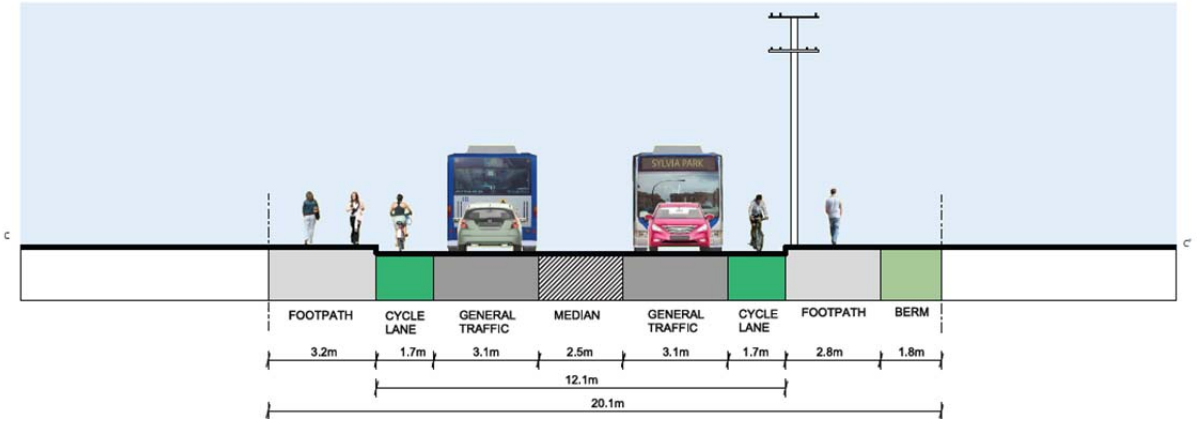
Mode	Provision
General traffic	■ General traffic lanes reduced to 3.0m ■ HOV priority lane provided in each direction. ■ 3m wide central flush median is retained
Public Transport:	■ Buses use HOV lanes ■ Buses do not have to cross cycle lanes to access bus stops
Pedestrians and Cyclists:	■ 1.8m on road separated cycle lanes provided. ■ Footpath widened to 3.0m on both sides of the road ■ Wide road corridor, 20.2m, for pedestrians to cross ■ Requires under-grounding of overhead lines

2.3 Segment C: Bayswater Avenue to Old Lake Road

The land use surrounding the segment of Lake Road between Bayswater Avenue and Old Lake Road is primarily residential with a localised town centre development at the northern end of the segment at the Lake Road/Bayswater Avenue Intersection. There are also localised neighbourhood centre style shops at the southern end of the segment to the west of the Lake Road/Old Lake Road intersection.

There are two, 3.1m lanes in each direction separated by a median up to 2.5m wide. There are 1.7m on-road cycle lanes and 2.5-3.2m wide footpaths in each direction, Figure 2-21. At the approach to the Belmont town centre intersection from Roberts Avenue, the median tapers out, the northbound cycle lane ends and Lake Road widens to two lanes.

Figure 2-21 Typical existing cross-section along segment C



There is a central pedestrian refuge just north of Montgomery Avenue but no other formal pedestrian crossing facilities along this segment. Power lines run overhead between Roberts Avenue and Regent Street with power poles against the eastern kerbline. There is no parking along this segment with the exception of a small section of Parallel parking on the western side of the road in front of the Old Lake Road shops.

There are two bus stops along this segment which service both school and public bus routes. Both bus stops have a painted bus box and modern bus shelter.

As the catchment south of the Lake Road/Bayswater Avenue Intersection decreases, the traffic demands reduce, therefore the priority for general traffic is low along this segment. Public transport, cycling and pedestrians still remain as high priorities and freight is considered a low priority.

2.3.1 Potential Future Corridor Themes

The potential future corridor themes and cross-sections for segment C are the same as per those shown above for segment B, with the exclusion of the general traffic four-laning options. The traffic demand and congestion is reduced south of Bayswater Avenue due to a reduction in the catchment size further south down Lake Road, therefore additional lanes may not be required.

2.4 Segment D: Old Lake Road to Seabreeze Road

The land use surrounding the segment between Old Lake Road and Seabreeze Road is mainly residential with a short section of neighbourhood centre shops on the western side at the intersection of Old Lake Road, as previously described in Segment C, Section 2.3.

Figure 2-22 Lake Road, segment D, looking northbound

This segment has two 3.1m wide lanes separated by a 2.5m flush median. There are 1.7m wide cycle lanes in each direction along this segment and a shared path on the western side of the road between Ngataringa Road and the start of Ngataringa Park. There are footpaths on both sides of the road, ranging from1.5-3.0m wide and a pedestrian zebra crossing south of the Lake Road/Old Lake Road intersection. The segment has a short section of power poles and overhead lines against the eastern kerb between Kawerau Avenue and Hanlon Crescent.

All of the seven side streets that exit out onto Lake Road along this segment are controlled by stop signs, with the exception of Seabreeze Road which is controlled by a give way. There are three bus stops along this segment which mainly service schools routes and one public bus service. The two bus stops outside Old Lake road shops do not have shelters. The third bus stop opposite Ngataringa Road has a historic bus shelter.

The agreed transport roles of this segment are for cycling and pedestrians to remain higher priorities and general traffic to be considered a medium priority. As this segment is not part of the proposed frequent network route, public transport is reduced to a medium priority and freight is considered a low priority.

2.4.1 Potential Future Corridor Themes

The potential future corridor themes and cross-sections for segment D are the same as per those shown above for segment C (excluding general traffic four-laning options). In addition, however, segment D also excludes any HOV lane options as the segment of Lake Road, south of Old Lake Road does not form part of the Frequent Bus Network.

2.5 Segment E: Seabreeze Road to Ariho Terrace

The land use surrounding the segment of Lake Road between Seabreeze Road and Ariho Terrace is mainly public open space with small areas of residential and light industrial. To the eastern side of Segment E is the Waitemata Golf Course. Ngataringa Park is on the western side with a small industrial area of landscape design supplies and a tyre shop to the south.

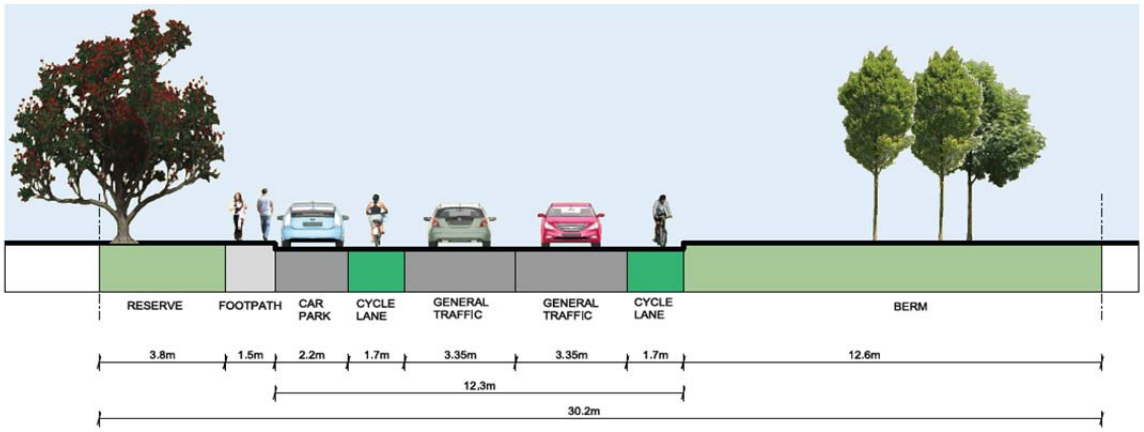
This segment is also known as Memorial Drive and is lined with Norfolk Pine and Pohutukawa Trees commemorating men from the area who lost their lives in the Second World War, Figure 2-23.

Figure 2-23 Lake Road (Memorial Drive), segment E, looking northbound

This segment has 3.35m wide lanes with a 2.2m lane of parallel parking on the western side. There is a short section of median at the northern end which tapers out where the Memorial Drive Trees begin. There are 1.7m wide cycle lanes in each direction throughout this segment. There is also a shared path on the western side of the road between Ngataringa Road and the start of Ngataringa Park, where it diverts westwards away from the road into the park. There is a 1.5m wide footpath along the western kerb but no footpath along the eastern side of Memorial Drive. There is a pedestrian refuge crossing facility opposite the entrance to Ngataringa Park. The road reserve totals 30.2m wide with a carriageway width of 12.3m.

The agreed transport roles of this segment are for cycling and pedestrians to remain higher priorities especially as this is a recreation type environment. General traffic is considered a medium priority. As this section is not part of the proposed frequent network route, public transport is reduced to a medium priority and freight is considered a low priority.

Figure 2-24 Typical existing cross-section along segment E



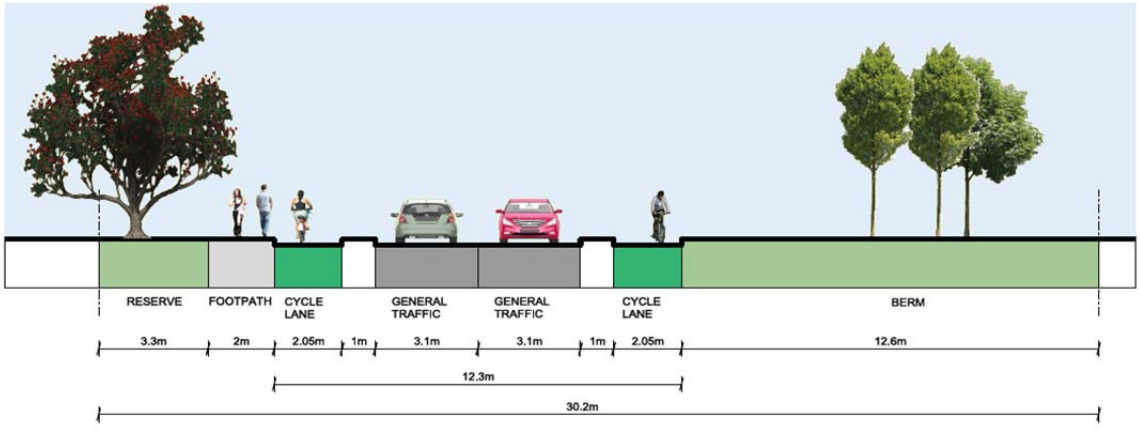
2.5.1 Potential Future Corridor Themes

Themes developed for this segment of the corridor have a focus around active transport modes. The focus on public transport along this segment has reduced due to the low volume of buses that travel south of Old Lake Road. General Traffic and public transport are therefore considered a medium priority. No HOV lane options have been included in these options given the minimal congestion and lack of inclusion of this section in the proposed frequent network route.

Option E1: Cycling Theme – Low intervention

This option provides improved safety for cycling in the open recreational environment, within the existing road carriageway.

Figure 2-25 Option E1: Separated cycle lanes

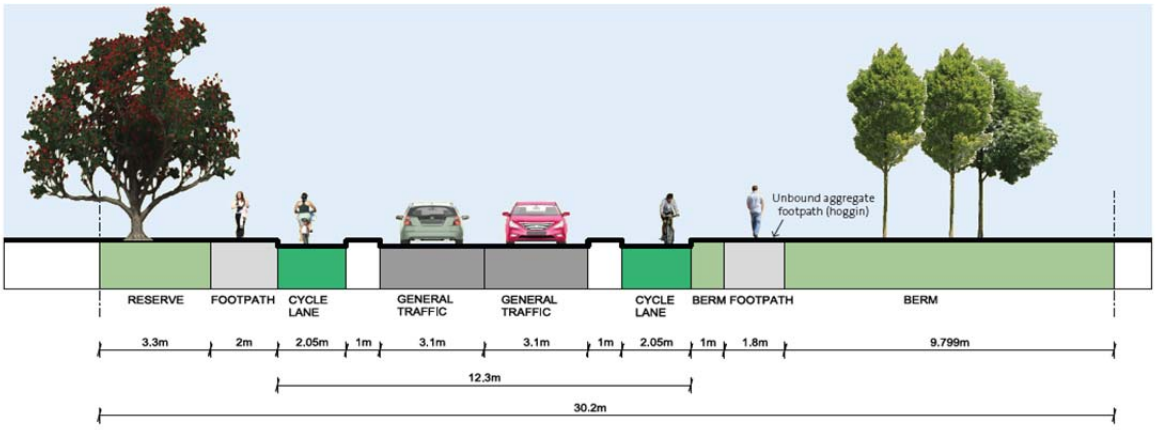


Mode	Provision
General traffic	■ Parking is removed from the eastern kerbline ■ Lane widths are reduced to 3.1m in each direction
Public Transport:	■ Buses share general traffic lanes ■ No dedicated bus facilities
Pedestrians and Cyclists:	■ Wide 2.2m dedicated separated cycle lanes with islands separating cyclists from general traffic. ■ Cycle lanes pass behind bus stops ■ Western footpath increased to 2m in width.

Option E2: Cycling and Walking Theme – Low intervention

This option provides improved pedestrian amenity through provision of an eastern footpath in addition to improved safety for cyclists within the existing road carriageway.

Figure 2-26 Option E2: Separated cycle lanes and eastern footpath



Mode	Provision
General traffic	■ Parking is removed from the eastern kerbline ■ Lane widths are reduced to 3.1m in each direction
Public Transport:	■ Buses share general traffic lanes ■ No dedicated bus facilities
Pedestrians and Cyclists:	■ Wide 2.05m dedicated separated cycle lanes with islands separating cyclists from general traffic. ■ Cycle lanes pass behind bus stops ■ Western footpath increased to 2m in width and eastern footpath added.

2.7 Segment F: Ariho Terrace to Albert Road

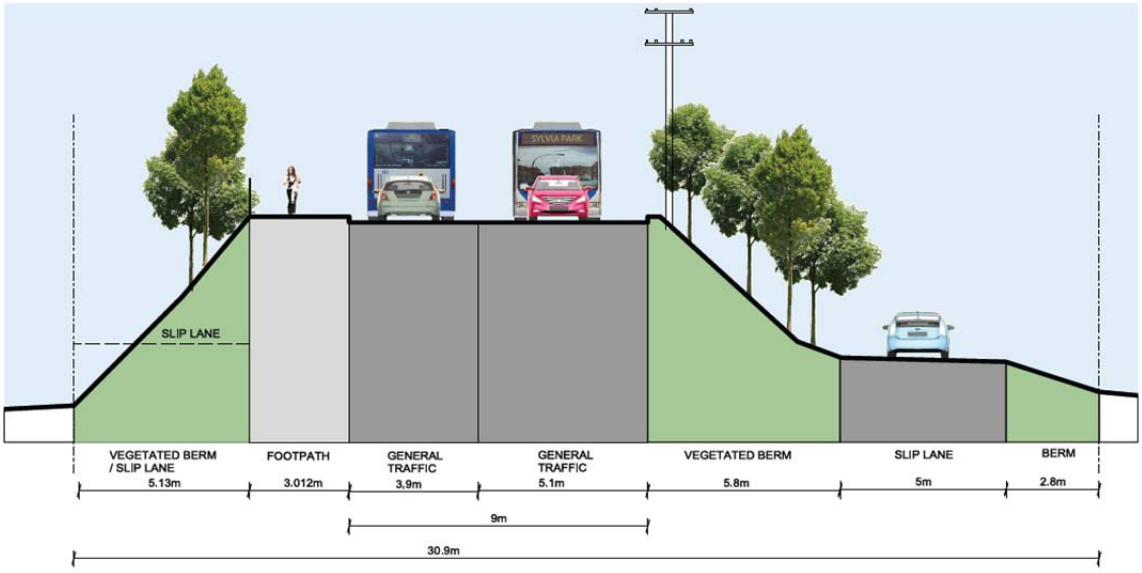
The land use surrounding the segment of Lake Road between Ariho Terrace and Albert Road is residential; however most properties are accessed from slip lanes that run parallel to Lake Road therefore resulting in few driveways that exit onto Lake Road directly.

At the northern end, opposite Ariho Terrace, the Devonport Fire Station is located. The corridor is lined by trees and has overhead lines along the eastern kerb, Figure 2-27. This segment of Lake Road has wide traffic lanes ranging from 3.9 to 5.1m in sections to provide additional width for vehicles turning right into side streets. There is also a tapering flush median at the intersection of Mozeley Avenue and Lake Road to provide a right turn box for southbound traffic.

The road reserve is up to 30.9m wide in this segment to including the slip lanes, Figure 2-28. There is a wide 3.0m footpath on the western side of the road. The footpath is absent from the eastern side along this length. North of Owens Road there is footpaths on both sides of the road with a cycle lane against the southbound kerb. There is a signalised pedestrian and cyclist crossing just north of the Owens Road intersection where the on-road cycle lane ends and transfers up onto the footpath. There is NSAAT along both sides of the road in this segment except for a small stretch of unmarked kerbline either side of the fire station.

Figure 2-27 Lake Road, Segment F, looking northbound

Figure 2-28 Typical existing cross-section along segment F



Alongside the northern boundary of the fire station is Abbotsford Way walkway providing pedestrian and cycle connection with Abbotsford Terrace and the southern end of Ngataringa Park. There is a historic bus shelter on the eastern side of the road with a half indented bus bay. The northbound bus stop has a painted kerbside box with modern glass shelter. The southern end of this segment terminates at Albert Road in a roundabout. There are no dedicated pedestrian crossing facilities at this roundabout.

The agreed transport roles of this segment are the same as for segment D. Cycling and pedestrians are to remain higher priorities and public transport and general traffic are considered a medium priority. Freight is considered a low priority.

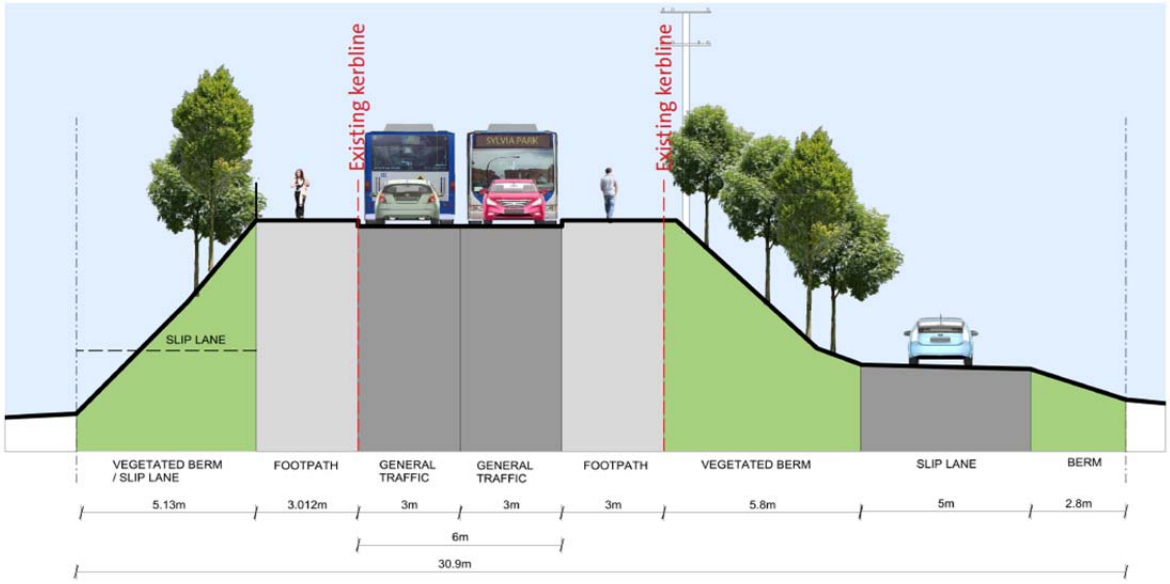
2.7.1 Potential Future Corridor Themes

The preferred theme developed for segment E will be considered for this segment to ensure continuity. Both environments are subject to the same network role demands and the similarity of land use provides similar advantages and challenges along each segment. Themes have also been developed for this short segment in isolation providing a focus on cycling and pedestrians, with general traffic and public transport considered a medium priority.

Option F1: Pedestrian Theme – Medium Intervention

This option supports active modes of transport through the provision of shared paths. This option will require 3.0m narrowing of the eastern kerbline however remains within the road corridor.

Figure 2-29 Option F1: Eastern footpath



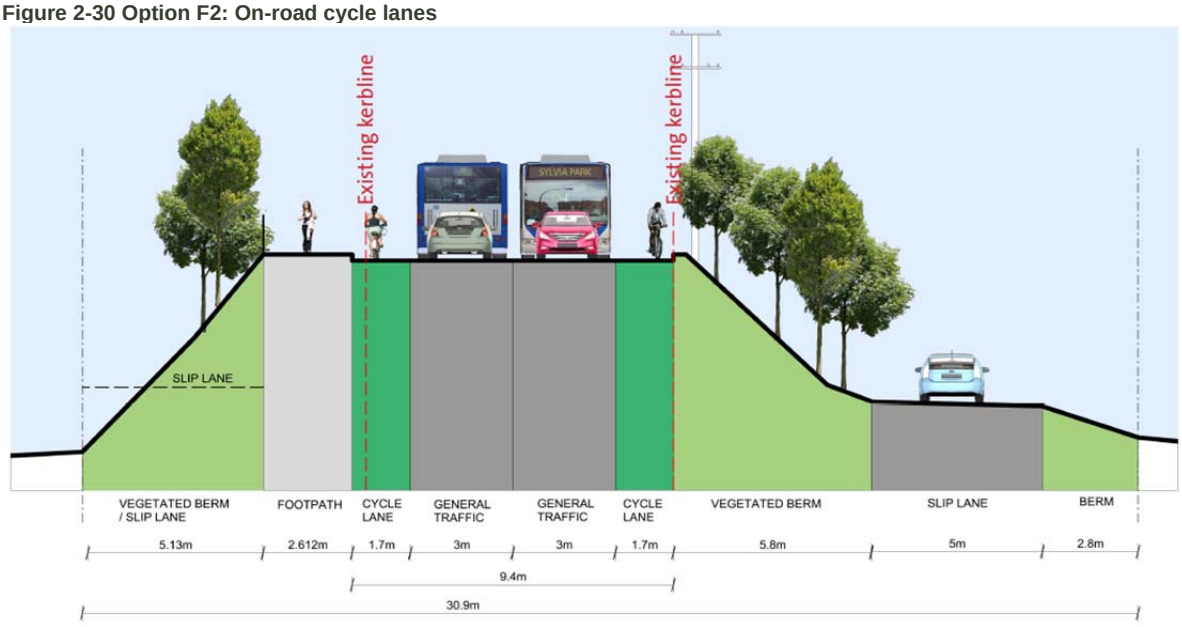
Mode	Provision
General traffic	■ Lane widths reduced to 3m in each direction, ■ Localised intersection variation and treatments
Public Transport:	■ Buses share lanes with general traffic ■ This option would require indented bus stops to remove buses from the general traffic lane when stopped.

Mode	Provision
Pedestrians and Cyclists:	■ Shared path added to eastern kerb ■ Pedestrian and cyclists occupy off road shared paths

Option F2: Cycle Theme – Medium intervention

This option provides dedicated cycling facilities in each direction. This option will require 0.4m widening of the western kerbline however remains within the road corridor.

Figure 2-30 Option F2: On-road cycle lanes

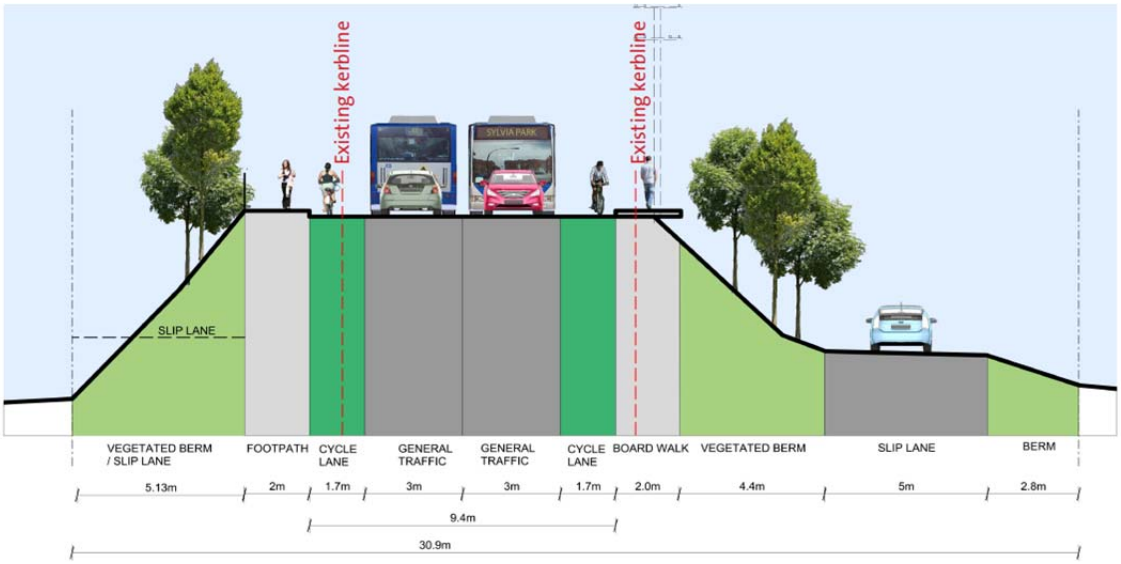


Mode	Provision
General traffic	■ Lane widths reduced to 3m in each direction ■ Localised intersection variation and treatments
Public Transport:	■ Buses share lanes with general traffic ■ This option would require indented bus stops to remove buses from the general traffic lane when stopped. ■ Buses have to cross cycle lanes to access kerb side bus stops
Pedestrians and Cyclists:	■ Pedestrians on the eastern side use the slip lane ■ Cyclists occupy 1.7m on road cycle lanes

Option F3: Cycle and Pedestrian Theme – High intervention

This option provides both dedicated on-road cycle lanes and footpaths in each direction. This option will require widening of the western kerbline by 1.0m and narrowing of the eastern kerb by 0.6m however remains within the road corridor.

Figure 2-31 Option F3: On-road cycle lanes and eastern pedestrian footpath



Mode	Provision
General traffic	■ Lane widths reduced to 3m in each direction ■ Localised intersection variation and treatments
Public Transport:	■ Buses share lanes with general traffic ■ This option would require indented bus stops to remove buses from the general traffic lane when stopped. ■ Buses have to cross cycle lanes to access kerb side bus stops
Pedestrians and Cyclists:	■ 2.0m wide footpath provided on the eastern side, will require cantilevering or retaining from the eastern berm ■ Western footpath width reduced to 2.0m. ■ Cyclists occupy 1.7m on-road cycle lanes ■ Requires under-grounding of overhead lines

3 Spot Locations

The development of potential options for three intersections has been undertaken to address a number of challenges at each spot. Spot plans have been developed for the intersections at Hauraki local shops, Belmont local centre and Albert Street Roundabout on the following pages.

A selection of the associated corridor cross section options has been made in the development of an option(s) for each intersection, in order to condense the number of potential intersection designs. These spot options will be refined further following agreement of the preferred cross-section(s) for each segment.

LAKE ROAD CORRIDOR MANAGEMENT PLAN

BELMONT LOCAL CENTRE

Spot Plan Investigations

EXISTING

TOWN CENTRE IMPROVMENTS WITH OPTION B4

Notes

Ⓐ Remove vehicular access slip lane arrangement (provide opportunity for outdoor dining, planting, artwork or other placemaking improvements)

Ⓑ Extend footpath and cycle paving out to lake road

Ⓒ Remove north-west corner slip lane at intersection (provide opportunity for outdoor dining, planting, artwork or other placemaking improvements)

Ⓓ Tighten up intersection corner radii

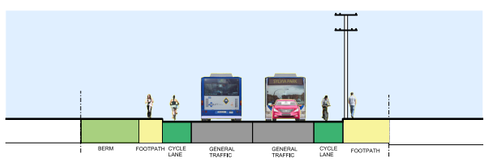
Ⓔ New northern pedestrian crossing to encourage 2-sided town centre/ safer pedestrian crossing opportunities

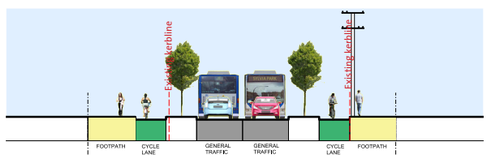
Ⓕ Review signal operations at Lake Road / Bayswater Ave intersection

Ⓖ Buses stop in lane on eastern side of Lake Road with cycle lane diversion at back of stop.

Key

- Belmont Shops
- Footpath
- Cycle lane
- General traffic lane
- Public Space
- Potential midblock controlled pedestrian crossing





N

LAKE ROAD CORRIDOR MANAGEMENT PLAN

Belmont Local Centre

DOCUMENT NUMBER A14153_007

Date: 28 October 2014

Revision: A

Plan prepared for Aurecon
on behalf of Auckland Transport by
Boffa Miskell Limited
*Author:***phillippaj@boffamiskell.co.nz**
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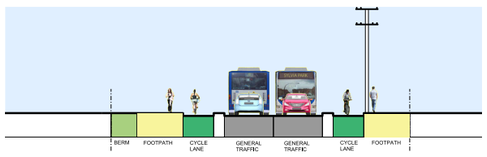
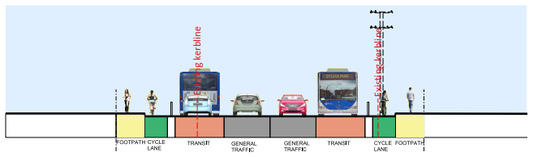
TOWN CENTRE IMPROVMENTS WITH OPTION B5

TOWN CENTRE IMPROVMENTS WITH OPTION B6





Notes

Ⓐ Remove vehicular access slip lane arrangement (provide opportunity for outdoor dining, planting, artwork or other placemaking improvements)

Ⓑ Extend footpath and angle parking out to Lake Road

Ⓒ Remove slip lane at north-west corner of intersection (provide opportunity for outdoor dining, planting, artwork or other placemaking improvements)

Ⓓ Tighten up intersection corner radii

Ⓔ New northern pedestrian crossing to encourage 2-sided town centre/ safer pedestrian crossing opportunities

Ⓕ Review signal operations at Lake Road / Bayswater Ave intersection

Ⓖ Buses stop in lane on eastern side of Lake Road with cycle lane diversion at back of stop.

Key

- Belmont Shops
- Footpath
- Cycle lane
- Transit lane
- General traffic lane
- Public Space
- Potential midblock controlled pedestrian crossing

N

LAKE ROAD CORRIDOR MANAGEMENT PLAN

Belmont Local Centre

DOCUMENT NUMBER A14153_007

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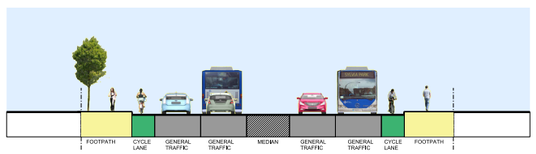
LAKE ROAD CORRIDOR MANAGEMENT PLAN

HAURAKI LOCAL SHOPS

Spot Plan Investigations

EXISTING

LOCAL CENTRE IMPROVEMENTS



Key

- Hauraki Shops
- Footpath
- Midblock controlled pedestrian crossing
- Public Space
- Zebra Crossing

Notes

- (A) Remove slip lane
- (B) Tighten up intersections
- (C) Consider northern pedestrian crossing opportunity (zebra crossing or refuge island)
- (D) Consider opportunities to provide for some further on street parking near the shops on western side.
- (E) Review of location and operation of existing signalised pedestrian crossing

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LAKE ROAD CORRIDOR MANAGEMENT PLAN

Hauraki Local Shops

DOCUMENT NUMBER A14153_007

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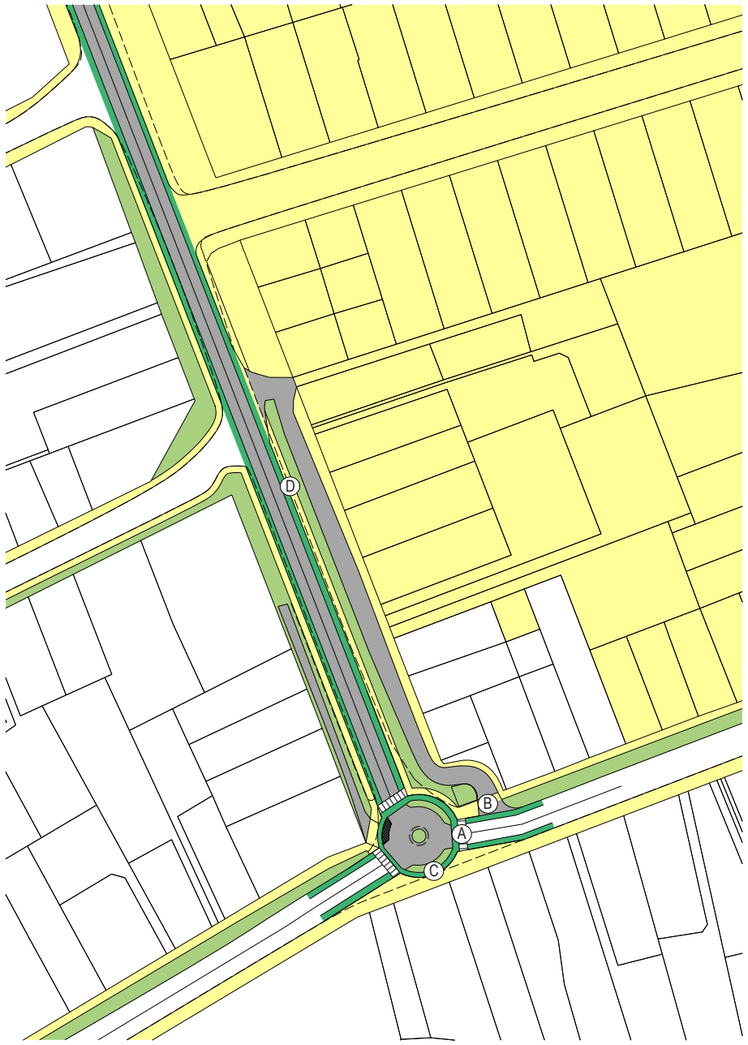
LAKE ROAD CORRIDOR MANAGEMENT PLAN

ALBERT STREET ROUNDABOUT & SLIP LANES

Spot Plan Investigations



Notes

Ⓐ Provide safer and more direct pedestrian crossing opportunities across each arm of the roundabout (consider potential zebra crossings)

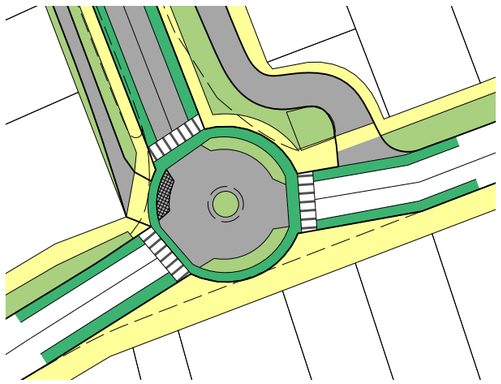
Ⓑ Improve pedestrian priority across entrances to slip lanes (consider vehicle crossing detail)

Ⓒ Consider provision of safer movement for cyclists through roundabout from all directions (subject to further discussion)

Ⓓ Consider provision of footpath on both sides of Lake Road between roundabout and Owens Road

Key

- Footpath
- Cycle lane
- General traffic lane
- Vegetated Berm
- Zebra Crossing



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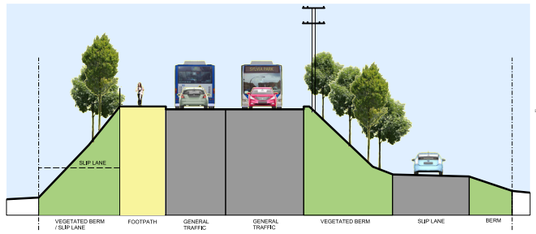
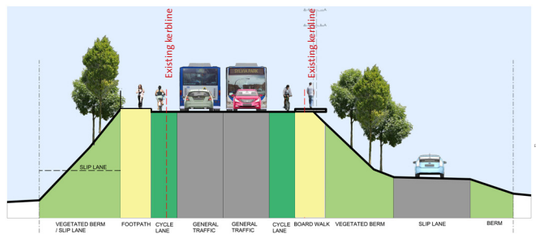


POTENTIAL WALKING & CYCLING IMPROVEMENTS



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LAKE ROAD CORRIDOR MANAGEMENT PLAN

Albert Street Roundabout

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Revision: A

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4 Corridor-wide Aspects

In addition to the options that have been developed through the cross sections and spots, there are a number of options best considered at a more macro, corridor wide level. These include:

- Alternative public transport offerings
- Bus stop design and spacing
- Bus priority at intersections
- Pedestrian crossing opportunities
- Traffic management options

Each of these is discussed in turn below.

4.1 Alternative public transport offerings

During the course of the study process a number of alternative public transport solutions have been raised by internal or external stakeholders. These include:

- Trams/ light rail
- Personal rapid transit (i.e. Skycab, ULTra)
- Ferry shuttles

It is recognised that full consideration of such options may require a wider strategic or network investigation, outside the context of a corridor management plan process. Notwithstanding this, it has been deemed appropriate to give consideration to whether these options may have merit.

These alternative options will be considered further during option testing and also discussed in the final (option selection) workshop.

4.2 Bus stop design and spacing

At present, bus stops are predominately standard kerbside arrangements. The exception is the recently reconstructed section between Esmonde Road and Jutland Road (which features two partial indented bus stops in each direction.

There are a number of options for refinement of these stops, including:

- Remove the indentation of the existing stops north of Jutland Road, to provide improved bus priority (i.e. buses do not need to merge with traffic while exiting the stop).
- Consider if there are any instances where indentation might be appropriate i.e. school stops with long boarding/ alighting times.

In addition to bus stop design, there are also options to consider in terms of bus stop spacing. Given the status of much of this corridor as a high frequency bus corridor, it is worth considering whether bus spacing should be increased to reduce bus delays.

Between Esmonde Road and Old Lake Road, there are 9 bus stops in each direction, equating to an average of 300m distance between stops. The Auckland Transport Code of Practice suggests a 400m stopping distance; however some further stopping distances have been proposed/ implemented elsewhere.

Given the above, it is suggested that options for optimising bus stop locations and spacing should be explored further. As the high frequency route along this corridor continues around Old Lake Road and Vauxhall Road, it is considered important that such investigation also extend to the full route length.

It is recognised that increasing bus stop spacing will have implications on catchment and walking distance to stops and therefore an optimum balance will need to be achieved.

Figure 4-1 Existing bus stop locations

4.3 Bus priority at intersections

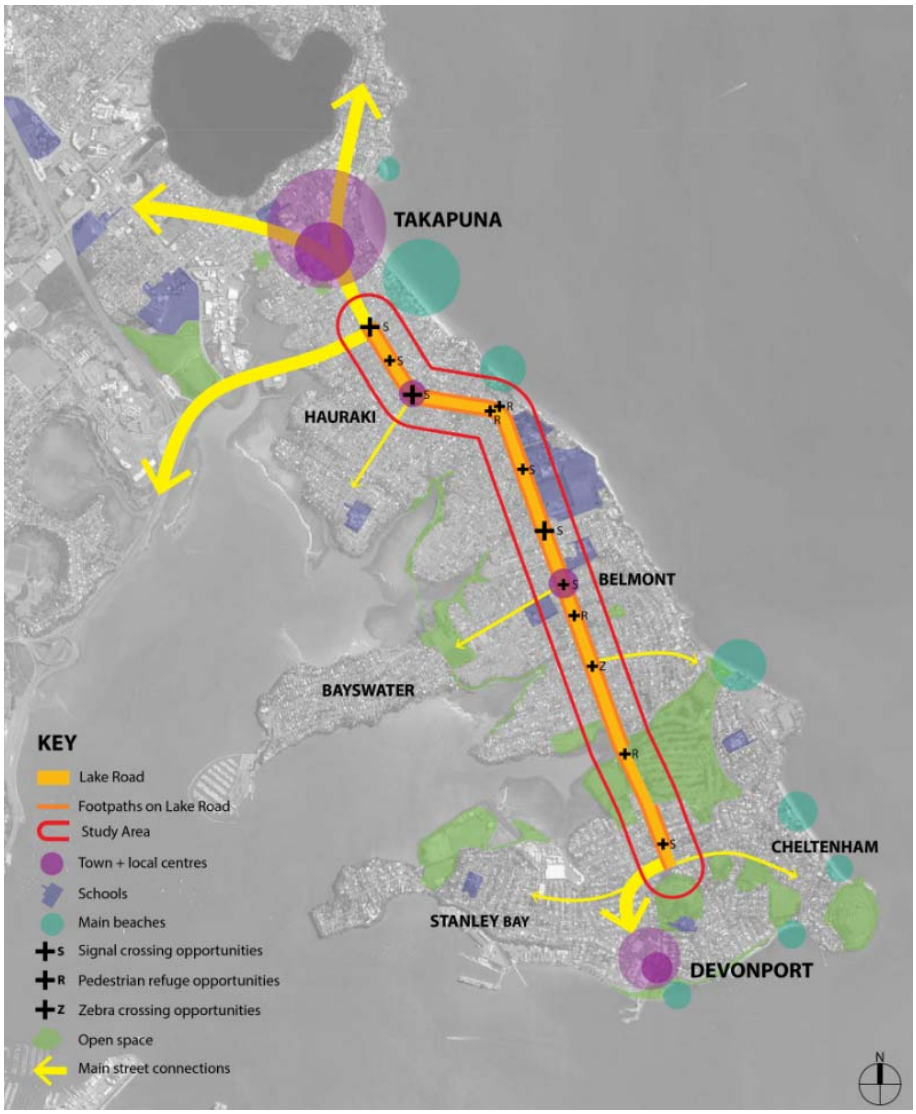
Buses are commonly delayed as the result of a number of factors along the corridor including congestion and intersection design. Re-configuring signals and intersections to prioritise bus movements will help reduce these delays, in particular at Lake Road/Old Lake Road. This intersection is currently controlled by a stop sign which delays to buses turning right out of Old Lake Road as they have to wait for an acceptable gap in the traffic streams. Signalisation of this intersection would improve the reliability of buses along the frequent bus route and improve pedestrian connectivity across Lake Road.

4.4 Pedestrian crossing opportunities

One of the issues identified during the initial project meetings and workshops was the barrier Lake Road caused to pedestrians needing to cross it.

There are a number of options to reduce the effect of this barrier. To aid in considering these options an analysis of pedestrian desire lines and existing crossing facilities has been undertaken, and is presented in Figure 4-2 below.

Figure 4-2 Lake Road pedestrian connections and crossing opportunities



Options to improve the ability for pedestrians to cross include:

- Reducing the distance between crossing facilities (locations with the greatest existing separation are south of Old Lake Road).
- Identifying significant desire lines that are not currently supported by crossing facilities and look at options to address this (examples may include opposite the Dacre Park sports field or near bus stops)
- Changing the type of crossing facility provided i.e. signalised or zebra rather than refuge (an example could be the refuge near the northern end of the Waitemata Golf Course)
- Ensuring retention of the existing Barnes Dance pedestrian phase at both Hauraki and Belmont town centres.
- Removing other impediments such as slip lane crossings at intersections
- Consideration of the implications of the Lake Road cross section on pedestrian crossing (i.e. wider carriageways increase crossing times and may provide reduced amenity for pedestrians).

4.5 Traffic management options

A principle issue identified during the initial stakeholder meetings and workshops, as well as community consultation undertaken outside the CMP process, is the level of vehicle congestion along the corridor.

It is understood that JTOC are exploring options for improving operations at signalised intersections along the corridor. It is recommended that this work is feed into the CMP as appropriate.

Examination of recent traffic flows and congestion mapping is also helpful in identifying opportunities. A specific instance of this is the Lake Road/ Winscombe Street signalised intersection, which has been referenced as a key location of congestion and delay. Traffic surveys indicate that the right turns from Lake Road (north and south) have minimal demand but are each allocated specific right turn bays. It is suggested that alternative arrangements be explored to provide an additional through lane northbound (localised at the intersection) through reallocation of space, perhaps through banning the right turns or having a shared through/ right lane.

As well as more conventional approaches, tidal flow operation has been raised as option to consider for Lake Road.

At present, only the section to the north of Jutland Road has more than a single lane of traffic in each direction. The implementation of a tidal flow scheme would therefore likely require a new cross section arrangement, an option for which is shown in an early part of this note.

Analysis of traffic survey information suggests that there is not a significant difference between northbound and southbound traffic during any of the peak periods. For example, the split between the two directions (northbound and southbound respectively) during the morning peak ranges from 57%/43% north of Jutland Road to essentially 50%/50% north of Bayswater Ave. The evening peak is even more equally split, with the greatest difference north of Bayswater Ave being 47%/53% (located north of Jutland Road). A clear justification for tidal flow is not therefore provided by the demands and would therefore then to relate to some alternative strategy prioritisation.

Other challenges with the implementation of a tidal flow system is the how to operate and communicate the system given the number of number of side roads and individual property vehicle crossings i.e. a movable barrier would restrict right turns, while a painted line separation (i.e. as per

Pakuranga Bridge) would require significant communication systems to clearly explain the current operating directions to vehicles entering the tidal system from side roads and vehicle crossings.

Given the challenges identified above, it is suggested that the appropriateness of a tidal flow system in this location would need to be carefully considered and whether any further investigation is warranted.

Notwithstanding the above, it should be recognised that increased use of more space efficient travel methods such as public transport, cycling and walking offer an alternative approach to addressing traffic congestion. This is reflected in the transport priorities developed during the corridor management plan process and is considered in detail through the cross section options part of this note.

Appendix G
Stakeholder workshop meeting minutes

Aurecon New Zealand Limited
Level 4, 139 Carlton Gore Road
Newmarket Auckland 1023
PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
F +64 9 524 7815
E auckland@aurecongroup.com
W aurecongroup.com

Meeting Note

To	**Jennifer Estong, Workshop Attendees**	From	Cassandra Kenworthy
Date	**12 September 2014**	Reviewed by	Craig Mitchell
Project	**Lake Road Corridor Management Plan**	Reference	243329
Subject	**Technical Stakeholder Workshop 1**		

1 Introduction

On the 5th of September 2014 the first technical stakeholder workshop was held with Auckland Transport, Auckland Council and NZTA stakeholders. The objectives of this workshop were to identify issues, opportunities and the preferred network role of the Lake Road study corridor. This meeting record summaries the process and outcomes from this first workshop.

2 Attendees

The following table lists the stakeholders who attended the workshop and their roles within their organisation.

Name	Organisation	Role
Jennifer Estong	Auckland Transport	AT Project Leader, Corridor and Centre Plans
Alastair Lovell	Auckland Transport	Transport Land Use Integration
Alison Johns	Auckland Transport	Community Transport North
Amit Patel	Auckland Transport	PT Infrastructure and Facilities
Andy Irwin	Auckland Transport	Stormwater Specialist
Brian Horspool	Auckland Transport	Community Transport (Walking and Cycling)
Brittany Morgan	Auckland Transport	Urban Design Specialist
Claire Macky	Auckland Transport	Walking and Cycling Specialist
Jude Tabuteau	Auckland Transport	Community Transport North- West
Karthi Govindasamy	Auckland Transport	Road Corridor Operations - North
Kimdon Nguyen	Auckland Transport	Investigation and Design North
Martin Dickson	Auckland Transport	Community Transport North
May Huang	Auckland Transport	Traffic Operations - North- West
Miguel Menezes	Auckland Transport	Network Performance
Mitchell Tse	Auckland Transport	Traffic Systems
Nicola Maire	Auckland Transport	Community Transport North- West
Robert Inman	Auckland Transport	Traffic Operations - North- West
Shweta Rattan	Auckland Transport	Public Transport Network Management
Trevor Clark	Auckland Transport	Parking Design
Andrew Smith	Auckland Council	Transport Strategy and Land Use
Catherine Edmeades	Auckland Council	City Transformation Projects

Name	Organisation	Role
David Sanders	Auckland Council	Team Leader Planning - North West
John Brown	Auckland Council	Built Heritage Implementation
John Stenberg	Auckland Council	Built Environment - Urban Design
David Croft	NZ Transport Agency	Planning and Investment
Cass Kenworthy	Aurecon	Transport Engineer
Craig Mitchell	Aurecon	Consultant Project Leader, Senior Transport Planner
Stuart Houghton	Boffa Miskell	Principal Urban Designer
Ben Clark	Boffa Miskell	Urban Designer

3 Corridor Analysis

Craig Mitchell and Stuart Houghton provided a brief overview of preliminary analysis undertaken for the corridor. Additional comments from the stakeholder group included:

- The need to further understand fundamental movement patterns, i.e. through the use of census data etc.
- School buses are also an important movement function alongside general public transport services.

Craig Mitchell indicated that a technical note will be prepared that presents and expands on the existing land use and transport context (to be issued by week ending 19th September 2014)

4 Issues and Opportunities

The first part of the workshop involved break-out sessions where stakeholders identified current issues and future opportunities along the corridor and adjacent area.

The stakeholder comments provided during these sessions are presented in diagrams attached to the end of this note. These diagrams also incorporate comments from the earlier stakeholder meetings.

5 Place context and transport role typologies

The second part of the workshop involved another break-out session; this time tasked with identifying place context and transport role typologies for sections of the corridor. For this purpose, the typology categories as outlined in the Auckland Transport '*Corridor Management Plan Guidelines'* were adopted.

The outcomes of this session will be further considered and incorporated into an upcoming Technical Note on the corridor's network role. However a brief summary of general outcomes from the session is provided as follows:

5.1 Place context typologies

Common themes from stakeholder groups on place context typologies included:

- Community focal point (Main Street) typologies at local centres of Hauraki and Belmont, as well as the shops on the corner of Old Lake Road.

- Further Community focal points (Community Facilities) typologies for the school hub between Hauraki and Belmont (i.e. Takapuna Grammar, Belmont Intermediate, Belmont Primary and Wilson School) and between Seabreeze Road and Abbotsford Terrace (I.e. Waitemata Golf Course, Ngataringa Park and Dacre Park/Sports field)
- Remaining areas/sections are predominately living (residential) typologies.

5.2 Transport Role Priorities

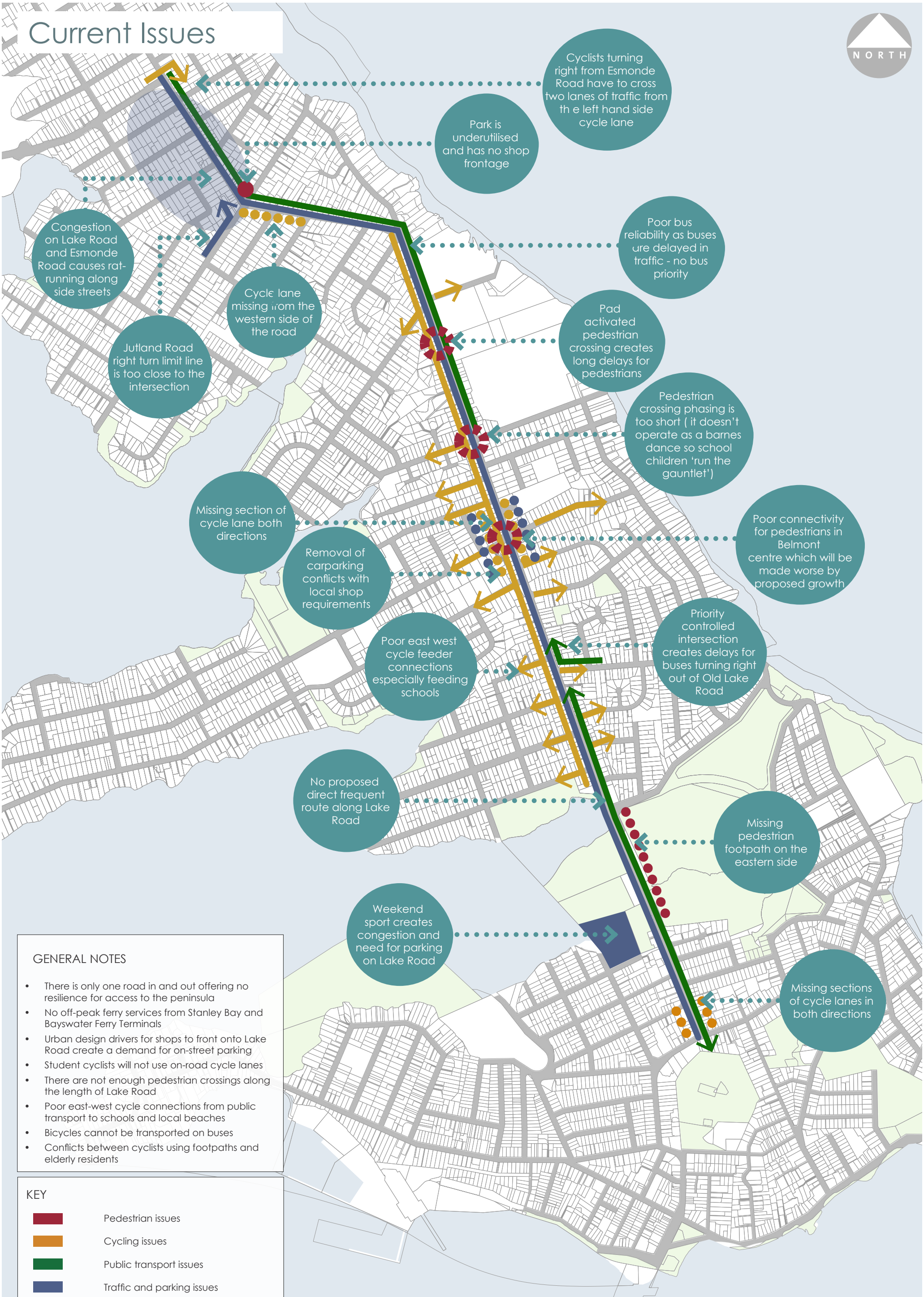
Common themes from stakeholder groups on transport role priorities included:

- Pedestrian, cycling and public transport were generally identified as high priority along the majority/full length of the corridor.
- Traffic generally identified as being medium priority, but with comments around reduced importance south of Bayswater Avenue.
- Freight was identified as being low priority.
- There were also some differing views on how public transport and traffic priorities may increase/decrease during weekends.

6 Next Steps

- Project team to prepare and circulate technical notes on ‘existing and future land use/transport context’ and the ‘corridor network role’.
- Next Stakeholder workshop scheduled for late September.

Current Issues



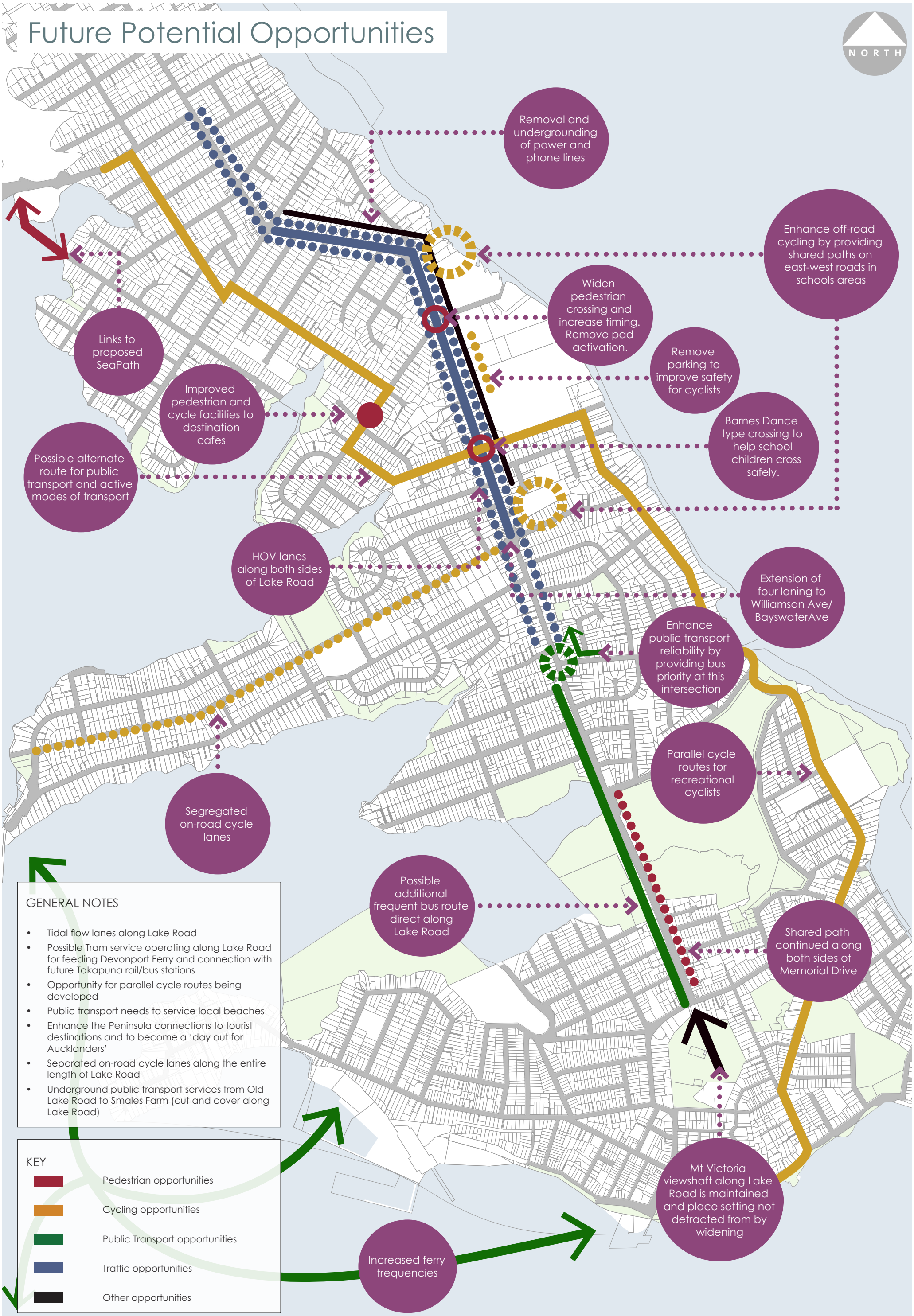
GENERAL NOTES

- There is only one road in and out offering no resilience for access to the peninsula
- No off-peak ferry services from Stanley Bay and Bayswater Ferry Terminals
- Urban design drivers for shops to front onto Lake Road create a demand for on-street parking
- Student cyclists will not use on-road cycle lanes
- There are not enough pedestrian crossings along the length of Lake Road
- Poor east-west cycle connections from public transport to schools and local beaches
- Bicycles cannot be transported on buses
- Conflicts between cyclists using footpaths and elderly residents

KEY

- Pedestrian issues
- Cycling issues
- Public transport issues
- Traffic and parking issues

Future Potential Opportunities



Aurecon New Zealand Limited
Level 4, 139 Carlton Gore Road
Newmarket Auckland 1023
PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
F +64 9 524 7815
E auckland@aurecongroup.com
W aurecongroup.com

Meeting Note

To	**Jennifer Estong, Workshop Attendees**	From	Cassandra Kenworthy
Date	**2 October 2014**	Reviewed by	Craig Mitchell
Project	**Lake Road Corridor Management Plan**	Reference	243329
Subject	**Technical Stakeholder Workshop 2**		

1 Introduction

On the 2nd of October 2014 the second technical stakeholder workshop was held with Auckland Transport, Auckland Council and NZTA stakeholders. The objectives of this workshop were to confirm the network role of the corridor and identify desired corridor outcomes of the Lake Road study area. This meeting record summarises the outcomes from this workshop.

2 Attendees

The following table lists the stakeholders who attended the workshop and their roles within their organisation.

Name	Organisation	Role
Jennifer Estong	Auckland Transport	AT Project Leader, Corridor and Centre Plans
Alison Johns	Auckland Transport	Community Transport North
Amit Patel	Auckland Transport	PT Infrastructure and Facilities
Brian Horspool	Auckland Transport	Walking and Cycling
Brittany Morgan	Auckland Transport	Project Specialist - Urban Design
David Tuson	Auckland Transport	Community Transport North/West
Hannah Jemmett	Auckland Transport	Travel Demand Planning
Jude Tabuteau	Auckland Transport	Community Transport North/West
Kimdon Nguyen	Auckland Transport	Investigation and Design North
Martin Dickson	Auckland Transport	Community Transport North/West
Ngan Truong	Auckland Transport	ITS Infrastructure
Richard Lloyd	Auckland Transport	JTOC
Robert Inman	Auckland Transport	Traffic Operations - Planning and Performance
Sayad Omar	Auckland Transport	Road Safety
Shweta Rattan	Auckland Transport	Public Transport Network Management
Weiwei Jiang	Auckland Transport	Transport Modelling
Andrew Smith	Auckland Council	Transport Strategy and Land Use
John Brown	Auckland Council	Built Heritage Implementation
John Stenberg	Auckland Council	Built Environment - Urban Design
Ross Moffatt	Auckland Council	Planning North-West
Callum Yule	NZ Transport Agency	Planning and Investment

Name	Organisation	Role
Cass Kenworthy	Aurecon	Transport Engineer
Craig Mitchell	Aurecon	Consultant Project Leader, Senior Transport Planner
Stuart Houghton	Boffa Miskell	Principal Urban Designer
Ben Clark	Boffa Miskell	Urban Designer

3 Additional Information to note

Additional information noted from stakeholders to the project team at this workshop included:

- 2,500 (approximately) staff are employed at the Devonport Naval Base and the neighbouring heavy machinery workshop.
- The modal share average for commuter cycling in Auckland is 1.3%.
- Travelwise Plans
  - Need to include the number of Takapuna Grammar School students who catch the ferry to school.
  - 'Park & Walk' is considered a sustainable option when the walk is further than 400m from the school. This reduces the traffic at the school gates.
  - Takapuna Grammar School has recently had a follow up survey undertaken including a trip origin map – *to be provided to Aurecon*
- Skateboarders are observed using the on-road cycle-lane to travel down to the Ngataringa Skate park.
- Cycle group 'Bike Devonport' could be engaged to advise on cycle facility aspirations. – *CM to discuss with JE*
- Approximate tourist numbers may be provided by i-SITE or ATEED.

4 Transport Priorities

CM introduced provisional network priorities as developed through Workshop 1. Comments on these from technical stakeholders included:

- The priority needs to be to provide people with an alternative to driving their car. Lake Road is an environment that can undergo a culture /shift.
- CMP's are designed to address deficiencies and provide priorities to address these. The focus is providing alternative transport options.
- General Traffic is considered the largest problem therefore it is likely that people may consider it the highest priority. We:
  - Need to ensure this perception is clearly addressed
  - 'Sell' the priorities as moving people not moving cars
- Cyclists are broken down further into two categories – both beginner and commuter cyclist need to be considered
- Cycling facilities need to reflect future demands not existing

- The operational cost is too high to have both a direct and the existing planned frequent route. The time difference is estimated to be minimal and all buses will be scheduled to meet ferry services.

Workshop Decision: General acceptance of provisional transport priorities but more detailed consideration should be given to different cyclist types and also the public transport requirements south of Old Lake Road.

5 Provisional Network Role – Overarching Goals

Workshop Decision: General agreement on the proposed goals. Minor amendments include:

- Goal 6 to be re-worded "Accommodates increased travel demand associated with recreational activities". Events are addressed under Temporary Traffic Management Plans rather than this CMP.
- The heritage element of the corridor is missing from these goals. CM to look at how to incorporate this with goals.

6 Desired Outcomes

CM introduced the proposed areas of focus for option development. This included cross sections, wider issues and spots (Belmont/Hauraki town centres, community areas of Takapuna Grammar School/Belmont Intermediate and Memorial Drive/Ngataringa Park/Waitemata Golf Course

6.1 Ideal Outcomes

Outcomes identified as desired by stakeholders included:

- Designed to ATCoP standards
- Separated cycle-lanes (physical separation)
  - Metro style: warranted by the volume of vehicles
  - Shared paths are too heavily trafficked by pedestrians
- Bus lanes/Transit lanes/peak hour/all day?
- 4-laning: we need to evaluate this option given some resident/stakeholder expectations
- Consider:
  - One lane tram line with passing lanes
  - Tidal bus lanes?
  - Tidal general traffic lanes
  - Unique opportunity to subsidise the bus service for a year.
- Central median is highly utilised but increases the crossing width (investigate the ideal width?)
- Opportunities for missing walkway link near Takapuna Grammar

7 Next Steps

- Project team to prepare and circulate workshop outcomes
- Option development and testing
- Further discussions with stakeholder groups as required
- Next stakeholder workshop scheduled for early November.

Aurecon New Zealand Limited
Level 4, 139 Carlton Gore Road
Newmarket Auckland 1023
PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
F +64 9 524 7815
E auckland@aurecongroup.com
W aurecongroup.com

Meeting Note

To	**Jennifer Estong, Workshop Attendees**	From	Cassandra Kenworthy
Date	**6 November 2014**	Reviewed by	Craig Mitchell
Project	**Lake Road Corridor Management Plan**	Reference	243329
Subject	**Technical Stakeholder Workshop 3**		

1 Introduction

On the 6th of November 2014 the third technical stakeholder workshop was held with Auckland Transport, Auckland Council and NZTA stakeholders. The objectives of this workshop were to discuss corridor options and confirm the preferred corridor strategy, including spatial allocations for the various sections of the Lake Road study area. This note summarises the outcomes from this workshop.

2 Attendees

The following table lists the stakeholders who attended the workshop and their roles within their organisation.

Name	Organisation	Role
Jennifer Estong	Auckland Transport	AT Project Leader, Corridor and Centre Plans
Brian Horspool	Auckland Transport	Walking and Cycling
Brittany Morgan	Auckland Transport	Project Specialist - Urban Design
Claire Macky	Auckland Transport	Project Specialist – Walking and Cycling
David Tuson	Auckland Transport	Community Transport North/West
Kimdon Nguyen	Auckland Transport	Investigation and Design North
Martin Dickson	Auckland Transport	Community Transport North/West
May Huang	Auckland Transport	Traffic operations - North/West
Miguel Menezes	Auckland Transport	Network performance
Nicola Maire	Auckland Transport	Community Transport North/West
Robert Inman	Auckland Transport	Traffic Operations - Planning and Performance
Shweta Rattan	Auckland Transport	Public Transport Network Management
Steve Wrenn	Auckland Transport	Public Transport Planning
Trevor Clark	Auckland Transport	Parking Design
Andrew Smith	Auckland Council	Transport Strategy and Land Use
John Brown	Auckland Council	Built Heritage Implementation
Ross Moffatt	Auckland Council	Planning North-West
David Croft	NZ Transport Agency	Planning and Investment
Cass Kenworthy	Aurecon	Transport Engineer
Craig Mitchell	Aurecon	Consultant Project Leader, Senior Transport Planner
Stuart Houghton	Boffa Miskell	Principal Urban Designer

3 Meeting Record

Item	Topic
1	**Introduction and welcome** Craig Mitchell (CM) welcomed the stakeholders and outlined the progress to date.
2	**Corridor Analysis** CM and Stuart Houghton (SH) provided a brief analysis of the predicted population, employment and transport growth for the corridor over the next 30 years based on the ART3 model scenario. Key points included: ■ Minimal population growth, less than 5%, is predicted over the next 30 years. Very low compared to the average across Auckland of 81% growth. Growth in employment is also low. ■ Car demands within the study area are expected to increase by approximately 1% during the AM peak. ■ Daily AM Peak transport by active modes is expected to increase by 35% within the study area.
3	**Strategic Priorities Recap** ■ Pedestrians, public transport (PT) and cyclist are considered a high priority along the length of the corridor ■ Freight and general traffic are considered low priorities in the southern section south of Bayswater Avenue. General Traffic is increases to a medium priority north of Bayswater Avenue. There are challenges with achieving the PT network frequency south of Old Lake Road to support PT as a high priority, therefore the priority could drop back to medium/low along this section.
4	**Option Evaluation** CM reinforced that: ■ The CMP process is not an occasion to assess the merits of redeveloping Lake Road against that of other corridors that may have larger issues. There are avenues for this assessment following the CMP process. ■ We do not need to resolve every detail at this early stage. We are generally looking at the desired future spatial allocation for the different modes along the corridor. At this stage CM provided an overview of the workshop process, outlining that the corridor sections, which had been broken down in terms of their current form and/or their function, will be evaluated first followed by spot locations and corridor wide aspects.
5	**Cross Section Options** CM commenced this section of the workshop by introducing the options for spatial allocation for the first four corridor segments, A-D. The key option differentiators being the: ■ presence or absence of high occupancy vehicle (HOV/transit) lanes; ■ type of cycle facilities provided (status quo/separated/shared paths) or not provided; ■ width of median provided or not provided; ■ width of the footpath and berm, and the ■ number of general traffic lanes (2 or 4). Following this option overview a voting process was carried out to shortlist the options and to establish if there is a consensus among stakeholders as to the preferred option for each cross section or identify options that are strongly opposed. Each workshop participant was given two blue voting dots to indicate like and two red dots to indicate dislike towards the options within each segment. Stakeholders were instructed they did not need to use all votes. Following the voting process, a plenary discussion was held to discuss voting outcomes of each option.

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<tr><th>Item</th><th>Topic</th></tr>
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Stakeholders were then asked to discuss the options for Segments E and F and consider that although they are separate segments in terms of land use, to ensure consistency along the corridor it is desirable to carry an option through both segments.

The results of the voting process, agreed preferred direction and comments raised by the workshop participants are noted in the following sections below:

Refer to Technical Note: Corridor Option Development for detailed descriptions and diagrams of the options listed below.
</td></tr>
<tr><td>5A</td><td>
Segment A – Esmonde Road to Jutland Road

Voting results:
<table>
<tr><th>Option</th><th>A0</th><th>A1</th><th>A2</th><th>A3</th><th>A4</th><th>A5</th></tr>
<tr><td>For</td><td>1</td><td>8</td><td>1</td><td>9</td><td>2</td><td></td></tr>
<tr><td>Against</td><td>2</td><td>3</td><td>2</td><td></td><td>2</td><td>9</td></tr>
</table>
Additional comments raised by stakeholders:

Need to better understand and evaluate the use of the median including its effects on speed and whether it is in fact safer for pedestrians.
Central planting along the median should be considered. SH indicated that in some instances this can make the road appear more highway-like and encourage higher speeds.
Options that involve narrowing of the existing footpath are unsuitable.
Share with care options for eastern footpath will provide for school children.
Safety improvements for cyclists at Esmonde Road Intersection need to be investigated.

Agreed Direction: The preferred direction includes transit lanes and separated cycle lanes with no kerbline widening, and retaining the existing footpath width, (Option A3). Removal of the central median would be required. Median removal is subject to a review of the safety and congestion impacts.

If the median is deemed a necessity for safety reasons then an alternative preferred option includes transit lanes with non-separated kerbside cycle lanes and a reduced width, central median, also within the existing kerbline, (Option A1).

Further widening of the road was strongly opposed and does not warrant further consideration
</td></tr>
<tr><td>5B</td><td>
Segment B – Jutland Road to Bayswater Avenue

Voting results:
<table>
<tr><th>Option</th><th>B0</th><th>B0</th><th>B1</th><th>B2</th><th>B3</th><th>B4</th><th>B5</th><th>B6</th><th>B7</th><th>B8</th><th>B9</th><th>B10</th></tr>
<tr><td>For</td><td>2</td><td>1</td><td>5</td><td>1</td><td></td><td>3</td><td>5</td><td>7</td><td>5</td><td>4</td><td></td><td></td></tr>
<tr><td>Against</td><td></td><td></td><td></td><td>1</td><td>8</td><td></td><td></td><td></td><td></td><td>1</td><td>9</td><td>8</td></tr>
</table>
Additional comments raised by stakeholders:

Cycling treatments should be continuous along each segment as much as possible
Need to address the intersection at Lake Road/Eversleigh Road/St. Leonards Road. Right turning traffic into Eversleigh, which supports a large catchment, creates congestion issues.
Tidal flow may be possible with caveats including separated cycle lanes and using the third lane as a peak transit lane.
An additional northbound lane for HOV vehicles may be preferred over tidal flow.
Transit lanes may not be necessary on the entire length of the route, just near major intersections.
Will need to address the practicalities of urban servicing including rubbish trucks and bus stops as well as emergency vehicle access and breakdowns.
Separator island treatments for the preferred option need to ensure pedestrians can cross safely and easily.

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<tr><th>Item</th><th>Topic</th></tr>
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<u>Agreed Direction</u>: For segment B the preferred direction includes separated cycle lanes, maintaining one lane in each direction separated by a central median and widening the footpath out to the full extent of the road reserve, (Option B5).

An alternative proposed direction is Option B6 which removes the central median providing the advantage of high urban amenity and an improved pedestrian/cyclist environment. However, further consideration is required to better understand the safety and congestion impacts. Retaining the median and providing this high urban amenity will require widening of the western kerbline.

If a high growth scenario along the peninsula eventuates, an alternative preferred long term direction may be to install transit lanes through four laning this segment. This option may require narrowing of the cycle lane buffer islands and both footpaths in order to achieve this within the road reserve, similar to Option B8.

Options requiring widening of the road reserve were strongly opposed.
</td></tr>
<tr><td>5C</td><td>
Segment C – Bayswater Avenue to Old Lake Road

<u>Voting results</u>:
<table>
<tr><th>Option</th><th>C0</th><th>C1</th><th>C2</th><th>C3</th><th>C4</th><th>C5</th></tr>
<tr><td>For</td><td>1</td><td>8</td><td></td><td>6</td><td></td><td></td></tr>
<tr><td>Against</td><td></td><td></td><td>7</td><td></td><td>4</td><td>6</td></tr>
</table>
<u>Additional comments raised by stakeholders</u>:
– Trees need to be added to the preferred direction, an integral element missing from the streetscape.
<u>Agreed Direction</u>: For segment C the preferred direction includes retaining the central median and providing separated cycle lanes (Option C3). Some kerb widening may be required.

An alternative option likely to be achieved without the need to widen the existing kerbline allows for improved urban amenity through greater streetscaping, (Option C1). Removal of the central median is required under this option; and further consideration would therefore be required to better understand the safety and congestion impacts.

Options including four-laning and/or widening were strongly opposed
</td></tr>
<tr><td>5D</td><td>
Segment D – Old Lake Road to Seabreeze Road

<u>Voting results</u>:
<table>
<tr><th>Option</th><th>D0</th><th>D1</th><th>D2</th><th>D3</th></tr>
<tr><td>For</td><td></td><td>12</td><td>4</td><td>11</td></tr>
<tr><td>Against</td><td>3</td><td></td><td></td><td></td></tr>
</table>
<u>Additional comments raised by stakeholders</u>:
– Widening options will need to consider the Road cut throughs between Achilles Crescent and Ngataringa Road.
– Trees improve the walking and cycling experience.
<u>Agreed Direction</u>: For segment D the preferred direction again includes separated cycle lanes and retaining the central median with one lane in each direction, Option D2, as in segment C. This option may require kerb widening.

The two alternative directions include removing the median to increase the space allocated to improved urban amenity/ streetscaping and/ or avoid any change to existing kerblines. One has a high level of urban amenity requiring widening of the existing kerbline Option D3, and the other provides a lesser degree of streetscaping to provide separated cycle lanes within the existing kerbline, (Option D1).
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Item	Topic
5E	**Segment E – Seabreeze Road to Ariho Terrace** Voting results: Voting wasn't undertaken for Segment E. Instead an open discussion with all participants was initiated. Additional comments raised by stakeholders: – A footpath along the eastern side of the road may be a future intervention but needs to be considered as a path through a park. Providing an eastern footpath will need to be discussed with a range of stakeholders including the RSA. – Use of the on-street parking is mainly weekend sport and event associated. – Boardwalk style paths could be considered to prevent inundation during flood rainfall events. Agreed Direction: The preferred direction along this section is to continue the separated cycle lanes and widen the western footpath. There was not strong support for a footpath down the eastern kerb as long as a safe crossing facility is provided at the northern end. It is preferred that the car parks along this segment are removed however further consideration as to their usage and available alternatives should be undertaken.
5F	**Segment F – Ariho Terrace to Albert Road** Voting results: As with Segment E voting wasn't undertaken for Segment F. Instead an open discussion with all participants was initiated. Additional comments raised by stakeholders: – Narrowing of the road lanes to less than 3m is acceptable as long as the width and tracking requirements of Navy and any other facilities are met. Agreed Direction: The preferred direction along this section is to continue the separated cycle lanes. This may require slight narrowing of the western footpath. As long as a safe crossing facility is maintained at the northern end it was generally considered acceptable that the footpath is not extended up the eastern kerb to Albert Road.
6	**Spot Options** SH introduced draft concept designs for important spot locations along the corridor. These included the Albert Road/Lake Road roundabout, Belmont Local Centre and Hauraki Local Centre. SH indicated that the spot options were dependant on the corresponding cross-sections and further refinement would be undertaken following the agreement on the preferred directions. Comments raised by stakeholders: – Albert Road Roundabout: if the roundabout is separated, it is important to ensure the sections leading up to it are also separated. – Belmont Town Centre Shops: it is very important that the options don't undermine the viability of the local centre. Signalising for cyclists should be considered to provide crossing opportunities before vehicles.
7	**Corridor Wide Options** CM indicated to stakeholders that there were other corridor wide options that have been considered in the Lake Road CMP. These include: ■ Pedestrian crossing opportunities ■ Public transport improvements (stop design and spacing, bus priority) ■ Alternative public transport offerings ■ Traffic management options ■ Stakeholder/Project team comments
8	**Next Steps** – Document workshop outcomes and circulate to the stakeholder team – Engage in further discussions with stakeholder groups to refine the preferred option(s) – Develop a sequencing and implementation plan – Issue draft CMP report to stakeholders for feedback (due 3rd December).

Appendix H
Implementation Plan

Funding Implementation Plan

CMP: Lake Road

Package Number	Identifier	Component	Project Description	Rational/Objective	Key Benefit to	BCR Likelihood	Short Term	Mid Term	Short 15/16	Short 16/17	Short 18/19	Short 19/20	Short 20/21	Medium 18/19	Medium 19/20	Medium 20/21	Medium 21/22	Medium 22/23	Medium 23/24	Medium 24/25	Medium 25/26	Medium 26/27	Medium 27/28	Long 29/30 +
1	Bus Stop Improvements - Esmonde Road to Old Lake Road (Segment A to C)		Evaluate existing bus stop locations and investigate the removal of-indented bus stops in section A. Implement bus stop upgrades in conjunction with bus stop location optimisation and also consider providing cycle lanes that wrap around the back of bus stops. This may include moving the bus stop from the slip lane at Belmont shops to a Lake Road kerbside position.	To achieve better balance between reduced stopping delay and maintaining catchment. With the roll out of the new network, Lake Road will be part of the Frequent Route Network and it is necessary that all bus stop amenities are up to the expected level of service .	PT	1-2																		
	1.1	Implementation of Bus Facilities along Lake Road				Low	$ 1,500,000		Inv/Design	Construct														
2	Corridor Improvement - Albert Road to Ariho Terrace (Segment F)		Improve pedestrian space and provision of segregated cycle ways to cater for all types of cyclists.	A dutch style roundabout will better cater for cyclists including commuter, recreational and beginners. Lake Road is part of the Regional Cycle Network, segregated cycle lanes will promote both walking and cycling, reducing the conflicts for pedestrains on shared paths. Roundabout re-configuration will reduce traffic speeds providing a safer environment for all road users.	Active mode, safety,	0-1																		
	2.1	Implementation of separated cycle lanes (less intersection upgrades)	Install separater islands and painted cycle lanes along the road carriageway. Remove Shared Path signage	To improve safety for cyclists and reduce conflicts with both pedestrains and vehicles				$ 500,000			Inv	Design/Consult	Design	Construct										
	2.2	Upgrade Lake Road/Albert Road roundabout to Dutch-style with improved pedestrain and cyclist facilities	Install cycle lanes and protector islands with pedestrain crossings on each approach. Provision of signs alerting drivers that they must give way to cyclists	Narrowing of approaches and providing cycling facilities will provide safer pedestrian crossing opportunities and better connections at this junction				$ 1,000,000				Inv	Inv	Design	Construct									
	2.3	Implementation of full cross-section	Improvements to streetscaping and urban amenity, removing berms and widening footpaths along both sides of the carriageway where possible. Under-grounding of power/phone lines.	To ensure continuity between the intersection and the road segment cross-section				$ 1,000,000						Inv/Design	Design	Construct	Construct						
3	Corridor Improvement - Seabreeze Road to Ariho Terrace (Segment E)		Improving pedestrian footpaths and pedestrain crossing safety and provision of segregated cycle ways to cater for all types of cyclists	To better embrace the memorial and recreational nature of this section of Lake Road which forms part of the part of the Regional Cycle Network and the Green Route.Signals will better cater for pedestrains promoting walking and recreation activities in Ngataringa Park	Active mode, safety, amenity	0-1																		
	3.1	Footpath Improvements	Widening of western footpath by 0.5m	Provide improved space for pedestrain in line with ATCoP standards			$ 50,000				Inv	Design/Consult	Construct										
	3.2	Implementation of full cross-section including separated cycle lanes	Install separater islands and painted cycle lanes along the road carriageway. Remove parking from the western kerbline.	To improve safety for cyclists and reduce conflicts with both pedestrains and vehicles. Dedicated, separated cycle facilities will further encourage cycling as a mode of travel in this area.				$ 1,000,000				Inv	Inv	Design	Construct									
	3.3	Signalisation of exisiting pedestrain refuge south of Seabreeze Road	Provision of signals and cycle facilities at this crossing	To improve safety at the pedestrain crossing as the footpath is discontinued along the eastern kerbline.			$ 100,000			Inv/Des	Construct												
4	Corridor Improvement - Old Lake Road to Seabreeze Road (Segment D)		Improve pedestrian space and provision of segregated cycle ways , while maintaining capacity for general traffic	To provide continuity with adjoining cross-sections. Lake Road is part of the Regional Cycle Network, segregated cycle lanes will promote both walking and cycling, reducing the conflicts for pedestrains on shared paths.	Active mode, safety, amenity	0-1																		
	4.1	Implementation of separated cycle lanes (less intersection upgrades)	Install separater islands and painted cycle lanes along the road carriageway. Remove Shared Path signage.	To improve safety for cyclists and reduce conflicts with both pedestrains and vehicles. Dedicated, separated cycle facilities will further encourage cycling as a mode of travel in this area. These will especially benefit cyclists in northbound uphill sections of the road.				$ 1,000,000						Inv/Design	Design	Construct	Construct						
	4.2	Implementation of full cross section (less separated cycle lanes)	Improvements to streetscaping and urban amenity, removing berms and widening footpaths along both sides of the carriageway where possible. Under-grounding of power/phone lines.	To provide a less cluttered pedestrian environment and ensure continuity with the adjoining segment cross-sections				$ 1,500,000										Inv/Design	Construct	Construct			
5	Corridor Improvement - Bayswater Avenue to Old Lake Road (Segment C)		Improve pedestrian space and provision of segregated cycle ways to cater for future growth in active modes. Improve bus priority and pedestrian crossing facilities at the local centre, a key pedestrain generator.	Lake Road north of Old Lake Road will become a Frequent Bus Route under the new Network Plan, the frequency of buses will increase . Provision of bus priority will improve reliability and efficiency of public transport. Also part of the Regional Cycle Network, segregated cycle lanes will promote both walking and cycling, reducing the conflicts for pedestrains on shared paths.	Active mode, safety, Existing community, development trips, PT, amenity	0-1																		
	5.1	Implementation of separated cycle lanes (less intersection upgrades)	Install separater islands and painted cycle lanes along each direction of the road carriageway. Remove Shared Path signage.	To improve safety for cyclists and reduce conflicts with both pedestrains and vehicles. Dedicated, separated cycle facilities will further encourage cycling as a mode of travel in this area. These will especially benefit cyclists on uphill sections of the road.				$ 1,000,000							Inv/Design	Design	Construct	Construct					
	5.2	Signalisation of Old Lake Road/Lake Road Intersection	Provision of signals, pedestrian crossings and cycle facilities at this intersection	To improve reliability for bus right turns and improve pedestrian accessibility to local shops.				$ 250,000						Inv/Design	Construct								
	5.3	Implementation of full cross section (less separated cycle lanes)	Improvements to streetscaping and urban amenity, removing berms and widening footpaths along both sides of the carriageway where possible. Under-grounding of power/phone lines.	To provide a less cluttered pedestrian environment and ensure continuity with the adjoining segment cross-sections				$ 1,000,000											Inv/Design	Construct	Construct		
6	Corridor Improvement - Jutland Road to Bayswater Avenue (Segment B)		Improve pedestrian space and provision of segregated cycle ways to cater for future growth and developments. Improve safety and pedestrian crossing facilities at intersections. Provide priority for multi-person carrying vehicles	Lake Road north of Old Lake Road will become a Frequent Bus Route under the new Network Plan, the frequency of buses will increase . Provision of bus priority will improve reliability and efficiency of public transport. Also part of the Regional Cycle Network, segregated cycle lanes will promote both walking and cycling, reducing the conflicts for pedestrians on shared paths.WIth the number of schools along this segment improving pedestrian and cycling spaces will likely encourage more students to walk or cycle to schools.	Active mode, safety,PT, amenity	0-1																		
	6.1	Bayswater Ave/ Lake Road Intersection upgrade																					
		6.1.1	Removal of slip lanes and signalisation optimisation	Enhance safety for pedestrian and cyclists including removal of slip lanes.	To reduce conflict with turning traffic and minimise pedestrian wait times and crossing distances.			$ 10,000,000						Inv/Design	Design	Construct							
		6.1.2	Cycle lanes through intersection	Continue cycle lanes through the intersection	Improve safety for cyclists through provision of a dedicated space fro them.			$ 500,000			Inv	Inv	Design/Cons	Design/Consu	Construct	Construct							
		6.1.3	Bus stop re-configuration	Remove bus stop from slip lane and install new in lane bus stop. Re-configure this space between Lake Road and the shops/rose gardens. Cycle lanes to wrap around behind bus stop.	Removing bus movements and stops from the slip lane car park arrangement on the eastern side. Provide for improved operation of car parking and potentially enhanced space for place-making opportunities associated with the local centre function such as outdoor dining, street trees and planting, seating opportunities, and artwork			$ 350,000						Inv/Design	Design	Construct	Construct						
		6.1.3	Full intersection cross-section implementation	Potential conversion of northbound lane to Transit lane or separated cycle lane	Upgrade intersection approaches to accommodate implemented segment cross sections.			$ 1,500,000						Inv/Design	Construct	Construct							
	6.2	Implementation of full cross-section (excludes Bayswater / Lake Intersection Upgrade)	Improve amenity and safety for pedestrians and cyclists while also enhancing provisions for public transport where possible. Improvements to streetscaping and urban amenity, removing berms and widening footpaths along both sides of the carriageway where possible. Under-grounding of power/phone.	To provide a less cluttered pedestrian environment.				$ 3,500,000										Inv/Design	Design	Construct	Construct		

Package Number	Identifier	Component	Project Description	Rational/Objective	Key Benefit to	BCR Likelihood	Short Term	Mid Term	Short 15/16	16/17	18/19	19/20	20/21	Medium 18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	Long 29/30 +
7	Corridor Improvement - Esmonde Road to Jutland Road (Segment A)		**Provide priority for multi-person carrying vehicles and improve cyclist safety throuh rovision of segregated cycle ways to cater for future growth.**	Lake Road will become a Frequent Bus Route under the new Network Plan, the frequency of buses will increase . Provision of busand multi person carrying priority will improve reliability and efficiency of public transport. Also part of the Regional Cycle Network, segregated cycle lanes will promote both walking and cycling..	Active mode, safety, Existing community, development trips, PT, amenity	0-1																		
	7.1	**Implementation of full cross-section**																						
		7.1.1 Separated Cycle Lanes	Install separater islands and painted cycle lanes along the road carriageway.	To improve safety for cyclists and reduce conflicts with vehicles traffic.				$ 1,000,000						Inv/Design	Design	Inv	Construct							
		7.1.2 Transit Lanes	Install painted transit lanes in each direction, including signage. Removal of the central median.	To improve the person carrying capacity through increased vehicle occupancy priority.				$ 1,000,000								Inv/Design	Construct							
8	Pedestrain Crossing Facilities Improvement		**Construction of crossing facilities at key desire lines and safety improvements to existing crossing facilities**	**Assessment of current pedestrian facilities and provide recommendations for improvements to current standard. Assessment should also take into account changes to future land use/ function and travel behaviour survey information.**	Active mode, safety, Existing community, development trips	1-2																		
	8.1	Implementation of increased and improved pedestrain crossing opportunities along Lake Road. (Excluding those already delivered as easy wins)					$ 600,000				Inv/Design	Construct	Inv/Design	Construct	Inv/Design	Construct								
9	Quick Wins (physical works projects under approx $200k total - i.e. may be																							
	9.1	Install electronic school zone signs to improve safety for children walking and cycling to schools.																						
	9.2	Implement a strategy of achieving consistent and regularly spaced street tree planting within the footpath adjacent to the kerb edge, along segments A-E as part of a multi-pronged strategy that enhances the amenity and safety of all street users and reduces the negative impacts of traffic on adjacent properties																						
	9.3	Signal Optimisation along Lake Road Corridor (study only - predominantly software)																						
	9.4	Implement painted cycle lanes through the Belmont Shops to create more continuous cycle provision prior to more medium term																						
	9.5	Installation of multi-modal way-finding signage supported by maps especially linking key PT hubs/stops and cycling/walking routes.																						
	9.6	Provide painted buffer outside existing cycle lanes where space allows to begin the re-distribution of carriageway space prior to physical separation projects																						

10	Non-physical works (e.g. monitoring, project review, lobbying etc)
	10.1 Review suite of identified pedestrian crossing opportunities and implement any 'easy win' outcomes
	10.2 Implement frequent bus route along Lake Road as part of Regional Public Transport Plan
	10.3 Review configuration of Lake Road/ Winscombe intersection, and in particular, opportunities to use right turns on Lake Road more effectively.
	10.4 Signal optimisation review of signalised intersections along the corridor.
	10.5 Review requirements for central medians in line with directions for arterials elsewhere in Auckland. Consider if banning movements at some side roads to help reduce delay associated with turning vehicles, and also any opportunities for increased tree planning and footpath widening.
	10.6 Consider opportunities to extend the transit lane arrangement south along Lake Road
	10.7 Review population and employment growth trends and if higher than expected, investigation four lane option

Appendix I
References: Relevant policies and plans

References: Relevant policies, plans and projects

Corridor Management Plan Guidelines Version 2 (October 2012)

The Auckland Plan 2012

New Zealand Census 2001, 2006, 2013

Proposed Auckland Unitary Plan

Final Draft Takapuna North CMP (July 2013)

Devonport Strategic Land Use and Transport Study (October 2013)

Transit New Zealand Over-dimension Vehicle Route Maps (November 2004)

Auckland Transport Regional Cycle Network (March 2014)

Auckland Transport Draft Parking Discussion Document (2014)

Devonport Peninsula Transport and Land Use Study (May 2006)

Devonport-Takapuna Local Board Area Plan (July 2014)

Devonport-Takapuna Local Draft Board Area Plan Engagement Feedback (August 2014)

Devonport-Takapuna Local Board Plan 2011

Takapuna Centre Based Transport Study (March 2014)

Takapuna Strategic Transport Study 2012 Update (August 2012)

Auckland Traffic Management Unit Land Road Capacity Improvements (2008)

Post Implementation Review, Lake Road Widening (October 2014)

Auckland Transport 2016 All Day Planned New Network

Auckland Transport Traffic Count Data (June 2014)

Lake Road Intersection surveys (June 2014)

Auckland Transport Cycle Network Plan 2030

School Travel Wise Plans

Auckland Transport Congestion Maps

Auckland Council Capacity for Growth Study (November 2012)

Richard Paling Consulting Journey to work patterns in the Auckland Region Report (July 2014)

School and Public Bus Services Patronage Data

Devonport Bike Plan

Additional Waitemata Harbour Crossing Project

Devonport Wharf and Marine Square Upgrade Project

SkyPath and SeaPath Projects

Aurecon New Zealand Limited
Level 4, 139 Carlton Gore Road
Newmarket Auckland 1023
PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
F +64 9 524 7815
E auckland@aurecongroup.com
W aurecongroup.com

Aurecon offices are located in:
Angola, Australia, Botswana, Chile, China, Ethiopia, Ghana, Hong Kong, Indonesia, Lesotho, Libya, Malawi, Mozambique, Namibia, New Zealand, Nigeria, Philippines, Qatar, Singapore, South Africa, Swaziland, Tanzania, Thailand, Uganda, United Arab Emirates, Vietnam.