Auckland Transport
An Auckland Council Organisation

Takapuna North

Corridor Management Plan 2013

Prepared for Auckland Transport
Prepared by Flow transportation specialists

flow
TRANSPORTATION SPECIALISTS

Executive Summary

This document outlines the proposed Corridor Management Plan (CMP) for Takapuna North. This provides a 30 year strategic concept for the key arterials within the study area, namely Forrest Hill Road, East Coast Road, Shakespeare Road, Kitchener Road, Hurstmere Road, Killarney Street, Taharoto Road and Anzac Street. The document is structured to provide an overview of the process followed and broad technical issues that have been analysed.

Document Control

Report Title: Takapuna North Corridor Management Plan

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Document Approval

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Executive Summary

continued

A CMP identifies large-scale strategic concepts or ideas that set out a desired future condition for one or more arterial streets. A CMP sets out an integrated transport and land use strategy, and an associated phased implementation plan for the management and development of key road corridors within Auckland.

A CMP is not intended to be a fully resolved or detailed scheme plan for implementation. Instead a CMP identifies areas of change that can then be focussed on with more detailed investigations and planning over the coming years. This approach is an efficient and effective way of coordinating strategic transport planning.

A CMP typically brings together and reconciles the various transport and land use plans, policies and strategies for a specific area and spatially illustrates the outcomes sought from the various documents. That is, the CMP offers a unique opportunity to understand how the corridor spatially accommodates the needs identified.

The Need For Change

The Auckland Plan sets a strategic direction for Auckland and its communities that integrates social, economic, environmental, and cultural objectives. The plan outlines a high-level development strategy to give direction and enable coherent, co-ordinated decision-making by Auckland Council and other parties.

Takapuna is identified in the Auckland Plan as a "Metropolitan Centre" and illustrated in the Development Strategy Map as expecting "most change". Metropolitan Centres are defined in the Auckland Plan to accommodate a large proportion of the city's future residential, retail and employment growth. Generally these areas will serve a sub-regional catchment and be supported by efficient transport networks.

The Auckland Regional Transport model, "ART3", uses land use inputs from the Auckland Strategic Planning (ASP) model to predict future traffic flows. Data from the ASP model has been extracted to establish the expected change in land use patterns within Takapuna.

Significant growth is forecast for Takapuna over the next 30 years (being the period this CMP forecasts to), with the population of the wider Takapuna area predicted to double from 6,000 to between 12,000 and 12,900 residents from 2011 to 2021. In terms of longer term trends, population growth is predicted to slow in the 20 years to 2041, with a further 4,600 to 5,500 residents forecast for the wider area. Much of this growth is to be concentrated within the Takapuna metropolitan centre, where approximately two thirds of the population growth is expected to occur.

Employment is also forecast to grow considerably. With 11,000 employees currently, total employment across the wider Takapuna area is projected to increase by between 4,400 and 5,300 from 2011 to 2021. A further 3,400 to 3,700 extra jobs are predicted in the 20 years to 2041. In terms of the distribution of this growth within Takapuna, virtually all the additional employment is predicted to occur within Takapuna town centre.

The anticipated growth in residents and employees will lead to increased traffic movements about the Takapuna area, although it is recognised that this increase in traffic movements will be limited by the capacity of the road network. Without widening or building new roads it is not going to be possible to cater for the growth anticipated by car travel alone.

A much greater emphasis needs to be given to walking, cycling and public transport to accommodate future growth in Takapuna. The future growth of Takapuna as a successful metropolitan centre is highly dependent on increasing the mode shares of these travel choices.

Design Philosophy

The Takapuna North CMP is premised on the reallocation of road space, rather than "wholesale" road widening. There may be localised widening required at specific locations, typically associated with any proposed intersection changes.

To make optimal use of the existing road reserve in order to achieve the future network roles, changes in the existing road configuration are required. In deciding how to reallocate the road space the following summarises the design philosophy given for each mode requiring space within the road reserve. Further information regarding the Design Philosophy for the Takapuna North CMP is provided in **Section 5** of the main report.

Key aspirations for each corridor

The following table summarises the key aspirations for each corridor. Further details for each corridor are provided for within the report.

Mode	Design Philosophy
	• car travel remains a very important transport mode in the study area • desire to reduce the impact of vehicular traffic on other modes • recommends lane width of 3.0 m to encourage lower vehicle speeds and minimise the space taken up by private vehicles
	• improving public transport is a critical component in realising the growth aspirations for Takapuna • bus lanes or bus priority measures on key arterials • to be achieved primarily through the reallocation of road space where available, or localised widening in some locations
	• all streets need to cater for cycling • facilities to cater for both adults and children (10 years and over) • separated cycle lanes are critical to cater for the target market • bi-directional cycle lanes also recommended for some east-west corridors
	• ability for pedestrians to safely move about the study area is also paramount within the design philosophy • pedestrians must be afforded a quality environment with safe crossing points to key destinations • promoting that where side roads meet the main corridors, the intersection design is appropriate to provide a quality pedestrian amenity – e.g. narrowing kerb radii and crossing distance
P	• required in some, but not all locations along the corridor • parking bays are kept to a minimum, at 2.0 m wide
	• where space allows, provision for greater landscaping should be provided • assists in stormwater treatment
	• integrate Low Impact Design (LID) stormwater management measures • Future road design in the study area needs to consider flood risk related to known flood plains, overland flow paths and impoundment

Table ES-1: *Summary of the Design Philosophy for each mode*

Corridor	Key Aspirations	Mode to Benefit
Forrest Hill Road	Improve intersection of Forrest Hill/East Coast Road to achieve • Bus priority • Lower speeds for vehicles negotiating the intersection • Improved pedestrian and cycling crossing opportunities • Improved bus priority measures northbound, if necessary	
	Improved pedestrian crossing opportunities via refuge islands introduced at desire line locations	
East Coast Road	Provision of Separated Cycle Lanes along the corridor length	
	Local Node Intensification – as the area intensifies over the lifespan of this CMP there is likely to be a need for the corridor to respond to these areas through improved pedestrian amenity	
	Improved bus priority measures southbound leading into the Milford town centre	

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Corridor	Key Aspirations	Mode to Benefit
Kitchener and Hurstmere Roads	Improve intersection of Kitchener Road/Shakespeare Road/ East Coast Road to achieve • Bus priority • Improved pedestrian amenity	
	Provision of Bus Priority Measures, seeking to bypass congested areas on the approached to Milford and Takapuna town centres respectively	
	Provision of Separated Cycle Lanes	
	Improve intersection of Hurstmere/Kitchener to achieve • Improved pedestrian amenity • Encourage extraneous traffic to travel via Killarney Street • Slow vehicle speeds approaching Takapuna town centre	
Anzac Street	Provision of on road cycle lanes in both directions	
	Provision of Bus Priority Measures seeking to bypass congested areas	
	Town centre influence. Cross section to encourage • Slower vehicle speeds. Public transport and cyclists share road space • Greater pedestrian amenity • Active frontages	
	Improved pedestrian amenity with signalised crossing proposed between Barrys Point Road and Auburn Street	
Killarney Street	Provision of bi-directional cycle lanes on the northern side, with on road cycle lanes linking to and from the bi-directional section	
	Improve intersection of Hurstmere/Kitchener to achieve • Improved pedestrian amenity • Encourage extraneous traffic to travel via Killarney Street • Slow vehicle speeds approaching Takapuna town centre	
	Signalised intersection with The Terrace to accommodate • Improved pedestrian amenity • Ability for cyclists to enter/exit the bi-directional cycle lane	
Taharoto Road	Investigate existing intersection configurations to improve pedestrian amenity through the removal of the left turn slip lanes. Intersections of interest are: • Taharoto – Shakespeare – Wairau • Taharoto – The Boulevard • Taharoto - Northcote	
	Improved bus priority measures. Results in the loss of a vehicle lane in some location in favour of bus priority measures. Four lanes for private vehicles are maintained across the corridor as a whole	
	Improved pedestrian crossing opportunities via possible signalisation of Rangitira Avenue or Ngaio Street	
Shakespeare Road	Provision of bi-directional cycle lanes on the southern side.	
	Provide bus priority measures for • Westbound movement leading into Taharoto Road • Eastbound movement leading into East Coast Road.	
	Signalised intersection with Alma Road to • Improve pedestrian amenity • Cater for cycle turning movements	
	Improved pedestrian amenity on southern side through dedicated and widened footpath	
	Improve intersection of Shakespeare/East Coast/Omana Road to achieve • Bus priority • Improved pedestrian amenity	

Table ES-2: *Summary of Key Aspirations for each corridor*

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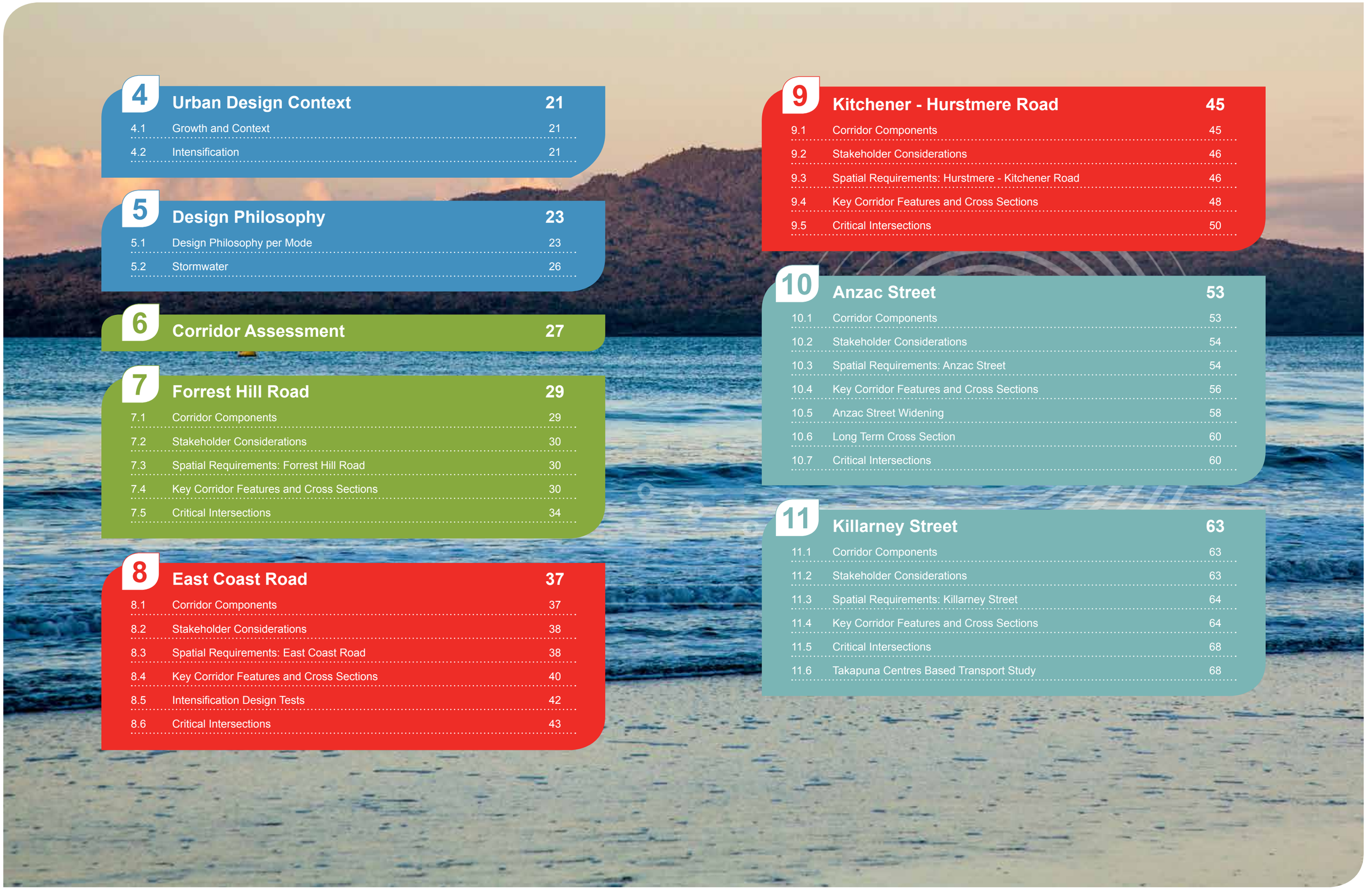


Introduction

1

Figure 1-1: *Picture taken from East Coast Road looking down on Shakespeare Road (horizontally) and Kitchener Road on the left (1910's)*

Flow Transportation Specialists Ltd, Urbanismplus and Transport Planning Solutions have prepared the following Corridor Management Plan (CMP) for the Takapuna North study area.

1.1 Study Area

The study area of the Takapuna North CMP is illustrated in **Figure 1-2** and consists of the following key corridors:

- Forrest Hill Road
- East Coast Road
- Kitchener Road
- Hurstmere Road
- Anzac Street
- Killarney Street
- Taharoto Road
- Shakespeare Road.

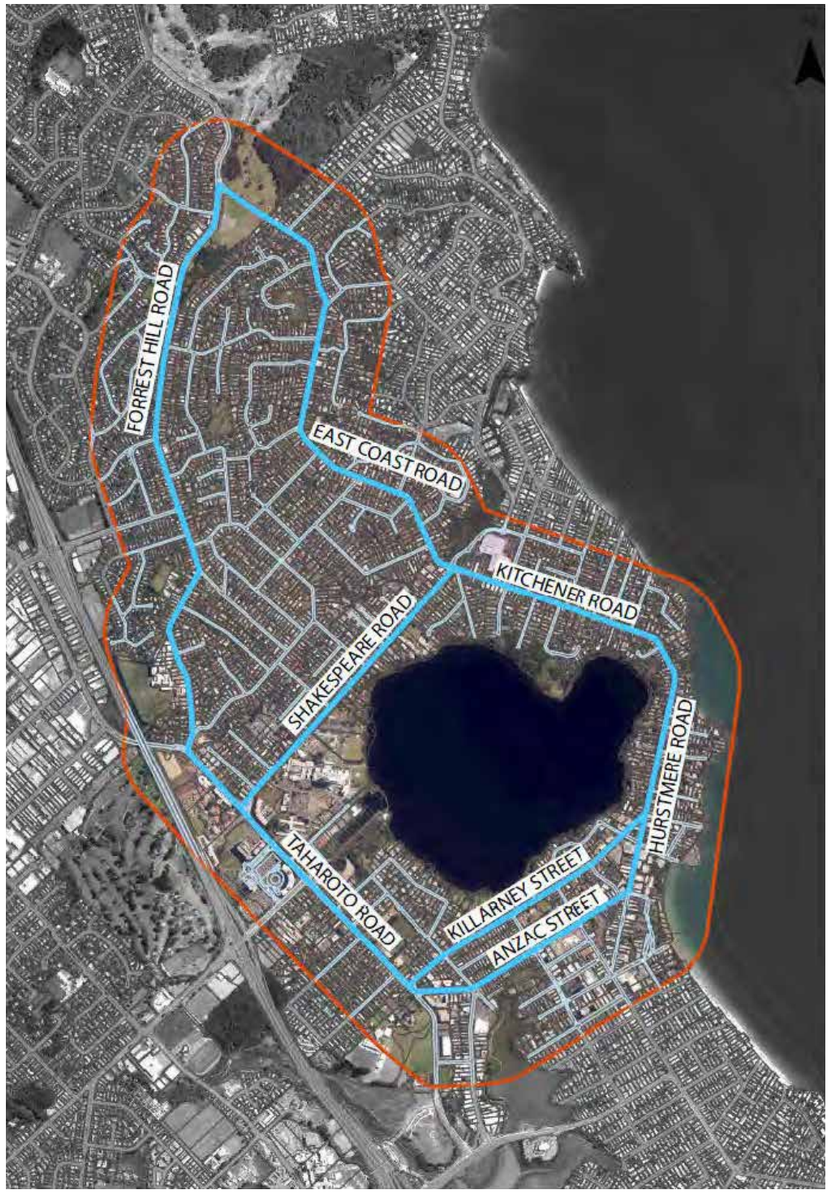


Figure 1-2: Study Area

1.2 Purpose of this Document

This document outlines the proposed Corridor Management Plan (CMP) for Takapuna North. This provides a 30 year strategic concept for the key arterials within the study area. The CMP is aimed at helping coordinate and align the many incremental steps that will be necessary in achieving a long-term implementation programme of corridor improvements. This CMP is a key tool in pulling together and integrating the various existing strategies and policies of Auckland Council (Council) and Auckland Transport and as such should not be seen as a new direction or policy position. The CMP also helps to identify points of tension or uncertainty around what new research and technical analysis could be prioritised. Ultimately this CMP aims to help ensure the right questions are being asked and the right answers are being given in order to understand the future configuration of the key arterials within the Takapuna North study area and how its adjoining land uses are anticipated to interact with the corridor.

The document is structured to provide an overview of the process followed and broad technical issues that have been analysed. This will include a clear statement of directions that have been taken and assumptions which have been made. This will be followed by the presentation of scaled cross section plans for the study area. These plans are not intended to be immediately buildable, but have been validated to ensure they are technically feasible and that key implementation issues are identified up front. The cross sections are intended to provide a steer as to the importance of the various land use and transportation elements for this corridor. Hence, there may be occasions where concessions need to be made (due to topography, spatial or cost constraints, for example) and whilst these may impact on the delivery of the proposed cross sections, it is important to maintain the overall priority of space and themes identified through the CMP process.

This CMP is expected to be reviewed approximately every 5 years, or as may become necessary if any significant changes in the area are to occur, including physical, operational or strategic changes.

1.3 What is a Corridor Management Plan

A CMP identifies large-scale strategic concepts or ideas that set out a desired future condition for one or more arterial streets. A CMP sets out an integrated transport and land use strategy, and an associated phased implementation plan for the management and development of key road corridors within Auckland.

A CMP is not intended to be a fully resolved or detailed scheme plan for implementation. Instead a CMP identifies areas of physical or other change that can then be focussed on with more detailed investigations and planning over the coming years. This approach is an efficient and effective way of coordinating strategic transport planning.

It is noted that CMP's are currently non-statutory documents. Their role is to help guide future transport and associated land use planning decisions for the corridor. In addition, a CMP may be in whole or part relied on in the preparation of statutory policies and plans.

1.4 Auckland Transport Corridor Management Plan Guidelines

Auckland Transport is responsible for developing and reviewing CMPs for arterial roads in the Auckland region. As previously described, a CMP is an important tool for planning and implementing transport improvements for a corridor and is based on an integrated assessment of both the transport and land uses within the corridor. The CMP provides a long-term vision for the corridor and an implementation plan of short, medium and long term actions.

A range of organisations, stakeholder groups and consultants had input into developing the Auckland Transport CMP Guidelines. Producing CMPs that align with this methodology will provide consistency across the Auckland region. The multidisciplinary and stakeholder-focussed approach to the methodology will also result in actions that are accepted and supported by different Council technical stakeholder groups and external stakeholder organisations.

The "CMP Guideline and Simplified Procedure" document prepared by Auckland Transport in October 2012 (Version 2) is intended as a reference guideline for those involved in preparing Corridor Management Plans. It is structured to provide a succinct summary of the basic methodology (based on eight key milestones) that are expected to be appropriate for most, if not all, CMP projects. The milestones, once achieved, assist in guiding the project team through the process and the use of these guidelines will ensure consistency between CMPs for different corridors in the Auckland region.

Relationship of a CMP to other planning documents

2

A CMP typically brings together and reconciles the various transport and land use plans, policies and strategies for a specific area and spatially illustrates the outcomes sought from the various documents. That is, the CMP offers a unique opportunity to understand how the corridor spatially accommodates the needs identified.

As identified in the CMP Guidelines, explicit links are expected between a CMP and the Auckland Plan, Regional Land Transport Strategy, Passenger Transport Network Plan and the Regional Arterial Road Plan.

Other regional transport network strategies and land use plans may also be created over time that will likewise help guide a CMP. Local Area (Spatial) Plans and the Unitary Plan will also provide key input to CMPs. Auckland's strategic transport planning framework and how a CMP is expected to fit within this is shown in **Figure 2-1**:

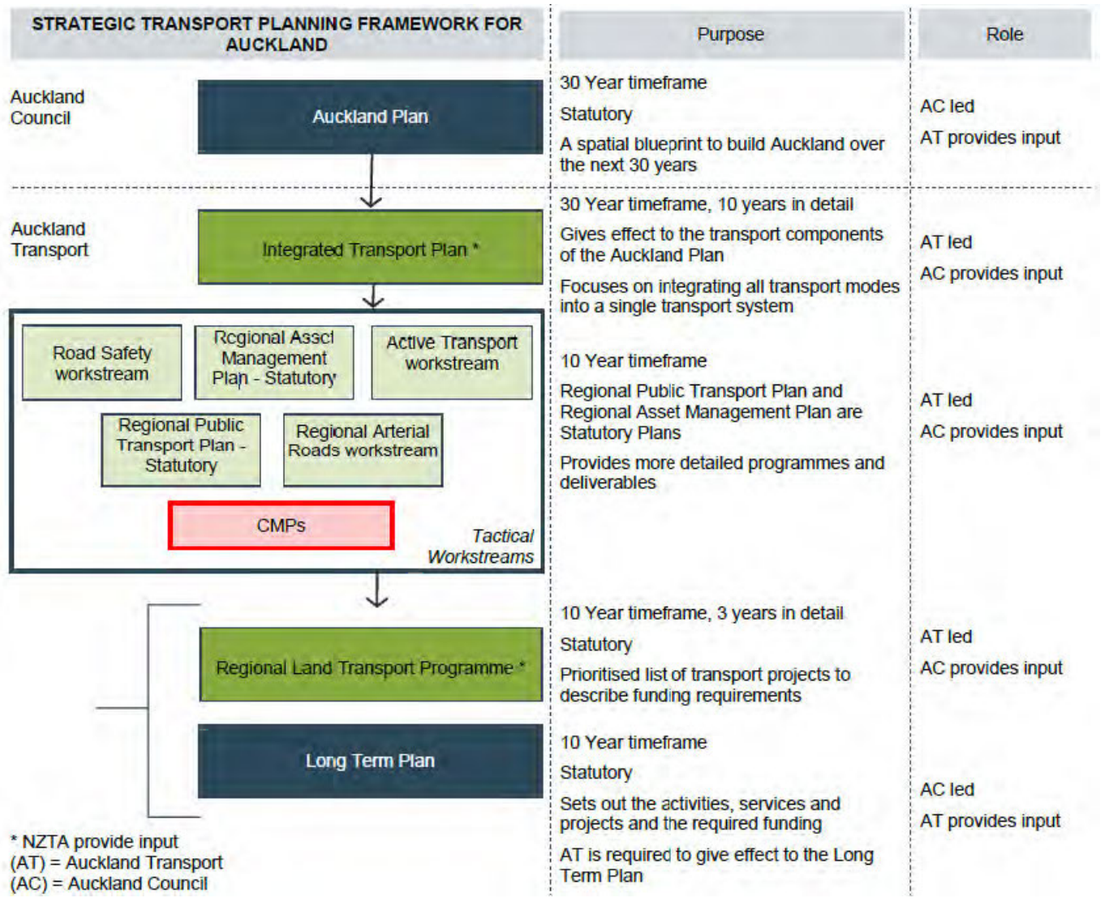


Figure 2-1: *Auckland's Strategic Transport Planning Framework*

2.1 The Auckland Plan

The Auckland Plan is a statutory strategic spatial plan that provides guidance on how to accommodate the anticipated population growth within the Auckland region over the next 30 years while achieving the goal of becoming the world's most liveable city. One of the assumptions of the Auckland Plan is that Auckland will grow by one million residents over the next 30 years. 60-70% of this growth is to be catered for within the existing Rural Urban Boundary (RUB) as infill or brownfield development. At the same time, the Auckland Plan sets targets for reductions in greenhouse gas emissions, doubling of Public Transport usage, reduction of congestion and increasing the number of people living within walking distance to public transport from 14% to 32%. The Auckland Plan anticipates a substantial amount of growth to be centred in Takapuna, which will increase the travel demands in and around Takapuna. This CMP acknowledges this growth and will address the increased travel demand through the provision of better quality infrastructure for alternative modes of travel, being Public Transport, Walking and Cycling.

2.2 The Integrated Transport Programme

The ITP sets out the 30 year investment programme to meet the transport priorities outlined in the Auckland Plan across modes, covering the responsibilities of all transport agencies.

The ITP was developed by Auckland Transport (AT) and the New Zealand Transport Agency (NZTA) in collaboration with Auckland Council, and provides a consolidated transport investment programme over the next 30 years. The ITP specifically:

- Guides transport agencies in their detailed planning activities for maintaining, operating, renewing and developing their transport networks
- Directs transport asset management, corridor and network development, transport service levels and the transport capital portfolio for each of the 10 year periods to 2041
- Informs the detailed programming of activities in the Regional Land Transport Programme (RLTP).

2.3 Specific to the Takapuna North CMP

A significant number of plans and strategies have been developed for the Takapuna area, and as such it is pertinent for this CMP to consider these plans and identify any matters relevant to the key arterial corridors in the Takapuna North study area.

These strategies and plans are those relevant at the local level and are therefore of relevance to the Takapuna North CMP. The strategies and plans summarised below would be expected to have been prepared with cognisance to the higher level strategic documents from the Ministry of Transport, Auckland Council and Auckland Transport.

A summary of the key findings from this are detailed in **Appendix A**.

Other relevant projects include:

- Proposed bus priority improvements at the Forrest Hill Road/East Coast Road intersection. These are discussed further in **Section 7.5**
- The Taharoto Road – Wairau Road Upgrade, with works currently underway about the Forrest Hill Road/ Taharoto Road intersection. This, in essence will complete the Taharoto Road – Wairau Road Upgrade until the land purchases along 3 and 7-15 Wairau Road can be resolved. Until such time as these purchases are complete, an Interim Stage 3 is being progressed, to ensure adequate safety for vulnerable users, pedestrians and cyclists.

2.4 Takapuna Strategic Framework 2010

The Takapuna Strategic Framework, published by the North Shore City Council in 2010, provides an outline of future growth within Takapuna. It identifies five key principles on which future growth is based, namely:

- Sustainability and Change
- People First
- Economy and Competition
- High Quality Urban Environment
- Access and Movement.

The strategy outlines future growth opportunities within each of the districts of Takapuna and identifies some of the strategic directions and possible key projects, including:

- Increasing the traffic function of Killarney Street as a bypass for vehicles travelling through Takapuna
- Better streetscape on Killarney Street to increase accessibility for pedestrians and cyclists
- Intensification of residential activity
- More pedestrian focus on the eastern side of Anzac Street
- Upgrade of the Takapuna Bus Station
- Mixed use development around Barry's Point Road / Anzac Street intersection
- Better linkages between Takapuna Centre and Akoranga Station
- Increase the number of pedestrians and cyclists through better street design
- Better facilities for pedestrians and cyclists walking and riding around Lake Pupuke

Figure 2-2: Takapuna Centres Based Transport Study Area

- Improving public access to Lake Pupuke.

The strategic framework contains maps of the main direction taken for each of the precincts within Takapuna.

A summary of the key findings from this framework is detailed in **Appendix B.**

2.5 Takapuna Centres Based Transport Study

The purposes of the Takapuna Centres Based Study are to:

- Define an integrated transport network plan and identify associated physical projects that are needed for the wider Takapuna area covering all travel modes
- Assess the likely travel demands for the Takapuna centre and the most appropriate way in which the transport system can respond to these demands with respect to public transport provision, parking provision and existing network capacity
- Develop concept designs for the key actions within the road reserve that give effect to the integrated transport network developed
- Identify and produce concept designs for transport interventions falling outside of the road reserve, such as required off-street parking facilities, through block pedestrian connections or off-street loading or service lanes
- Assess the performance of the wider transport network on the basis of the transport and parking interventions identified
- Estimate an approximate implementation cost for all network improvements
- Define a staging plan for proposed improvement projects including approximate timing or key development triggers.

This project has recently begun, with Flow, Urbanismplus, Transport Planning Solutions and Sills van Bohemen being the consortium responsible for this study.

The study area for the Takapuna Centres Based Study is illustrated in **Figure 2-2.**

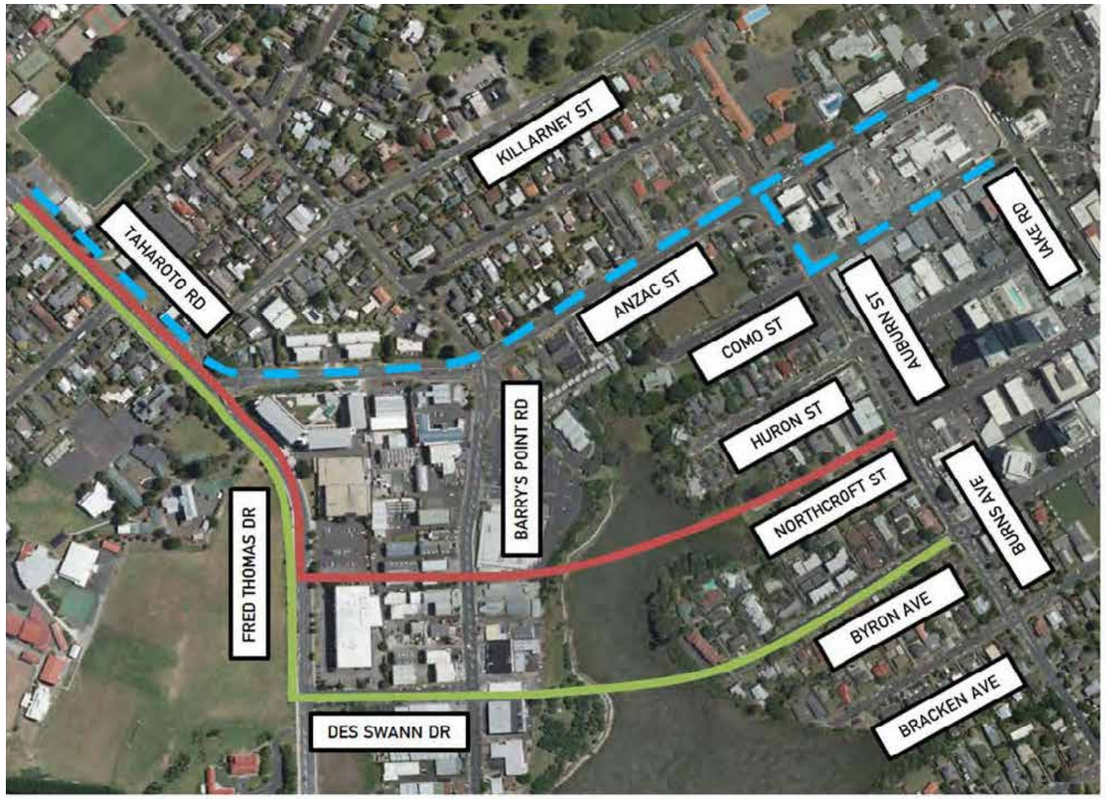


Figure 2-3: Iternative Taharoto Road to Takapuna bus route via Northcroft Street or Byron Avenue

The outcomes of the Takapuna Centres Based Transport Study will have a direct influence on the southern extents of the CMP study area, with Anzac Street and Killarney Street likely to be the most affected. As a consequence it is necessary to ensure there is integration between the two studies to ensure a consistent outcome is identified.

One of the options being considered within the Takapuna Centres Based Transport Study is the provision of a connection across Upper Shoal Bay to serve as a public transport-pedestrian-cyclist connection into Takapuna. The provision of this link will enable buses to be redirected away from Anzac Street onto the new connection, thereby relieving some of the pressure on Anzac Street as well as offering a "more direct" link into Takapuna. This is illustrated above, where options for linking across Upper Shoal Bay are shown.

Such a link is likely to be some time from completion if it is to be pursued. Consequently Anzac Street will have to maintain its function as the primary public transport corridor into Takapuna for a number of years. This is further discussed in **Section 10**.

Setting the scene

3

The following section and illustrations summarise the Takapuna North study area and the pertinent traffic and transportation matters that the study area is currently accommodating.

3.1 Traffic Volumes

Figure 3-2 illustrates the Average Annual Daily Traffic (AADT) and the over-dimensional routes for each of the key corridors within the study area.

The following provides a summary of the key congestion areas within the study area:

- **Forrest Hill Road** – congestion is largely a result of the bottleneck at the Tristram Avenue on-ramp in the morning peak period. Incidence of evening peak congestion is observed at the roundabout intersection with East Coast Road. School traffic causes congestion about the southern extents of the corridor in the vicinity of Westlake Boys and Westlake Girls schools
- **East Coast Road** – congestion is largely restricted to the morning peak period about its intersection with Shakespeare Road, Omana Road and Kitchener Road
- **Kitchener Road** – Hurstmere Road – congestion is largely as a result of vehicles approaching the town centres at either end, with the morning period seeing congestion on the approach to Takapuna town centre. The evening period sees congestion on the approach to Milford town centre
- **Taharoto Road** – congestion along this corridor intrinsically linked to the SH1 connection at Northcote Road, although also as a result of the surrounding land uses
- **Shakespeare Road** – congestion along this corridor can be linked to the land uses it serves, schools, hospitals – but also as a result of the connection to Taharoto Road and the SH1 Northcote Interchange. In the morning period there is a combination of queuing on Taharoto Road due to the Northcote intersection delays reaching back to Shakespeare Road, plus school\related traffic later in the peak period. In the evening period peak delays occur at the intersection with East Coast Road due primarily to capacity limitations on the Shakespeare Road approach.

3.2 Conventional Road Classification

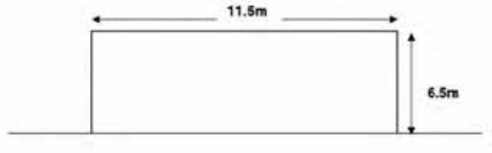
Auckland Transport has reviewed the classification of the roads in the Auckland network. The classification for the key roads in the study area are as follows:

- Primary Arterials: Taharoto Road, Anzac Street west of Auburn Street and Forrest Hill Road
- Secondary Arterials: Hurstmere Road, Kitchener Road and Shakespeare Road
- Collector Roads: Killarney Street

3.3 Over Dimension Routes

As can be seen in **Figure 3-2** Anzac Street, Hurstmere Road, Taharoto Road and the western side of Shakespeare Road are identified as over dimension routes. This issue must be taken into consideration as part of the CMP as it affects the corridor designs that may be desired. This is due to the need to maintain a certain dimensioned envelope for which an over dimension route can pass through. At its simplest, the clearance envelope that permits the safe passage of an over dimension load is 11.5 m in width and 6.5 m in height, as shown in **Figure 3-1**. This requires any permanent structures (trees, light posts etc.) to be located clear of this envelope, unless the structure is removable.

Figure 3-1: Over Dimension Route Envelope



There are a number of variations in the clearance requirements, largely as a result of the various elements that can exist within a road reserve, for example traffic islands, wire median barriers etc. Consequently there are a number of other requirements identified. For example:

- The clearance requirement for traffic islands and pedestrian islands is 7.5 m, required from one side of the island to a permanent structure
- Requirement for a pavement width of 5.5 m between two islands.

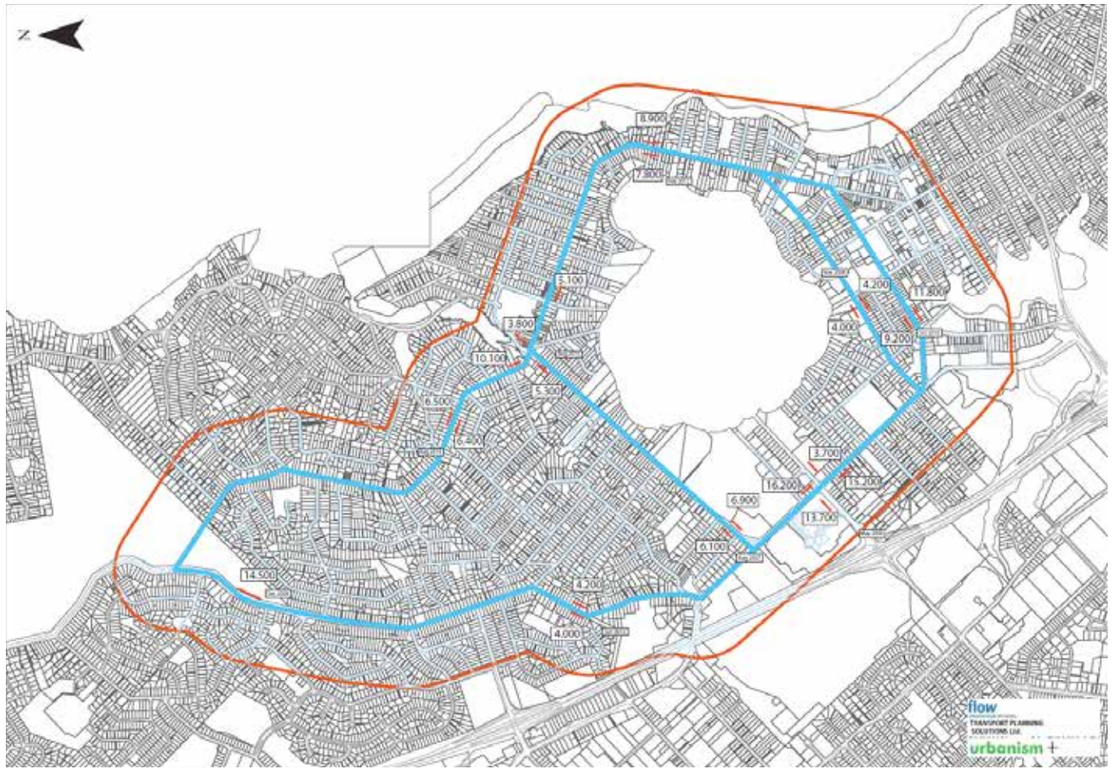


Figure 3-2: Traffic volumes

- Through the CMP process it is necessary to ensure any changes to the corridor's cross section do not conflict with the over dimension requirements.

3.4 Anticipated Growth

The Auckland Regional Transport model, "ART3", uses land use inputs from the Auckland Strategic Planning (ASP) model to predict future traffic flows. Data from the ASP model has been extracted to establish the expected change in land use patterns within Takapuna. It is noted that the Scenario I model, which is the scenario that is used for transport assessments in the region, represents a medium growth scenario, while Scenario H represents the higher growth model proposed by the Auckland Plan. **Table 3-1** presents statistics from these land use forecast models, with data presented for the Takapuna town centre (ART3 zone 108) and for the wider Takapuna area (including the town centre, zones 108 to 111)

Significant growth is forecast for Takapuna under both scenarios, with the population of the wider Takapuna area predicted to double from 6,000 to between 12,000 and 12,900 residents from 2011 to 2021. In terms of longer term trends, population growth is predicted to slow in the 20 years to 2041, with a further 4.600 to 5,500 residents forecast for the wider area. Much of this growth is to be concentrated within the Takapuna town centre, where approximately two thirds of the population growth is expected to occur.

Employment growth is also forecast, with total employment across the wider Takapuna area projected to increase by 4,400 (40%) to 5,300 (47%) from 2011 to 2021. A further 3,400 to 3,700 extra jobs are predicted in the 20 years to 2041. In terms of the distribution of this growth within Takapuna, virtually all the additional employment forecast by the model is predicted to occur within Takapuna town centre (91% to 100% of the growth).

The anticipated growth in residents and employees will lead to increased traffic movements about the Takapuna area, although it is recognised that this increase in traffic movements will be limited by the capacity of the road network. Without widening or building new roads it is not going to be possible to cater for the growth anticipated by car travel alone.

A much greater emphasis needs to be given to walking, cycling and public transport to ensure future growth in Takapuna. The future growth of Takapuna as a successful metropolitan centre is highly dependent on increasing the mode shares of these travel choices.

Land Use	2010/2011	2021	2040/2041
Residents			
Takapuna Strategic Framework	4,000	n/a	15,000
ART3 Scenario I (Medium Growth)	6,000	12,000	16,600
ART3 Scenario H (High Growth, Auckland Plan)	6,200	12,900	18,400
Employees			
Takapuna Strategic Framework	10,000	n/a	15,000
ART3 Scenario I (Medium Growth)	11,100	15,500	19,000
ART3 Scenario H (High Growth, Auckland Plan)	11,300	16,600	20,300

Table 3-1: Takapuna Land Use Projections

3.5 Cycling

Figure 3-3 illustrates the key existing cycle facilities within the study area as well as indicating their future hierarchy within the Auckland Cycle Network.

Future Auckland Cycle Connectors are proposed for Kitchener Road, Hurstmere Road, Anzac Street, Killarney Road, Taharoto Road, Shakespeare Road, East Coast Road (south of the intersection with Forrest Hill Road), and Forrest Hill Road.

- Due to the flat topography of the southern part of the corridor, cycling has a lot of potential to increase its mode share if catered for appropriately.

3.6 Pedestrian Activity

Figure 3-4 illustrates the areas of high or concentrated pedestrian activity. This typically represents the locations of schools, employment and retail/commercial activity.

3.7 Priority Lanes

Within the study area the following existing priority lanes have been identified:

- southbound T2 lane on Forrest Hill Road between East Coast Road and Tristram Avenue which enables buses to by-pass the queue of vehicles waiting to turn into Tristram Avenue in morning peak periods
- westbound T2 lane on Shakespeare Road
- bus advance lanes at the Taharoto Road/ Shakespeare Rd intersection
- bus advance lanes at the East Coast Road/Shakespeare Road/Kitchener Road/Omana Road
- bus advance lanes at the East Coast Road/ Forrest Hill Road intersections.

3.8 Public Transport

The current morning peak hour bus frequencies (peak direction) are as follows:

- Forrest Hill Road 10 buses/hour
- East Coast Road 7 buses/hour
- Kitchener – Hurstmere 9 buses/hour
- Fred Thomas Drive 6 buses/hour
- Taharoto -Anzac 32 buses/hour
- Shakespeare Rd 5 buses/hour.

Figure 3-5 illustrates the morning peak hour bus frequencies along each of the corridors within the study area, highlighting the key public transport corridors.

Further discussion as to the draft Regional Public Transport Plan is provided in **Section 3.11**.

3.9 Crash History

Auckland Transport commissioned a Crash Reduction Study (CRS) of the Lake Pupuke Cycle Route in 2011. This focused on Shakespeare Road, Kitchener Road, Hurstmere Road, Anzac Street, Killarney Street and Taharoto Road. This study aimed to recommend crash remedial measures based on the results of the crash investigations completed, with the crash investigations undertaken for the 5 year period between 2006 and 2010. The study was undertaken by Traffic Engineering Solutions (TES). The following section summarises the findings and recommendations from this report for each corridor.

The crash history from the Lake Pupuke Cycle Safety study has been supplemented with the crash histories for East Coast Road and Forrest Hill Road which have been retrieved from the CAS system as part of this CMP.

3.9.1 Shakespeare Road Crash History

27 crashes were recorded in the five year period from 2006 to 2010. Of these 21 crashes, half appear to be attributable to the operation of the Kitchener Road and Shakespeare Road intersection.

The TES report identified the following additional remedial measures for this section in response to the other road user crashes:

- Alterations to the left turn island from Kitchener Street to Shakespeare Road
- Removal of on street parking about Brooke Street to improve visibility
- Provision of broken yellow lines (NSAAT) at four locations along Shakespeare Road, again to improve visibility for vehicles exiting their sites
- Provision of two lanes westbound at the termination of the T2 lane.

Six crashes involving cyclists were identified along Shakespeare Road. Four of the six accidents occurred at intersections along Shakespeare Road, specifically two at the intersection of Kitchener Road and Shakespeare Road.

The following recommendations were made to remedy the underlying causes of the cycle crashes identified:

- Removal of filter right turns at Kitchener Street/ Shakespeare Road
- Installation of bus speed tables on the left turn slip lanes to and from Shakespeare Road
- Removal of parallel parking spaces and installation of a smooth taper to guide cyclists from parking spaces and allow sufficient overtaking room
- Removal of parallel parking spaces at entrances to key land uses, to improve visibility, and also consider kerb build outs to improve visibility.

3.9.2 Hurstmere Road – Kitchener Road Crash History

37 crashes were recorded involving other road users through the study area for this section of road. The TES report identified the following additional remedial measures for this section in response to the other road user crashes:

- Installation of parking edge line and flush median through sections of Hurstmere Road and Kitchener Street
- Installation of chevron signage about the curves on Kitchener Street
- Installation of primary overhead signals at the Milford Road/Kitchener Street intersection

Eight crashes involving cyclists were recorded in the five year period analysed.

3.9.3 Anzac Street – Killarney Street Crash History

27 crashes were recorded in the five year period from 2006 to 2010. The TES report recommended the following:

- Signal upgrade to LED lanterns and ensuring adequate visibility of the lantern heads and installation of primary overhead signals at the Anzac Street/Auburn Street intersection
- Increase deflection on the roundabout at The Strand and Anzac Street.

Five crashes involving cyclists were reported in the five year period analysed in the report.

3.9.4 Taharoto Road Crash History

With respect to non-vehicular road users, 54 crashes were recorded. The TES report recommended the following remedial measures:

- Signal upgrade to LED lanterns and ensuring adequate visibility of the lantern heads at the intersection of Taharoto Road/The Boulevard
- Installation of a pedestrian fence opposite Shea Terrace
- Realignment of the left turn slip lane islands to and from Northcote Road
- Ensuring adequate visibility of the lantern heads at the Northcote Road/Taharoto Road intersection, including provision of primary overhead signals and relocation of the secondary signal
- Change of give way control to stop control at the side roads of Karaka Street, Ngaio Street and Rangitira Avenue respectively.

Four crashes involving cyclists were reported on the Taharoto Road corridor between 2006 and 2010.

3.9.5 East Coast Road Crash History

58 crashes were recorded on East Coast Road between 2008 and 2012. Of these:

- 11 occured at the East Coast Road/Forrest Hill Road intersection
- 8 occurred at the East Coast Road/Aberdeen Road intersection.

The majority of crash movements related to rear end/ obstruction type crashes (predominantly at intersections) and crossing/turning type crashes, where a vehicle may have failed to give way or poorly judged a gap in the traffic stream. These are relatively common crash types for arterial roads with a number of side roads, and property accesses.

Ten crashes have occurred on East Coast Road involving cyclists and four involving pedestrians.

3.9.6 Forrest Hill Road Crash History

88 crashes were recorded on Forrest Hill Road between 2008 and 2012. Of note are,

Figure 3-3: Cycling Infrastructure & Typology

- 18 crashes occurred at its intersection with Wairau Road
- 12 crashes occurred at its intersection with Richards Avenue

The majority of crash movements related to rear end/ obstruction type crashes (predominantly at intersections) and crossing/turning type crashes where a vehicle may have failed to give way or poorly judged a gap in the traffic stream. The Wairau Road intersection is currently being upgraded as part of the Warau Taharoto Corridor Upgrade works and this would be expected to address many of the crashes that have occurred at this intersection in the past.

Four crashes have occurred on Forrest Hill Road involving cyclists and six involving pedestrians.

3.10 Stormwater Catchment Management Plans

The study area of the Takapuna North CMP traverses through eight stormwater catchments, each with a stormwater catchment management plan in varying stages of development. The stormwater catchment management plans identify stormwater related issues and mitigation options that could be adopted as part of any future works within the study area.

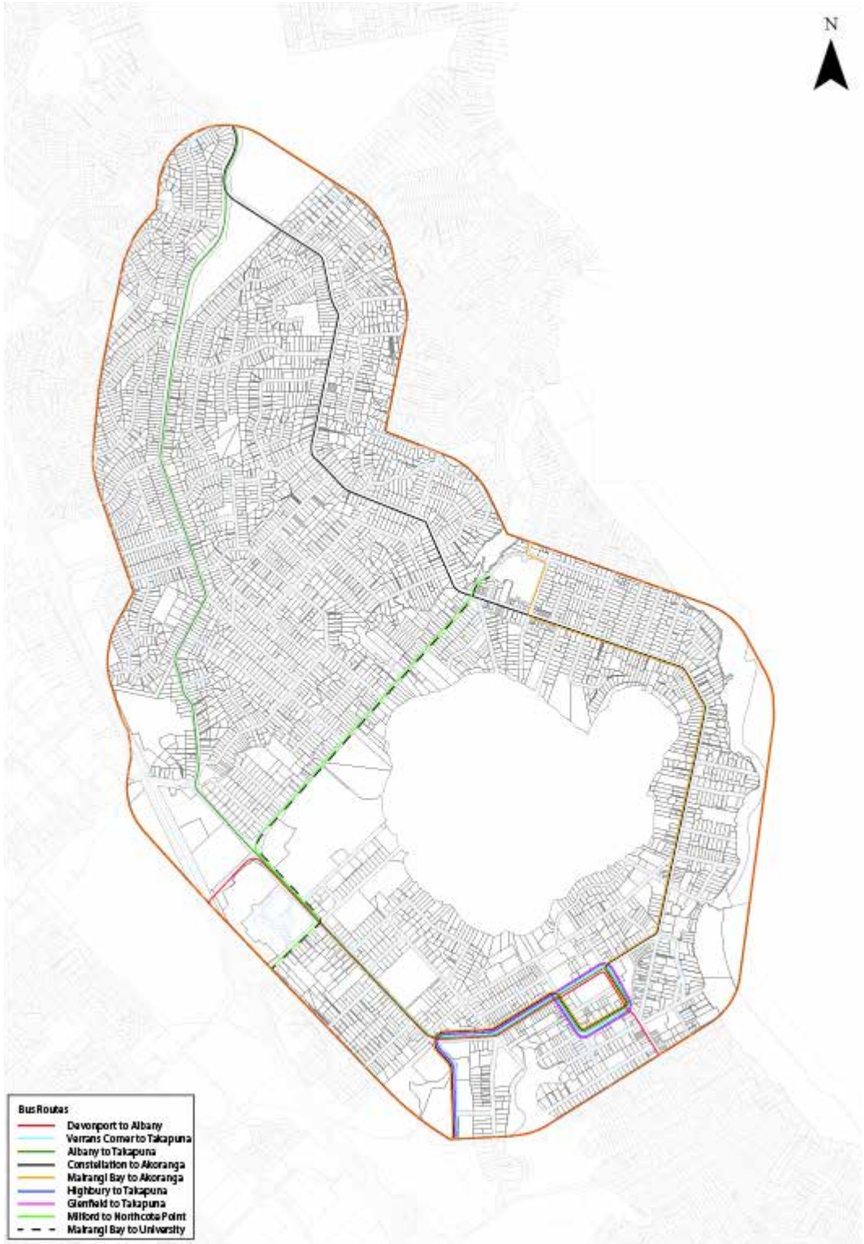


Figure 3-4: Pedestrian Activity

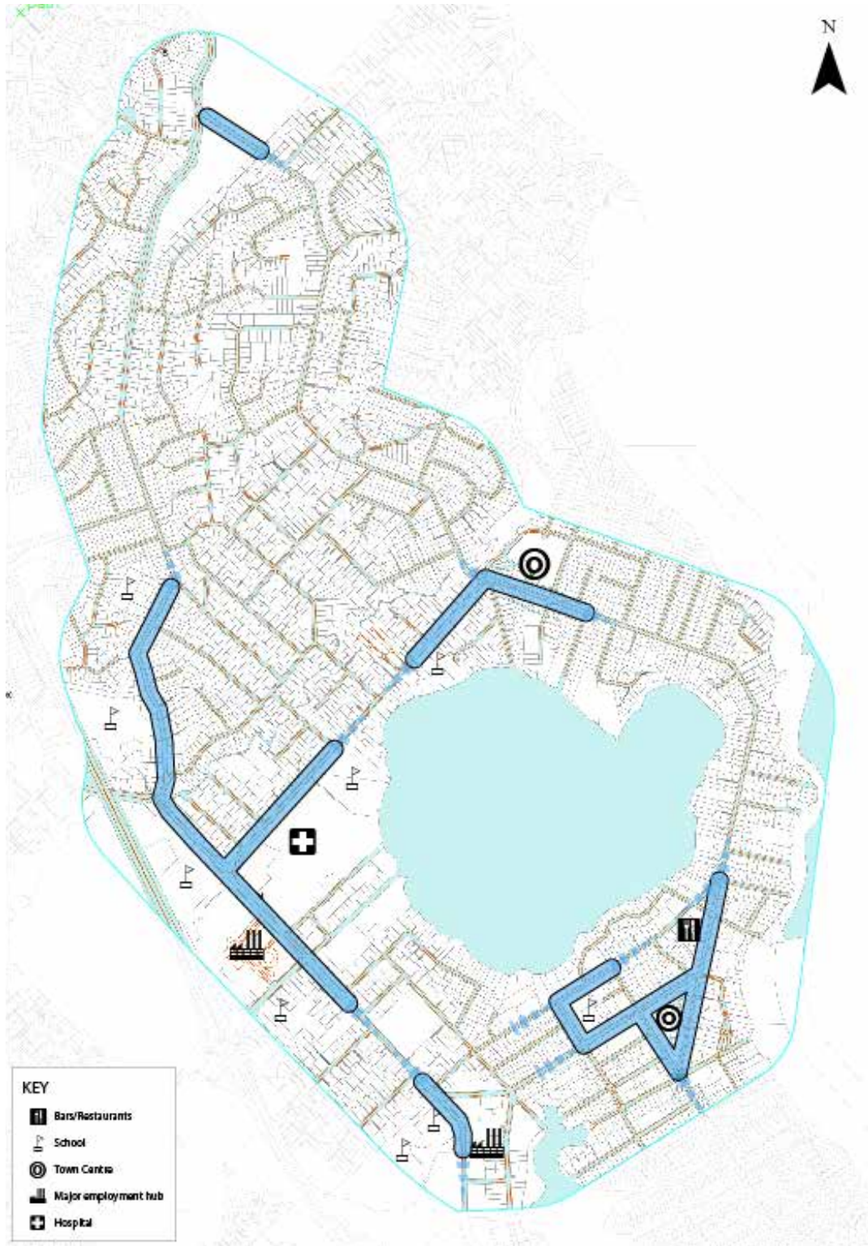


Figure 3-5: Public Transport Activity

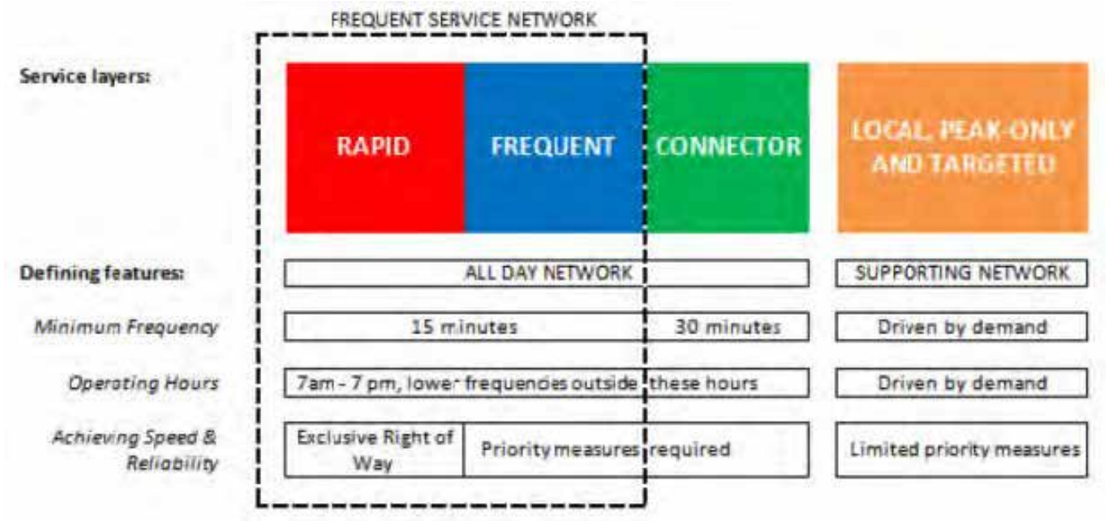


Figure 3-6: RPTP Network Concept

3.11 Draft Regional Public Transport Plan

The draft Regional Public Transport Plan (RPTP), October 2012, includes new service categories. The new network structure is described as being built around a core network of frequent services. These include the existing rapid transit services on rail and the Northern Busway, supplemented by a number of high-frequency routes connecting the major centres.

The new service categories are as follows:

- **Rapid and Frequent services** - operating at least every 15 minutes, all day, seven days a week
- **Connector services** - operating at least every 30 minutes, all day, seven days a week – connecting people to town and employment centres and/or the Frequent Service Network
- **Local services** - operating less frequently (approximately hourly) but providing service for areas not directly served by Frequent or Connector services
- **Peak-only services** – run only during peak times to serve specific commuter demands and improve coverage or provide more direct services where required
- **Targeted services** - that meet other customer needs, including school bus services and bus services to communities outside the main urban area.

With respect to the study area:

- **Frequent Service Routes** include Taharoto Road, Anzac Street (west of Auburn Street), Hurstmere Road, Kitchener Road and Shakespeare Road
- **Connector Routes** include Taharoto Road, Anzac Street (west of Auburn Street), Forrest Hill Road and East Coast Road

To understand the implications that the draft RPTP will have on the key corridors within the study area, the following summarises the proposed future routes and their respective frequencies along each corridor in 2016 and 2022.

Discussions held with Auckland Transport officers have confirmed that the new bus network serving the Takapuna area is still “work in progress” and may not be finalised until 2014. **Figure 3-7** reflects the current thinking based on information received and discussions with Auckland Transport officers.

Key conclusions to be taken from the 2016 network are:

- Future growth of Takapuna as a successful metropolitan centre is highly dependent on increased bus use and bus service frequencies
- Akoranga Station is to have greater importance in the new Frequent Network, but has poor walk accessibility to much of Takapuna. Consequently there is likely to be a need to consider a link/shuttle type service linking the Takapuna town centre with the Akoranga Station
- The proposed Frequent Network bus system relies heavily on Anzac Street and the Anzac Street/Fred Thomas Drive/ Taharoto Road/Killarney Street intersection
- Discussions with Auckland Transport Public Transport planners indicate that while Shakespeare Road is a Frequent Network route this is not likely to be the case as the Devonport services are likely to use the North Shore busway north of Smales Farm rather than travel to Milford via Shakespeare Road. As Shakespeare Road is unlikely

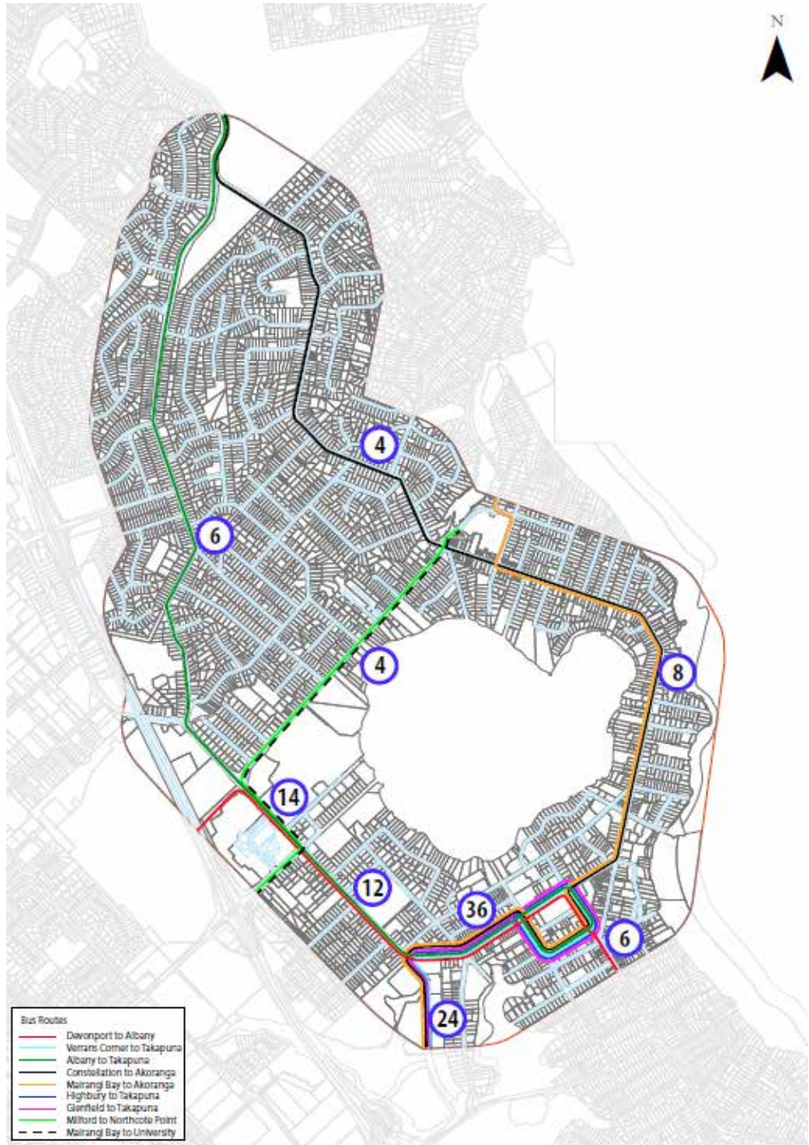


Figure 3-7: 2016 Frequent Network Services

Road	Rd Class.(AT)	Proposed 2016 PT Network	Regional Cycle Network
Kitchener Road	Secondary Arterial	Frequent Network	Proposed on-road cycle lane
Hurstmere Road	Secondary Arterial	Frequent Network	Proposed on-road cycle lane
Killarney Street	Secondary Arterial	Not included	Not stated
Anzac Street east of Auburn St	Secondary Arterial	Not included	Proposed on-road cycle lane
Anzac Street west of Auburn St	Primary Arterial	Frequent Network & Connector Net.	Proposed on-road cycle lane
Taharoto Road	Primary Arterial	Frequent Network & Connector Net.	Existing or proposed on-rd cycle lane
Shakespeare Road	Secondary Arterial	Frequent Network	Shared footpath (existing)
East Coast Rd (S of Forrest Hill Rd I/S)	Secondary Arterial	Connector Network	Proposed on-road cycle lane
Forrest Hill Road	Primary Arterial	Connector Network	Existing shared footpath

Table 3-2: Road Functions

to carry high bus numbers in the future, the need for a bus/T2 lane is much reduced

- Initial modelling does not suggest a large increase in bus numbers needed by 2041. However, this needs to be reviewed and implications of a higher bus mode share need to be identified.

3.12 Summary of Key Corridors

Table 3-2 provides a summary of the various requirements for each of the key routes within the study area

3.13 Known and Anticipated Changes

There are a number of known or anticipated changes within the study area that have a bearing on the development of the CMP. Land use changes, illustrated in **Figure 3-8**, highlight areas of greater intensification or a change in use. Infrastructure changes, illustrated in **Figure 3-9**, identify works that may already be in the pipeline regarding changes to the existing road network.

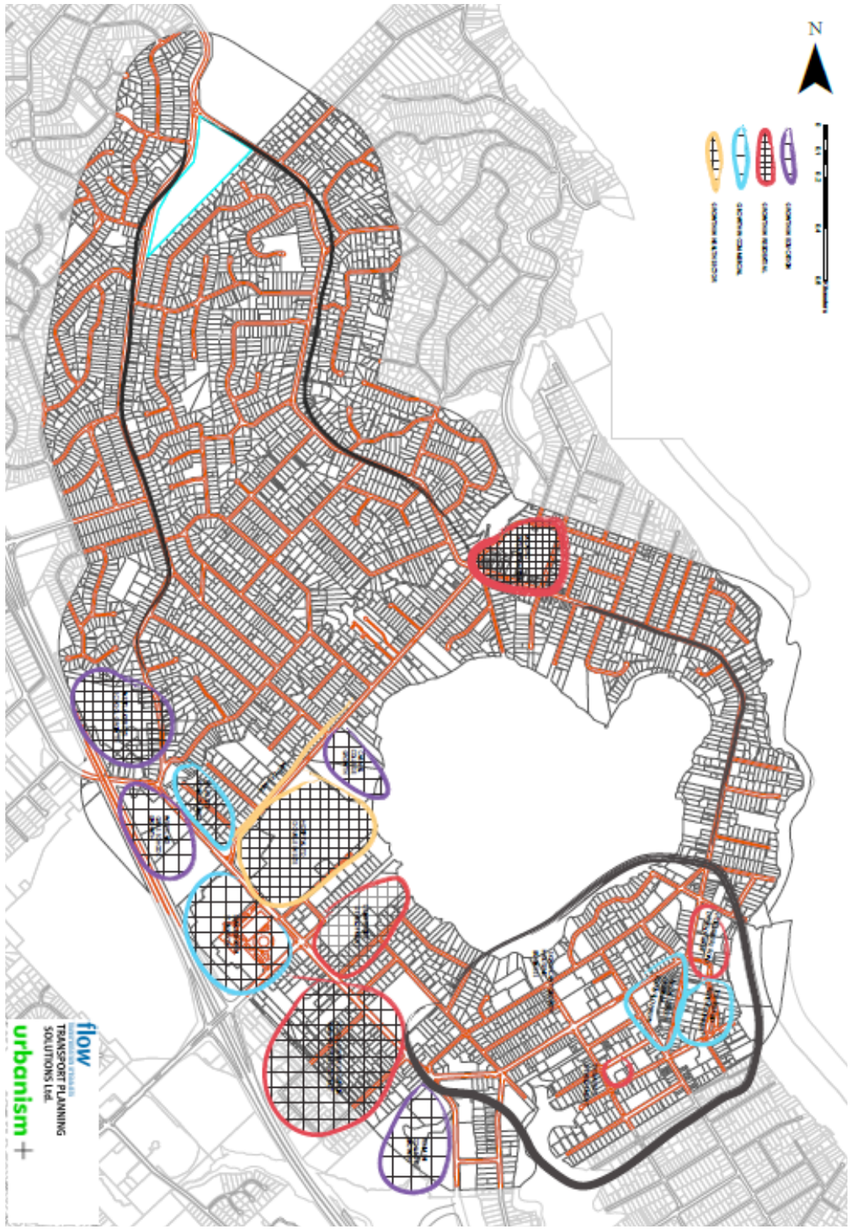


Figure 3-8: Land Use Changes

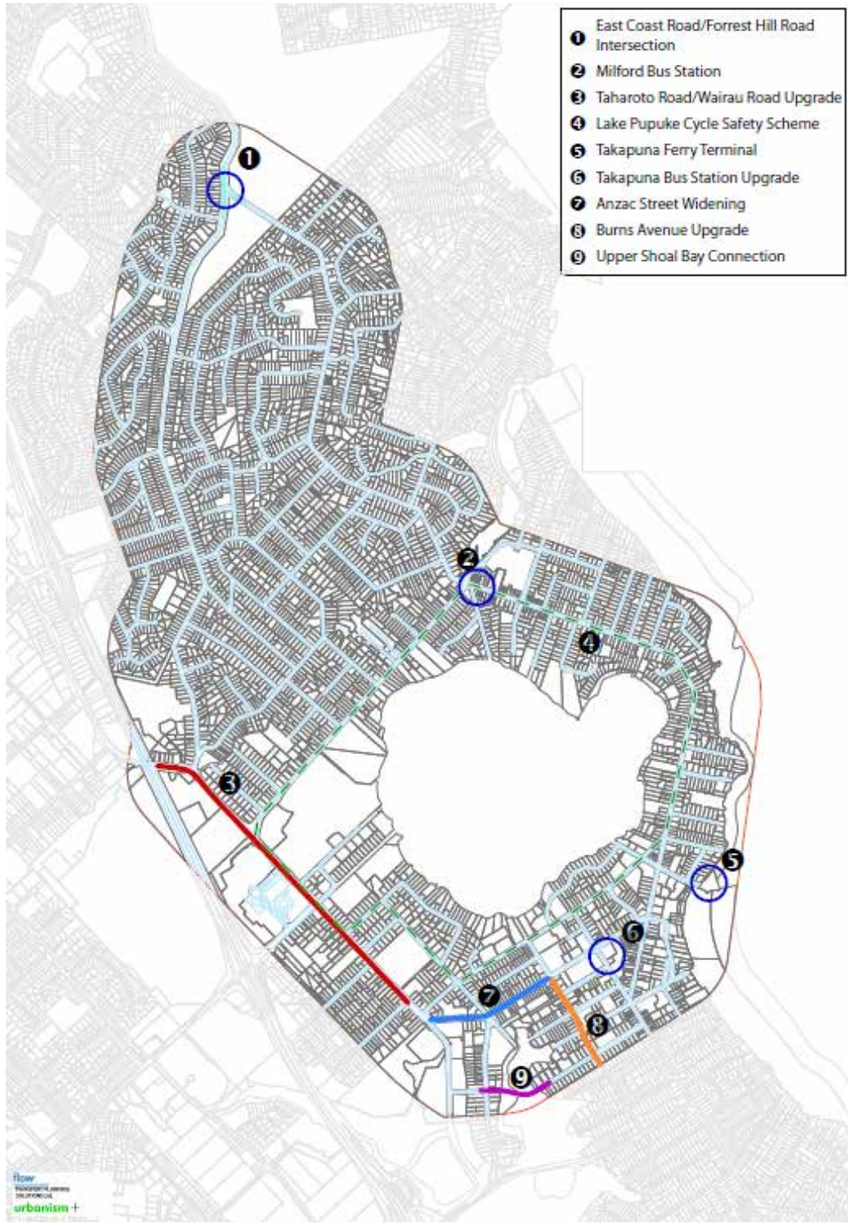


Figure 3-9: Infrastructure Changes

Urban Design Context

4

4.1 Growth and Context

Information has been provided from the Auckland Council's Growth Model. Over the next 30 years the study area is expected to increase in population by around 56%, amounting to approximately 12,000 to 12,900 additional people and approximately 6,400 new dwellings. It is understood that the Unitary Plan provisions will facilitate at least some of this growth. The draft Unitary Plan proposes continuing the previous centres-first focus supported by up-zoning in residential areas.

It is very likely that a substantial proportion of future growth in the catchment (at least 20%) will occur in locations that are not within a convenient walk of a centre, local node, or major passenger transport corridor. This portion of future growth will add to peak hour commuter loads on the arterials.

4.2 Intensification

Intensification will be a primary issue in the development of Takapuna North local network over the next 25 years. The projected growth numbers for the area will be challenging to accommodate even if half the additional dwellings are located in town centres. In addition, the density of the current environment of centres and corridors is, in parts, already higher than one dwelling per 600m lot. For example, there is a significant number of existing 'sausage' flats or brick and tile units that can accommodate three attached dwellings on one lot. As such, much of the density trying to be achieved in the Unitary Plan already exists in the current built form. Redevelopment of those sites would necessitate a substantial increase in density beyond this.

It is well established that new development along major arterials must not provide for vehicles to reverse directly onto streets. This does not apply to historically approved dwellings and in the study area there remains a significant number of these. This raises the potential for a degraded urban design future defined by front yards used for formed manoeuvring space.

As there is already higher density of housing and vehicles due to historical infill, one of the major urban design issues relevant to the CMP is that intensification may bring a significant increase in vehicle access requirements, where a vehicle will cross the footpath to access a lot. Of particular concern are continuous terrace housing units that could be directly enabled in some of the Unitary Plan zones. Key considerations are:

- Accepted urban design principles seek that development "front" the street and help define the delineation of public and private property.
- Common terrace modules can lead to a propagation of vehicle crossings and garaging at high frequencies:
- A 6 m module based on a 3 m single garage door and a 3 m habitable space module. This is typically accepted as not leading to garage-dominant building facades (the garage is no more than 50% of the frontage width), but leads to a vehicle crossing every 3 m
- A 6.5 m module based on a 5.5 m double garage and a front door. This is the lowest possible quality outcome in terms of both streetscape and pedestrian safety or amenity as each driveway would only be separated by 1 m, resulting in almost continuous garage doors. Based on the indications provided within the draft Unitary Plan, such outcomes would not be provided for but the context of work to date implies that the only relevant consideration is on the visual appearance and general amenity of buildings
- In Albany terraced housing using a 4 to 4.5 m module has been granted consent. On an arterial road such an outcome would be very low quality, leading to continuous garage scapes and a footpath that was essentially one large continuous mountable driveway.

This raises serious concerns about the management of growth on arterials, likely to be promoted in the Unitary Plan but which may create severe access and safety issues along those roads. The following potential serious issues have been identified:

- The increased number of vehicle crossings will reduce the safety of pedestrians who will encounter more vehicles
- As new buildings are constructed requiring greater vehicle access onto the road, public landscaping on the edge of buildings will be changed into turning spaces as cars will not be able to reverse straight out onto the road and will require manoeuvring space
- As the frequency and/or concentration of traffic around driveways increases, road space may need to be set aside for flush medians or other on-road stacking facilities. Providing for these facilities is likely to remove road space available for other purposes such as cycle lanes or street amenity (planting).

As is understood from the draft Unitary Plan, there are currently no controls in place to help manage this strategic access issue. When the current state of development is

added to the access issues that could manifest as a result of the intensification likely to be promoted under the Unitary Plan, there will be a potentially significant adverse urban design effects. Of particular concern is the accumulative effect of many little developments undertaking higher density housing on an ad hoc basis. It is recommended that Auckland Transport develop as a matter of urgency a position on future access to its key arterial corridors and promote that view during the development of the Unitary Plan.

To further assist Auckland Transport a number of intensification tests have been explored in relation to the CMP study area. These are summarised in **Appendix D**.

5 Design Philosophy

The Corridor Management Plan for Takapuna North is premised on the reallocation of road space, rather than "wholesale" road widening. There may be localised widening required at specific locations, typically about any proposed intersection changes.

In deciding how to reallocate the road space, the following summarises each travel mode and the priority it is given.

To make optimal use of the existing road reserve in order to achieve the future network roles, changes in the existing road configuration are required. The following design principles have been adopted in designing conceptual cross sections for each of the roads

5.1 Design Philosophy per Mode

Private Vehicles: Within the foreseeable future, car travel is expected to remain a very important transport mode in the study area. The Takapuna North CMP acknowledges this, but at the same time stresses the importance of reducing the impact of vehicular traffic on other modes. AUSTROADS recommends a lane width between 3.0 – 3.3 m for Urban Arterials with low truck volumes. This CMP chooses to opt for the lower end of the bandwidth to make sure the concept cross section does not encourage high speeds and minimises the space taken up by private vehicles. It is recognised that a 3.0 m lane width is relatively narrow compared to the existing layout, with a notable exception being Taharoto Road, which features lane widths of approximately 2.8 m. A reduced lane width allows for more space to be allocated for other modes and has a positive impact on travel speeds and safety throughout the corridor.

International research suggests that there is no increase in risk related to lane width. Research by Potts, Harwood, and Richard, presented at the 2007 TRB Conference comes to the following conclusion:

> **"Analysis of geometric design, traffic volume, and accident data collected in NCHRP Project 17-26 has found that, with limited exceptions, there is no consistent, statistically significant relationship between lane width and safety for approaches to intersections on urban and suburban arterials. There is no indication that the use of 3.0- or 3.3-m (10- or 11-ft lanes), rather than 3.6-m (12-ft) lanes, for arterial intersection approaches leads to increases in accident frequency. There are situations in which use of narrower lanes may provide benefits in traffic operations, pedestrian safety, and/or reduced interference with surrounding development, and may provide space for geometric features that enhance safety such as medians or turn lanes. The analysis results indicate narrow lanes can generally be used to obtain these benefits without compromising safety."**
>
> **"It is concluded from this research that there is no indication that crash frequencies increase as lane width decreases for arterial roadway segments or arterial intersection approaches."**

The Institute of Transportation Engineers (ITE) published a guideline for the design of major urban thoroughfares. The guideline, called "Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities" recommends lanes to be 10 – 11 ft. (3.05 – 3.35 m) wide on urban arterials with a design speed of 35 mph (56 km/h). Since the design of most of the arterials within the CMP aims to reduce the vehicular speed along the corridor, the lower end of the range is appropriate in this case.

A study undertaken in 2002 by the Centre for Transport Studies of the London Imperial College of Science, Technology and Medicine, focused on road safety across all fifty states in the U.S. and uses data from fourteen years. This research analyses how different road infrastructure improvements affect the number of serious injury or fatal crashes. The conclusion of this research is that arterial roads with lane widths of 9 or 10 ft (2.75 or 3.05 m) show a lower than average number of injuries or fatalities. Roads with a lane width of 12 ft or more (3.6 m) have a higher rate of injuries or fatalities. This shows that while wider lanes are commonly considered safer, in reality wider lanes cause more injuries and fatalities. This reinforces our design philosophy of providing lane widths of 3.0 m along most corridors.

Bus: Auckland needs first-rate public transport infrastructure and services to remain internationally competitive. Improving public transport is a crucial component to lift the performance of Auckland's transport system, and is a critical component in realising the growth aspirations for Takapuna. To ensure reliable and efficient operation of public transport in the area, bus lanes or bus priority measures are required on the key public transport corridors and at key intersections. As identified in the RPTP, Frequent Networks require "priority measures" to deliver at least a 15-minute service operating all day (initially from 7am-7pm, seven days a week).

While in Auckland it is common practice for cyclists and buses to share a lane, our design philosophy does not

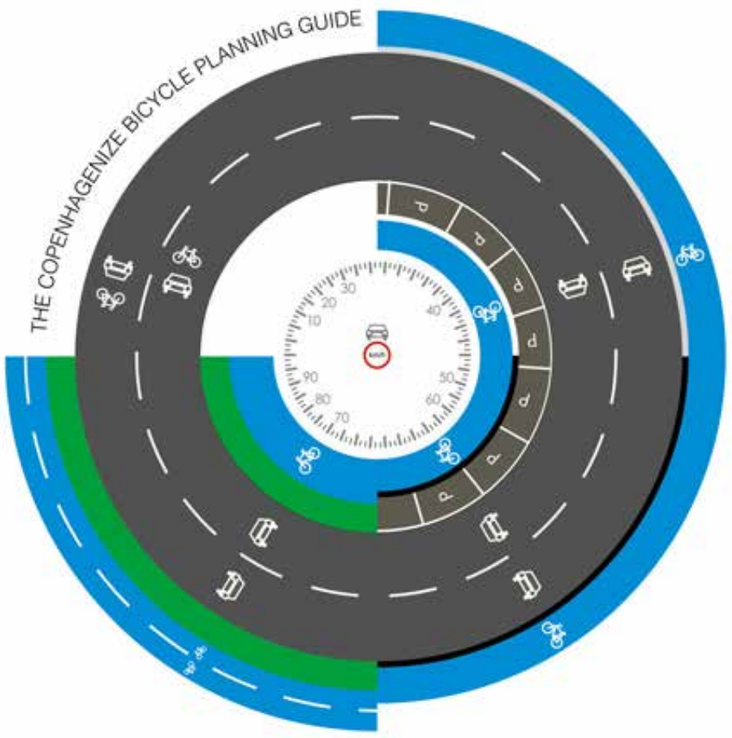


Figure 5-1: Copenhagen Bicycle Planning Guide

include these shared facilities as they are deemed not inviting enough for less confident cyclists.

Bus stops should be located within the traffic lane to ensure buses can pull out when required. Where bus stops meet separated cycle lanes, the cycle lane will be guided around behind the bus platform to minimise the risk of a cyclist/bus conflict.

Bus Priority: Given the design philosophy for the Takapuna CMP is premised on the reallocation of road space, rather than "wholesale" road widening, bus priority measures have focussed on the reallocation of road space where available, although there may be areas where localised widening will be required to achieve any meaningful bus priority measures. Where space is constrained, the focus is on providing buses with dedicated facilities on the approach to signalised intersections in combination with the provision of dedicated bus phases at these intersections. This allows buses to jump the queue and gain a head start downstream from the signalised intersection, ensuring efficiency and timeliness of the bus services.

The CMP proposes a standard bus lane width of 3.5 m but due to spatial constraints, this might be reduced to a minimum of 3.3 m in some locations. This is less than the recommended width of 4.2 m as per AUSTROADS, but because there will be no cyclists in the bus lane, the narrower lane width is deemed safe.

Cycling: Improving the visibility of cycling and providing good cycling facilities is paramount in order to achieve high levels of cycling. The guiding principle of the design philosophy is that all streets need to cater for cycling. The type of facility required on a street is governed by the speed and volume of a street – greater separation in terms of space and physical constraints is necessary where vehicle speeds are high. This is supported by overseas examples of cycle design guidelines, referencing the Copenhagen Bicycle Planning Guide as illustrated in **Figure 5-1**. This illustrates the type of cycle facility required depends on the vehicle speeds on the corridor. As vehicle speeds increase, it is recommended that the separation between vehicles and cyclists also increases and becomes more physical.

The design philosophy for cyclists aims to cater for both adults and children (10 years and over). There is a desire to provide safe links to popular destinations and key activity centres and offer the highest level of service to cyclists.

Figure 5-2: Christchurch Cycle Guide Examples

Figure 5-3: Cycle Track Example

Where this is of greatest importance the CMP has sought to develop "showcase" elements that make a strong statement about the importance of cycling within a corridor.

While some of the recommended designs within the CMP are aspirational and may be new to New Zealand, these are realistic and achievable, with many of these being common in large parts of Western Europe.

Separated Cycle Lane Examples: Separated cycle lanes - or cycle tracks - are widely recognised as excellent facilities to encourage cyclists of all ages and experiences levels to use. The protection offered by a raised median or physical separation between the cyclist and the live vehicle lane is the key component that offers the safety aspect to the cyclist. These are widely used internationally and there are a number of design matters to consider with respect to their use in the Takapuna North CMP. Matters to consider include:

- Frequency of driveways and how often a buffered cycle lane is interrupted
- Type of median to be provided, whether it be raised, flush, planted, sealed. In reality there is likely to be a mix of treatments along a corridor length
- Width of median to accommodate planting, lighting or other infrastructure
- How to treat vehicle crossings.

These are all matters of detail that can be further explored through the next stage of design. The following figures provide design guidance from national and international literature. These include examples from the recently released Christchurch Cycle Design Guide.

Pedestrians: The minimum required footpath width is according to the Auckland Transport engineering standards is 1.8 m. On roads with more pedestrian activity or on roads that are currently uninviting to pedestrians, wider footpaths, between 2.0 and 2.5 m wide, are desired. Around schools, which see major pedestrian traffic during short peaks, much wider footpaths must be considered, with footpaths up to 4.0 m wide in some areas.

Whilst the CMP does not go into the detailed design for each corridor there are a number of fundamental

pedestrian matters that should be considered as part of any future changes to the corridors within the study area. These include

- Ensure that the side roads where they meet the main corridors are appropriately designed to provide a quality pedestrian amenity to those travelling along a corridor. The typical treatments to be considered include
- Tightening of the kerb radii about the side road to provide convenient and safer crossing areas
- Narrowing of the side road to reduce pedestrian crossing distances
- The need for any left turn slip lanes to be reconsidered as part of any intersection upgrades. If the slip lanes are to be retained, ensuring appropriate pedestrian amenity is provided for (for example, a zebra crossing)
- Ensure all signalised intersections accommodate pedestrians on all intersection arms
- Provision of safe crossing points along the corridor to address desire lines as well as to link with public transport
- Provision of street planting between the pedestrian and vehicle lane where space permits.

Parking: On street parking is required in some, but not all locations along the corridor. Where parking is required, the width of parking bays is kept to a minimum, at 2.0 m wide. This accommodates a private vehicle and introduces side friction for vehicles travelling in the general traffic lane. Increased side friction will have a positive impact in reducing vehicle speeds in the general traffic lane.

5.2 Stormwater

From a stormwater perspective, the two main goals are to treat the carriageway runoff to ARC TP10 standards and improve/provide attenuation to limit adverse effects downstream. Opportunity exists to integrate Low Impact Design (LID) stormwater management measures into the study area, for example rain gardens and increasing vegetated areas.

As part of future private development within the corridor, the opportunity exists for Council to collaborate with developers to increase the size/capacity of the on-site treatment and attenuation devices in order to cater for runoff from the carriageways within the study area.

Future road design in the study area needs to consider flood risk related to known flood plains, overland flow paths and impoundment. Design considerations should give recognition of existing flood issues related to road level and runoff and an effort should be made to resolve these where possible, to minimise the risk of new flooding resulting from road level changes.

Corridor Assessment

6

The following chapters examine each of the corridors within the study area in greater depth, in order to understand how the corridors may need to change over the next 30 years.

To assess the available and required width throughout each of the corridors, the generic spatial requirement for each corridor has been determined. This spatial requirement is the amount of width required for each mode to deliver the ideal outcome for the corridor.

To assess the feasibility of the spatial requirements, the required widths have been applied at key points along the corridor, illustrated on an aerial. In these key points, possible solutions have been sketched to address typical treatments for elements like intersections, driveways and pedestrian crossing points. Where the preferred corridor outcome is not feasible due, to for example, gradients, right turn bay requirements, or bus stops, a level of flexibility is shown to indicate which element of the cross section can be compromised to achieve a good outcome.

Any intersection designs that are provided in the following sections are illustrative only. The sketches have been included to identify how an intersection could be altered to better accommodate all users – these are by no means a “preferred solution”. No analysis of traffic movements, signal phasing or land purchase requirements has been undertaken. Consequently these sketches should be treated as being “for illustrative purposes” only.

The following sections are structured as follows

- Corridor components – providing a description of existing and future issues for each mode of travel
- Stakeholder considerations – being a summary of the matters identified during the workshops
- The spatial requirements for each corridor – taking the above matters and providing a visual representation as to how the corridor can accommodate the users
- Proposed cross sections along each corridor to demonstrate how the spatial requirements fit within the existing environment
- A discussion on more detailed maters such as any flexibility or constraints that may be available along the corridor or at critical intersections.

Forrest Hill Road

7

7.1 Corridor Components

Forrest Hill Road (between Taharoto Road and East Coast Road) is classified as a primary arterial road. The road carries around 14,000 vehicles a day on the section north of Tristram Avenue and around 8,000 vehicles a day on the section south of Tristram Avenue. The existing road layout consists of one lane northbound, one lane southbound plus a morning peak hour southbound T2 lane. A 2.5 to 3.0 m wide shared path runs along the length of Forrest Hill Road, crossing from the western side of Forrest Hill Road to the eastern side around Havelock Avenue. A signalised pedestrian crossing is provided for in the location where the shared path switches.

General Traffic Environment: Forrest Hill Road connects the suburb of Forrest Hill to Takapuna and the Northern Motorway. The road has a clear "through" function as there are not many attractions located along the road. Due to the fact that several major schools are located at the southern end, the road is well used by cyclists and pedestrians. To cater for these groups, a high quality shared path has been constructed. The existing road layout seems to be sufficient, but the long term viability of the T2 lane may need to be reviewed should PT services increase.

A bottleneck in this part of the corridor is the southbound connection to SH1, which causes significant delays and queuing on Tristram Avenue and Forrest Hill Road in the morning peak period. The intersection of Tristram Avenue and Forrest Hill Road should be investigated to provide for additional turning capacity to and from Tristram Avenue.

Public Transport: There is currently a limited number of bus services that travel via Forrest Hill Road. The morning peak frequency is about 10 buses an hour in each direction. While this frequency is expected to increase, Forrest Hill Road is not on the planned frequent network as part of the draft RPTP 2016. However, a frequent service line is included in the draft RPTP for 2022, with a bus route connecting Smales Farm to Albany via Windsor Park servicing Forrest Hill Road.

Land Use: The northern section of Forrest Hill Road is dominated by Greville Reserve along the eastern side of the corridor. This is a significant open space area and access to and from Greville Reserve is vital in terms of linking across Forrest Hill Road. Land use along Forrest Hill Road is not expected to change to a great extent. Some residential intensification will occur along the corridor, particularly on the eastern side of the road. This will lead to some increase in traffic on the road plus more demand for access onto Forrest Hill Road. A minor local centre is located at the northern end of Forrest Hill Road near the intersection with Manutara Avenue with several shops located on the western side of the road.

Walking and Cycling: Currently a high quality shared path is located along Forrest Hill Road. This shared path is located on the western side of the road along the southern half of the road; it crosses to the eastern side at a signalised crossing just south of Havelock Avenue. It is also important to connect the existing shared path to other facilities in the area; for example the connection at the East Coast Road roundabout is unsatisfactory.

For cyclists, Forrest Hill Road will connect into the proposed upgrade of Wairau Road at its southern extent. This will see cycle lanes provided along Wairau Road between Forrest Hill Road and Shakespeare Road as part of the Stage 3 works for the Taharoto/Wairau Corridor Upgrade. The Stage 3 works see:

- Widening of the northern side of Wairau Road outside Atlas Concrete
- On-road cycle lanes
- Dedicated bus lane
- Additional lanes
- Wider footpaths
- Improvements to services and utilities
- Land purchase from Atlas Concrete and some private properties

One of the major issues for pedestrians is the ability to cross the road. The lack of traffic signals along the road means there are few opportunities to provide pedestrians a safe place to cross, with only few pedestrian refuge islands available. High quality pedestrian crossing facilities are desired particularly around the busier bus stops and around the local schools. Potential locations for improved pedestrian crossing facilities have been indicated on the aerial, shown in **Figure 7-2.**

The second major issue faced by pedestrians is the treatment of the side roads where they join Forrest Hill Road. The ability for these side roads to be narrowed in terms of width and kerb radii will help to improve the pedestrian experience along Forrest Hill Road.

There is very minimal street planting within the road reserve along Forrest Hill Road, particularly within the grass berm adjacent the road carriageway. The addition of planting helps to soften the otherwise stark "concrete" nature of the corridor as well as helping to buffer pedestrians and cyclists from the vehicle lanes.

General Traffic	Public Transport	Land Use Change	Walking and Cycling	Stormwater
• SH1 bottleneck at Tristram Avenue causes congestion along Forrest Hill Road • Improvements to Tristram/ Forrest Hill intersection to cater for turning movements • Maintain T2 lane for future bus lane	• Part of the Frequent Network in 2022 • T2 lane could transition to bus lane as services increase in the future	• Minor residential intensification • Minor commercial/ retail growth about existing centre by Manutara Avenue	• Improved crossing facilities – particularly about schools • Understand linkages through residential streets to serve Shakespeare Road area	• Eastern catchment feeds into valley running from Greville Reserve to Shakespeare Road and Lake Pupuke

Table 7-1: Stakeholder Consideration: Forrest Hill Road

7.2 Stakeholder Considerations

The needs for this corridor have been identified through stakeholder input as well as reviewing key strategies and policies with respect to intensification, public transport and cycling within the area. From this research the following matters have been identified as requiring consideration with respect to the future cross section of the corridor.

7.3 Spatial Requirements: Forrest Hill Road

The above components and considerations have been translated into spatial requirements, to understand how the corridor needs to be configured in order to cater for the needs of each mode of travel, with the needs for each mode summarised as follows.

Spatial requirements per mode

Private Vehicles: The existing road configuration of one lane each direction plus a southbound T2 lane should be maintained. If bus frequencies increase, the T2 lane should be converted into a bus only lane, or the operating hours of the T2 lane might be altered. The lane width should be reduced to 3.0 m to reduce vehicle speeds.

Bus: The existing southbound T2/Bus lane seems to operate well. While the operating hours may be reviewed in the future, a northbound bus lane along the entirety of Forrest Hill Road seems unnecessary at this stage.

Parking: Parking is currently allowed in the T2 lane outside morning peak hours and is allowed along most of the northbound vehicle lane. On-street parking along the northbound vehicle lane should be maintained except around intersections. Parking in the southbound may be restricted to fewer hours if the need arises.

Cyclists: The existing shared path is of high quality and caters well for cyclists. No additional cycle lanes will be required along Forrest Hill Road. The quality of the facilities at either end of the shared path is still less than desirable, particularly around the East Coast Road intersection.

Pedestrians: Pedestrian activity along Forrest Hill Road is considered minor, with the school frontages as exceptions. Pedestrian amenity is considered important along the entirety of the road. Minimum footpath width is 1.8 m. For Forrest Hill Road, footpaths of 2.0 m on each side of the road are required and should up to 4.0 m wide in front of the schools. Side road treatments are also recommended to improve the pedestrian amenity.

Landscaping: where space allows provision for greater landscaping should be provided for in terms of street trees or planting within the berms. Consider low impact design and stormwater treatment requirements as part of any landscaping.

Figure 7-1 summarises the spatial requirements for Forrest Hill Road. This details the expected and desired changes for the corridor and how these fit within the existing carriageway and road reserve widths.

7.4 Key Corridor Features and Cross Sections

The spatial requirements have been applied to the Forrest Hill Road corridor at a greater level of detail to identify how the corridor will transform over time to meet its anticipated demands. These also help to identify alternative cross sections to respond to the varied needs of a corridor. **Figure 7-2** demonstrates the corridor as a whole, highlighting key points of interest and identifying potential pedestrian crossing points using orange arrows. **Figure 7-3** provides cross sectional details at these specific locations.

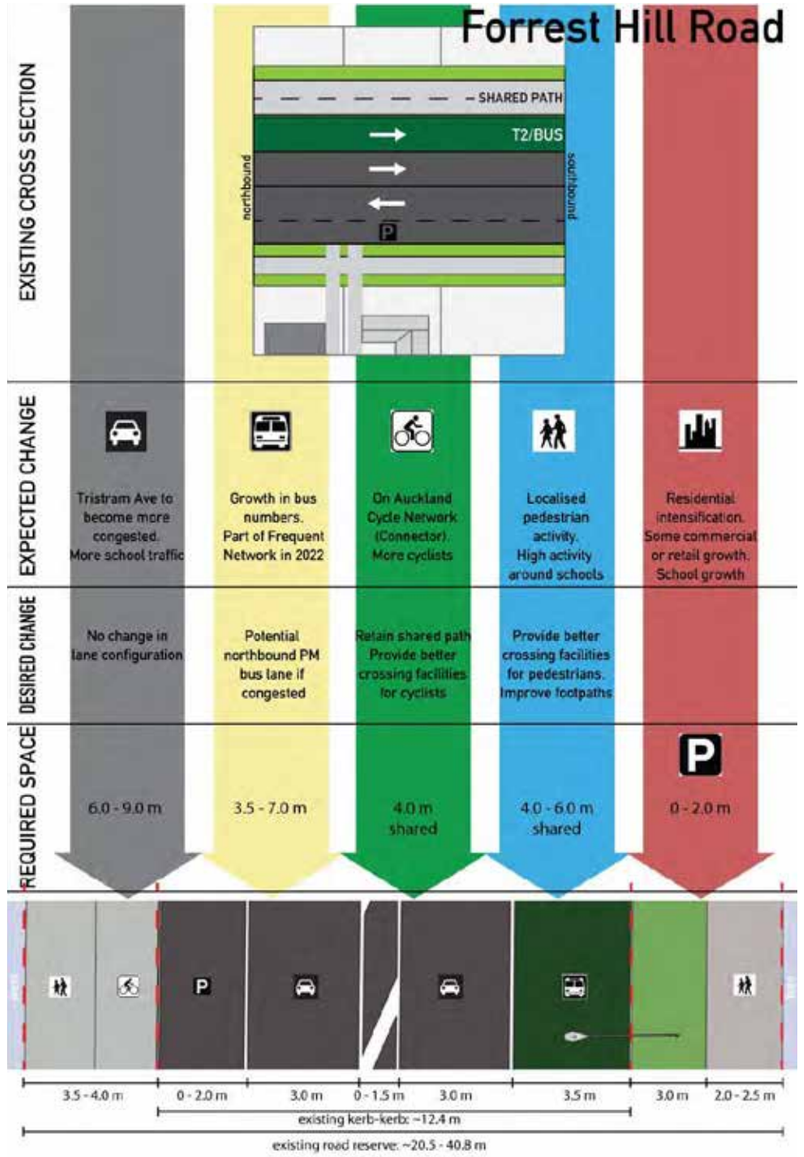


Figure 7-1: Forrest Hill Road Spatial Requirements

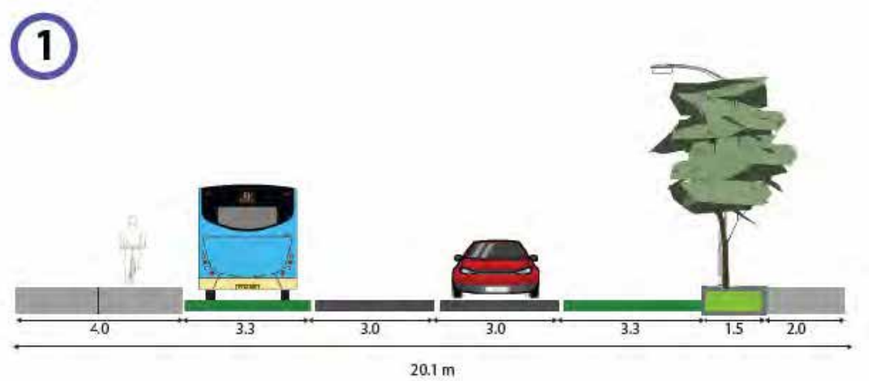


Figure 7-2: *Forrest Hill Road Aerial*

Figure 7-3: *Forrest Hill Road Cross Sections*

The Forrest Hill Road cross sections are largely the same as existing, as this corridor is not expected to see a great degree of change. There are a number of locations where greater attention can be given to pedestrian amenity and bus priority. Potential cross sections have been developed to reflect this and locations for potential pedestrian improvements are illustrated in **Figure 7-2.** The pedestrian improvement locations have been identified with respect to their proximity to:

- public transport
- key land uses
- key connections about the surrounding area, be it roading connections or local accessways.

As with any corridor, there will always be variations to the typical cross section in order to "stitch together" the road along the length of the corridor. In any corridor there are:

- Transitions to accommodate intersections and the need for additional turning lanes, bus priority etc
- The need to accommodate other users at specific locations, for example bus stops, pedestrian refuge islands, turning bays for side road traffic
- Constraints in the available width in which to implement the preferred cross section. This can arise due to topography along the corridor or road reserve constraints.
- All of these issues are of relevance to this corridor and will need to be considered as part of any future works in order to realise the goals of this CMP.

Cross Section 1: This cross section examines the ability to introduce a northbound bus lane at the northern extent of Forrest Hill Road as it approaches the East Coast Road roundabout intersection. The existing bus priority at the roundabout intersection currently extends back to Manutara Avenue, illustrated in **Figure 7-4**. To extend a bus priority measure further south will require the removal of on street parking and localised widening extending across the frontages of commercial properties. This is illustrated in **Figure 7-5**.

Cross Section 2: this shows a typical section where greater crossing ability is introduced for pedestrians with a refuge island included within the cross section. This typically refers to Forrest Hill Road south of Tristram Avenue, where there is a greater concentration of schools. However this could also be introduced north of Tristram Avenue if desired. Achieving the refuge island will be at the expense of on –street parking, with this being removed locally about the refuge.

Cross Section 3: Located outside Westlake Boys High School, the existing signalised crossing could be modified to reduce the side island extents in order to remove the pinch point the existing situation causes for on road cyclists.

Flexibility: the cross sections proposed provide flexibility, with the ability to remove on street parking should this space be required to cater for turn bays, bus stops or refuge islands.

Constraints: with minimal change to the existing cross section of Forrest Hill Road proposed, there are no significant constraints to achieving the design philosophy of this CMP.

Stormwater: this area discharges into flood sensitive area of the Wairau catchments. Any changes to the cross section of Forrest Hill Road need to consider stormwater and the relevant catchment plans. The potential for Low Impact Design principles should be considered.

7.5 Critical Intersections

The Forrest Hill Road/East Coast Road intersection has recently been examined with respect to improved bus priority measures through the intersection. Auckland Transport has prepared a scheme design of this, as illustrated in **Figure 7-6**. As suggested above, Cross Section 1 highlights the ability to extend the northbound bus lane further to the south.

To accommodate all road users at this intersection, it is recommended that the intersection upgrade design be further explored to focus on the following:

- The ability to reduce vehicle speeds negotiating the roundabout. Currently there is limited deflection for certain movements, meaning vehicles can travel through the intersection at higher speeds than desirable. The intersection design also relies heavily on paint markings to "pseudo-narrow" the intersection. Consideration should be given to the ability to install raised traffic islands to reinforce lower vehicle speeds. Tracking requirements for larger vehicles could be accommodated on raised "aprons" about the traffic islands
- Pedestrian and cyclist connections, particularly about East Coast Road. These are currently poor, and also a subject of the poor intersection design encouraging high vehicle speeds. There is no ability on any of the intersection arms to cross at the intersection
- Upgrade and widen the footpath about East Coast Road – about the Pupuke Golf Course. This is currently very narrow, poorly maintained and does not offer conducive pedestrian amenity
- If it is deemed unsafe or unachievable to provide for pedestrians on all arms of the intersection, then there is a need to identify where pedestrian crossing facilities can be provided in close proximity to the intersection
- Any bus priority northbound on Forrest Hill Road would ideally be continued on East Coast Road, until at least Sunnynook Road
- Future signalisation of this intersection seems a long term proposition due to upstream blockages that prevent meaningful increases in efficiency from being achieved, and cannot be seen as viable for the very long term.

The intersection of Forrest Hill Road with Tristram Avenue is also identified as a critical intersection. Consideration

Figure 7-4: Northbound Approach to Forrest Hill Road roundabout

Figure 7-5: Forrest Hill Road: carriageway widening to achieve Cross Section 1

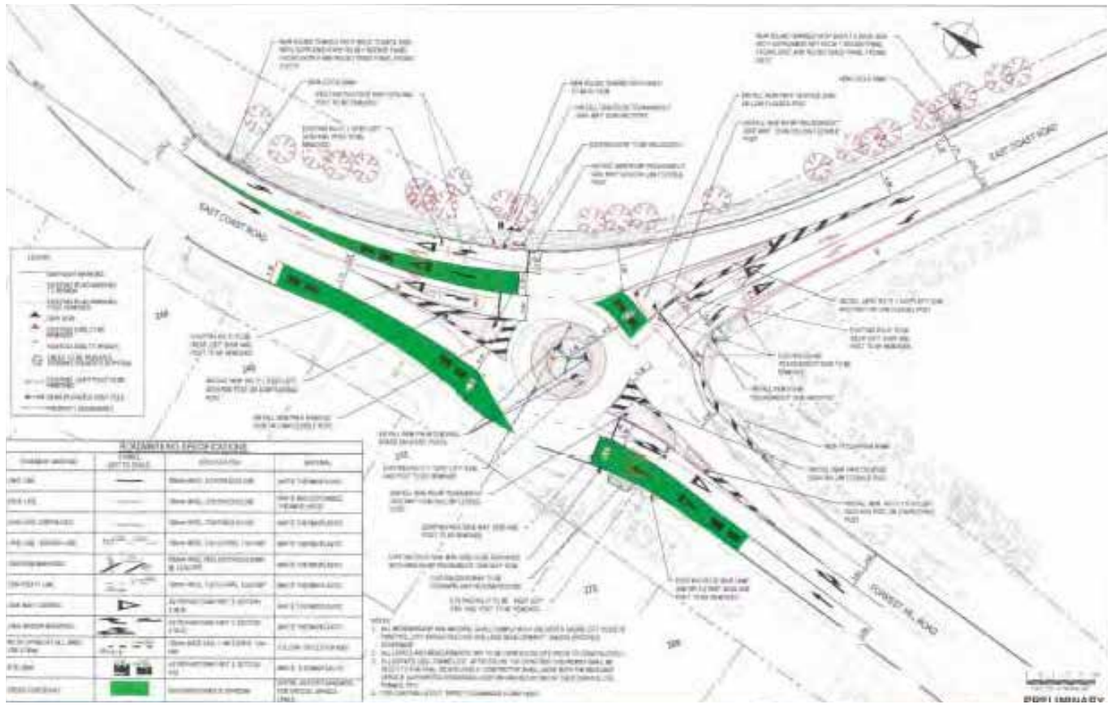


Figure 7-6: Proposed upgrade of Forrest Hill Road/East Coast Road

has been given to the need to upgrade this intersection; however in this instance the following points have been concluded:

- The congestion at this intersection is largely as a result of Tristram Avenue's connection with the SH1 corridor
- Congestion is of most concern in the morning commuter period
- Outside of these times the intersection is understood to operate relatively efficiently
- On this basis, it seems unnecessary to upgrade or widen this intersection to accommodate the morning commuter traffic, which is a confined period of the day.

East Coast Road

8

Figure 8-1: East Coast Road, east of Stanley Avenue facing east (image courtesy of Google Streetview)

8.1 Corridor Components

East Coast Road, between Forrest Hill Road and Shakespeare Road, is classified as a secondary arterial road. The road carries around 13,000 vehicles a day (5-day AADT). The existing layout typically consists of one northbound lane and one southbound lane, with parking allowed along both sides of the road. At the main intersections with Forrest Hill Road and Shakespeare Road, the approach widens to two lanes. Narrow footpaths and grass berms are available on both sides, with a total road reserve width of approximately 20.1 m.

General Traffic Environment: East Coast Road connects Milford to Forrest Hill, the East Coast Bays and Wairau Valley. This stretch of the corridor mainly provides access to the neighbouring properties and there are few attractions located along the road. While outside peak hours the road is not very busy, the intersections at either end of the corridor are considered bottlenecks, with queues running up East Coast Road to Rangitoto Terrace from the Shakespeare Road intersection.

Public Transport: During the morning peak, approximately seven buses an hour pass through this section of East Coast Road. Outside peak hours, the frequency is considerably lower. While this frequency may increase in coming years and with this section of East Coast Road planned to be serviced by the Frequent Network by 2022, the volume of buses using the corridor is not expected to be significant.

Land Use: There is some potential for residential intensification along East Coast Road, particularly on the eastern side, as this side provides the opportunity to gain views of the Hauraki Gulf. While the degree of residential intensification may vary, depending on market

General Traffic	Public Transport	Land Use Change	Walking and Cycling	Storm water
• Signalised crossing/ • intersection with Aberdeen Road	• Due to low bus frequencies, no dedicated bus lanes are required • Intersection priority desired about Shakespeare Road intersection	• Minor residential intensification	• Improved facilities for pedestrians and cyclists along and across the corridor	• Discharges into flood sensitive area of the Wairau, Campbells Bay and Castor Bay catchments

Table 8-1: Stakeholder Consideration: East Coast Road

conditions and Unitary Plan zoning, it is expected that some redevelopment will happen within the timeframe of the CMP. Depending on the level of intensification, this will lead to minor increases in traffic on the road plus more demand for access onto East Coast Road. Commercial development is not expected to happen to a large degree along this corridor.

Walking and Cycling: The footpaths along East Coast Road are relatively narrow and no cycle lanes are currently present. Especially closer to Milford Centre, wider footpaths and uphill (northbound) cycle lanes as a minimum are recommended, to cater for longer distance commuter cyclists and people accessing Milford Town Centre. Due to the lack of signals along the corridor it is hard for pedestrians to cross the road. There are only three formalised pedestrian crossings along this 2.3 km long section. The treatment of the side roads where they join East Coast Road is recommended as part of any corridor upgrade. The ability for these side roads to be narrowed in terms of width and kerb radii will help to improve the pedestrian experience along East Coast Road.

8.2 Stakeholder Considerations

The needs for this corridor have been identified through stakeholder input, as well as reviewing key strategies and policies with respect to public transport, cycling and growth within the area. From this the following matters have been identified as requiring consideration with respect to the future cross section of the corridor.

8.3 Spatial Requirements: East Coast Road

The above components and considerations have been translated into spatial requirements, to understand how the corridor needs to be configured in order to cater for the needs of each mode of travel, with the needs for each mode summarised as follows.

Spatial requirements per mode

Private Vehicles: The existing space for private vehicles should be retained, with one travel lane in each direction. While some growth in vehicle numbers is expected, increasing the number of vehicle lanes is neither practicable nor desirable. Vehicle lane width should be reduced to 3.0 m to reduce vehicle speeds along the corridor.

Bus: Dedicated bus facilities will not be required along the length of the road, but localised bus priority is required on the northern and southern end of East Coast Road.

Parking: Currently, parking is permitted along a large part of East Coast Road except around intersections. Where possible, the existing parking should be retained, but the parking lane width should be minimised to increase side friction, reduce vehicle speeds and minimise the amount of asphalt, which helps to humanise the corridor.

Cyclists: Serving as the preferred local traffic route from Forrest Hill into Takapuna, East Coast Road is a key route for cyclists heading to Milford or Takapuna. To cater for these cyclists, 1.8 to 2.0 m wide cycle lanes on both sides of East Coast Road are desired, preferably separated from vehicular traffic.

Pedestrians: Minimum footpath width required is 1.8 m. Since East Coast Road will cater for some pedestrian traffic along the road, 2.0 m wide footpaths on both sides of the road will be enough to provide the required pedestrian amenity. Side road treatments are also recommended to improve the pedestrian amenity

Landscaping: where space allows, greater landscaping should be provided for in terms of street trees or planting within the berms. Consider low impact design and stormwater treatment requirements as part of any landscaping.

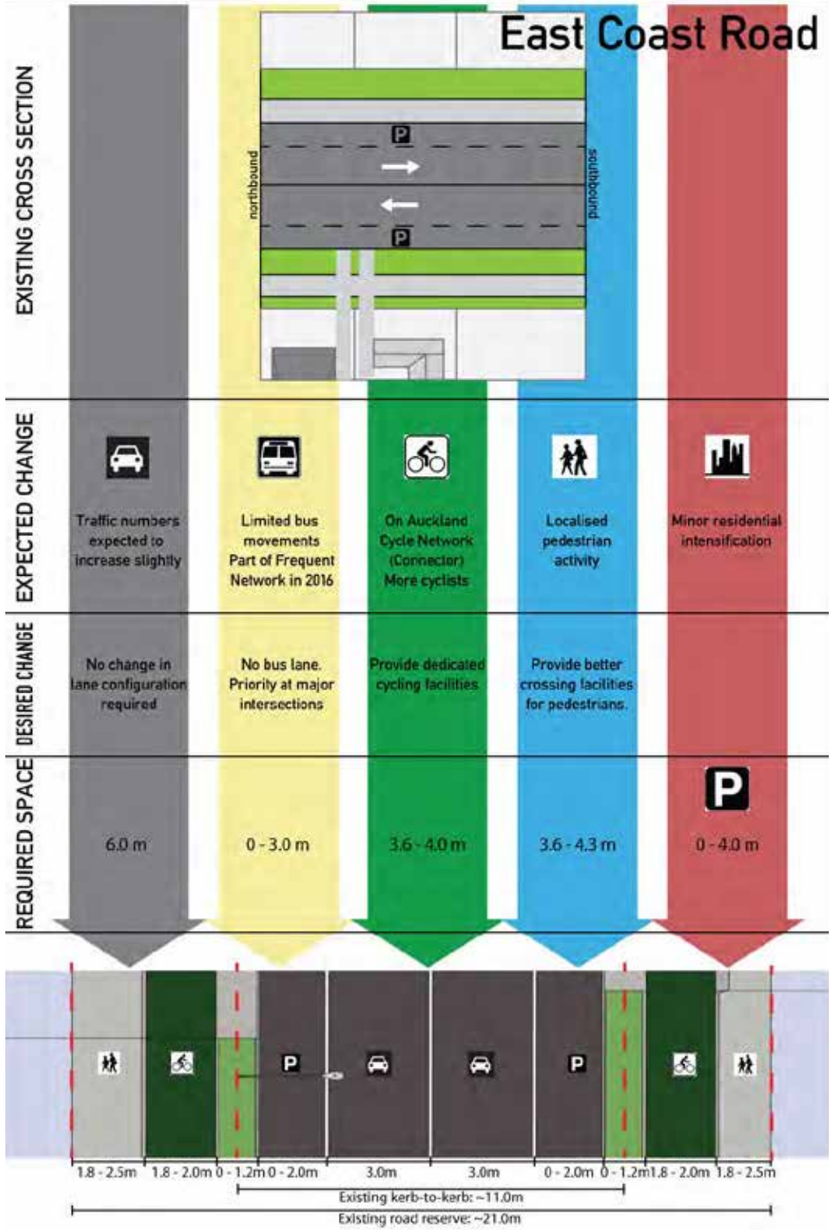


Figure 8-2: East Coast Road Spatial Requirements

Figure 8-3 summarises the spatial requirements for East Coast Road. This details the expected and desired changes for the corridor and how these fit within the existing carriageway and road reserve widths.

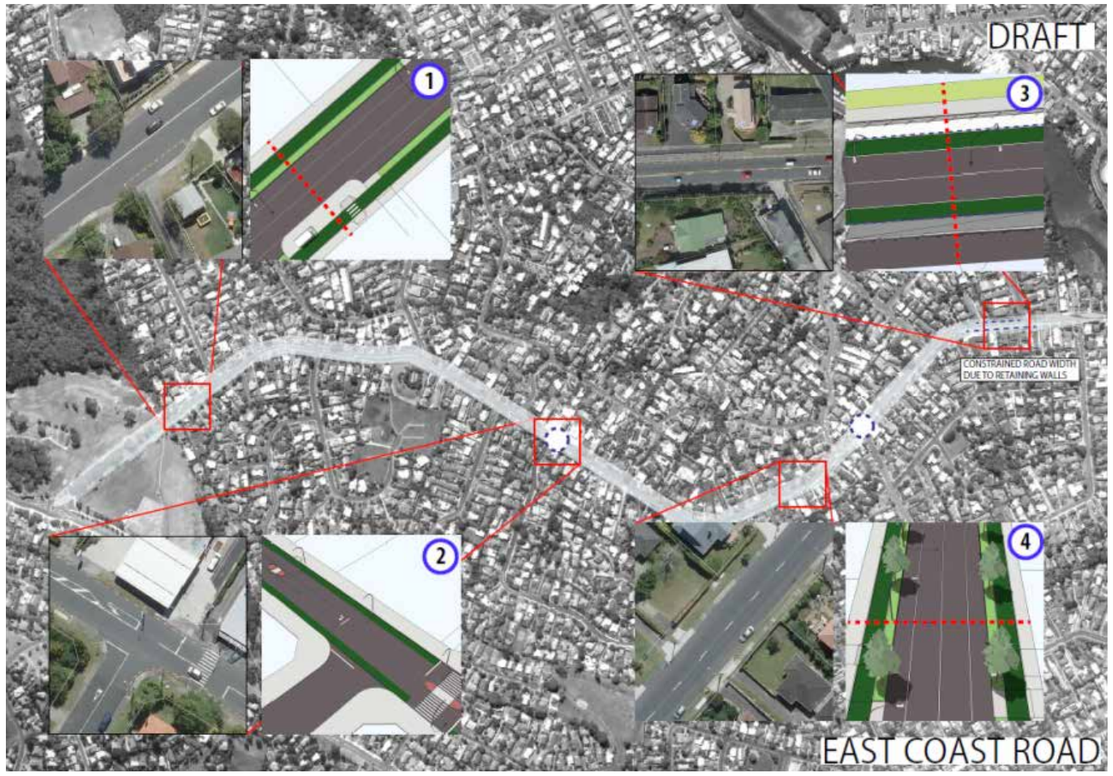


Figure 8-3: East Coast Road Aerial

8.4 Key Corridor Features and Cross Sections

The spatial requirements have been applied to the East Coast Road corridor at a greater level of detail to identify how the corridor will transform over time to meet its anticipated demands. These also help to identify alternative cross sections to respond to the varied needs of a corridor. **Figure 8-3** demonstrates the corridor as a whole, highlighting key points of interest. **Figure 8-4** provides cross sectional details at specific locations. Key pedestrian improvement locations have been identified in **Figure 8-3** with respect to their proximity to the following:

- public transport
- key land uses
- key connections about the surrounding area, be they roading connections or local accessways

As with any corridor there will always be variations to the typical cross section in order to "stitch together" the road along the length of the corridor. In any corridor there are:

- Transitions to accommodate intersections and the need for additional turning lanes, bus priority etc
- The need to accommodate for other users at specific locations, for example bus stops, pedestrian refuge islands, turning bays for side road traffic
- Constraints in the available width in which to implement the preferred cross section. This can arise due to topography along the corridor or road reserve constraints.
- All of these issues are of relevance to this corridor and will need to be considered as part of any future works in order to realise the goals of this CMP.

The East Coast Road cross sections focus on improving the cycling amenity along this route as well as identifying potential bus priority measures. Potential cross sections have been developed to reflect this.

Cross Section 1: this cross section shows a design option where a bus stop on the corridor exists and how to accommodate the proposed separated cycle lanes at such a location. The cross section removes parking locally about the bus stop, and promotes the stop to the kerb edge in order to accommodate facilities for waiting passengers.

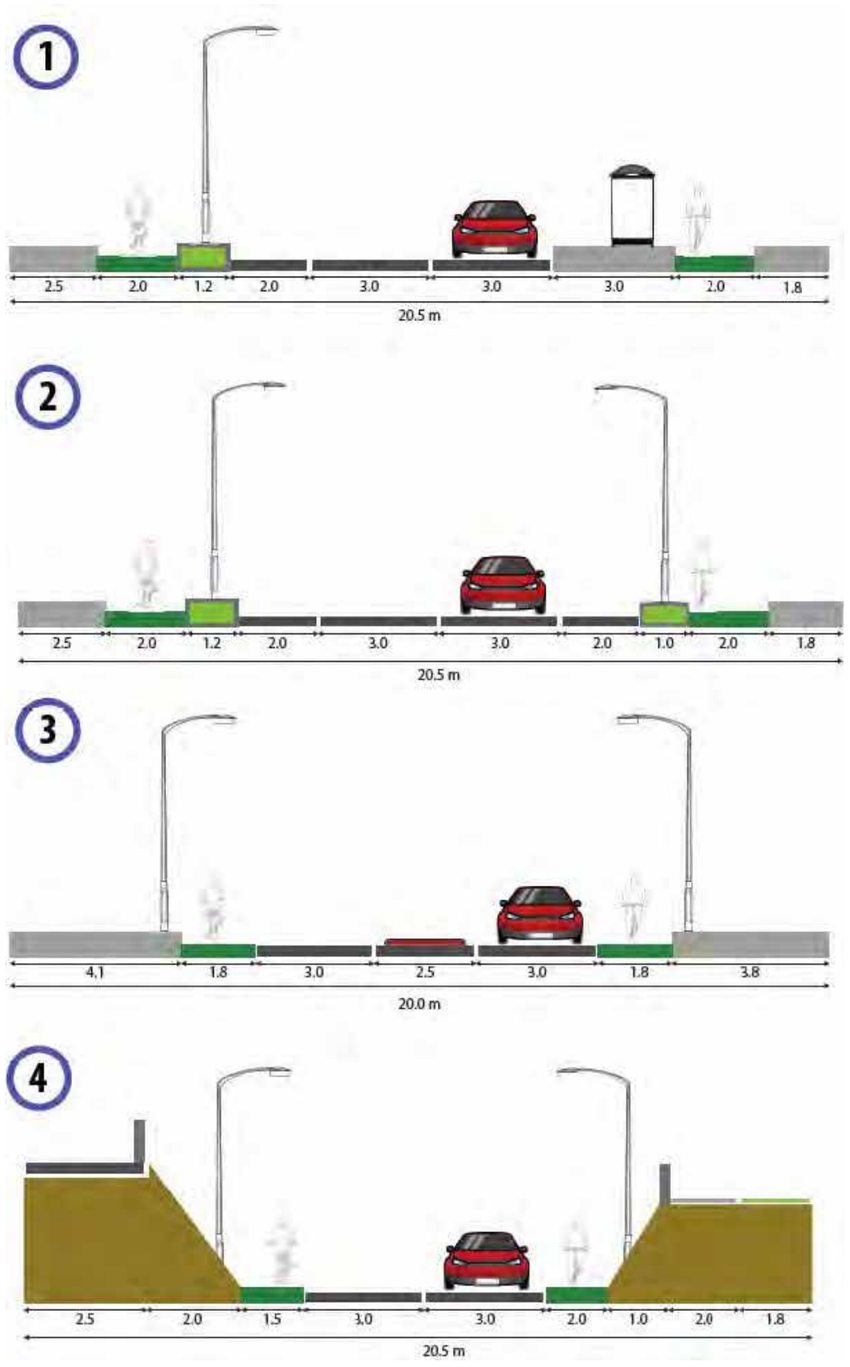


Figure 8-4: East Coast Road Cross Sections

Figure 8-5: East Coast Road Constraint between Rangitoto Terrace and Argyle Terrace (source: Google Streetview)

Cross Section 2: this shows the typical section proposed for East Coast Road, with on street parking and separated cycle lanes proposed. Design consideration will need to be given to the physical form of separation achieved between the cycle lane and on street parking. Options for this have been previously discussed in **Section 5**.

Cross Section 3: identifies a cross section variation to be applied at areas of intensification about local commercial nodes. This would typically apply to a short section of corridor where it passes through an area of higher density about local shops or cafes. Greater provision is made for pedestrian amenity through this area. On street parking may be accommodated for on East Coast Road if the footpath space is not critical – but ideally parking is located in greater numbers in the side streets. An example of where this cross section may be applicable is around the Stanley Avenue intersection.

Cross Section 4: the fourth cross section relates to an area of constraint in the East Coast Road corridor where the topography affects the ability to provide for all modes of travel spatially, as shown in **Figure 8-5**. On road cycle lanes are provided for, although not separated as proposed along the rest of the corridor. Parking and pedestrians are catered for at the top of the retaining structures, as is currently the case.

Flexibility: the cross sections proposed provide flexibility with the ability to remove on street parking should this space be required to cater for turn bays, bus stops or refuge islands. The potential footpath widths can also be reduced in certain locations should there be a desire for increased landscaping. Any narrowing of footpaths should be considered in line with its location to local commercial nodes.

Design Test: Separated Cycle Lanes: **Figure 8-6** illustrates a design test of East Coast Road to understand how a separated cycle lane is affected by the existing property accesses. This has been undertaken on an 85 m section of East Coast Road (between Seaview Road and Stanley Avenue, as illustrated) there are noticeable sections of the cycle lane that will be uninterrupted by property accesses, making the separation strip prominent and able to be planted/grassed accordingly.

Constraints: there is a short section of East Coast Road, between Argyle Terrace and Rangitoto Terrace, where a retaining wall restricts the ability for changes to the existing cross section – with Cross Section 4 identifying the proposed spatial arrangement through this area.

Stormwater: this area discharges into flood sensitive area of Wairau, Campbells Bay and Castor Bay catchments. There are also erosion issues in the Campbells Bay and Castor Bay catchments. Any changes to the cross section of East Coast Road need to consider stormwater and the relevant catchment plans. The potential for Low Impact Design principles should be considered.

8.5 Intensification Design Tests

To understand how future intensification may occur, a number of design tests have been completed along East Coast Road. Theoretical design tests were undertaken to assess and respond to the identified urban design issues, alongside general feasibility and efficiency issues, and existing character considerations. These tests were discussed and progressed during workshops with the consultant team, Auckland Council and Auckland Transport.

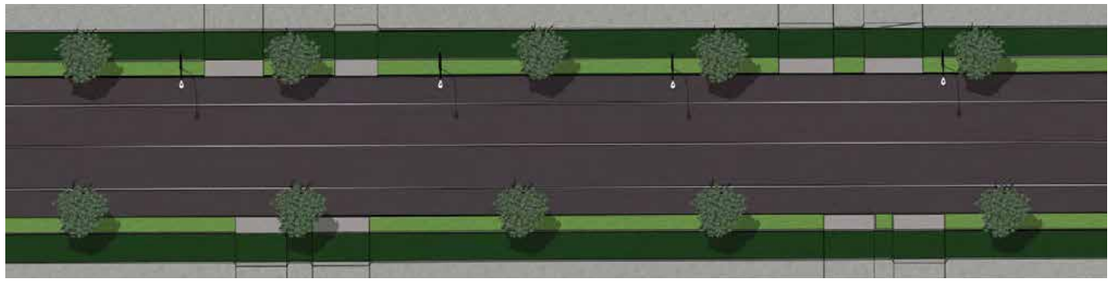


Figure 8-6: East Coast Road Design Test for Separated Cycle Lanes

Figure 8-7: Option 1: Additional Bus Priority - East Coast Road – (illustrative only)

The tests undertaken were not intended to be detailed design concepts, rather they help to illustrate future access and design issues if intensification were to occur along a segment of road.

These design tests are summarised in **Appendix D**.

8.6 Critical Intersections

Approach into Milford Town Centre: the approach to Milford Town Centre and its intersection with Shakespeare Road, Kitchener Road and Omana Road has been focussed on with respect to bus priority provisions, to enable buses to avoid congestion through this area. Two options have been developed conceptually to improve bus priority through this section of East Coast Road.

Option 1: Figure 8-7 provides for a short section of bus lane at the approach to the intersection with Shakespeare, Kitchener and Omana Roads. Anecdotally the congestion at this intersection is typically caused by Milford town centre and vehicles travelling straight through. This results in the kerbside lane being over-utilised and the central lane being underutilised. Hence buses are able to be accommodated in the central lane, and then given the ability via the bus lane to jump the queue heading into Milford town centre. Achieving the necessary width will require widening of the existing bridge at the intersection and a small amount of property purchase.

Option 2: providing bus priority beyond that achieved in Option 1 will require additional property to be purchased on East Coast Road to Wolsley Avenue or through to Rangitoto Terrace, in order to provide a dedicated bus lane over this length of East Coast Road, as illustrated in **Figure 8-8**. There is a wider berm on the western side of East Coast Road between Rangitoto Terrace and the bridge across the Wairau Creek, although the services through this area would need to be relocated/undergrounded to achieve any widening. The lengthened bus lane and land required to achieve this is illustrated below.

Figure 8-8: Option 2: Lengthened Bus Priority - East Coast Road

Kitchener - Hurstmere Road

9

Figure 9-1: Kitchener Road

Figure 9-2: Hurstmere Road

9.1 Corridor Components

Kitchener Road runs from the intersection with Shakespeare Road in Milford Town Centre around Lake Pupuke, where it changes to Hurstmere Road and continues towards Takapuna Town Centre. Consequently the corridor serves two town centres at either end of the corridor, while providing access to a long section of residential properties in between. While the road is in close proximity to both the lake front and the ocean front, it does not provide direct access to either. Sylvan Park is located close to Milford and provides access to the lake front. The roads on the northern and eastern side of the corridor provide access to Milford Beach.

The two roads are classified as secondary arterials and carry approximately 16,000 vehicles a day (5-day AADT). The road consists of one northbound lane and one southbound lane with intermittent on-street parking along the length. Footpaths are provided on both sides, and in some locations are relatively generous in width. A flush median is provided in Milford Town Centre.

General Traffic Environment: This part of the corridor provides access to both Takapuna and Milford Town Centres and to the residential properties along the road. At a wider level, Kitchener Road and Hurstmere Road provide a connection between Lake Road and Milford. According to the relevant stakeholders, traffic in Milford and Takapuna town centre should be slowed down to a maximum of 30 km/h. Through the town centres the road layout should focus on pedestrian movements and amenity. To enable a calmer traffic environment in Takapuna Town Centre, through traffic at the Hurstmere Road/Killarney Street intersection is to be encouraged to travel along Killarney Street, thereby redirecting extraneous traffic from using Hurstmere Road. This will require the intersection to be redesigned, with this redesign encouraging a slower speed environment on Hurstmere Road in Takapuna. The existing road layout on Kitchener-Hurstmere Road is expected to be sufficient to cope with future traffic growth, no widening appears to be required.

Public Transport: Kitchener - Hurstmere Road currently carries around nine buses an hour in the morning peak period. It is included in the RPTP as being on the 2016 Frequent Network. This means the road will carry buses from Akoranga to Milford all day at a minimum frequency of one every 15 minutes. To ensure reliability and speed of these services, the workshop participants recommended that a bus lane/priority should be provided on Kitchener Road westbound to avoid queuing at the Shakespeare Road intersection and southbound on Hurstmere Road to avoid queues forming on the approach to Takapuna town centre. Bus stops along the corridor should be rationalised and evenly spaced.

An upgraded bus layover facility or bus station may be required at Takapuna town centre in the future to cater for the increased number of buses. The location of this is yet to be determined and will be addressed in the Takapuna Centre Based Transport Study.

Land Use: Major land-use change is anticipated in Milford Town Centre, if Plan Change 34 (or similar) is adopted. While this plan change has been declined by the Council hearing committee, this decision has been appealed to the Environment Court. Major land-use change intensification is also expected in Takapuna town centre, which is classified as a metropolitan centre under the Auckland Plan and is earmarked for significant growth. Developers have expressed plans to develop sites along Hurstmere Road and The Strand, but no resource consent applications have been received as of yet.

Walking and Cycling: Because Kitchener - Hurstmere Road is popular with cyclists cycling around Lake Pupuke, it is important to cater for cycling along this corridor. The flat topography and the short distance to both Milford and Takapuna make it an ideal corridor to encourage cycling for recreational and commuters to use. The existing road is wide enough to cater for separated cycle lanes.

Both Milford and Takapuna town centre need to be focused on pedestrian movements. The current traffic environment in both town centres is focused too much on vehicular traffic. Traffic calming is recommended to allow for safer and easier pedestrian crossing movements.

The northern/eastern berm is predominately sealed, with no grass verge. This maximises the footpath width about much of the corridor.

As part of any corridor upgrade the treatment of the side roads where they join Kitchener Road and Hurstmere Road is recommended. The ability for these side roads to be narrowed in terms of width and kerb radii will help to improve the pedestrian experience.

9.2 Stakeholder Considerations

The needs for this corridor have been identified through stakeholder input as well as reviewing key strategies and policies with respect to public transport, cycling and growth within the area. From this the following matters have been identified as requiring consideration with respect to the future cross section of the corridor.

9.3 Spatial Requirements: Hurstmere - Kitchener Road

The above components and considerations have been translated into spatial requirements to understand how the corridor needs to be configured in order to cater for the needs of each mode of travel, with the needs for each mode summarised as follows.

Figure 9-3 summarises the spatial requirements for Kitchener and Hurstmere Road. This details the expected and desired changes for the corridor and how these fit within the existing carriageway and road reserve widths.

Spatial requirements per mode

Private Vehicles: In the existing layout, private vehicles have one travel lane each direction. While some growth is expected due to intensification on both sides of the corridor, no widening is anticipated or desired. The current lane configuration should be retained. The lanes should be narrowed to 3.0 m to reduce vehicle speeds.

Bus: To ensure frequent network service reliability and speed, Kitchener - Hurstmere Road is expected to require a dedicated bus lanes in either direction leading in to the critical intersections. Due to spatial constraints, only one bus lane can be accommodated at any one point.

Parking: Parking is intermittently allowed on either side of Kitchener - Hurstmere Road. Some parking should be retained, but limited to one side of the road only. The parking lane width should be reduced to 2.0 m to increase side friction. The parking lane should preferably be buffered from the cycle lanes. At intersections or at locations where road reserve width is insufficient, no parking should be permitted.

Cyclists: Due to the flat nature of Kitchener/Hurstmere Road, the route forms an excellent connection between the upper part of the North Shore and Takapuna/ Devonport. This part of the corridor is also heavily used by recreational cyclists, cycling around Lake Pupuke. To cater for each of these types of cyclist, a 2.0 m wide buffered or raised cycle path on each side of Kitchener - Hurstmere Road is desired.

Pedestrians: Pedestrian amenity on this corridor is important, as many people walk around Lake Pupuke for exercise or leisure reasons. Because this part of the corridor is identified by the stakeholders as a local traffic route, pedestrians should have a higher priority along Kitchener - Hurstmere Road. To achieve high pedestrian amenity, wider footpaths are desired on both sides of the road. Side road treatments are also recommended to improve the pedestrian amenity.

Landscaping: where space allows, greater landscaping should be provided for in terms of street trees or planting within the berms. Consider low impact design and stormwater treatment requirements as part of any landscaping.

General Traffic	Public Transport	Land Use Change	Walking and Cycling	Stormwater
• Improve town centre environments • Utilise Killarney Street for traffic destined outside of Takapuna • Utilise Shakespeare Road for traffic destined outside of Takapuna	• Part of the 2016 Frequent Network • Consideration of bus lane/priority westbound on Kitchener at its intersection with Shakespeare/ East Coast Road	• Town centre growth anticipated to be significant. Catering for residential, commercial and retail	• Improved facilities for pedestrians and cyclists along and across the corridor, particularly within the town centres	• Provision of green links through to Lake Pupuke

Table 9-1: Stakeholder Consideration: Kitchener - Hurstmere Street

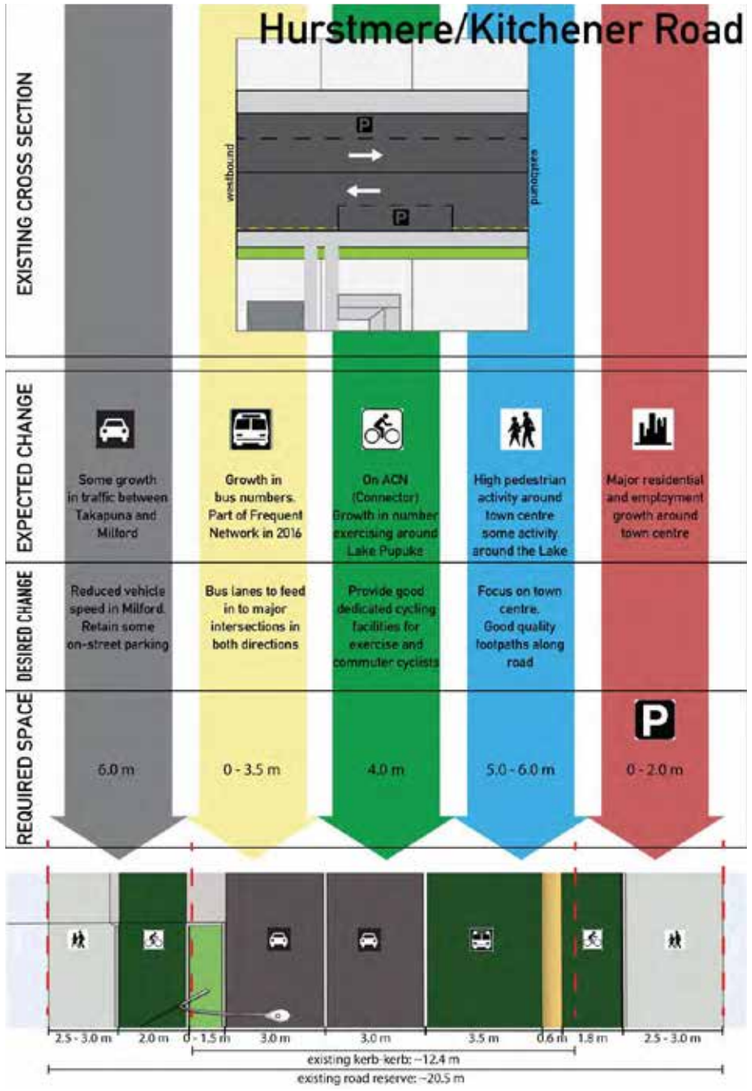


Figure 9-3: Kitchener/Hurstmere Street Spatial Requirements

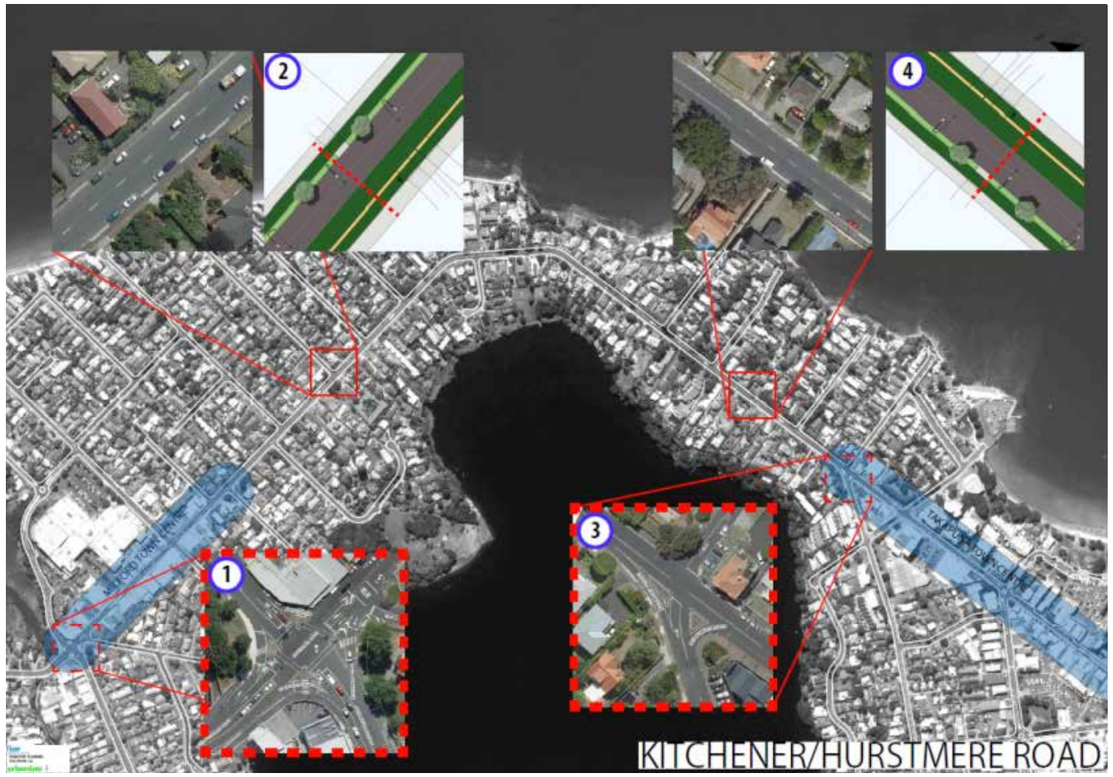


Figure 9-4: Kitchener and Hurstmere Road Aerial

9.4 Key Corridor Features and Cross Sections

The Spatial Requirements have been applied to the Kitchener - Hurstmere Road corridor at a greater level of detail to identify how the corridor will transform over time to meet its anticipated demands. This also helps to identify alternative cross sections to respond to the varied needs of a corridor. **Figure 9-4** demonstrates the corridor as a whole, highlighting key points of interest. **Figure 9-5** provides cross sectional details at specific locations. Key pedestrian improvement locations have been identified in **Figure 9-4** with respect to their proximity to the following

- public transport
- key land uses
- key connections about the surrounding area, be they roading connections or local accessways

As with any corridor there will always be variations to the typical cross section in order to “stitch together” the road along the length of the corridor. In any corridor there are:

- Transitions to accommodate intersections and the need for additional turning lanes, bus priority etc
- The need to accommodate for other users at specific locations, for example bus stops, pedestrian refuge islands, turning bays for side road traffic
- Constraints in the available width in which to implement the preferred cross section. This can arise due to topography along the corridor or road reserve constraints.

All of these issues are of relevance to this corridor and will need to be considered as part of any future works in order to realise the goals of this CMP.

Town Centre Influence (section 1 and 4): This corridor is influenced by the Milford town centre at the western extent and Takapuna town centre at the southern extent. In the town centre areas it is anticipated that the road corridor will cater for higher pedestrian amenities and on street parking. This would be at the expense of cycle lanes and bus priority measures. Vehicle speeds through the town centres need to reduce to 30 km/h to enable vehicles and cyclists to share the road. Traffic calming measures and “threshold” treatments will help to reinforce lower vehicle speeds through the town centres.

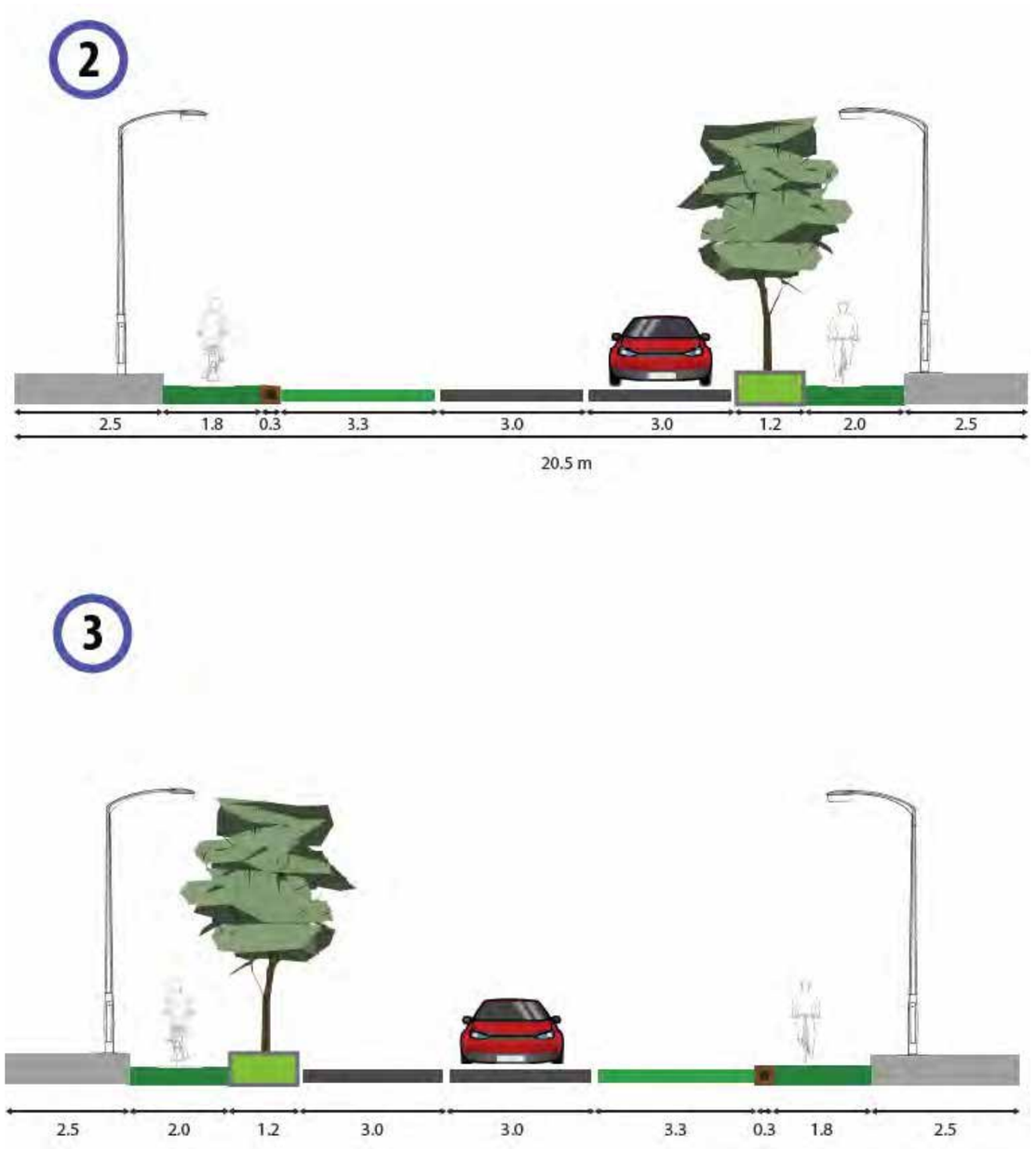


Figure 9-5: Kitchener and Hurstmere Road Cross Sections

Figure 9-6: Kitchener-Shakespeare-East Coast-Omana short term improvements – illustrative only

Cross Section 2: Achieving Cross Section 2 will require widening of the existing kerb to kerb width. This cross section provides for separated cycle lanes in both directions and a bus lane in the westbound direction. It is envisaged that this cross section could apply to Kitchener Road between Tiri Road and Frieston Road, thereby providing bus priority to Milford town centre. The provision of a bus lane will be at the expense of on street parking, albeit that on street parking could be provided for when the bus lane is not operational.

Cross Section 3: Achieving Cross Section 2 will require widening of the existing kerb to kerb width. Cross Section 3 is the mirror of Cross Section 2, with the bus priority measure transferred to the other side of the corridor to provide bus priority southbound towards Takapuna town centre. It is envisaged that this cross section could apply to Hurstmere Road between Minnehaha Avenue and Brett Avenue, thereby providing bus priority to Takapuna town centre. The provision of a bus lane will be at the expense of on street parking, albeit that on street parking could be provided for when the bus lane is not operational.

Flexibility: the cross sections proposed provide flexibility, with the ability for the bus priority lanes to revert to on street parking outside of peak times. There is also the ability to reduce the 1.2 m landscaping separation, as well as reducing some of the footpath width, to provide for a pedestrian refuge in the middle, or for "undersized" turn bays to serve the side roads along the corridors. The proposed footpaths are also wide enough to enable some landscaping treatments, whether by way of a grassed median or by way of tree pits.

Constraints: the berms and property accesses on the western side of Hurstmere Road, about 221 Hurstmere Road to Eric Price Avenue, slightly slope away from Hurstmere Road. Through this location it may be desirable to maintain the grassed berm in its current form to help deal with this gradient change.

Stormwater: the Kitchener – Hurstmere corridors discharges into Lake Pupuke. Stormwater considerations are critical as part of any changes to the cross sections with contaminant management a critical outcome. The potential for Low Impact Design principles should be considered.

9.5 Critical Intersections

The two intersections at either end of this corridor, being Kitchener-Shakespeare-East Coast-Omana and Hurstmere-Killarney, are within the Milford and Takapuna town centres respectively. Consequently there is a desire to improve the pedestrian amenity catered for at these intersections. The following describes conceptual intersection improvements to address this.

Kitchener-Shakespeare-East Coast-Omana (**Figure 9-6**): the recommendations for this intersection are:

- Narrow and provide kerb build outs about Fenwick Avenue to reduce pedestrian crossing distances, and slow vehicle speeds about this intersection

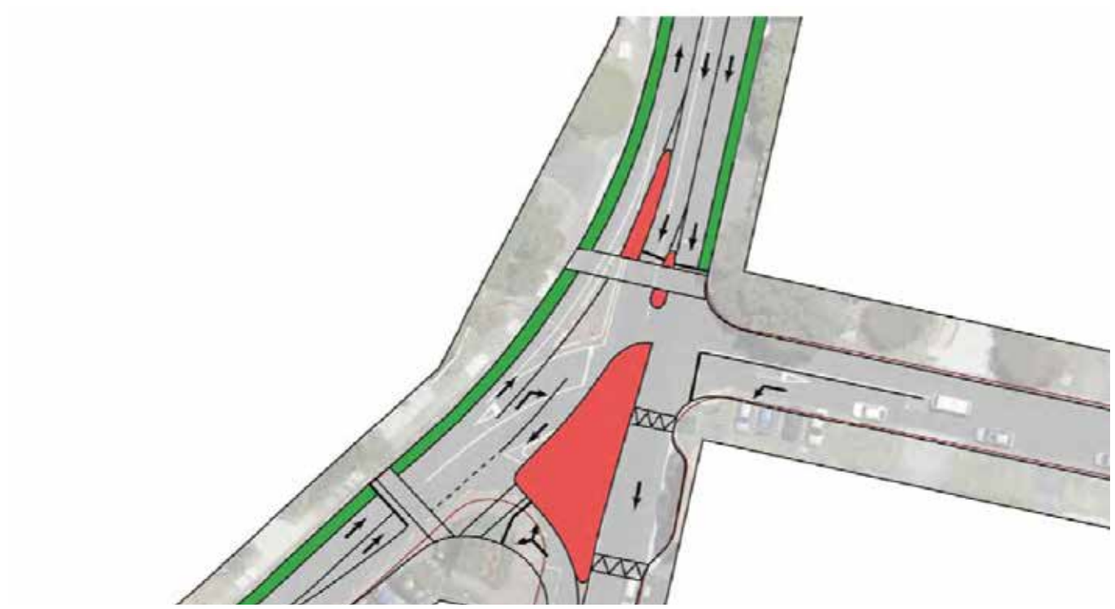


Figure 9-7: Killarney – Hurstmere - Option – illustrative only

- In the short term, provide raised pedestrian crossing points about each of the left turn slip lanes to slow vehicle speeds and improve pedestrian amenity
- In the medium-long term the slip lanes can be removed in favour of full pedestrian crossings on each intersection arm. This may offer the opportunity to provide a Barnes Dance crossing phase for pedestrians.

Hurstmere – Killarney (**Figure 9-7**): Several options have been considered at this location, one option has been displayed. It is recognised that there may be others. The key outcomes for any intersection improvements at this location should be:

- Encourage the use of Killarney Street for traffic destined further afield than Takapuna town centre
- Offer a gateway to the start of Takapuna town centre
- Slow vehicle speeds entering the Takapuna town centre
- Improve pedestrian amenity.

Improvements at this intersection are long overdue, particularly given the poor pedestrian amenity currently offered at this intersection. Changes to this intersection will be critical in realising streetscape aspirations for Hurstmere Road within Takapuna town centre.

Anzac Street

10

Figure 10-1: *Looking down Anzac Street towards the east from Fred Thomas Drive intersection (image: KH)*

10.1 Corridor Components

Anzac Street runs between Takapuna Town Centre in the east to the intersection with Taharoto Road in the west. According to the Auckland Council District Plan (North Shore Section), the western part of the road is classified as a primary arterial, while the eastern part (east of Auburn Street) is classified as a secondary arterial. Anzac Street currently carries approximately 21,000 vehicles a day (5-day AADT). East of Auburn Street, the road consists of one eastbound lane and one westbound lane with a flush median. West of Auburn Street, the road consists of two eastbound lanes and two westbound lanes. No cycle facilities are provided and parking is not allowed along the entire length of the road, except for limited on-street parking on the eastern side.

General Traffic Environment: The western part of Anzac Street is strongly oriented towards private vehicles, with access to Taharoto Road, Barry's Point Road and Fred Thomas Drive. The eastern part of Anzac Street is more oriented towards pedestrian activity with commercial activity on the southern side of Anzac Street. It also provides access to the Anzac Street West precinct, which is earmarked for high levels of intensification as part of Plan Change 37. The workshop stakeholders acknowledged the importance of the eastern side of Anzac Street as part of Takapuna Town Centre. Therefore it must cater for safe pedestrian crossing movements and less for private vehicle use. The western part of Anzac Street is more vehicle-oriented, as it currently serves as an important connection between Takapuna and other areas on the North Shore.

Public Transport: Anzac Street is currently a very important bus corridor for buses serving Takapuna. It carries approximately 35 buses an hour in the morning peak direction and this number is expected to grow significantly in the next 30 years. The road is part of the proposed Frequent Network in 2016 with Takapuna identified as a major interchange. Anzac Street has been earmarked for

widening, although funding has not been allocated until at least 2016. Part of this upgrade is the construction of a westbound bus lane, on the western part of the corridor, which will improve bus reliability.

Land Use: As previously mentioned, the Anzac Street West Plan Change (PC37) allows for the intensification of the area bounded by Killarney Street in the north, Huron Street in the south, Auburn Street in the east and Pupuke Road in the west. Under the plan change, residential development of up to eight stories is allowed in this precinct. Access onto Anzac Street will be restricted, with encouragement for access provided through laneways at the back of the properties. Commercial uses will be allowed at the ground floor.

Walking and Cycling: Anzac Street currently has no cycling facilities. It is identified as a cycling connector route in the proposed Auckland Cycle Network, which means it should provide dedicated facilities for cyclists. At the eastern end of Anzac Street, traffic should be calmed to provide safer crossing facilities for pedestrians and enforce the town centre pedestrian focus. At the western end of Anzac Street, and linked with the land use intensification, it can be expected that more pedestrian crossing movements will occur and the design for the Anzac Street widening should take this into account. There are also a number of schools clustered about Anzac Street, with Takapuna Primary, Rosmini College and St Josephs School all located in close proximity. As part of any corridor upgrade the treatment of the side roads where they join Anzac Street is recommended. The ability for these side roads to be narrowed in terms of width and kerb radii will help to improve the pedestrian experience.

10.2 Stakeholder Considerations

The needs for this corridor have been identified through stakeholder input as well as reviewing key strategies and policies with respect to public transport, cycling and land-use growth within the area. From this analysis the following matters have been identified as requiring consideration with respect to the future cross section of the corridor.

10.3 Spatial Requirements: Anzac Street

The above components and considerations have been translated into spatial requirements to understand how the corridor needs to be configured in order to cater for the needs of each mode of travel, with the needs for each mode summarised as follows.

Figure 10-2 summarises the spatial requirements for Anzac Street. This details the expected and desired changes for the corridor and how this fits within the existing carriageway and road reserve widths.

Spatial requirements per mode

Private Vehicles: Under the Anzac Street widening scheme, two lanes in each direction are to be allocated to general traffic. This lane configuration is proposed to be retained, but lane widths should be limited to 3.0 m. At the Auburn Street intersection, the double right turn lane should be reduced to a single right turn lane to allow for a bus lane leading in to the intersection travelling eastbound.

Public Transport: Due to the large number of buses that will use Anzac Street to access Takapuna, bus priority measures will be required to allow reliable and efficient bus operations. While under the existing widening scheme, bus lanes in both directions are not an option, bus priority measures at the intersections will be possible.

Parking: No on-street parking is permitted on the western section of Anzac Street. Due to the close proximity of the Anzac Street car park, on-street parking may be removed, pending the findings of the parking study undertaken as part of the Takapuna Centre Based Study.

Cyclists: Anzac Street is identified as a connector under the Auckland Cycle Network. A cycle lane connecting Taharoto Road to Takapuna Town Centre will be valuable from a network perspective and the existing widening scheme provides the opportunity to provide on-road cycle lanes in both directions. On the eastern part of Anzac Street, on-road cycle lanes are not required due to the low speed and volume anticipated on this stretch of road.

Pedestrians: The eastern section of Anzac Street requires wide footpaths due to the commercial land use on the southern side. The western section will see major redevelopment under the Anzac Street West Plan Change, under which higher density residential buildings are permitted. This will increase pedestrian traffic, requiring a high quality footpath.

Landscaping: where space allows greater landscaping should be provided for in terms of street trees or planting within the berms. Consider low impact design and stormwater treatment requirements as part of any landscaping.

General Traffic	Public Transport	Land Use Change	Walking and Cycling	Stormwater
• Vehicle orientated focus	• Key bus corridor • Part of the 2016 Frequent Network • Proposed westbound bus lane • Takapuna Interchange	• Plan Change 27: Anzac Street West Precinct • Significant residential and commercial intensification	• Improved facilities required for pedestrians and cyclists along and across the corridor • Eastern end of Anzac Street needs to reflect its town centre link function • Utilise Killarney Street for eastbound cycle lanes	• Provision of green links through to Lake Pupuke • Flood management at the Anzac/Fred Thomas/ Killarney/ Taharoto intersection is of importance

Table 10-1: Stakeholder Consideration: Anzac Street

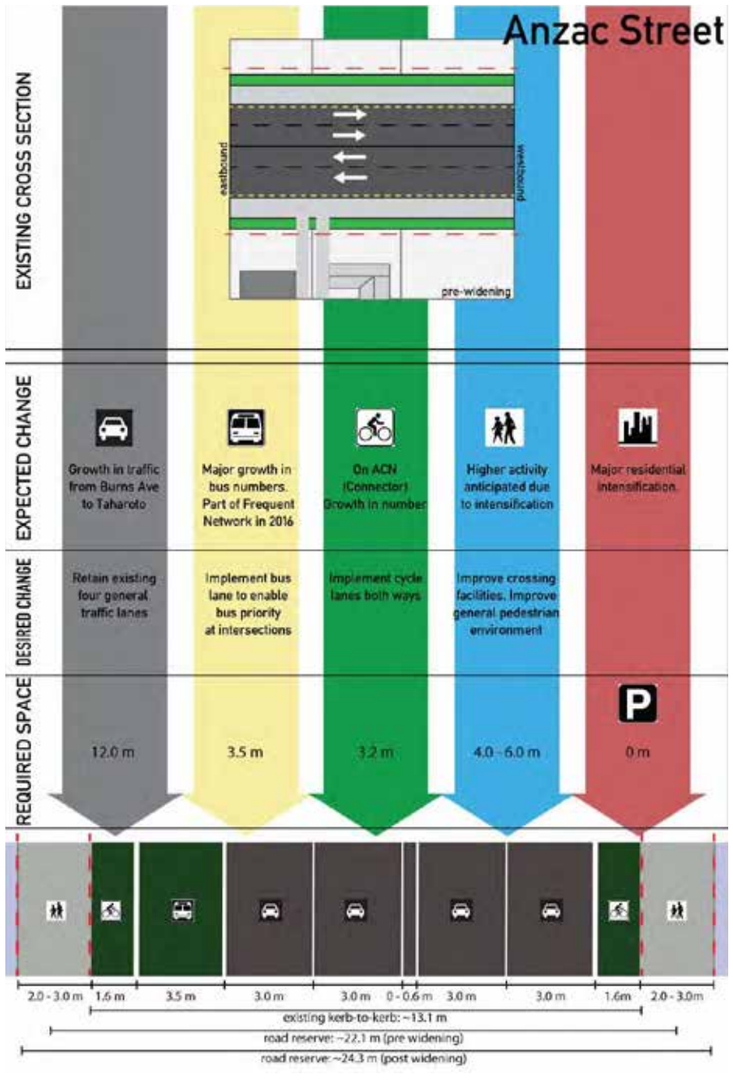


Figure 10-2: Anzac Street Spatial Requirements

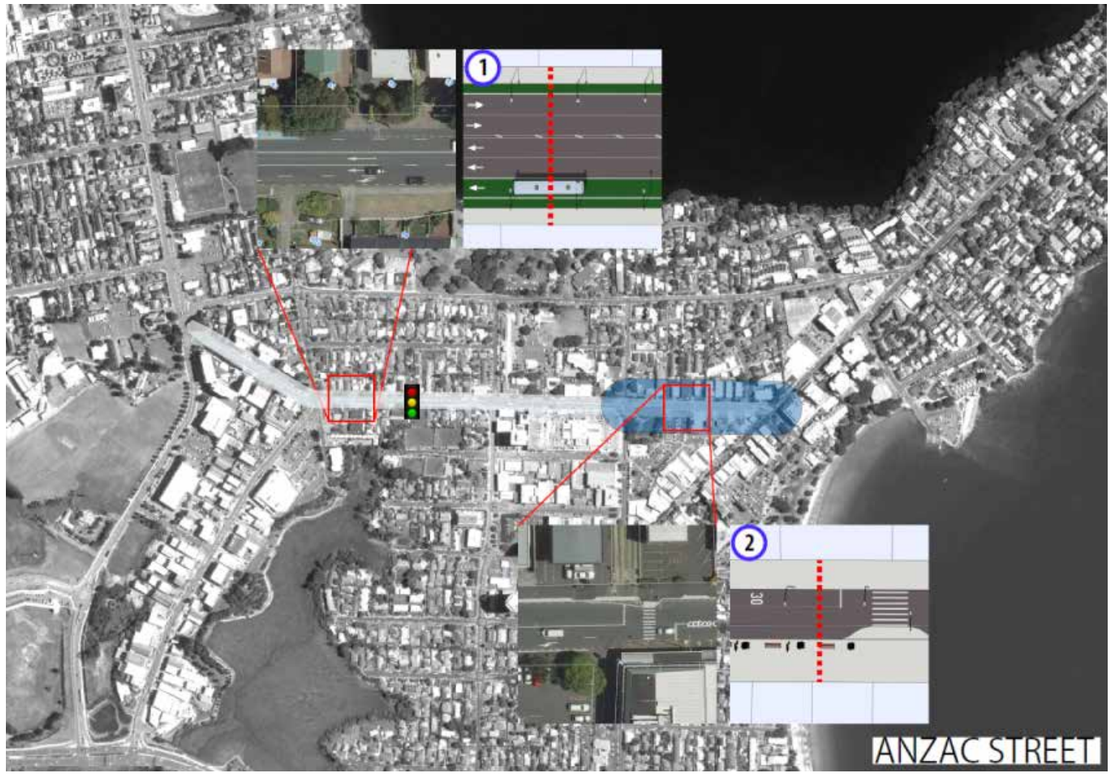


Figure 10-3: Anzac Street Aerial

10.4 Key Corridor Features and Cross Sections

The Spatial Requirements have been applied to the Anzac Street corridor at a greater level of detail to identify how the corridor will transform over time to meet its anticipated demands. This also helps to identify alternative cross sections to respond to the varied needs of a corridor. **Figure 10-3** demonstrates the corridor as a whole, highlighting key points of interest. **Figure 10-4** provides cross sectional details at these specific locations. Key pedestrian improvement locations have been identified in **Figure 8-3** with respect to their proximity to

- public transport
- key land uses
- key connections about the surrounding area, be it roading connections or local accessways.

As with any corridor there will always be variations to the typical cross section in order to "stitch together" the road along the length of the corridor. In any corridor there are:

- Transitions to accommodate intersections and the need for additional turning lanes, bus priority etc
- The need to accommodate for other users at specific locations, for example bus stops, pedestrian refuge islands, pedestrian crossings and turning bays for side road traffic
- Constraints in the available width in which to implement the preferred cross section. This can arise due to topography along the corridor or road reserve constraints.

All of these issues are of relevance to this corridor and will need to be considered as part of any future works in order to realise the goals of this CMP. The spatial requirement diagrams do show varying widths for certain elements to allow for flexibility within the design.

Cross Section 1: Achieving Cross Section 1 will require widening of the existing kerb to kerb width, but it will stay within the proposed road widening to be achieved through the Anzac Street West Precinct Plan. This cross section provides for on-road cycle lanes in both directions and a bus lane in the westbound direction. The provision for cyclists is anticipated to cater for the more confident commuter/

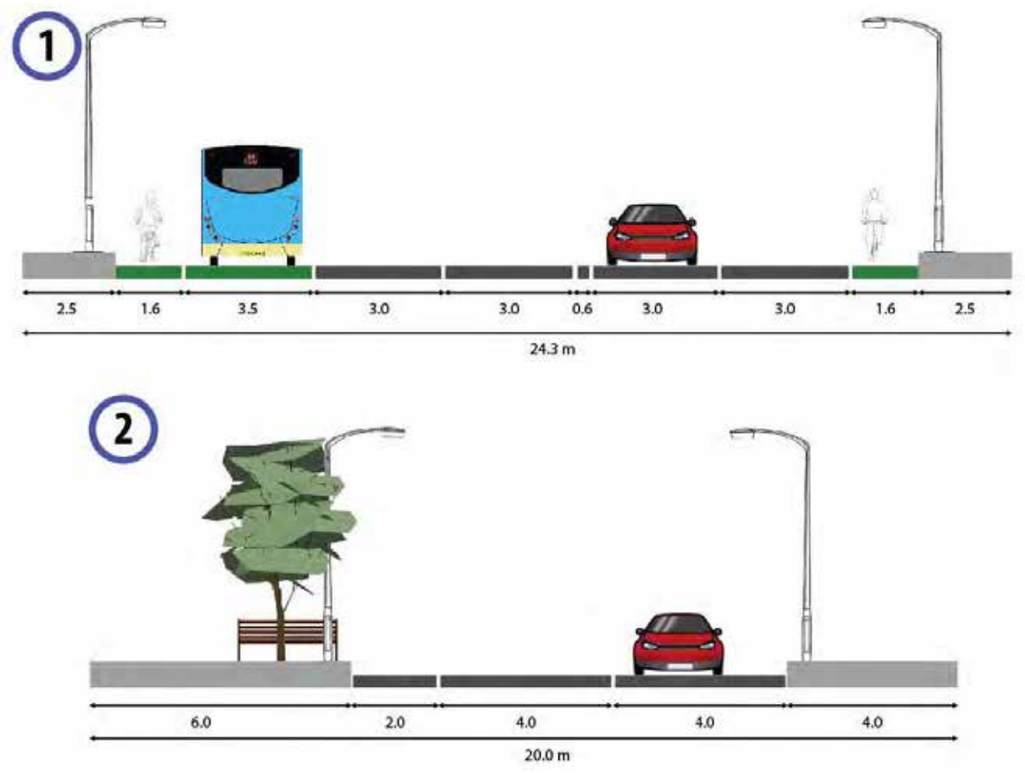


Figure 10-4: Anzac Street Cross Sections

recreational rider. Less confident cyclists will have the option of utilising Killarney Street (discussed in **Section 11**).

Cross Section 2: This corridor is influenced by the Takapuna town centre at its eastern end, with the extent of the town centre influence indicated in blue on **Figure 10-3**. In the town centre area it is anticipated that the road corridor will cater for higher pedestrian amenities, lower vehicle speeds and on street parking. This would be at the expense of cycle lanes and bus priority measures. Vehicle speeds through the town centres need to be reduced to 30km/h to enable vehicles and cyclists to share the road. Traffic calming measures and "threshold" treatments will help to reinforce lower vehicle speeds through the town centres.

Flexibility: There is the ability for the bus lane to alter its direction of travel along the corridor, depending on the needs to bypass any congestion. The westbound bus lane, as indicated, is similar to that identified in the Anzac Street Widening proposal. However there is the ability to seek bus priority measures for eastbound buses about the intersection with Auburn Street – but this would be at the expense of the westbound bus lane.

Constraints: the cross section has very little room available for landscaping, pedestrian refuges, right turn bays or other specific features. Given the inability to cater for safer informal pedestrian crossing locations it is recommended that consideration be given to a mid-block signalised pedestrian crossing, between Barry's Point Road and Auburn Street.

Stormwater: The Anzac Street corridor discharges into Shoal Bay. Stormwater considerations are critical as part of any changes to the cross sections with contaminant management a critical outcome. The potential for Low Impact Design principles should be considered.

Bus Priority: Due to the spatial constraints, full length bus lanes along Anzac Street in both the eastern and the western direction are not feasible if two general traffic lanes per direction are retained. To ensure bus services can bypass the expected queues on Anzac Street in both the morning and afternoon peak hours, partial bus lanes are proposed which lead into each of the signalised intersections. The Takapuna Centre Based Transport Study will further address the long term solutions for bus traffic on Anzac Street. The concept of the proposed short-term bus priority measures is shown in **Figure 10-5.**

Figure 10-5: Anzac Street Bus Priority Concept

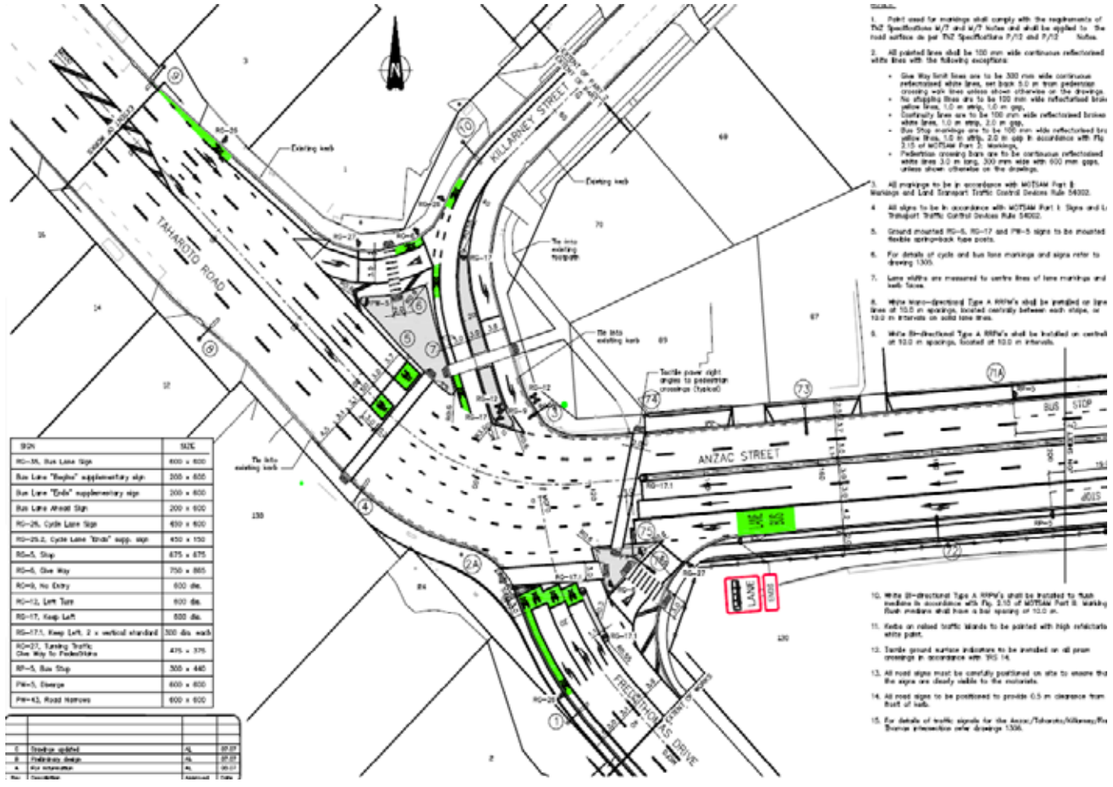


Figure 10-6: Anzac St widening scheme drawings

10.5 Anzac Street Widening

Anzac Street is currently earmarked for widening between Fred Thomas Drive and Auburn Street. The project is under review by T2 Engineers. A notice of requirement (NoR) has been processed and the required property has been acquired. The existing design for the Anzac Street Widening Project is shown in **Figure 10-9** and includes an extra westbound bus lane along Anzac Street. Anzac Street is also an important part of the Takapuna Centre Based Transport study which is still in process at the time of writing. The outcomes of this study will have a big influence on the long term cross section of Anzac Street, particularly in relation to the bus lane requirements. Short to medium term however, the cross section shown in **Figure 10-4** is considered appropriate.

The proposed widening scheme proposes a 1.1 m wide solid median along Anzac St. It also includes 3.0 m wide lanes, with an eastbound kerbside lane of 3.7 m wide. The bus lane provided on the southern side is 4.2 m wide. Footpaths are provided on both sides and measure 2.0 m in width. The remaining space is allocated to a grass verge on the southern side.

While the widening scheme does provide a westbound bus lane, the lack of cycling facilities is not considered appropriate for Anzac Street. To make sure cycling provides a decent alternative to the private vehicle, a complete cycle network is required, including cycling provisions along Anzac Street. The proposed cross section shown in **Figure 10-4** differs from the scheme design shown in **Figure 10-6** in several aspects:

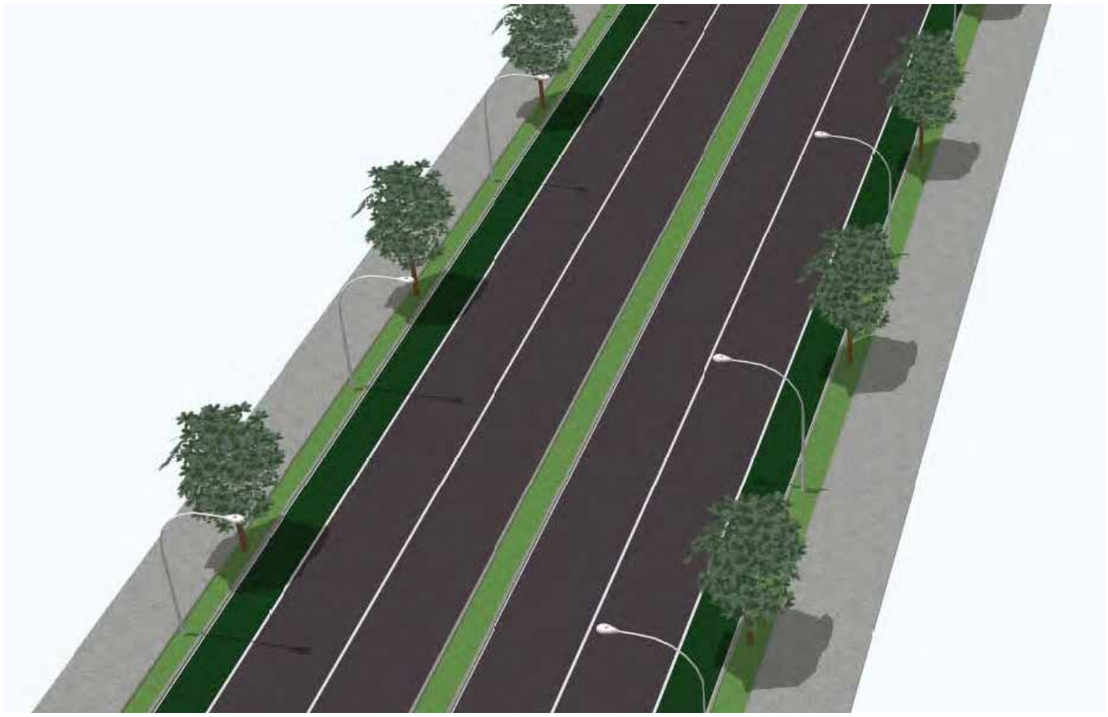


Figure 10-7: Long term cross section Anzac Street

10.6 Long Term Cross Section

If the Upper Shoal Bay Link, as proposed in the Takapuna Centres Based Transport Study is realised, Anzac Street's function as a major bus arterial would decrease and the bus lanes would become unnecessary. The corridor could then be redeveloped to achieve better pedestrian amenity and provide a higher quality road environment. A concept cross section has been developed which would remove the bus lanes on Anzac Street and introduce wider footpaths, a planted median and planted buffers between the footpath and the roadway. An impression of this cross section can be seen in **Figure 10-7**.

10.7 Critical Intersections

Two intersections along Anzac Street have been identified as requiring consideration as to intersection improvements in order to cater for the future demands. Whilst no traffic modelling has been undertaken as part of this study to understand how these intersection might operate, consideration has been given to the design issues facing these two intersections and alternative intersection configurations investigated to provide an understanding as to how changes could be achieved.

Figure 10-8: Anzac - Barry's Point-Pupuke Short Term Concept Option – illustrative only

10.7.1 Anzac–Barry's Point–Pupuke (Figure 10-8)

The recommendations for this intersection are:

- Removal of the left turn slip lane from Anzac Street to Barry's Point Road and simplify the access to and from Greydene Place to improve pedestrian safety and amenity
- Remove the left turn slip lane from Barry's Point Road to Anzac Street to improve pedestrian amenity.

Figure 10-9: Anzac – Fred Thomas – Taharoto - Killarney Concept Option 1 – illustrative only

10.7.2 Anzac–Fred Thomas–Taharoto–Killarney (Figure 10-9)

The key outcomes for any intersection improvements at this location are:

- Improved bus priority measures in all directions
- Provision for pedestrians to cross on all intersection arms
- Appropriately cater for flood plain/overland flow paths.

Killarney Street

11

11.1 Corridor Components

Killarney Street offers a parallel east-west route to Anzac Street, linking Taharoto Road in the west to the northern extent of Takapuna town centre in the east. It provides one traffic lane in each direction, and is classified as a "collector" road in the road hierarchy plan. On-street parking is provided for in sections on the southern side of the corridor only. Killarney Street carries approximately 11,000 vehicles a day (5 day AADT).

General Traffic Environment: With a desire to divert extraneous traffic away from Hurstmere Road, Killarney Street offers an alternative route for traffic. At the same time, the road environment does not necessarily suit increased levels of traffic along its entire length. The cross section design therefore needs to carefully balance the competing spatial needs. The existing cross section is narrow in nature, with parking restricted on large sections of the corridor.

Consideration has also been given as to how Killarney Street operates with respect to the surrounding road network. If it is to take extraneous traffic from Hurstmere Road there is a desire for this traffic to be redirected via Lake Pupuke Drive, heading south back towards Anzac Street and Barry's Point Road. This will assist in alleviating pressure that may otherwise occur at the intersection of Anzac Street/Taharoto Road/Killarney Street/ Fred Thomas Drive.

Public Transport: There are no public transport services utilising Killarney Street and this is not expected to change as part of the draft RPTP.

Land Use: Killarney Street provides a mix of land uses and open space. The southern side of the corridor is dominated by residential dwellings and Takapuna Primary School. At its eastern end the Takapuna town centre and Bruce Mason Theatre become more dominant. The northern side of Killarney Street has Lake Pupuke as a key open space frontage, with local community facilities also provided. The existing fire station is relocating from its site on Killarney Street, offering a possible redevelopment opportunity at this location. Under the draft Unitary Plan, the southern side of Killarney Street is zoned for apartment buildings or terraced housing. The northern side is mainly zoned for single dwelling houses with a small area of mixed zone close to the intersection with Hurstmere Road. This indicates that a high degree of intensification is expected around Killarney Street.

Walking and Cycling: Killarney Street currently has no cycling facilities. It is identified as a cycling connector route in the proposed Auckland Cycle Network, which means it should provide dedicated facilities for cyclists. It has also been identified as part of the Anzac Street widening project to provide cycle lanes along its length, with a scheme design undertaken identifying cycle lanes on Killarney Street between Taharoto Road and Auburn Street. Given the local school and community facilities clustered about the middle of the corridor, safer crossing facilities for pedestrians are paramount. As part of any corridor upgrade, the treatment of the side roads where they join East Coast Road is recommended. The ability for these side roads to be narrowed in terms of width and kerb radii will help to improve the pedestrian experience along Forrest Hill Road.

11.2 Stakeholder Considerations

The needs for this corridor have been identified through stakeholder input as well as reviewing key strategies and policies with respect to public transport, cycling and growth within the area. From this the following matters have been identified as requiring consideration with respect to the future cross section of the corridor.

General Traffic	Public Transport	Land Use Change	Walking and Cycling	Stormwater
• Provide indented parking where possible • Maintain carriageway capacity	• Nil	• Fire Station and potential future development • Anzac Street Plan change will see residential growth	• School children • Community facilities • Recreational use linked with Lake Pupuke	• Contaminant management critical as area discharges into Lake Pupuke or Upper Shoal • Low impact design potential

Table 11-1: Table 8: Stakeholder Consideration: Killarney Street

11.3 Spatial Requirements: Killarney Street

The above components and considerations have then been transformed spatially to understand how the corridor needs to be configured in order to cater for the needs of each mode of travel, with the needs for each mode summarised as follows.

Figure 11-1 summarises the spatial requirements for Killarney Street. This details the expected and desired changes for the corridor and how these fits within the existing carriageway and road reserve widths.

Spatial requirements per mode

Private Vehicles: Killarney Street has an existing configuration of one traffic lane each direction. While private vehicle traffic is expected to increase due to the reconfiguration of the Killarney Street/Hurstmere Road intersection, no extra private vehicle lanes are desired. The existing configuration should be retained, although the lane width should be reduced to 3.0 m to reduce vehicle speeds.

Bus: No buses are expected to service Killarney Street in the foreseeable future. The Regional Public Transport Plan does not identify Killarney Street as part of any bus route. For this reason, no bus facilities are required on Killarney Street.

Parking: Killarney Street has some on-street parking capacity, which is mainly used as commuter parking for employees working at North Shore Hospital or in Takapuna. This parking capacity should be removed and replaced with some indented parking on the southern side to cater for the neighbouring properties. Where the existing road reserve width does not allow for on-street parking, the parking should be removed.

Cyclists: Killarney Street is part of the cycle bypass route for Taharoto Road/Anzac Street. Many recreational cyclists use Killarney Street to cycle around Lake Pupuke. Combined with the local attractions and the nearby school this results in a desire for high cyclist amenity to provide cyclists with a continuous route around Lake Pupuke and into and out of Takapuna. A buffered two-way cycle lane on the northern side of Killarney Street is desired.

Pedestrians: Killarney Street has access to Lake Pupuke and a swimming pool on the northern side and will see some major intensification on the southern side. For this reason, high pedestrian amenity is desired on both sides of the road. Side road treatments are also recommended to improve the pedestrian amenity

Landscaping: where space allows greater landscaping should be provided for in terms of street trees or planting within the berms. Consider low impact design and stormwater treatment requirements as part of any landscaping.

11.4 Key Corridor Features and Cross Sections

The Spatial Requirements have then been applied to the Killarney Street corridor at a more “micro” level to identify how the corridor will transform over time to meet its anticipated demands. These also help to identify alternative cross sections to respond to the varied needs of a corridor. **Figure 11-2** demonstrates the corridor as a whole, highlighting key points of interest. **Figure 11-3** provides cross sectional details at these specific locations. Key pedestrian improvement locations have been identified in **Figure 11-2** with respect to their proximity to the following:

- public transport
- key land uses
- key connections about the surrounding area, be it roading connections or local accessways

As with any corridor there will always be variations to the typical cross section in order to “stitch together” the road along the length of the corridor. In any corridor there are:

- Transitions to accommodate intersections and the need for additional turning lanes, bus priority etc
- The need to accommodate for other users at specific locations, for example bus stops, pedestrian refuge islands, turning bays for side road traffic
- Constraints in the available width in which to implement the preferred cross section. This can arise due to topography along the corridor or road reserve constraints.

All of these issues are of relevance to this corridor and will need to be considered as part of any future works in order to realise the goals of this CMP.

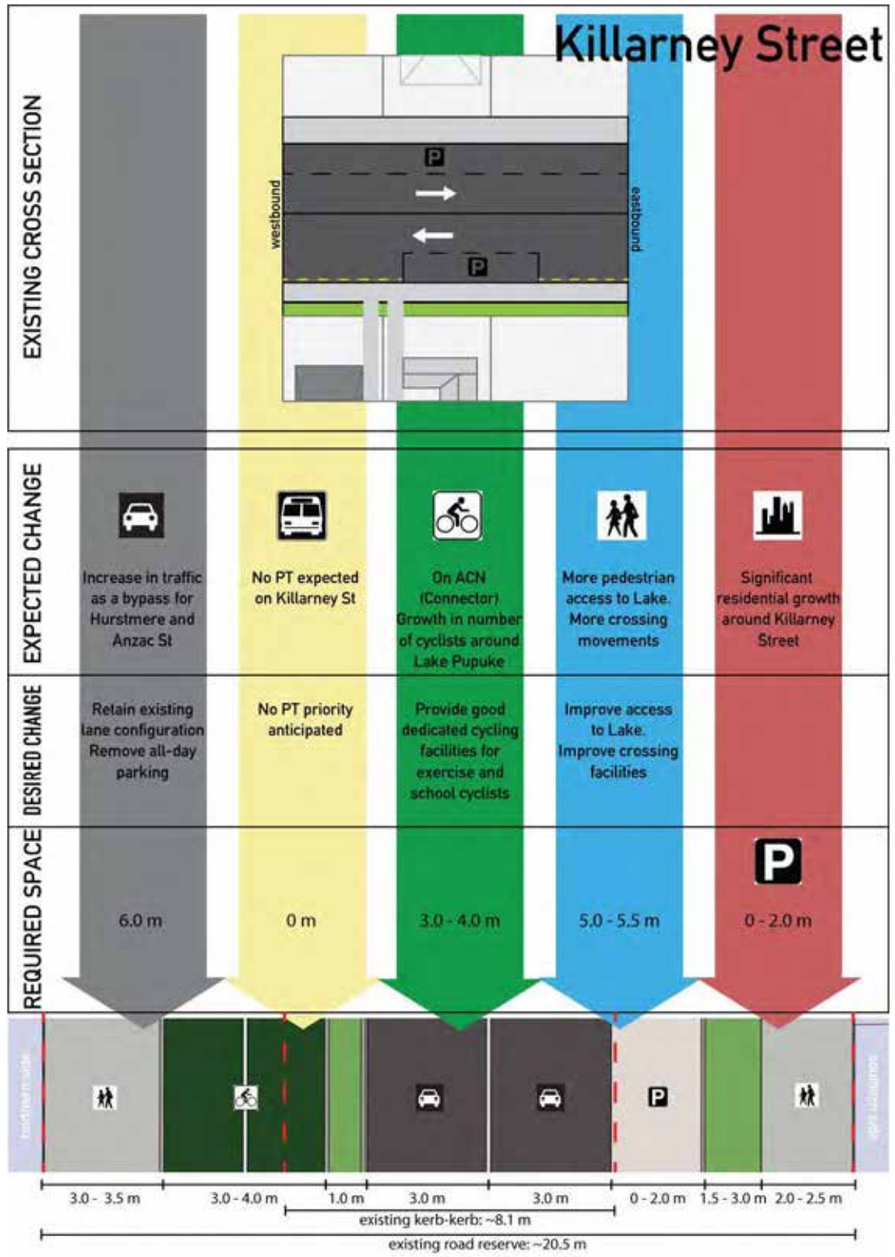


Figure 11-1: Killarney Street Spatial Requirements

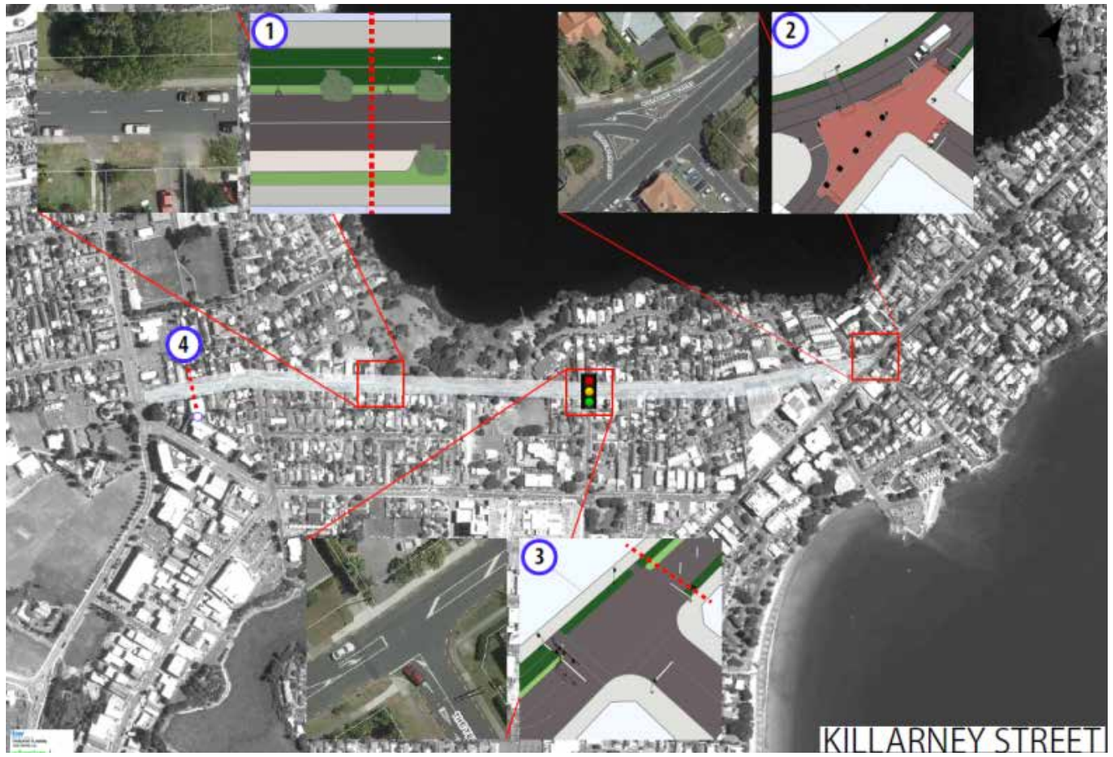


Figure 11-2: Killarney Street Aerial

Cross Section 1: Cross Section 1 extends between Lake Pupuke Drive and Taharoto Road and provides a more conventional cross section, providing one traffic lane in each direction and on road cycle lanes.

Cross Section 2: This cross section provides for a bi-directional separated cycle lane along the northern side of the corridor, with this proposed to extend between Lake Pupuke Drive and The Promenade. The bi-directional cycle lane offers a unique opportunity for recreational cyclists – with the ability for this to link to Lake Pupuke Drive and the possibility of this being extended further north through Smales Quarry, North Shore Hospital and Shakespeare Road – this is discussed further in **Section 14**. To the west of Pupuke Road and the east of The Promenade, the cycle lanes are more "conventional" on road cycle lanes (Cross Section 3). To traverse between the cycle lanes it is proposed to signalise Killarney Street and The Promenade and to also consider crossing facilities about the Lake Pupuke Drive roundabout. Parking is able to be provided on the southbound side of the corridor, with this recommended to be indented.

A bi-directional path has been designed to reduce bicycle - vehicle conflict points along Killarney Street. **Figure 11-4** illustrates the difference in bicycle – vehicle conflict at side road intersections between on road cycle lanes and the proposed bi-directional cycle lanes.

Cross Section 3: Cross Section 3 extends between The Promenade and Hurstmere Road and provides a more conventional cross section, providing one traffic lane in each direction and on road cycle lanes.

Flexibility: the cross sections proposed provide flexibility for minor alterations as follows:

- The proposed parking can be indented and the landscaping/berm extended about the indented bays to improve landscaping on the southern side of the corridor
- The flush median illustrated in Cross Section 3 allows for the provision of pedestrian refuge islands where there may be desire lines. Outside of these, this median can be removed with the space able to be relocated to the edge of the corridor for landscaping/berm purposes
- The physical separation between the cycle lanes and the vehicle lanes could be reduced, removed or achieved via flush markings.

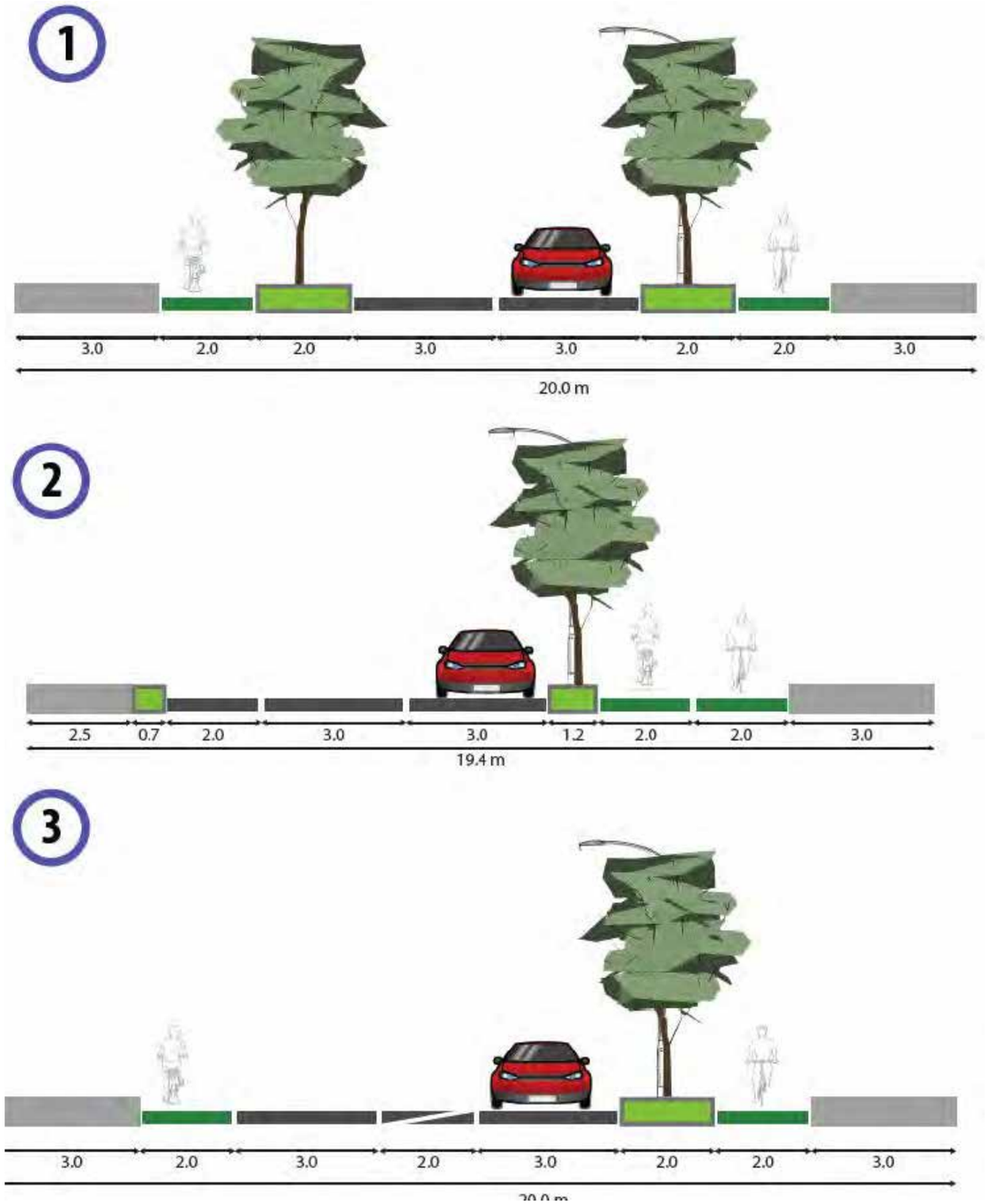


Figure 11-3: Killarney Street Cross Sections

Figure 11-4: Figure 51: On-Road vs. Bi-Directional Cycle Path – Killarney Street

Constraints: There is a sharp drop in gradient by the Pumphouse car park, restricting the ability to undertake under kerb realignment on the northern side of the corridor at this point.

Stormwater: The Killarney Street corridor discharges into Lake Pupuke and Shoal Bay. Stormwater considerations are critical as part of any changes to the cross sections with contaminant management a critical outcome. The potential for Low Impact Design principles should be considered.

11.5 Critical Intersections

The critical intersections at either end of the Killarney Street corridor have been addressed in the following sections of the report:

- Anzac – Fred Thomas – Taharoto - Killarney
  Section 10, Figure 10-4
- Hurstmere – Killarney
  Section 9, Figure 9-7

11.6 Takapuna Centres Based Transport Study

The Takapuna Centres Based Transport Study does not propose major changes to the cross section as proposed in this CMP. While the final outcomes of the TCBTS are not available at the time of writing, it is anticipated that the study will have an influence on the long term cross section of Anzac Street and on the design of the intersections at both the eastern and western end of Killarney Street. The midblock sections of Killarney Street should be of lesser importance to the TCBTS.

Taharoto Road

12

Figure 12-1: Taharoto Road looking north towards its intersection with Shakespeare Road

12.1 Corridor Components

Taharoto Road (between Anzac Street and Forrest Hill Road) is classified as a primary arterial road. The road carries around 35,000 vehicles a day (5 day AADT). The existing road layout varies between 4 lanes in the mid-block sections to up to seven traffic lanes at the intersections, with dedicated cycle lanes along the corridor. The following summarises the existing configuration:

Traffic Environment: Taharoto Road currently serves as a major traffic route to and from the Northern Motorway. This leads to severe pressure on the Northcote Road intersection, with queues backing up on the northbound and southbound approaches in the morning peak. The locations of Westlake Girls and Boys high schools, Takapuna Normal Intermediate, the North Shore Hospital and Smales Farm office park further increase pressure on the road. Taharoto Road also serves as a connector between the commercial district in Wairau Valley and the Takapuna/Devonport area.

According to the stakeholders, the existing road layout has enough capacity to cope with traffic in the next 20-30 years; space for widening is very limited and widening is considered undesirable. The intersection with Northcote Road is considered a bottleneck, due to the large volumes travelling towards the motorway interchange. Further traffic demand should be managed by improving passenger transport facilities, the potential introduction of T2 or T3 lanes and improved cycle facilities.

Public Transport: Taharoto Road currently carries approximately 60 buses an hour in the morning peak. This number is envisaged to grow significantly within the timeframe of the CMP, with the current number of buses connecting the North Shore to the city centre to grow by up to 100%. To accommodate this growth and to improve bus

Section	Northbound lanes	Southbound lanes
Anzac – Northcote	3 + Cycle lane	2 + Cycle lane
Northcote – Shakespeare	2 + Cycle lane	3 + Cycle lane
Shakespeare – Wairau	2	2 + Bus Lane

Table 12-1: Taharoto Road Existing Layout

Figure 12-2: Figure 53: Taharoto Road intersection with Northcote Road

reliability along Taharoto Road, it is envisaged that this road will need dedicated bus facilities on the approaches to the various intersections along Taharoto Road. This will allow buses to bypass the generally heavy queuing of vehicles travelling towards the motorway.

Land Use: Most land use change along this corridor is expected to happen on the eastern side of Taharoto Road, with intensification to occur as part of the Quarry Site redevelopment, the Atlas Concrete site redevelopment and intensification around North Shore Hospital. Intensification is also to occur around Anzac Street, due to the Anzac Street West Plan Change. The schools about the northern extent of Taharoto Road and its intersection with Forrest Hill Road are expected to grow significantly, increasing demand for improved pedestrian facilities, particularly around the Shakespeare Road intersection. North Shore Hospital is expected to double in size over the next twenty years, with associated medical service providers anticipated to grow along Shakespeare Road. This will increase pressure on the Shakespeare Road intersection as well. Smales Farm Office Park is also expected to grow, increasing the quantity of employees in the area.

Walking and Cycling: Currently the walking environment around Taharoto Road is poor. Footpaths are fairly narrow, crossing points are scarce, particularly around the southern section of the road and there is no planting along the road. There are cycle lanes on both sides of the road for the largest part of the road. The northern end of the corridor (north of Shakespeare Road) currently has no cycling facilities. It is understood cycle lanes will be extended along the northern side of Taharoto Road up to Forrest Hill Road/Wairau Road as part of completing the Wairau Taharoto Corridor Upgrade project. As part of any corridor upgrade the treatment of the side roads where they join Taharoto Road is recommended. The ability for these side roads to be narrowed in terms of width and kerb radii will help to improve the pedestrian experience along Taharoto Road. This includes considering the suitability of left turn slip lanes and whether they are appropriate, particularly at the Northcote Road intersection, due to the proximity to Takapuna Normal Intermediate School.

Stormwater: Stormwater from Taharoto Road either discharges to Lake Pupuke, Wairau or the Hillcrest catchments. Much of this area is flood sensitive and water quality requires consideration.

12.2 Stakeholder Considerations

The needs for this corridor have also been identified through stakeholder input as well as reviewing key strategies and policies with respect to public transport, cycling and growth within the area. From this the following matters have been identified as requiring consideration with respect to the future cross section of the corridor.

General Traffic	Public Transport	Land Use Change	Walking and Cycling	Stormwater
• SH1 bottleneck at Northcote causes congestion along Taharoto Road • Existing road layout severs corridor – would not expect further widening	• Need for bus lanes to cater for future growth	• Growth along the corridor: Smales Farm, Smales Quarry, Atlas Concrete • Growth about the corridor: North Shore Hospital, Anzac Street West	• Improved crossing facilities – Takapuna Normal • Complete cycle connections at northern end	• Provision of green links through to Lake Pupuke

Table 12-2: Stakeholder Consideration: Taharoto Road

12.3 Spatial Requirements: Taharoto Road

The above components and considerations have then been transformed spatially to understand how the corridor needs to be configured in order to cater for the needs of each mode of travel, with the needs for each mode summarised as follows.

Figure 12-3 summarises the spatial requirements for Taharoto Road. This details the expected and desired changes for the corridor and how these fits within the existing carriageway and road reserve widths.

Spatial requirements per mode

Private Vehicles: In its current layout, Taharoto Road has a total of up to seven vehicle lanes available, but, it still suffers from congestion during peak hours. Further widening is deemed undesirable. A minimum of two private vehicle lanes each way should be retained, the flush median should be removed or replaced with a raised median.

Bus: No bus lanes are currently present on Taharoto Road. In the Regional Passenger Transport Plan, Taharoto Road is identified as a key bus corridor in and out of Takapuna and is part of the Frequent Network. Because of the existing congestion on Taharoto Road in the morning and afternoon peak hours, bus priority measures or bus lanes are required on Taharoto Road to ensure reliable operation of the bus network. Consideration should be therefore given to bus priority measures at key intersections

Parking: No on-street parking is currently allowed on Taharoto Road. Due to the constrained space and the nature of the road, no on-street parking should be allowed in the future.

Cyclists: Cycle lanes are desired along both sides of Taharoto Road to provide a continuous cycle route from Forrest Hill to Takapuna. Cyclists are encouraged to use Lake Pupuke Drive and Killarney Street instead of proceeding down Taharoto Road to Anzac Street. On Taharoto Road between Forrest Hill Road and Lake Pupuke Drive, cycle lanes on both sides are required.

Pedestrians: The existing pedestrian environment on Taharoto Road is less than desirable. While there are several schools located along Taharoto Road, footpaths are relatively narrow, traffic islands in some locations are too small and the number of vehicle lanes and the lack of street amenity and trees make it a very uninviting road for pedestrians. Increasing pedestrian amenity will have to be achieved by improving the quality of the footpaths and increasing the number of crossing points.

Landscaping: where space allows provision for greater landscaping should be provided for in terms of street trees or planting within the berms. Consider low impact design and stormwater treatment requirements as part of any landscaping.

12.4 Key Corridor Features and Cross Sections

The spatial requirements have then been applied to the Taharoto Road corridor at a greater level of detail to identify how the corridor will transform over time to meet its anticipated demands. These also help to identify alternative cross sections to respond to the varied needs of a corridor. **Figure 12-4** demonstrates the corridor as a whole, highlighting key points of interest. **Figure 12-5** provides cross sectional details at these specific locations. Key pedestrian improvement locations have been identified in **Figure 12-4** with respect to their proximity to

- public transport
- key land uses
- key connections about the surrounding area, be it roading connections or local accessways.

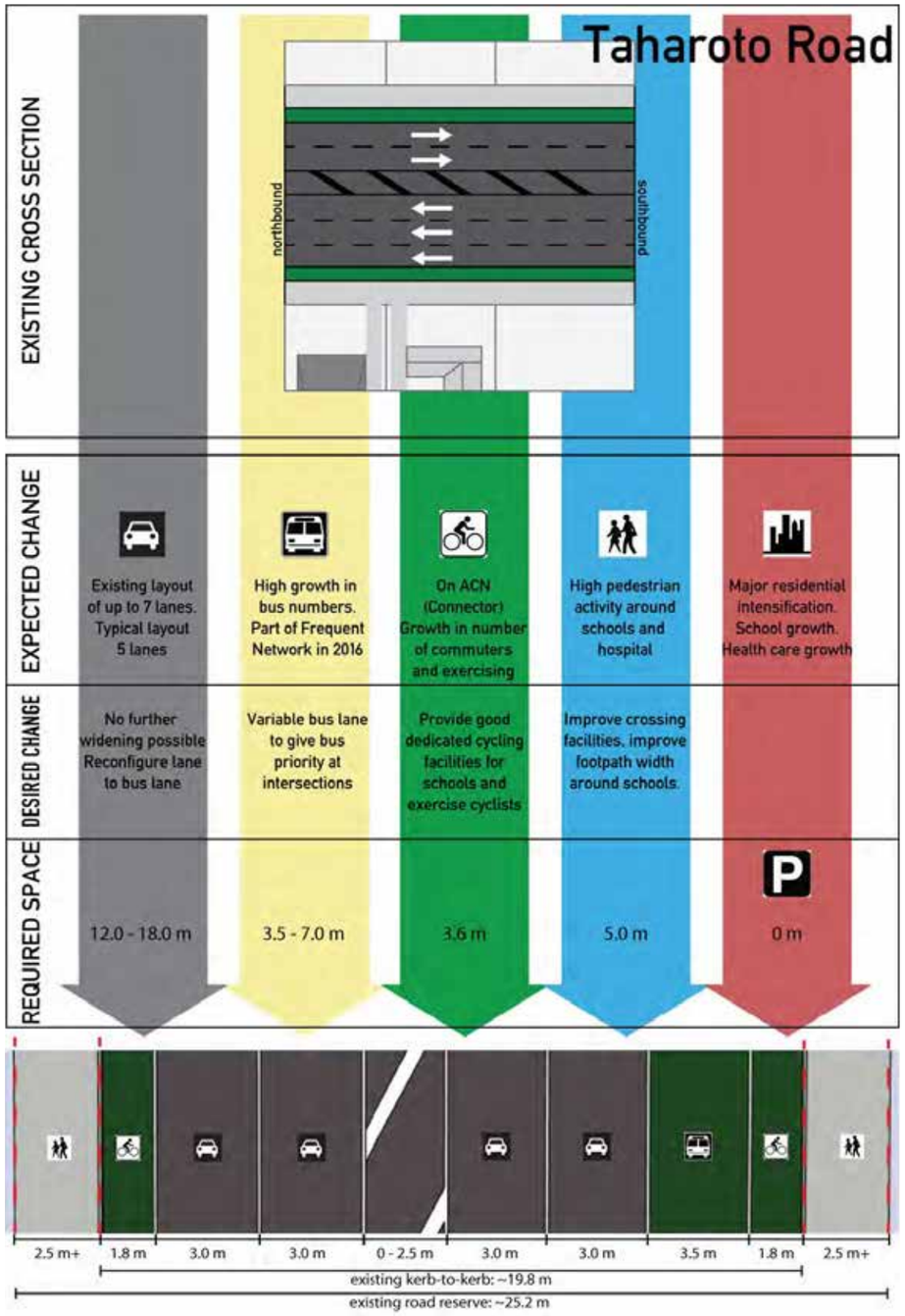


Figure 12-3: Taharoto Road Spatial Requirements

Figure 12-4: Taharoto Road Aerial

As with any corridor there will always be variations to the typical cross section in order to "stitch together" the road along the length of the corridor. In any corridor there are:

- Transitions to accommodate intersections and the need for additional turning lanes, bus priority etc
- The need to accommodate for other users at specific locations, for example bus stops, pedestrian refuge islands, turning bays for side road traffic
- Constraints in the available width in which to implement the preferred cross section. This can arise due to topography along the corridor or road reserve constraints.

All of these issues are of relevance to this corridor and will need to be considered as part of any future works in order to realise the goals of this CMP.

Cross Section 2 and 3: Cross Section 2 and 3 illustrates how bus priority can be implemented on Taharoto Road, whilst still maintaining four lanes of traffic along the corridor as well as the existing cycle lanes. The provision of the bus lane would come at the expense of a vehicle lane, with 5 vehicle lanes currently provided through the southern part of Taharoto Road. It would also come at the expense of the flush median extents along the corridor. The bus lane could alter sides of the corridor depending on where priority is required to avoid congestion.

Proposed Signalisation of Rangitira Avenue: It is understood that the Smales Quarry site is exploring development options. One matter that has arisen from this is the possible signalisation of Rangitira Avenue. With respect to the Takapuna North CMP, a signalised intersection would help to improve pedestrian connectivity across Taharoto Road, and for that reason is a desirable outcome. If this intersection were not to be signalised it is recommended that consideration be given to signalising Ngaio Street or Karaka Street, as this would also improve pedestrian connectivity across Taharoto Road.

Flexibility: the cross sections provide flexibility with respect to the direction the bus lane serves. It is possible for this to alternate sides of the corridor in order to provide priority measures where congestion may be impacting on bus operations. The ability for bus priority to be provided along the corridor has been considered and is illustrated in **Figure 12-6**. The exact extent of bus priority measures will need to be considered as part of further investigations and can be altered as per the outcomes of these further investigations. Essentially the figure below illustrates how

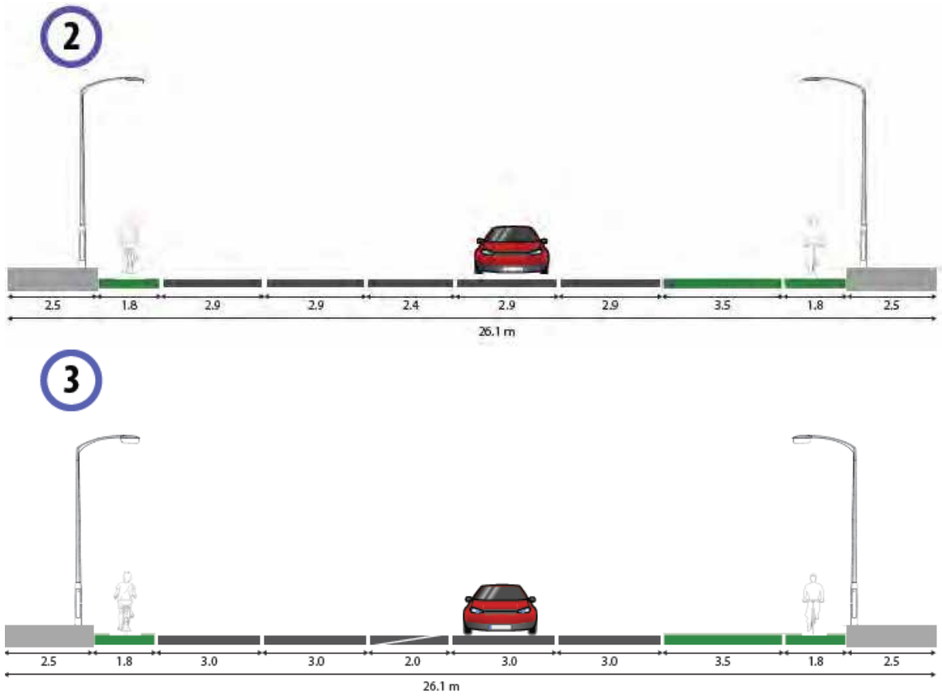


Figure 12-5: Taharoto Cross Section

bus priority can be achieved without widening the cross section and without significantly affecting the vehicle carrying capacity of Taharoto Road.

Stormwater: Stormwater considerations are critical as part of any changes to the cross sections with contaminant management and flood management critical outcomes. The potential for Low Impact Design principles should be considered.

12.5 Critical Intersections

The intersections along Taharoto Road have previously been designed to maximise vehicle capacity, at the expense of pedestrian amenity. In particular the following intersections all operate left turn slip lanes that may be less desirable, given the increase in pedestrian activity about this corridor over recent years. Left turn slip lanes have been recognised as not being the best outcome in terms of pedestrian amenity, coupled with the fact that they are quite space intensive and result in expansive intersection footprints.

- Taharoto – Shakespeare – Wairau intersection has a significantly large footprint and results in considerable crossing distances for pedestrians. Three of the four approaches utilise left turn slip lanes to cater for traffic movements, resulting in large central islands and requiring pedestrians to cross four streams of traffic if looking to cross Shakespeare Road or Taharoto Road. It is recognised that this is a very busy intersection, critical in providing access to and from the Northern Busway via Smales Farm. However it is recommended that further investigations are undertaken to understand the viability of the left turn slip lanes and whether there is the opportunity to improve pedestrian amenity through this intersection
- Taharoto – The Boulevard intersection has left turn slip lanes to cater for traffic movements to and from the Smales Business Park. Given the number of school children traversing Taharoto Road in the morning and afternoon periods the use of left turn slip lanes is questioned.
- Taharoto – Northcote intersection has left turn slip lanes to cater for traffic movements to and from Northcote Road. Given the number of school children traversing Taharoto Road in the morning and afternoon periods it is questioned whether this is the right intersection configuration. Anecdotally the size of these islands has raised safety concerns before as they are unable to safely cater for the swell of school children in the afternoon period. This results in children standing on the edges of the islands and in the live vehicle lanes, which is a serious safety concern.

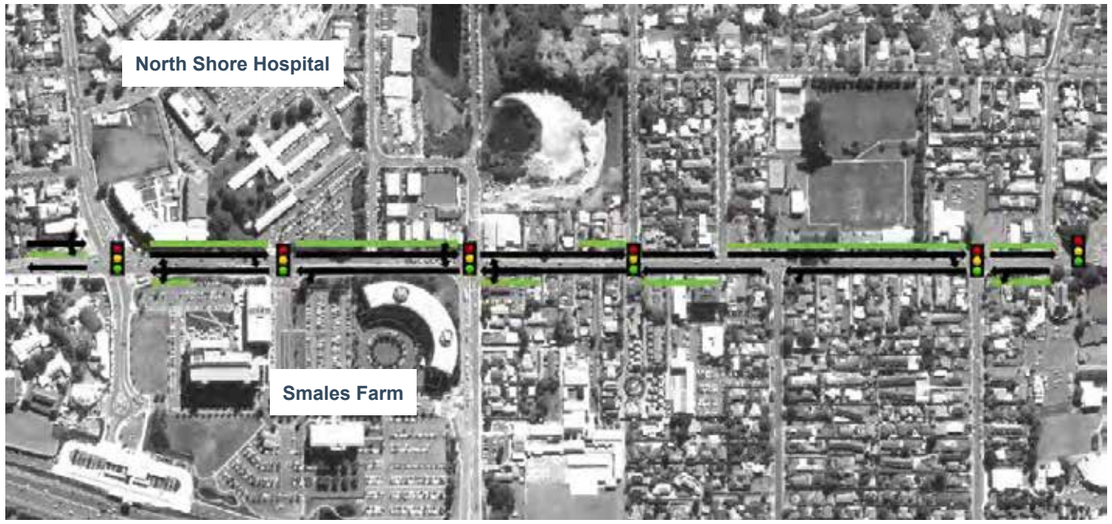


Figure 12-6: Taharoto Road Bus Priority Measures– possible extents

12.6 Alternative Cycle Route

As an alternative to using Taharoto Road, a new cycle connection between Shakespeare Road and Killarney Street is possible using a new connection which could be constructed between Mary Poynton Crescent and Rangitira Avenue. This would create a viable alternative to using Taharoto Road for less confident cyclists and would complete the cycle route around the lake. While questions have been raised around the feasibility of the connection through the quarry site due to gradient constraints, it is recommended that Auckland Transport undertakes an investigation into this route and that it will be included in a future design for the redevelopment of the quarry site. In addition, consultation and agreement from the Waitemata District Health Board will be required, given the desire to pass through the North Shore Hospital site. An illustration of the possible route can be found in **Figure 15-1**.

Shakespeare Road

13

Figure 13-1: Shakespeare Road outside number 96, looking west (image courtesy of Google Streetview)

13.1 Corridor Components

Shakespeare Road is a secondary arterial that runs between Taharoto Road in the west and East Coast Road/Omana Road/Kitchener Road in the east. The road operates with one eastbound and one westbound lane, plus a morning peak (6:30 to 9:00 am) westbound T2 lane. On-street parking is allowed on the northern side and on the southern side, outside the operation and hours of the T2 lane. The road carries around 13,000 vehicles a day (5-day AADT). It does provide cycle facilities, with cyclists allowed in the T2 lane. There is a narrow shared path along the southern side of Shakespeare Road, but the quality of this shared path is well below standard.

General Traffic Environment: Shakespeare Road connects the suburb of Milford and the Milford town centre to the Northern Motorway. It provides access to Carmel College, Milford School and North Shore Hospital. It is one of the few east-west connections in the area, making it an important corridor for vehicular traffic.

The workshop participants recommended that Shakespeare Road should to be encouraged for traffic coming from East Coast Road so that extraneous traffic through Milford Town Centre and on Hurstmere/Kitchener Road can be avoided.

Public Transport: While Shakespeare Road currently only carries a limited number of buses, it is identified in the RPTP as a route for the Frequent Network. This means it will serve a higher frequency of buses in the near future. To ensure reliability and speed of the bus routes, bus priority measures leading into the intersections on both ends of Shakespeare Road are recommended. Future changes in the public transport network might warrant the construction of a full-length bus lane along the entirety of Shakespeare Road. While this is not expected to happen in the near future, the CMP will allow flexibility in the design to be able to accommodate it when deemed necessary.

Due to the schools along Shakespeare Road, a high number of school buses use the road for picking up and dropping off schoolchildren. This is a factor that needs to be taken into account in any future desired cross section.

Land Use: North Shore Hospital is anticipated to double in size over the life of the CMP. The area around North Shore Hospital is expected to develop into a medical precinct, stretching along Shakespeare Road from the west. This intensification will influence the number of pedestrian

movements about Shakespeare Road as well as the number of vehicles attracted to this area.

Walking and Cycling: The existing road layout has a westbound T2 lane that operates in morning peak hours. Outside these hours, on-street parking is allowed in the T2 lane. The width of the T2 lane allows cyclists to pass parked cars within the lane and thus serves as a de facto cycle lane. Eastbound no cycling facilities exist. The shared path on the southern side of the road is relatively narrow, as it caters for a large number of school children. More pedestrian crossing movements are expected on the western side, as the hospital and medical precinct expands. Many cyclists exercise around Lake Pupuke. It is recommended that a future Shakespeare Road cross section provides for these cyclists. As part of any corridor upgrade the treatment of the side roads where they join Shakespeare Road is recommended. The ability for these side roads to be narrowed in terms of width and kerb radii will help to improve the pedestrian experience along Shakespeare Road.

13.2 Stakeholder Considerations

The needs for this corridor have been identified through stakeholder input as well as reviewing key strategies and policies with respect to public transport, cycling and growth within the area. From this the following matters have been identified as requiring consideration with respect to the future cross section of the corridor.

General Traffic	Public Transport	Land Use Change	Walking and Cycling	Stormwater
• Key people generators along the corridor	• Identified for the Frequent Network • T2 lane could transition to bus lane as services increase in the future	• Growth in North Shore Hospital • Medical Precinct on the northern side of Shakespeare Road about the Hospital	• Improved facilities for pedestrians and cyclists along and across the corridor	• Catchment feeds into Lake Pupuke and Wairau

Table 13-1: Stakeholder Consideration: Shakespeare Rd

13.3 Spatial Requirements: Shakespeare Road

The above components and considerations have been transformed spatially to understand how the corridor needs to be configured in order to cater for the needs of each mode of travel, with the needs for each mode summarised as follows.

Spatial requirements per mode

Private Vehicles: The existing configuration of one lane each direction should be retained. The existing T2 lane should be converted to the above mentioned bus lane leading into the intersections at either end of Shakespeare Road. Each of the private vehicle lanes should be reduced in width to a minimum of 3.0 m.

Bus: While the RPTP indicates a limited number of buses using Shakespeare Road, long queues are expected on either end of Shakespeare Road. To ensure reliable and punctual bus services on Shakespeare Road, for both scheduled bus services and school buses, a bus lane is proposed at each side of Shakespeare Road, catering for bus priority at both intersections. Because this bus lane alternates in direction, only one bus lane will be required in any location.

Parking: The existing unrestricted on-street parking should be largely removed. The only on-street parking available should be in the bus lane during off-peak hours. The existing on-street parking is largely used by employees and visitors of North Shore Hospital and the neighbouring schools.

Cyclists: Shakespeare Road is identified as a cycle connector in the Auckland Cycle Network. The large number of schools on the southern side of the road make it an attractive destination for school cyclists. To cater for school cyclists, recreational cyclists and commuter cyclists, a two-way buffered cycle path is proposed on the southern side of Shakespeare Road. Access to this cycle path should be located at each intersection.

Pedestrians: Due to the large number of school children that use Shakespeare Road, wide footpaths are required on the southern side. The northern side has mostly residential uses and requires less wide footpaths. The minimum footpath width according to Auckland Transport is 1.8 m, which should be provided at all times, widening to up to 4.0 m on the southern side outside the schools. Side road treatments are also recommended to improve the pedestrian amenity

Landscaping: where space allows greater landscaping should be provided for in terms of street trees or planting within the berms. Consider low impact design and stormwater treatment requirements as part of any landscaping.

Figure 13-2 summarises the spatial requirements for Shakespeare Road. This details the expected and desired changes for the corridor and how these fit within the existing carriageway and road reserve widths.

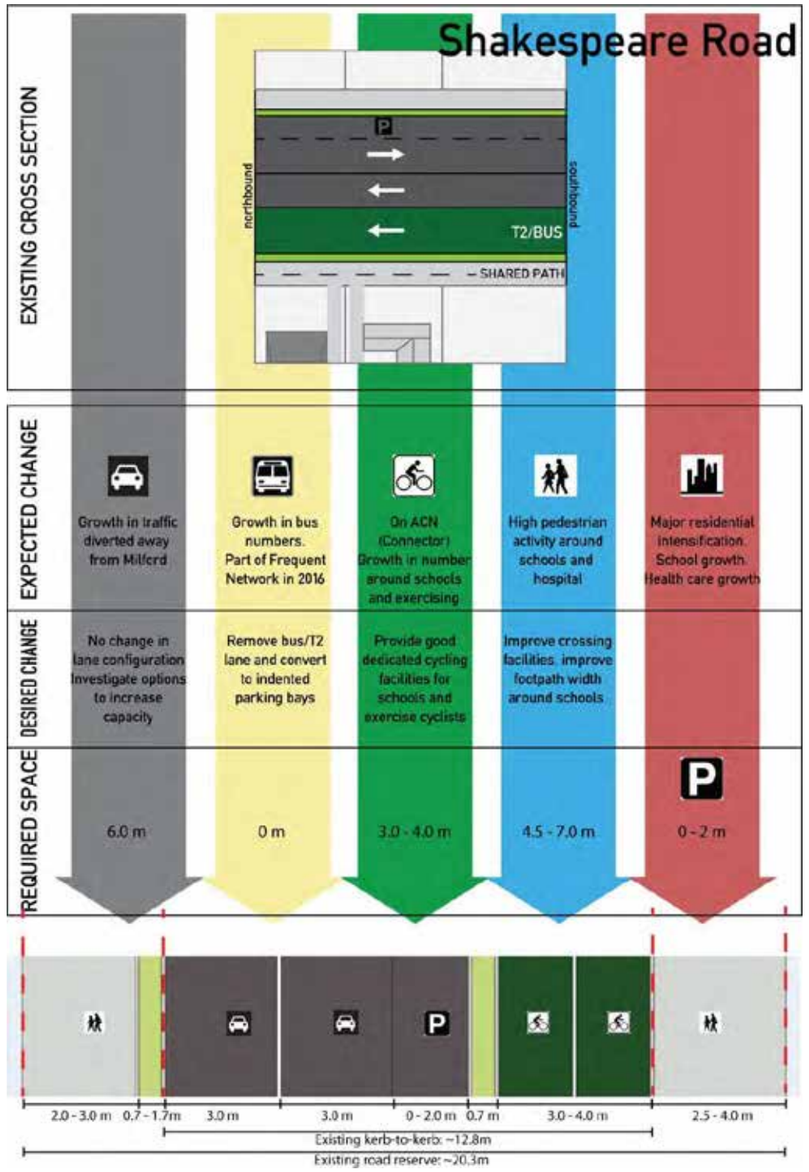


Figure 13-2: Shakespeare Road Spatial Requirements

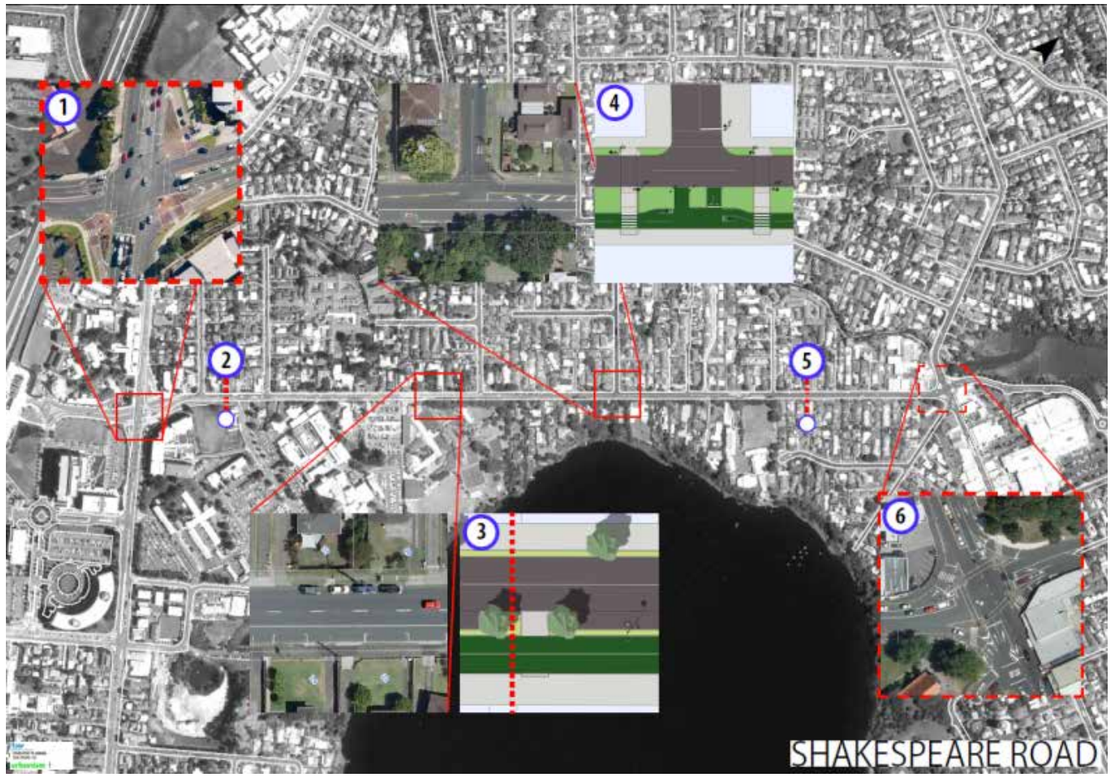


Figure 13-3: Shakespeare Road Aerials

13.4 Key Corridor Features and Cross Sections

The Spatial Requirements have then been applied to the Shakespeare Road corridor at a greater level of detail to identify how the corridor will transform over time to meet its anticipated demands. This also helps to identify alternative cross sections to respond to the varied needs of a corridor. **Figure 13-3** demonstrates the corridor as a whole, highlighting key points of interest. **Figure 13-4** provides cross sectional details at these specific locations. Key pedestrian improvement locations have been identified in **Figure 13-3** with respect to their proximity to:

- public transport
- key land uses
- key connections about the surrounding area, be it roading connections or local accessways

As with any corridor there will always be variations to the typical cross section in order to “stitch together” the road along the length of the corridor. In any corridor there are:

- Transitions to accommodate intersections and the need for additional turning lanes, bus priority etc
- The need to accommodate for other users at specific locations, for example bus stops, pedestrian refuge islands, turning bays for side road traffic
- Constraints in the available width in which to implement the preferred cross section. This can arise due to topography along the corridor or road reserve constraints.

All of these issues are of relevance to this corridor and will need to be considered as part of any future works in order to realise the goals of this CMP.

Cross Section 2: This cross section provides for a bi-directional cycle lane along the southern side of Shakespeare Road, with this proposed to extend between Taharoto Road and Kitchener Road. The bi-directional cycle lane offers a unique opportunity for school aged, recreational and commuter cyclists to ride along the road safe from motor vehicles. A bi-directional path has been designed to reduce bicycle - vehicle conflict points across the northern side of Shakespeare Road. **Figure 13-5** illustrates the difference in bicycle – vehicle conflict at side road intersection between on road cycle lanes and

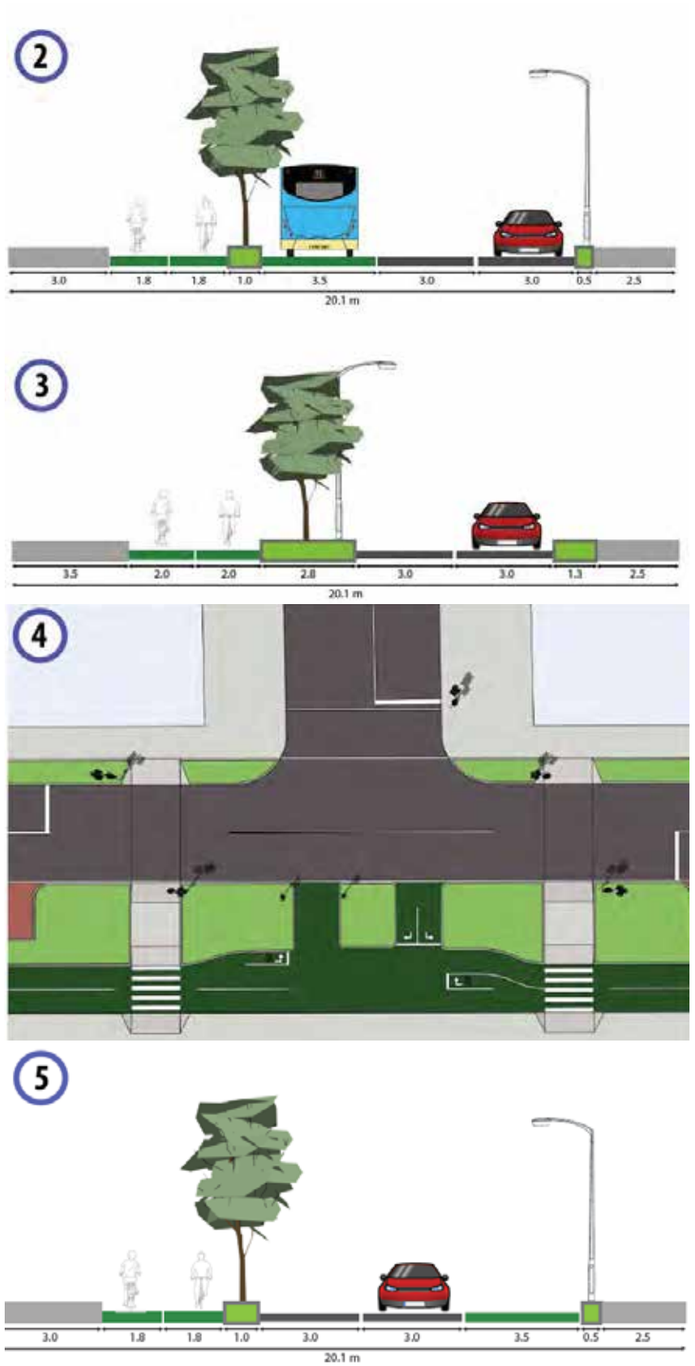


Figure 13-4: Shakespeare Road Cross Sections

Figure 13-5: On-Road vs Bi-Directional Cycle Path – Shakespeare Road

the proposed bi-directional cycle lanes. This cross section also maintains bus priority on Shakespeare Road as it approaches its intersection with Taharoto Road. The provision of a dedicated bus lane would come at the expense of the transit lane and this may only become feasible once bus services using Shakespeare Road become more frequent. On street parking should be only provided outside hours of operation of the bus lanes.

Cross Section 3: The bi-directional cycle lane should be continued over the length of Shakespeare Road. At this location the southern berm should be widened to enable multiple uses through the central area of Shakespeare Road. The widened berm can be interspersed with on street parking, bus stops to serve the schools, a continued bus lane, or landscaping, depending on the needs.

Cross Section 4: The intersection with Alma Road is signalised to improve pedestrian amenity as well as enabling cyclists to safely move between the bi-directional cycle lane and Alma Road.

Cross Section 5: The bi-directional cycle lane should be continued over the length of Shakespeare Road. This cross section also introduces eastbound bus priority on Shakespeare Road as it approaches the intersection with East Coast Road. No on-street parking should be provided for.

Flexibility: Through the central section there is the ability for the southern berm to be reduced in size, or removed entirely in order to extend any bus lanes further. The footpath on the northern side is nominally shown at 2.5 m in width. However this could be reduced and greater space given to the berm, although this may only be feasible if the existing overhead services are undergrounded and the power poles removed.

Stormwater: Stormwater considerations are critical as part of any changes to the cross sections with contaminant and flood management and water quality critical outcomes. The potential for Low Impact Design principles should be considered.

Implementation Plan

14

To take the vision identified for this CMP through to an achievable reality can be a complex task. The following sequencing and implementation plan identifies how the CMP can be rolled out in a timely, collaborative and resource efficient way by Auckland Transport.

The following table outlines the key moves along the corridor that are being sought, either through this CMP, or as part of other known changes in the area. These key moves have been grouped into:

- **Quick Wins:** being low risk projects that could be undertaken in due course, given their ease of implementation
- **Short term:** 0 - 4 years
- **Medium term:** 4 – 10 years
- **Long Term:** 10 - 30 years.

The mode to benefit from each project has also been identified, to clearly show what each project is trying to achieve.

The following table also outlines what outside influences may trigger the need for a particular option to be bought forward in time. As an example, the public transport network in this area is being reviewed in 2014-15. While the outcomes of this review will not affect the main FSN networks, but the frequencies and number of routes may affect certain corridors within the study area and may trigger the need to either revisit the CMP or to fast track certain recommendations in order to accommodate the network changes.

Growth within the study area could also proceed at a greater, or slower, rate than anticipated by the Auckland Plan. This in turn may trigger the need to fast track certain options, or conversely enable a slower response in line with land use changes in the area.

An indication has also been given as to the cost band expected for each infrastructure related key move and if this would come out of Capital Development (CAPEX) budget, or out of Operations budget (OPEX). It should be stressed that these are merely an indication on the assumed complexity and cost associated with a particular project. No formal cost estimation process has been undertaken, and the cost indication should be treated simply as a guide. The bands used in the following table are:

- $ less than $100,000
- $$ $100,000 to $1m
- $$$ $1m to $10m
- $$$$ greater than $ 10m.

The implementation plan also indicates broadly what further work is required for each project and whether there is an external trigger that may affect when the project may need to be completed.

This CMP proposes some significant changes to the cycle infrastructure around Takapuna. Some of these interventions will require some major reconstruction works to be undertaken within the corridors, although it is noted that land purchase is not required.

While there might not be a direct trigger for these projects, undertaking these projects is of vital importance to the area. Introducing a complete and dedicated cycle network in the area around Takapuna and Milford will allow people of all ages and of different levels of cycle experience to cycle safely to and from Takapuna and Milford. Providing this kind of dedicated facility will provide a true alternative to the private vehicle for travel around the generally flat roads around Lake Pupuke and for reaching the Northern Busway stations. Considering the topography of the area and the high number of dwellings within 3 km of Takapuna Centre, there is a great opportunity to encourage more cycling. One of the triggers to kickstart the implementation of high-quality cycle facilities in the area could be the will to complete the Auckland Cycle Network. Other reasons include improving safety for cyclists riding around Lake Pupuke and improving access to the schools in the area.

The annual cycle monitoring surveys undertaken in the Auckland region have shown a steady increase in cyclists at the eight sites surveyed on the North Shore. Three of these sites are within the Study area of this CMP. Of these:

- The Hurstmere Road/Killarney Street is the busiest survey site in the North Shore area in the morning peak. This site saw a 14% increase in cyclists over the past 12 months during the morning period.

- The Shakespeare Road/East Coast Road is only just behind the Hurstmere Road/Killarney Street intersection in terms of the number of cyclists passing through this intersection in the morning period. This intersection saw a 19% increase in cyclists over the last 12 months during the morning period
- The Taharoto Road/Northcote Road intersection saw an 8% increase in cyclists over the last 12 months during the morning period
- Whilst the evening period results at the above three intersections show lower increases, it remains that these three intersections cater for significant numbers of cycle movements within the North Shore area, all showing a growth in the number of cyclists travelling through each intersection.

There is therefore a valid reason to provide for cyclists as recommended by this CMP as it is catering for a growing number of cyclists along some of the busiest cycle corridors within the North Shore area.

Quick wins		Priority	Mode to benefit	Cost implications	Work required	Triggers
Fenwick Avenue Intersection Improvements	Provision of a kerb extension about Kitchener Road and Fenwick Avenue to increase footpath amenity and narrow up the width for pedestrains to cross Fenwick Avenue.	M		$$ (OPEX)	**Scheme & detailed design**	Can be triggered by safety concerns or Milford Town Centre upgrade projects.
Forrest Hill Road / East Coast Road Bus Priority	Auckland Transport has already considered a bus prioirty upgrade to this intersection. It is recommended that this could be proceeded with, however it is recommended that further investigation be given to: • promoting slower vehicle speeds through the intersection, reduce overall intersection footprint • addressing the pedestrian and shared path connections about the intersection • seek improved pedestrian amenity about golf course through footpath maintenance / renewal East Coast Road • the need for the existing southbound bus priority lane to be extended further south to avoid any congestion	M		$$$ Investigation and Implementation (CAPEX)	**Further investigations required to ascertain preferred scheme**	With implementation of the Frequent Service Network, improvements to bus priority are required to achieve the desired level of service for PT. Safety concerns can trigger further investigation into design of intersection.
East Coast - Forrest Hill Pedestrian Improvements	Undertake a review of the Forrest Hill and East Coast Road corridors to identify pedestrian desire lines and treat accordingly. The CMP has identified concept cross sections that enable pedestrian refuge islands to be installed. This should take into consideration linkages to public transport, local school walking routes and local commercial/retail nodes.	L		$ Investigation and Implementation (OPEX)	**Further investigations to determine desire lines** **Scheme & detailed design**	Can be triggered by school safety programmes or public demand for better crossing points. Can also be triggered by changes in bus network or stop locations or commercial (re)developments.
Review of Town Centre Speed Limits	Undertake a review of the town centre speed limits to assess the relative needs for speed reduction measures. This may result in the need to implement further infrastructure changes to achieve lower vehicle speeds and alterations to posted speed limits	L		$ Investigation Costs (OPEX)	**Town centre speed limit investigations**	Can be triggered by town centre streetscape upgrade projects (Takapuna)

Short term options (0 to 4 years)		Priority	Mode to benefit	Cost implications	Work required	Triggers
Realise regional cycle network	Investigate and implement cycle lanes on Killarney Street to address the current gap in the cycle network on the southern side of Lake Pupuke.	M		$$ Investigation and Implementation (CAPEX)	**Further investigations required to ascertain preferred scheme**	Increased intensification and redevelopment of Killarney St (ie: Fire Station Redevelopment) should trigger cycle lane development along the length of the road. Safety concerns and/or a school Travel wise programme could also trigger further investigation into design of intersection
Implement frequent network for public transport	Undertake investigations into bus priority improvements on Taharoto Road and Anzac Street to coincide with the RPTP "North Auckland" consultation of the proposed new public transport network. Investigations to include the following intersections: • Taharoto /Anzac /Killarney / Fred Thomas • Anzac/Lake Pupuke/Barry's Point Road • Implement preferred scheme	H		$$$ Investigation and Implementation (CAPEX)	**Investigations required to ascertain preferred scheme**	With implementation of the Frequent Service Network, improvements to bus priority are required to achieve the desired level of service for PT.
Taharoto road pedestrian improvements	Investigate the following in intersections with the aim of improving pedestrain amentiy. Consideration given to the need for left turn slip lanes, storage areas for pedestrians, crossing distances, signal phasing to reduce pedestrian wait times: • Taharoto /Northcote • Taharoto/The Boulevard • Taharoto/Wairau/Shakespeare	L		$ Investigation Costs (OPEX)	**Investigations required to ascertain preferred schemes**	These works can be undertaken as part of major maintenance to the intersections or as a result of existing safety concerns. These works could also be a part of any major development along the corridor (ie Quarry Redevelopment or NS Hospital).
Shakespeare road streetscape upgrade	Investigate Shakespeare Road to ascertain the aspirations identifed by this CMP. Investigations to focus on: • Bidirectional cycle facility • Improved pedestrian amenity • Maintain bus priority about key congested areas	M		$ Investigation Costs (OPEX)	**Investigations required to ascertain preferred scheme**	The outcomes of the public transport network review in 2014-5 may trigger further consideration of the Shakespeare Road cross sections proposed

Medium term options (5 to 10 years)		Priority	Mode to benefit	Cost implications	Work required	Triggers
Implement frequent network for public transport **Realise regional cycle network**	Undertake investigations into the need for bus priority measures on Kitchener Road and Hurstmere Road. Provision made within design to accommodate separated cycle lanes along the corridor Implement preferred scheme	M		$$$ Investigation and Implementation (CAPEX)	**Scheme & detailed design**	Hurstmere Road streetscape works within the Takapuna town centre will trigger these works to be prioritised. Cycle works may also be triggered by increased cycle demand and/or safety concerns
Implement frequent network for public transport	Investigate bus priority measures for East Coast Road on its approach to Milford town centre and the extent of priority needed	M		$ Investigation Costs (OPEX)	**Investigations required to ascertain preferred scheme**	Greater bus services using East Coast Road following the network review in 2014-15
Taharoto road pedestrian improvements	Implementation of improvements identifed in short term options investigations.	L		$$ Implementation Costs (OPEX)		Smales Quarry Development likely to result in the need to provide a signalised intersection with Rangitira Road. This will aid in improving pedestrian crossing opportunities in this location.
Upgrade hurstmere / killarney intersection	Upgrade Hurstmere Road/Killarney Street intersection to improve pedestrian connectivity and better delineate traffic movements between town centre related traffic and state highway bound traffic	H		$$ Investigation and Implementation (CAPEX)	**Scheme & detailed design**	Hurstmere Road streetscape works within the Takapuna town centre will trigger these works to be prioritised. Works may also be triggered by safety concerns. This intersection is included in the Takapuna CBTS.
Shakespeare road streetscape / landscape upgrade	Implementation of improvements identifed in short term options investigations.	M		$$$ Implementation Costs (CAPEX)	**Investigations required to ascertain preferred scheme**	Undergrounding of services may enable these works to be completed soomer Works may also be triggered by increased cycle demand, safety concerns and/or a school Travel wise programme.
Milford town centre streetscape upgrade	Undertake a town centre streetscape upgrade to improve pedestrian amenity, rationalise vehicle circulation and movement to/from the various parking areas Upgrade the East Coast Road/Kitchener Road/Omana Road/ Shakespeare Road Intersection to reflect its location within a town centre, seeking to remove left turn slip lanes, improve pedestrian amenity	L		$$$ Investigation and Implementation (CAPEX)	**Investigations required to ascertain preferred scheme**	Further intensification about the Milfrod Town Centre will trigger the need for this to be undertaken sooner

Long term options	(10 to 30 years)	Priority	Mode to benefit	Cost implications	Work required	Triggers
Realise regional cycle network	Investigate and implement separated cycle lanes on East Coast Road	L		**$$$** Investigation and Implementation (CAPEX)	**Scheme & detailed desgin**	Undergrounding of services may enable these works to be completed soomer if there is the abiltiy to set the kerb line to suit the CMP as part of the undergrounding project. Works may also be triggered by increased cycle demand, safety concerns and/or a school Travel wise programme
Local node development	Intensification about local nodes will require the corridor to respond accordingly. The need for these works wll be dependant on the type of intensification occurring, and when it happens. There may be the ability to require changes to the corridors consistent with the CMP to be completed by the developer/applicants	L		**$** (OPEX)		Will depend on rate, location and type of intensification and the need for the corridor to respond to this.

Summary

15

Through the CMP process a range of technical stakeholder views have been canvassed, as well as a thorough review of previous studies and known infrastructure and land use change. The Takapuna North CMP study area is expected to see considerable growth in the next 30 years, most noticeably about Takapuna town centre, Milford town centre and Smales Farm, but also about the key corridors within the study area through local node intensification.

Consequently the role of key corridors within the study area needs to change in order to accommodate the changes in behaviour already occurring within the area. In determining the 30 year vision for the study and giving effect to the CMP, a number of cross sections have been designed to meet the anticipated needs of each corridor over the next 30 years. These identify what ideally needs to be given importance within the carriageway and road reserve. It is however recognised that time and/or space constraints may make it difficult to achieve the preferred cross sections "to the letter".

Consequently it is likely that variations to the preferred cross sections will be necessary – but it is reiterated that the space allocation, and how each mode of travel is accommodated, should be maintained. That is, the "essence" of the preferred cross sections should be maintained.

As with any corridor there will always be variations to the typical cross section in order to "stitch together" the road along the length of the corridor. In any corridor there are:

- Transitions to accommodate intersections and the need for additional turning lanes, bus priority etc
- The need to accommodate for other users at specific locations, for example bus stops, pedestrian refuge islands, turning bays for side road traffic
- Constraints in the available width in which to implement the preferred cross section. There can arise due to topography along the corridor or road reserve constraints.

All of these issues are of relevance to the Takapuna North CMP and will need to be considered as part of any future works in order to realise the goals of this CMP.

15.1 Design Philosophy

The Takapuna North CMP is premised on the reallocation of road space, rather than "wholesale" road widening. There may be localised widening required at specific locations, typically about any proposed intersection changes.

To make optimal use of the existing road reserve in order to achieve the future network roles, changes in the existing road configuration are required. The following design principles have been adopted in designing conceptual cross sections for each of the roads:

Private Vehicles: Within the foreseeable future, car travel is expected to remain a very important transport mode in the study area. The Takapuna North CMP acknowledges this, but at the same time stresses the importance of reducing the impact of vehicular traffic on other modes. To make sure the concept cross section does not encourage high speeds and minimises the space taken up by private vehicles, it is proposed that general vehicle lanes should be kept at a width of 3.0 m, which is relatively narrow compared to the existing layout.

Bus: Improving public transport is a critical component in realising the growth aspirations for Takapuna. To ensure reliable and efficient operation of public transport in the area, bus lanes or bus priority measures are required. Given the design philosophy for the Takapuna CMP is premised on the reallocation of road space, rather than "wholesale" road widening, bus priority measures have focussed on the reallocation of road space where available, although there may be areas where localised widening will be required to achieve any meaningful bus priority measures.

Cycling: Improving the visibility of cycling and providing good cycling facilities is paramount in order to achieve high levels of cycling. The guiding principle of the design philosophy is that all streets need to cater for cycling. The cycle design philosophy for Takapuna North CMP is to cater for both adults and children (10 years and over). Separated cycle lanes have been recommended for many of the corridors within the study area to achieve the desired outcome of attracting cyclists of all experience levels.

Pedestrians: The minimum required footpath width, according to the Auckland Transport engineering standards is 1.8 m. On roads with more pedestrian activity or on roads that are currently uninviting to pedestrians, wider footpaths, between 2.0 and 2.5 m wide, are desired. Around schools, which see major pedestrian traffic during short peaks, much wider footpaths must be considered, with footpaths up to 4.0 m wide in some areas.

Parking: On street parking is required in some, but not all locations along the corridor. Where parking is required, the width of parking bays should be kept to a minimum, at 2.0 m wide. This will accommodates a private vehicle and introduce side friction for vehicles travelling in the general

traffic lane. Increased side friction will have a positive impact on reducing vehicle speeds in the general traffic lane.

15.2 Summary of Cycle Provision about the Study Area

Figure 15-1 summarises the proposed cycling provision about the study area and the different treatments proposed to cater for cyclists. This highlights how, through the Takapuna North CMP, provision could be made for cyclists throughout the study area with high quality facilities encouraging cyclists of all skill levels. This figure also illustrates a potential "quieter" route between Shakespeare Road and Killarney Street via North Shore Hospital, Smales Quarry and Pupuke Road. This would require consultation and agreement with private landowners, but would appear to be worth pursuing.

15.3 Summary of Bus Priority Provision about the Study Area

Figure 15-2 summarises the proposed bus priority provision about the study area. This highlights how, through the Takapuna North CMP, provision could be made for public transport throughout the study area with the priority measures focused on enabling public transport to avoid areas of congestion.

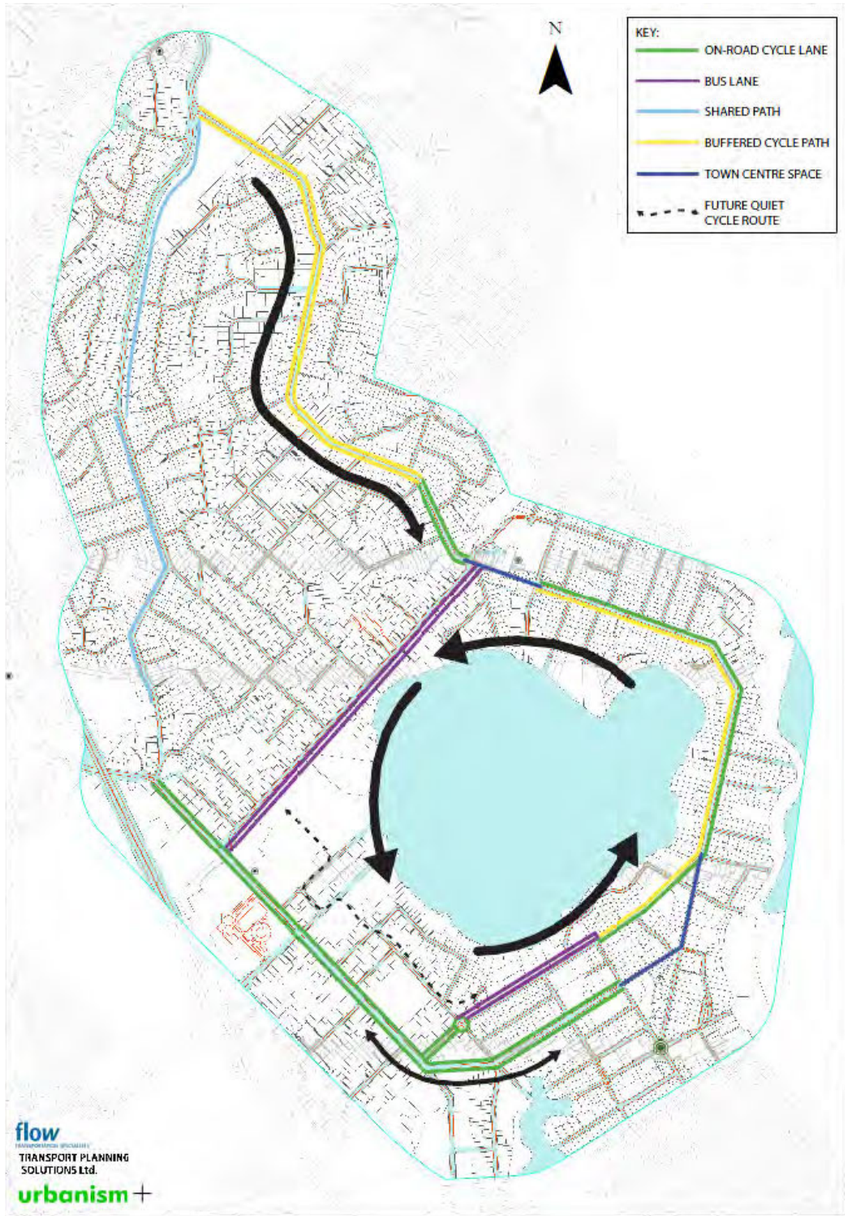


Figure 15-1: Takapuna CMP Cycle Provision

Figure 15-2: Takapuna CMP Bus Priority Provision

Appendix A: Strategic document and background info summary

A

Takapuna Strategic Transport Study

(Flow, August 2012)

The Takapuna Strategic Transport Study was developed to update and revise the Takapuna Strategic Study Background Transport Report (2007). The report is designed to be complementary to the Takapuna Strategic Framework which is discussed above. The report discusses the key issues facing the road network, public transport, car parking, and the pedestrian and cycling environment. The transport study is focused primarily on the routes surrounding the existing Takapuna town centre, being the southern end of the study area for the Takapuna North CMP

- Significant congestion in and around Takapuna with limited options to relieve congestion
- Improvements to walking and cycling and public transport to enable development given the predicted levels of congestion
- There will be a need to ensure that sufficient public transport capacity is achievable through proposed projects such as the Anzac Street widening project
- Acknowledgement that parking will be necessary but there is a need for careful management of ancillary and non ancillary parking to achieve an appropriate balance.
- A Comprehensive Parking Management Plan is recommended for all publically available car parking to assist in decisions regarding the supply and management of public parking
- Predicted increase in cycling and walking trips in and around Takapuna, and accordingly a priority should be places on facilities for those walking and cycling, including designing Takapuna Streets to be more pedestrian orientated which is consistent with the Takapuna Strategic Framework

Key Relevance to Takapuna North CMP

- Significant congestion in and around Takapuna town centre means that the CMP will need to give priority to support transport modes other than private vehicles. This will include options that enable better facilities for public transport, cycling and walking.
- Anzac Street is identified as having significant potential in terms of widening to support public transport
- Management of ancillary and non ancillary parking including comprehensive parking management plans

Burns Avenue Corridor Study

(Flow, URS, Hill Young Cooper, Thresher, June 2012)

The Burns Avenue/Auburn Street Corridor Study was completed in 2011. The purpose of this corridor study was to provide infrastructure, in the short term (next 5 years) to support commercial and residential growth in Takapuna, in the context of a longer term plan (within the next 30 years) for a route which contributes to improved accessibility within Takapuna and support the role of central Takapuna as a vibrant, pedestrian- friendly retail core. The Burns Avenue Corridor Study was completed using a detailed option assessment and identified two main options, with eight supporting options that could be incorporated into the main options. The main options and sub options were assessed using a multi-criteria analysis including traffic modelling undertaken in Paramics.

Key Relevance to Takapuna North CMP

The preferred option that was developed within this plan for Burns Avenue from Northcroft Street to Killarney Street included the following short to medium term improvements:

- Retain roundabouts with minor improvements
- Footpath improvements
- Monitor pedestrian and traffic volumes to identify additional pedestrian improvements as required
- Narrow the carriage way between Anzac Street and Killarney Street including improvements to the Killarney Street intersection
- Over the longer terms development options included signalisation of Huron Street and Northcroft Street.

Lake Pupuke Cycle Route Improvements

(Flow, August 2012 prepared for Auckland Transport)

The Lake Pupuke Cycle Route Improvements study was instigated by Auckland Transport to investigate upgrade options to improve the cycle environment relating to the Lake Pupuke Cycle Route. The key arterials that were assessed in the Lake Pupuke Cycle Route improvements

report, specifically Shakespeare Road, Hurstmere Road, Kitchener Road, Anzac Street, Killarney Street, and Taharoto Road are all included in the Takapuna North CMP area. Specifically, the report has been undertaken to:

- Report upon any past (prior to 2009) in the vicinity of Lake Pupuke
- Complete a comprehensive cycle site visit and cycle facility audit of the route and report the findings.
- Provide concept options for safety improvements to the circuit for cyclists and other users of the Lake Pupuke circuit

Key Relevance to Takapuna North CMP

The key recommendations for the study area, and focussing on improving the cycle amenity, can be summarised into the following:

- Improved management and design of the links and corridors including "greening" of intersections, transit lanes, on street parking, widening capabilities, and cycle lanes
- Progress options for shared lanes, and cycle lanes on specific links
- Consideration of future works to include raised table at Milford at zebra crossings and upgrade of existing shared facilities to a higher standard.
- Consultation with stakeholders regarding opposition to cycle lanes and implementing hook turns

Anzac Street West Urban Design Brief

This brief addresses the urban design requirements of the transportation elements of the Anzac Street West, which includes a redesign of the road reserve in Anzac Street and Killarney Street from their intersections with Auburn Street to their intersection with Taharoto Road, and also Pupuke Road.

The design brief provides specific design advice in regards to how the project can be further developed in order to support the over arching objectives of the project. These objectives include

- Design that supports a sense of place and the evolving character of an urban neighbourhood and provides an appropriate entry into Takapuna.
- The creation of an avenue with the planting of street trees which will contribute to a new street character. This includes the use of appropriate street furniture and lighting.
- Development of an environment that encourages non-car travel through maximised footpath widths, dedicated bus lanes, dedicated cycle lanes

A design that balances traffic flow efficiency with pedestrian linkages, and balances the public and private realms in the street environment

Key Relevance to Takapuna North CMP

Overall when considering the Takapuna North CMP, the urban design brief provides direction in terms of the development of arterials and highlights the need to focus on an environment that encourages non-car travel and balances traffic flows with pedestrian linkages.

Anzac Street Widening Reassessment 1 and 2 (Flow, 2008)

These reports include the assessment of a variety of options for the development of Anzac Street. The most recent of these reports has similar conclusions to that of the initial report, and the key findings are summarised below.

- The report overall recommends that the Anzac Street widening project proceeds given that there will be benefits to both buses and general traffic and improved conditions for pedestrians and cyclists.
- The report also recommends the following potential improvements should be considered
- The provision of a northbound bus priority lane along Taharoto Road from Fred Thomas Drive to Rangitira Avenue
- The provision of a section of bus priority westbound along Anzac Street approaching Auburn Avenue

Key Relevance to Takapuna North CMP

Consideration in the CMP should be given to the likelihood of Anzac Street being widened and the provision of bus priority lanes on Anzac Street and Taharoto Road.

Bus and Transit Lane Review

(Auckland Transport, 2011)

This review provided by Auckland Transport puts forward a policy that aligns with strategic planning objectives and provides an analytical basis for the implementation of bus and transit lanes for the Auckland region.

In addition to this the document also provides clarity around the need for and use of bus and transit lanes, and in doing so sets out to show:

- Why transit lanes may be necessary
- Where should these be introduced
- When should a bus or transit lane be introduced
- How these are to be physically represented on the ground

Key Relevance to Takapuna North CMP

Whilst this document does not specify which roads with the Takapuna North CMP area should have bus or transit lanes, it provides a framework and standardised template to assess the roads within the CMP that are being considered for bus lanes or transit lanes.

NSCC Key Corridor Strategy

(North Shore City Council, 2010 – abridged version as provided)

The Strategy for the development of North Shore's key corridors is to provide a long term (50+ year) view on the type of development that could or should eventuate in the City. This takes the form of maps showing the 'end game' of road transport and land use development. These maps are supported by descriptions of the types of land uses and road function, along with a guide on how planning for change might occur, both at a project level and high order level, and a priority listing of when planning and implementing specific corridors should be addressed.

The report provided by Auckland Transport is an abridged version of this strategy, as the NSCC Key Corridor Strategy was not formally adopted by NSCC Council prior to the amalgamation of local councils.

Key Relevance to Takapuna North CMP

Provided with the Strategy documentation is a map detailing the overall results of the strategy. This identifies Shakespeare Road, Kitchener Road, and Killarney Street being high priority for investigation, and Taharoto Road as a medium priority

Smart Roads Auckland Trial

The Smart Roads Auckland Trial was completed for the Takapuna area. The Smart Roads workshop as utilised to identify Activity areas, the pedestrian network, bicycle network, public transport network and traffic routes. These networks and areas are then collated and mapped to show the overall Road User Hierarchy.

Subsequent to this the individual Road User Hierarchies are amalgamated into one summary map, which is in turn used to develop the network operating plan (NOP). This plan and subsequent work has not been provided to the project team, and therefore has not been summarised here.

Key Relevance to Takapuna North CMP

When considering the road networked encompassed within the CMP scope, the following preferred routes are identified in each category of road user:

- **Pedestrian:** Shakespeare Road, Taharoto Road, Takapuna and Milford central areas.
- **Cycle:** Killarney Street, Hurstmere Road, Kitchener Road, Shakespeare Road, Forest Hill and Akoranga Drive
- **Freight:** Wairau Road and SH1
- **Bus:** Shakespeare Road, Hurstmere Road, Kitchener Road, Anzac Street, Lake Road, Burns Avenue, Fred Thomas Drive, Taharoto Road and Esmonde Road
- **Traffic:** SH1, Fred Thomas Drive, Behind Milford shopping area.

Devonport – Takapuna Local Board Plan

This plan is about Devonport-Takapuna Local Board area. It expresses what the local board members have heard and learnt from the community. It contains the aspirations and priorities for the local community. This plan sets the framework that guides their decision-making and actions for the next three years. The plan identifies five priorities for the Takapuna-Devonport area

- Distinctive village and town centres
- Cherishing our environmental and Historic Treasures
- Improving our economy
- Improving our transport
- Community facilities, services and recreation

Key Relevance to Takapuna North CMP

The key initiatives that the local board support in Takapuna include

- The Hurstmere Green Redevelopment (completed)
- Advocate for better public transport connections and services between the different modes of public transport, as well as developing safe and secure facilities for recreational and commuter cyclists, and pedestrians.
- Creating a "shared space" in Hurstmere Road between Anzac Street and Lake Road and the continuing assessment of alternative access routes into the centre of Takapuna through Burns, Bracken, Auburn and Killarney streets.
- Advocate for a tunnel option that provides the opportunity to bring rail to The Shore in addition to providing capacity for vehicles.

Appendix B: Takapuna framework summary

B

Lake Edge Precinct

Northern Hurstmere Precinct

Anzac Street West

Taharoto Precinct

Key directions relevant to Takapuna North CMP

- Explore the option of Killarney Street as a route for taking more traffic in the future allowing greater pedestrian priority in the centre of Takapuna
- Improvements to the quality of streetscape
- Explore options to improve public access to the edge of Lake Pupuke
- Redevelop the Takapuna Aquatic Centre site and strengthen the physical and visual links between Takapuna and lake Pupuke

- Investigate the traffic function of Killarney Street with a view to improving it as the preferred vehicular route for vehicles travelling through Takapuna.
- Implement streetscape improvements to The Promenade adjacent to the Takapuna Beach Cafe, with the aim of increasing the level of safety and encouraging pedestrian circulation between Takapuna Beach and the reserve.
- Create a shared space on the portion of The Promenade outside the Bruce Mason Centre, allowing the space to be used for festivals and events.

- Encouraging the development of apartments (ranging from 4 to 6-8 storeys) and terraces (2-3 storeys) to achieve a more compact urban neighbourhood primarily residential function, but provision for mixed use (residential above service, office or retail uses) along Anzac and Auburn Streets
- The provision of a high quality public realm focused around a landscaped link between Killarney Park and Auburn Reserve
- A plan change notified in October 2010 provides the rules and policies to enable redevelopment of the Precinct.

- Intensification of a mixed use corridor connecting Takapuna to Smales Farm and Wairau Valley
- Create an urban boulevard on Taharoto Road
- Consolidation of a medical precinct
- Provision of commercial development on the southern side of Northcote Road
- Opportunity for more intensive residential development between Smales Quarry and Lake Pupuke
- Improvements to pedestrian circulation and local neighbourhood amenity
- Intensive development fronting onto Taharoto Road
- Improve public access to the edge of Lake Pupuke

Other precinct areas identified in the Takapuna Strategic Framework include Barry's Point Precinct, Central and Beachfront Precinct, Upper Shoal Bay Precinct, and Central West Precinct. These precincts overlap in part the Takapuna North CMP, and have the following key matters that may have relevance to the direction of the CMP:

- Continue with plans for the redevelopment of Hurstmere Green to create an open and inviting public space and pedestrian link between Hurstmere Road and Takapuna Beach.
- Implement a full streetscape upgrade of Hurstmere Road, creating a level surface which provides opportunities for using the space in a more flexible way – for markets, events and festivals. Exploration of the traffic and parking function of Hurstmere Road would be a priority in the design process, assessing the extent to which pedestrianisation of a portion of Hurstmere Road would be desirable.
- Implement a streetscape improvement project for the section of Anzac Street between the Anzac Street car park and Hurstmere Road.
- Implement a streetscape improvement project for Lake Road between Anzac Street and Hall's Corner. The design should express and support the priority of pedestrian movement along and across Lake Road.
- Takapuna Bus Station is likely to be retained in its highly visible Lake Road location for the medium term. However, opportunities for its longer term relocation should be explored
- Ongoing investigation of the function of the Burns / Auburn corridor, with a high level of amenity for pedestrians and cyclists incorporated into the design.
- Improving connectivity with the western side of Takapuna will become increasingly important as the adjacent Anzac Street West Precinct begins to redevelop
- Streetscape improvements to Como Street, Huron Street, Northcroft Street and Byron Avenue, focused on the section between Lake Road and the Burns / Auburn corridor.
- Identification of opportunities to create local pocket parks and form mid-block connections, improving walkability and pedestrian circulation throughout the precinct.
- Investigation of the function of Burns Avenue as an alternative route for traffic currently moving through the commercial heart of Takapuna. The formation of a shared pedestrian/vehicle lane to the rear of properties along the eastern side of Barry's Point Road, running adjacent to the edge of the Upper Shoal Bay Reserve, would assist in providing good access to those sites upon redevelopment.

Appendix C: Known & anticipated change summary

C

Land Use Changes

Proposed Private Plan Change 34: Milford Intensive Residential Development Overlay Area (declined)

This proposed private plan changes encompasses a plan change to allow for high density residential development in Milford Town Centre. This development is aimed at providing more housing opportunities in suburbs earmarked for growth in the Auckland Plan. The proposed plan change removes the height to boundary controls from the existing business 2 zone. It will allow for the construction of several residential towers, the highest of which will measure 52 m above the shopping centre concourse. This proposed plan change allows for the construction of max 235 residential units.

Proposed Plan Change 37: Anzac Street Precinct (adopted)

The Anzac Street Plan Change 37 was publically notified by the former North Shore City Council in October 2010 and a hearing was held in May 2012. The Plan Change for the Anzac Street West Precinct introduces a new residential zone into the District Plan: (Residential 8) Urban Neighbourhoods. The Precinct stretches from Killarney Street in the north to Huron Street in the south and is bounded by Pupuke Road and Auburn Street. As such it is relevant to the study area. The new Residential 8 Zone will enable a mix of apartment and terrace type housing in a more intensive form while providing for a high quality public realm. It will be predominantly residential with some retail and commercial use and be up to 8 storeys or 28 metres in height in some places. Of particular relevance for this study is the approach taken to the treatment of the streets throughout the Precinct.

Key recommendations include:

- Maximising the footpath widths to create generous footpath space for pedestrians
- Planting street trees – to provide buffers between pedestrians and traffic and building occupants and traffic
- Detailed design and paving for full footpath width.

The Plan Change also imposes development controls to ensure that individual buildings address and define the edge of the street in a way that is consistent for the street as a whole i.e. taking into account the nature of the street. The number of vehicle crossing points onto Anzac Street is also reduced to help provide a high quality street environment.

Merge Development (former Gasometer Site) (consented)

Development of the property at 15 Northcroft Street (corner of Auburn Street) has been approved in 2010. The proposed development comprises a 20-storey high rise complex with a 750 space public car park. The ground floor will be dedicated to retail and hospitality. The higher levels will be constructed as a mix of offices and one or two-bedroom apartments. While resource consent has been granted, building consent has not been applied for yet so construction is expected to start in 2014.

53-73 Hurstmere Road (under investigation)

The owner of the properties at 53-73 Hurstmere Road unveiled plans to redevelop the site and connect Hurstmere Road to The Strand. The proposed development includes 186 apartments, a hotel, retail, hospitality and 460 car parks. While resource consent for this development has not been sought yet, the developer has publicly announced that the development is scheduled to start in 2014. One of the issues that will need to be addressed is the planned realignment of The Strand.

Anzac Street Car Park Redevelopment (planned)

The Takapuna Strategic Framework identifies the Anzac Street car park in central Takapuna as an opportunity for redevelopment, while at the same time retaining the existing car parking capacity. This site is currently owned by Auckland Council and is earmarked for redevelopment in the medium long term.

Infrastructure Changes

Taharoto/Wairau Road Upgrade (under construction)

At the moment, an upgrade of Taharoto Road is under construction. Stage four out of seven is currently being constructed at the intersection of Wairau and Forrest Hill Road. This phase includes the replacement of the existing bridge, the construction of on-road cycle lanes and the redesign of the intersection by providing central median islands, new traffic lights and additional traffic lanes.

Future stages of the works, still to be constructed include widening of Wairau Road outside Atlas Concrete and upgrading of the Taharoto Road/Northcote Road intersection.

Auburn Street/Burns Avenue Upgrade

The Auburn Street/Burns Avenue corridor is earmarked for an upgrade in the short term (next 5 years) to support commercial and residential growth in Takapuna. The proposed works include roundabout improvements, the banning of right turns out of Tennyson Avenue, footpath improvements and improvements to the Killarney Street intersection.

Anzac Street Upgrade (Fred Thomas Drive to Hurstmere Road)

A westbound bus priority lane is proposed along Anzac Street, from Auburn Street to Taharoto Road, as part of the Anzac Street Widening project. However funding for this project is not available until the 2017/2018 financial year

East Coast Road/Forrest Hill Road Intersection

The intersection of East Coast Road and Forrest Hill Road will be reconstructed, with bus priority measures installed on two of the three approaches. This will allow buses to travel between East Coast Road and Forrest Hill Road through the intersection with less delay than before.

Lake Pupuke Cycle Routes

Concerns have been raised about the safety of cyclists around Lake Pupuke. The provision of improved cycle facilities has been researched showing that cycle lanes can be implemented without land acquisition. This project is currently under review.

Takapuna Bus Station Upgrade

The Takapuna bus station on Lake Road is due to be upgraded. Consideration has been given previously to the best location for the station with other locations suggested being the Anzac Street car park and other sites closer to Auburn Street

Takapuna Ferry Terminal

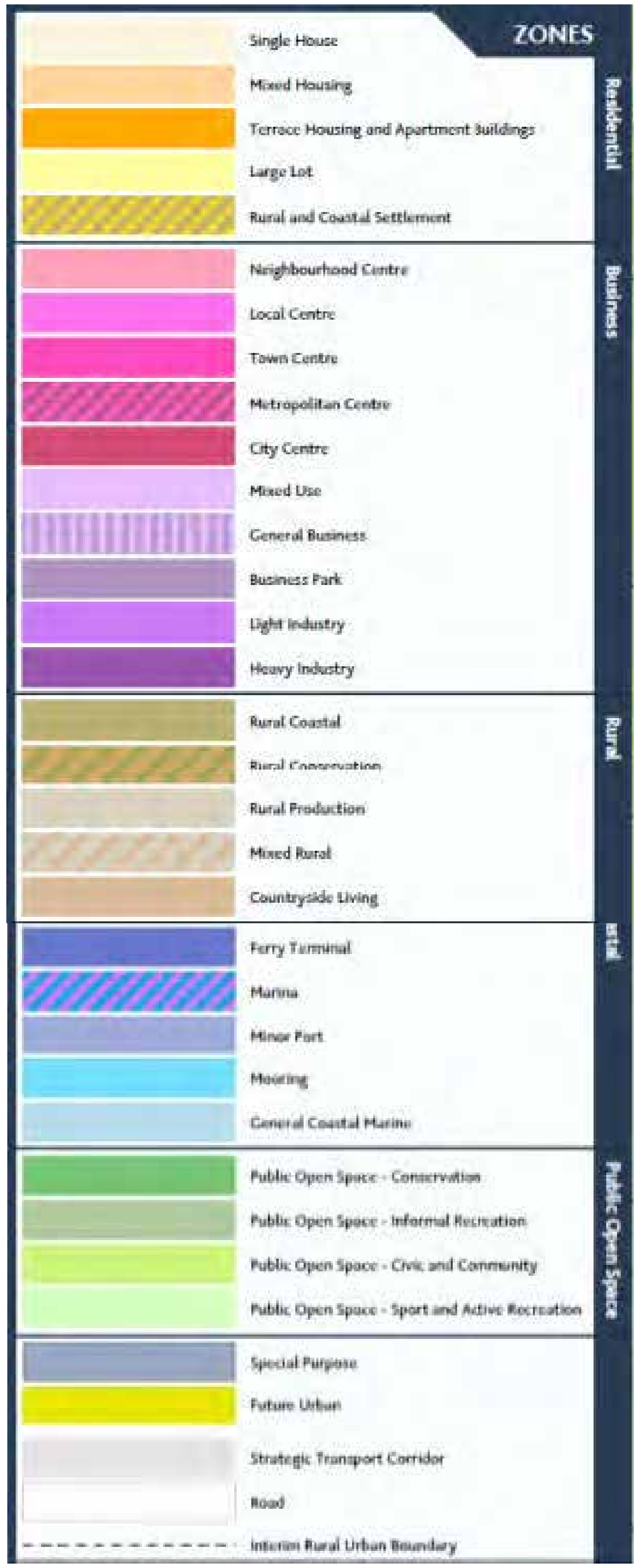
The option of a ferry terminal or wharf facility at the current boat ramp facility at the northern end of Takapuna Beach has been considered at a very high level only. There are general concerns regarding the environmental impacts of such a facility. However, no formal investigations have been carried out at this stage

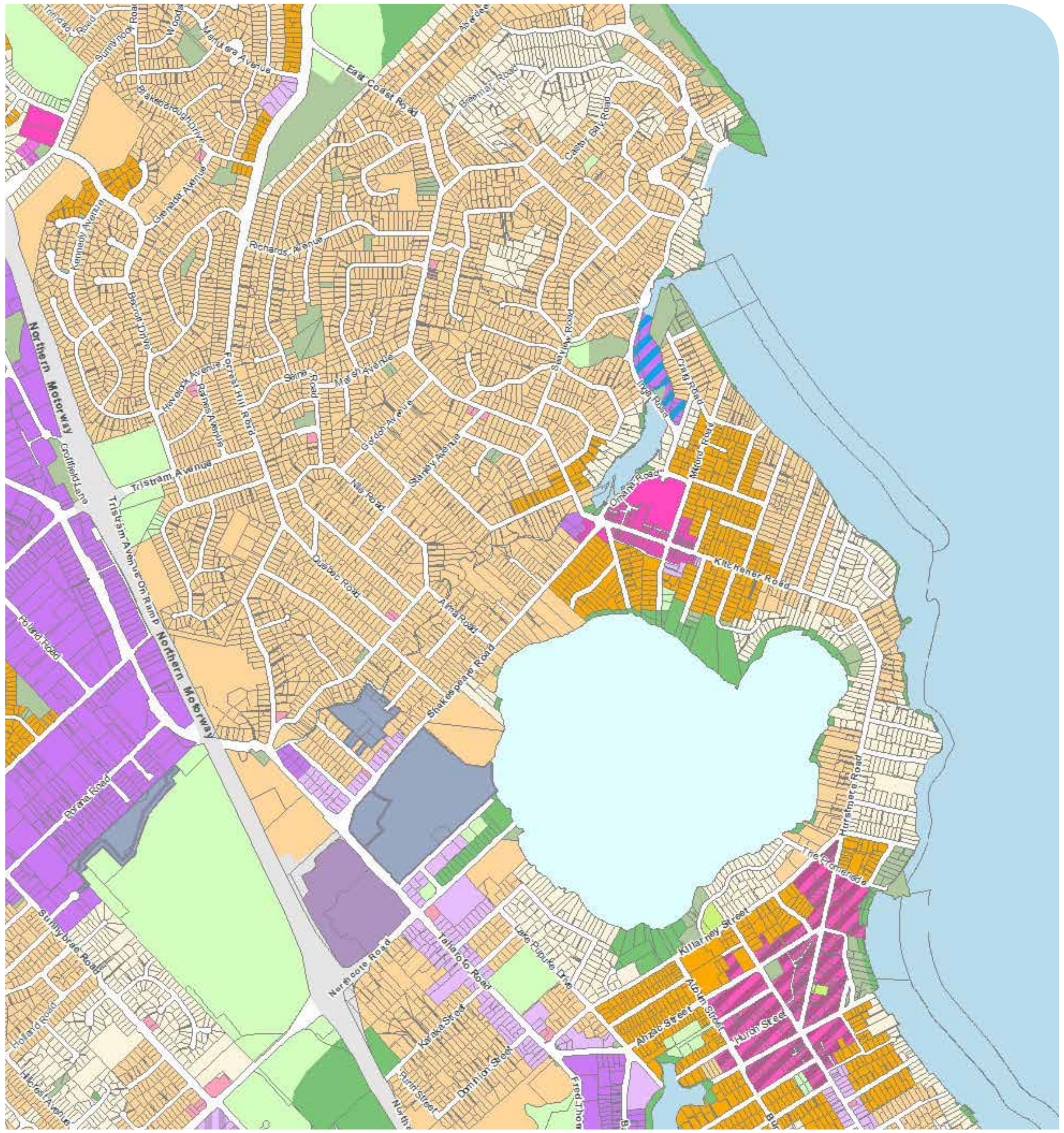
New Shoal Bay Connection

Consideration has been given to a new connection across Upper Shoal Bay being provided as a public transport only connection (in addition to a pedestrian and cycle facility), providing a more direct link between Takapuna centre and Akoranga station and creating additional capacity.

Milford Bus Station

The Devonport-Takapuna Local Board has expressed an interest in advocating for a new bus station to be constructed in Milford.





Unitary Plan


possible growth scenario
10+ years


possible growth scenario
20+ years


possible growth scenario
30+ years

Appendix D: Intensification design tests

D

D1. Intensification design tests

Theoretical design tests were undertaken to assess and respond to the identified urban design issues, alongside general feasibility and efficiency issues, and existing character considerations. These tests were discussed and progressed during workshops with the consultant team, Auckland Council and Auckland Transport.

The process to undertake the assessment used the following method:

- A set of typologies was created to test what type of intensified development could be undertaken in the area.
- Potential areas of growth and intensification within the CMP were identified during workshop one. These included the arterial roads and in particular local nodes and town centres.
- Two indicative sites on East Coast and Forrest Hill Roads were identified that are likely to be subject to intensification and have dimensions and contours that are common in the area. One site is flat and the other has a sloped topography, to test that the typologies could be easily amended to apply to a variety of sites.
- Theoretical intensification options were tested for the sites. Typologies were developed to provide an indication of site layouts including: retaining the existing dwellings with one additional unit, terrace houses, rear lane developments, mixed units, and apartments. Future zone rules were omitted for this test.
- Typology options were assessed in regards to vehicle access and general urban design impacts.
- A site was selected and finalised during workshop two for further investigation into how intensification could be undertaken at a larger scale along the corridor.
- An indicative concept plan for intensification at a node was developed that could be applied at locations across the area.

The tests undertaken were not intended to be detailed design concepts rather they help to illustrate future access and design issues if intensification were to occur along a segment of road. However, the method used real sites and contours, using tried and tested dimensions and typologies in order to make credible and realistic assumptions about the local network. The draft Unitary Plan provisions were used as guide when undertaking these tests however independent judgement was used to determine potential heights and characteristics of the layouts based on accepted best practice urban design principles.

Figure D-1: Design Test site at 65, 67, 69 East Coast Road.

D2. Design tests for 65, 67 & 69 East Coast Road

This site was selected as being representative of a desirable candidate for future intensification along both East Coast and Forrest Hill Roads. These corridors are characterised by being elevated and on ridges, allowing high amenity outlook and some views (more in the case of East Coast Road's eastern side), but also frequently involving sloped sites. Sloping land offers a number of advantages in the accommodation of density, primarily through the ability of people to look out above their neighbour (and in so doing retain more sunlight and outlook than would otherwise be likely), and the necessity for more varied and modelled building facades.

The site at 65, 67 & 69 East Coast Road has the following characteristics:

- Five existing units that vary from one to two storeys.
- Four accessways onto East Coast Road.
- Site slopes down 10m towards the east (1m contours)

The outcomes of the seven design tests are set out below.

Design Test One: Additional Unit	• Five existing units and one new unit (six in total) that is 260sqm and two storeys. • Units vary from one to two storeys. • New unit shares existing driveway, four accessways onto East Coast Road.
Design Test Two: Terraced Units	• Seven units. • All units are 145sqm, two storeys, with three bedrooms. • Narrow backyards. • Seven driveways requiring access of East Coast Road. • Units step down to deal with the slope. • Units appear to be one storey from the street. • Two car parks per unit. • Units could be 190sqm, three storeys, with five bedrooms.
Design Test Three: Rear Lane Units (larger backyard)	• Eight units. • All units are 120sqm, two storeys, two bedrooms, and have 40sqm garages. • Narrow and long backyards to maximise open space. • The one way rear lane requires one or two accessways off East Coast Road. • Garages are a long distance from the units. • Units appear to be two storeys from the street. • Two car parks per unit.
Design Test Four: Rear Lane Units (smaller backyard)	• Eight units. • All units are 120sqm, two storeys, two bedrooms, and have 40sqm garages. • Smaller backyards to reduce the distance between the units and garages. • Large buffer between development and north eastern neighbours. • The one way rear lane requires one or two accessways off East Coast Road. • Units appear to be two storeys from the street. • Two car parks per unit.
Design Test Five: Mixed Units	• Ten units. • Nine units are two storeys, one is one storey. • One unit is 100sqm, one unit is 140sqm, four units are 136sqm, and four units are 148sqm. • Small backyards. • The design requires five access points from East Coast Road. • Some units step down with the slope. • Units appear to be one storey from the street. • Two car parks per unit. • Massing is similar to neighbouring properties.
Design Test Six: Three Storey Apartments	• Twenty four apartments. • All apartments are 70sqm. • Three storeys plus a basement car park. • All apartments have two bedrooms. • Open space / large buffer to the north east. • Requires one or two access points off East Coast Road. • At least two car parks per apartment. • The large footprint does not suit the existing fabric.
Design Test Six: Four Storey Apartments	• Thirty two apartments. • All apartments are 70sqm. • Four storeys plus a basement car park. • All apartments have two bedrooms. • Limited open space. • Requires one or two access points off East Coast Road. • At least two car parks per apartment. • The large footprint and height of the development would not fit in with the existing fabric.

Table D-1 Intensification Tests

Figure D-2: *East Coast Road site, Existing layout*

Figure D-3: *East Coast Road site, Design Test 1: Additional Unit*

Figure D-4: *East Coast Road site, Design Test 2: Terraced Units*

Figure D-5: *East Coast Road site, Design Test 3: Rear Lane Units (larger backyard)*

Figure D-6: *East Coast Road site, Design Test 4: Rear Lane Units (smaller backyard)*

Figure D-7: *East Coast Road site, Design Test 5: Mixed Units*

Figure D-8: *East Coast Road site, Design Test 6: Three Storey Apartments*

Figure D-9: *East Coast Road site, Design Test 7: Four Storey Apartments*

Figure D-10: Design test site at 236, 238 & 240 Forrest Hill Road

D3. Design tests for 236, 238 & 240 Forrest Hill Road

A second design test was undertaken to illustrate that the typologies could be easily amended to apply to a variety of sites. The site at 236, 238 & 240 Forrest Hill Road has the following characteristics:

- Five existing units that vary from one to two storeys.
- Three accessways onto Forrest Hill Road.
- Site slopes down 2m towards the south west (1 m contours).

The outcomes of the three design tests are set out below.

18.3.1 Front service lanes

Although not progressed to an actual diagram, front-loaded service lanes were tested. They could not be accommodated without creating serious urban design disruption. This will be further discussed in the recommendations section.

Design Test One: **Terraced Units**	• Six units. • All units are 130sqm, two storeys, with three bedrooms. • Narrow backyards. • Six driveways requiring access of Forrest Hill Road (on site manoeuvring not shown but to be provided in the front yard space). • Two car parks per unit.
Design Test Two: **Rear Lane Units**	• Seven units • All units are 120sqm, two storeys, two bedrooms, with 40sqm garages • Narrow backyards • The one way rear lane requires two accessways off Forrest Hill Road • Garages are a large distance from the units • Two car parks per unit
Design Test Three: **Three Storey Apartments**	• Twenty apartments. • Three storeys. • 16 apartments are 70sqm with two bedrooms, and four apartments are 140sqm with four bedrooms. • Minimal open space. • Requires two accessways off Forrest Hill Road. • Two car parks per unit. • The height and footprint of the development does not fit in with the existing fabric.

Table D-2 Intensification tests for 236, 238, 240 Forrest Hill Road

Figure D-11: Forrest Hill Road site, Existing layout

Figure D-12: Forrest Hill Road, Design Test 1: Terraced Units

Figure D-13: Forrest Hill Road site, Design Test 2: Rear lane Units

Figure D-14: Forrest Hill Road site, Design Test 3: Three Storey Apartments

Figure D-15: Design test site at Seaview Shops, East Coast Road

D4. Design tests for Seaview shops intensification

In order to make assumptions about growth on the local Takapuna North road network design tests were undertaken on how intensification could be undertaken on a larger scale. This allows an investigation into the future access and urban design issues along a representative segment of road.

The site at the Seaview shops on East Coast Road was chosen and agreed with the client and consultant group as the site to take forward for the design test as the location represents an area likely to be intensified and with challenging characteristics that will provide a robust test environment.

This existing context consists of:

- Shops currently located on the southern side of East Coast Road.
- Good public transport amenity – there are four bus stops in the area that are located along East Coast Road.
- The sites slopes in a north eastern direction towards the coast, providing views of the ocean.
- Subdivided lots – the majority of lots in the area have already been subdivided. There are many ‘Sausage flats’ which can be divided into three units.
- The area is zoned Residential 4a in the current District Plan except for the local shops which are zoned Business 1.
- The area is zoned as Mixed Housing in the draft Unitary Plan except for the area in red which is zoned as a neighbourhood Centre.

One of the primary site constraints identified is the topography, this results in the follow considerations:

It is less desirable to develop north of the green dashed line (refer to **Figure 5-2**), as there are problematically steep contours beyond this point which fall towards the coast in a north eastern direction.

- The falling topography would most likely increase construction costs, and cause issues with design.
- It is not an ideal area to intensify as the steeper terrain will reduce the appeal of walking between the site and East Coast Road.

Figure D-16: Design test site at Seaview Shops showing shops and bus stops

Figure D-17: Design test site at Seaview Shops showing contours and area of steep topography north of the green line

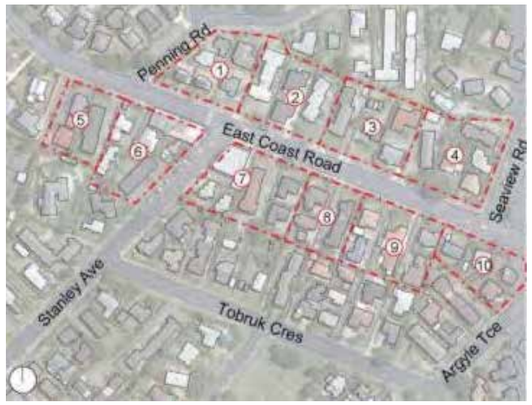


Figure D-18: Development sites identified for intensification on East Coast Road for design tests

Ten development sites were identified within this area as potential candidates for intensification. These development sites vary in terms of the amount and type of existing units, amount of accessways onto the main road, and topography. They are summarised in **Table D-3** below:

As this particular site is based around a local centre, this test has assumed that future development would be undertaken as a node. The previously established typologies were used.

- Shops may expand along East Coast Road, and some may appear on the other side of the road. This would be the ideal location for any height (i.e. apartments). Refer to red area in **Figure D-19**.
- Medium density units could be located around the apartments, due to their close proximity to shops and bus stops. Design will need to be sensitive to the surrounding lower density housing. Refer to orange areas in **Figure D-19**.
- The surrounding area would likely be subject to further passive infill. Refer to yellow area in **Figure D-19**.

This test illustrates what might happen if the ten development sites were intensified. The developments are described in **Table D-4** below.

Development site	Existing units	Existing shops	Accessways onto main road	Sloping Site?	Special features
1	6	0	2	Yes	Corner site
2	8	0	3	Yes	
3	6	0	3	Yes	
4	8	0	3	Yes	Corner site
5	5	0	2	No	
6	7	7	1	No	Corner site
7	3	3 + medical	2	No	Corner site
8	5	0	3	No	
9	6	0	5	No	
10	4	0	2	No	Corner site, thin depth

Table D-3 Table showing features of development sites for intensification on East Coast Road

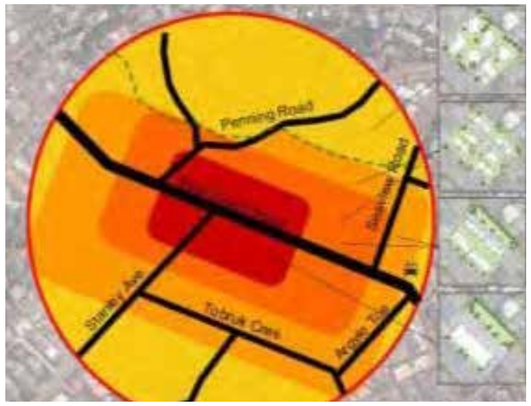


Figure D-19: Design test for future development of the Seaview shops site as a node

Figure D-20: Design test for future development of the sites identified for intensification at the Seaview shops

Dev. Site	Typology	Gain in units or shops	Accessways onto main rd	Number of storeys	Special features
1	Apartments	6 units, 5 shops	1	4	Basement Parking
2	Apartments	8 units, 7 shops	2	4	Basement Parking
3	Mixed units	4 units	3	2	Some step down
4	Rear lane	2 units	2	2	Existing units
5	Apartments	5 units	2	3	
6	Apartments	13 units	1	3	
7	Apartments	15 units, 4 shops (med centre could be int.)	1	3	
8	Apartments	7 units	2	3	
9	Mixed units	4 units	3	2	
10	Rear lane	2 units	2	2	Existing unit

Table D-4 Table showing design test results if development sites on East Coast Road were intensified in the future

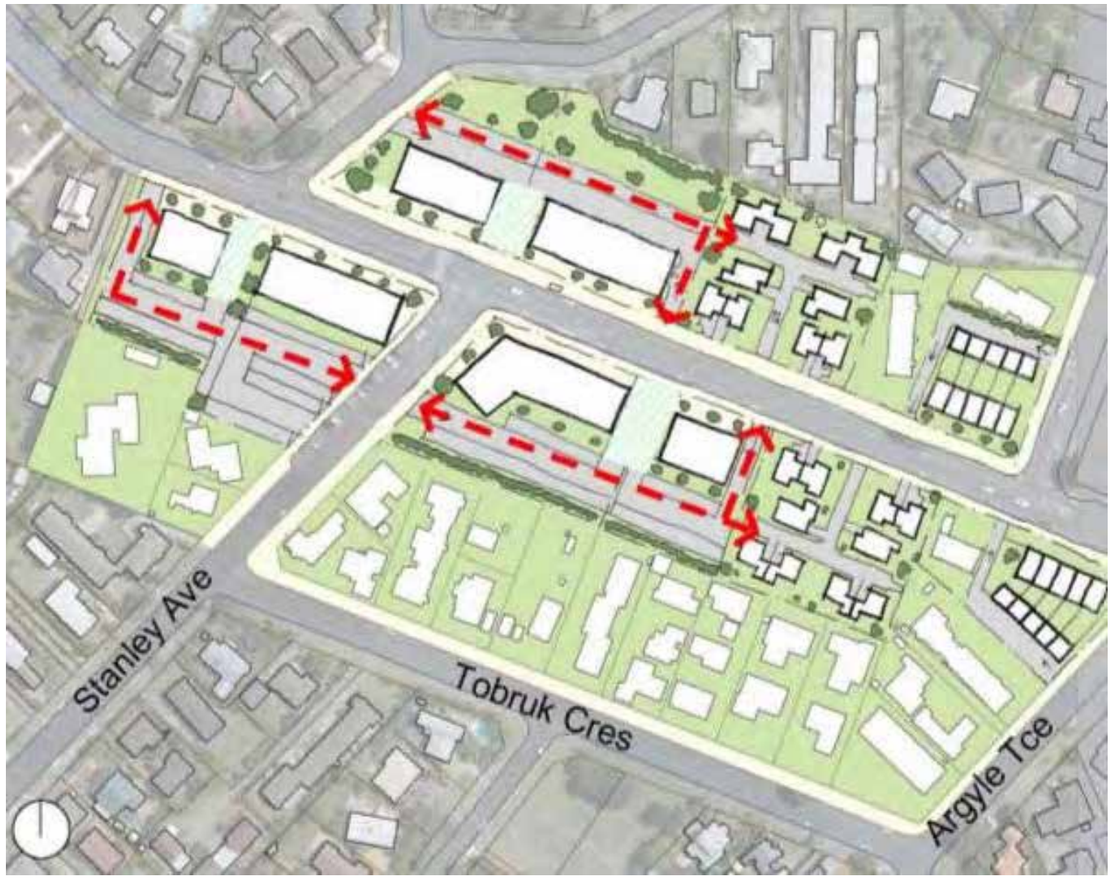


Figure D-21: Indicative design concept for intensification layout of Seaview Shops, East Coast Road

Figure D-21 is an indicative long term outcome where, once a comprehensive internal link has been established, a number of redundant crossings to East Coast Road could be removed and set aside as either additional development sites or some form of open space. Achieving such a comprehensive movement network is a very desirable goal of intensification but due to the incremental site by site basis that intensification will likely take a strategic view would need to be taken in respect of:

- Requiring people to overdesign vehicle access-ways so as to be able to accommodate future traffic from other sites;
- Obtaining suitable right of ways over carriageways so as to enable a long term connection to emerge (if possible); and
- The removal of 'transitional' vehicle access from individual sites when over time a comprehensive alternative forms.

D5. Design test findings

The provisional design tests for the two sites found each typology had different urban design impacts and access requirements. The overall findings for each typology were:

Additional Units.

This is a simple option for intensification as it involves adding one additional unit to a rear yard of an existing unit. This provides a gain of an extra unit without requiring the existing units to be demolished. The new unit can share an existing driveway, negating the need for additional vehicle crossing points. This type of intensification is common practice in this area, however most lots do not have space available for this option.

Terraced Units (front loaded)

This option would require the existing units to be demolished in order to build new units. The gain in units is relatively small, in the design test one or two additional units were gained. This form of intensification is likely to only provide a real gain on sites that are vacant or occupied only to a low density. A significant increase in the number of individual driveways would be needed to provide access, as each dwelling may require its own access, however these could be reduced if two units shared a driveway. In any event the order of 50% or more of the street frontage (in the best case scenario) would be given over to driveways and numerous manoeuvring areas, to the detriment of pedestrian amenity and pedestrian safety. In the most compact terraced housing designs, the entire footpath would essentially become one continuous driveway. The design tests show that terraced units can be designed to step down and integrate with the slope, appearing to be one storey from the street, and as such reducing the conspicuity of change in sensitive receiving environments.

In the preliminary design process front access via a service lane was also tested. This approach was not workable for small, incremental intensification and should only be pursued as part of comprehensive subdivision design. The operational need for ingress and egress tapers reduces pedestrian amenity and safety. Adjusting to require 90o vehicle manoeuvres into and out of sites serves to push development further back from streets, and slope can have the effect of burying development. Most problematically, it led to a series of slip lanes with ingress/egress adjacent to one another. Due to slope, excavation and setback factors, these could not always be assuredly set at a level that would allow future connections between them to be made.

Rear Lane units

Rear lane units will require the existing units to be demolished in order to build new units. There will be a higher gain of units than terraced units however this will not be a great number, the design tests found a gain of two or three. The design tests show a one-way rear lane that requires two access points onto the road. This could be reduced to one access point if it was two-way. Where the topography is sloped the garages of these units can be set below the unit, therefore they would appear to be two storeys from the street. However, rear lane units are uncommon in the area.

This typology offered superior urban design benefits depending on the long term frequency of in and out points required between sites and the ability to connect adjoining sites together over time. However it would not lend itself to internal access and connected garaging. This is not a fatal drawback, but has been seen as a preference of the New Zealand housing market when it can be made possible.

Mixed Units

In order to develop mixed units, all existing units will need to be demolished. This option would provide a higher gain in units; the design test for East Coast Road gained five new units of different design, size, and height. The design test shows two shared driveways and one shared lane that require access onto the road. As with the terraced units, some units can be designed to step down to deal with a slope and the front units would appear to be one storey high from the street. These mixed units would easily fit in with the existing character of the area, as the massing is similar to properties in the area, and are essentially a "super-sized" version of the existing infill. The risk with this approach would be a developer that undertook the model but used only one basic typology repeated several times. That, where it has occurred to date, is often seen as negative to locals.

Apartments

The existing units will need to be demolished in order to build apartments however these will provide the highest gain in unit numbers with the design tests showing 20-32 apartments. While the unit yield is highest, the construction complications of a solid apartment building would also be the greatest. Ground floor retail or additional upper floors could be added depending on location and car parking solutions. The design test options show a one way rear lane that requires two access points onto the road. This could be reduced to one access point if it was two-way. In order to construct this typology on a slope land would be excavated for basement car parking. In this scenario, a four storey apartment building would appear to be three storeys high from the street. A common open space is provided in the design tests that also act as a buffer between the apartment building and neighbouring buildings. However, the large footprint and bulk massing of this building does not sit easily the existing character of the area.

Typologies for Seaview shops

When considering the typologies for intensified development in a location such as the Seaview shops the design tests found that due to the current density of the site, which was indicative of the area as whole, terraced units do not seem a feasible option. In most cases the net gain would be around one unit if seven terraced units were developed over three 'parent' titles. The apartment and mixed housing typologies were the most realistic options here. This implies that terraced housing, while attractive in a theoretical density gradient from detached units to apartments, may have more of a role to play in green field medium density situations.

Overall, the mixed housing model offers an effective and surprising balance of familiarity (existing character and market preferences) and yield. Critically, the slope of the land allowing for outlook and open spaces is essential to this solution being workable. Without the slope, the proximity and internal cramp between buildings would put solutions offering more comprehensive pools of open space (terraces or apartments) back into focus.

It is noted that in the case of a general intensification corridor, the case study could be simply stretched' to take in additional sites. The Seaview shops case study however differs markedly from more significant rows of apartment tower blocks marching along major passenger transport corridors and may be a more realistic impression of corridor growth for the next fifteen to twenty years.

Figure D-22: Slip lanes at the front of a site and at a lower level to the road create a hostile pedestrian environment

18.3.2 Access requirements onto main road

As outlined above all the typologies tested have different access requirements. The urban design tests found that the best outcome to achieve pedestrian safety, street amenity, and traffic efficiency, is to maintain existing driveways or to develop comprehensive ingress and egress points within a development with some rear lane access provided.

Intensification outcomes that significantly increase the proportion of site frontage given to vehicle crossings and vehicle predominance should be avoided. Specifically, and having regard to the related issues of cumulative frequency and the individual width of vehicle crossings, Auckland Transport should investigate and identify its long term preferences for its key arterial corridors. As a guide, the following could be a starting point of pedestrian amenity and safety thresholds on key arterials:

- No more than 34% (one third) of any street frontage and footpath length should be occupied by driveways, on average (note – this is the street frontage, not a proportion of building façade)
- No more than one driveway per ten metres of street frontage, on average
- The existing number and cumulative width of vehicle crossings on already-developed arterials (i.e. not new green field arterials) should be a ceiling that is not exceeded as a consequence of intensification
- All new access ways to serve developments should be required to comply with a minimum design standard equivalent to a public lane, to aloe future loading from adjacent sites to be accommodated
- Vehicle crossings and access to key arterials should be granted on a transitional basis, with ongoing review provisions or lapse periods, to allow Auckland Transport to remove redundant crossings in the long term when comprehensive internal access between sites is established
- Require all new vehicle crossings to be accompanied by appropriate legal protections for non-resident traffic, to safeguard the creation of future internal lanes.

In addition, Auckland Transport could investigate service thresholds for individual driveways (i.e. the number of units or vehicles that can be served by a single crossing without creating the potential for travel lane blockages, in the event that flush medians are not present or not permanently guaranteed.

Terraced housing with front access requires the most accessways and therefore cannot be supported from an urban design perspective. In addition, slip lanes to provide access at the front of the lots are not serviceable as they create a hostile environment for pedestrians, particularly where the contours result in a level difference between the footpath and the access lane which is common in this area due to the topography.

Overall, the apartments, mixed housing and rear lane units generally require fewer accessways onto the main road than existed previously. It was found that the access lanes of these typologies are set back a similar distance (30-35m). This would allow the access lanes to be amalgamated across sites if comprehensive developments are untaken, which would reduce or simplify the amount of accessways onto the main road. Auckland Transport should as a matter of some priority further investigate mechanisms that would allow the long term and incremental development of internal movement routes associated with key corridor intensification.

A strategic approach to this access issue could be provided for in the Unitary Plan to help avoid the cumulative effect of many little developments undertaking higher density housing and increasing crossing points, on an ad hoc basis. One means of addressing this is to place a restriction on higher density developments being undertaken on one or two adjacent sites, requiring a minimum of three sites to undertake intensive development. This would allow the sites to be designed in a manner that reduces the vehicle access. This would of course make it more expensive and otherwise harder to obtain a site and then undertake intensification.

Alternatively or in conjunction with this approach, it is recommended that a management option is considered for parts of the corridor. This would provide for Strategic Development Areas, or areas subject to a mini-structure plan or concept plan, whereby the Council could place site specific designations or development requirements over certain areas intended for intensified development. This would allow developments to be undertaken while ensuring that the accumulated effects of multiple developments are planned for and well integrated. Alongside this, land for a rear lane would be required to be kept aside to provide for access once future adjunct developments are undertaken. This would allow for access to be provided in different stages over an established period, for example 15 years.

Intensification along the corridor

The design test shows that intensification can occur within a node, such as the Seaview shops, at a higher density, including typologies such as apartments. Medium density development can stretch out from the node due to the close proximity to the shops and bus stops with passive infill occurring at a greater distance from the corridor.

The tests show much of the development in the Takapuna North area will be impacted by topography. The design test illustrates that locating developments on a ridge line, such as the site on East Coast Road, provides both benefits and constraints. The topography offers the opportunity for dwellings to sit higher, allowing for good outlook and with dwellings looking over the top of neighbours, which increases a sense of space and privacy. However, the slope can complicate development in regards to earthworks and parking, and can impact on solar access for neighbours.

Intensification will have significant impact on the corridors and will raise a number of questions for the future management of the corridor:

- Does traffic need to be slowed down?
- Will additional pedestrian crossings be needed and where will pedestrian crossings be located?
- How will increased access points have an effect on pedestrian and vehicle traffic flow, and the allocation of road space (perpetual flush medians to accommodate turning movements)?
- Will access lanes be required?

Overall, these design tests show that it is critical to work through the assumptions about the local network systematically in order to be realistic about the impacts of future intensified development and ensure that the potentially significant adverse effects of the Council's intended intensification scenario are accounted for.

D6. Milford town centre

Town centres will be a focus of growth and change as they are intended to accommodate significant growth and higher numbers of people. As such, Milford town centre has been identified as an area of focus of the study. While Takapuna town centre is also important, as this CMP includes Killarney Street, Takapuna town centre proper will be reviewed under a separate study.

Milford town centre has been assessed in regards to urban design issues with a focus on pedestrian safety and amenity in the main street. The following outlines the issues considered

Vehicle traffic

Vehicle traffic has been identified as impacting on pedestrian amenity on Kitchener Road. While improving bus services is a priority, an assessment shows that the width of Kitchener Road cannot support bus lanes, and that any additional travel lanes would significantly reduce pedestrian amenity. Therefore it is recommended that buses are retained within current lanes and are given priority during traffic light sequencing at either end of the main street. Bypassing the main street by directing buses around the back of Milford (Omana / Milford Roads is not seen as appropriate largely due to the configuration of intersections and the peak vehicular saturation of these streets.

The retention of on-street car parking is essential. It is likely that at least some of the existing car parks in Milford will be lost as a consequence of redevelopment. On-street car parking also helps to buffer pedestrians from traffic in travel lanes, enable opportunities for spontaneous exchange important in street-based retail configurations and create disruptions in the traffic flow that in turn facilitate informal crossing opportunities for pedestrians. Milford's on-street parking should be seen as an essential element of the street.

The assessment also found that promoting slower vehicle speed on Kitchener Road would be beneficial to pedestrian amenity. The assessment found that this could be encouraged through reducing the posted speed limit to a maximum of 40km/h and a preferable 30km/h. Narrowing the carriageway would help reinforce the desired speed environment. This could be achieved by removing the flush median, which is in turn dependent on removing certain right turn vehicle movements from the main street. A reduced speed limit will also allow cyclists to safely and confidently share the carriageway with vehicles. As there is insufficient road space to form dedicated cycle lanes without removing either on street car parking or footpath width (or the flush median), this is seen as the optimal overall outcome. Cycle lanes are also less desirable in a busy main street as pedestrian vs. cyclist impacts can be promoted (especially if there is a lane of parked cars blocking visibility).

Milford Town Centre – Existing Carpark Access

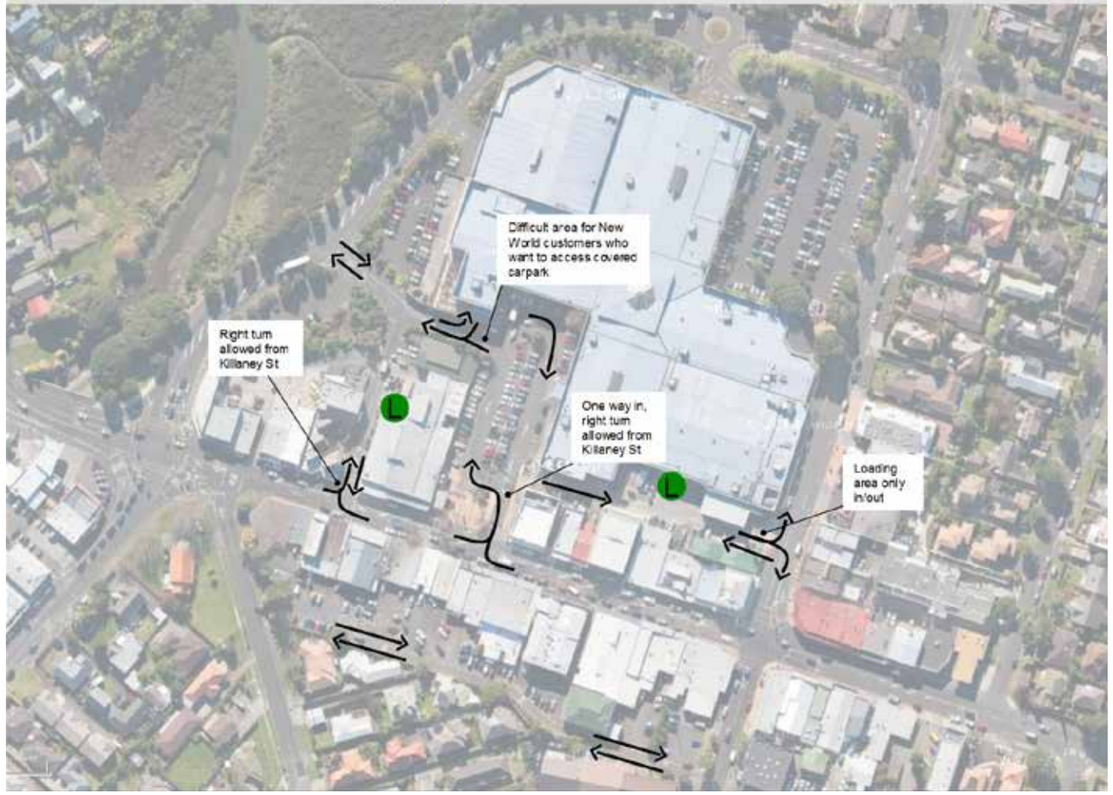


Figure D-23: Milford Town Centre, existing mall car park access

Footpath width and crossing

Kitchener Road is oriented east-west which is not ideal for pedestrian amenity as it results in significant shadow on one side of street for the majority of the day. It is assumed that following the implementation of the draft Unitary Plan it is likely there will be very little sun on the street. However, the street currently has a relatively high amenity with good footpaths, canopies, active edges, parallel parking, and street trees.

When considering what could be done to further enhance the pedestrian environment, it was found that a wider footpath, particularly on the southern side which is sunnier, would provide space for cafes to have seats on the footpath without impeding pedestrian movement. In addition, the pedestrian crossing on Kitchener Road was identified as a feature that results in a more complicated layout. The location of the existing crossing reduces legibility and efficiency as it does not align with the square on the north side. The flush median also creates safety issues for pedestrians.

In order to widen the footpath an assessment of the road reserve was undertaken. The flush median and turning bays were identified features that could be removed in order to provide the additional footpath width. To remove the right turns would necessitate a review of the service lanes (especially the northern one supporting the public car park).

Milford Town Centre Design Tests

Design tests were undertaken to assess whether the flush median could be removed and the location of the crossing modified. The process used the following method:

- Design options were developed for removing the flush median from Kitchener Road.
- Options were assessed on impacts to pedestrian amenity and vehicle access to the mall car parking area and service lane as the flush median is currently required to facilitate the right turning provision into the car parking area.
- Options for car park and service lane access were developed.

Milford Town Centre – Proposed Carpark Access

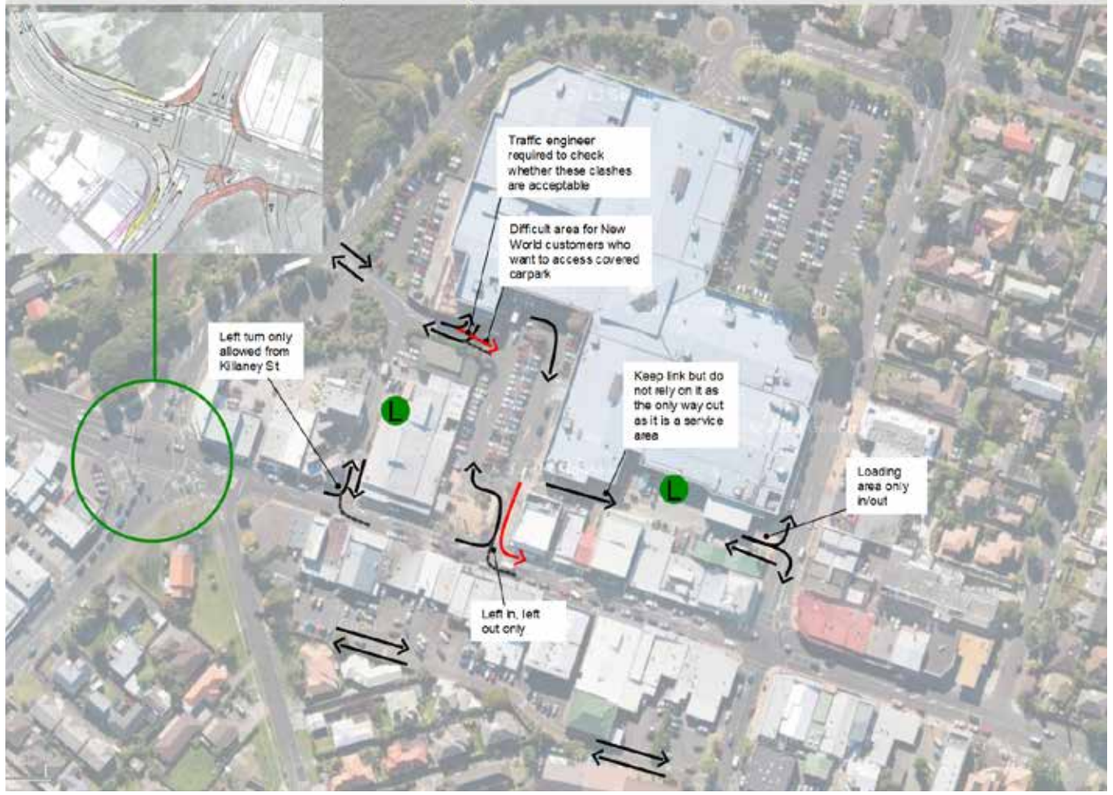


Figure D-24: Milford Town Centre, proposed mall car park access

Design tests for removing flush median on Kitchener Road

Option one for removing the flush median provides for least change to other features, with the planted median retained and extended slightly and the pedestrian crossing retaining its current location. The footpath is extended on the south side of the street with parking and the westbound lane moving to fill the space left by the median. This narrows width of the carriageway. The second option removes the planted median and the pedestrian crossing is relocated to provide a direct link to the square. More space is provided for on-street parking on Kitchener Road under this option.

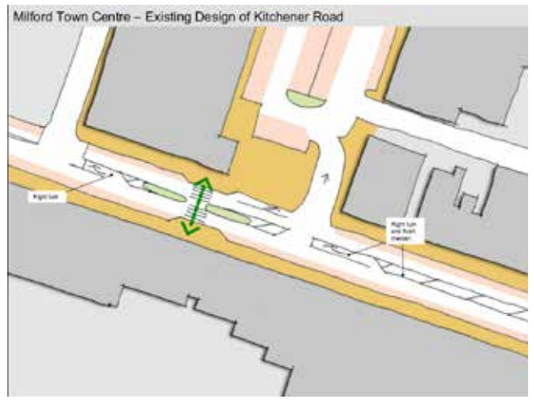


Figure D-25: Existing design of Kitchener Road with flush median

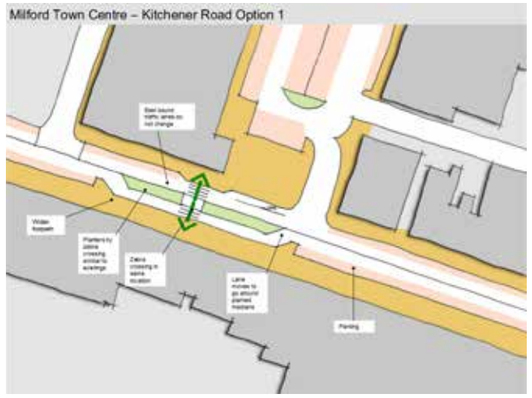


Figure D-26: Option 1 to remove flush median

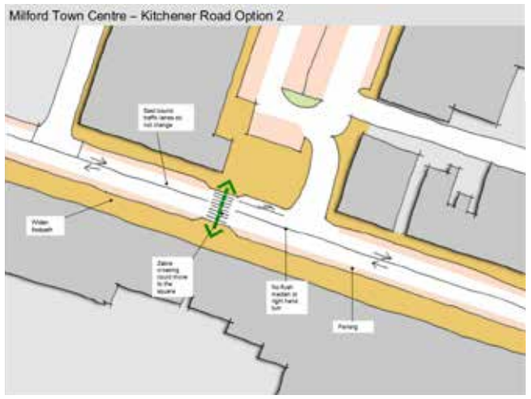


Figure D-27: Option 2 to remove flush median and relocate pedestrian crossing

18.3.3 Design tests for car park access

The design tests identified that removing the right turn ingress into the car parking area, that is currently enabled through the flush median, would require changes to access the service lane and provide for circulation of the parking area that gain access from Kitchener Road.

The first option for car park access removes the right turn ingress while maintaining two-way access with turning becoming just left entry and left exit onto Kitchener Road. The second option is one-way ingress allowing only left turn access into the car parking area from Kitchener Road.

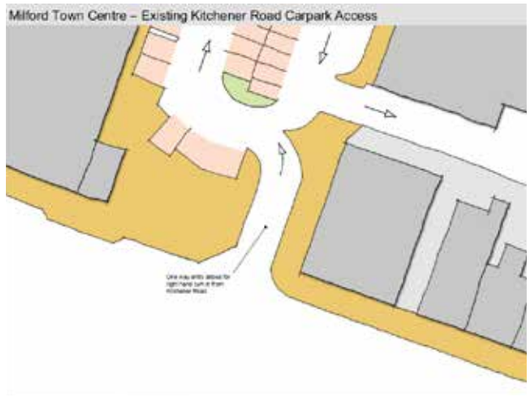


Figure D-28: Milford Town Centre, existing mall car park access

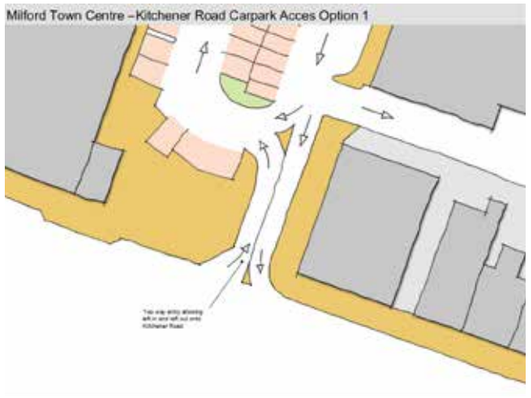


Figure D-29: Milford Town Centre, mall car park access: Option 1

18.3.4 Design test findings

The tests indicate that there is no simple solution to provide any enhancement of the existing main street in terms of the allocation of space or location of key elements.

While pedestrian amenity would be improved by removing the flush median and widening the footpath, narrowing the carriageway, and allowing the relocation of the pedestrian crossing, the removal of the right turn will have a significant impact on vehicle access to the car parking area. While the design tests show vehicle access can be accommodated through ingress and egress layout changes, loading and serving the supermarket, which requires access for large delivery trucks, is a more complex problem.

Removing the right turn may be problematic for trucks, as turning bays are narrow and using right turns allows trucks to use both lanes as they turn. However this could be addressed by trucks using the Omana Road access. Trucks could enter the site by turning right (this would require reversing the service lane direction) and then exit right when turning out of the service lane, leaving trucks facing westbound towards Shakespeare Road. This test shows that this option is possible however it is understood that with other factors to consider this change may be too difficult to implement, therefore the design tests results in this regard are indeterminate.

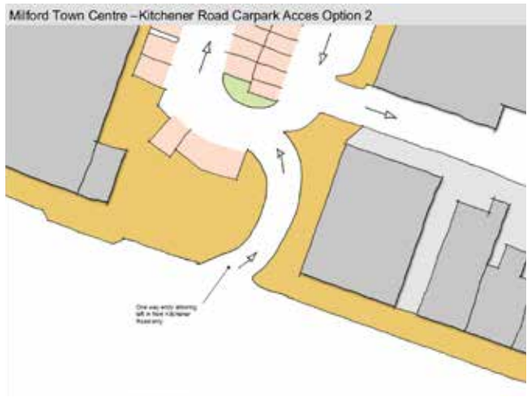
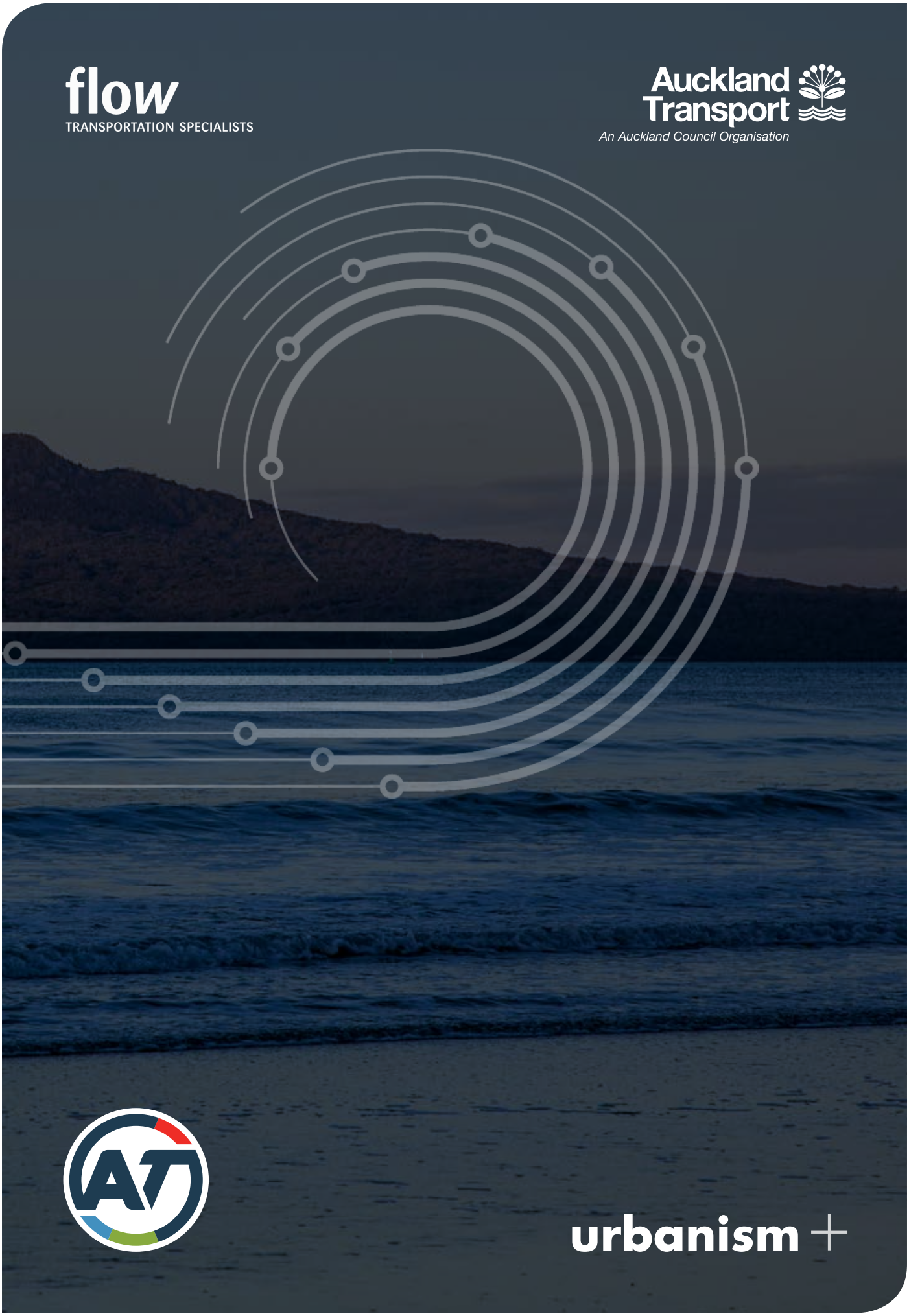


Figure D-30: Milford Town Centre, mall car park access: Option 2

Appendix E: Comment Tracker

E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