flow
TRANSPORTATION SPECIALISTS

TRANSPORT PLANNING
SOLUTIONS Ltd.

urbanism +

Sills van Bohemen

Takapuna Centre

Centre Based Transport Study

June 2014

flow TRANSPORTATION SPECIALISTS

TRANSPORT PLANNING SOLUTIONS Ltd. urbanism + Sills van Bohemen

Project: Takapuna Centre

Title: Centre Based Transport Study

Document Reference: S:\ATSP Auckland Strategy and Policy\015 - Takapuna CBTS\Documents\final report\R3H140627.docx

Prepared by: Project Team

Reviewed by: Ian Clark

Revisions:

Date	Status	Reference	Approved by	Initials
23 September 2013	A	R3B130923	Ian Clark	
11 October 2013	B	R3E131011	Bronwyn Coomer-Smit	
21 March 2014	C	R3F140321	Ian Clark	
11 June 2014	D	R3G140611	Ian Clark	
27 June 2014	E	R3H140627	Ian Clark	

EXECUTIVE SUMMARY

Takapuna is identified as a Metropolitan Centre within the *Auckland Plan*, and substantial residential and employment growth is anticipated. Takapuna is also noted in the *Auckland Plan* as a priority centre for investigation. This Takapuna Centre Based Transport Study presupposes that the land use aspirations of the *Auckland Plan* will take place and this report sets out how investment in transport should take place, in response to, and to enable, the expected land use changes.

A significant change will be necessary in how the transport network to and through Takapuna is managed, if Auckland Council's objectives for Takapuna as a high amenity, liveable and thriving Centre are to be achieved. There is very limited opportunity for continued emphasis on private vehicle-based transport solutions. Therefore, significant emphasis on walking, cycling and the use of public transport, including connecting with the rapid transit network at the Akoranga Busway station, should lead future transport investments.

Overall Direction

This Study recommends the following overall directions:

- Greater emphasis must be given to public transport to enable Takapuna to meet its strategic objectives as a successful, dynamic Metropolitan Centre
- Greater emphasis must be given to the *'streetscape'* of streets within the Takapuna Centre, to improve the character and *'liveability'* of the centre. Streets and other public spaces need to give greater priority to pedestrians and cyclists so that Takapuna becomes a more attractive place to live, work, and spend time in
- Parking management is required with an element of parking restraint to be introduced over time, sufficient to discourage some commuters from driving to work, but flexible enough to continue to attract shoppers, visitors and essential business trips
- Road capacity should generally be retained on the main routes to and from Takapuna, to provide a satisfactory level of service for most of the day, accepting that congestion can be expected in the peak periods
- Changes should be undertaken to general traffic operations within Takapuna. These include treatment of certain key intersections to encourage traffic to pass around the Takapuna Centre and to reduce the traffic speed environment within the central core.

The Study has identified three 'transformational projects' (or groups of projects) that are seen as pivotal to the successful revitalisation and growth of the Takapuna Centre over the next 20 to 30 years:

- **A 30 kph "walkability" zone, and upgrade of street amenity within the central core of Takapuna**. A series of projects is proposed which cumulatively seeks to reduce the speed environment and enhance the streetscape of central Takapuna, particularly for the benefit of pedestrians and cyclists

- **A Link or Links across the Upper Shoal Bay.** A facility for pedestrians and cyclists should be provided in the short term, while a public transport connection is recommended in the medium to longer term, to establish a proper connection between Takapuna and Auckland's rapid transit network and to improve bus reliability. This is also seen as pivotal to the successful regeneration of the Barry's Point Road precinct
- **A new (relocated) bus station in central Takapuna, in the longer term.** This would open up the Lake Road area for growth of 'main street' retailing over time, as well as help make bus movements easier into and out of the Centre.

Changes in people's travel behaviour will not happen overnight and rapid mode change should not necessarily be expected. Parking restraint, on its own, would reduce the accessibility of the Takapuna Centre and suitable investment in other transport modes will be required in order to retain accessibility. This may be difficult to achieve in the short to medium term, but the level of mode change suggested in this Study should be achievable in the longer term if suitable investment is made in public transport and active travel improvements, in conjunction with suitable parking restraint.

Public Transport

The key issues relating to public transport are as follows:

- A substantial increase in the use of public transport is essential if Takapuna is to achieve its growth potential in a location with limited ability to cater for increased vehicular traffic flows. While an increase in public transport mode share from 12% to 14% is predicted by 2041[1], this is not considered adequate for a Metropolitan Centre
- Takapuna is approximately 1.5 km from the Northern Busway's Akoranga Station and is the only Metropolitan Centre in Auckland which is not directly served by the rapid transit network. It is essential that bus travel between central Takapuna and the Busway should be on a route which provides reliability and consistent travel times and isolates buses from congestion as far as practicable. Linking Takapuna to the rapid transit network is therefore of high strategic importance and is a focus of this Study
- The *Regional Public Transport Plan's* 2016 bus network includes a number of high frequency bus routes serving Takapuna. Most of the routes which previously terminated in Takapuna will instead terminate at the Akoranga Station. This will enable more efficient use to be made of bus stop space at the Takapuna bus station and will reduce bus lay-up requirements
- By 2041, bus numbers can reasonably be expected to double from those proposed in the 2016 *Regional Public Transport Plan*
- The existing on street Takapuna Bus Station is conveniently located in the centre of Takapuna in terms of pedestrian access. However, there are tensions around the need for public transport to serve the centre and the desire for speciality retail and very high quality main street to grow around the perimeter of the triangle formed by Hurstmere Road, Lake Road and Anzac Street. This issue is explored in more detail in the main body of the report

[1] This increase in the mode share is based on the Auckland Regional Transport model, for a scenario without the additional transport investment proposed by this study

- There are also concerns regarding bus trip reliability in the future, in terms of getting buses into and out from the current bus stop location when key roads will likely face periods of vehicular congestion.

The proposed transport package is forecast to increase public transport mode share from the 14% figure noted above to 20% by 2041. This may seem like a modest increase, but with the greater level of development in the centre it equates with a tripling of public transport trips to/from Takapuna, between 2011 and 2041.

Key recommendations for public transport encompass both the bus route between central Takapuna and the Akoranga Station, and the location of the Takapuna Bus Station. They include:

- Improvements to the environment around the current bus station in Lake Road, in the short term
- Measures which would enable Anzac Street to provide an adequate route for buses over the medium term
- The provision of a more direct bus link across Upper Shoal Bay in the longer term. This link would enable buses to avoid expected future congestion on Anzac Street and offer assurance of bus reliability that will not be possible along Anzac Street in the longer term. It would also offer improved trip times between Takapuna and the Busway, as well as help open up the Barry's Point Road and (further to the west) Akoranga Drive precincts
- The construction of a new, centrally located Takapuna bus station, in the long term, to support both the changes in bus circulation which result from the proposed public transport connection across the Upper Shoal Bay, and urban design improvements at the northern end of Lake Road to support planned mixed use intensification of Takapuna's central area.

Active Transport

The projected demand for active trips is high within and surrounding Metropolitan Centres and active mode share is forecast to increase in Takapuna from 5% to 16% by 2041[2]. For this mode share to be met, routes must offer a combination of convenience, safety, comfort and interest. Takapuna is particularly well suited to accommodate significant increases in journeys by foot or cycle, and recommendations for active transport include:

- Further development of the cycle network to, from and within Takapuna, to support existing cyclists and to encourage more people to cycle for transport and leisure
- A new cycle and pedestrian pathway from central Takapuna across Upper Shoal Bay to Akoranga Station to provide better connections between the Takapuna Centre and the Northern Busway
- Further development of the pedestrian network, especially to access public transport and to access key destinations within Takapuna. Giving pedestrians greater priority and convenience in Takapuna's central area is necessary, in terms of the vehicular speed environment, provision of facilities, and opportunities to readily cross key roads
- Signalisation of many of the intersections which will assist pedestrians to cross busy roads.

[2] As per footnote 1, this prediction has been derived from the Auckland Regional Transport model

Improved Walkability and Streetscape

The future of Takapuna will need to include ongoing improvements and uplift in street quality throughout the central area. This is needed to support the *Auckland Plan*'s Metropolitan Centre strategy for higher densities.

The *Takapuna Centre Walkability Assessment,* undertaken as part of this Study, identifies a range of measures to improve walkability across 'hotspots' and it proposes a full list of recommended upgrades, including high, medium and low priority projects. The Study's methodology was geared around identifying priorities based on overall potential to improve walkability in the Centre. It gives emphasis to projects on key roads that currently offer lower standards of amenity rather than on the existing heavily invested Hurstmere Road main street.

Recommendations for improved walkability and streetscape improvements include:

- Greater emphasis given to the streetscape within the central area of Takapuna including reducing the vehicular speed environment
- A number of proposed improvements to Takapuna's streets including crossing facilities, pedestrian amenity and improved signal phasing
- A stronger connection between Upper Shoal Bay, Lake Pupuke and Takapuna Beach
- General recommendations for every street in the study area.

Parking Management

This report concludes that ongoing parking management will be required and that an element of parking restraint should be introduced over time. As part of the Study, a *Comprehensive Parking Management Plan* (CPMP) was developed to support the forecast growth for Takapuna. The CPMP identifies interventions to manage parking supply and demand. It concludes that Takapuna currently has an adequate supply of short stay parking to meet the next ten years' demand, but that the public sector should look to provide additional off-street short stay parking to accompany future development beyond that period. Additional short stay parking would also be required to replace on-street parking lost on implementing the proposed improvements to streets in central Takapuna. Altogether up to 700 short stay spaces may be required over the next 30 years.

The CPMP concludes that the supply of public long stay/commuter parking is approximately in balance with demand. As Takapuna's economy is currently considered to be relatively 'fragile', it is recommended that public long stay parking removed through the implementation of the proposed improvements to central Takapuna streets and through future development of the Waterfront be replaced over the short to medium term. Such replacement parking should, however, be converted to short stay over time in phase with increased use of alternatives to the single occupant car for travel to work. Recommendations for parking include:

- Parking charges, numbers and location should discourage some commuters from driving to work in Takapuna, but should be flexible enough to continue to attract shoppers, visitors and essential business trips

- There is no requirement for additional short stay/visitor parking for ten years to accommodate the rate of development projected to occur over this period. The street network changes proposed in the Takapuna CBTS would, however, result in the loss of approximately 160 short stay spaces which should be replaced. Between years 11 and 30, an estimated total of up to 580 short stay spaces are required to support projected development in central Takapuna
- At the appropriate time, parking within the central area[3] should be dedicated to short stay parking, or priced to encourage short stay parking
- Initially, long stay parking lost as a result of the implementation of the street network changes proposed by this study and, potentially, the redevelopment of the waterfront, should be replaced. The number of spaces involved could range from approximately 75 to 250 spaces, depending on the nature of the waterfront redevelopment. Over time, these replacement long stay spaces should be converted to short stay as the single occupant vehicle mode share reduces
- Developers should be encouraged to provide substantially less than the maximum parking permitted by the Proposed Auckland Unitary Plan, by providing some certainty that public parking will be provided at an appropriate location and time
- Assuming the proposed Gasometer site parking facility goes ahead, it may provide 600 additional public parking spaces in Takapuna in the relatively near future. To reduce the potential impact of such a large increase in parking availability, it is strongly recommended that the opening of the facility be accompanied by measures to reduce long stay parking elsewhere in Takapuna including the dedication of all on-street parking within the central area to short stay[4]. The ability to progressively convert all public Gasometer site parking to short stay parking over time should be ensured
- If the Gasometer site parking facility does not go ahead, it will be necessary to find an alternative site or sites capable of eventually accommodating around 700 parking spaces. The parking facility should cater for short stay parking needs and, initially, long stay parking displaced from central Takapuna locations. Depending on the timing and nature of land use development within central Takapuna, it may not be required within the next 5 years. The facility (or facilities) should be located within the central area, if feasible.

Road Capacity

This report outlines various proposals to change operations for general traffic within Takapuna. A key issue for traffic operations relates to the predicted effects of reallocating an eastbound traffic lane along Anzac Street to bus use, in the short to medium term. Despite the predicted increases in public transport and active travel, the number of car trips is predicted to increase. This highlights the importance of maintaining vehicle capacity on the main routes to/from Takapuna, whilst still catering for growing public transport and active mode users.

[3] The area in question is shown in Figure 14

[4] The various changes to parking proposed are set out in Section 4.3 of the report

Recommendations for road capacity include:

- Generally retaining road capacity on the main routes to and from Takapuna to provide a satisfactory level of service for most of the day
- Acceptance that congestion can be expected in the peak periods, particularly during the morning peak period, due to severe queuing along Esmonde Road on the approaches to the Northern Motorway interchange
- Outlining recommended proposals to change operations for general traffic within Takapuna. This is to include treatment of certain key intersections, to encourage through traffic to pass around rather than through central Takapuna, and by reducing the traffic speed environment within the central core.

The Integrated Transport Plan for Takapuna

The following figure provides a summary of the projects recommended for Takapuna. This figure is followed by a table which sets out the nature of each proposal, its relationship to other projects, and the actions that will need to be implemented in the short, medium and long term, defined as 0-5 years, 5-10 years and over 10 years, respectively. The table divides projects primarily by geographical location.

The following table relates primarily to the delivery of projects. There are also a number of actions that are required in the short term, some of which are required to facilitate the delivery of longer term projects, namely:

- Liaise with the Auckland Council Unitary Plan team on the proposed Retail Frontage Control and the long term parking standards proposed by the Study for Takapuna
- Review progress regarding the implementation of the projects outside this Study, for example those recommended by the *Takapuna North Corridor Management Plan*
- Progress the planning of the various medium term streetscape projects that are cumulatively designed to provide the slow speed zone within the Takapuna Centre. This will need to include a consideration of the future overdimension routes through Takapuna.

Figure ES 1: Integrated Transport Plan for Takapuna

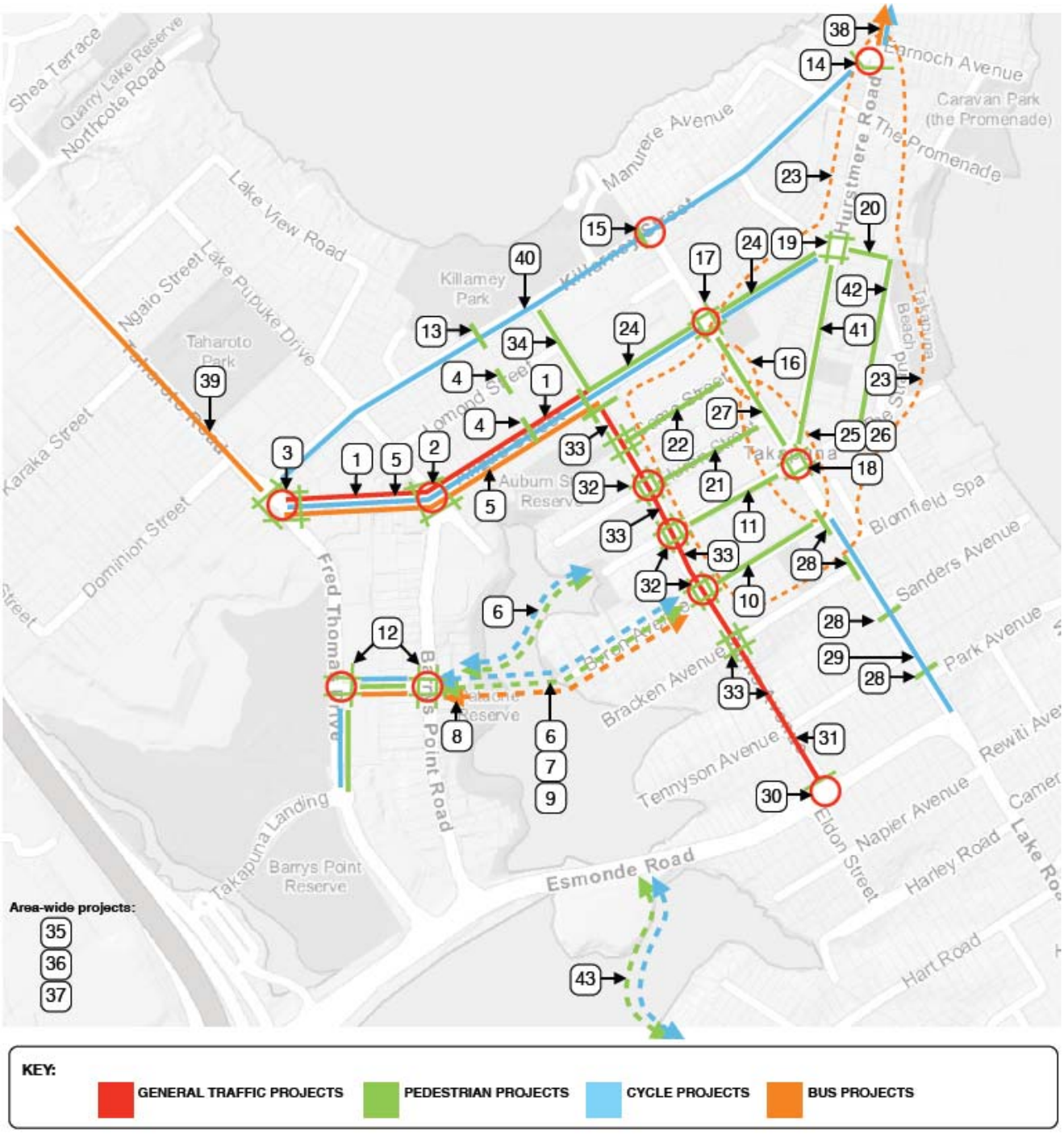


Table ES1: Project Implementation

	Project	Modes[5]	Nature of Proposal	Discussion/trigger points	Owner	Cost	Short Term[6]	Med Term	Long Term
Package 1: Anzac Street									
1	Anzac Street Widening	GT, PT, W/C	Widening of street, within designation, to provide bus lanes	Current pedestrian/cycle environment is poor, but timing of the project is likely to be dictated more by delays being incurred by buses	AT	$12m[7]	I, D&C		
2	Anzac/Barry's Point intersection upgrade	GT, PT	Part of above project, to provide sufficient traffic capacity, and to improve bus reliability		AT	See above	I & D	C	
3	Anzac/Fred Thomas intersection upgrade	GT, PT	Part of above project, to provide sufficient traffic capacity and to improve bus reliability	Needs to consider capacity for traffic from Killarney Street, to support getting traffic around Takapuna	AT	See above	I & D	C	
4	Anzac Street pedestrian crossing	W/C	Midblock crossing between Barry's Point Road and Auburn Street, as part of proposed connection between Auburn Reserve and Killarney Park	Proposed through Anzac West Plan Change. Should be delivered as part of Anzac Street project	AT	See above	I, D&C		
5	Anzac Street streetscape (west of Auburn Street)	W/C	Removal of bus lane, to provide greater pedestrian/cycle facilities and to enhance streetscape	Can only be implemented following provision of Upper Shoal Bay public transport link, and removal of buses from Anzac Street		$1.1m		I & D	C

[5] Key: GT = general traffic, PT = public transport, W/C = walking and cycling
[6] Key: I = investigation, D = design, C = construction
[7] Existing LTP project

	Project	Modes[5]	Nature of Proposal	Discussion/trigger points	Owner	Cost	Short Term[6]	Med Term	Long Term
Package 2: Upper Shoal Bay									
6	Upper Shoal Bay pedestrian/cycle Link	W/C	Boardwalk connecting Barry's Point Road with either Byron Avenue or Northcroft Street	To improve connectivity between Takapuna and Barry's Point Peninsula	AT	$3.5m	I, D&C		
7	Identify preferred option for Upper Shoal Bay bus Link	PT	Consider options for the Upper Shoal Bay bus link identified in this study in more detail, and identify a preferred option	Proposal to provide connection between Takapuna and rapid transit network. Designation to be progressed immediately	AT	$250k	I		C
8	Protection of land for Upper Shoal Bay bus Link	PT	Design and designate land needed to deliver Upper Shoal Bay bus link (including connection to Barry's Point Road)	As above	AT	$250k	I&D		
9	Provision of Upper Shoal Bay bus Link	PT	Implement Upper Shoal Bay bus link, including extension of cycleway and bus priorities along Des Swann Drive	As above	AT	$18m			C
10	Byron Avenue streetscape	PT, W/C	Streetscape project in short term. Potential PT component, depending on Upper Shoal Bay Link	Could be connected to Upper Shoal Bay Link, depending on alignment of Link	AT	$2.4m	I, D&C		
11	Northcroft Street streetscape	PT, W/C	Streetscape project in short term. Potential PT component, depending on Upper Shoal Bay Link	Could be connected to Upper Shoal Bay Link, depending on alignment of Link	AT	$2.4m	I, D&C		
12	Des Swann and Fred Thomas Drive intersections	PT, W/C	Will provide onward connections from Upper Shoal Bay link	Improved pedestrian connections across Barry's Point Road and Fred Thomas Drive required, irrespective of Upper Shoal Bay Link	AT	$0.25m	I & D	C	
Package 3: Killarney Street									
13	Killarney Street signalised pedestrian crossing	W/C	To provide linkage between Takapuna and Killarney Park		AT	$0.2m	I, D&C		

	Project	Modes[5]	Nature of Proposal	Discussion/trigger points	Owner	Cost	Short Term[6]	Med Term	Long Term
14	Hurstmere Road/Killarney Street signals	W/C	Signals, including realignment of intersection	To support concept of traffic travelling around Takapuna, in conjunction with Anzac St/Fred Thomas Dr intersection upgrade (project 3 above)	AT	$0.6m	I&D	C	
15	Killarney Street/The Terrace signals	GT,W/C	Signals proposed partly to allow safe right turns out from The Terrace, but also to allow safe pedestrian crossing movements		AT	$0.6m	I,D&C		
Package 4: City Centre Streets									
16	Improvements to bus station	PT	Improvements to facilities for bus passengers	Extent of improvements will depend on timing of potential relocation of bus station. Would also benefit development potential of surrounding sites – and therefore street's quality of place.	AT	$0.5m[8]	I,D&C		
17	Anzac Street/Lake Road signals	W/C	Signals, primarily to improve pedestrian connectivity, adjacent to bus station	Will depend to a certain extent on need to retain U turn facility for buses	AT	$1.8m	I,D&C		
18	Halls Corner intersection	W/C	Signal phase changes, removal of slip lane, and banning of selected movements	Primarily designed to improve pedestrian amenity (shorten wait time)	AT	$0.15m	I,D&C		
19	Hurstmere Road/Anzac St intersection	W/C	Provision of pedestrian facilities at roundabout	To resolve current deficiency, so needed immediately	AT	$0.1m	I,D&C		
20	The Strand footpath improvement	W	Filling gap in existing pedestrian network	Adjacent to above intersection	AT	$0.15m	I,D&C		

[8] This cost estimate is based on the value in the LTP

	Project	Modes[5]	Nature of Proposal	Discussion/trigger points	Owner	Cost	Short Term[6]	Med Term	Long Term
21	Huron Street streetscape	W/C	Streetscape project, to improve pedestrian amenity and development potential of surrounding sites		AT	$2.4m	I,D&C		
22	Como Street streetscape	W/C	Streetscape project, to improve pedestrian amenity and development potential of surrounding sites		AT	$2.4m	I,D&C		
23	30 kph zone	W/C, GT	Desire to reduce speed environment within Takapuna Centre	Needs more than road signs – depends on streetscape projects to reinforce speed environment	AT	$0.1m	I,D&C		
24	Anzac Street streetscape (east of Auburn)	W/C	Streetscape project, to improve pedestrian amenity	May be affected by potential development of Central Car Park site (with primary vehicle access onto Anzac Street)	AT	$8.5m	I&D	C	
25	Investigate relocation of bus station and secure site	PT	Investigate further the potential implications and alternatives for a new bus station and secure a site for this purpose	Would better support bus circulation following completion of Upper Shoal Bay Link to rapid transit network and would enable implementation of urban design improvements to northern end of Lake Road	AT	$250k	I		
26	Relocation of bus station	PT	New, probably off street facility, to remain in central location. Will include property purchase (if off street)	As above	AT	$9.3m[9]		D	C

[9] This cost estimate for the potential long term relocation of the bus station is a nominal sum, as the location has yet to be determined

	Project	Modes[5]	Nature of Proposal	Discussion/trigger points	Owner	Cost	Short Term[6]	Med Term	Long Term
27	Lake Road streetscape	W/C	Streetscape project, to improve pedestrian amenity	Facilitated by relocation of bus station. Also relates to potential development of Central Car Park site. Requires identification of different over dimension route	AT	$8.7m	I	D	C
Package 5: Lake Road									
28	Lake Road pedestrian crossings	W/C	Provision of pedestrian crossing facilities, partly to connect Upper Shoal Bay to Takapuna Beach	Implement in short term	AT	$0.1m	I,D&C		
29	Lake Road cycle lanes	C	Provision of cycle lanes (including some loss of on street parking)	Implement in conjunction with parking management plan	AT	$0.25m	I&D	C	
Package 6: Burns Avenue/Auburn Street									
30	Burns Ave/ Esmonde Rd intersection	GT, W/C	Additional pedestrian crossings to be provided, plus right turn into Burns Ave to be reinstated	Implement in short term	AT	$5.4m	I, D&C		
31	Tennyson Ave intersection	GT	Ban right turns, to improve safety	Implement in short term	AT	See above	I, D&C		
32	Signals at Huron, Northcroft, Byron	GT, W/C	Signals proposed, partly to provide for turning traffic and also to provide for pedestrians and cyclists	May be triggered by Upper Shoal Bay Link	AT	See above	I&D	C	
33	Burns Ave/ Auburn St street-scape (south of Anzac St)	W/C	Streetscape project, to improve pedestrian amenity	Implement in conjunction with above intersection works	AT	See above	I&D	C	
34	Burns Ave/Auburn St streetscape (north of Anzac Street)	W/C	Streetscape project, to improve pedestrian amenity past school	Implement in short term	AT	See above	I,D&C		

	Project	Modes[5]	Nature of Proposal	Discussion/trigger points	Owner	Cost	Short Term[6]	Med Term	Long Term
Package 7: Parking									
35	Alteration of parking to short stay only	GT	Implement parking restrictions and appropriate pricing within central area to short stay parking only, plus other changes outlined in CPMP.	Implement in coordination with opening of Gasometer car park (or alternative site). If possible combine with implementation of proposed street network changes.	AT	Opex	Implement as outlined		
36	Protection of land for future off-street parking facility, then construct facility	GT	Construction of a parking facility (or facilities) capable of eventually accommodating up to 700 short stay parking spaces.	Timing influenced by factors such as phasing of the proposals for the central Takapuna road network, Waterfront development etc. Should ideally be provided in stages, with first stage required in 5 to 10 years. May be delivered as part of commercial agreement	AT	$34.7m [10]	I&D	C	
37	Alteration of parking to short stay only	GT	Implement parking restrictions and/or appropriate pricing to achieve desired outcome	Co-ordinate with timing of implementation of street network changes	AT	Opex	Parking Ops		
Package 8: Project proposed through other studies[11]									
38	Hurstmere Road (north of Killarney St)	C, PT	Cycle lanes, with partial bus lanes	Proposed through *Takapuna North Corridor Management Plan*	AT	-	I&D	C	
39	Taharoto Road	PT	Partial bus lanes	Proposed through *Takapuna North Corridor Management Plan*	AT	-	I&D	C	
40	Killarney Street	C	Cycle Lanes	Proposed through *Takapuna North Corridor Management Plan*	AT	-	I&D	C	
41	Hurstmere Rd (Anzac to Lake)	W/C	Streetscape project	Proposed by Auckland Council	AC	-	I, D&C		

[10] Cost estimate assumes Gasometer site not progressed
[11] Cost estimates have not been developed for projects proposed by other studies

	Project	Modes[5]	Nature of Proposal	Discussion/trigger points	Owner	Cost	Short Term[6]	Med Term	Long Term
42	The Strand Redevelopment	W/C	Streetscape project	Proposed by Auckland Council	AC	-	I&D	C	
43	Francis Street to Esmonde Road boardwalk	W/C	Walking and cycling connection	Proposed by Auckland Council	AC	-	I,D&C		

CONTENTS

APPENDICES

1 INTRODUCTION

Flow Transportation Specialists Ltd (Flow) has been commissioned by Auckland Transport to carry out the Takapuna Centre Based Transport Study (the Study). This report provides a summary of the work undertaken as part of this Study, and it includes reports prepared by the other members of the wider consultant team, namely Urbanism Plus, Sills van Bohemen and Transport Planning Solutions Ltd.

In general the Study has looked to limit the accessibility of Takapuna by the private motor vehicle during peak times, by having a limited amount of parking restraint for commuters and focussing on the projects that are necessary to encourage a modal shift towards public transport, walking and cycling in the Centre. Particular emphasis has been put on the place value of the streets within Takapuna as areas for leisure and economic activity and therefore focus has been placed on diverting through traffic around the Takapuna Centre. This will ensure that greater space is provided for footpaths, cycling facilities, street tree planting and general streetscape works that will support greater residential, commercial and leisure activity, in line with the aspirations of the *Auckland Plan*[12].

1.1 The Reason for Progressing this Study

The *Auckland Plan* sets out a vision of creating the world's most liveable city. A key aspect of the Plan is providing for appropriate intensification within the existing urban areas with a "70/40" split mandated for urban versus greenfield expansion. This means that, at most, 40% of the expected growth in population will be housed in greenfield areas, with a target of limiting this to 30%. To achieve these targets, the Metropolitan Centres identified in the *Auckland Plan* will need to play an important role in accommodating population growth.

Auckland Transport's *Integrated Transport Programme* (ITP)[13] identifies that Corridor Management Plans and other tactical plans will be prepared for the identified growth centres, to assess the necessary transport and parking responses needed to effectively cater for the growth anticipated by the *Auckland Plan.*

The *Takapuna Centre Based Transport Study* (CBTS) is the first of these tactical plans and has been guided by the principles set out in the ITP in determining the appropriate transport response to growth[14].

1.2 Purposes of this Study

The purposes of this 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
- To 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

[12] *The Auckland Plan*. Auckland Council, 2012
[13] *Integrated Transport Programme*. Auckland Transport, 2013
[14] The principles set out in the ITP are summarised in Section 3 of this report

- To develop concept designs for the key actions within the road reserve that give effect to the integrated transport network developed
- To 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, off-street loading or service lanes
- To assess the performance of the wider transport network on the basis of the transport and parking interventions identified
- To estimate an approximate implementation cost for all network improvements
- To define a staging plan for proposed improvement projects including approximate timing or key development triggers.

1.3 Study Area

The Study area for the Study was defined by Auckland Transport and is shown in Figure 1.

Figure 1: Takapuna Centre Based Transport Study – Study Area

1.4 Scope of this Report

This summary report is the result of research, workshops, reports, and further work undertaken by the consultant team to date. The report is compiled as follows:

- Section 2 sets out the strategic context of the Study, in terms of planning and transport documents, and the land use aspirations for Takapuna
- Section 3 sets out the effects of the proposed land use changes in transport demands and traffic operations
- Section 4 sets out the proposed direction for transport investment in and around Takapuna, by each mode, leading to an Integrated Transport Plan for the Centre

- Section 5 considers each of the projects identified for inclusion in the Integrated Transport Plan
- Section 6 considers the implementation of the Integrated Transport Plan and it provides cost and benefit estimates, along with an assessment of the Integrated Transport Plan against the evaluation criteria developed during and early stage of the project
- Section 7 provides conclusions.

The report also includes the following appendices:

- Appendix A provides a summary of the Stage 1 report
- Appendix B provides results of the traffic and transport modelling that has informed this study
- Appendix C is a Public Transport report, prepared by Transport Planning Solutions
- Appendix D is a Comprehensive Parking Management Plan, prepared by Transport Planning Solutions
- Appendix E provides a walkability assessment, prepared by Urbanismplus
- Appendix F provides cost estimates for each of the identified projects
- Appendix G provides a high level economic assessment prepared by John Bolland Consulting.

1.5 Assessment Criteria

During the project development, a number of assessment criteria were identified, in consultation with Auckland Transport. These criteria are set out in Table 1.

Table 1: Assessment Criteria

Category	Assessment Criteria
Public transport operation and mode share	Improving the operation and mode share of buses on the Frequent Transport Network By achieving a Level of Service (LOS) B - C for buses along identified key bus routes. A lower LOS may be acceptable if reliability is good
Quality Spaces	Achieving quality spaces within the Metropolitan Centre by identifying areas of the road reserve which are surplus to requirements and could be better used for landscape planting, plazas or general amenity areas
Supporting land use aspirations for the Centre	Ensuring road designs respond to and integrate with the built form expected in the Unitary Plan zones for the area
	Achieving a significant change in mode split, with shifts to greater levels of walking, cycling and public transport use
	Identifying areas where specific rear lot access/service lanes should be acquired to support land use outcomes and to reduce the proliferation of vehicle crossings
	Ensuring parking is managed in a way that responds to predicted demands, without reducing targeted modes shares for public transport usage

Table 1: Assessment Criteria

Category	Assessment Criteria
Improving conditions that support an increase in the overall probability of walking within the Study area	Ensuring formal crossing facilities are provided at all key pedestrian crossing locations as identified in the walking accessibility study
	Maximising the convenient, (10 minute) walking catchment around identified key destinations in Takapuna including the Akoranga Busway Station
	Ensuring that the key routes that connect the identified key destinations and public open spaces in Takapuna score 'high quality' or better in terms of pedestrian amenity, (as set out within the walkability assessment) by 2025
	Providing additional footpath widths or shared space where appropriate and minimising the number of driveway accesses along streets with relatively high pedestrian or cycle numbers
	Ensuring that any land use consequences that will notably contribute to the achievement of this objective are identified and passed on to the Auckland Council Unitary Plan team
Improving cycling within the Centre	Providing dedicated cycle facilities on those roads forming part of the Auckland Cycle Network, especially the Cycle Connector Network proposed within Takapuna
	Achieving a low speed environment, (40km/h or less) on those streets where cyclists do not have a dedicated facility
	Ensuring adequate on-street cycle parking facilities
Providing for general traffic	Maintaining adequate transport functionality for general traffic by achieving traffic LOS E over a peak period, or a combination of measures representing the minimum functionality to be achieved

An assessment of the proposed package of works for Takapuna against the agreed criteria is provided in Section 6.4.

1.6 Consultation

No consultation with the public has been undertaken on this project at this stage. However, the work has been undertaken with significant inputs from Auckland Transport, and to a lesser extent, from Auckland Council and the NZ Transport Agency (the Transport Agency). In addition to the development of assessment criteria, referred to above, and regular progress meetings with the Auckland Transport project managers, the following meetings have been held:

- Two workshops were held with a wide variety of attendees from Auckland Transport, plus attendees from Auckland Council and the Transport Agency
- Meetings were held with individual departments within Auckland Transport, particularly Public Transport Operations and Parking Management.

2 STRATEGIC CONTEXT

2.1 Strategic Planning Documents

2.1.1 The Auckland Plan

The *Auckland Plan*[15] sets out the strategy to make Auckland 'the world's most liveable city.' It sets out the proposed approach to accommodate an expected increase of Auckland's population by one million people, to reach 2.5 million by 2040[16].

The *Auckland Plan* provides a hierarchy classification of urban centres. The Auckland City Centre sits alone in the top tier, with five suburbs classified as urban fringe centres. There are ten centres classified as 'Metropolitan Centres' in the second tier of the hierarchy. These Metropolitan Centres are as follows:

- Albany, (emergent centre)
- Botany, (emergent centre)
- Henderson
- Manukau
- New Lynn
- Newmarket
- Papakura
- Sylvia Park, (emergent centre)
- Takapuna
- Westgate/Massey North, (emergent centre).

The *Auckland Plan* further explains that:

> *"These (Metropolitan Centres) serve regional catchments or have strategic roles within the region. They provide a diverse range of shopping, business, cultural, entertainment and leisure facilities, together with higher-density residential and mixed-use environments. They have good transport access and are served by high-frequency public transportation. These centres have the greatest opportunities for additional business and residential growth".*[17]

The *Auckland Plan* includes a number of targets relating to transport that Takapuna, as a Metropolitan Centre, should contribute to achieving. These targets include:

- Doubling public transport usage from 70 million trips in 2012 to 140 million trips by 2022, (subject to additional funding)
- Increasing the proportion of people living within walking distance of frequent public transport stops from 14% in 2011 to 32% in 2040[18].

Auckland's Rapid Transit Network, (RTN) is to provide frequent services, (bus and rail) on separate right of ways from 7 am to 7 pm seven days a week. The RTN, shown in Figure 2, is designed to achieve the transformational shift in public transport required by the *Auckland Plan*[19].

[15] *The Auckland Plan*. Auckland Council, March 2012
[16] Statistics New Zealand's high growth scenario, 2041 projection
[17] *The Auckland Plan*. Auckland Council, March 2012, page 253
[18] Ibid, page 312
[19] *Integrated Transport Programme* 2012-2014. Auckland Transport, March 2013, page 40.

Figure 2: Existing and Proposed Rapid Transport Network, 2012-2042[20]

[20] *The Auckland Plan*. Auckland Council, Map 13.2: Auckland's Priority Transport Projects (2012-2042), March 2012.

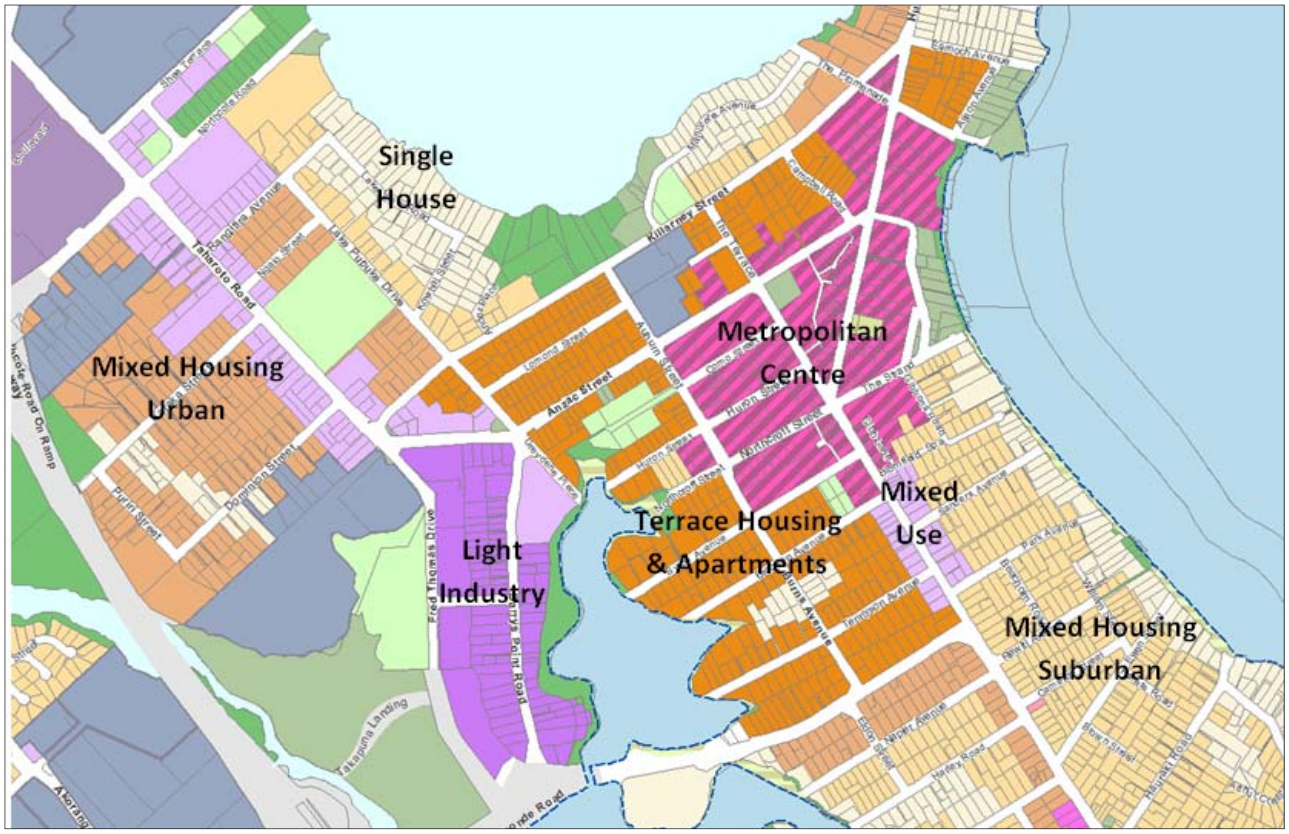
As can be seen in Figure 2, Takapuna, despite its Metropolitan Centre status, is not served by the existing RTN and is not indicated as being subject to RTN improvements. Auckland Transport states that improvements to the RTN have seen the number of people using public transport rise. These increases can be attributed in part to the RTN being "*high-frequency, high-quality services that do not get held up by road traffic congestion*."[21] Without significant improvements, including preferably a link to the RTN, public transport patronage to and from the Takapuna Centre is unlikely to reach the required level.

Linking Takapuna to the RTN is therefore of high strategic importance and is a key focus of this Study.

2.1.2 Proposed Auckland Unitary Plan

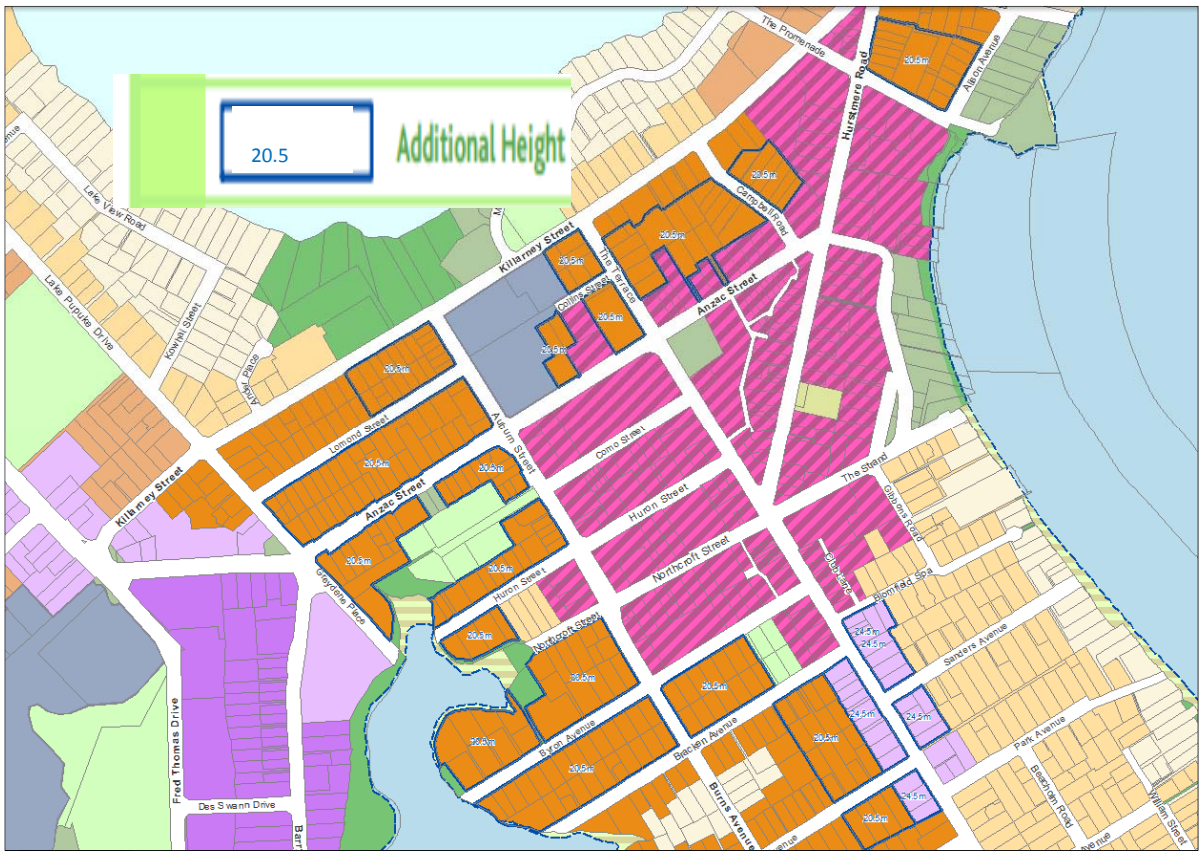
The *Proposed Auckland Unitary Plan*[22] provides a legislative framework "*to manage Auckland's natural and physical resources whilst enabling growth and development and making Auckland a quality place to live in and do business*"[23]. Figure 3 below shows the proposed land use zoning for the Study area, as notified, while Figure 4 shows the proposed height controls.

Figure 3: Proposed Auckland Unitary Plan Zoning[24]



[21] https://www.aucklandtransport.govt.nz/improving-transport/completed-projects/RapidTransit/Pages/default.aspx
[22] *Proposed Auckland Unitary Plan*. Auckland Council, September 2013.
[23] Auckland Council Website: http://unitaryplan.aucklandcouncil.govt.nz/Pages/Plan/Book.aspx
[24] http://acmaps.aucklandcouncil.govt.nz/unitaryplan/FlexViewer/index.html

Figure 4: Proposed Unitary Plan Additional Height Controls[25]



This map illustrates that significant change is expected in the Takapuna area, particularly on those sites zoned "Terrace Houses and Apartment Buildings" and "Metropolitan Centre".

2.1.3 Takapuna Strategic Framework

The *Takapuna Strategic Framework* was published by the former North Shore City Council in October 2010. The objective of the Framework is to set out an overarching direction for growth over the next 30 years and beyond which will guide development, and sequencing of precinct plans and district plan changes, provide the basis for integrated planning, and give confidence about Takapuna's future direction.

The vision focuses on capitalising on Takapuna's location (lake and seaside setting) to create a more pedestrian and cycle focused, safe, and accessible Centre which is less dominated by cars.

There are 13 Strategic Principles set out in the *Takapuna Strategic Framework* and under 'Access and Movement', these focus on improving accessibility (for pedestrians and cyclists), providing for public transport and the balancing of short term and long term parking requirements.

In regards to opportunities to improve access and movement, the *Takapuna Strategic Framework* recognises that Takapuna has good access to the motorway and a relatively small scale block size that supports connectivity and which allows the development of:

[25] http://acmaps.aucklandcouncil.govt.nz/unitaryplan/FlexViewer/index.html (amended)

"...a connected street pattern with traffic speeds and distribution managed in a way that will support an intensive mixed-use development and pedestrian environments."

Eight precincts are identified in the *Takapuna Strategic Framework* to accommodate the forecasted growth, and all eight fall within the Study area of the Takapuna CBTS. The proposals for each of the precincts are summarised in the Stage 1 report for this Study, provided as Appendix A to this report.

2.2 Strategic Transport Documents

2.2.1 The Integrated Transport Programme

Auckland Transport has prepared the *Integrated Transport Programme* (ITP) which sets out how it proposes to respond to the directions from the *Auckland Plan* within current funding limitations. Current estimates put the gap between necessary spending and actual funding at between $10 – $15 billion dollars.

Key drivers of the ITP are the *"One System Approach"* and the *"Four Stage Intervention Process".* The One System Approach outlines the following principles for transport investment:

- Use a single system approach in the planning, design, management and development of the transport system
- Use travel demand management, such as travel plans and optimising the use of existing networks, before providing additional capacity to the transport system
- Achieve the appropriate balance between movement and place and acknowledging the role of transport in assisting place shaping
- Ensure that long term land use drives long term transport functionality, taking into account the existing and proposed transport networks, and ensure that transport investment aligns with growth envisaged in the *Auckland Plan*
- Optimise existing and proposed transport investment
- Establish Corridor Management Plans that account for place shaping
- Recognise existing community investment and the need to enable connectivity between and within communities
- Align community expectations in urban areas with an urban "*level of service*", particularly with realistic expectations around levels of congestion
- Align community expectations in rural areas with rural "*levels of service",* particularly acknowledging limited opportunities for alternatives to motor vehicle
- Ensure that transport is sustainable in the long term, minimises negative impacts on people's health and the built and natural environment, and reduces our dependence on fossil fuels
- Improve the capability of the transport system to withstand adverse effects.

The Four Stage Intervention Process in the ITP sets out an order for investment as follows:

- Operate, maintain and renew infrastructure optimally. This effectively means ensuring that our existing assets are looked after first before contemplating the construction of new ones

- Make better use of networks. This includes a wide variety of techniques including smarter use of traffic lanes (such as bus or transit lanes), optimisation of traffic signals and range of other measures
- Manage demand efficiently and safely. This includes workplace travel plans, appropriate location of land use zoning, parking charges and potentially road pricing
- Invest in new infrastructure, services and technology. This is the last principle and is to be advanced only where the preceding measures do not effectively manage transport issues.

2.2.2 Regional Public Transport Plan

Auckland Transport published an updated *Regional Public Transport Plan* in September 2013. The Executive Summary to this Plan noted that it resulted from a number of recent changes to the planning and operating environment for public transport in Auckland, including:

- Changes to Auckland's governance, which enabled Auckland Transport to integrate the provision of public transport services and infrastructure more effectively
- The new *Auckland Plan*, which calls for a transformational shift in public transport and sets a target of doubling the number of public transport passenger trips over the next 10 years
- A new legislative framework for public transport which provides for implementation of the new Public Transport Operating Model. This adopts a partnership approach between funders and providers, for the planning and development of public transport services
- The Transport Agency requirement for regions to develop a fare box recovery policy to show the share of public transport operating costs to be recovered from users
- A major review of the public transport network which has resulted in a series of proposed changes, designed to improve network efficiency and effectiveness by making best use of the significant ongoing investments in public transport infrastructure, including rail electrification, new electric trains and integrated ticketing.

A major focus of the *Regional Public Transport Plan* is on making the best use of available resources, and improving the frequency and range of travel options offered by public transport. There is a requirement to review the Plan at least every 6 years and it only has a view for the next ten years.

The implications of this new *Regional Public Transport Plan* on Takapuna are discussed in Section 4.2 below. In summary, the main changes relate to transport services operating on a hub-and-spoke basis (described as "a connected network"), resulting in substantial changes to the operation of the Takapuna Interchange, plus bus route and bus frequency changes within central Takapuna.

2.2.3 Takapuna North Corridor Management Plan

The *Takapuna North Corridor Management Plan* (CMP) relates to some of the areas within this Study. The following proposals emerging from that CMP are of relevance to this Study:

- The CMP proposes bus lanes along sections of Taharoto Road and Anzac Street, on both sides, but not at the same location. That is to say, a westbound bus lane may be provided along the northern or western half of the block, with a southbound or eastbound bus lane to be provided along the other half, in order to maximise benefits for bus operations at intersections

- The CMP is seeking the reorientation of the intersection of Hurstmere Road and Killarney Street, to give greater priority to traffic travelling around rather than through Takapuna
- In conjunction with the aim to get more traffic to divert around Takapuna via Killarney Street, the CMP considers options for the proposed layout at the Taharoto Road/Fred Thomas Drive/Anzac Street/Killarney Street intersection
- The CMP also proposes that higher priority be given to pedestrians and cyclists on Hurstmere Road (south of Killarney Street), and on Anzac Street east of Lake Road
- Bus lanes are proposed on Anzac Street, west of Lake Road. The CMP acknowledges however that any long term bus/cycling/pedestrian connection across Upper Shoal Bay between Burns Avenue and Barry's Point Road could remove the need for bus routing via Anzac Street. In this scenario, Anzac Street bus lane could be replaced with dedicated cycle facilities, improved pedestrian facilities and/or landscaping.

2.3 Land Use Forecasts

2.3.1 Land Use Forecasts in Regional Models

The Auckland Regional Transport Model, (ART model) is a strategic land use/transportation computer model which is used to predict future travel demands based on certain land use assumptions for the Auckland region.

Data has been extracted from the ART model to identify the expected changes in land uses within Takapuna. It is noted that the Scenario I model represents a medium growth scenario, while Scenario H represents the higher growth model proposed by the *Auckland Plan*. Scenario I (the medium growth model) is used in this Study as this is the one accepted by the Transport Agency for the assessment of transportation projects.

Table 2 sets out the land uses from these scenarios, with data presented for the Takapuna centre, (ART model zone 108) and for the wider Takapuna area. As can be seen, significant growth in population and employment is forecast for Takapuna under both scenarios.

Table 2: Land Use Assumptions in the Auckland Regional Transport Model

Area	Measure	Scenario I (Medium Growth)			Scenario H (*Auckland Plan*)		
		2011	2021	2041	2011	2021	2041
Takapuna Town Centre	Population	2,500	6,600	9,600	2,600	7,100	10,900
	Employment	5,900	10,100	13,500	6,000	10,800	14,500
Wider Takapuna	Population	6,000	12,000	16,600	6,200	12,900	18,400
	Employment	11,100	15,500	19,000	11,300	16,600	20,300

2.3.2 Land Use Forecasts in Takapuna Strategic Framework

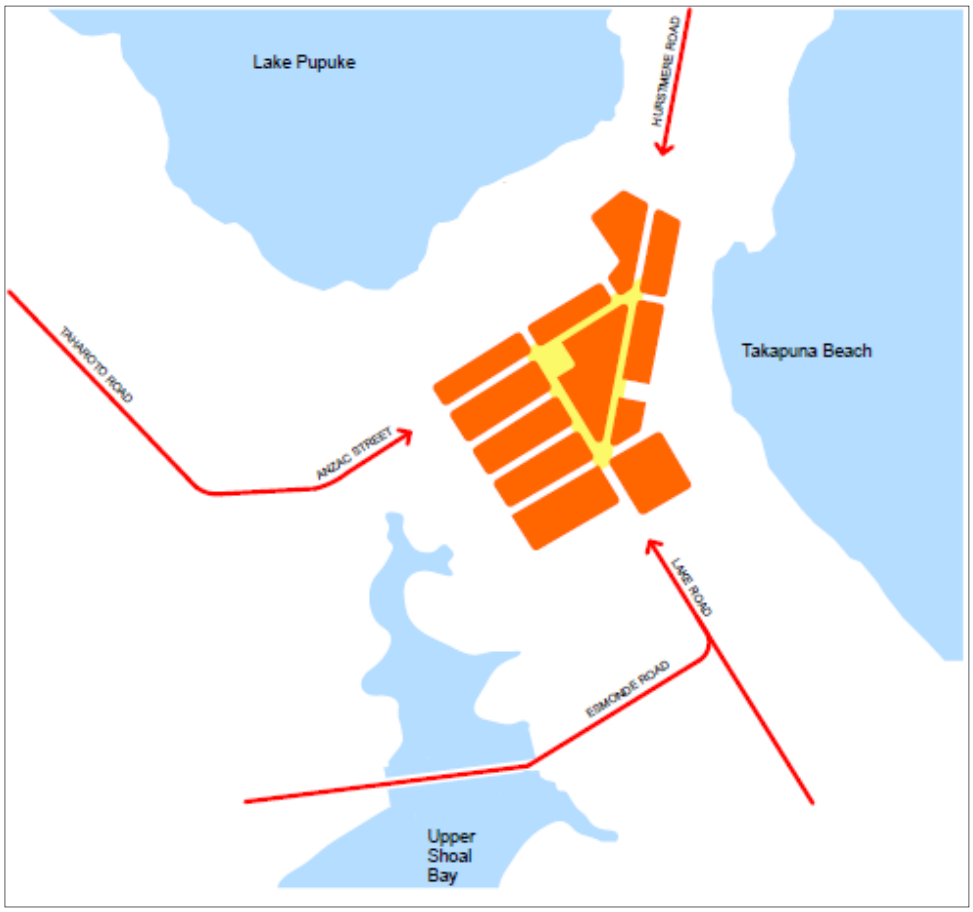
The *Takapuna Strategic Framework* outlines that Takapuna is a sub-regional Centre with a population of approximately 4,000 residents and 10,000 employees. Growth predictions used in the Framework estimate a population of 15,000 residents (4,000 new dwellings) and 15,000 employees by 2040.

The population and employment projections within the Takapuna Strategic Framework are lower than those from either ART model scenario, which forecast between 16,600 and 18,400 residents and between 19,000 and 20,300 employees in 2041. It is noted that the Takapuna Strategic Framework excludes a small residential neighbourhood that is included in the ART model's Takapuna zone (Sanders Avenue, Park Avenue and Beacholm Road). However, the discrepancy between these two sources is likely to be due to the generally higher levels of intensification and development proposed under the *Auckland Plan* than under the *Takapuna Strategic Framework*.

3 EFFECTS OF LAND USE CHANGE ON TRANSPORT DEMANDS

This Study presupposes that the medium growth land use aspirations for Takapuna will take place. This forecast growth will result in the existing transport networks coming under increased pressure, with further strain imposed on the networks due to the three 'pinch points' established by the existing landform in the north, west and south of Takapuna. The main routes to and from Takapuna, and the surrounding water bodies, are shown in Figure 5 below.

Figure 5: Transport Approaches and Surrounding Water Bodies



The key issue to establish is how, and at what time, investment in transport should take place in response to the anticipated land use changes.

3.1 Predicted Travel Demands

Forecast travel demand data has been obtained from the ART model. Data presented is for the 2011, 2021 and 2041 years using the Scenario I model referred to in Section 2.3 above. Greater information on the results of the transport modelling is provided at Appendix B.

3.2 Predicted Mode Splits

The ART model has been used to identify the predicted travel mode split to and from Takapuna, for each forecast year. Table B1 (within Appendix B) indicates that while the number of trips into and out of Takapuna by public transport is currently predicted to double (from 1,850 to 3,950 over the two hour morning peak period, between 2011 and 2041), the mode share of public transport is currently only predicted to increase by a modest amount, from 12% in 2011 to 14% in 2041. Greater increases are predicted in walking and cycling, presumably as a result of greater numbers of shorter trips, resulting from greater residential and employment activity within the Takapuna Centre. However, it should be noted that the ART model is limited in terms of its ability to predict trips by active modes.

The increases in public transport, walking and cycle trip percentages are predicted to lead to corresponding decreases in percentages of trips by car, from 82% in 2011 down to 69% in 2041. In spite of this trend, the absolute number of car trips is predicted to increase by 57%. By comparison, land use scenario I includes a 41% increase in employment and 64% increase in residents between 2011 and 2041.

While the ART model reflects the effects of congestion at a broad level, it does not fully reflect the effects of parking restraint or potential further improvements in public transport, (beyond those proposed within the *Regional Public Transport Plan*). A key aim of this Study relates to the need to more properly understand the limitations of the transport system (as currently proposed) on the growth aspirations of the *Auckland Plan* for Takapuna and the achievement of greater non car mode shares.

3.3 Traffic Demands

Table B2 (within Appendix B) presents the traffic volumes crossing a cordon around Takapuna for each of the three modelled years. The cordon volume has been obtained by summing link flows across the four arterial routes into/out of Takapuna that are shown in Figure 5 above (i.e Taharoto Road south of Northcote Road, Esmonde Road west of Fred Thomas Drive, Kitchener Road north of Hurstmere Road and Lake Road, south of Esmonde Road)[26].

It should be noted that while there is fairly modest through traffic that needs to pass right through the Takapuna Centre, the cordon used for the table above does include significant volumes of through traffic. For example, traffic from the Devonport Peninsula to the motorway will be entering the Takapuna cordon via Lake Road and exiting via Esmonde Road (or possibly Taharoto Road).

Substantial growth in traffic volumes to 2021 and 2041 is predicted. Due to congestion in the peak periods, this growth is predicted to be greater during the interpeak period than in the peak periods.

[26] The Stage 1 report also provided the traffic flow predictions crossing the wider Takapuna and Devonport cordon; ie the above cordon minus Lake Road.

Interpeak traffic volume growth to 2041 is forecast to be 37%-38%, while peak period growth for the same period is forecast at between 21% and 25%.

As a result of this strong growth, 2041 interpeak traffic volumes are predicted to be greater than 2011 peak period volumes in either direction. Similarly, 2041 evening peak inbound volumes (ie the contra peak direction) are predicted to be greater than 2011 morning peak inbound volumes (ie the tidal peak direction). This level of traffic volume growth will result in increased congestion and travel times, and reduced travel reliability.

Overall, daily traffic volumes across the cordon are predicted to increase by 33% to 2041.

These percentage increases are lower than those noted in Section 3.2 above. This is because Section 3.2 related only to trips with origins or destinations within Takapuna, while this Section also includes trips from adjacent areas (where less land use growth is expected) that are expected to pass through the Takapuna cordon.

3.4 Predicted Traffic Operations

The predicted traffic operation in the Takapuna area has been assessed using Auckland Transport's PARAMICS model of Takapuna. This assesses the weekday morning and evening peak periods. The scenario modelled in PARAMICS includes all of the anticipated land use changes in Takapuna, as envisaged by Scenario I, but it relates to a 2031 scenario in terms of "background growth" (i.e changes in traffic flows for trips with origins and destinations outside Takapuna), in order to provide a traffic assessment which relates to the period before the completion of an Additional Waitemata Harbour Crossing. This scenario is still termed a 2041 scenario, as the land use changes within Takapuna are unlikely to be fully in place by 2031.

The overall average travel times within the modelled area are summarised in Table B4 (within Appendix B). The average times in the morning peak are predicted to reduce from 32 kph in 2011 to 20 kph in 2041. In the evening peak, the predicted reduction is from 41 kph to 30 kph. These average speeds should be viewed with caution as they conceal significant variations at a route by route level. For example, the average speeds in the morning peak are dragged down by the significant congestion on the approaches to the Northern Motorway. This congestion occurs today and it is predicted by the model to get worse over time. However, the average figures show useful comparisons, as they indicate that with the forecast traffic growth, congestion is predicted to increase, with average speeds failing by around 30%, as a result of the growth proposed within Takapuna.

3.5 Effects of Transport Investment on Travel

The data referred to in Sections 3.2 to 3.4 above relates to the "default" situation, without additional investment or intervention in transport in and around Takapuna. Tests have also been run using the Auckland Passenger Transport Model to establish, at a broad level, the predicted effects of additional bus frequencies (to overcome routes where overcrowding was predicted), the provision of additional bus lanes[27], and a moderate level of parking restraint. The results are summarised in Table B3 (within Appendix B).

[27] The assumed bus lanes were along Taharoto Road, Hurstmere Road/Kitchener Road, with additional facilities along Esmonde Road

Table B3 assumes that all of the trips that are predicted by the APT model to be diverted away from car travel are diverted onto buses. In reality, some of these trips are likely to divert to active modes instead. The data in the table may be taken to indicate that the additional transport investment is predicted to have modest effects, in terms of the reduction in car trips. However, the number of passenger transport trips is already predicted to more than double, between 2011 and 2041, according to the ART model (see Table B1), and the additional investment is predicted to lead to public transport trips tripling (from 1,850 in 2011 to 5,400 trips in 2041 over the two hour morning peak period), instead of doubling. This is considered to be a substantial mode change.

The effects of this mode change has been run through the PARAMICS traffic model, which indicates that the average traffic speeds in 2041 will increase from 20 to 21 kph in the morning peak and from 30 to 38 kph in the evening peak. The morning peak figure is still heavily influenced by the city bound queues, but the evening peak prediction is less than 10% slower than the existing figure (i.e. 38 kph compared with 41 kph in 2011). It is noted that this improvement is predicted through the APT model and is predicted to be achieved through investment in modes of transport other than the private vehicle, and through a moderate level of parking restraint. No improvements in traffic capacity were assumed.

4 OVERALL TRANSPORT DIRECTION FOR TAKAPUNA

As noted in Section 3 above, increases in car trips of the magnitude anticipated are likely to be difficult to accommodate satisfactorily; in terms of providing historically accepted operational speeds for traffic and satisfactory environmental outcomes.

4.1 Overall Direction

This Study recommends the following overall direction:

- Greater emphasis must be given to public transport to enable Takapuna to meet its strategic objectives as a successful, dynamic Metropolitan Centre
- Greater emphasis must be given to the ‘streetscape’ of streets within the Takapuna Centre, to improve the character and ‘liveability’ of the Centre. Streets and other public spaces need to give greater priority to pedestrians and cyclists so that Takapuna becomes a more attractive place to live, work, and in which to spend time
- Parking management is required with an element of parking restraint to be introduced over time, sufficient to discourage some commuters from driving to work, but flexible enough to continue to attract shoppers, visitors and essential business trips
- Road capacity should generally be retained on the main routes to and from Takapuna, to provide a satisfactory level of service for most of the day, accepting that congestion can be expected in the peak periods
- Changes should be undertaken to general traffic operations within Takapuna. These are to include treatment of certain key intersections to encourage traffic to pass around the Takapuna Centre and to reduce the traffic speed environment within the central core.

Changes in people's travel behaviour will not happen overnight and rapid mode change should not necessarily be expected. Parking restraint, on its own, would reduce the accessibility of the Takapuna Centre and suitable investment in other transport modes will be required in order to improve accessibility. This may be difficult to achieve in the short to medium term, but the level of mode change identified in Section 3 should be achievable in the longer term if suitable investment is made in public transport, active travel improvements and in conjunction with suitable parking restraint, as soon as possible.

4.2 Public Transport

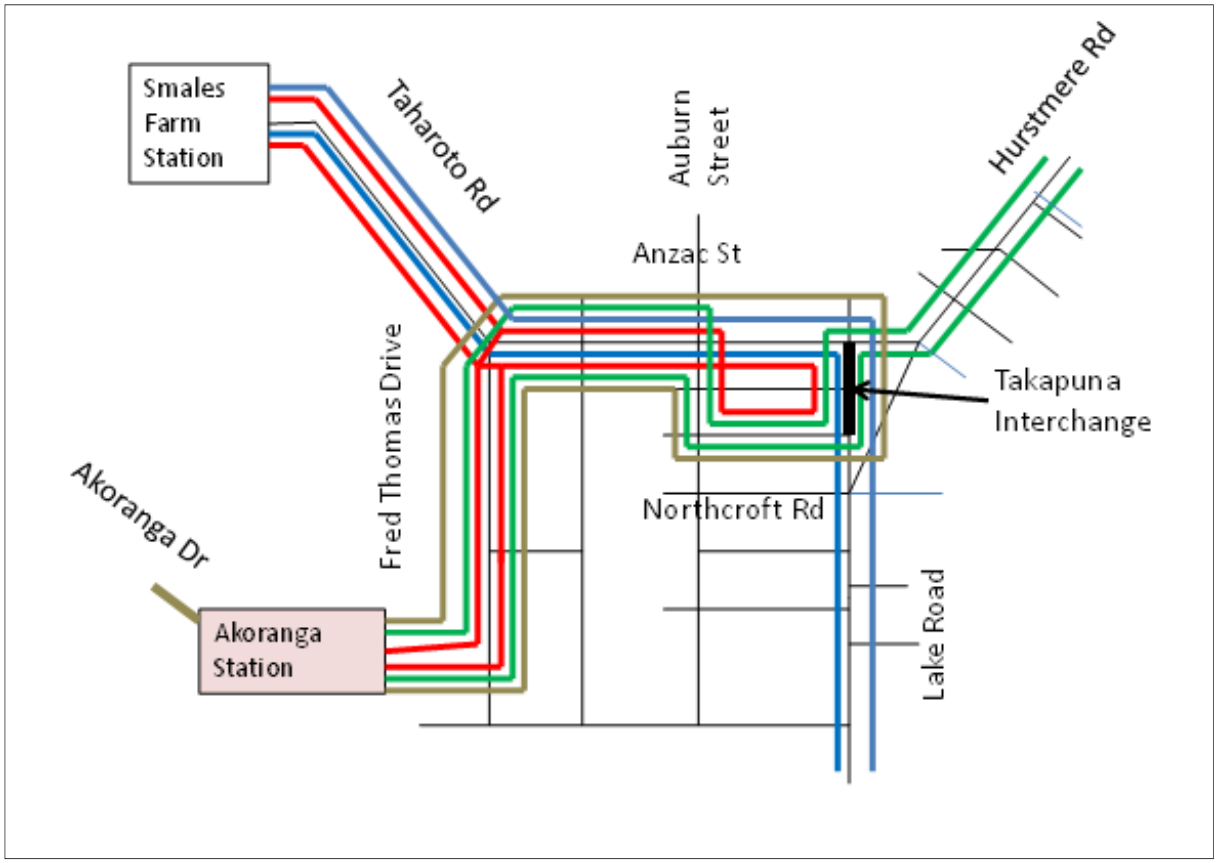
A report on public transport matters is provided at Appendix C.

4.2.1 Proposed Bus Network

Section 2.2 noted that changes are proposed to the bus network serving Takapuna, following implementation of the *Auckland Regional Public Transport Plan*.[28] The changes will lead to Auckland's public transport services operating on a hub-and-spoke basis (described as "a connected network"). The initial stages of the network are expected to be introduced on the North Shore in 2016. The new system will result in substantial changes to the operation of the Takapuna Interchange, plus bus route and bus frequency changes within central Takapuna.

The new service concept is shown schematically in Figure 6.

Figure 6: Network Service Concept for Takapuna



28 *Auckland Regional Public Transport Plan*. Auckland Transport, September 2013.

Once this new service network is introduced, only those services from west of the Northern Motorway approaching Takapuna via Akoranga Drive will terminate in Takapuna. All other services will pass through Takapuna travelling to/from the Akoranga Station or travelling between Lake Road south of Takapuna and Taharoto Road. Due to efficiencies gained from the new network, the number of bus services entering Takapuna in 2016 will reduce.

It can be seen from Figure 6 that the revised services are all expected to use Anzac Street, west of Auburn Street. Anzac Street connects Taharoto Road with central Takapuna. The widening of Anzac Street by one lane is currently planned and is likely to be implemented by or near 2016. This would enable short bus lanes to be introduced at the approaches to the Taharoto Road and Auburn Street intersections. It would not, however, adequately protect buses from future traffic congestion generated by the intensification of Takapuna.

4.2.2 Connecting with the Rapid Transit Network

As noted in Section 2.1, Takapuna will not be directly served by the Rapid Transit Network (RTN). This is considered to be a significant deficiency in Takapuna's future transport network, as it will inhibit the provision of reliable and effective public transport to and from Takapuna. This is inconsistent with the significant increases in public transport required to ensure appropriate accessibility to and from Takapuna.

A separate analysis of the RTN by consultants for Auckland Transport has identified that a connection from the RTN to the 'key Metropolitan Centre' of Takapuna is a potential gap in the network[29]. A link from the Northern Busway to the Takapuna Centre is considered to be highly desirable and of strategic importance.

Three options for connections between the Takapuna Centre and the Northern Busway have been identified: Esmonde Road, Anzac Street and a new Link across the Upper Shoal Bay. Table 3 outlines the advantages and disadvantages of these three options.

29 Draft Rapid Transit Network Review. SKM, May 2013, pages 5.2, 5.6

Table 3: Advantages and disadvantages of options to connect with the Northern Busway.

	Advantages	Disadvantages
Esmonde Road	A good bus lane exists, heading toward Akoranga station and the motorway The current amenity along Esmonde Rd is not good, so further widening would be affecting an already poor environment This route would well serve buses to/from Akoranga and Harbour Bridge	No facility exists heading toward Takapuna, and the existing, (westbound) facility does not extend over the whole route, (including along Burns Avenue) Any eastbound facility would require further widening along Esmonde Road, requiring acquisition of a row of houses which would be expensive The main function of Esmonde Road is as a traffic link, for the Devonport Peninsula and Takapuna It would poorly serve buses to/from Taharoto Road/Smales Farm
Anzac Street	Section 5.1 sets out options for Anzac Street. The Takapuna North CMP proposes a change to the current scheme (which would provide a westbound bus lane), to provide partial bus lanes in each direction. Section 5.1 suggests a greater extent of eastbound bus lane, at the expense of general traffic lane. A bus facility could serve buses to/from Akoranga and Harbour Bridge and Taharoto Road/Smales Farm May offer a reasonable short to medium term solution, achieved by removing an eastbound lane for general traffic along most of the route.	An eastbound facility would require either the loss of an existing traffic lane or additional widening Further widening, (beyond designation) would appear to be problematic. There are potential effects of removing an eastbound traffic lane, (see below) This route is unlikely to provide the reliability of travel times required for a quality public transport connection, and over time (>10 years), buses are likely to become increasingly caught up in general traffic congestion There is insufficient space to provide for all transport modes (pedestrians, cyclists, buses, freight and private vehicles)
Link across Upper Shoal Bay	Could provide direct link between Akoranga/Harbour Bridge and Takapuna, with sections of dedicated bus facility Could also serve buses between Taharoto Rd/Smales Farm and Takapuna Could remove buses, (and therefore bus lanes) from Anzac Street, improving the amenity of that street	Would introduce a new, (costly) structure, with environmental implications across coastal area Would impact on Byron Avenue or Northcroft Street residents

The option of a dedicated public transport facility across the Upper Shoal Bay is the preferred long term solution. It will provide quicker and more reliable bus travel times between the Northern Busway and the Takapuna Centre, and it will completely separate buses from congestion along Anzac Street or Esmonde Road.

Section 5.2 below considers in more detail the route options for connecting the Upper Shoal Bay with Burns Avenue/Auburn Street.

4.2.3 Current Takapuna Centre Bus Station Location

It is essential that passenger transport continues to play a large part of Takapuna's transport solution, including opportunities for high volumes of bus passengers to conveniently access a range of services north, south, and west (the Akoranga Busway station). The passenger transport service must also work with, rather than against, the intensification outcomes identified for Takapuna. The existing Lake Road interchange has been located in a historically ideal location that supports the Hurstmere Road main street and beach without overwhelming either with the operational requirements and existing amenity of the bus infrastructure. Passengers have been able to enjoy the easy ability to disperse from the functional bus environment to higher amenity parts of Takapuna, and vice versa.

Whilst the existing interchange supports Takapuna's amenity areas by being "close but not too close", the future environment of Takapuna may justify reconsideration of the interchange's location. This is because the Council's planning preferences for Takapuna are for speciality retail and very high quality main street to grow around the perimeter of the triangle formed by Hurstmere Road, Lake Road and Anzac Street.

The most successful public retail streets generally offer superior accessibility, a variety of interesting shops, and a very high quality pedestrian environment where people are sufficiently motivated to linger over and above any deliberate or planned reasons they had for occupying the space. Wide footpaths with street furniture offering seating and some protection from the weather further encourage pedestrians to enjoy and visit the area more frequently.

Such streets should be well served by public transport and indeed, there are examples of town centre areas providing for public transport only (with general traffic excluded). Examples include malls in Melbourne and Vancouver served by trams or trolley buses respectively.

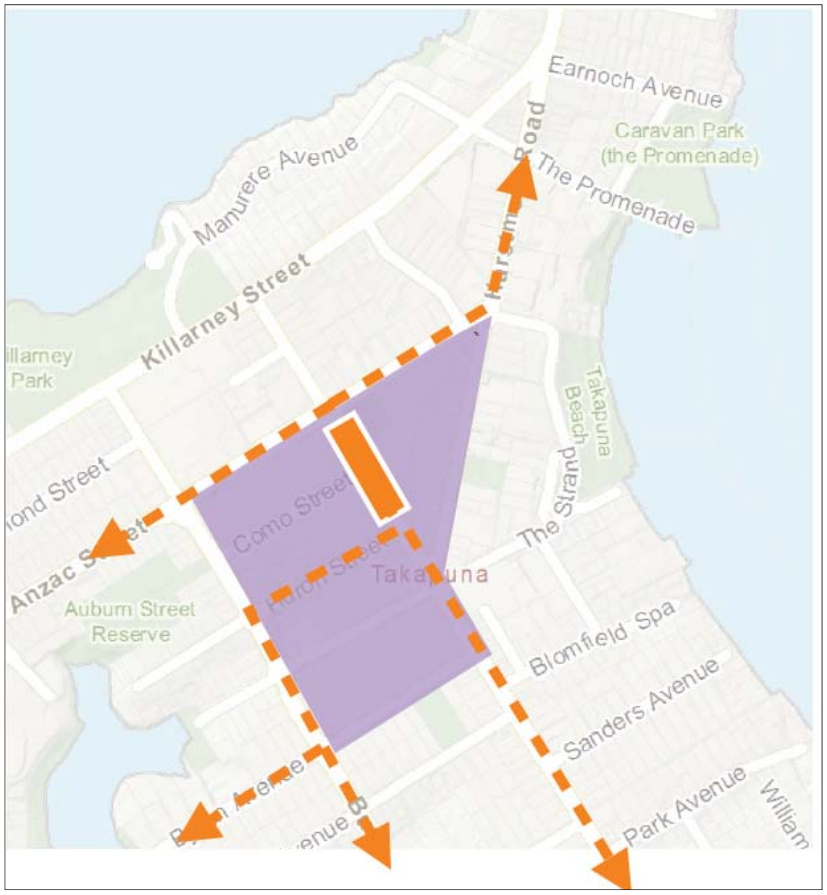
A bus interchange requires a significant length of kerb space for serving passengers or for short term lay over and sufficient road width to cater for both bus stops and passing traffic. If used by diesel buses, noise and fumes are generated as buses accelerate away from stops or idle to load passengers. These conditions generally do not encourage anyone other than waiting passengers to sit and relax in the immediate vicinity nor do they necessarily complement shop fronts and in particular, outdoor activity.

The land use outcomes sought by the Council are less likely to emerge along this section of Lake Road unless existing characteristics change. In order to achieve significantly higher pedestrian amenity and a retail and hospitality atmosphere like that provided on Hurstmere Road (whilst still providing for a bus interchange in the current position), Lake Road north would need to undergo changes in order to provide:

- opportunities for pedestrians to easily cross at multiple locations (prioritised and informal)
- a street furniture zone and frontage zone to support quality retail and hospitality
- increased 'through route' (or clear zone) space
- a high quality bus interchange infrastructure for passengers
- a significant reduction in gas and noise emissions currently caused by diesel buses, (particularly important for encouraging hospitality options in the immediate area).

The existing location of the on-street bus station on Lake Road is illustrated in Figure 7 and Photograph 1 below.

Figure 7: Existing Bus Station Location, Lake Road



Photograph 1: Existing Takapuna Bus Station on Lake Road

It is acknowledged that the current interchange could be improved by enhancing the shelters and pedestrian amenities. However, the extent of these improvements is currently constrained by the road reserve. For example, assuming the potential Anzac Street car park redevelopment extends right up to the edge of the 20.1 m road reserve, only 2.5 m would remain for shelters etc at bus stops on the eastern side of Lake Road. That is not adequate for a 'quality' bus interchange. As a result, widening of the road reserve, by encroaching on the Anzac Street car park site, could be considered, if the bus station is to remain in its current location.

Relocating the bus station to an alternative site connected or very close to Lake Road could open up greater opportunities for urban design improvements by making available road space no longer required to stop or park buses. Furthermore, an alternative bus interchange location could be better integrated with the proposed Upper Shoal Bay Link discussed in Section 4.2.5 below.

4.2.4 Future Takapuna Centre Bus Station Location

The future of Takapuna involves ongoing improvements and uplift in existing street quality throughout the Takapuna Centre. This is needed to support the *Auckland Plan's* Metropolitan Centre strategy for higher densities. This Study has therefore considered various options for the future bus station within the Takapuna Centre.

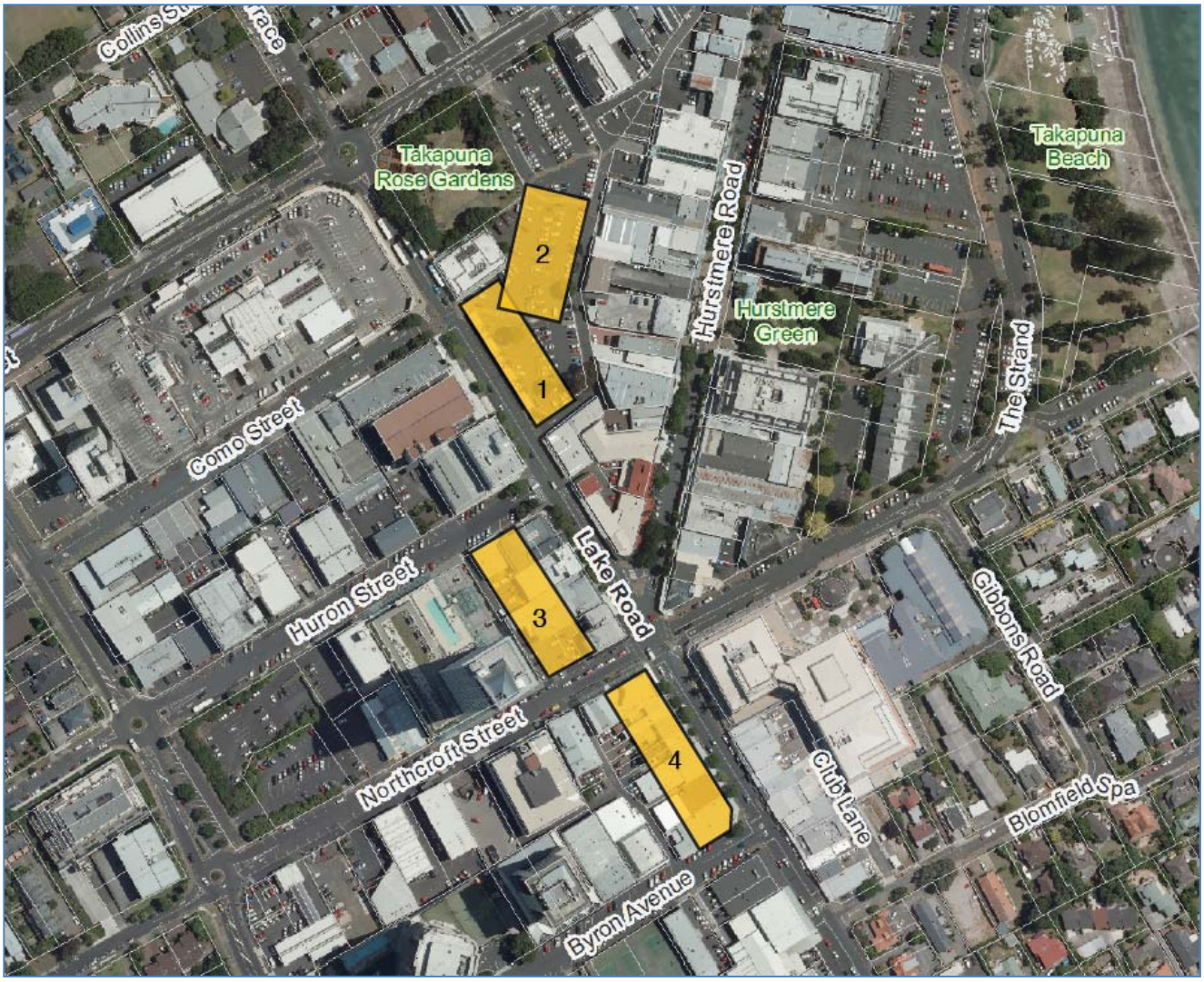
The report at Appendix C indicates that any future bus station will need to accommodate 12 loading spaces/bus berths. Therefore alternative locations for a Takapuna Interchange have been investigated which can meet this requirement. Key criteria are that the site has to be centrally located within Takapuna (i.e. in the vicinity of the existing Lake Road bus station) and that it has to be conveniently located for the proposed Busway Link to the Akoranga Station.

The former Gasometer site was initially included in the assessment, but it was eliminated following concerns expressed by Auckland Transport's Public Transport Operations Team. That team considered that this site is not sufficiently close to the centre of Takapuna to warrant any further investigation.

On-street options in the vicinity of the existing interchange were investigated, but the existence of numerous driveways made these impractical.

Figure 8 shows the alternative locations for an off-street Takapuna Bus Interchange which were considered within the Public Transport study at Appendix C.

Figure 8: Alternative Bus Station Locations



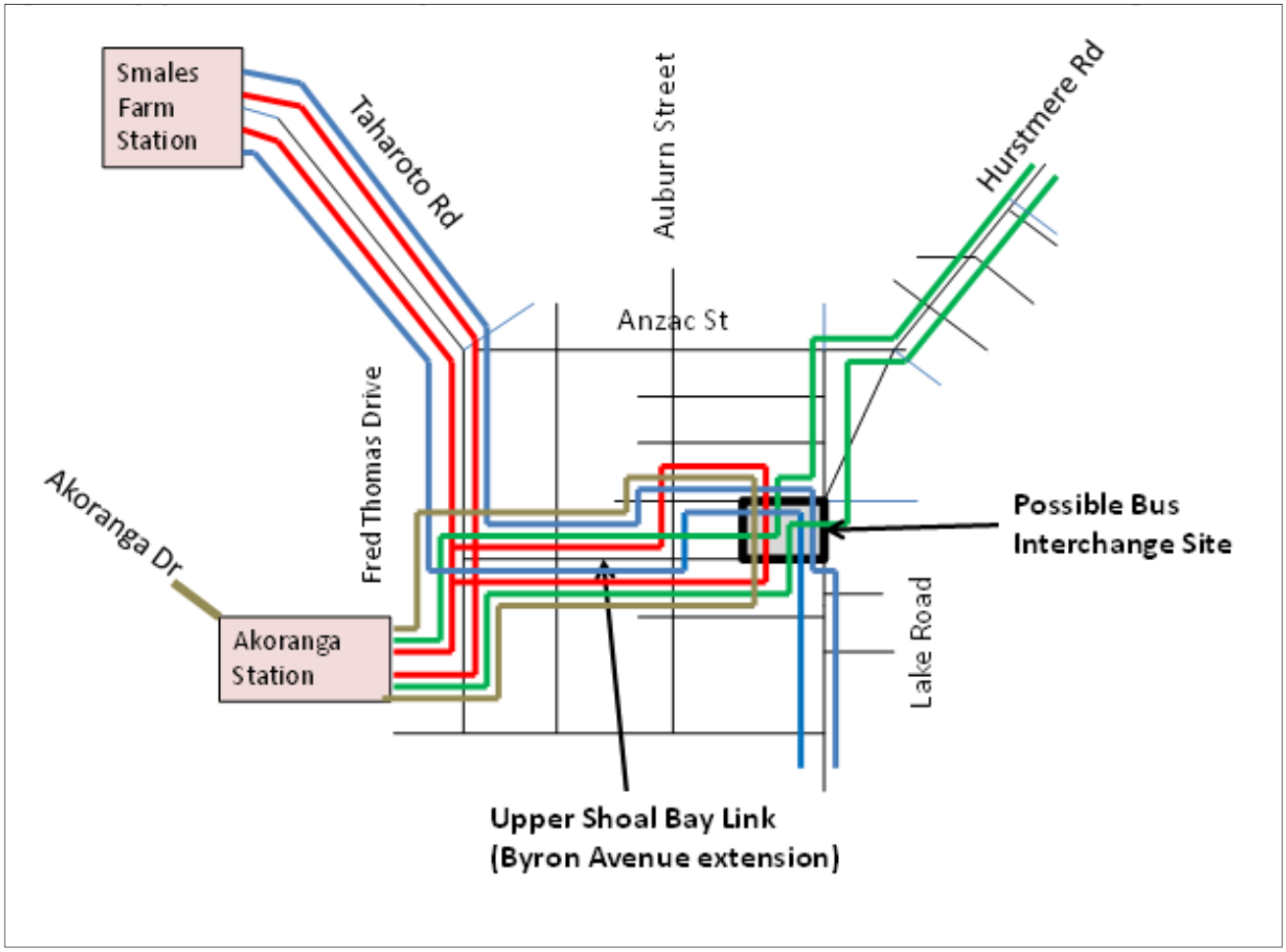
Each site in Figure 8 is adequate for a 12 berth bus interchange or a 15-berth bus interchange, depending on the location. In two instances the area of land required is reduced by assuming that buses are able to stop on-street immediately alongside the off-street bus interchange. The options are described in Table 4 below.

Table 4: Possible Takapuna Interchange Off-Street Locations

Option	Location	Number of bus berths
1	Lake Road east side largely within the Anzac Street Car Park	12, with 4 on-street
2	Fully within Anzac Street Car Park	12
3	West side of Lake Road (between Northcroft Street and Huron Street)	12, sleeved by retail
4	West side of Lake Road (between Byron Avenue and Northcroft Street)	12-15, with 2-5 on-street

Figure 9 shows the relationship between one of the indicated sites and an Upper Shoal Bay Busway crossing formed by extending Byron Avenue across Upper Shoal Bay to Fred Thomas Drive opposite Des Swann Drive.

Figure 9: Alternative Network concept for Takapuna, with Upper Shoal Bay Link and alternative bus interchange site



A comparison of Figures 6 and 9 demonstrates the potential benefits of an Upper Shoal Bay Busway Link between the Akoranga Station and a relocated Takapuna Bus Interchange. This bus network concept would provide a relatively direct route between the two stations and would enable buses to avoid Anzac Street which is expected to become increasingly congested. Travel time savings for buses are predicted to be seven to eight minutes, for buses traveling between the motorway (south of Esmonde Road) and Takapuna and back (see Table B15, within Appendix B). In addition it would provide opportunities for urban design improvements for Lake Road, between Huron Street and Anzac Street.

4.2.5 Upper Shoal Bay Link

Previous studies have recommended the provision of a connection for pedestrians and cyclists between the Takapuna Centre and Barry's Point Road across the Upper Shoal Bay, in order to bring the proposed development area of Barry's Point Road within acceptable walking and cycling distance of the Metropolitan Centre. The Link was identified as a high priority intervention by the *Takapuna Walkability Assessment Report*[30] provided as Appendix D.

[30] Takapuna Centre Walkability Assessment. Urbanismplus Ltd, June 2013

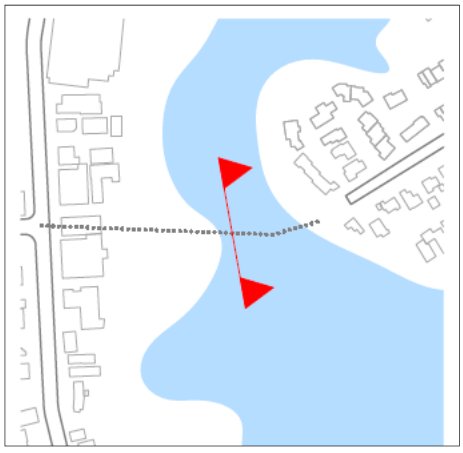
Similarly, a need for a public transport Link across the Upper Shoal Bay has also been identified, most recently in the *Draft Rapid Transit Network Review Report*[31]. Such a Link would directly connect the Metropolitan Centre of Takapuna and the RTN at the Northern Busway Akoranga Station.

This Study recommends such a Link, initially as a low key structure for pedestrians and cyclists, and in the longer term as a permanent structure for buses. Such a Link would reduce bus travel times between Akoranga Station and Takapuna, as well as provide improved bus reliability for all Takapuna bus routes. Bus reliability is one of the key components of the RTN, and it is by this measure that the Upper Shoal Bay Link would provide better service to bus users than alternative routes via either Anzac Street or Esmonde Road. If combined with buses, the Link will need to reflect a pedestrian and cycle friendly design which would result in a pleasant and safe environment for active travellers. This will also be required for routes leading to and from the bridge.

Figures 11 and 12 below illustrate the concept of a public transport Link across the Upper Shoal Bay. The Link shown would be of a relatively low cost and visually unobtrusive design. Alternatively, there would be scope to construct a contemporary and dynamic bridge; one that conveys to users the message that they 'have arrived' at Takapuna. Such a bridge could ultimately be an iconic structure, and a distinctive symbol of Takapuna along with its beach, lake and skyline. This issue will need to be explored further at the feasibility stage.

The following figures relate to the option from Byron Avenue in the east and connecting to Barry's Point Road opposite Des Swann Drive in the west. Section 5.2 below considers a number of alternative routes for this proposed Link.

Figure 10: Indicative Location of Upper Shoal Bay Cross Section



[31] Draft Rapid Transit Network Review Study Report, SKM, 2 May 2013

Figure 11: Indicative Cross Section – Upper Shoal Bay Link

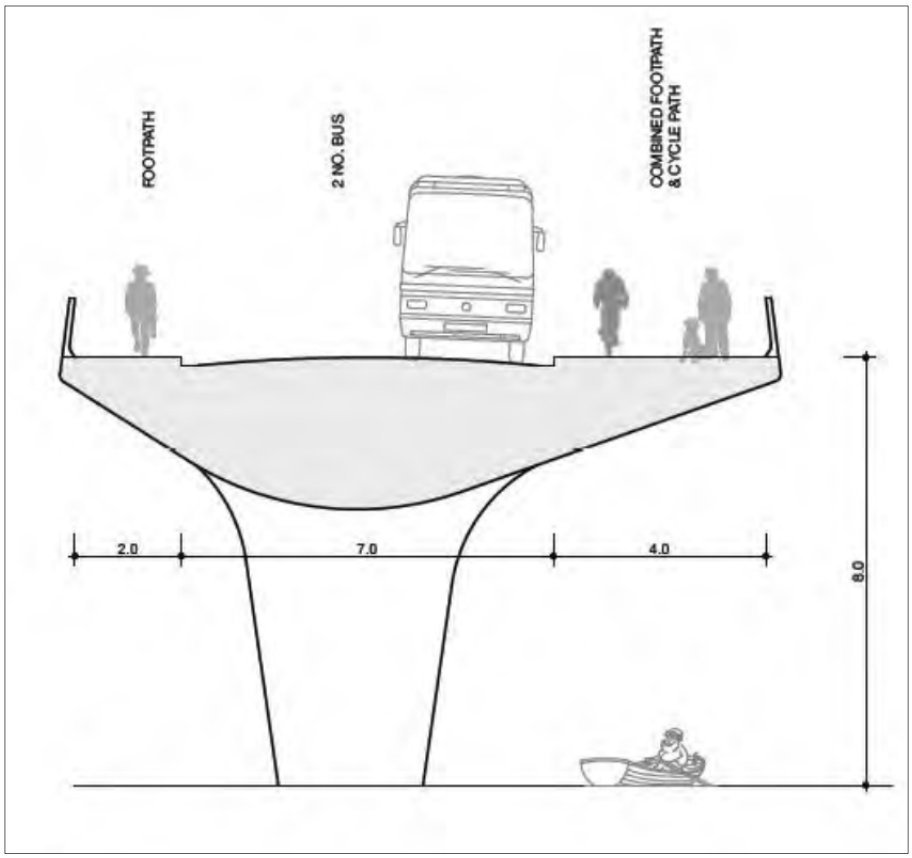


Figure 12: Indicative 'Functional' Upper Shoal Bay Link – Artist's Impression

4.2.6 Recommended Public Transport Solution for Takapuna Central

The recommended public transport solution for Takapuna is to provide a new Link to connect the Takapuna Centre with the Northern Busway across the Upper Shoal Bay combined with a new bus station, in the longer term. The location for the new bus station has to be centrally located, but it should allow bus circulation to be nearer to the edge of the Takapuna Centre in comparison with the existing situation, which takes buses through the Takapuna Centre. Such an option would also reduce the adverse effect buses can have on streets, pedestrians and surrounding buildings whilst still maintaining appropriate pedestrian access to the heart of the Takapuna Centre.

Further investigation is required into the most appropriate location of the Takapuna Interchange. This should accompany the investigation into the feasibility of the proposed Upper Shoal Bay Link as the two projects are inter-related.

The recommended long term public transport solution for Takapuna is summarised in Figure 13.

Figure 13: Recommended Public Transport Solution

4.3 Parking

As part of this Study, a separate *Comprehensive Parking Management Plan* (CPMP) has been developed for Takapuna. This CPMP has been developed based on 2008 and 2013 parking survey data, forecast growth projections for Takapuna and the parking provision for Takapuna as contained in the *Proposed Auckland Unitary Plan*. The purpose of the CPMP is to support the proposed growth of Takapuna, and is appended in full to this report as Appendix D. The following section summarises its key conclusions and recommendations.

4.3.1 Short Stay/Visitor Parking

It is estimated that the supply of short stay/visitor parking in central Takapuna (area shaded yellow and red in currently exceeds the demand by about 300 spaces. The projected economic growth of Takapuna is expected to generate an average demand of an additional 145 spaces every 5 years, meaning that the current 'surplus' would be absorbed over the next 10 years. An additional 580 (4x145) visitor parking spaces may, however, be required between 11 and 30 years in the future to accommodate the projected growth.

In addition, some on-street parking would be lost through the street network changes outlined in the Takapuna CBTS. The reduction in short stay parking can be limited to approximately 100 spaces, if accompanied by the conversion of all on-street parking in the "blue" area in Figure 14 below to short stay. These 100 spaces will need to be replaced in the next 6 to 10 years assuming the proposed street improvements take place over that period.

Figure 14: Proposed short stay parking boundary (in blue)

4.3.2 Long Stay/Employee Parking

Surveys indicate that the current supply and demand for long stay/employee parking in the Takapuna Centre is in relative balance.

The philosophy behind maximum parking ratios is that over time parking prices will approach resource costs and market forces will then provide additional parking. This additional parking could take the form of stand-alone parking developments provided by the private sector or the sale or lease of vacant ancillary parking in existing developments.

Over the short term, however, steps should be taken to avoid a significant shortfall in long stay parking in central Takapuna as that may discourage much needed investment in new developments. The proposed improvements to Takapuna's street network in the Takapuna CBTS, plus potential Waterfront Development, could result in the loss of 77 to 253 long stay parking spaces. Due to the 'fragility' of the economy of Takapuna it is considered that these should be replaced over the short to medium term.

Section 2.3 above indicated that an additional 7,900 employees is forecast for Takapuna by 2041. Even assuming a reduction in private vehicle mode share from 82% in 2011 to around 60% by 2041[32], a further 4,600 employee parking spaces are estimated to be required as 'ancillary parking' in new developments to meet the expected parking demand.

The *Proposed Auckland Unitary Plan*[33] supposes that for the Takapuna Centre a maximum parking rate for office developments should be imposed at a rate of 1 space for every 30 m^2 of gross floor area (GFA). This maximum parking rate is considered appropriate for employee parking within Takapuna, although it may be appropriate to reduce this maximum to 1:35 m^2 GFA in approximately 15 years, depending on changes to private vehicle mode share, public transport and active mode share.

Applying the *Proposed Auckland Unitary Plan*'s parking maximum rates to the expected office, retail and other land use activities expected in Takapuna over 30 years produces a maximum increase in on-site parking supply in new developments of 6,630 spaces. The assessed potential additional demand of 4,600 spaces is equivalent to 69% of this permitted maximum under the *Proposed Auckland Unitary Plan.*

The *Proposed Auckland Unitary Plan*'s maximum parking ratio of 1:10 m^2 GFA for retail food and beverage is considered to be generous, and it is recommended that this be reduced.

4.3.3 Anzac Street Car Park

The Anzac Street car park is ideally located for visitor car parking and should continue to be priced to encourage short stay parking. It is understood that it will be retained following potential redevelopment of the site. The redevelopment should provide at least the current 245 spaces.

[32] It is acknowledged that this figure of 60% is lower than the figure of 69% derived from the future models, in Section 3

[33] *Proposed Unitary Plan*. Auckland Council, March 2013

4.3.4 Gasometer Car Park, Huron Street

It is understood that the redevelopment of the former Gasometer site may include a 600 space parking facility. The facility would add significantly to the parking supply in Takapuna. In view of the current 'surplus' of short stay parking, it is very likely to initially cater predominantly for long stay/commuter parking. To reduce the impact of such a large increase in supply, it is recommended that at the same time:

- The area within the blue line in Figure 14 should be converted to short stay parking only
- Clearways should be introduced on Killarney Street between Auburn Street and Lake Pupuke Drive and on Burns Avenue south of Bracken Avenue, to assist general traffic and cyclists
- All parking on Tennyson Avenue should be limited to short stay (or resident) parking.

These actions would reduce the amount of long stay parking in Takapuna by approximately 160 spaces. Together with the proposed street network changes and Waterfront redevelopment they could reduce the available supply by between 237 and 336 spaces. They would also temporarily increase the short stay parking supply in the 'blue' short stay parking area.

Changes to the pricing structure and operation of the facility should be introduced over time. To enable these changes to be implemented as/when required it is essential that the public sector retain control over the car park pricing structure. A suitable timetable is:

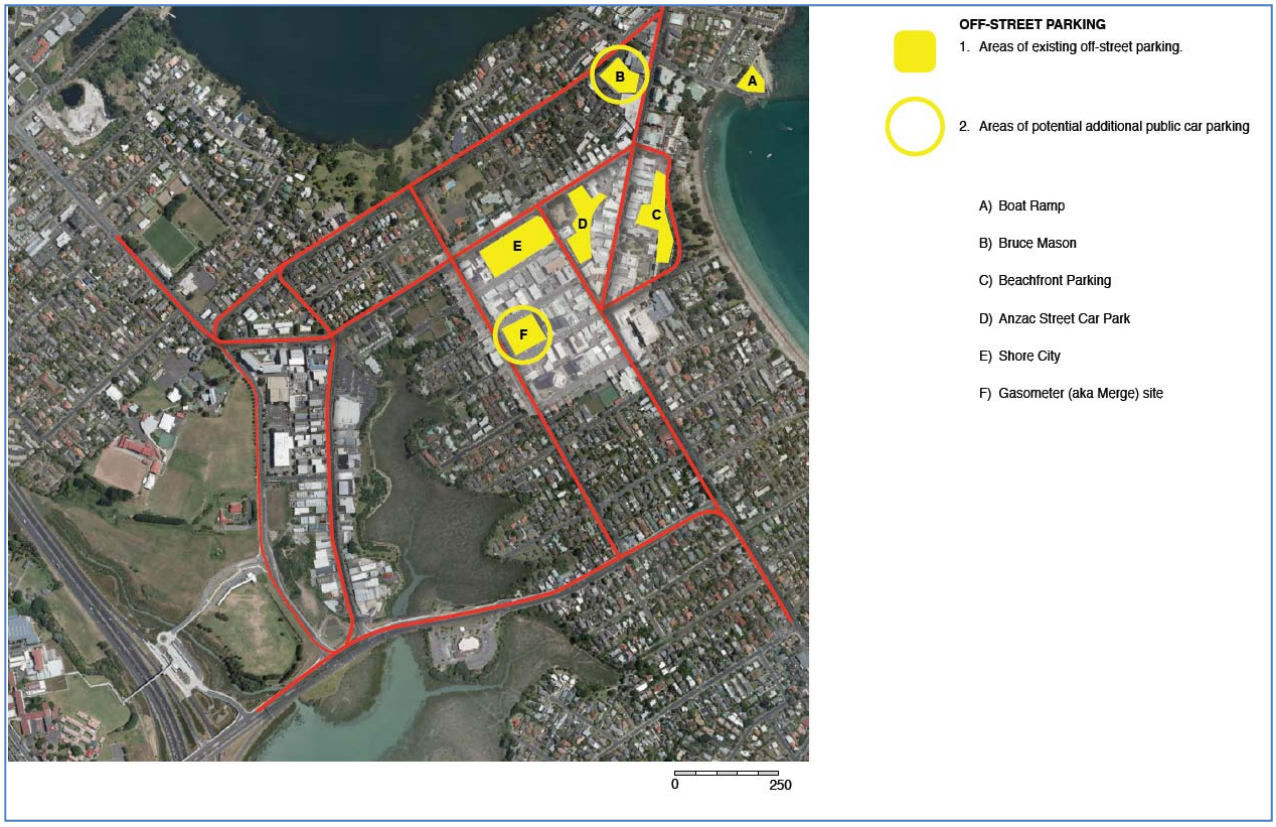
- Years 6-10: Convert approximately 100 spaces to short stay to accommodate on-street parking losses resulting from implementation of the proposed street network improvements
- Years 11-30: Convert up to 145 spaces every 5 years to short stay operation. Provide additional spaces elsewhere if required towards the end of the 30-year period.

4.3.5 Alternative Parking Facilities

Should the Gasometer site parking facility not go ahead, it will be necessary to find an alternative site or sites capable of eventually accommodating up to approximately 700 parking spaces (with the final number reviewed later in the planning period and reduced if appropriate). The parking facility may not be required within the next 5 years. It should cater for short stay parking needs and, initially, long stay parking displaced from central Takapuna locations. A public parking facility catering predominantly for visitor parking should be located with the area highlighted red in Figure 14 if feasible.

Figure 15 illustrates the existing off-street parking and identifies two potential additional public parking locations.

Figure 15: Existing Off-Street Parking and Potential Public Parking Facilities



4.3.6 Shared Parking

Under the maximum parking provisions for the Takapuna Centre included within the *Proposed Auckland Unitary Plan*, decisions on the provision of parking associated with individual developments are to be determined by resource consent applicants. The provision of public parking to replace any resultant demand shortfall is to be based on a business case, taking into account assessed demand and parking fee income.

It is desirable that the public sector should identify a suitable parking facility location (or locations) to help give greater certainty to prospective developers that a parking facility will indeed be provided. Identified funding and purchase of a suitable site (or sites) would provide increased certainty.

Shared parking (i.e. parking available to all users and not allocated to individual developments) makes better use of the available parking, as spaces are not allocated to individual users. It is desirable that any stand alone parking facility should be managed as a shared parking facility. In a situation such as Takapuna, where the car mode share is predicted to decrease over time, car parking demand reductions will result in surplus on-site parking at existing developments. Providing parking within a shared, public facility would allow such surpluses to be managed through pricing and, if appropriate, allow surplus capacity to be removed.

4.3.7 Retail Frontage Control

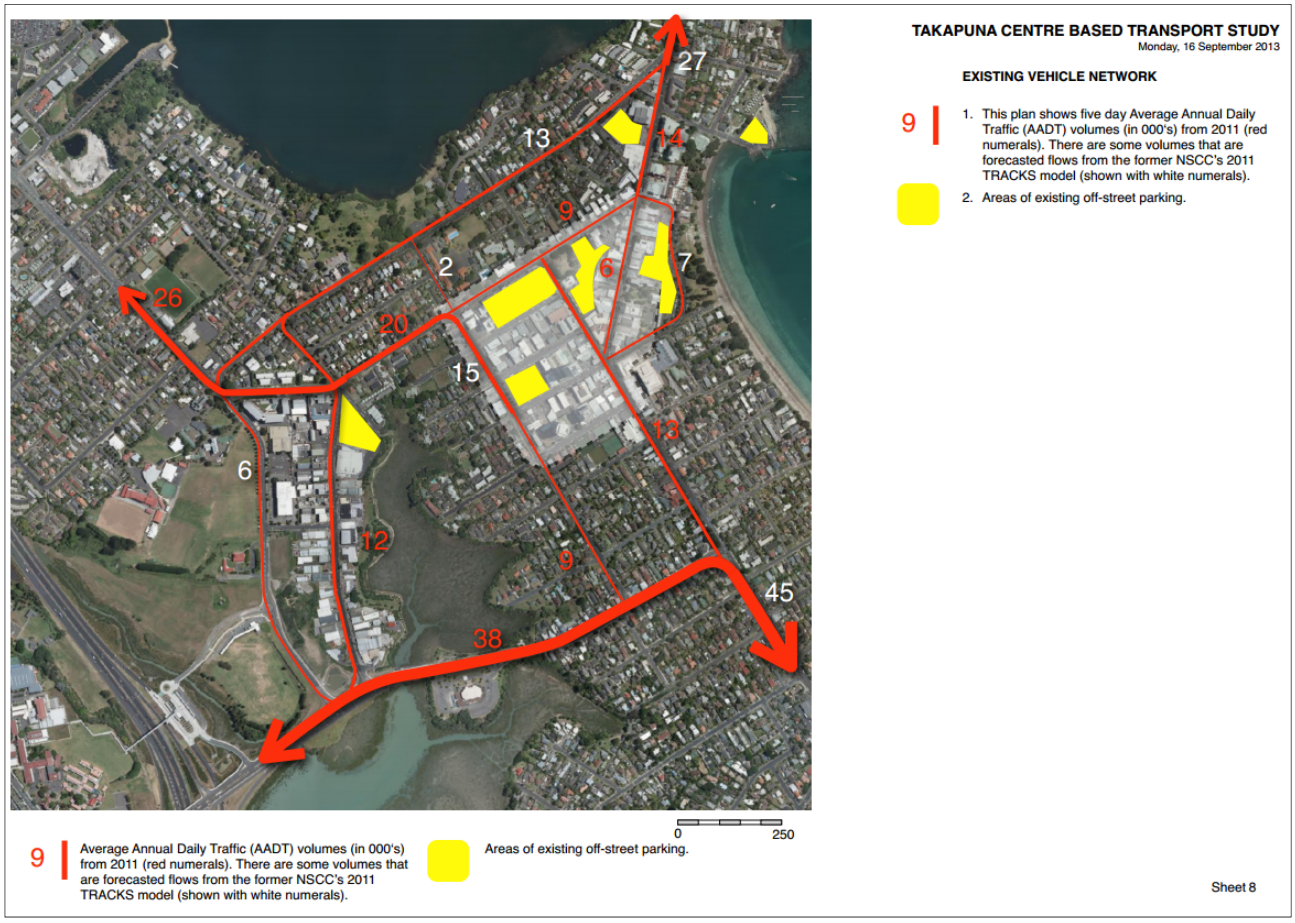
The *Proposed Auckland Unitary Plan* also proposes a Retail Frontage Control within much of the Takapuna Centre, restricting vehicle access to these sites. Enforcement of this rule as currently drafted[34] could require the construction of a parking building or buildings to provide replacement ancillary parking to serve the affected new developments within the retail frontage control area. It is recommended that the application of the retail frontage control to the Takapuna Centre be reviewed by Auckland Council.

4.4 General Traffic

A fundamental matter for general traffic accessibility relates to the limited number of routes in and out of the Takapuna Centre, namely, Taharoto Road, Esmonde Road and Hurstmere Road. Lake Road provides a fourth route, but this only serves the Devonport Peninsula and therefore does not provide linkages to other parts of Auckland.

The existing daily traffic flows are summarised in Figure 16 below.

Figure 16: Existing Traffic Flows and Vehicle Network



[34] *Proposed Unitary Plan*. Auckland Council, March 2013. Rule 4.2.1.3.3.1

4.4.1 Road Hierarchy

The *Operative District Plan*[35] defines the road network according to a hierarchy. This hierarchy includes two levels of "arterial" roads:

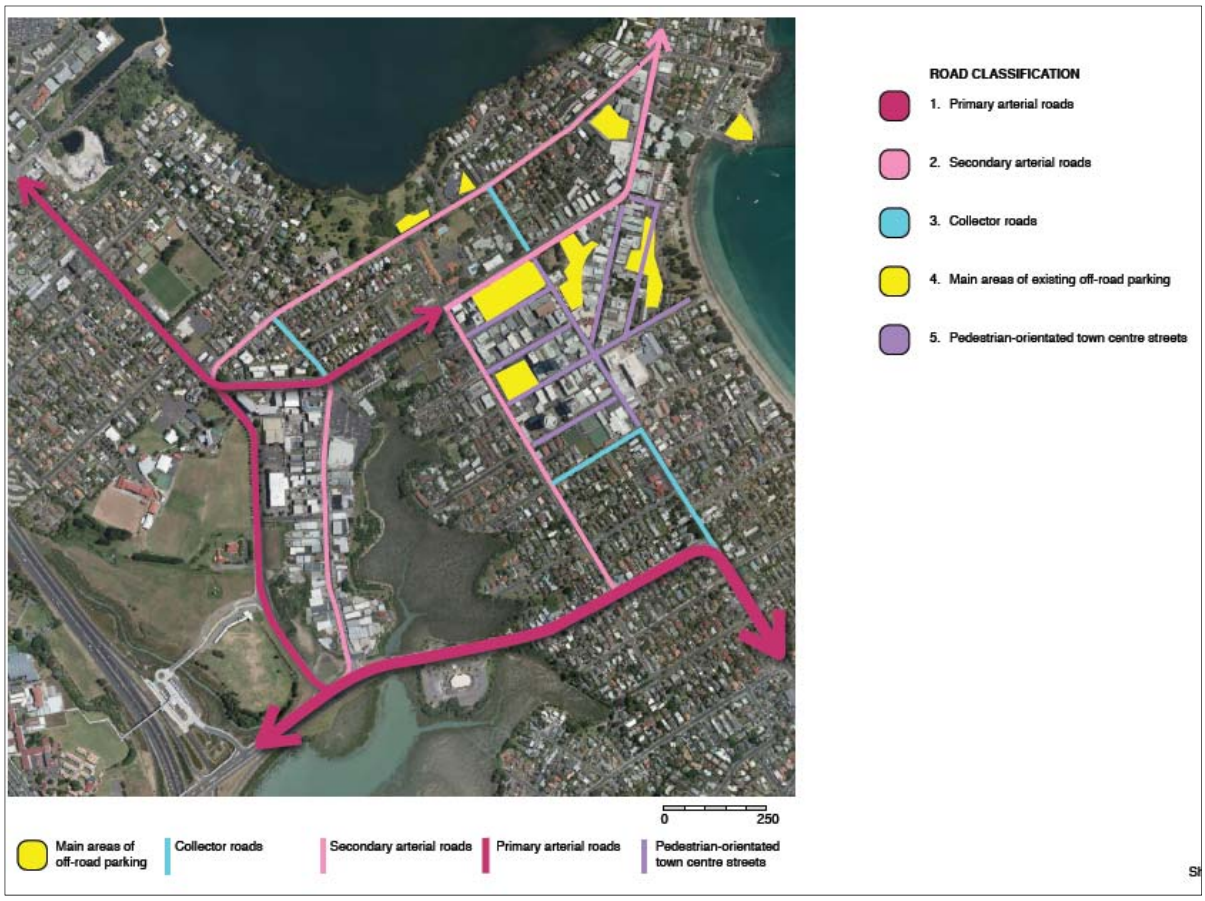
- Primary arterials serve an arterial function of strategic importance between regions or within districts. These roads generally provide access to significant areas of population and provide significant inter-urban links. Access to and from properties is allowed but may be restricted
- Secondary arterials are roads catering primarily for traffic movement between major areas of the city and are of strategic importance, a function partly shared with primary arterials. Secondary arterials are an essential element to sustain general travel in the city and an appropriate level of user service needs to be provided

Based on an assessment of the future roles of the routes within Takapuna, Figure 17 provides a proposed future road hierarchy for the area. The following key points are noted:

- Esmonde Road is currently classified as a primary arterial route. This is appropriate as it serves traffic to and from the Devonport Peninsula as well as Takapuna
- Taharoto Road and Anzac Street are also currently classified as primary arterial routes. The status of Taharoto Road is appropriate, but it is worth considering whether Anzac Street needs to retain this classification, or whether the diversion of some through traffic around rather than through Takapuna Centre, via Fred Thomas Drive, Killarney Street, and to a less extent, Barry's Point Road, is sufficient to justify a downgrade in the status of the route
- Fred Thomas Drive is also classified as a primary arterial route. This is considered appropriate as through traffic is relatively unimpeded by vehicle accesses, unlike the alternative parallel route, Barry's Point Road
- As shown in Figure 17 it is proposed that Barry's Point Road, Killarney Street, Burns Avenue/Auburn Street, (as far north as Anzac Street) and Anzac Street, (east of Auburn Street) should be defined as secondary arterial roads.

[35] *Auckland Council District Plan, Operative North Shore Section 2002*. Updated January 2011. Part 12, Transportation

Figure 17: Proposed General Traffic Road Hierarchy



4.4.2 Changes to General Traffic Operations

Section 5 of this report sets out various proposals to change operations for general traffic within Takapuna. In summary these include:

- The reintroduction of the right turn from Esmonde Road to Burns Avenue, to allow some traffic to pass around rather than through the Takapuna Centre
- The reorientation of the intersection of Hurstmere Road/Killarney Street, and the introduction of traffic signals, to create a gateway and to encourage some traffic to pass around rather than through the Takapuna Centre
- Changes to the layout at the Taharoto Road/Killarney Street/Anzac Street/Fred Thomas Drive intersection to also encourage traffic to pass around the Takapuna Centre
- The introduction of traffic signals at intersections along Burns Avenue/Auburn Street, partly to allow for safe and convenient turning traffic, and also to provide crossing facilities for pedestrians
- The introduction of traffic signals at the intersection of Killarney Street/The Terrace, partly to allow some traffic to avoid the eastern end of Anzac Street and the section of Hurstmere Road between Killarney Street and Anzac Street, and also to provide crossing facilities for pedestrians
- Changes in the operation of the intersection of Lake Road/Anzac Street, from roundabout to traffic signal control, primarily to provide safe pedestrian crossings

- Measures at the intersection of Lake Road/Hurstmere Road (Halls Corner) to reduce the number of signal phases, to reduce delays, particularly for pedestrians
- The provision of improved facilities for pedestrians at the intersection of Hurstmere Road/Anzac Street.

The congestion experienced on Esmonde Road, and connecting roads, is a product of the motorway operation rather than of the local road network within Takapuna itself. Nonetheless, the implication of the above congestion on public transport is that buses will increasingly become caught up in general traffic congestion. The provision of improved bus priority, allowing buses to avoid these queues, will clearly become increasingly more important.

A key issue for future traffic operations in the Takapuna Centre relates to the predicted effects of reallocating an existing eastbound traffic lane on Anzac Street to bus use, in the short-medium term. This is further described in Section 5 below.

The 2041 traffic demands, for a situation without an additional Waitemata Harbour Crossing, indicate that congestion approaching the Northern Motorway is predicted to increase over time. The following comments relate to the forecast 2041 scenario following the investment in public transport, active transport and moderate parking restraint as recommended by this Study:

- Severe congestion currently extends back from the Northern Motorway along Esmonde Road during the weekday morning peak. In the future, queues are predicted to extend back to Lake Road, and some way up Fred Thomas Drive, Barry's Point Road and Burns Avenue. However, these queues are not predicted to severely effect traffic in and through Takapuna during the morning peak period
- Congestion also currently occurs back from the Northern Motorway along Esmonde Road during the weekday evening peak period, but only occasionally. In the future, these queues are predicted to extend further back up Esmonde Road on a more regular basis
- Increases in congestion are also predicted at the Taharoto Road/Northcote Road intersection, in the evening peak period.

4.5 Walking

4.5.1 Projected Demand for Walking

The projected demand for active trips, based on specific ART model zones in 2041, is illustrated in Figure 18 below. High demand, as indicated by the size of the dot, is projected within and surrounding Metropolitan Centres including Takapuna. Given that walking is generally accepted as being undertaken for shorter trips of less than 2 km, the Study area is particularly well suited to accommodate significant increases in pedestrian journeys.

Figure 18: Projected Demand for Active Transport, (Walking and Cycling) in 2041[36]

4.5.2 Takapuna Centre Walkability Assessment

A walkability assessment of the Takapuna Centre was undertaken by Urbanismplus Ltd[37], as part of this study. Appendix E contains the *Takapuna Centre Walking Accessibility Report.* The assessment is an urban design led analysis based on qualitative and quantitative methods, using desktop and on site observations. The assessment identifies the most walkable areas in Takapuna, and determines the built form and pedestrian amenity condition of those areas.

The product of the assessment is a starting point for identifying locations and physical pedestrian improvements and interventions where development could be best directed, and where Auckland Transport could address or influence future land uses which affect the pedestrian environment.

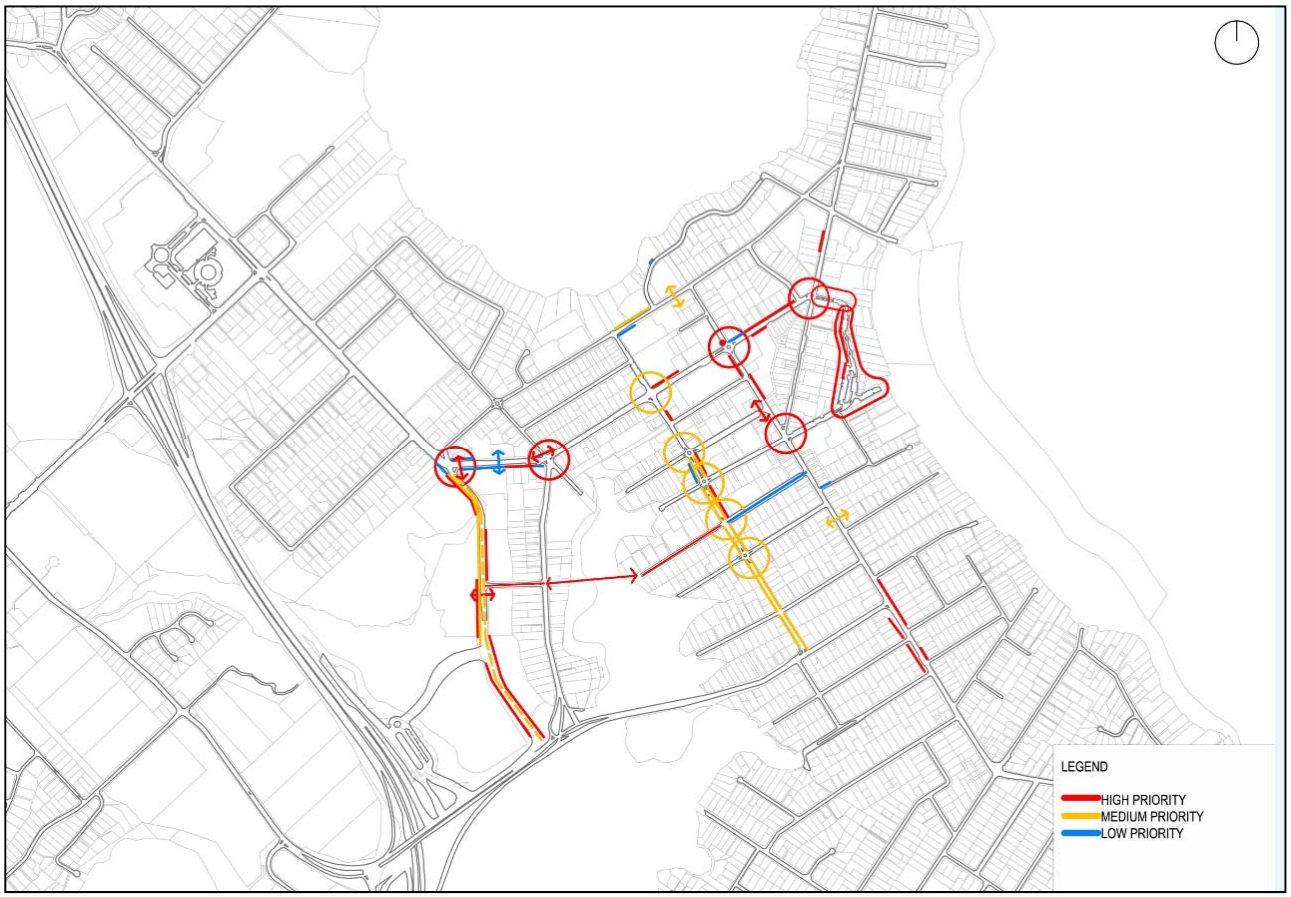
4.5.3 Prioritised Interventions to Improve Walking Accessibility and Support Growth

The *Takapuna Centre Walkability Assessment* found that a significant amount of work could be undertaken to improve walkability across identified 'hotspots'. The built form quality and pedestrian amenity of these hotspots were assessed to highlight a number of opportunities for improvement that would provide the most immediate benefit. This method is one way of directing upgrades which could be undertaken to improve walking accessibility.

A full list of recommended upgrades, including medium and low priority projects for the Takapuna Centre, is provided in the *Takapuna Centre Walkability Assessment* and is summarised in Figure 19.

[36] Integrated Transport Programme 2012-2014. Auckland Transport, March 2013, pp 48, (image modified).
[37] Takapuna Centre Walkability Assessment. Urbanismplus Ltd, June 2013

Figure 19: High, Medium and Lower Priority Walking Interventions



4.5.4 High Priority Pedestrian Interventions

The following have been assessed as high priority areas requiring improvements:

- The roundabouts at Anzac Street/Lake Road and Anzac Street/Hurstmere Road are difficult for pedestrians to cross
- The corner of Anzac Street and Lake Road has landscaping on public land that creates a barrier for pedestrians
- The intersection of Lake Road/Hurstmere Road (Halls Corner) includes long distances to cross, for those who want to travel diagonally through the intersection
- The corner of Lake Road and Huron Street has visibility issues and conflicts with buses at the zebra crossing
- The corner of Anzac Street and Fred Thomas Drive is confusing and requires pedestrians to cross multiple sections of road to cross one road
- The corner of Lake Pupuke Drive, Anzac Street, and Barry's Point Road is confusing for pedestrians as pedestrians need to cross multiple sections of road to cross one road, and there is no signal at Lake Pupuke Drive
- There are limited crossing points on Fred Thomas Drive
- The Strand has some confusing areas for pedestrians, with faded paving, a slip lane, and footpath compromised by parking.

Previous sections of this report put forward the concept of a connection across the Upper Shoal Bay. A pedestrian and cyclist Link may be perceived by local residents as more acceptable than a new bus connection. A pedestrian and cyclist Link could be a fairly low-key structure, for example, a boardwalk connection and a connection at Northcroft Street may be the preferred location for a pedestrian and cyclist connection.

4.6 Cycling

The draft Auckland Cycle Network[38], (ACN) aligns with the cycle network proposed within the Study area provided at Figure 20 below. The draft ACN aims to provide a three-layered approach to provide a quality, robust and comprehensive network that will make cycling a more attractive and feasible transport option for both commuting and recreation[39].

Figure 20: Existing and Proposed Cycle Network

As shown in Figure 18, the number of active trips is predicted to be high within and surrounding Metropolitan Centres. Given this projection for high demand in the Takapuna Centre and the significant increase in cycling movements recorded in the area[40] further development of the cycle network within Takapuna is needed to support existing cyclists and to encourage more people to cycle for transport and leisure.

[38] Takapuna Centre Walkability Assessment. Urbanismplus Ltd, June 2013
[39] Integrated Transport Programme 2012-2014, Auckland Transport
[40] 2013 Auckland Region Manual Cycle Monitor – North Shore Ward, Gravitas. May 2013. This report notes a 124% increase in cycle movements since 2007 at the intersection of Hurstmere Road/Killarney Street and a 44% increase in cycle movements since 2007 at the intersection of Taharoto Road/Northcote Road.

There is presently a strong cycling connection between the Takapuna Centre and Devonport, supported by dedicated cycle infrastructure on Lake Road. This connection should continue to be enhanced by extending the existing cycle lanes, which stop at Esmonde Road, northwards to the Takapuna Centre.

Cycling projects and infrastructure proposed by this Study include:

- Dedicated cycle facilities on Lake Road between Esmonde Road and Byron Avenue
- A new walking and cycling connection across the Upper Shoal Bay
- A new path for cyclists on the south side of Des Swann Drive, (supporting the Upper Shoal Bay Link)
- A new cycle path on the south side of Byron Avenue or Northcroft Street, (supporting the Upper Shoal Bay Link)
- A new cycle path on the east side of Fred Thomas Drive between Takapuna Landing and Des Swann Drive, (supporting the Upper Shoal Bay Link)
- Dedicated cycle facilities on Anzac Street
- Other projects including intersection improvements and slower speed zones will also have positive outcomes for cyclists. For example, dedicated cycle infrastructure is not proposed on The Terrace, but improvements to intersections at either end of The Terrace will encourage cyclists to use this route.

Progression of the SkyPath project, a proposed walking and cycling connection across the Auckland Harbour Bridge, would likely further increase the attractiveness of Takapuna as an active transport journey destination and origin. Whilst walk or cycle journey distances of approximately 8 km from Britomart to Barry's Point Road and approximately 6 km from Westhaven to Barry's Point Road are considered to be at the upper end of a generally accepted cycle commute, it is deemed viable as a cycle commute route, particularly given the lack of alternative options to cross the Harbour. It is noted that these estimated distances are based on the assumption of a shared path facility alongside State Highway 1 (generally referred to as 'the northern link'). There is no certainty of such a facility, which would be planned and constructed by the Transport Agency, most likely after completion of the SkyPath across the Harbour Bridge

4.7 Transport Network Integration

Figures 21 and 22 seek to bring the separate components of the future transport network for Takapuna outlined in Sections 4.1 to 4.6 together in integrated plans, covering the scenarios without and with a public transport connection across Upper Shoal Bay. The plans have been prepared in the style of 'SmartRoads' maps.

Conflicts within these integrated plans, (that is where a route needs to accommodate differing needs) include the status of Lake Road, (between Bracken Avenue and Anzac Street), Anzac Street, (east of Lake Road) and Hurstmere Road, (between Killarney Street and Anzac Street). Specifically, these roads have a traffic carrying function, including for through traffic (between the Devonport Peninsula and Milford), but they are also within the core area of the Takapuna Centre.

Figure 21: 'SmartRoads' Style Mode Map, without Upper Shoal Bay Link for Public Transport

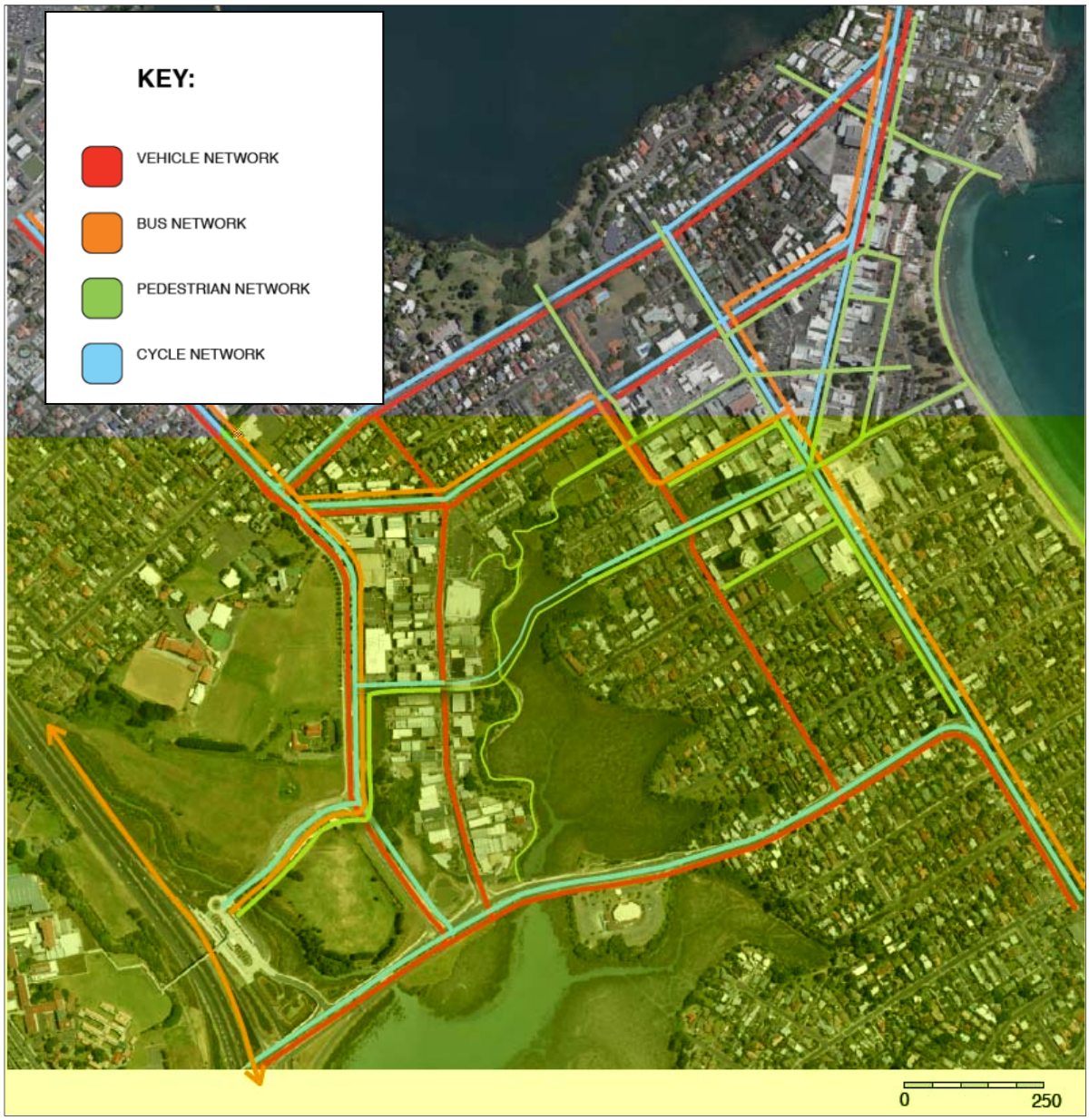


Figure 22: 'SmartRoads' Style Mode Map, with Upper Shoal Bay Link

5 ASSESSMENT OF PROJECTS

Section 4 set out the overall direction for transport for the Takapuna Centre. The three most significant, transformational projects are the development of a 30 kph "walkability" zone, a Link (or Links) across the Upper Shoal Bay and long term relocation of the bus station. This section of the report considers the various individual projects as a series of packages of work within the overall Integrated Transport Plan for Takapuna. The locations of each of the projects are shown in Figure 23, with Table 5 providing a list of the projects.

Figure 23: Plan of Transport Projects for Takapuna

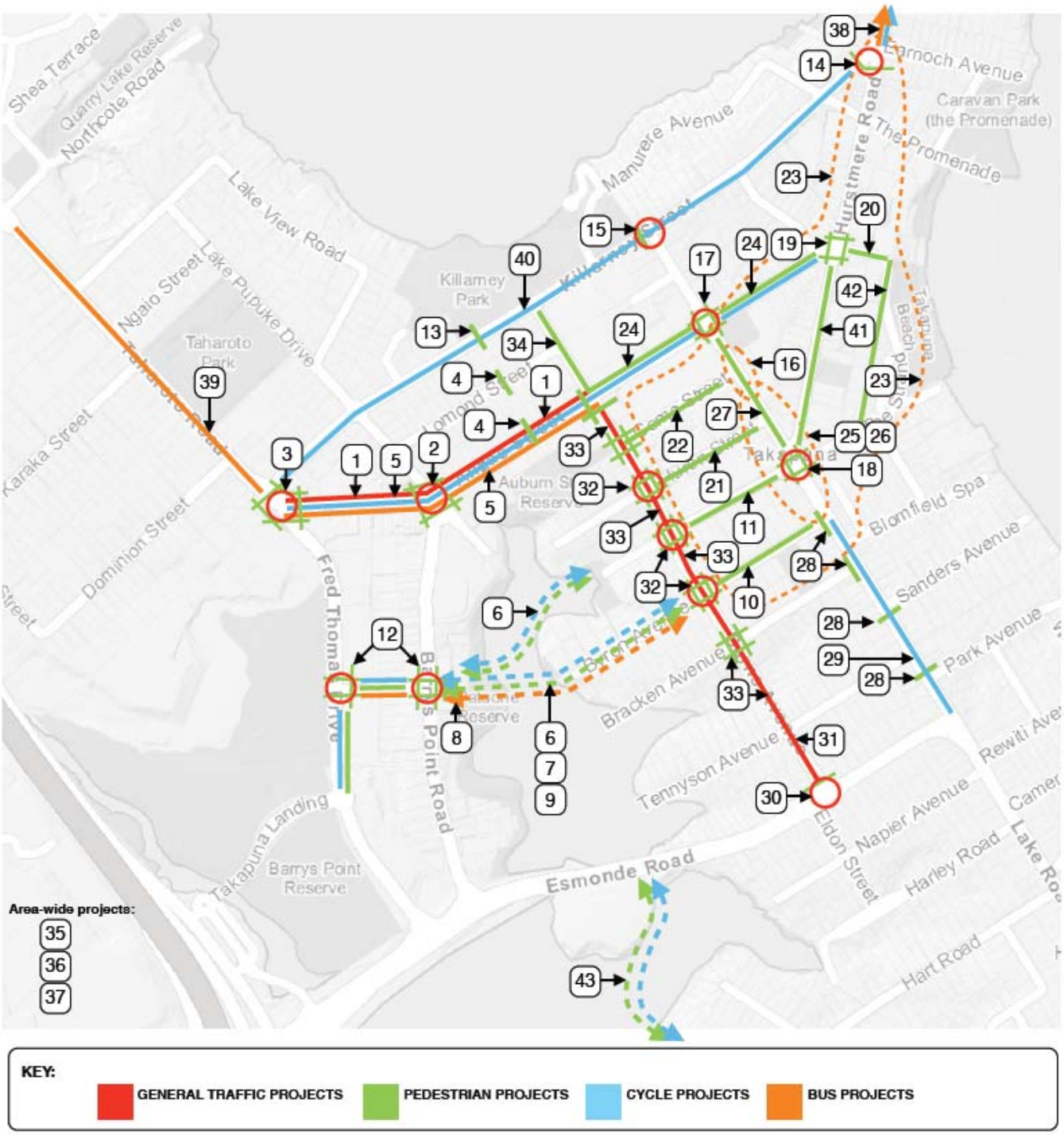


Table 5: List of Projects

	Project	Description
Package 1: Anzac Street		
1	Anzac Street Widening	Widening of street, within designation, to provide bus lanes
2	Anzac/Barry's Point intersection upgrade	Part of above project, to provide sufficient traffic capacity, and to improve bus reliability
3	Anzac/Fred Thomas intersection upgrade	Part of above project, to provide sufficient traffic capacity and to improve bus reliability
4	Anzac Street pedestrian crossing	Midblock crossing between Barry's Point Road and Auburn Street, as part of proposed connection between Auburn Reserve and Killarney Park
5	Anzac Street streetscape (west of Auburn Street)	Removal of bus lane, to provide greater pedestrian/cycle facilities and to enhance streetscape
Package 2: Upper Shoal Bay		
6	Upper Shoal Bay pedestrian/cycle Link	Boardwalk connecting Barry's Point Road with either Byron Avenue or Northcroft Street
7	Identify preferred option for Upper Shoal Bay bus Link	Consider options for the Upper Shoal Bay bus link identified in this study in more detail, and identify a preferred option
8	Protection of land for Upper Shoal Bay bus Link	Design and designate land needed to deliver Upper Shoal Bay bus link (including connection to Barry's Point Road)
9	Provision of Upper Shoal Bay bus Link	Implement Upper Shoal Bay bus link, including extension of cycleway and bus priorities along Des Swann Drive
10	Byron Avenue streetscape	Streetscape project in short term. Potential PT component, depending on Upper Shoal Bay Link
11	Northcroft Street streetscape	Streetscape project in short term. Potential PT component, depending on Upper Shoal Bay Link
12	Des Swann and Fred Thomas Drive intersections	Will provide onward connections from Upper Shoal Bay link
Package 3: Killarney Street		
13	Killarney Street signalised pedestrian crossing	To provide linkage between Takapuna and Killarney Park
14	Hurstmere Road/Killarney Street signals	Signals, including realignment of intersection
15	Killarney Street/The Terrace signals	Signals proposed partly to allow safe right turns out from The Terrace, but also to allow safe pedestrian crossing movements
Package 4: City Centre Streets		
16	Improvements to bus station	Improvements to facilities for bus passengers
17	Anzac Street/Lake Road signals	Signals, primarily to improve pedestrian connectivity, adjacent to bus station
18	Halls Corner intersection	Signal phase changes, removal of slip lane, and banning of selected movements
19	Hurstmere Road/Anzac St intersection	Provision of pedestrian facilities at roundabout
20	The Strand footpath improvement	Filling gap in existing pedestrian network

	Project	Description
21	Huron Street streetscape	Streetscape project, to improve pedestrian amenity and development potential of surrounding sites
22	Como Street streetscape	Streetscape project, to improve pedestrian amenity and development potential of surrounding sites
23	30 kph zone	Desire to reduce speed environment within Takapuna Centre
24	Anzac Street streetscape (east of Auburn)	Streetscape project, to improve pedestrian amenity
25	Investigate relocation of bus station and secure site	Investigate further the potential implications and alternatives for a new bus station and secure a site for this purpose
26	Relocation of bus station	New, probably off street facility, to remain in central location. Will include property purchase (if off street)
27	Lake Road streetscape	Streetscape project, to improve pedestrian amenity
Package 5: Lake Road		
28	Lake Road pedestrian crossings	Provision of pedestrian crossing facilities, partly to connect Upper Shoal Bay to Takapuna Beach
29	Lake Road cycle lanes	Provision of cycle lanes (including some loss of on street parking)
Package 6: Burns Avenue/Auburn Street		
30	Burns Ave/ Esmonde Rd intersection	Additional pedestrian crossings to be provided, plus right turn into Burns Ave to be reinstated
31	Tennyson Ave intersection	Ban right turns, to improve safety
32	Signals at Huron, Northcroft, Byron	Signals proposed, partly to provide for turning traffic and also to provide for pedestrians and cyclists
33	Burns Ave/ Auburn St street-scape (south of Anzac St)	Streetscape project, to improve pedestrian amenity
34	Burns Ave/Auburn St streetscape (north of Anzac St)	Streetscape project, to improve pedestrian amenity past school
Package 7: Parking		
35	Alteration of parking to short stay only	Implement parking restrictions and appropriate pricing within central area to short stay parking only, plus other changes outlined in CPMP.
36	Protection of land for future off-street parking facility, then construct facility	Construction of a parking facility (or facilities) capable of eventually accommodating up to 700 short stay parking spaces.
Package 8: Projects proposed through other studies		
37	Alteration of parking to short stay only	Implement parking restrictions and/or appropriate pricing to achieve desired outcome
38	Hurstmere Road (north of Killarney St)	Cycle lanes, with partial bus lanes
39	Taharoto Road	Partial bus lanes
40	Killarney Street	Cycle Lanes
41	Hurstmere Rd (Anzac to Lake)	Streetscape project
42	The Strand Redevelopment	Streetscape project
43	Francis Street to Esmonde Road boardwalk	Walking and cycling connection

5.1 Package 1: Anzac Street (west of Auburn Street)

There have been proposals to widen Anzac Street for some time. The Notices of Requirement for the former North Shore City Council project have been completed, as have property purchases and a preliminary design. The scheme has been adopted by Auckland Transport and it features in the Long Term Plan. However, the current scheme was subject to a review by T_2 Engineers in 2013 and the *Takapuna North Corridor Management Plan*[41] *(CMP)* recommended some changes to the scheme, primarily relating to provision for buses and cyclists. The CMP noted the proposals that were emerging at the time through this Centre Based Study, particularly the potential benefits for Anzac Street of pursuing a public transport Link across Upper Shoal Bay.

5.1.1 Midblock Cross Sections

A key issue for this Study relates to improving the provision for and reliability of buses, to facilitate an increase in the bus mode share for trips to and from Takapuna. Buses can use Anzac Street to head either to Akoranga station, or to Taharoto Road, (and therefore Smales Farm) so this Study has reconsidered potential options for Anzac Street. The main options are:

- The provision of bus lanes in both directions, along with the retention of two traffic lanes per direction. This would either require the acquisition of further land along one or both sides of the street, or it would not provide adequately for pedestrians or cyclists. Therefore this option has not been pursued further, due to the space limitations of the existing 24 m corridor
- The possible removal of an eastbound traffic lane, which would be replaced with an eastbound bus lane. This option would provide a bus lane in both directions, along most but not all of the route
- The longer term removal of all buses from Anzac Street onto the proposed bus Link across Upper Shoal Bay. This would facilitate the removal of bus lanes in both directions, allowing the cross section along Anzac Street to be revisited in favour of pedestrians, cyclists and visual amenity.

As noted above, considerable work has already been undertaken on the existing Anzac Street Widening project and it is in a relatively advanced stage of development. Therefore, this Study has endeavoured to develop concepts that remain consistent with the existing Anzac Street designation.

The development of cross sections for Anzac Street, from the existing situation through to this Study's recommendations, is shown in Figures 25 to 32 below, for the location shown in Figure 24.

[41] *Takapuna North Corridor Management Plan*. Flow Transportation Specialists. August 2013.

Figure 24: Approximate Location of Anzac Street West Cross Sections (see Figures below)

5.1.1.1 Existing Anzac Street Cross Section

The existing midblock cross section along Anzac Street is shown in Figure 25 and Figure 26 below.

The existing layout provides two traffic lanes in each direction, but no bus lanes or cycle lanes, and low pedestrian amenity. It does not meet the requirements of a RTN connection between Takapuna and the Northern Busway, either in terms of travel time, reliability or provision of a dedicated right of way. It should be noted that there is a flush median shown in Figure 25, but this relates only to the section immediately west of Auburn Street, approaching the right turn lane. This flush median does not extend westwards along the entire route.

Figure 25: Existing Anzac Street West Layout

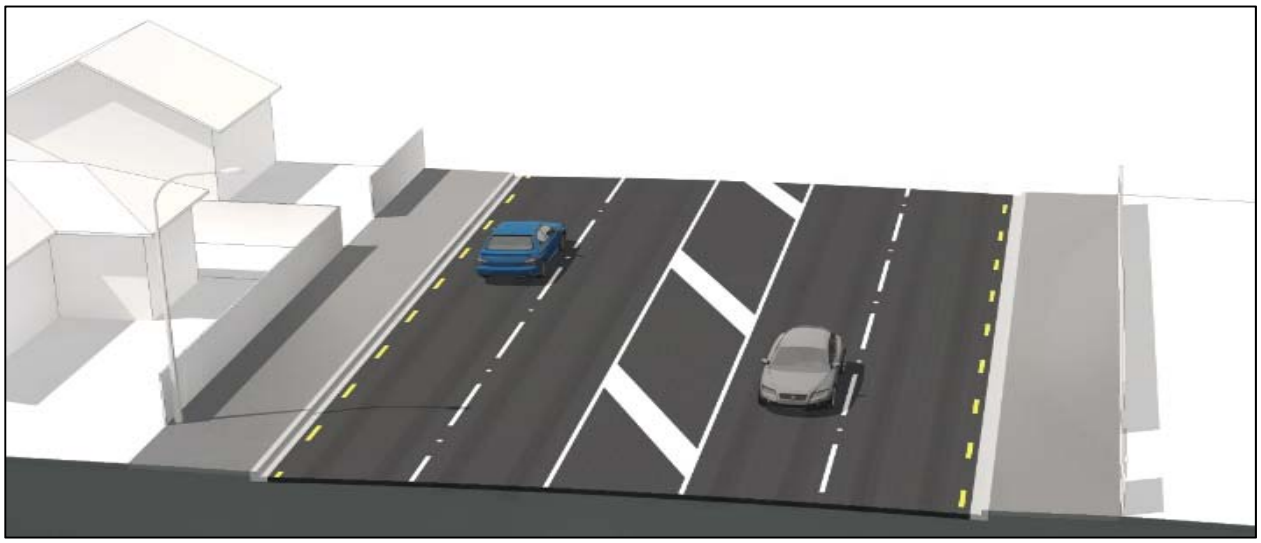
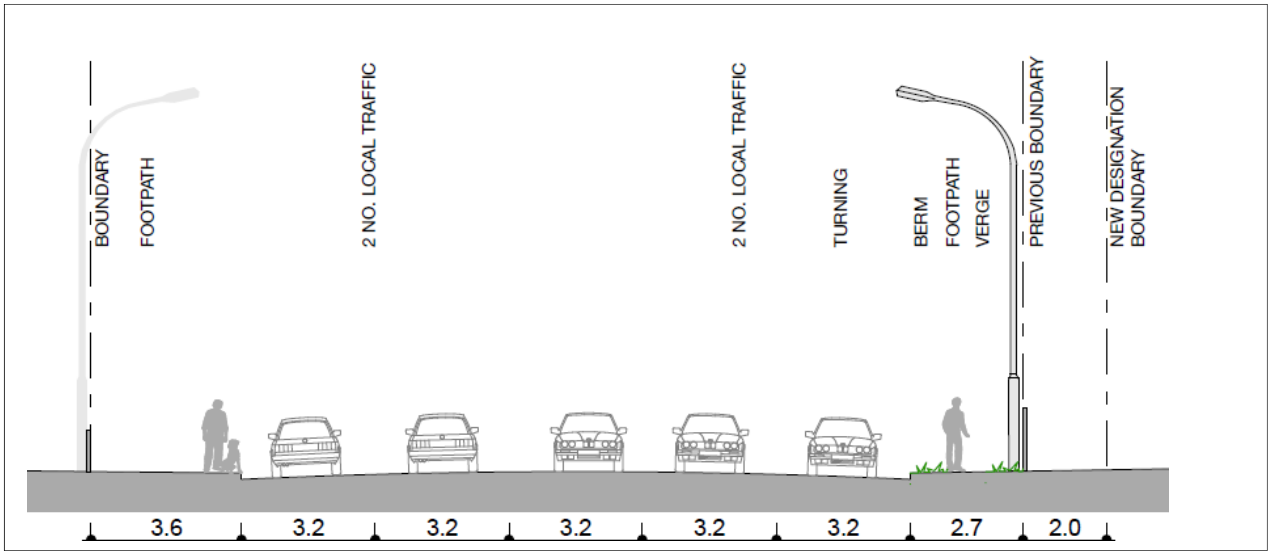


Figure 26: Existing Anzac Street West Layout[42]



5.1.1.2 Current Anzac Street Widening Proposal

The current Auckland Transport proposal for Anzac Street Widening includes the following:

- Four general traffic lanes; three would be 3.0 m wide, with the fourth (the eastbound kerbside lane) being 3.7 m
- One 4.2 m wide westbound bus lane
- A 1.1 m wide raised central median
- No cycle lanes
- A 2.0 m footpath along the northern side, and a 3.5 m footpath/berm on the southern side.

The key objective of the scheme is to provide a westbound bus lane, to allow buses to avoid congestion that occurs primarily in the evening peak, while maintaining two general traffic lanes in each direction. It does not however provide cycle lanes, nor sufficient improvement in pedestrian amenity.

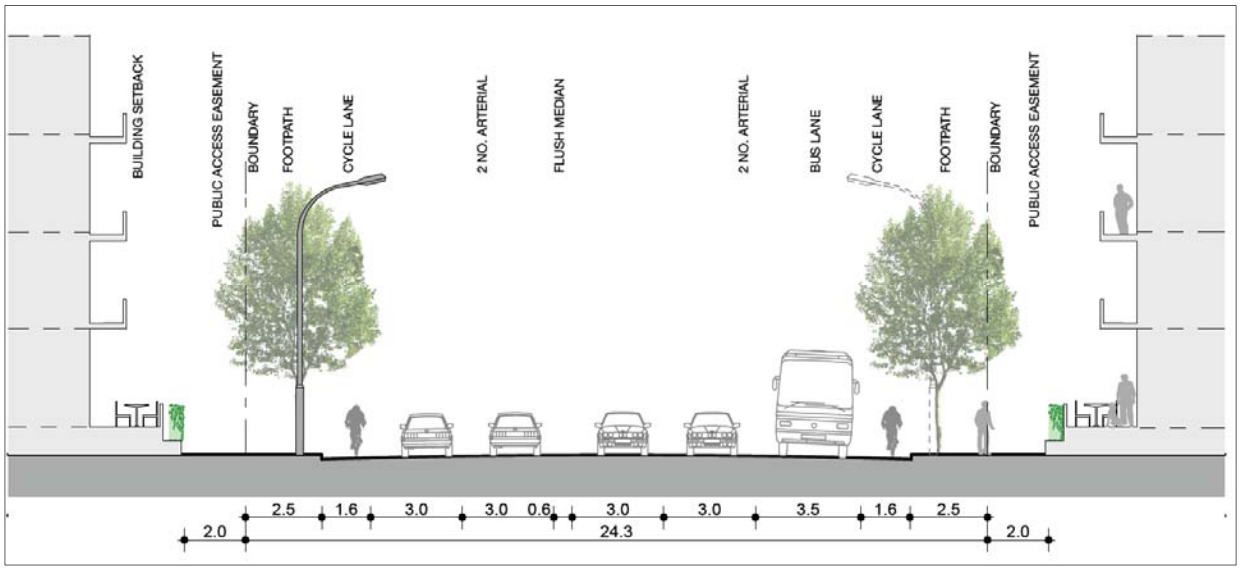
5.1.1.3 Cross Section proposed by Takapuna North CMP

The cross section proposed by the Takapuna North CMP is shown in Figure 27 and Figure 28 below.

[42] This cross section shows vehicles using the central flush median lane. This reflects the fact that the central lane is in fact used by vehicles heading for the right turn lane to Auburn Street

Figure 27: Indicative Anzac Street West Layout - Takapuna North Corridor Management Plan

Figure 28: Anzac Street West Layout - Takapuna North Corridor Management Plan (Indicative)



The CMP scheme proposed changes, from a westbound bus lane along the full route to intermittent westbound and eastbound bus lanes, on the approaches to the key intersections. These would not overlap, and the intention would be to stay within the Anzac Street designation.

By reducing the width of the proposed central median, kerbside lanes are proposed which are wide enough for cyclists, in addition to widening footpaths on both sides of the road.

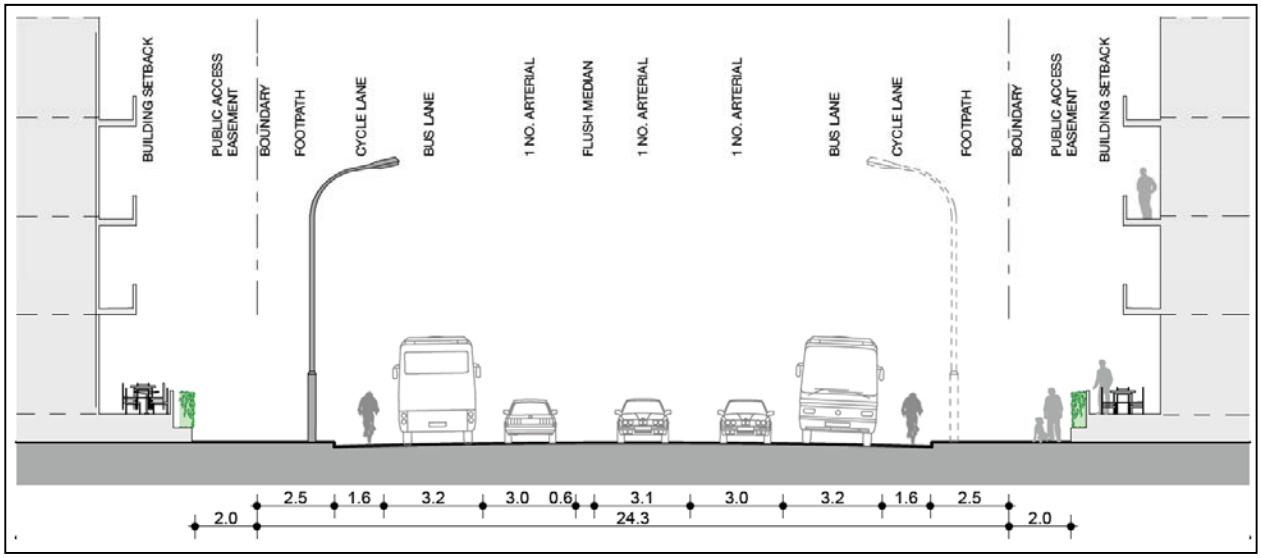
By providing only intermittent bus lanes, it does not guarantee a level of bus service required by an RTN, as buses will continue to be caught up in general traffic congestion.

5.1.1.4 Recommended Interim Cross Section for Anzac Street

The interim cross section proposed by this Study is shown in Figure 29 and Figure 30 below.

Figure 29: Anzac Street West Layout - Recommended Interim Layout (Indicative)

Figure 30: Anzac Street West Layout - Recommended Interim Layout (Indicative)



Until such time as an Upper Shoal Bay Link is constructed, Anzac Street will retain its function as a key bus corridor. The interim scheme accordingly provides bus lanes in both directions along most of the route from Taharoto Road to Auburn Street, by removing an eastbound traffic lane. This option aligns with the strategic direction to provide Takapuna with a higher quality public transport Link to and from the Northern Busway. In the short term it will provide an improved bus service in terms of both travel times and reliability. Also, it maintains the narrow raised central median and the pedestrian and cyclist facilities proposed as part of the CMP scheme.

The scheme has been developed so as to remain within the existing Anzac Street widening designation, requiring no additional property purchase, and without compromising any existing conditions of the Notice of Requirement.

The reduction of eastbound traffic lanes from two to one is considered practicable, on the following basis:

- A certain proportion of through traffic currently using Anzac Street could travel via Killarney Street, encouraged by a package of intersection improvements at either end of Killarney Street and by speed restrictions and streetscape improvements at the eastern end of Anzac Street and on Hurstmere Road. These improvements are inextricably linked to the Anzac Street scheme, and should be constructed as part of the same package of work
- The existing road layout of Anzac Street at the intersection with Barry's Point Road is that Anzac Street has two eastbound lanes. The second of these lanes is a shared right turn and through lane, and a moderate right turn volume in this location reduces the capacity of through traffic to between one and two lanes. Accordingly, the traffic effects of a reduction to a single through lane will be less than may have been anticipated
- Preliminary traffic modelling of the scheme using the Takapuna PARAMICS model indicates that the proposed lane reduction would reduce 2041 peak hour the eastbound level of service (LOS)[43] along Anzac Street from LOS D to LOS E (see Tables B7 to B10, within Appendix B). This level of service during the peak periods is considered appropriate for a Metropolitan Centre environment.

In the short term, this Interim Concept for Anzac Street should provide a satisfactory level of bus service in terms of travel times and reliability. In the long term, higher levels of traffic congestion on Anzac Street, due to the reduction in eastbound midblock capacity for general traffic, and capacity issues at the Fred Thomas Drive and Barry's Point Road intersections, are likely to compromise this level of service, such that this route is unlikely to offer a suitable quality connection to the Rapid Transit Network.

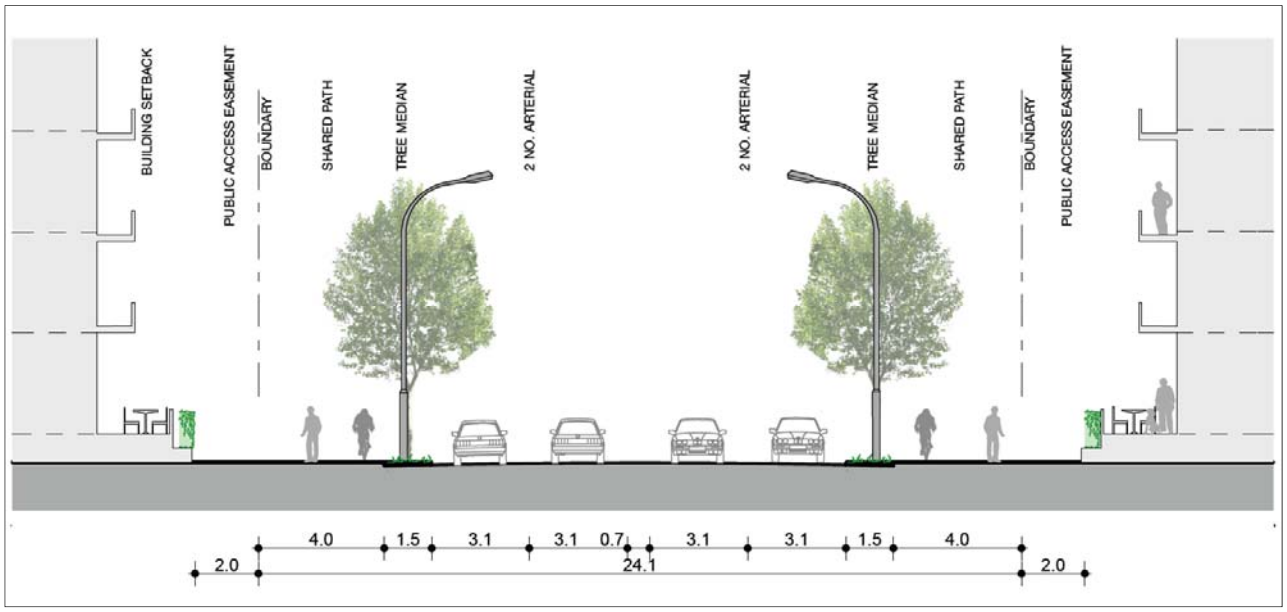
5.1.1.5 Recommended Long Term Cross Section for Anzac Street

The long term cross section proposed by this Study is shown in Figure 31 and Figure 32 below.

43 LOS assessed using method from Highway Capacity Manual, Transportation Research Board, 2000 (Urban Street Class III)

Figure 31: Anzac Street West Layout - Recommended Long Term Layout (Indicative)

Figure 32: Anzac Street West Layout - Recommended Long Term Layout (Indicative)



Construction of the Upper Shoal Bay Link would be a transformational project for Anzac Street, allowing the removal of bus lanes and the reallocation of road space to other users. The proposed long term cross section would therefore see the reintroduction of a second eastbound traffic lane[44], as well as the construction of raised separators between the cycle and traffic lanes. These separators would allow the planting of modest street trees, provide greater cyclist safety and security, and enhance the pedestrian amenity and general streetscape.

Should the Upper Shoal Bay Link not be constructed, then the interim Anzac Street scheme would remain in place permanently. In this way, the interim Anzac Street scheme is an important stepping stone, in that it can be implemented relatively quickly and does not pre-empt the decision making process behind the Upper Shoal Bay Link.

On the other hand, if the Upper Shoal Bay link is to be implemented in the short to medium term, it may be that Anzac Street recommended long term layout should be implemented at the outset. That is to say, one would not invest in an interim solution for Anzac Street if it is likely that this will soon be replaced.

5.1.2 Anzac Street/Fred Thomas Drive/Taharoto Road/Killarney Street Intersection

The above plans relate to the cross section at a midblock point west of Auburn Street. The intersection of Anzac Street/Fred Thomas Drive/Killarney Street is important to the operation of the route and Figures 33 and 34 below show how this intersection could operate, firstly with bus lanes in both directions along Anzac Street (the interim scheme) and secondly with buses travelling between Taharoto Road and Fred Thomas Drive towards the Upper Shoal Bay Link (the long term scheme).

A key change with both of these layouts, compared with the current scheme, is that it is proposed that movements from Killarney Street are retained. Indeed widening to three lanes at the stop line is proposed. This is consistent with the proposals for Killarney Street which are discussed at Section 5.3 below.

It is apparent that the existing layout of the intersection and the proposed layout of the current Auckland Transport project have been constrained to a significant degree by the desire to retain the Morton Bay fig tree on the corner of Anzac Street and Killarney Street. This intersection is important for the accessibility of Takapuna, meaning that the assumed imperative to retain the tree will need to be reconfirmed.

It should be noted that while the long term layout shown in Figure 34 includes a right turn bus lane from Taharoto Road to Fred Thomas Drive, it does not include a bus lane for buses travelling in the opposite direction, ie the left turn from Fred Thomas Drive to Taharoto Road. As a result, buses travelling northbound on Fred Thomas Drive may be caught up with traffic congestion, with this layout.

[44] In other words, this long term scheme would provide the same capacity for general traffic as is envisaged by the current Auckland Transport scheme for Anzac Street, and the scheme proposed by the Takapuna North CMP (see Sections 5.1.1.2 and 5.1.1.3 above)

Figure 33: Fred Thomas Drive/Anzac Street Intersection: Interim Option (Indicative)

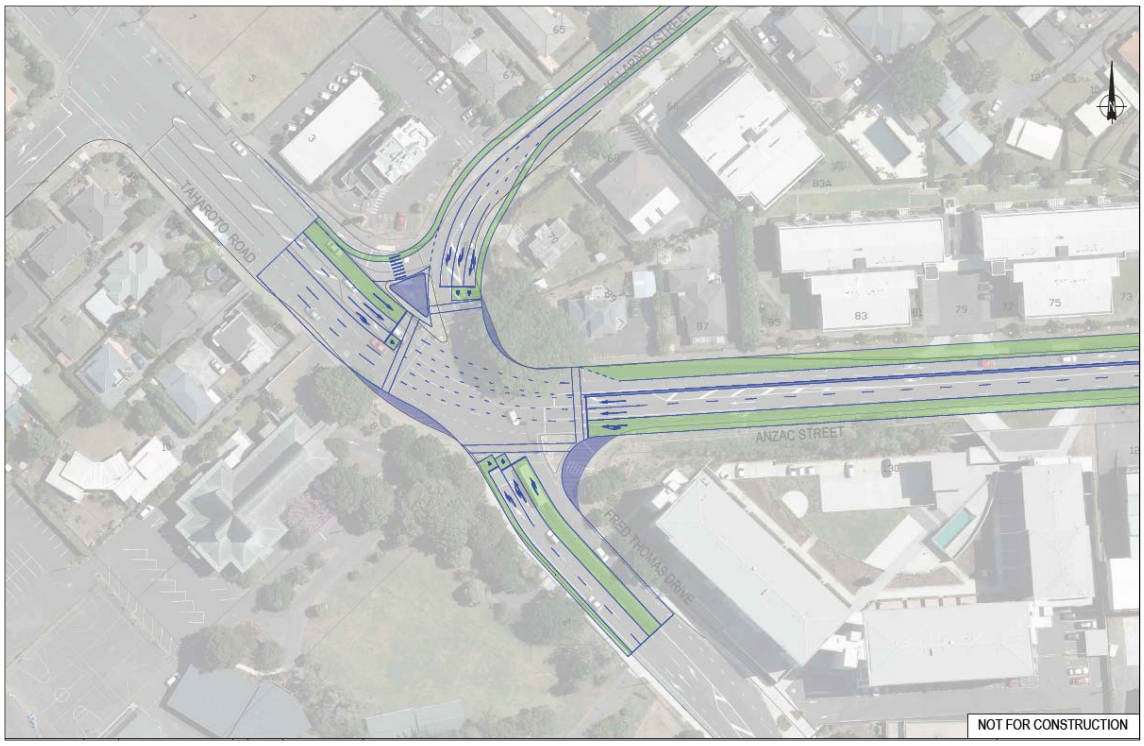
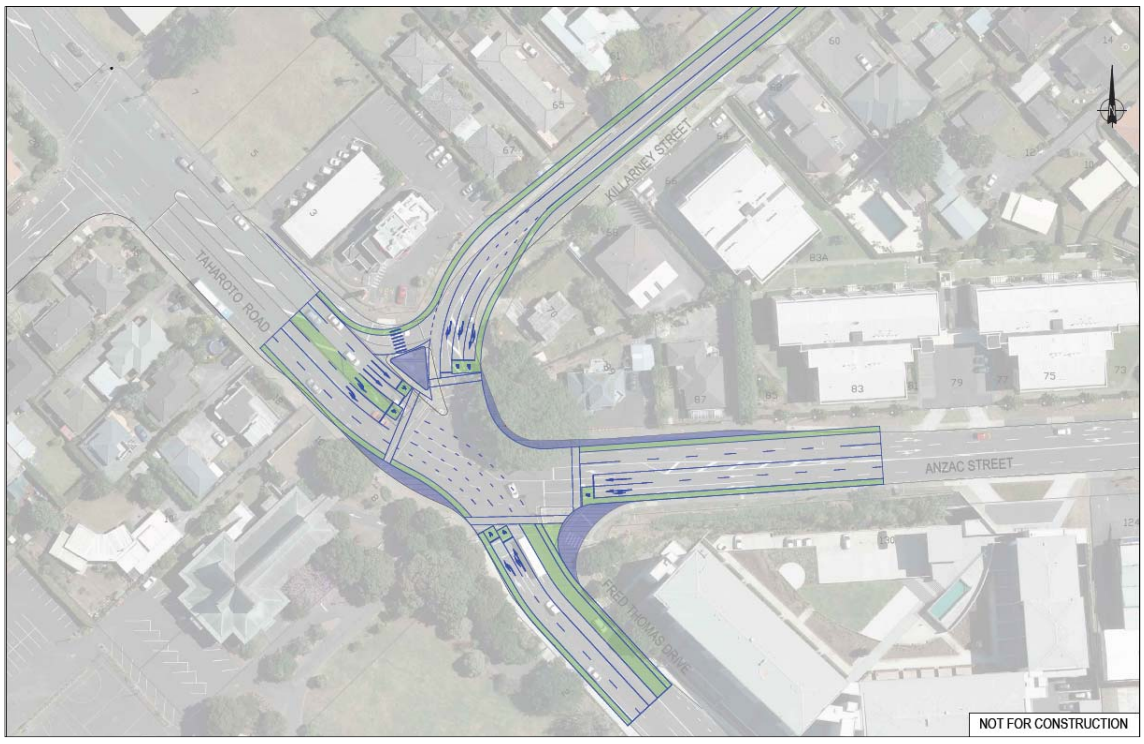


Figure 34: Fred Thomas Drive/Anzac Street Intersection: Long Term Option (Indicative)



5.1.3 Anzac Street/Barry's Point Road Intersection

The intersection of Anzac Street with Barry's Point Road and Lake Pupuke Drive is also important. Two plans are shown below:

- Figure 35 shows the possible layout with bus lanes along Anzac Street in both directions. The eastbound lane would terminate just to the east of this plan. The plan shows a third approach lane from Barry's Point Road, which is not in the current scheme for Anzac Street widening. This third lane will reduce the green time required for traffic from Barry's Point Road, thereby giving greater capacity for traffic along Anzac Street. This will therefore reduce the effect of converting an eastbound traffic lane from general traffic to bus useFrom a pedestrian perspective, it is acknowledged that there may be merit in removing the free flow left turn from Anzac Street (east) into Barry's Point Road
- Figure 36 shows the possible layout with the bus lanes removed. The plan retains the third approach lane from Barry's Point Road referred to above, and it removes the free flow left turn from Anzac Street (east) into Barry's Point Road.

Figure 35: Barry's Point Road/Anzac Street Intersection: Interim Option (Indicative)

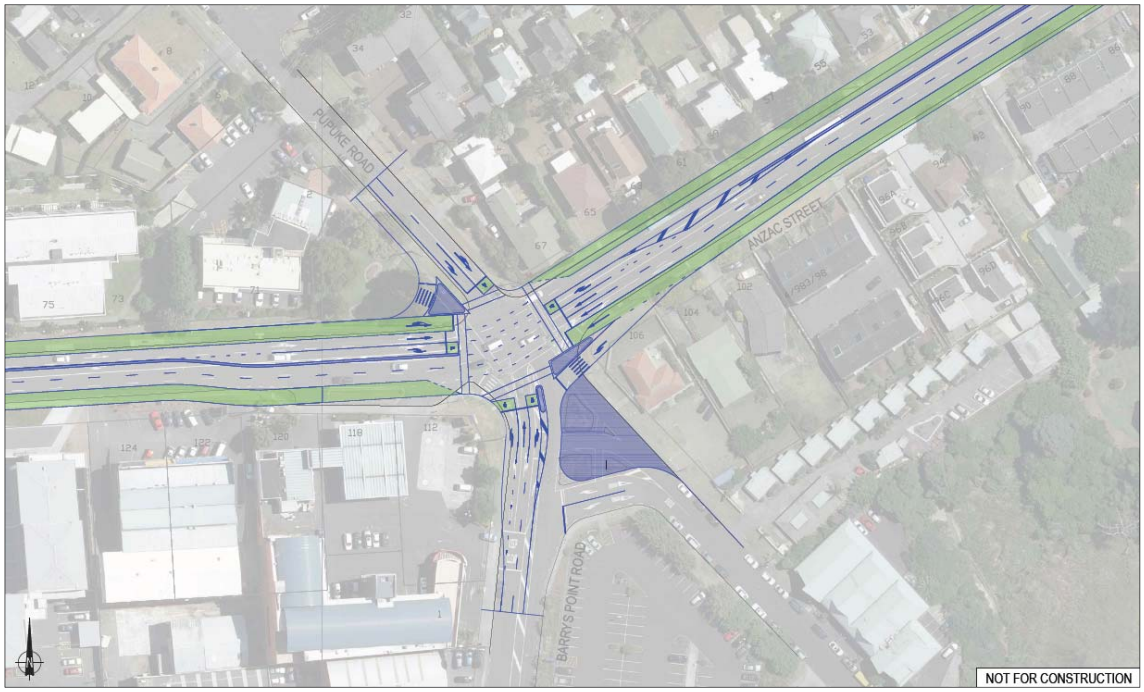
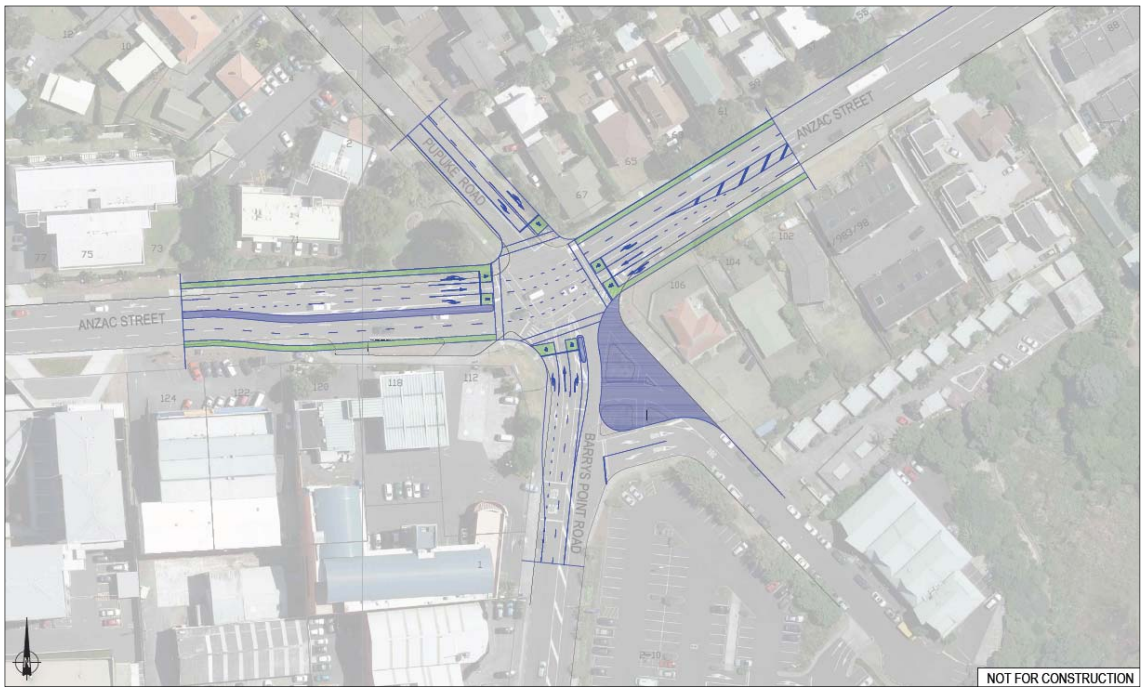


Figure 36: Barry's Point Road/Anzac Street Intersection: Long Term Option (Indicative)



5.2 Package 2: Upper Shoal Bay Link

Sections 4.2 and 4.6 above set out the proposal for a Link (or Links) across the Upper Shoal Bay, for two distinct purposes:

- To provide a quality public transport connection between Takapuna and the rapid transit network (i.e. the Northern Busway)
- To provide a walking and cycling connection between Takapuna and the Barry's Point Peninsula and beyond.

5.2.1 Route Options

A number of different alignments were investigated for a proposed Upper Shoal Bay Link:

- On the western side, connections were considered to Barry's Point Road, either opposite Des Swann Drive or further to the north
- On the eastern side, connections were considered to Como Street, Northcroft Street, Byron Avenue and Bracken Avenue.

The options that are shown in the plans within Section 4 above (such as Figure 22) assume that the Link will connect into Barry's Point Road, opposite Des Swann Drive, to the west, and to either Northcroft Street or Byron Avenue to the east. The advantages and disadvantages of connecting into Northcroft Street or Byron Avenue are as follows:

- A connection to Byron Avenue will offer a shorter crossing of the Upper Shoal Bay, meaning that construction costs will be lower than a connection to Northcroft Street and potentially the environmental effects across the Bay itself may be less

- However, the section of Northcroft Street between the Upper Shoal Bay and Auburn Street is shorter than the relevant section of Byron Avenue. A Northcroft Street public transport connection will therefore have less effects on the amenity of residential properties than a connection to Byron Avenue
- The Northcroft Street option will provide a more direct connection to the Takapuna Centre. As such, it may offer the better connection for pedestrians, cyclists and buses. However, the relative merits of the two routes for buses will depend on the site of the future potential relocation of the Takapuna bus station.

It is anticipated that the Upper Shoal Bay Link is likely to be subject to objection from residents of Byron Avenue or Northcroft Street, and it is acknowledged that an increase in bus volumes along one of these streets will have an impact on that street's character. Similarly there are likely to be concerns relating to the construction of a bridge structure over the Upper Shoal Bay. However, the following points are noted:

- The Upper Shoal Bay Link would be a transformational project, benefiting a large number of bus passengers, pedestrians and cyclists, as well as businesses within Barry's Point
- The Upper Shoal Bay Link would facilitate improvements to the streetscape along Anzac Street
- The environmental quality of Upper Shoal Bay is not currently good and the project could be seen as a catalyst for the regeneration of this area. The area of the Bay to the north of the Link could, for example, potentially be used as a wetland water retention area, improving water quality in the lower section of the Bay
- Takapuna is an area of significant change and a link should be viewed in the context of the long term land uses, which is to include apartments along Byron Avenue and Northcroft Street.

It is recommended that a further feasibility study is undertaken to assess these issues and to identify a preferred option.

5.2.2 Indicative Cross Sections

The following plan shows an indicative cross section for Byron Avenue. The preferred option is for parking to be removed from one side of the street and an off road two-way cycle path separated from the footpath by a berm, possibly planted. A high quality cycling facility is required to support and provide an important connection between Takapuna and Akoranga station, and on towards the SkyPath and proposed northern cycling link.

There is an element of tension between the desires for a high quality link for public transport, compared with the need to retain slow vehicle speeds along a local road in a residential area. The *draft Auckland Transport Code of Practice*[45] (ATCOP) makes references to the need for vehicle lane widths to accommodate the movement of buses, particularly along routes on the Regional Public Transport Plan. Lane widths of 3.2 m, which are the minimum indicated in ATCOP for bus lanes, are shown in the following plans of the proposed link. This is considered appropriate in this instance, partly to discourage high vehicle speeds and partly due to the fact that the link will predominantly be straight. However Auckland Transport may wish to consider lane widths of up to 3.5 m.

[45] Draft Auckland Transport Code of Practice (2013), pages 131 and 335

Figure 37: Approximate Location of Byron Avenue Cross Sections

Figure 38: Existing Local Road Layout (Byron Avenue) (Indicative)

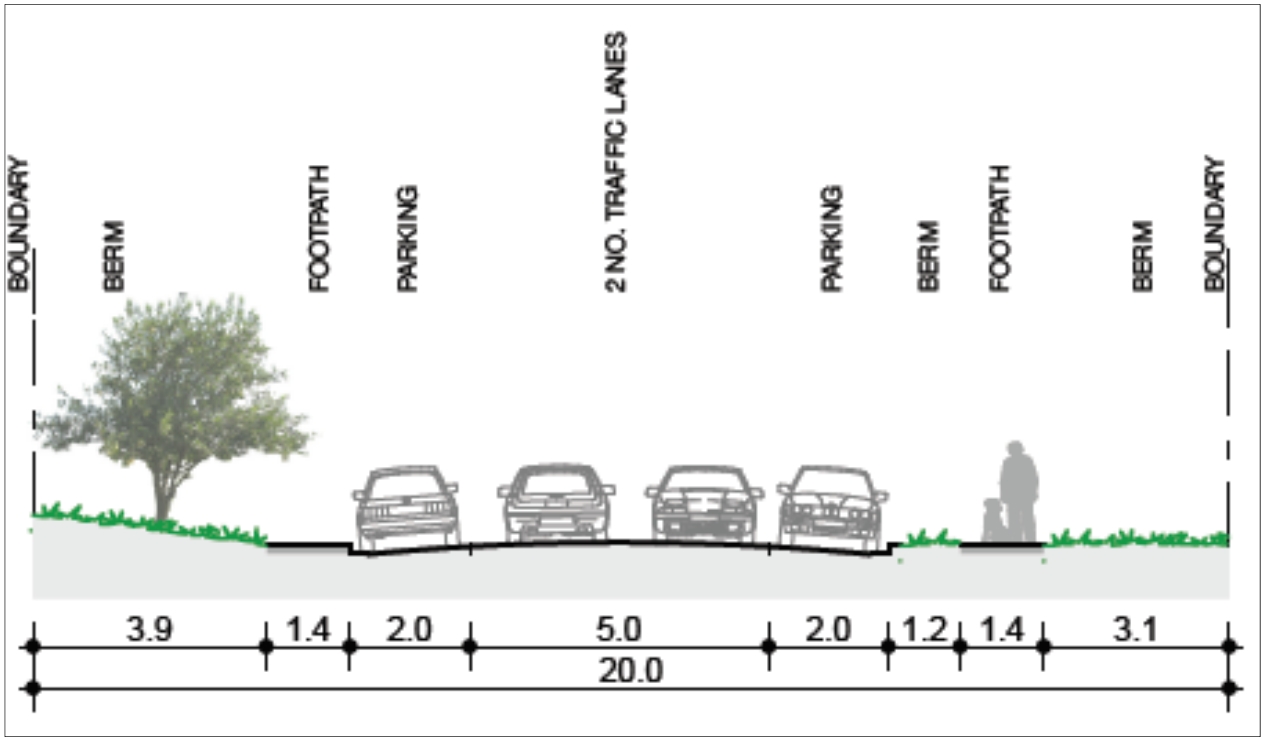
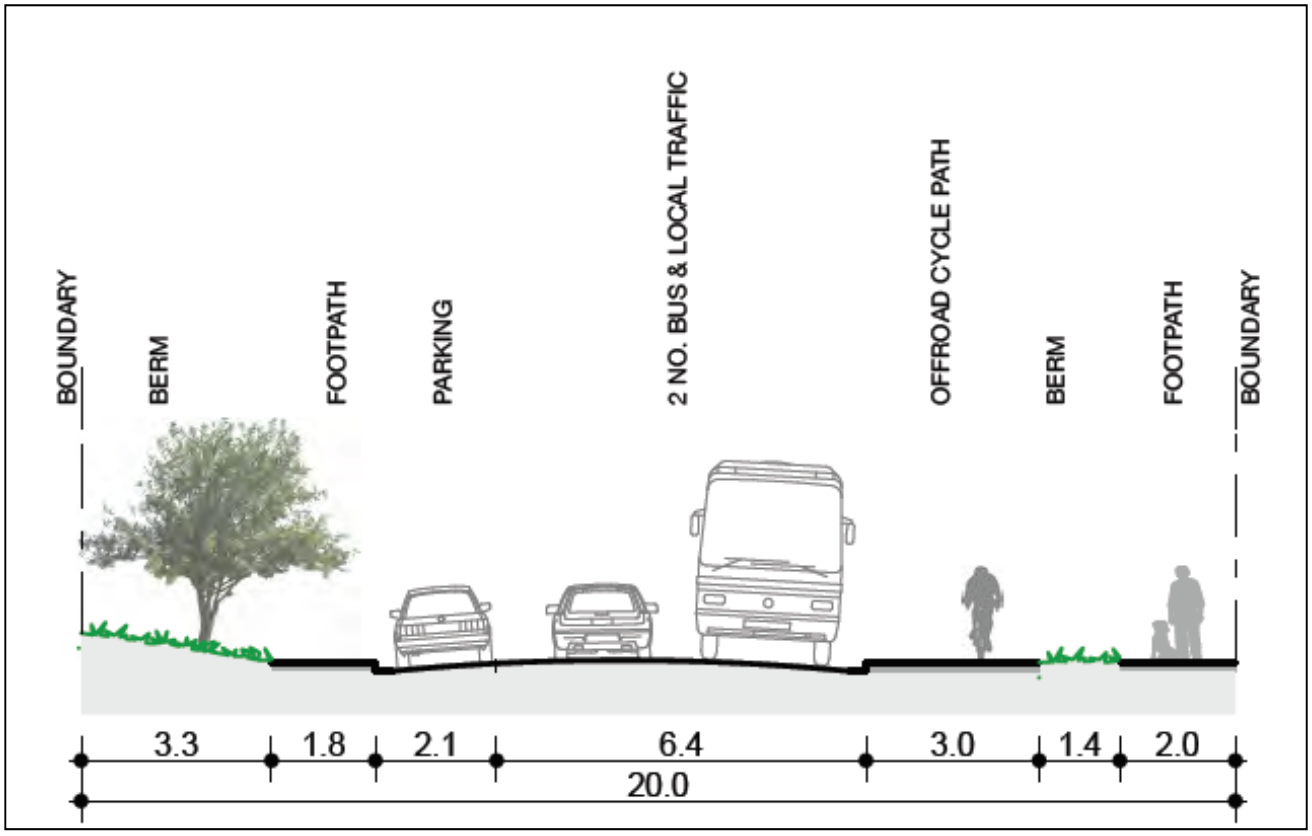


Figure 39: Future Local Road Layout for Byron Avenue (Connecting with Upper Shoal Bay Link)



Consideration has been given to providing a turning circle at the western end of Byron Avenue (or Northcroft Street) for vehicles to turn around clear of buses. Such a facility is not thought to be required however, as Byron Avenue or Northcroft Street would be clearly signed from Burns Avenue as "buses and residents only". This, coupled with the on street parking restrictions proposed, will mean that the demand for vehicles to U turn will be very low.

5.2.3 Additional Components of the Project

It is likely that a pedestrian and cycle Link could be provided across the Upper Shoal Bay in the short term, with a public transport Link provided as a longer term project. This public transport Link could be provided in association with, or separate from, the shorter term facility. In other words, in the long term there could be one Link, providing for walking, cycling and public transport, or two Links, with one providing for walking and cycling, and the other providing for walking, cycling and public transport.

At either end of the Upper Shoal Bay Link, a number of additional project components are recommended, in order to complete the connections between the Northern Busway and the Takapuna Centre.

In the short term the following measures will be required to support the pedestrian and cycle Link:

- On Byron Avenue or Northcroft Street west of Burns Avenue, the cross section of the local road should be changed by removing car parking on one side of the road[46] and providing facilities along the street for pedestrians and cyclists. Given confirmation of the SkyPath walking and cycling connection across the Auckland Harbour Bridge, the important of this route as a walking and cycling link to and from Takapuna a dedicated cycle facility on both sides of the street may be considered desirable. This option is shown indicatively along Byron Avenue in Figure 39
- A cyclist path should be provided along Des Swann Drive between Fred Thomas Drive and Barry's Point Road
- This cycle facility should be continued south on Fred Thomas Drive to Takapuna Landing
- Safe pedestrian crossing facilities, probably including traffic signals, should be provided both at Fred Thomas Drive and Barry's Point Road.

In the long term, the following measures will be required to support the public transport Link:

- Signalising the Des Swann Drive intersections with both Fred Thomas Drive and Barry's Point Road and optimising these intersections in favour of walking, cycling and bus movements
- Providing bus priority on Des Swann Drive, in both directions
- Optimising bus travel times at Burns Avenue/Auburn Street by providing bus priorities and by double phasing certain movements
- Providing a southbound right turn bus lane on Taharoto Road, allowing buses priority into Fred Thomas Drive, as was shown in Figure 34 above.

5.2.4 Predicted Bus Route Operation

Preliminary traffic modelling of the Upper Shoal Bay Link has been undertaken by Auckland Transport, using the Takapuna PARAMICS model. The modelling undertaken was of a preliminary nature to assess the broader impacts of the packages of interventions. While some efforts were made to optimise traffic signal operation in favour of bus routes, this was not carried out to the extent recommended by this report (for example, by double phasing traffic signal phases on key bus routes, or by providing bus priority on Des Swann Drive).

The results indicate that (return) bus travel times between Takapuna and Akoranga Station are predicted to reduce significantly with the Upper Shoal Bay Link (and associated measures), with travel time savings of seven to eight minutes predicted for the route to and from the Northern Motorway (south) for onward routes to the city (see Table B15, within Appendix B). These routes are understood to be the most important for Takapuna's access, in that they are Takapuna's strategic connection to the RTN, and represent the highest frequency route.

On other routes, travel times are predicted to be generally comparable without and with the Upper Shoal Bay Link (and associated measures).

In addition to travel time savings, travel times for all affected bus routes are likely to become more consistent as a result of the Upper Shoal Bay Link. In this way there will be a benefit in terms of travel time reliability for all routes, even if some routes may take marginally longer.

[46] A resident only parking scheme or similar could be implemented to manage any loss of parking.

5.3 Package 3: Killarney Street

Killarney Street offers an alternative east-west route to the north of Anzac Street which could allow traffic to pass around rather than through the Takapuna Centre. The route currently offers a good level of amenity, due to its location next to Killarney Park, so the aim is not to provide a high capacity bypass, but rather a route which can take slightly higher volumes of traffic around Takapuna than is currently the case.

To this end, the following proposals are recommended:

- Reorientation of the intersection of Killarney Street/Hurstmere Road, so that movements between Killarney Street and Hurstmere Road north become the through movements (see Section 5.3.1 below)
- Changes to the intersection at the western end of Killarney Street, at the intersection with Anzac Street (see Section 5.3.2 below)
- A change in the operation of the intersection of Killarney Street with The Terrace to signalised control, partly to provide safe pedestrian crossing facilities and also to allow for the currently banned right turn movement out from The Terrace to be reinstated.

5.3.1 Hurstmere Road and Killarney Road Intersection

This Study proposes that the intersection of Killarney Street/Hurstmere Road should be reoriented so that movements around Takapuna, between Killarney Street and Hurstmere Road north, become the through movements. The existing northbound through movement from central Takapuna would be discouraged by becoming a signalised right turn, while the existing southbound movement would be discouraged by the implementation of a gateway treatment. This gateway treatment would notify drivers that they have arrived at the Takapuna Centre, and that they have entered a lower speed environment.

Two layout options have been developed for the signalisation of the intersection of Hurstmere Road and Killarney Street, and these are shown in Figures 40 and 41.

Both options provide cycle lanes on Killarney Street, aligning with those proposed under the Takapuna North CMP. Both options also allow for signalisation and pedestrian crossings of the Killarney Street, Hurstmere Road (south) and Earnoch Avenue approaches. Finally, both options also serve to redirect a portion of through traffic away from Takapuna's Centre.

Figure 40: Hurstmere Street and Killarney Street Traffic Signals – Preferred Option (Indicative)

Figure 41: Hurstmere Street and Killarney Street Traffic Signals – Alternative Option (Indicative)

The preferred option provides two right turn lanes from Hurstmere Road (south) into Hurstmere Road (north). This necessitates two northbound exit lanes on Hurstmere Road (north), removing the opportunity to provide cycle lanes on this road without additional road widening.

The alternative layout provides only a single right turn lane on the Hurstmere Road (south) approach. This would allow cycle lanes on the Hurstmere Road (north) approach. This outcome would align with the recommendations of the Takapuna North CMP by providing cycle facilities in this location. However, it is considered that this option may have the following effects:

- Providing only a single right turn lane would increase bus travel times to Kitchener Road, while reducing reliability
- Some degree of queuing and delays on the Hurstmere Road (south) approach is considered desirable, and this would be a useful tool to discourage through traffic from using this route. However, restricting this approach to only a single right turn lane may result in significant queuing, adversely affecting the amenity of Hurstmere Road
- While the intention of this Plan is to redirect some through traffic away from Hurstmere Road and onto Killarney Street, it is not intended that Killarney Street should become a busy arterial route. Rather, a sharing of traffic between Killarney Street and Hurstmere Road is desired. The alternative layout may result in too large a shift in traffic onto Killarney Street.

5.3.2 Killarney Road and Anzac Street Intersection

The concept for the intersection of Killarney Street/Hurstmere Road depends to a certain extent on a similar proposal being pursued at the western end of Killarney Street at the intersection with Anzac Street. The current Anzac Street widening project restricts traffic exiting from Killarney Street to left turn movements out only at this western end, whereas the preferred design resulting from this Study proposes widening of the approach to allow all existing movements from Killarney Street to be retained. Further details relating to this proposed design can be found in Section 5.1 above.

5.4 Package 4: Takapuna Centre Streets

5.4.1 30 Kilometre per Hour (kph) Speed Zone

There is a strong desire to improve the streetscape, reduce vehicle speeds and continue to improve pedestrian amenity within the core of the Takapuna Centre to encourage the increase in walking and cycling set out in the *Auckland Plan* and to encourage the land use redevelopment goals of the Proposed Auckland Unitary Plan.

The Takapuna Strategic Framework's vision for the future of Takapuna prioritises the creation of "a more pedestrian focused environment" and a centre that is both "less dominated by cars" and "increasingly vibrant."[47] In order to achieve these clear goals there needs to be a focus on street quality and sense of place for people on foot. One means of achieving this is to reduce vehicle speeds to help strengthen street life and encourage more active building frontages.

[47] Takapuna Strategic Framework, North Shore City Council 2010. P3

In particular, slower speed zones help create a street environment that is more conducive to high levels of pedestrian activity, often enabling reduced road widths, and therefore pedestrian crossing distances, and offering the opportunity to allocate increased road space to pedestrians. Slower vehicle speeds are also desirable to encourage safer cycling in town centres and to support the higher level of residential and employment development anticipated in Takapuna. Slower speeds are viewed as contributing to an environment where pedestrians and cyclists are encouraged to feel that they are the dominant mode in terms of how street width, as a form of public open space, is designed and managed.

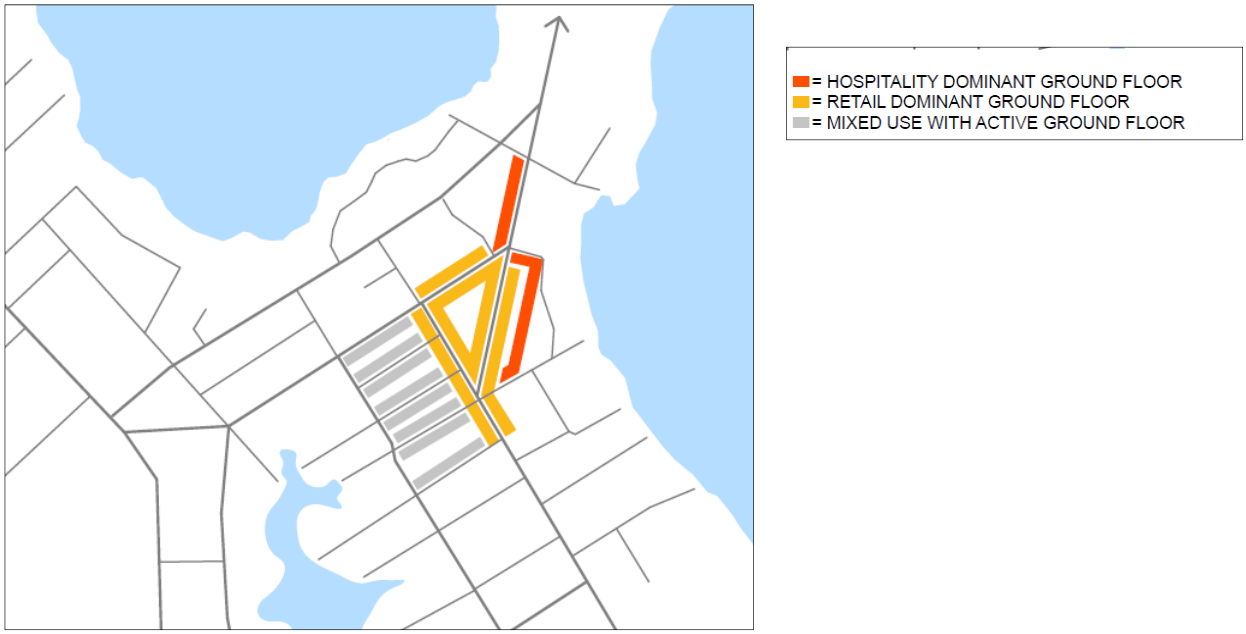
Whist vehicles are still able to travel through the Takapuna Centre, a 30 km/h speed zone portrays a strong message that walking and cycling are priority modes of transport in the town centre. It is further considered that some motorists will choose an alternative route in preference to travelling through a 30 km/h zone thereby providing the added benefit of reducing 'through traffic' volumes.

This Study's expectations for the future of the central retail core are set out at Figures 42 and 43:

- Figure 42 illustrates the existing key areas of dominant ground floor hospitality and retail
- Figure 43 illustrates the proposed future key areas of dominant ground floor hospitality and retail, indicating the anticipated changes in the Takapuna Centre as the current 'high street plus mall' further develops into a more intensive grain across the whole network of Takapuna Centre. It is essential to Takapuna's long term prosperity that the retail main street is conveniently accessible for all modes, including slow moving vehicles.

Figure 42: Current Retail and Hospitality Areas in Takapuna

Figure 43: Future Retail and Hospitality Areas in Takapuna (5–10 years time)

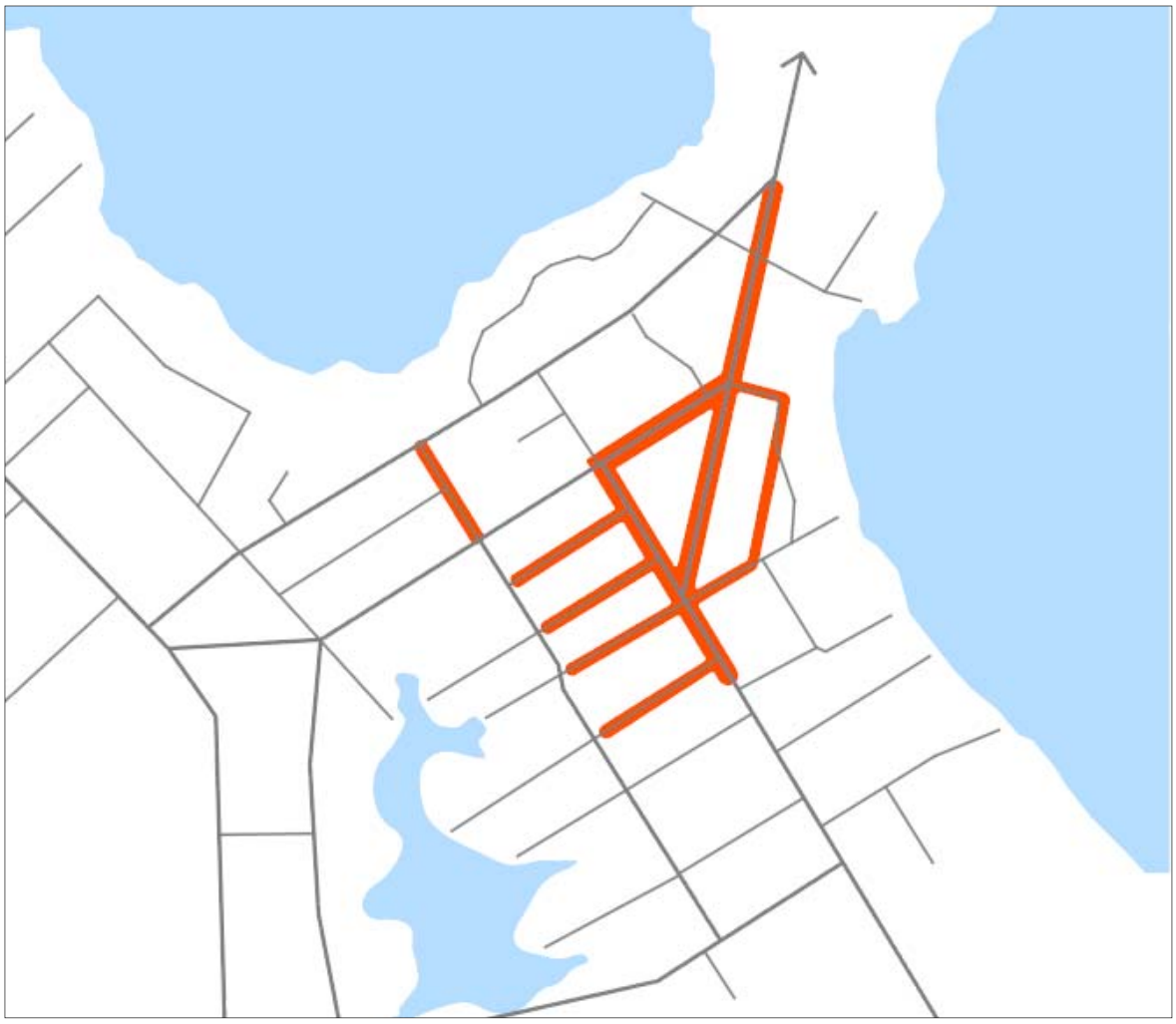


The above plans of the future extent of Takapuna's core retail and hospitality are relevant to defining the extent of a proposed 30 kph speed zone, which is illustrated in Figure 44. This zone is proposed for the centre, to complement the proposed streetscape upgrades and to improve pedestrian accessibility, safety and amenity.

The proposed slow speed zone should be supported by gateway treatments at the boundaries of the zone, to inform drivers that they have arrived at the Centre, and that they have entered a slow speed area. These should be located as follows:

- On Hurstmere Road, immediately south of the intersection with Killarney Street
- On Lake Road, at the intersection with Byron Avenue
- On Como Street, Huron Street, Northcroft Street and Byron Avenue, immediately east of Burns Avenue.

Figure 44: Proposed 30 Km/hr Speed Zone for the Takapuna Centre

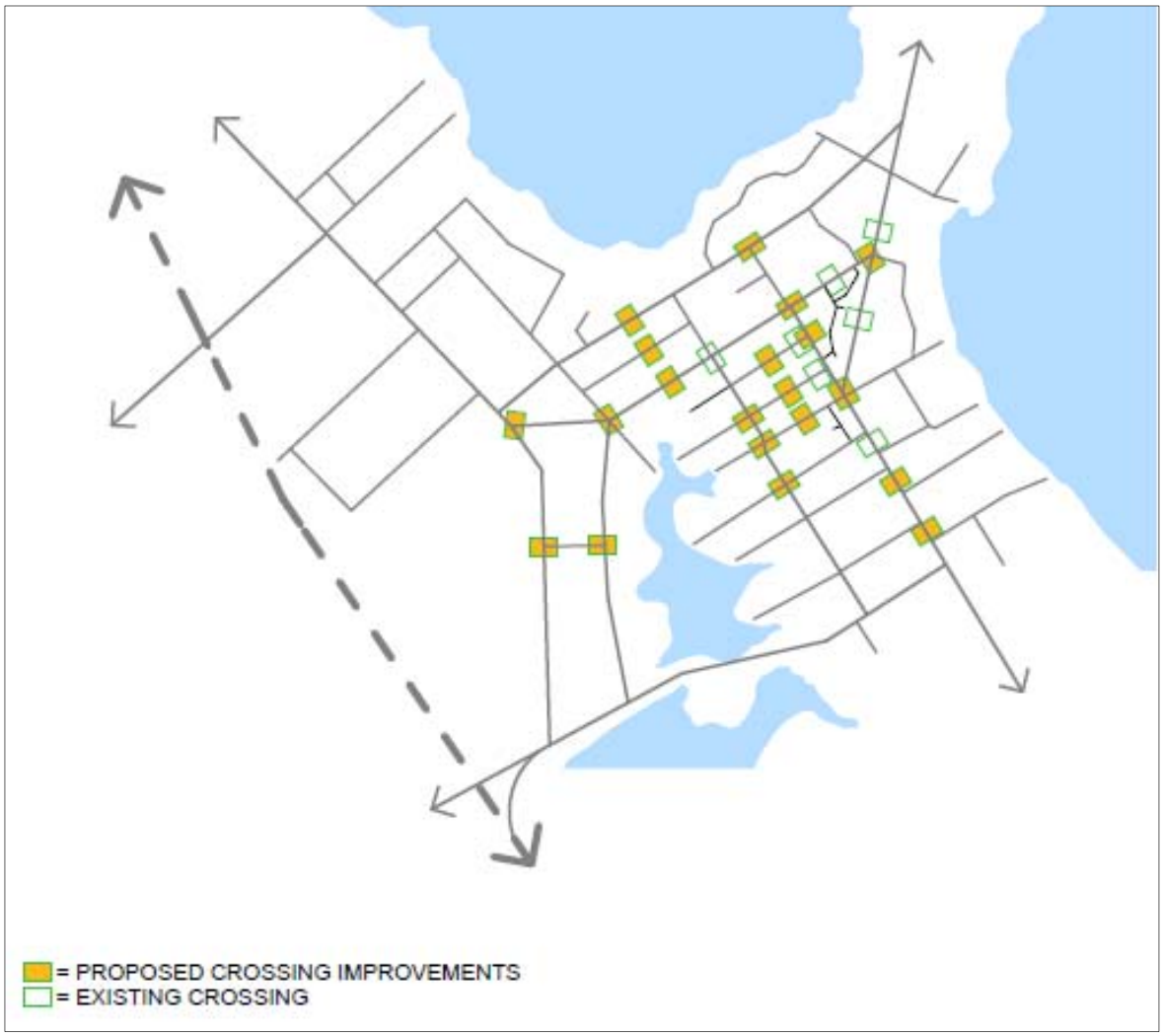


5.4.2 Pedestrian Crossings

Pedestrian crossing improvements, including controlled pedestrian crossings, are proposed at various locations within the Takapuna Centre as highlighted in Figure 45 below. These improvements will support and promote improved pedestrian amenity and connectivity and include a mix of the following:

- Midblock signalised and zebra crossings
- New signalised intersections with full pedestrian crossing facilities, and
- Crossings at existing signalised intersections, where crossings are currently not provided.

Figure 45: Existing Pedestrian Crossings and Proposed Crossing Improvements



Improvements to the Takapuna Centre to encourage and support pedestrian movement reflect Auckland Transport's desire to provide appropriate transport, and movement options to town centres in general. These improvements are needed if the mode shares predicted by the ART model (16%) are to be achieved. This coincides with the desires of the Local Board and the Takapuna Business Association and the *Proposed Auckland Unitary Plan* to promote Takapuna as a pedestrian-friendly retail Centre.[48]

5.4.3 Lake Road: Anzac Street to Halls Corner

The section of Lake Road between Halls Corner and Anzac Street extends through the centre of Takapuna and it accommodates the current on street bus station. The current on street station limits the design options for the street and the current location does not align well with the proposed Upper Shoal Bay link. Also, there may be merit, in terms of bus circulation, to relocate buses away from the slow speed core.

48 *Devonport-Takapuna Local Board Area Plan*. Auckland Council, 2011, pp 19

Figures 47 to 49 show cross sections for part of Lake Road and compare the existing situation (Figure 47) with the potential future long term scenarios which assume that the existing bus station is retained (Figure 48) or relocated (Figure 49). Figure 48 shows the issue referred to in Section 4.2.3, with limited space for footpaths on the eastern side of Lake Road. Figure 49 shows a narrower road carriageway, and therefore greater space for pedestrians, following the removal of buses and bus stops from Lake Road.

Depending on vehicle volumes and trip type (origins/destinations), cycle facilities may be desirable in some 30 km/h zones. For example, dedicated cycle facilities are recommended for the proposed 30 km/h zone on Anzac Street east due to the strong 'through route' movement required by cyclists to and from Hurstmere Road, and the number of vehicle lanes required. However, cycle facilities along this section of Lake Road are not recommended as this is not considered to be a key cycle 'through route', nor is it predicted to carry significant volumes of vehicles.

The expectation for Lake Road north is that it will provide for slower and possibly less traffic and that increased road space will be dedicated to pedestrian movement and amenity. The intent of the 30 km/h zone and consequential design of street elements in Lake Road is to create an outcome of very high amenity where pedestrians and cyclists are the dominant modes. Dedicated cycle facilities in this location may work against this outcome by continuing the mindset that the vehicular carriageway is for the exclusive territory of vehicles, undermining the driver behaviour and courtesy that the 30 km/h zone aims to achieve.

Figure 46: Approximate Location of Lake Road Cross Sections in Figures 47 to 49

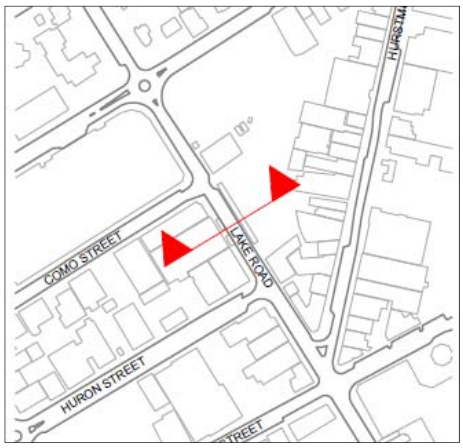


Figure 47: Existing Cross Section for Lake Road – Looking North

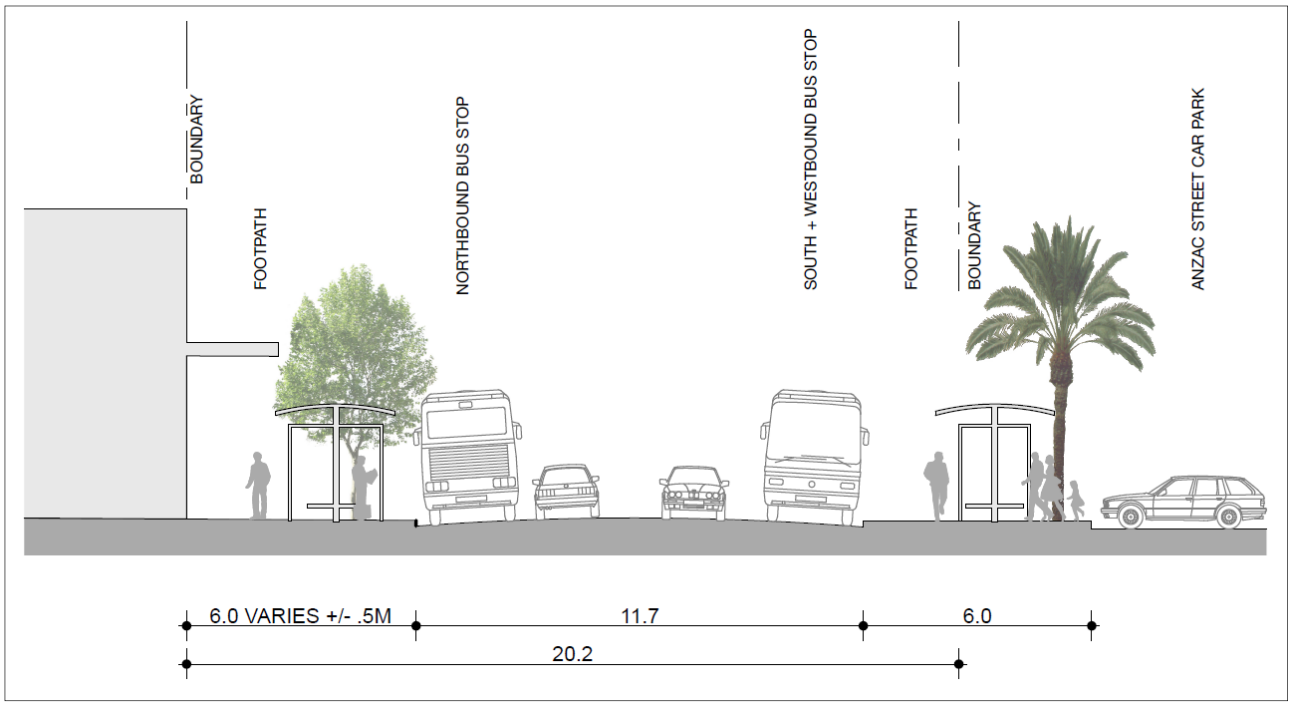


Figure 48: Proposed Cross Section for Lake Road with Bus Station retained (Indicative) – Looking North)

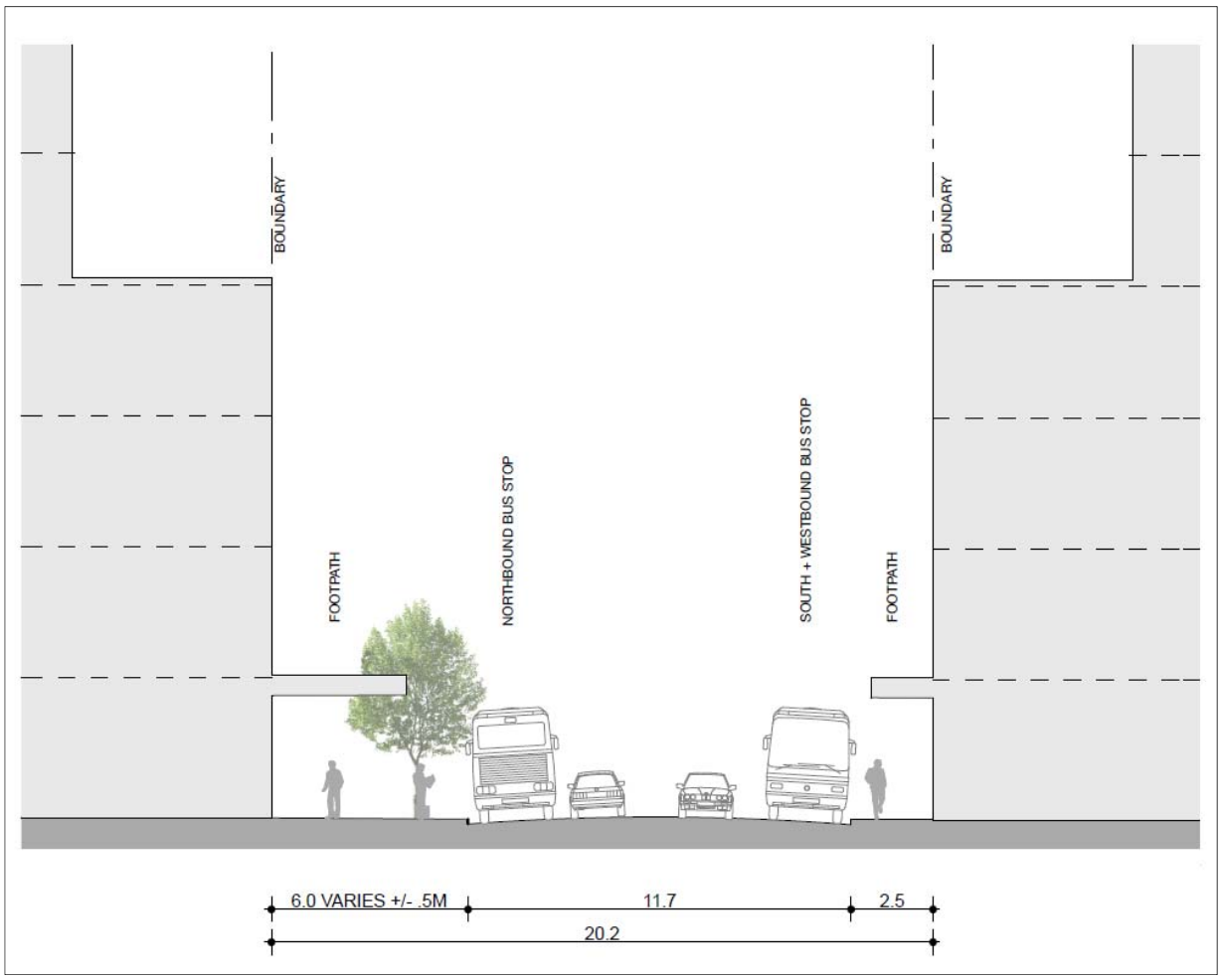
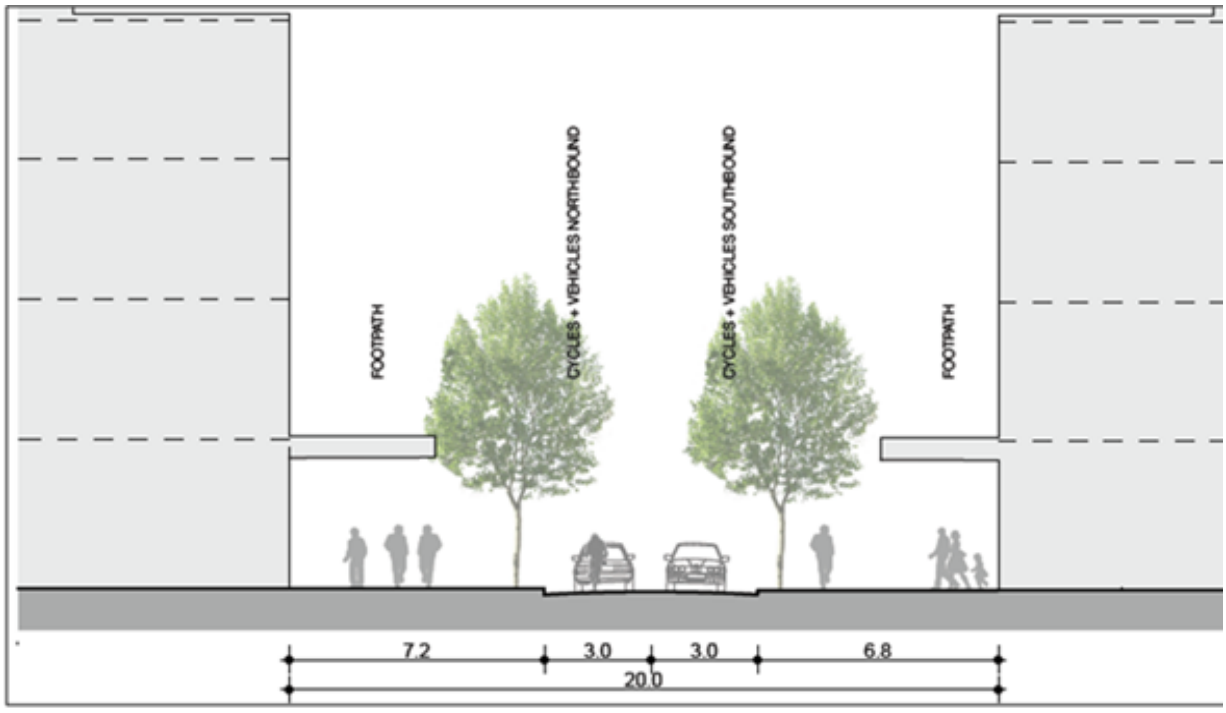


Figure 49: Proposed Cross Section for Lake Road with Bus Station relocated (Indicative) – Looking North)[49]



It is noted that Lake Road is currently an over-dimension route, and the proposal to reduce the road carriageway width through the Centre will be in conflict with this classification. It will be necessary for an alternative over-dimension route to be identified for the above plans to be able to be implemented. A route along Burns Avenue is recommended for further investigation with the signalisation of the existing roundabouts on this route supporting this designation. This is further discussed in Section 5.6 of this report.

Potential improvements to the intersections of Lake Road with Anzac Street and at Halls Corner have been identified.

Pedestrian crossing facilities should be introduced on all approaches to the Lake Road/Anzac Street intersection as a matter of high priority. One option could be to change the existing roundabout to traffic signal control, as shown in Figure 50, and this solution would provide protected pedestrian crossings. However, it is acknowledged that this concept may depend on the acceptability of removing the U turns that currently take place for the following reasons:

- Buses repositioning, from northbound to southbound bus stops
- Vehicles exiting the Central Car Park, due to a right turn ban onto Anzac Street
- Vehicles exiting Como Street and Huron Street, due to right turn bans onto Lake Road.

If the concept of traffic signals is not implemented in the immediate short term, due to the above three issues, then pedestrian crossing facilities should be introduced on all approaches to the roundabout as a matter of high priority.

[49] The traffic lanes are likely to need to be a minimum of 3.2m if buses are to continue to use the route following the relocation of the bus station

Figure 50: Proposed Signalisation of Lake Road and Anzac Street (Indicative)

It is also proposed to change the intersection of Lake Road/Hurstmere Road/The Strand/Northcroft Street, known locally as Halls Corner. This is presently an awkward five arm intersection which operates with long signal times, resulting in pedestrians currently experiencing long delays between the calling of the 'Barnes Dance' pedestrian phase.

The proposed layout in Figure 51 shows the removal of the left turn slip lane from The Strand, both to reduce the attractiveness of this route as a 'rat run' for through traffic, but mainly to shorten up the pedestrian crossing. It also shows the elimination of right turns from Northcroft Street and The Strand, to allow those two streets to operate during a single traffic signal phase, thus reducing the overall cycle time, for the benefit of pedestrians. The current "Barnes Dance" pedestrian phase should be retained.

Figure 51: Possible Improved Pedestrian Amenity and Signal Phasing – Halls Corner (Indicative)

5.4.4 Anzac Street (East of Auburn Street)

The environment along Anzac Street changes significantly from the west to the east of Takapuna. At the eastern end between Lake Road and Hurstmere Road, the street is within the retail core of Takapuna, with numerous cafes and small retail activities. Redevelopment of the Anzac Street car park is also a potential and this is expected to result in more ground floor activity along the southern side of Anzac Street. As shown in Figure 43, this area is also expected to be an important future retail area.

Figure 53 and Figure 54 illustrate the existing cross section and proposed cross section for Anzac Street, to further improve the amenity of this area.

Figure 52: Approximate Location of Anzac Street Cross Sections in Figures 53 and 54

Figure 53: Existing Anzac Street East Cross Section– Mid Block Looking East

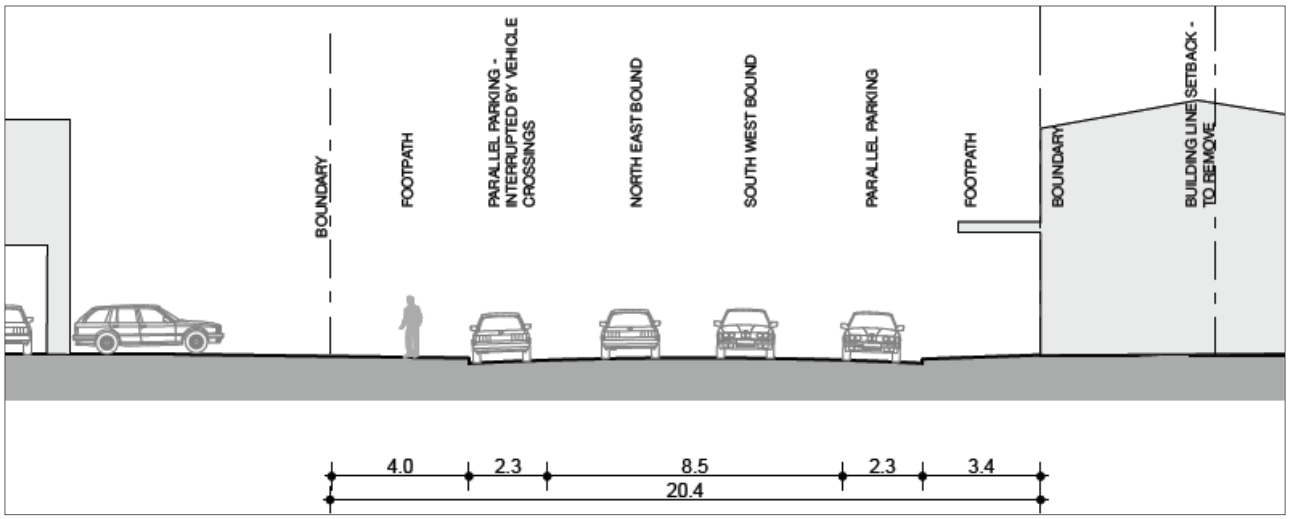
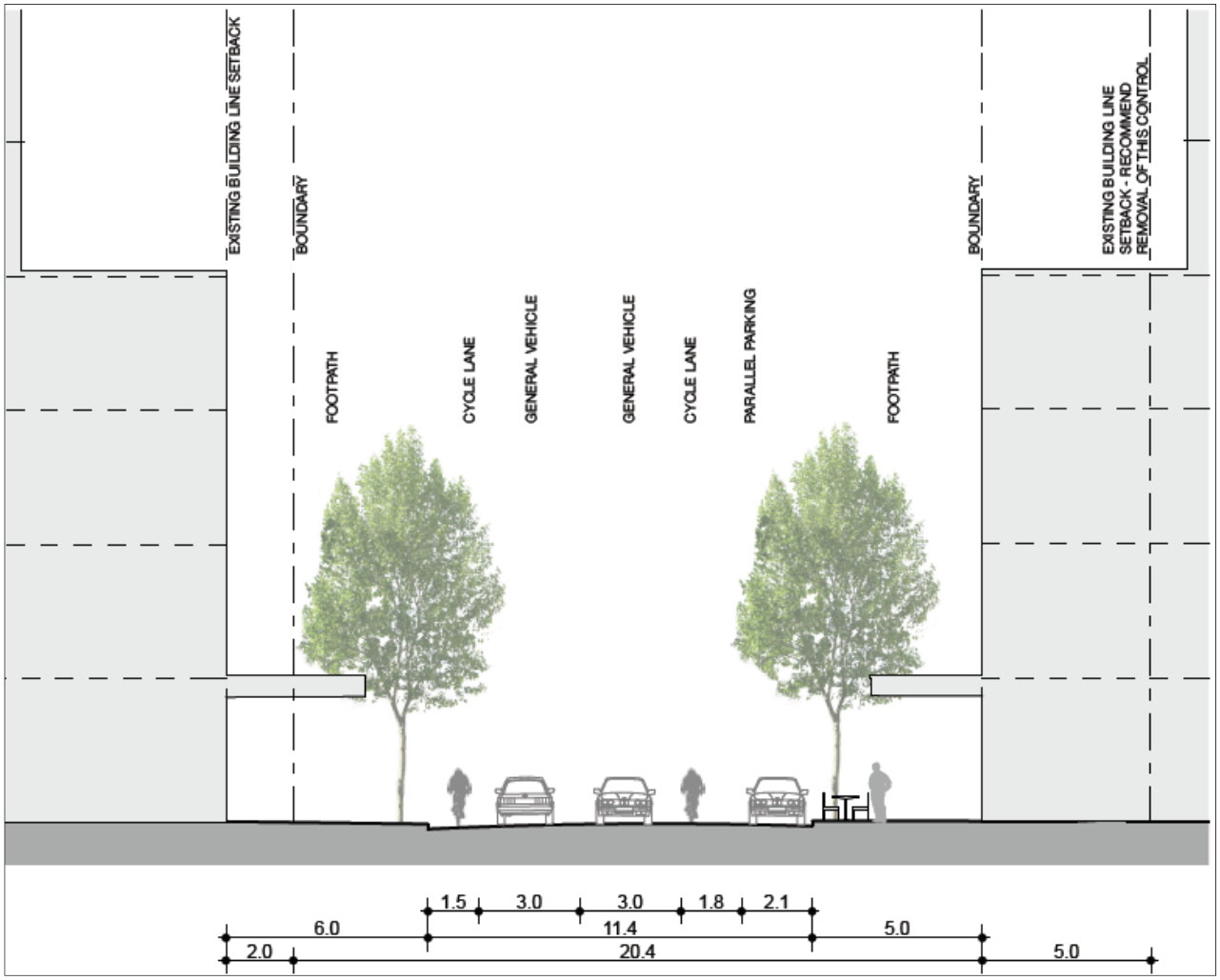


Figure 54: Proposed Anzac Street East Cross Section (Indicative) – Mid Block Looking East[50]



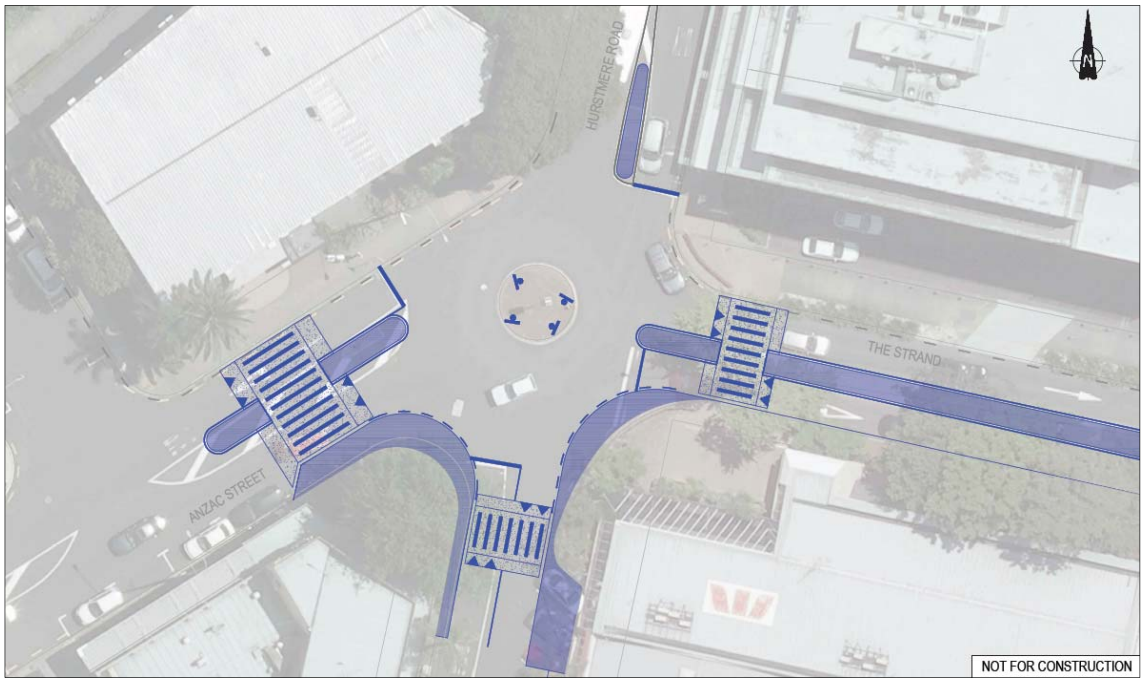
[50] The traffic lanes are likely to need to be a minimum of 3.2m if buses are to continue to use the route following the relocation of the bus station

Cycle lanes are recommended on this section of Anzac Street, along with the proposed reduction in vehicle speeds to 30 km/ph. Given that cyclists travelling east at this location are likely to be using Anzac Street as a through route connecting with Hurstmere Road, dedicated provision for cyclists is appropriate in this instance.

In terms of the intersections along this section of Anzac Street

- Figure 50 above considered the potential to change the intersection of Lake Road/Anzac Street from roundabout to traffic signal control
- Figure 55 below proposes the addition of raised pedestrian crossings at the existing Anzac Street/Hurstmere Road roundabout.

Figure 55: Proposed Improvements to Crossing Facilities – Hurstmere Road and Anzac Street (Indicative)



The section of Anzac Street between Auburn Street and Lake Road fulfils a mixed function, part way between the traffic oriented role of Anzac Street west of Auburn Street, and the greater pedestrian oriented role of Anzac Street east of Lake Road. The treatment recommended for this section of Anzac Street is essentially the same as that proposed above for Anzac Street east of Lake Road; two traffic lanes and two cycle lanes are recommended. There is however scope to provide an increased level of on street parking, while providing a more modest pedestrian amenity improvement.

5.4.5 East-west Routes between Lake Road and Burns Avenue/Auburn Street

Improvements to the streetscape of the east-west roads between Lake Road and Burns Avenue/Auburn Street should be pursued, as these streets are currently very wide and the road space is poorly utilised. Measures to reduce the road carriageway width by the removal of angled parking and greater provision for pedestrians in particular should be pursued for implementation along Como Street, Huron Street, Northcroft Street, Byron Avenue and Bracken Avenue. Street tree planting will also be particularly important to improve the visual amenity of these streets

The following figures illustrate potential treatments along Huron Street and include:

- Reductions in road space for cars, particularly with the removal of all angled parking. This is considered essential to create a town centre streetscape environment for all modes
- Increases in space for pedestrians, including canopies to provide all weather connections
- The lowering of traffic speeds through the reduction of road widths and speed limit restrictions.

Figure 56: Approximate Location of Huron Street Cross Sections

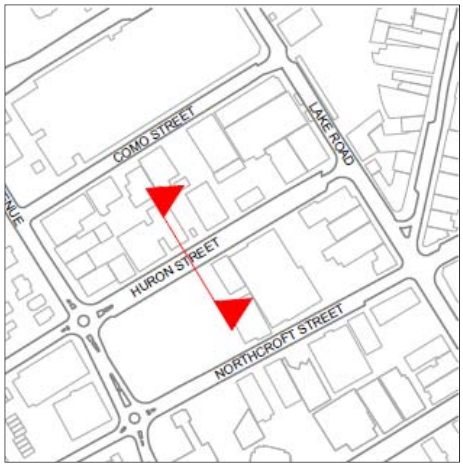


Figure 57: Existing Huron Street – Looking East

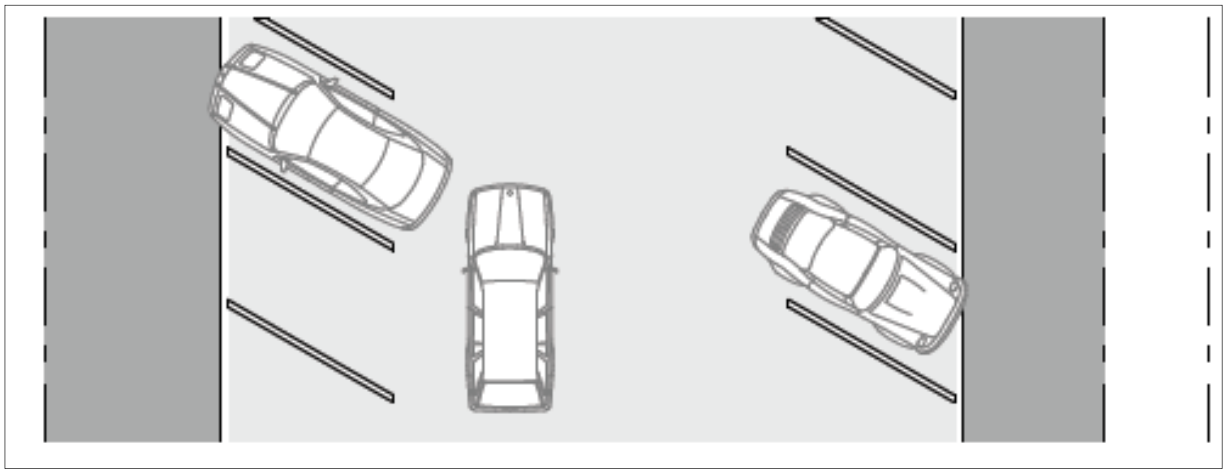


Figure 58: Existing Huron Street – Looking East

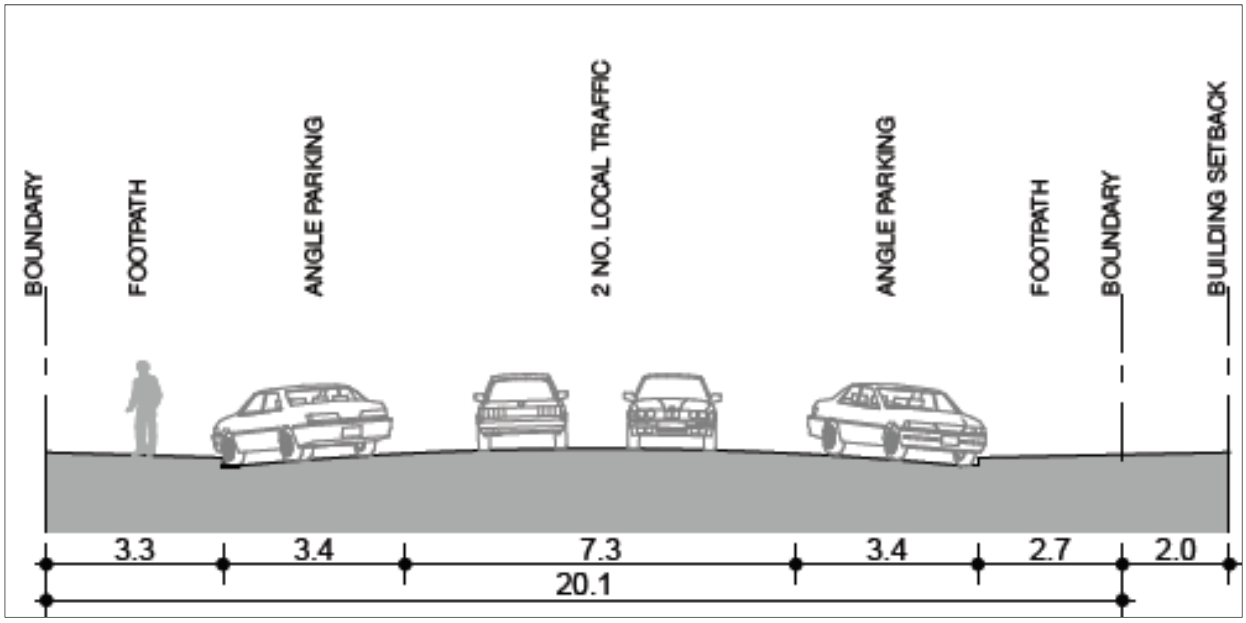
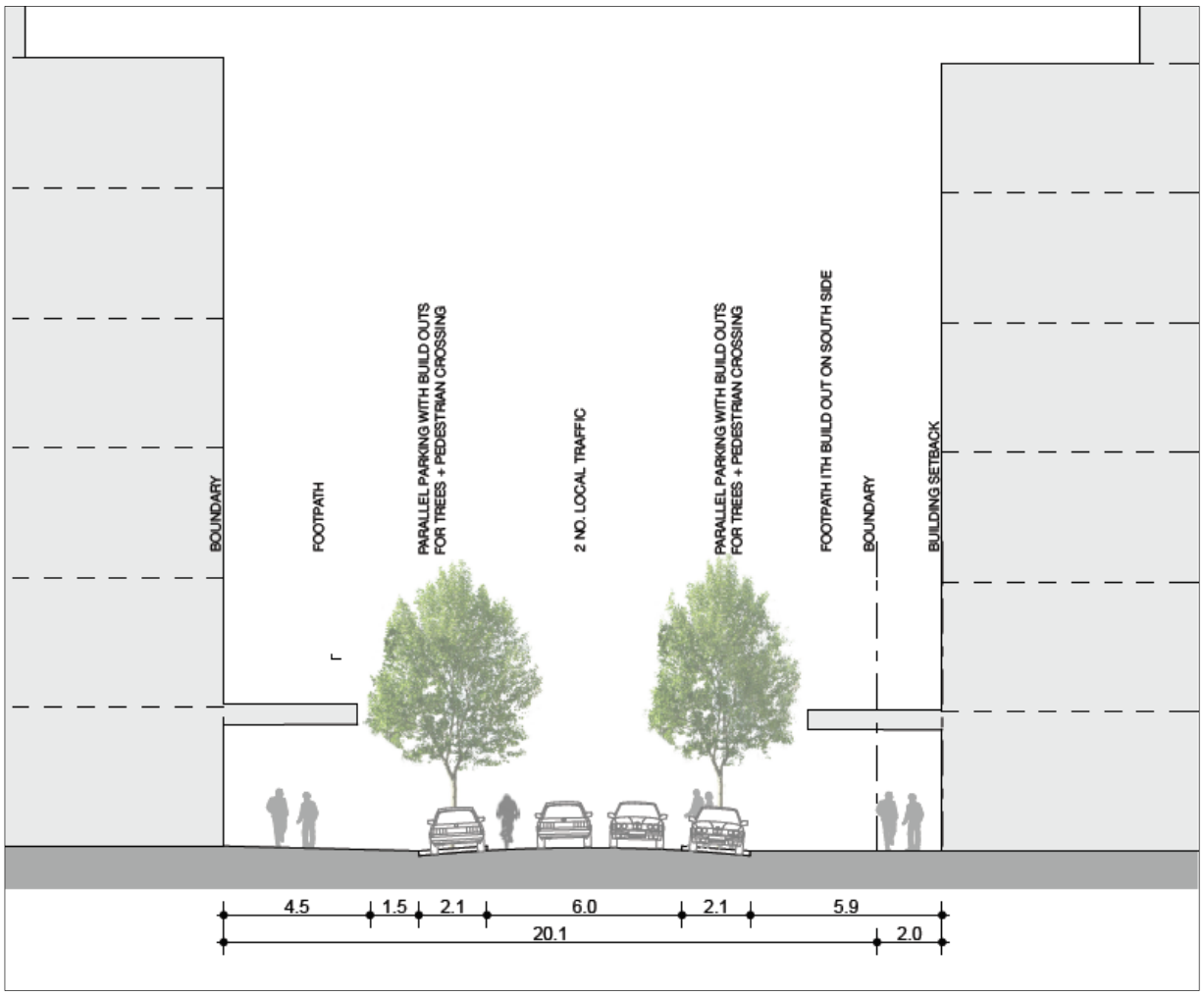


Figure 59: Proposed Huron Street Cross Section (Indicative) – Looking East[51]



[51] The traffic lanes may to need to be a minimum of 3.2m if buses need to use the route following the relocation of the bus station

5.5 Package 5: Lake Road (south of Halls Corner)

The cross section of Lake Road south of Byron Avenue is proposed to be quite different to the Lake Road cross section described in Section 5.4.3 above, through the core of the Takapuna Centre. Reasons for these differences include:

- Through the Centre it is proposed that traffic speeds be reduced to 30 kph, and that the road carriageway narrows to around 6m with a single traffic lane in each direction, with wide footpaths and with cyclists sharing the lane with general traffic
- Between Esmonde Road and Byron Avenue, it is proposed that on street cycle lanes are provided on both sides, with parking on one side. Furthermore, it is noted that the cycle lane adjacent to the parking lane is to have additional width.

Figure 61 and Figure 62 relate to the general cross section proposed for Lake Road south of Bracken Avenue. Pedestrian amenity is considered important in this area, but this is the road within Takapuna where there is the greatest tension between the street/pedestrian amenity and the element of through traffic travelling between Milford and the Devonport Peninsula.

Figure 60: Approximate Location of Lake Road Cross Sections in Figures 61 and 62

Figure 61: Existing Lake Road South Cross Section– Looking North

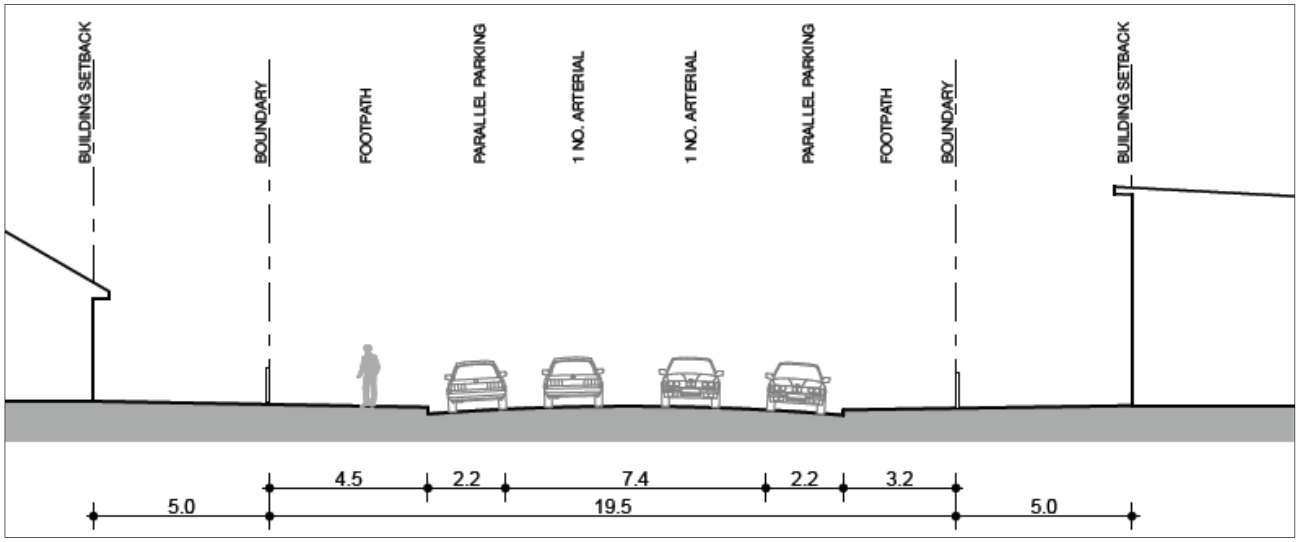
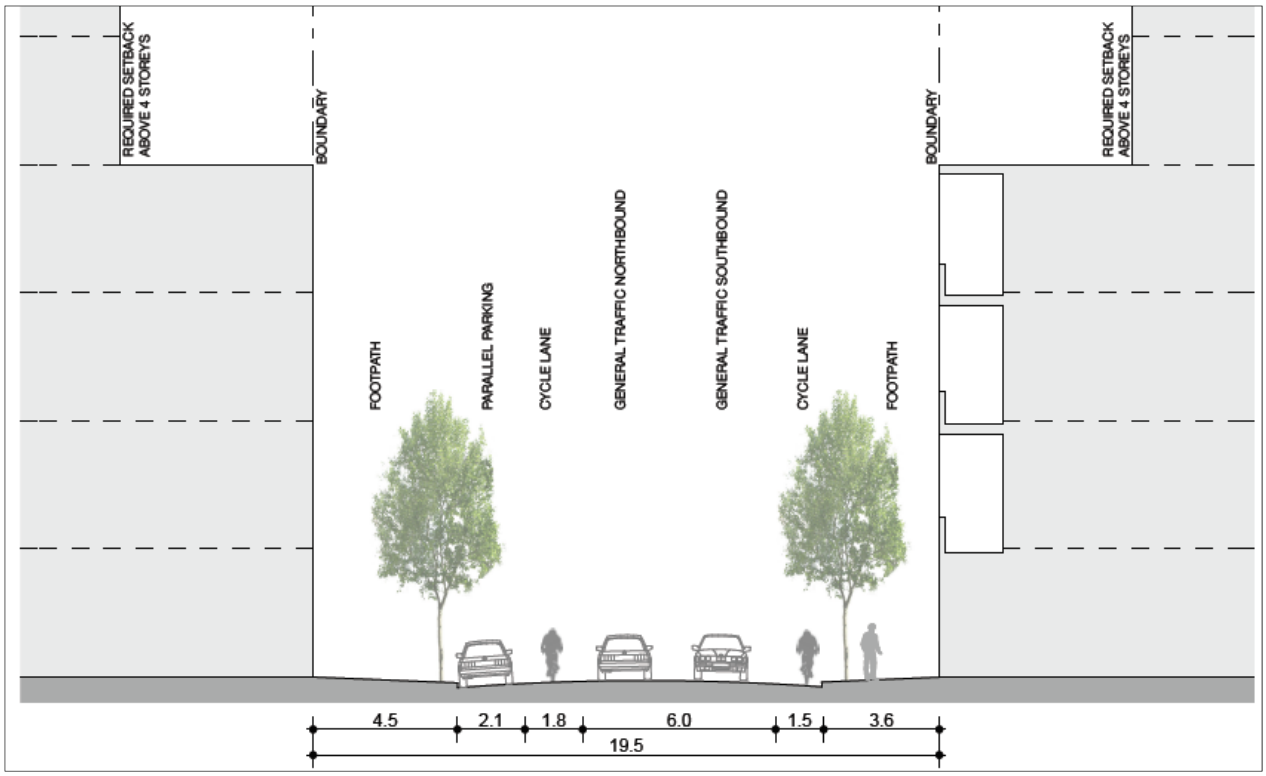


Figure 62: Proposed Lake Road Cross Section (Indicative) South of Bracken Avenue – Looking North[52]



The proposals for the future layout along Lake Road between Byron Avenue and Park Avenue are illustrated at Figure 63.

[52] The traffic lanes are likely to need to be a minimum of 3.2m if buses are to continue to use the route following the relocation of the bus station

Figure 63: Future Lake Road Layout (Indicative, South of Takapuna Core Centre)

5.6 Package 6: Burns Avenue/Auburn Street

Burns Avenue/Auburn Street provides a north south route to the west of the Takapuna Centre. This route is within the 'transition zone' between the higher speed, higher capacity arterial routes to/from Takapuna, and the slower speed zone proposed for the Takapuna Centre, and the route has a role to play in encouraging traffic to pass around rather than through the central core.

A corridor study for Burns Avenue/Auburn Street was undertaken by Flow in 2011/12 for Auckland Transport[53]. The main recommendations of that study included the following:

- Reintroduction of the right turn from Esmonde Road to Burns Avenue, to encourage some traffic to pass around rather than through central Takapuna
- Provision of the missing pedestrian crossings at the intersection of Esmonde Road/Burns Avenue, and "tighten up" the intersection
- The banning of right turns between Tennyson Avenue and Burns Avenue, primarily due to the visibility issue resulting from the dip to the north
- The provision of pedestrian crossings across Burns Avenue/Auburn Street
- Signalisation of the intersections of Burns Avenue/Auburn Street with Byron Avenue, Northcroft Street and Huron Street, possibly in the medium term
- The reduction of the speed environment along the northern leg of Auburn Street, between Anzac Street and Killarney Street, outside Takapuna Primary School.

The *Burns Avenue/Auburn Street Corridor Study* recommended the provision of cycle lanes along the route, from Esmonde Road to Anzac Street, although views expressed within Auckland Transport on this issue were mixed. This study team recommends that cycle facilities should be provided instead on Lake Road, from Esmonde Road to the Centre, as the vertical geometry for cyclists is better along Lake Road than Burns Avenue. This option will further allow greater emphasis to be given to buses travelling between the proposed Upper Shoal Bay bus Link and the proposed bus station, in the longer term, and to pedestrians crossing the north-south route, including those travelling to/from the Upper Shoal Bay pedestrian and cycle Link.

5.7 Package 7: Parking

Package 7 relates to the parking proposals summarised within Section 4.3.

At the appropriate time, parking within the central area (ie within the area shown in Figure 14) should be dedicated to short stay parking or priced to encourage short stay parking.

Public parking facilities catering primarily for short stay parking should be placed within a short walking distance of the centre of Takapuna, but in locations that minimise the traffic impacts on streets within Takapuna's core retail area. It is recommended that a short stay public parking facility be located within the area identified by the blue line in Figure 14.

[53] Burns Avenue/Auburn Street Corridor Study, Flow et al. June 2012

If the proposed Gasometer site parking facility goes ahead, it may provide up to 600 additional public parking spaces in Takapuna in the relatively near future. To reduce the potential impact of a large increase in parking availability it is strongly recommended that the opening of the facility be accompanied by measures to reduce long stay parking elsewhere in Takapuna including the dedication of all on-street parking within the central area to short stay[54]. The ability to progressively convert all public Gasometer site parking to short stay parking over time should be ensured.

If the Gasometer site parking facility does not go ahead, it will be necessary to find an alternative site or sites capable of eventually accommodating around 700 parking spaces. The parking facility should cater for short stay parking needs and, initially, long stay parking displaced from central Takapuna locations. Depending on the timing and nature of land use development within central Takapuna, it may not be required within the next 5 years. The facility (or facilities) should be located within the central area (ie within the area shown red in Figure 14 if feasible).

5.8 Package 8: Other Proposals

There are a number of other transport related projects that have been put forward, or are being pursued, by others. These have been considered by the study and integration with the following projects has been achieved where possible:

- The *Takapuna North Corridor Management Plan* recommends cycle lanes along Hurstmere Road/Kitchener Road, along with partial bus lanes, that is, a northbound bus lane on the approach to Milford and a southbound bus lane on the approach to Takapuna
- The *Takapuna North Corridor Management Plan* recommends partial bus lanes on Taharoto Road, between Northcote Road and Fred Thomas Drive, that is, a northbound lane approaching Northcote Road and a southbound lane approaching Fred Thomas Drive). This proposal includes the concept of traffic signals at the intersection of Taharoto Road with Rangatira Avenue, primarily to allow pedestrians and cyclists to cross Taharoto Road
- The *Takapuna North Corridor Management Plan* also recommends cycle lanes along Killarney Street
- Auckland Council is pursuing a project to improve the streetscape along Hurstmere Road, between Halls Corner and Anzac Street. Consultation with the local community was undertaken during 2013
- Auckland Council is also progressing the concept of the redevelopment/realignment of The Strand
- We understand that consideration is being given to a pedestrian/cycle boardwalk which would connect the western end of Francis Street with Esmonde Road.

These projects support the overall transport direction proposed by this Study and they are recommended for implementation.

[54] Section 4.3 above indicated that this should include the area within the blue line in Figure 14 being converted to short stay parking only, clearways being introduced on Killarney Street and Burns Avenue and parking on Tennyson Avenue being limited to short stay or resident parking

6 STAGING AND ASSESSMENT OF TRANSPORT INVESTMENT FOR TAKAPUNA

Section 5 above set out the various projects that are proposed by this Study. This section considers the following matters:

- The implementation or staging of the projects
- Indicative costs of the projects
- Indicative benefits of the package of transport investment
- An assessment of the package of transport investment against the criteria set out in Section 1.5 above.

6.1 Project Implementation and Cost

The timing and cost of each of the projects identified within Section 5 above is provided in Table 6 below. For this table, short, medium and long term is defined as 0-5 years, 5-10 years and over 10 years. The table also provides commentary on the relationship of each project with other projects.

The cost estimates in Table 6 are intended to be indicative only, as several of the larger projects include significant unknowns at this stage.

Before the projects are implemented, the *Regional Public Transport Plan* is assumed to be rolled out. This includes the provision of new bus services to/from Takapuna.

Table 6: Proposed Projects for Takapuna

	Project	Modes[55]	Nature of Proposal	Discussion/trigger points	Owner	Cost	Short Term[56]	Med Term	Long Term
Package 1: Anzac Street									
1	Anzac Street Widening	GT, PT, W/C	Widening of street, within designation, to provide bus lanes	Current pedestrian/cycle environment is poor, but timing of the project is likely to be dictated more by delays being incurred by buses	AT	$12m[57]	I, D&C		
2	Anzac/Barry's Point intersection upgrade	GT, PT	Part of above project, to provide sufficient traffic capacity, and to improve bus reliability		AT	See above	I & D	C	
3	Anzac/Fred Thomas intersection upgrade	GT, PT	Part of above project, to provide sufficient traffic capacity and to improve bus reliability	Needs to consider capacity for traffic from Killarney Street, to support getting traffic around Takapuna	AT	See above	I & D	C	
4	Anzac Street pedestrian crossing	W/C	Midblock crossing between Barry's Point Road and Auburn Street, as part of proposed connection between Auburn Reserve and Killarney Park	Proposed through Anzac West Plan Change. Should be delivered as part of Anzac Street project	AT	See above	I, D&C		
5	Anzac Street streetscape (west of Auburn Street)	W/C	Removal of bus lane, to provide greater pedestrian/cycle facilities and to enhance streetscape	Can only be implemented following provision of Upper Shoal Bay public transport link, and removal of buses from Anzac Street		$1.1m		I & D	C

[55] Key: GT = general traffic, PT = public transport, W/C = walking and cycling
[56] Key: I = investigation, D = design, C = construction
[57] Existing LTP project

	Project	Modes[55]	Nature of Proposal	Discussion/trigger points	Owner	Cost	Short Term[56]	Med Term	Long Term
Package 2: Upper Shoal Bay									
6	Upper Shoal Bay pedestrian/cycle Link	W/C	Boardwalk connecting Barry's Point Road with either Byron Avenue or Northcroft Street	To improve connectivity between Takapuna and Barry's Point Peninsula	AT	$3.5m	I, D&C		
7	Identify preferred option for Upper Shoal Bay bus Link	PT	Consider options for the Upper Shoal Bay bus link identified in this study in more detail, and identify a preferred option	Proposal to provide connection between Takapuna and rapid transit network. Designation to be progressed immediately	AT	$250k	I		C
8	Protection of land for Upper Shoal Bay bus Link	PT	Design and designate land needed to deliver Upper Shoal Bay bus link (including connection to Barry's Point Road)	As above	AT	$250k	I&D		
9	Provision of Upper Shoal Bay bus Link	PT	Implement Upper Shoal Bay bus link, including extension of cycleway and bus priorities along Des Swann Drive	As above	AT	$18m			C
10	Byron Avenue streetscape	PT, W/C	Streetscape project in short term. Potential PT component, depending on Upper Shoal Bay Link	Could be connected to Upper Shoal Bay Link, depending on alignment of Link	AT	$2.4m	I, D&C		
11	Northcroft Street streetscape	PT, W/C	Streetscape project in short term. Potential PT component, depending on Upper Shoal Bay Link	Could be connected to Upper Shoal Bay Link, depending on alignment of Link	AT	$2.4m	I, D&C		
12	Des Swann and Fred Thomas Drive intersections	PT, W/C	Will provide onward connections from Upper Shoal Bay link	Improved pedestrian connections across Barry's Point Road and Fred Thomas Drive required, irrespective of Upper Shoal Bay Link	AT	$0.25m	I & D	C	
Package 3: Killarney Street									
13	Killarney Street signalised pedestrian crossing	W/C	To provide linkage between Takapuna and Killarney Park		AT	$0.2m	I, D&C		

	Project	Modes[55]	Nature of Proposal	Discussion/trigger points	Owner	Cost	Short Term[56]	Med Term	Long Term
14	Hurstmere Road/Killarney Street signals	W/C	Signals, including realignment of intersection	To support concept of traffic travelling around Takapuna, in conjunction with Anzac St/Fred Thomas Dr intersection upgrade (project 3 above)	AT	$0.6m	I&D	C	
15	Killarney Street/The Terrace signals	GT,W/C	Signals proposed partly to allow safe right turns out from The Terrace, but also to allow safe pedestrian crossing movements		AT	$0.6m	I,D&C		
Package 4: City Centre Streets									
16	Improvements to bus station	PT	Improvements to facilities for bus passengers	Extent of improvements will depend on timing of potential relocation of bus station. Would also benefit development potential of surrounding sites – and therefore street's quality of place.	AT	$0.5m[58]	I,D&C		
17	Anzac Street/Lake Road signals	W/C	Signals, primarily to improve pedestrian connectivity, adjacent to bus station	Will depend to a certain extent on need to retain U turn facility for buses	AT	$1.8m	I,D&C		
18	Halls Corner intersection	W/C	Signal phase changes, removal of slip lane, and banning of selected movements	Primarily designed to improve pedestrian amenity (shorten wait time)	AT	$0.15m	I,D&C		
19	Hurstmere Road/Anzac St intersection	W/C	Provision of pedestrian facilities at roundabout	To resolve current deficiency, so needed immediately	AT	$0.1m	I,D&C		
20	The Strand footpath improvement	W	Filling gap in existing pedestrian network	Adjacent to above intersection	AT	$0.15m	I,D&C		

[58] This cost estimate is based on the value in the LTP

	Project	Modes[55]	Nature of Proposal	Discussion/trigger points	Owner	Cost	Short Term[56]	Med Term	Long Term
21	Huron Street streetscape	W/C	Streetscape project, to improve pedestrian amenity and development potential of surrounding sites		AT	$2.4m	I,D&C		
22	Como Street streetscape	W/C	Streetscape project, to improve pedestrian amenity and development potential of surrounding sites		AT	$2.4m	I,D&C		
23	30 kph zone	W/C, GT	Desire to reduce speed environment within Takapuna Centre	Needs more than road signs – depends on streetscape projects to reinforce speed environment	AT	$0.1m	I,D&C		
24	Anzac Street streetscape (east of Auburn)	W/C	Streetscape project, to improve pedestrian amenity	May be affected by potential development of Central Car Park site (with primary vehicle access onto Anzac Street)	AT	$8.5m	I&D	C	
25	Investigate relocation of bus station and secure site	PT	Investigate further the potential implications and alternatives for a new bus station and secure a site for this purpose	Would better support bus circulation following completion of Upper Shoal Bay Link to rapid transit network and would enable implementation of urban design improvements to northern end of Lake Road	AT	$250k	I		
26	Relocation of bus station	PT	New, probably off street facility, to remain in central location. Will include property purchase (if off street)	As above	AT	$9.3m[59]		D	C

[59] This cost estimate for the potential long term relocation of the bus station is a nominal sum, as the location has yet to be determined

	Project	Modes[55]	Nature of Proposal	Discussion/trigger points	Owner	Cost	Short Term[56]	Med Term	Long Term
27	Lake Road streetscape	W/C	Streetscape project, to improve pedestrian amenity	Facilitated by relocation of bus station. Also relates to potential development of Central Car Park site. Requires identification of different over dimension route	AT	$8.7m	I	D	C
Package 5: Lake Road									
28	Lake Road pedestrian crossings	W/C	Provision of pedestrian crossing facilities, partly to connect Upper Shoal Bay to Takapuna Beach	Implement in short term	AT	$0.1m	I,D&C		
29	Lake Road cycle lanes	C	Provision of cycle lanes (including some loss of on street parking)	Implement in conjunction with parking management plan	AT	$0.25m	I&D	C	
Package 6: Burns Avenue/Auburn Street									
30	Burns Ave/ Esmonde Rd intersection	GT, W/C	Additional pedestrian crossings to be provided, plus right turn into Burns Ave to be reinstated	Implement in short term	AT	$5.4m	I, D&C		
31	Tennyson Ave intersection	GT	Ban right turns, to improve safety	Implement in short term	AT	See above	I, D&C		
32	Signals at Huron, Northcroft, Byron	GT, W/C	Signals proposed, partly to provide for turning traffic and also to provide for pedestrians and cyclists	May be triggered by Upper Shoal Bay Link	AT	See above	I&D	C	
33	Burns Ave/ Auburn St street-scape (south of Anzac St)	W/C	Streetscape project, to improve pedestrian amenity	Implement in conjunction with above intersection works	AT	See above	I&D	C	

	Project	Modes[55]	Nature of Proposal	Discussion/trigger points	Owner	Cost	Short Term[56]	Med Term	Long Term
34	Burns Ave/Auburn St streetscape (north of Anzac Street)	W/C	Streetscape project, to improve pedestrian amenity past school	Implement in short term	AT	See above	I,D&C		
Package 7: Parking									
35	Alteration of parking to short stay only	GT	Implement parking restrictions and appropriate pricing within central area to short stay parking only, plus other changes outlined in CPMP.	Implement in coordination with opening of Gasometer car park (or alternative site). If possible combine with implementation of proposed street network changes.	AT	Opex	Implement as outlined		
36	Protection of land for future off-street parking facility, then construct facility	GT	Construction of a parking facility (or facilities) capable of eventually accommodating up to 700 short stay parking spaces.	Timing influenced by factors such as phasing of the proposals for the central Takapuna road network, Waterfront development etc. Should ideally be provided in stages, with first stage required in 5 to 10 years. May be delivered as part of commercial agreement	AT	$34.7m [60]	I&D	C	
37	Alteration of parking to short stay only	GT	Implement parking restrictions and/or appropriate pricing to achieve desired outcome	Co-ordinate with timing of implementation of street network changes	AT	Opex	Parking Ops		

[60] Cost estimate assumes Gasometer site not progressed

	Project	Modes[55]	Nature of Proposal	Discussion/trigger points	Owner	Cost	Short Term[56]	Med Term	Long Term
Package 8: Project proposed through other studies[61]									
38	Hurstmere Road (north of Killarney St)	C, PT	Cycle lanes, with partial bus lanes	Proposed through *Takapuna North Corridor Management Plan*	AT	-	I&D	C	
39	Taharoto Road	PT	Partial bus lanes	Proposed through *Takapuna North Corridor Management Plan*	AT	-	I&D	C	
40	Killarney Street	C	Cycle Lanes	Proposed through *Takapuna North Corridor Management Plan*	AT	-	I&D	C	
41	Hurstmere Rd (Anzac to Lake)	W/C	Streetscape project	Proposed by Auckland Council	AC	-	I, D&C		
42	The Strand Redevelopment	W/C	Streetscape project	Proposed by Auckland Council	AC	-	I&D	C	
43	Francis Street to Esmonde Road boardwalk	W/C	Walking and cycling connection	Proposed by Auckland Council	AC	-	I,D&C		

[61] Cost estimates have not been developed for projects proposed by other studies

Several of the projects listed in Table 6 relate to the concept to introduce a slow speed zone within the core of the Takapuna Centre. The streetscape projects for Northcroft Street, Huron Avenue and Anzac Street, (east of Lake Road) are included within the short term projects, while the Lake Road streetscape project is included within the list of longer term projects. This is due to the fact that the Lake Road streetscape project will depend on the relocation of the bus station, which is seen as a long term project.

Table 6 relates primarily to the delivery of projects. There are also a number of actions that are required in the short term, some of which are required to facilitate the delivery of longer term projects, namely:

- Liaise with the Auckland Council Unitary Plan team on the proposed Retail Frontage Control and the long term parking standards proposed by the Study for Takapuna
- Review progress regarding the implementation of the projects outside this Study, for example those recommended by the *Takapuna North Corridor Management Plan*
- Progress the planning of the various medium term streetscape projects that are cumulatively designed to provide the slow speed zone within the Takapuna Centre. This will need to include a consideration of the future overdimension routes through Takapuna.

6.2 Costs of Proposals

A broad assessment has been undertaken of the costs of projects identified in Section 5. The costs, as outlined in Table 6 above, are indicative with several of the larger projects including significant unknown elements at this stage. The parking buildings for example are based on the estimated long term parking demand for Takapuna, both short and long stay parking. Actual demand will be subject to the level of future redevelopment. Similarly, streetscape improvement projects have been priced with a rough order cost per linear metre, based on the road width, as the exact treatment to be applied to each street is to be determined.

The major cost components of the Integrated Transport Plan are as follows:

- Anzac Street widening is a project that has been identified for some time, and it has been allocated a cost of $27.2 million in the Regional Land Transport Programme, (RLTP). This figure relates however to the full project length from Northcote Road to Hurstmere Road, while the treatments specifically referred to in this report stretch from Taharoto Road to Auburn Street, and Lake Road to Hurstmere Road. The RLTP figure additionally includes property purchase costs, and it is understood that all property purchase associated with this scheme has now been completed. No further property purchase is required for the scheme recommended in this Study, and accordingly, the total cost estimate is lower than the $27.2 million stated in the RLTP
- The proposed cost of a bus Link across the Upper Shoal Bay will be a high cost item, and is estimated at $18 million. This figure excludes approximately $2.6 million for property purchase east Barry's Point Road, as that sum is included within the estimate for the pedestrian/cyclist Link. However, it includes over $5m for land on the western side of Barry's Point Road, along Des Swann Drive. This will be required to provide the western extension of the proposed cycleway, plus bus priorities along Des Swann Drive

- A new off street bus station also has the potential to be a high cost item. However, the location has yet to be determined. The proposal could be implemented as part of a mixed use development, which could reduce the public costs
- Similarly, the construction of an off street parking building has the potential to be another high cost item. The location has yet to be confirmed and the car park could also be implemented as part of a mixed use development, which could reduce the public costs. The cost estimate is based on the provision of 700 spaces, as discussed in Section 5.7

Greater details of these cost estimates are provided at Appendix F. The estimates have been developed inclusive of property costs, where significant property purchase is required. The cost estimates are also inclusive of an indicative utilities cost of 10%, client costs/internal Auckland Transport planning, etc of 10%, investigation and design of 12%, and contingency costs of 30%, except where lump sum estimates have been assumed. Consenting and approval costs have been excluded.

6.3 Economic Assessment

A high level economic assessment of the projects recommended by this Study has been carried out by John Bolland Consulting Ltd. That assessment is provided as Appendix G to this report. It provides analysis which identifies cost and benefit streams in a manner which is consistent with the current Transport Agency Economic Evaluation Manual.

The evaluation includes benefits from a range of sources: existing public transport users, new public transport users, decongestion due to mode shift from car, and increased use of active modes. Benefits from improved liveability were considered but could not be quantified (given that the assessment was intended to be only at a "high level".

The assessment was based on the draft version of this report which was provided to Auckland Transport in October 2013. The timing and definition of some projects has since been adjusted, partly in response to comments received from persons within Auckland Transport, but this should not significantly alter the broad conclusion. This conclusion is that the benefits are likely to be more than 2.5 times the costs. This is considered to be a good return on investment and would rank as "medium" in the Transport Agency efficiency profile. About three quarters of the benefits accrue to public transport users, both new and existing, and the remainder to active modes and road traffic.

The assessment notes that information on how costs and in particular benefits are spread through time is currently limited. For this reason sensitivity tests have been carried out on the "ramp up" of benefits, with these tests indicating that the Benefit/Cost ratio should remain above 2. Additionally, the assessment notes that not all funding will be sought from the Transport Agency, and a sensitivity test shows that if this is taken into account in the assumed capital costs, then the Benefit/Cost ratio will be much higher, at 4.6.

Finally, a number of assumptions have been made in the light of the limited information that is currently available and it is considered likely that the benefits have been understated at this stage.

6.4 Assessment of the proposed Transport Investment

Section 1.5 above noted that a number of assessment criteria were identified at an early stage of the project. These criteria were developed collaboratively between the consultant team and Auckland Transport[62]. Table 7 considers the extent to which the proposed plan for Takapuna meets these criteria.

Table 7: Criteria for Proposed Plan

Assessment Criterion	Assessment of proposed package of works for Takapuna against the criterion
Public Transport operation and mode share	
Improving the operation and mode share of buses on the Frequent Transport Network By achieving a LOS B - C for buses along identified key bus routes. A lower LOS may be acceptable if reliability is good	Section 3 of the report notes the modelled improvement in bus mode share, from 12% currently, to 14% by 2041, to 20% with the package of proposed measures. The Auckland Transport PARAMICS model of Takapuna has been used to assess future bus operations. The models predict bus speeds of LOS D-E overall. This does not meet the targets, partly due to the number of signalised intersections that buses are forced to travel through, but partly also because the modelling did not include all of the bus priority measures proposed in this Study. The Study recommends a number of additional areas of dedicated bus facility, and journey times will be reliable within the length of these facilities. Also, the Study recommends that buses circulate around rather than through the central core, in the interests of vehicle speeds. LOS C is predicted for the critical route between Takapuna and Akoranga Station (in both directions) in both the morning and evening peaks.
Quality Spaces	
Achieving quality spaces within the Metropolitan Centre by identifying areas of the road reserve which are surplus to requirements and could be better used for landscape planting, plazas or general amenity areas	There are several locations within the central core of Takapuna where the Study recommends wider footpaths and landscape/amenity improvements. These include Lake Road, Anzac Street, (east of Lake Road), and east-west links from Como Street to Byron Avenue
Supporting land use aspirations for the Centre	
Ensuring road designs respond to and integrate with the built form expected in the Unitary Plan zones for the area	As noted above, there are several areas within the central core of Takapuna, where the Study recommends wider footpaths and landscape/amenity improvements. There are very few locations where road widening is proposed

[62] Developed in a meeting on 24 April 2013, in subsequent email exchange, and at the first project workshop

Table 7: Criteria for Proposed Plan

Assessment Criterion	Assessment of proposed package of works for Takapuna against the criterion
Achieving a significant change in mode split, with shifts to greater levels of walking, cycling and public transport use	Section 3 of the report notes the modelled improvement in bus mode share, from 12% currently, to 14% by 2041 without intervention, and to 20% with the package of proposed measures. An increase in walking and cycling is predicted, from 5% to 16% of trips by 2041, without intervention. The models will not however reflect the likely effects of the proposed measures on walking and cycling. However, the transport package is expected to lead to further increases in mode share for these modes
Identifying areas where specific rear lot access/service lanes should be acquired to support land use outcomes and to reduce the proliferation of vehicle crossings	This Study has referred to the Retail Frontage Control, which relates to the proliferation of access points
Ensuring the parking is managed in a way that responds to predicted demands, without reducing targeted modes shares for public transport usage	Appendix D summarises the approach to parking. A measure of parking restraint is proposed, to be implemented in over time
Improving the conditions that support and overall probability of walking within the Study area	
Ensuring formal crossing facilities are provided at all key pedestrian crossing locations as identified in the walking accessibility study	Section 4.5 and various parts of Section 5 set out the proposed improvements for pedestrians. Significant numbers of additional crossings are proposed and the ease of crossing is to be facilitated by a reduction in the speed environment
Maximising the convenient, (10 minute) walking catchment around identified key destinations in Takapuna including the Akoranga Busway Station	As above: significant numbers of additional crossings are proposed and the ease of crossing is to be facilitated by the reduction in the speed environment in the central core of Takapuna Additional pedestrian crossings are proposed within the catchment of Akoranga station, and the Upper Shoal Bay Link is proposed partly to improve the station catchment
Ensuring that the key routes that connect the identified key destinations and public open spaces in Takapuna score 'high quality' or better in terms of pedestrian amenity, (as set out within the walkability assessment) by 2025	Section 5 responds to the walkability hot spots that were identified by the walkability assessment, and numerous measures are proposed to connect the key destinations and public open spaces within Takapuna
Providing additional footpath widths or shared space where appropriate and minimising the number of driveway accesses along streets with relatively high pedestrian or cycle numbers	The Study proposes the widening of footpaths in several locations and shared paths for use by pedestrians and cyclists in and around the Takapuna Centre

Table 7: Criteria for Proposed Plan

Assessment Criterion	Assessment of proposed package of works for Takapuna against the criterion
Ensuring that any land use consequences that will notably contribute to the achievement of this objective are identified and passed on to the Auckland Council Unitary Plan team	One relevant issue that has emerged relates to the retail frontage control proposed in the *Proposed Auckland Unitary Plan*
Improving cycling within the Centre	
Providing dedicated cycle facilities on those roads forming part of the Auckland Cycle Network, especially the Cycle Connector Network proposed within Takapuna	Dedicated cycle facilities are to be provided on key cycle routes, including Lake Road and Anzac Street. Within the core of the Centre, a slow speed (30 km/h) environment is proposed and it is assumed that cyclists will "take the lane" in this area
Achieving a low speed environment, (40km/h or less) on those streets where cyclists do not have a dedicated facility	See above – a slow speed zone is proposed
Ensuring adequate on-street cycle parking facilities	This Study has not gone into this level of detail, but it is acknowledged that consideration should be given to the implementation of appropriate cycle parking facilities[63]
Providing for general traffic	
Maintaining adequate transport functionality for general traffic by achieving traffic LOS E over a peak period, or a combination of measures representing the minimum functionality to be achieved	As noted in Section 3.4, traffic conditions are predicted to get worse between now and 2041, due to the predicted increases in traffic demands. Conditions are not predicted to deteriorate to the same level if some mode change is achieved. LOS E or better are predicted to be maintained on each of the main Takapuna routes. Congestion is predicted to be quite severe however along Esmonde Road, Burns Avenue and Barry's Point Road in the morning peak period due to city bound traffic queuing on the approaches to the Esmonde Road interchange. This congestion however is independent of Takapuna's internal road network. Within Takapuna, reductions in the speed environment are proposed primarily to improve pedestrian amenity.

[63] It is understood that Auckland Transport has a planned programme for the implementation of cycle parking in Auckland.

7 CONCLUSIONS

7.1 Overall Direction

This Study recommends the following overall directions:

- Greater emphasis must be given to public transport to enable Takapuna to meet its strategic objectives as a successful, dynamic Metropolitan Centre
- Greater emphasis must be given to the *'streetscape'* of streets within the Takapuna Centre, to improve the character and *'liveability'* of the centre. Streets and other public spaces need to give greater priority to pedestrians and cyclists so that Takapuna becomes a more attractive place to live, work, and spend time in
- Parking management is required with an element of parking restraint to be introduced over time, sufficient to discourage some commuters from driving to work, but flexible enough to continue to attract shoppers, visitors and essential business trips
- Road capacity should generally be retained on the main routes to and from Takapuna, to provide a satisfactory level of service for most of the day, accepting that congestion can be expected in the peak periods
- Changes should be undertaken to general traffic operations within Takapuna. These include treatment of certain key intersections to encourage traffic to pass around the Takapuna Centre and to reduce the traffic speed environment within the central core.

The Study has identified three 'transformational projects' (or groups of projects) that are seen as pivotal to the successful revitalisation and growth of the Takapuna Centre over the next 20 to 30 years:

- **A 30 kph "walkability" zone, and upgrade of street amenity within the central core of Takapuna**. A series of projects is proposed which cumulatively seeks to reduce the speed environment and enhance the streetscape of central Takapuna, particularly for the benefit of pedestrians and cyclists
- **A Link or Links across the Upper Shoal Bay.** A facility for pedestrians and cyclists should be provided in the short term, while a public transport connection is recommended in the medium to longer term, to establish a proper connection between Takapuna and Auckland's rapid transit network and to improve bus reliability. This is also seen as pivotal to the successful regeneration of the Barry's Point Road precinct
- **A new (relocated) bus station in central Takapuna, in the longer term.** This would open up the Lake Road area for growth of 'main street' retailing over time, as well as help make bus movements easier into and out of the Centre.

Changes in people's travel behaviour will not happen overnight and rapid mode change should not necessarily be expected. Parking restraint, on its own, would reduce the accessibility of the Takapuna Centre and suitable investment in other transport modes will be required in order to retain accessibility. This may be difficult to achieve in the short to medium term, but the level of mode change suggested in this Study should be achievable in the longer term if suitable investment is made in public transport and active travel improvements, in conjunction with suitable parking restraint.

7.2 Public Transport

The key issues relating to public transport are as follows:

- A substantial increase in the use of public transport is essential if Takapuna is to achieve its growth potential in a location with limited ability to cater for increased vehicular traffic flows. While an increase in public transport mode share from 12% to 14% is predicted by 2041, this is not considered adequate for a Metropolitan Centre
- Takapuna is approximately 1.5 km from the Northern Busway's Akoranga Station and is the only Metropolitan Centre in Auckland which is not directly served by the rapid transit network. It is essential that bus travel between central Takapuna and the Busway should be on a route which provides reliability and consistent travel times and isolates buses from congestion as far as practicable. Linking Takapuna to the rapid transit network is therefore of high strategic importance and is a focus of this Study
- The *Regional Public Transport Plan's* 2016 bus network includes a number of high frequency bus routes serving Takapuna. Most of the routes which previously terminated in Takapuna will instead terminate at the Akoranga Station. This will enable more efficient use to be made of bus stop space at the Takapuna bus station and will reduce bus lay-up requirements
- By 2041, bus numbers can reasonably be expected to double from those proposed in the 2016 *Regional Public Transport Plan*
- The existing on street Takapuna Bus Station is conveniently located in the centre of Takapuna in terms of pedestrian access. However, there are tensions around the need for public transport to serve the centre and the desire for speciality retail and very high quality main street to grow around the perimeter of the triangle formed by Hurstmere Road, Lake Road and Anzac Street. This issue is explored in more detail in the main body of the report. There are also concerns regarding bus trip reliability in the future, in terms of getting buses into and out from the current bus stop location when key roads will likely face periods of vehicular congestion.

The proposed transport package is forecast to increase public transport mode share from the 14% figure noted above to 20% by 2041. This may seem like a modest increase, but with the greater level of development in the centre it equates with a tripling of public transport trips to/from Takapuna, between 2011 and 2041.

Key recommendations for public transport encompass both the bus route between central Takapuna and the Akoranga Station, and the location of the Takapuna Bus Station. They include:

- Improvements to the environment around the current bus station in Lake Road, in the short term
- Measures which would enable Anzac Street to provide an adequate route for buses over the medium term

- The provision of a more direct bus link across Upper Shoal Bay in the longer term. This link would enable buses to avoid expected future congestion on Anzac Street and offer assurance of bus reliability that will not be possible along Anzac Street in the longer term. It would also offer improved trip times between Takapuna and the Busway, as well as help open up the Barry's Point Road and (further to the west) Akoranga Drive precincts
- The construction of a new, centrally located Takapuna bus station, in the long term, to support both the changes in bus circulation which result from the proposed public transport connection across the Upper Shoal Bay, and urban design improvements at the northern end of Lake Road to support planned mixed use intensification of Takapuna's central area.

7.3 Active Transport

The projected demand for active trips is high within and surrounding Metropolitan Centres and active mode share is forecast to increase in Takapuna from 5% to 16% by 2041. For this mode share to be met, routes must offer a combination of convenience, safety, comfort and interest. Takapuna is particularly well suited to accommodate significant increases in journeys by foot or cycle, and recommendations for active transport include:

- Further development of the cycle network to, from and within Takapuna, to support existing cyclists and to encourage more people to cycle for transport and leisure
- A new cycle and pedestrian pathway from central Takapuna across Upper Shoal Bay to Akoranga Station to provide better connections between the Takapuna Centre and the Northern Busway
- Further development of the pedestrian network, especially to access public transport and to access key destinations within Takapuna. Giving pedestrians greater priority and convenience in Takapuna's central area is necessary, in terms of the vehicular speed environment, provision of facilities, and opportunities to readily cross key roads
- Signalisation of many of the intersections which will assist pedestrians to cross busy roads.

7.4 Improved Walkability and Streetscape

The future of Takapuna will need to include ongoing improvements and uplift in street quality throughout the central area. This is needed to support the *Auckland Plan*'s Metropolitan Centre strategy for higher densities.

The *Takapuna Centre Walkability Assessment,* undertaken as part of this Study, identifies a range of measures to improve walkability across 'hotspots' and it proposes a full list of recommended upgrades, including high, medium and low priority projects. The Study's methodology was geared around identifying priorities based on overall potential to improve walkability in the Centre. It gives emphasis to projects on key roads that currently offer lower standards of amenity rather than on the existing heavily invested Hurstmere Road main street.

Recommendations for improved walkability and streetscape improvements include:

- Greater emphasis given to the streetscape within the central area of Takapuna including reducing the vehicular speed environment

- A number of proposed improvements to Takapuna's streets including crossing facilities, pedestrian amenity and improved signal phasing
- A stronger connection between Upper Shoal Bay, Lake Pupuke and Takapuna Beach
- General recommendations for every street in the study area.

7.5 Parking Management

This report concludes that ongoing parking management will be required and that an element of parking restraint should be introduced over time. As part of the Study, a *Comprehensive Parking Management Plan* (CPMP) was developed to support the forecast growth for Takapuna. The CPMP identifies interventions to manage parking supply and demand. It concludes that Takapuna currently has an adequate supply of short stay parking to meet the next ten years' demand, but that the public sector should look to provide additional off-street short stay parking to accompany future development beyond that period. Additional short stay parking would also be required to replace on-street parking lost on implementing the proposed improvements to streets in central Takapuna. Altogether up to 700 short stay spaces may be required over the next 30 years.

The CPMP concludes that the supply of public long stay/commuter parking is approximately in balance with demand. As Takapuna's economy is currently considered to be relatively 'fragile', it is recommended that public long stay parking removed through the implementation of the proposed improvements to central Takapuna streets and through future development of the Waterfront be replaced over the short to medium term. Such replacement parking should, however, be converted to short stay over time in phase with increased use of alternatives to the single occupant car for travel to work. Recommendations for parking include:

- Parking charges, numbers and location should discourage some commuters from driving to work in Takapuna, but should be flexible enough to continue to attract shoppers, visitors and essential business trips
- There is no requirement for additional short stay/visitor parking for ten years to accommodate the rate of development projected to occur over this period. The street network changes proposed in the Takapuna CBTS would, however, result in the loss of approximately 160 short stay spaces which should be replaced. Between years 11 and 30, an estimated total of up to 580 short stay spaces are required to support projected development in central Takapuna
- At the appropriate time, parking within the central area[64] should be dedicated to short stay parking, or priced to encourage short stay parking
- Initially, long stay parking lost as a result of the implementation of the street network changes proposed by this study and, potentially, the redevelopment of the waterfront, should be replaced. The number of spaces involved could range from approximately 75 to 250 spaces, depending on the nature of the waterfront redevelopment. Over time, these replacement long stay spaces should be converted to short stay as the single occupant vehicle mode share reduces
- Developers should be encouraged to provide substantially less than the maximum parking permitted by the Proposed Auckland Unitary Plan, by providing some certainty that public parking will be provided at an appropriate location and time

[64] The area in question is shown in Figure 14

- Assuming the proposed Gasometer site parking facility goes ahead, it may provide 600 additional public parking spaces in Takapuna in the relatively near future. To reduce the potential impact of such a large increase in parking availability, it is strongly recommended that the opening of the facility be accompanied by measures to reduce long stay parking elsewhere in Takapuna including the dedication of all on-street parking within the central area to short stay[65]. The ability to progressively convert all public Gasometer site parking to short stay parking over time should be ensured
- If the Gasometer site parking facility does not go ahead, it will be necessary to find an alternative site or sites capable of eventually accommodating around 700 parking spaces. The parking facility should cater for short stay parking needs and, initially, long stay parking displaced from central Takapuna locations. Depending on the timing and nature of land use development within central Takapuna, it may not be required within the next 5 years. The facility (or facilities) should be located within the central area, if feasible.

7.6 Road Capacity

This report outlines various proposals to change operations for general traffic within Takapuna. A key issue for traffic operations relates to the predicted effects of reallocating an eastbound traffic lane along Anzac Street to bus use, in the short to medium term. Despite the predicted increases in public transport and active travel, the number of car trips is predicted to increase. This highlights the importance of maintaining vehicle capacity on the main routes to/from Takapuna, whilst still catering for growing public transport and active mode users.

Recommendations for road capacity include:

- Generally retaining road capacity on the main routes to and from Takapuna to provide a satisfactory level of service for most of the day
- Acceptance that congestion can be expected in the peak periods, particularly during the morning peak period, due to severe queuing along Esmonde Road on the approaches to the Northern Motorway interchange
- Outlining recommended proposals to change operations for general traffic within Takapuna. This is to include treatment of certain key intersections, to encourage through traffic to pass around rather than through central Takapuna, and by reducing the traffic speed environment within the central core.

[65] The various changes to parking proposed are set out in Section 4.3 of the report

APPENDIX A Takapuna CBTS Stage 1 Report

APPENDIX B Traffic Modelling Results

Section 3 of the report refers to traffic and transport modelling that has supported the development of the study. This Appendix provides further details.

The study has been informed by results from the Auckland Regional Transport (ART) model, the Auckland Passenger Transport (APT) model, and a PARAMICS traffic model operated by Auckland Transport.

REGIONAL TRANSPORT MODEL RESULTS

Forecast travel demand data has been obtained from the Auckland Regional Transport (ART) model. Data presented is for the 2011, 2021 and 2041 years using the Scenario I model. It is noted that Scenario I represents a medium growth model, and is accepted by the NZ Transport Agency for assessment of transportation projects. The land use forecasts are set out in Table 2, within Section 2.3 of the report.

Mode Splits

The ART model has been used to assess the predicted mode split to and from Takapuna, for each forecast year. This information is summarised in Table B1, for the wider Takapuna area (including the town centre, ART model zones 108 to 111)[66].

Table B1: Morning Peak Trips by Mode, according to ART Model (2 Hour Period)

Area	Mode	2011		2021		2041	
		Person Trips	Mode Split	Person Trips	Mode Split	Person Trips	Mode Split
Wider Takapuna	Car	12,200	82%	17,100	78%	19,200	69%
	Public Transport	1,850	12%	2,970	13%	3,950	14%
	Active	810	5%	1,980	9%	4,500	16%

Commentary on the above figures is provided at Section 3.2 of the report.

Traffic Demands

Table B2 sets out the traffic volumes crossing a cordon around Takapuna for each of the three modelled years. The cordon volume has been obtained by summing link flows across the four arterial routes into/out of Takapuna that are shown in Figure 5 (i.e Taharoto Road south of Northcote Road, Esmonde Road west of Fred Thomas Drive, Kitchener Road north of Hurstmere Road and Lake Road, south of Esmonde Road).

[66] The Stage 1 report also provided predictions solely for the Takapuna town centre zone (ART model zone 108)

Table B2: Takapuna Cordon: Traffic Volumes predicted by ART Model (2 Hour Periods)

	2011	2021		2041	
	Screenline Vehicles	Screenline Vehicles	Change (2011-2021)	Screenline Vehicles	Change (2011-2041)
Trips In					
Morning Peak	11,200	12,200	+1,000 (9%)	13,600	+2,400 (21%)
Interpeak	9,300	11,000	+1,700 (18%)	12,800	+3,500 (38%)
Evening Peak	9,500	10,700	+1,200 (13%)	11,900	+2,400 (25%)
Trips Out					
Morning Peak	8,700	9,800	+1,100 (13%)	10,900	+2,200 (25%)
Interpeak	9,000	10,600	+1,600 (18%)	12,300	+3,300 (37%)
Evening Peak	12,100	13,200	+1,100 (9%)	14,700	+2,600 (21%)

Commentary on the above figures is provided at Section 3.3 of the report.

Effects of Transport Investment on Travel

The above figures relate to the "default" situation, without additional investment or intervention in transport. Tests have also been run using the Auckland Passenger Transport Model to establish, at a broad level, the predicted effects of additional bus frequencies (to overcome routes where overcrowding was predicted), the provision of additional bus lanes[67], and a moderate level of parking restraint. The results are summarised in Table B3 below.

Table B2: Takapuna ART3 Morning Peak Trips by Mode, with modifications resulting from APT Model Runs (2 Hour Periods)

Area	Mode	2011		2041 (ART model prediction)		2041 (with additional transport investment)	
		Person Trips	Mode Split	Person Trips	Mode Split	Person Trips	Mode Split
Wider Takapuna	Car	12,200	82%	19,200	69%	17,800	64%
	Public Transport	1,850	12%	3,950	14%	5,400	20%
	Active	810	5%	4,500	16%	4,500	16%

Table B3 assumes that all trips diverted away from car travel are diverted onto buses. In reality, some trips may divert to active modes instead.

Commentary on the above figures is provided at Section 3.2 of the report.

[67] The assumed bus lanes were along Taharoto Road, Hurstmere Road/Kitchener Road, with additional facilities along Esmonde Road

PARAMICS TRAFFIC MODEL RESULTS

Predicted Traffic Operations

The predicted traffic operation in the Takapuna area has been assessed using Auckland Transport's PARAMICS model of Takapuna. Two sets of runs were carried out, with the second set in effect superseding the first. Therefore this Appendix reports only on the results of the second set of tests, undertaken by Auckland Transport in late August/early September 2013.

Future Reference Case

The scenario modelled in PARAMICS includes all of the anticipated land use changes in Takapuna, as envisaged by Scenario I, but it relates to a 2031 scenario in terms of "background growth" (i.e changes in traffic flows for trips with origins and destinations outside Takapuna), in order to provide a traffic assessment which relates to the period before the completion of an Additional Waitemata Harbour Crossing. This scenario is still termed a 2041 scenario, as the land use changes within Takapuna are unlikely to be fully in place by 2031.

The models relate to the weekday morning and evening peak periods. They have been run for two sets of 2041 demands: firstly without and then with the reductions in traffic demands indicated by the APT model runs (see previous page). The future (2041) Reference Case (often called the "Do Minimum" scenario) incorporates the following changes from the base (2011) model:

- Changes in traffic demands, as noted above
- Changes in bus routing and frequency, generally in accordance with the Regional Public Transport Plan.

The overall average travel times within the modelled area are summarised in Table B4 below.

Table B4: Average Vehicle Speeds within PARAMICS Modelled Area (kph)

	AM Peak Period	PM Peak Period
Existing (2011)	32	41
Future (2041) Reference Case Scenario without APT model diversion	20	30
Future (2041) Reference Case Scenario with APT model diversion	21	38

The absolute average speeds in the above table should be viewed with caution as they conceal significant variations at a route by route level. For example, the average speeds in the morning peak are dragged down by the significant congestion on the approaches to the Northern Motorway.

Model Tests

In addition to the Future Reference Case, the models have been run for a number of tests which were aimed primarily around establishing the likely future operation of Anzac Street, with bus lanes, and the likely bus travel times, if buses travel via either Anzac Street or a link across the Upper Shoal Bay.

All three tests included the changes to traffic demands and bus frequencies that were included within the Future Reference Case, and they added the following network changes:

- The introduction of the right turn from Esmonde Road to Burns Avenue (as proposed in Section 5.6)
- Rationalisation of Halls Corner intersection (as proposed in Section 5.4.3)
- Traffic calming along Auburn Street: past the school (as proposed in Section 5.6)
- The long term signalised solutions proposed along Burns Avenue/Auburn Street (again as proposed in Section 5.6)
- Anzac Street Widening, in some form, noting that the layout along Anzac Street differed between the options. Bus lanes were assumed with Options 1a and 1b, while with Option 2, no bus lanes were included, as all buses were assumed to use the proposed Upper Shoal Bay link. Further details are set out below
- Realignment of the Hurstmere Road/Kitchener Street intersection (as proposed in Section 5.3.1)
- Taharoto Rd bus lanes (as included conceptually in the APT model tests). The northbound lane would replace a general traffic lane from Karaka Street to north of Rangitira Avenue, which the southbound lane would replace a general traffic lane from Karaka Street to the approach to Killarney Street
- Kitchener Road bus lanes (again, as included conceptually in the APT model tests). The northbound lane would run alongside the single general traffic lane in the evening peak period, from Eric Price Avenue to Milford Road, while the southbound lane would run alongside the general traffic lane in the morning peak period from Eric Price Avenue to the approach to Killarney Street
- Signalisation of the Lake Road/Anzac Street intersection, as proposed in Section 5.4.3
- Lower midblock speed environments were assumed along Lake Road (between Bracken Avenue and Anzac Street), Anzac Street (between Auburn Street and Hurstmere Road), Byron Avenue (between Lake Road and Burns Avenue) and Northcroft Street (between Lake Road and Burns Avenue).

Option 1a assumed that the existing Lake Road bus station was relocated to an adjacent site, somewhere to the west of Lake Road. As a result, intermittent bus lanes were assumed along Anzac Street, in both directions, consistent with the proposal in Figures 29 and 30. With this option, the eastbound bus lane would stop east of Barry's Point Road, to allow buses to get from the kerbside lane (and the bus stop) into the right turn lane (to allow buses to turn into Auburn Street).

With Option 1b, it was assumed that the existing Lake Road bus station was relocated to an adjacent site, with access off Anzac Street. As a result, the eastbound kerbside bus lane was assumed to continue to Auburn Street.

With both Options 1a and 1b, the layouts at the intersections of Anzac Street with Fred Thomas Drive/Taharoto Road/Killarney Street and Barry's Point Road/Lake Pupuke Drive were generally consistent with those shown in Figures 33 and 35.

Option 2 included the bus link across Upper Shoal Bay (along Byron Avenue, to a signalised crossroads at Barry's Point Rd/Des Swann Drive), and all Anzac Street buses were diverted to the new link. As a result, the Anzac Street bus lanes were removed, consistent with the proposal in Figures 31 and 32. The layouts at the intersections of Anzac Street with Fred Thomas Drive/Taharoto Road/Killarney Street and Barry's Point Road/Lake Pupuke Drive were generally as shown in Figures 34 and 36.

It is important to note that the models were not used to test the effects of all projects which were subsequently included within the link of recommended projects, after the completion of the modelling in September 2013.

The overall average travel times within the modelled area are summarised in Tables B5 and B6 below.

Table B5: Average Vehicle Speeds within PARAMICS Modelled Area (2041, without APT Model Trip Diversion)

	Reference Case	Option 1a	Option 1b	Option 2
Morning Peak	20	19	19	20
Evening Peak	30	28	28	29

Table B6: Average Vehicle Speeds within PARAMICS Modelled Area (2041, with APT Model Trip Diversion)

	Reference Case	Option 1a	Option 1b	Option 2
Morning Peak	21	20	20	20
Evening Peak	38	35	35	35

It should be noted that the three options tests include a number of projects which will deliberately increase delay for general traffic or reduce vehicle speeds, for example by signalising certain intersections to improve pedestrian accessibility and to improve safety for all road users, or by narrowing streets and reducing the speed environment within the Takapuna Centre.

Tables B7 to B10 below set out the forecast corridor speeds, on Takapuna's key arterial routes.

Table B7: Predicted Corridor Speeds (kph): 2041 Morning Peak, without Diversion of Trips (from APT Model runs)

		Reference Case	Option 1a	Option 1b	Option 2
Taharoto Road	Northbound	36	31	28	29
	Southbound	27	22	24	24
Anzac Street	Eastbound	26	18	18	20
	Westbound	19	20	20	20
Hurstmere Road	Northbound	32	24	24	25
	Southbound	21	19	21	22
Lake Road	Northbound	13	17	18	18
	Southbound	24	25	24	25
Barry's Point Road	Northbound	19	25	26	14
	Southbound	2	2	2	2
Burns Avenue	Northbound	15	13	14	13
	Southbound	7	7	6	6
Esmonde Road	Eastbound	36	34	34	34
	Westbound	4	4	4	4

Table B8: Predicted Corridor Speeds (kph): 2041 Morning Peak, with Diversion of Trips (from APT Model runs)

		Reference Case	Option 1a	Option 1b	Option 2
Taharoto Road	Northbound	34	30	29	28
	Southbound	28	25	25	26
Anzac Street	Eastbound	28	20	19	22
	Westbound	20	19	20	19
Hurstmere Road	Northbound	33	25	25	26
	Southbound	23	20	21	22
Lake Road	Northbound	15	18	18	17
	Southbound	25	24	24	25
Barry's Point Road	Northbound	22	31	32	17
	Southbound	2	2	2	2
Burns Avenue	Northbound	15	14	14	16
	Southbound	7	6	6	5
Esmonde Road	Eastbound	38	37	38	39
	Westbound	4	4	4	4

Table B9: Predicted Corridor Speeds (kph): 2041 Evening Peak, without Diversion of Trips (from APT Model runs)

		Reference Case	Option 1a	Option 1b	Option 2
Taharoto Road	Northbound	18	20	18	23
	Southbound	28	25	26	27
Anzac Street	Eastbound	26	20	19	22
	Westbound	20	20	21	23
Hurstmere Road	Northbound	32	24	24	24
	Southbound	22	21	22	22
Lake Road	Northbound	18	20	20	21
	Southbound	20	22	21	22
Barry's Point Road	Northbound	22	25	27	21
	Southbound	5	5	5	4
Burns Avenue	Northbound	15	12	13	15
	Southbound	19	13	13	13
Esmonde Road	Eastbound	36	35	35	34
	Westbound	8	8	8	8

Table B10: Predicted Corridor Speeds (kph): 2041 Evening Peak, with Diversion of Trips (from APT Model runs)

		Reference Case	Option 1a	Option 1b	Option 2
Taharoto Road	Northbound	26	26	25	28
	Southbound	28	26	26	28
Anzac Street	Eastbound	27	21	21	23
	Westbound	22	23	23	24
Hurstmere Road	Northbound	33	25	25	25
	Southbound	23	23	23	23
Lake Road	Northbound	20	21	22	21
	Southbound	23	24	24	24
Barry's Point Road	Northbound	27	30	31	19
	Southbound	27	24	24	21
Burns Avenue	Northbound	20	15	15	18
	Southbound	22	18	17	17
Esmonde Road	Eastbound	39	37	38	39
	Westbound	22	20	18	19

The PARAMICS models also provide predicted travel times for buses. The predicted times for the primary route, between the Northern Motorway (south of the Esmonde Interchange) and the Takapuna bus station, and back, are summarised in Tables B11 to B14.

Table B11: Predicted Bus Travel Times (mins): 2041 Morning Peak, without Diversion of Trips (from APT Model runs)

	Reference Case	Option 1a	Option 1b	Option 2
Taharoto Road to Lake Road and back	13.0	12.7	13.3	19.0
SH1 (south) to Takapuna and back	24.5	21.6	22.6	21.0

Table B12: Predicted Bus Travel Times (mins): 2041 Morning Peak, with Diversion of Trips (from APT Model runs)

	Reference Case	Option 1a	Option 1b	Option 2
Taharoto Road to Lake Road and back	13.1	12.1	13.4	19.2
SH1 (south) to Takapuna and back	23.0	22.2	21.6	20.4

Table B13: Predicted Bus Travel Times (mins): 2041 Evening Peak, without Diversion of Trips (from APT Model runs)

	Reference Case	Option 1a	Option 1b	Option 2
Taharoto Road to Lake Road and back	14.6	13.3	13.3	16.6
SH1 (south) to Takapuna and back	19.0	17.5	16.8	15.0

Table B14: Predicted Bus Travel Times (mins): 2041 Evening Peak, with Diversion of Trips (from APT Model runs)

	Reference Case	Option 1a	Option 1b	Option 2
Taharoto Road to Lake Road and back	12.6	12.1	12.4	15.8
SH1 (south) to Takapuna and back	17.3	16.3	16.1	14.1

As noted above, the modelling was undertaken prior to the identification of all projects recommended as part of this study. Indeed the modelling was partly used to identify potential refinements to some projects, or to identify the need for more projects. Information was received from Auckland Transport in terms of the predicted delays at certain locations, and manual modifications have been made in order to assess the potential bus travel times between SH1 (south) and Takapuna, for example through removing delays on Des Swann Drive, approaching Fred Thomas Drive, through the provision of bus priorities. As a result, the modified times are set out in Table B15, comparing the Reference Case times without the APT model trip diversion with the manually adjusted times with Option 2, with the APT model trip diversion. These are the times referred to in Section 5.2.4.

Table B15: Predicted Bus Travel Times (mins): SH1 (south to Takapuna and back: 2041 (including manual modification to times with Option 2, see above)

	Reference Case	Option 2
Morning Peak	24.5	16.8 (ie – 7.7 mins)
Evening Peak	19.0	12.1 (ie – 6.9 mins)

APPENDIX C Report on Public Transport

APPENDIX D Comprehensive Parking Management Plan

APPENDIX E Takapuna Centre Walkability Assessment

APPENDIX F Project Cost Estimates

APPENDIX G High Level Economic Assessment