AECOM Imagine it. Delivered.

AECOM Australia Pty Ltd
Level 21, 420 George Street
Sydney NSW 2000
PO Box Q410
QVB Post Office NSW 1230
Australia
www.aecom.com

+61 2 8934 0000 tel
+61 2 8934 0001 fax
ABN 20 093 846 925

# Memorandum

| | | | |
|---|---|---|---|
| To | Willoughby City Council | Page | 1 |
| CC | Jack Jiang (AECOM)<br>Anoop Sridhar (AECOM) | | |
| Subject | Pacific Highway Shared Path, Artarmon to St Leonards<br>Summary of Route Assessment (Stage 1) | | |
| From | Ghizlane Chergaoui (AECOM) | | |
| File/Ref No. | Final | Date | 29-Apr-2019 |

## 1.0 Project background

AECOM has been commissioned by Willoughby City Council (Council) to undertake a high-level route assessment as well as concept design for a proposed off-road shared path that connects Artarmon to St Leonards Station ('the project').

The purpose of the shared path is to connect centres and destinations in all directions and integrate into Sydney's principal bike network. This is in line with Council's Strategic Community Plan '*Our Future Willoughby 2028*', released in 2018.

## 2.0 Project objectives

Council has identified key project objectives as follows:

- Develop a safe, coherent, direct and comfortable off-road cycling route along the eastern footpath of the Pacific Highway.
- Connect the Artarmon to St Leonards train station with a connection to the Gore Hill Freeway shared path and Lane Cove LGA bike links.
- Determine a 'fit for purpose' shared path and adopt an approach to "achieve the best out of existing assets".
- Provide a 3m wide shared path (due to constraints, some locations may be less than 3m wide).
- To increase road safety where possible, pedestrians and cyclists are to receive greater priority.

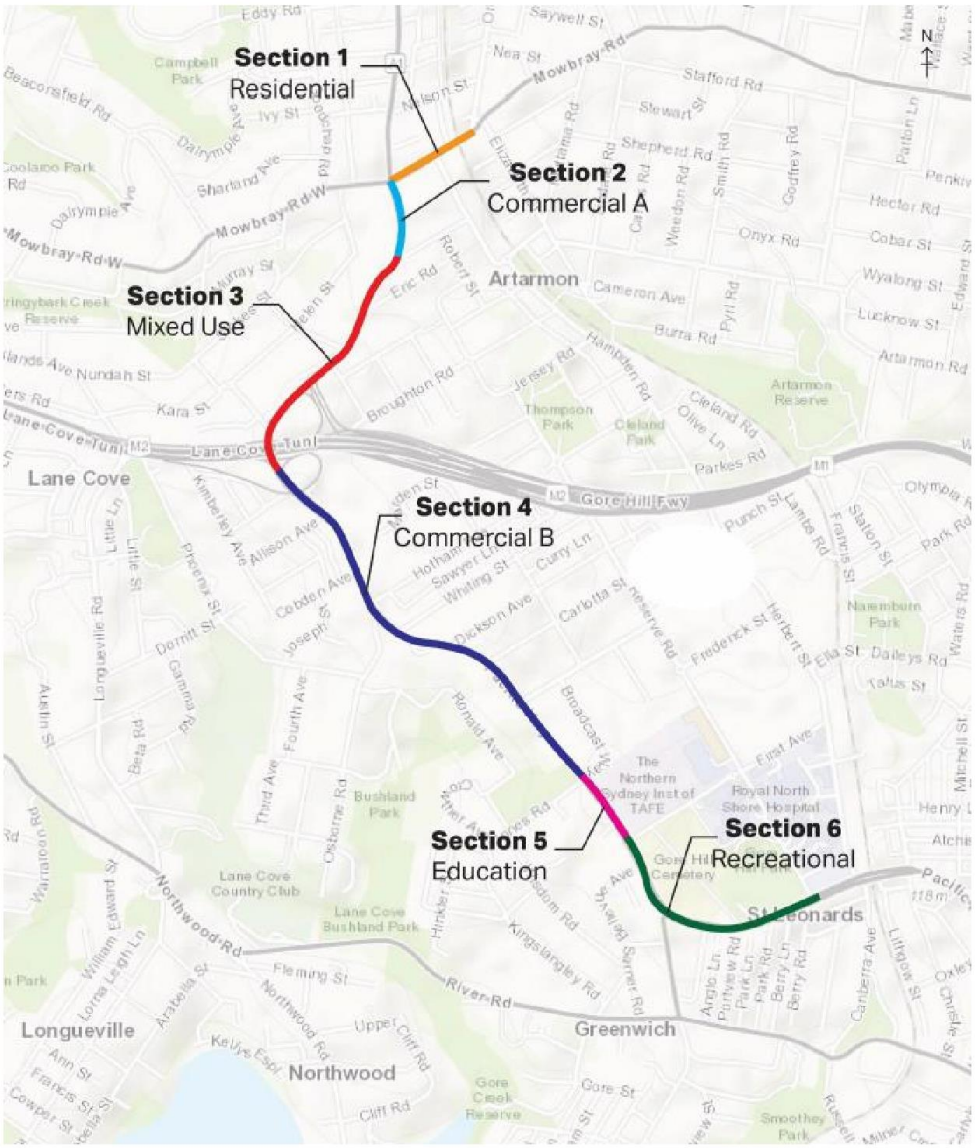
## 3.0 Project description

The shared pedestrian and bike path is proposed along the eastern footpath of Pacific Highway, with the primary users of the infrastructure expected to be commuters, users with key destinations along the route or people using the facilities for recreational purposes.

The proposed route poses several challenges as Pacific Highway is a State Road and provides the major north-south traffic route through the area. It is characterised by large traffic volumes (approx. 30,000 vehicles per day) and high vehicle speeds (60km/h posted speed) throughout the day. The eastern footpath is further characterised by limited footpath and verge width along majority of the route, existing structures like bus shelters and sign posts, services and a variety of trees and vegetation.

The overall project route was divided into six sections based on the function of the frontage land-use characteristics as illustrated in Figure 1.

**Figure 1 The proposed shared path along Pacific Highway between Artarmon and St Leonards**




Source: AECOM, 2019

## 4.0 Project stages

The project is proposed to be delivered under three key project stages as follows:

- Stage 1: Route Assessment
- Stage 2: Draft Concept Design
- Stage 3: Final Concept Design.

## 5.0 Summary of Stage 1

Stage 1 of the project commenced in February 2019 and consists of the preliminary high-level assessments of the route with the key tasks summarised in Table 1. It is noted that Stage 1 was completed in collaboration with Council, bicycle user groups and various stakeholders including Transport for NSW (TfNSW) and Roads and Maritime Services (Roads and Maritime).

**Table 1 Summary of Stage 1**

| Task no. | Task | Description | Reference document |
|---|---|---|---|
| 1.1 | Design brief | The design brief has been produced to support the development of the project and aims to provide a framework for the project execution. It contains three main sections: The Preliminary Design Philosophy Statement, the Movement & Place Assessment and the Multi-Criteria Assessment (MCA) criteria.<br>The Multi-Criteria Analysis (MCA) was used as a tool to conduct options assessment with stakeholders to guide the decision making. It ensures uniformity in the assessment, fast-tracks the process and supports community consultation. Prior to the MCA process, each option was cross-checked against the KPIs (as part of Stage 1). | Appendix 1 |
| 1.2 | Design philosophy statement | The preliminary design philosophy statement (DPS) outlines the relevant engineering standards required for the shared path. The statement identified the following key design parameters:<br>• 2.5m width at pinch points (larger widths will be adopted where feasible).<br>• 30km/h design speed where feasible given existing path alignment.<br>• Horizontal radii subject to existing footpath/road alignment. Desirable minimum of 24m.<br>• No changes to grades of the footpath are proposed, however local improvements would be proposed.<br>• Bicycle related signage to be designed in accordance with Australian Standards. Bicycle related pavement markings are to be designed in accordance with the Roads and Maritime Guide to Delineation Section 12.<br>• Where driveways require amendment, design will be carried out per the Roads and Maritime standard drawings.<br>• Intersection treatment options would be adopted per the NSW Bicycle Guidelines and AS1742.9-2000.<br>• Other parameters considered in this DPS include pedestrian parameters, urban design, landscaping, cut and fill, visibility, on-street parking, off-street parking, public transport, existing signage, lighting, utilities and drainage. | Appendix 1 |
| 1.3 | Movement and Place memo | A Movement and Place assessment of the proposed route was completed in accordance with the Future Transport Strategy 2056 guidance and based on guidance received from TfNSW and the Council. This assessment aims to allocate road space in a way that improves liveability of spaces, integrate land use and transport planning strategies to deliver better focused outcomes for the community.<br>The assessment indicated that the corridor is a mix of a movement corridor environment and a vibrant street environment. The middle section of the corridor is predominantly a movement corridor environment with a low priority and need for provision for pedestrians and cyclists or access to land use. The end sections of the route are classified as vibrant streets with high activity and movement at all hours of the day and an identified need to balance high pedestrian and cyclist activity. | Appendix 1 |
| 1.4 | High-level planning and | The high-level planning and environmental assessment aim to outline the regulatory context along the route and considers planning policies relevant to the assessment. | Appendix 2 |





| Task no. | Task | Description | Reference document |
|---|---|---|---|
| | environmental assessment memo | The assessment found that the project is within the strategic planning context for the area. However, works associated with the shared path may require the relocation of existing street furniture, street trees, bus shelters, light posts and poles and other existing assets along the route which are permitted activities with agreement from the affected stakeholders. The planning approach should be agreed with Council and consultations with relevant stakeholders should further be undertaken prior to the relocation works of identified assets along the route. | |
| 1.5 | High-level route safety memo | The high-level safety assessment identified a series of safety hazards for the people walking along the route which include narrow footpath width, width side road crossing distances, overgrown vegetation, street furniture such as bus shelters, service boxes or poles in the desired line of travel and uneven footpath surfaces. Improvement works were identified to improve pedestrian safety.<br>The safety assessment also identified that a series of pedestrian crashes occurred at locations along the route which resulted in moderate to serious crashes. One crash occurred at the intersection of Pacific Highway and Herbert Street which resulted in a fatality. | Appendix 3 |
| 1.6 | Opportunities and constraints report | The opportunities and constraints report aims to identify the opportunities and constraints observed along the route. The existing constraints along the route were identified in the report. These include trees, bus shelters and other street furniture which create pinch points along the path.<br>The top three opportunities observed along the route consist of unsignalized intersections, bus shelters and signage. The unsignalized intersections require addressing the crossing area combined with measures to slow vehicle speeds.<br>bus shelters restrict clear width and create significant pinch-points, creating a safety concern given the high movements of pedestrians at these locations. Relocation is required in most instances. Signage requires relocation as it reduces clear width, sometimes creating significant pinch-points.<br>Two focus areas have been identified due to higher pedestrian activities and are located along TAFE NSW frontage and areas in proximity to St Leonard Station. | Appendix 4 |
| 1.7 | Route assessment and high-level optioneering | A high-level optioneering assessment has been completed for the route. The assessment includes improvement strategies ranging from quick wins such as relocation of small signs, parking metres and pavement works, to complicated works such as relocation of power poles, improvements at both the signalised and unsignalised intersections and bus shelters and large sign relocations.<br>A bus stop pack has been prepared for the existing bus stop locations and submitted to Council and other stakeholders. It outlines improvement strategies at bus shelter locations, ranging from simple spatial arrangements to relocation works. | Appendix 4 |
| 1.8 | Stakeholder consultation | Consultations with Council, bicycle user groups and other stakeholders including TfNSW and Roads and Maritime have been carried out. Key communications, meetings and workshops include the following:<br>• A workshop was held on Wednesday 13 March with Council, bicycle user groups and other stakeholders to obtain feedback and agree on key principles to develop the preferred design option. During the session, opportunities and constraints were discussed and high-level improvement strategies were identified and agreed upon. Opportunities to provide future dedicated cycling facilities were also discussed. | Appendix 5 |

| Task no. | Task | Description | Reference document |
|---|---|---|---|
| | | • A Movement and Place Framework workshop was held with Council and TfNSW on Wednesday 13 March to seek guidance on the potential application of the framework to the project route.<br>• A meeting was held with Roads and Maritime. Discussions involved application of the Movement and Place Framework to the route and treatments at signalised and unsignalized intersections to improve pedestrian and cyclist safety.<br>• A meeting was held with Council and other internal stakeholders on Thursday 14 March to discuss potential issues and options to mitigate obstructions due to trees along the proposed route and also understand the strategic planning proposals for the study corridor. | |
| 1.9 | Preferred option and recommendations | Following consultations with Council, internal stakeholders and external stakeholders including bicycle user groups, TfNSW and Roads and Maritime, a preferred option and project recommendations were achieved as follows:<br>• Council and stakeholders acknowledged that pinch points will be present throughout the route due to the presence of trees. This has been accepted by the user groups and stakeholders during the workshop held on 13 March 2019 and will be accepted by the Council considering the Council's resolution to increase tree cover along the Pacific Highway. Signage will be provided along the route to alert cyclists at the identified pinch points.<br>• 3 metres clear width will be achieved by relocating existing street furniture and relocating bus shelters where feasible.<br>• High level optioneering for all ten bus stops along the route has been completed and is currently under consideration with the Council and other stakeholders. The improvement strategy considers three approaches:<br>  ○ bus shelter location would be maintained, and the shared path would be located away from existing street furniture, power or lighting poles and other pinch points,<br>  ○ bus shelter would be relocated clear of any existing power or lighting poles to gain manoeuvring space for walking and cycling, and<br>  ○ area around the bus shelter would be improved in terms of spatial arrangement at locations of high pedestrian activity.<br>• Where possible at unsignalised intersections, priority would be given to pedestrians and cyclists given most heavy vehicle routes are through signalised intersections. Improvement strategies at these locations include surface painting, traffic islands and kerb build outs.<br>• At signalised intersections, improvement strategies will be developed in consultation with Roads and Maritime and include widening pram crossings and improving intersection phasing and timing to improve cyclist safety. | Appendix 4 |

## 6.0 Stage 2 - Draft concept design

This stage of the project includes developing a draft concept design that aims to address the opportunities and constraints identified in Stage 1 of the project.

Stage 2 is currently underway and is based on the findings of the route assessment completed in Stage 1. The draft concept design stage proposes to develop three typical locations in plan as follows:

- Location with a tree and a small sign
- Location with a bus stop
- Proposed treatment at an unsignalised intersection

Stage 2 also includes developing 3D section of a typical mid-block section. It should be noted that this stage will also involve coordination with Council and key stakeholders including TfNSW and Roads and Maritime.

AECOM Imagine it. Delivered.

# Appendix 1

AECOM has prepared this document for the sole use of the Client and for a specific purpose, each as expressly stated in the document. No other party should rely on this document without the prior written consent of AECOM. AECOM undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document. This document has been prepared based on the Client's description of its requirements and AECOM's experience, having regard to assumptions that AECOM can reasonably be expected to make in accordance with sound professional principles. AECOM may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified. Subject to the above conditions, this document may be transmitted, reproduced or disseminated only in its entirety.

# Design Brief - Pacific Highway Shared Path

## Artarmon to St Leonards Route Development & Concept Design

Willoughby City Council

Project number: 60598451

March 27, 2019

Project number: 60598451

## Quality information

| Prepared by | Checked by | Verified by | Approved by |
|---|---|---|---|
| Siân Spear<br>Consultant | Jack Jiang | Anoop Sridhar | |

## Revision History

| Revision | Revision date | Details | Authorized | Name | Position |
|---|---|---|---|---|---|
| 1 | 28-02-2019 | For Client Review | | | |
| 2 | 07-03-2019 | Amendments based on Review | | | |
| 3 | 27-03-2019 | Final | | | |

## Distribution List

| # Hard Copies | PDF Required | Association / Company Name |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

## Prepared for:

Willoughby City Council

## Prepared by:

AECOM Australia Pty Ltd

Level 21, 420 George Street

Sydney NSW 2000

PO Box Q410

QVB Post Office, NSW 1230

T: +61 2 8934 0000

F: +61 2 8934 0001

aecom.com

ABN 20 093 846 925ABN 20 093 846 925

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001, AS/NZS4801 and OHSAS18001.

© AECOM Australia Pty Ltd (AECOM) (AECOM). All rights reserved.
AECOM has prepared this document for the sole use of the Client and for a specific purpose, each as expressly stated in the document. No other party should rely on this document without the prior written consent of AECOM. AECOM undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document. This document has been prepared based on the Client's description of its requirements and AECOM's experience, having regard to assumptions that AECOM can reasonably be expected to make in accordance with sound professional principles. AECOM may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified. Subject to the above conditions, this document may be transmitted, reproduced or disseminated only in its entirety. AECOM has prepared this document for the sole use of the Client and for a specific purpose, each as expressly stated in the document. No other party should rely on this document without the prior written consent of AECOM. AECOM undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document. This document has been prepared based on the Client's description of its requirements and AECOM's experience, having regard to assumptions that AECOM can reasonably be expected to make in accordance with sound professional principles. AECOM may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified. Subject to the above conditions, this document may be transmitted, reproduced or disseminated only in its entirety.

## Table of Contents



## Figures



## Tables

# 1. Overview

## 1.1 Purpose

This design brief has been produced to support the development of the Pacific Highway Shared Path – Artarmon to St Leonards Route Development & Concept Design. The proposed route is anticipated to be used by commuters, accessing facilities and for recreational purposes.

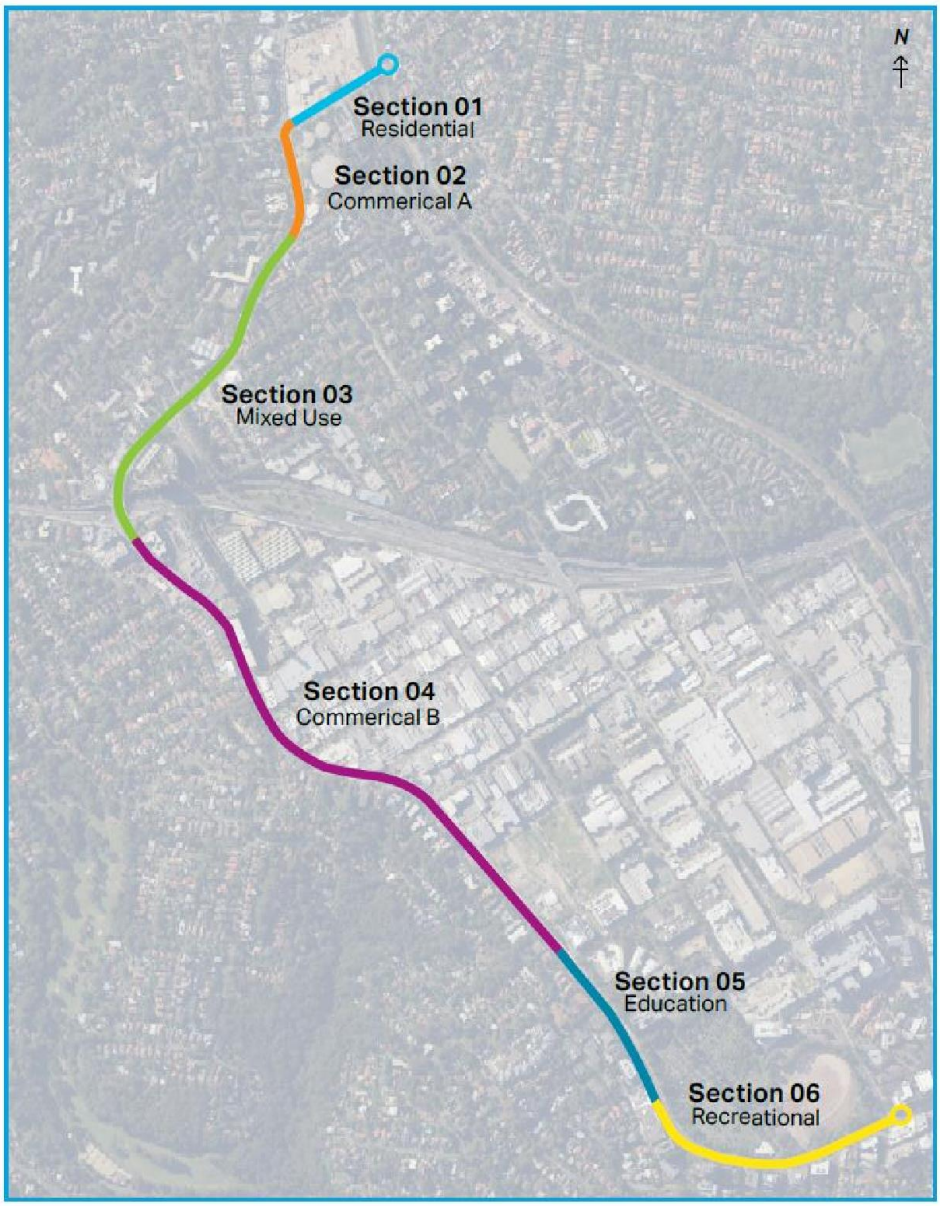
The purpose of this document is to provide a framework for the project execution. The design brief contains three key sections as follows:

- Preliminary Design Philosophy Statement
- Movement & Place Assessment
- Multi-Criteria Assessment (MCA) criteria

## 1.2 Project Location

The project has been identified as a Tier 1 inter-regional connector route in the Transport for New South Wales (TfNSW) *Future Transport Strategy (2056)*. The project entails creating an off-road shared path that will run along the eastern side of the Pacific Highway, acting as a connection between St Leonards Station and Artarmon Station. The cycle route/shared path will be created by modifying the existing path and relocating certain barriers on the route (e.g. bus stops, trees, poles). The off-road path is split into six sections based on their frontage land uses, as shown in Figure 1. This route is within the Willoughby City Council jurisdiction.

**Figure 1 Pacific Highway study route and sections**




The study area has been divided into these six sections based on land-use characteristics of the region. For each section, up to three options will be developed and MCA can be used to aid the decision making of complex issues. This process will be further detailed in Section 6.

# 2. Stakeholders

The project team worked with a range of stakeholders to establish the design brief. The stakeholders provide crucial information and set the expectations for the project, which are outlined in this document.

The stakeholders consulted include :

| Name | Organisation | Comments |
|---|---|---|
| Gordon Farrelly | Willoughby City Council | |
| Heather Gavriel | Willoughby City Council | |
| Benny Horn | Transport for NSW | |
| Sara Stace | Transport for NSW | |
| Zakaria Ahmad | Roads and Maritime | |

# 3. Summary of Project Objectives and KPI's

The following section outlines the project objectives and key performance indicators (KPI's). The project objectives and KPI's have been developed through reflecting on strategic fits with wider policy documents and stakeholder engagement. The KPIs were selected with the aim to assess the options for their technical feasibility, cost and implementation considerations, and the strategic fit.

The project objectives, as agreed with Willoughby City Council, include:

| | Objectives |
|---|---|
| 1 | Develop a safe, coherent, direct and comfortable off-road cycling route along the eastern footpath of the Pacific Highway |
| 2 | Connect the Artarmon to St Leonards train station with a connection to the Gore Hill Freeway shared path and Lane Cove LGA bike lanes |
| 3 | Determine a 'fit for purpose' shared path and adopt an approach to "achieve the best out of existing assets" |
| 4 | Provide a 3m wide shared path (reduce to 2.5m if required, with proper justification) |
| 5 | Pedestrians and cyclists will need to receive more priority to ensure road safety is increased |

Three KPIs were derived based on the objectives and in collaboration with the council and their stakeholders. These KPIs are the targets the designs will be benchmarked against, this will ensure a certain level of quality can be achieved to meet the expectations of the Tier 1 route and the council.

| | KPI | Classification |
|---|---|---|
| 1 | 90% of trees will be retained along the route | Measurable during design phase |
| 2 | 80% of the route will have a minimum 3m width | Measurable during design phase |
| 3 | Target 20kph turning speeds from the Pacific Highway on to local roads | Implementable, with certain design modification considerations (such as speed tables) |

# 4. Preliminary Design Philosophy Statement

The preliminary design philosophy statement (DPS) outlines the relevant engineering standards required for the shared path. The intention is to revise and finalise this document once the design is confirmed and before the next stage of design. The DPS is included in **Appendix A.**

# 5. Movement and Place Assessment

A Movement and Place assessment of the proposed route was completed in accordance with the *Future Transport Strategy 2056* guidance. This assessment aims to allocate road space in a way that improves liveability of spaces, integrate land use and transport planning strategies to deliver better focused outcomes for the community. For a detailed assessment, refer to **Appendix B**.

A summary of each section and their fit into the Movement and Place assessment are detailed in Table 1

**Table 1. Movement and Place Assessment per section of the proposed route**

| Section | Description | Street Environment (based on Movement and Place Framework) |
|---|---|---|
| 1 | Residential, with a major intersection characterised with high pedestrian and cycling movements, especially during peak hours. | Movement Corridor |
| 2 | Commercial, with bus stops along the route and no crossing opportunities. | Movement Corridor |
| 3 | Mixed-use, with limited midblock crossings along the route. | Movement Corridor |
| 4 | Commercial, with bus stops and car parking permitted along multiple sections. | Movement Corridor |
| 5 | Educational land use, with bus stops and crossings along the route. | Movement Corridor |
| 6 | Recreational, with bus stops and car parking permitted along the route, and midblock crossing provided. | Vibrant Street |

The assessment highlighted that the corridor is a mix of a movement corridor environment and a vibrant street environment. The mid-section of the corridor is predominantly a movement corridor environment with a low priority and need for provision for pedestrians and cyclists or access to land use. The end sections of the route are classified as vibrant streets with high activity and movement at all hours of the day and an identified need to balance high pedestrian and cyclist activity.

These classifications will be finalised in collaboration with the council and stakeholders.

# 6. Project Assessment Criteria (development of MCA)

## 6.1 Overview

The Multi-Criteria Analysis (MCA) will be used as a tool to conduct options assessment with stakeholders. The criteria have been developed to guide the decision making for complex issues that may occur during the design process. This process ensures uniformity in the options assessment process, fast track the optioneering process and support community consultation. It is noted that the MCA is to be used as a tool for options which may need further work; however not all options have to go through the MCA process provided the preferred option is justified. For example, the MCA may only be used as a tool for intersection treatment.

## 6.2 MCA Criteria and Scoring

The following MCA criteria are proposed to enable assessment of the options. The three MCA categories are:

- Project Objectives
- Implementability
- Assessment of effects

Each option will be scored against each criterion using the following seven-point scale as outlined below. The colours are useful as they provide the opportunity for a visual assessment alongside the numerical one which will enable ranking of the options. When assessing the options, both the scale and the significance of the impact must be considered, along with any feasible mitigation measures proposed.

| Description | Scoring |
|---|---|
| Significant adverse effect (very difficult to manage/mitigate) | -3 |
| Moderate adverse effect (can be managed/mitigated) | -2 |
| Minor adverse effect (little/no mitigation required) | -1 |
| Neutral / no change / not applicable | 0 |
| Minor positive effect | +1 |
| Moderate / major positive effect | +2 |
| Significant positive effect | +3 |

## 6.3

## 6.4 MCA weighting

Best practice suggests that the base weighting provides an equal weight across the MCA categories, as follows.

| MCA Category | Weighting |
|---|---|
| Project Objectives/Project Mandate | 33.3% |
| Implementability | 33.3% |
| Assessment of Effects | 33.3% |

Each criterion within each of these categories will be given an equal split of the percentage for their respective category. From this, an overall weighted score for each option can be determined; giving each option a numerical score and a ranking score. The rankings will be undertaken for each section of the route.

After the base weightings are applied and a base score determined, sensitivity tests are proposed to gain an appreciation the weighting of the individual objectives to understand the impact on the recommended option, if deemed appropriate.

## 6.5 MCA Outcome

The MCA process as described is to support the development of the Pacific Highway Shared Path.

Prior to the MCA process, each option will be cross-checked against the KPIs (as part of Stage 1). If an option fails meeting any of these measures, then it will no longer be considered viable and will not be assessed through the MCA process into Stage 2. If an option is considered to score negatively but can be mitigated or justified, this will be clearly outlined in the qualitative assessment in Stage 1. If a KPI criterion is not applicable to the option, then the option will pass, provided reasoning is outlined.

The proposed MCA structure and criteria can be viewed in **Appendix C**.

# Appendix A – Preliminary Design Philosophy Statement

# Preliminary Design Philosophy Statement

Pacific Highway Shared Path, Artarmon to St Leonards

Revision – 27-Mar-2019
Prepared for – Willoughby City Council – ABN: 47 974 826 099

# Preliminary Design Philosophy Statement

Pacific Highway Shared Path, Artarmon to St Leonards

Client: Willoughby City Council

ABN: 47 974 826 099

Prepared by

**AECOM Australia Pty Ltd**
Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 2 8934 0000 F +61 2 8934 0001 www.aecom.com
ABN 20 093 846 925

27-Mar-2019

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

© AECOM Australia Pty Ltd (AECOM). All rights reserved.

AECOM has prepared this document for the sole use of the Client and for a specific purpose, each as expressly stated in the document. No other party should rely on this document without the prior written consent of AECOM. AECOM undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document. This document has been prepared based on the Client's description of its requirements and AECOM's experience, having regard to assumptions that AECOM can reasonably be expected to make in accordance with sound professional principles. AECOM may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified. Subject to the above conditions, this document may be transmitted, reproduced or disseminated only in its entirety.

Revision – 27-Mar-2019
Prepared for – Willoughby City Council – ABN: 47 974 826 099

# Quality Information

Document Preliminary Design Philosophy Statement

Ref

Date 27-Mar-2019

Prepared by Alexander Saunders

Reviewed by Jack Jiang

Revision History

| Rev | Revision Date | Details | Authorised | |
|---|---|---|---|---|
| | | | Name/Position | Signature |
| | 28-Feb-2019 | Draft for review | Anoop Sridhar | |
| | 07-Mar-2019 | Draft | Anoop Sridhar | |
| | 27-Mar-2019 | Final | Anoop Sridhar | |
| | | | | |

# Table of Contents

# Executive Summary

Willoughby Council has proposed a shared path connecting Artarmon to St Leonards. As part of the initial route planning and concept design for this shared path, AECOM has developed this preliminary Design Philosophy Statement (DPS) which aims to outline the standards the project will be designed to.

Shared path design parameters that will be adopted include:

- 2.5m minimum shared path width at pinch points (larger widths will be adopted where feasible). Note this represents a departure from the desirable minimum width of 3m.
- 30km/h design speed where feasible given existing path alignment.
- Horizontal radii subject to existing footpath/road alignment. Desirable minimum of 24m.
- No changes to grades of the footpath are proposed, however local improvements to dilapidated or non-compliant sections will be carried out.
- Bicycle related signage in accordance with the 'Australian Standard AS1752 – Manual of Uniform Traffic Control Devices Part 9, Bicycle Facilities'.
- Bicycle related pavement markings in accordance with the Roads and Maritime Services (Roads and Maritime) Guide to Delineation Section 12.
- Where driveways require amendment, design will be per the Roads and Maritime 'R0300 Kerb and Channel Series' standard drawings

The design vehicle for intersection treatments has been selected per Austroads recommendations as the prime mover (19m) for arterial/arterial and arterial/local(industrial) intersections and the single unit bus / truck (8.8m) for arterial/local intersections. The following intersection treatment options will be adopted per the NSW Bicycle Guidelines and AS1742.9-2000.

- Potential treatment types have been identified for unsignalised intersections with local roads dependant on what priority is assigned.
- For signalised intersections on the Pacific Highway within the project area, shared pedestrian / cyclist crossing facilities will be adopted. Consideration will be given to providing bicycle lanterns at the crossing past the Lane Cove Tunnel entrance.

Other parameters considered in this DPS include pedestrian parameters, urban design, landscaping, cut and fill, visibility, on-street parking, off-street parking, public transport, existing signage, lighting, utilities and drainage.

# 1.0 Introduction

## 1.1 Purpose

This Preliminary Design Philosophy Statement (DPS) has been prepared for Willoughby Council for the Concept Design Phase of the Pacific Highway Shared Path (Artarmon to St Leonards) implementation. This document describes the philosophy by which this project will be developed and outlines the relevant standards that the project will be designed to.

The relevant standards comprise of guidelines and technical publications from the national road and transport agency Austroads, the state road authority Roads and Maritime Services (Roads and Maritime) and the local governing authority Willoughby Council.

## 1.2 Project Scope

The scope of this project includes route assessment and concept design for a proposed shared path linking Artarmon station to St Leonards station along the eastern footpath of Pacific Highway.

## 1.3 Project Objectives

The project aims to deliver a bicycle shared path between Artarmon and St Leonards that will integrate to the Sydney's principle bike network, as well as connecting to the centres and destinations in all directions on lower order bicycle networks.

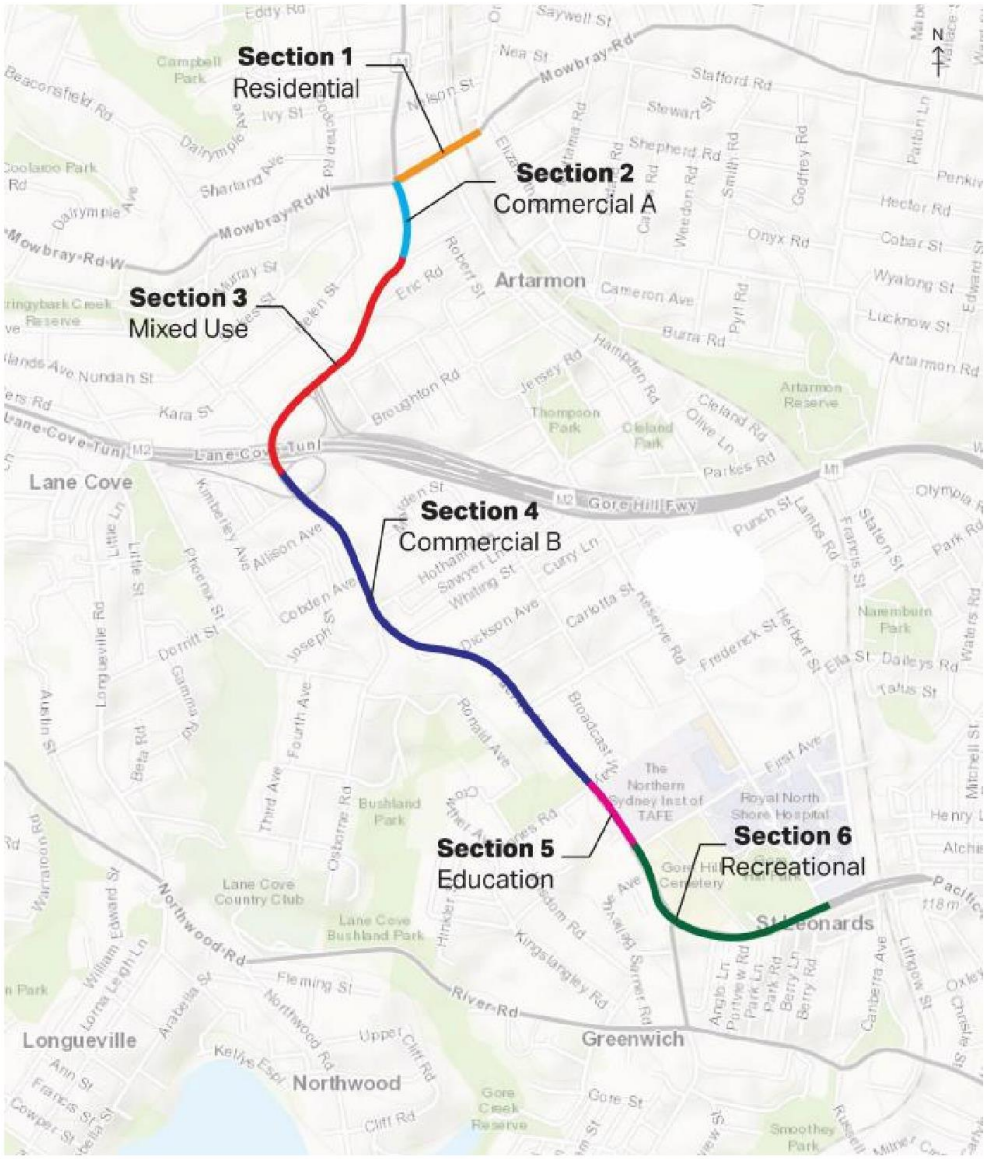
The project objectives, as agreed with Willoughby Council, are:

- Develop a safe, coherent, direct and comfortable off-road cycling route along the eastern footpath of the Pacific Highway;
- Connect the Artarmon to St Leonards train station with a connection to the Gore Hill Freeway shared path and Lane Cove LGA bike lanes;
- Determine a 'fit for purpose' shared path and adopt an approach to "achieve the best out of existing assets";
- Provide a 3m wide shared path (reduce to 2.5m if required, with proper justification);
- Pedestrians and cyclists will need to receive more priority to ensure road safety is increased.

## 1.4 Project Extents

The project area is located within the suburbs of Artarmon and St Leonards. Its northernmost extent commences at the intersection of Mowbray Road and Orchard Road where it proceeds westbound to the intersection of Mowbray Road and the Pacific Highway. From there, the project area continues southbound on the Pacific Highway past the M2 interchange, the Artarmon industrial area, Northern Sydney TAFE and Gore Hill Cemetery terminating outside St Leonards Station. The proposed shared path will be situated on the eastern side of the Pacific Highway / southern side of Mowbray Road. The alignment and extent of the proposed shared path is presented in Figure 1.

**Figure 1 Project area**




Source: AECOM, 2019

## 2.0 Design Standards and Guides

The following standards and guides referred to will be adopted to develop the design of the project:

| Standards | Description | Year |
|---|---|---|
| Ausgrid | Asset Relocation Underground Policy | 2017 |
| Ausgrid | NS183 Installation of Private Attachments | 2016 |
| Australian Federal Government | Disability Standards for Accessible Public Transport Guidelines | 2004 |
| Australian Human Rights Commission | Bus Stops and Disability Standards for Accessible Public Transport | 2006 |
| Austroads | Cycling Aspects of Austroads Guides | 2017 |
| Austroads | Design Vehicles and Turning Path Templates Guide | 2013 |
| Austroads | Guide to Road Design Part 3 Geometric Design (AGRD Part 3) | 2016 |
| Austroads | Guide to Road Design Part 4 Intersections and Crossings General (AGRD Part 4) | 2017 |
| Austroads | Austroads Guide to Road Design Part 4A: Unsignalised and signalised intersections | 2017 |
| Austroads | Guide to Road Design Part 6A Pedestrian and Cyclist Paths (AGRD Part 6A) | 2017 |
| Austroads | Guide to Traffic Management Part 6 Intersections Interchanges and Crossings (AGTM Part 6) | 2017 |
| Standards Australia | AS/NZS 1158 – Lighting for roads and public spaces | 2010 |
| Standards Australia | AS 1428.1-2009 – Design for Access and Mobility | 2009 |
| Standards Australia | AS/NZS 1428.4.1:2009 - Means to assist the orientation of people with vision impairment: Tactile ground surface indicators | 2009 |
| Standards Australia | AS1742.9 – Manual of Uniform Traffic Control Devices - Bicycle facilities | 2000 |
| Standards Australia | AS1742.2 – Manual of Uniform Traffic Control Devices - Traffic control devices for general use | 2009 |
| Standards Australia | AS/NZS 2890.1-2004 – Parking Facilities – Off Street Car Parks | 2004 |
| Roads and Maritime | Delineation Section 12 - Pavement markings for bicycle facilities (D12) | 2010 |
| Roads and Maritime | NSW Bicycle Guidelines (NSWBG) | 2005 |
| Roads and Maritime | Standard Drawings R200 and R300 series | - |
| Roads and Maritime | Temporary stormwater drainage for road construction | 2011 |
| Roads and Maritime | Traffic Signal Design | 2008 |
| Willoughby City Council | Willoughby City Council DCP | 2016 |

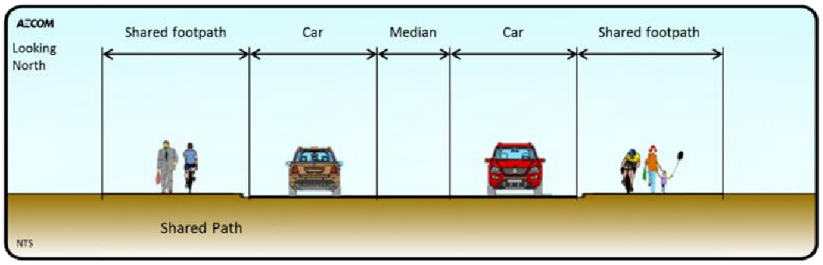
# 3.0 Design Requirements

## 3.1 Cycleway Facilities – Shared Path

A shared path is an off-road facility which can accommodate both pedestrians and cyclists either in a road corridor or elsewhere, such as parks, or alongside rail lines, motorways, rivers, coastlines or lakeshores. All proposed facilities within the subject project area are currently slated to be in the form of a shared path within the road reserve along the eastern side of Pacific Highway.

This option is a cost-effective method to enable cycling which can be simple to construct and has lower land requirements compared to alternative facilities. Figure 2 shows a typical road cross section with the inclusion of a shared path.

**Figure 2: Shared Path Facility**

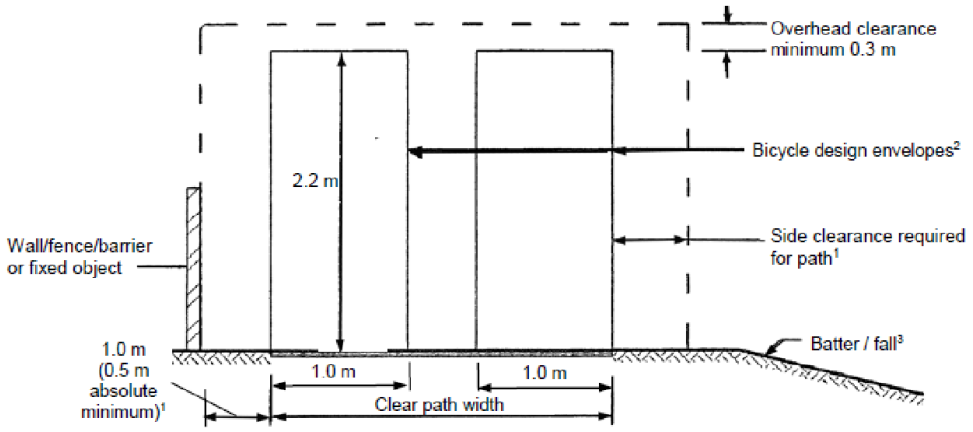



Source: AECOM 2019

### 3.1.1 Clearances and Design Envelope

Section 3.2.1 and Section 3.2.2 and Section 5.5 of the AGRD Part 6A outline the clearances and design envelopes required for pedestrians and cyclists which shall form the first principles by which design decisions for the shared path will be made. An extract from the guideline is presented in Figure 3

**Figure 3 Clearances required between obstacles and cyclists**




1 *This may be reduced to 0.3 m where a fence or obstacle has smooth features.*
2 *Refer to Section 3.2.2 for guidance on bicycle design envelopes.*
3 *Refer to Section 5.5.3 for guidance on batters and need for a fence.*

Source: AGRD Part 6A 2017 Figure 5.7

### 3.1.2 Width

AGRD 6A provides guidance on shared path widths based on the intended role of the path and the volumes of cyclists / pedestrians (summarised in Figure 4, Figure 5 and Figure 6). Note the Austroads recommendations based on patronage are sourced from the Queensland Department of Transport and Main Roads Road planning and design manual: edition 2: volume 3: supplement to Austroads Guide to Road Design Part 6A: Pedestrian and Cyclist Paths.

New South Wales Bicycle Guidelines (NSW BG) states that the minimum width for a shared path within the road reserve is 3m. Where there are high numbers of users, wider paths should be considered.

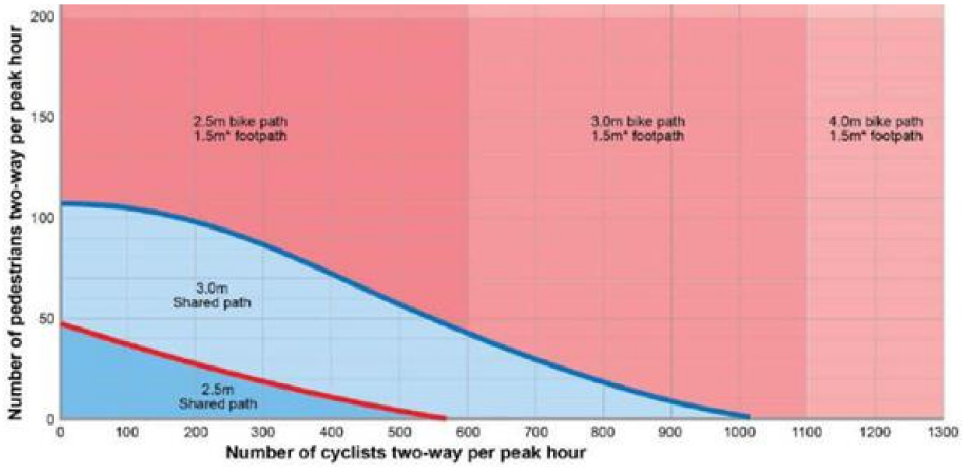
**Figure 4 Path widths based on role of path within transport hierarchy**

| | Suggested path width (m) | | |
|---|---|---|---|
| | Local access path | Regional path[3] | Recreational path |
| Desirable minimum width | 2.5 | 3.0 | 3.5 |
| Minimum width – typical maximum | 2.0[1] – 3.0[2] | 2.5[1] – 4.0[2] | 3.0[1] – 4.0[2] |

1 *A lesser width should only to be adopted where cyclist volumes and operational speeds will remain low.*
2 *A greater width may be required where the numbers of cyclists and pedestrians are very high or there is a high probability of conflict between users (e.g. people walking dogs, in-line skaters etc.).*
3 *May be part of a principal bicycle network in some jurisdictions.*

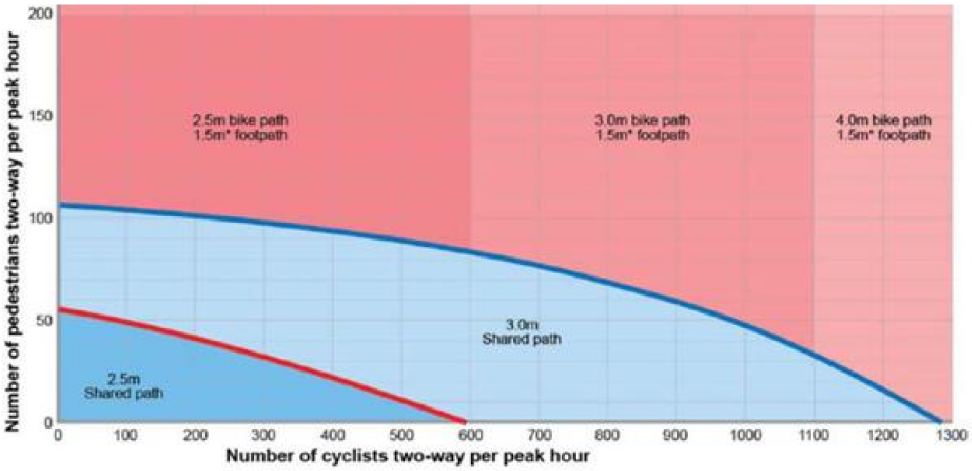
Source: AGRD Part 6A 2017 Table 5.3

**Figure 5 Path widths based on patronage for 50-50 directional split**




Source: Queensland Department of Transport and Main Roads (via AGRD Part 6A 2017 Figure 5.4).

**Figure 6 Path widths based on patronage for 75-25 directional split**




Source: Queensland Department of Transport and Main Roads (via AGRD Part 6A 2017 Figure 5.5).

### 3.1.3 Bicycle Operating Speeds

AGRD Part 6A Section 5.2 recommends that bicycle paths in general be designed for a speed of at least 30km/h, however it notes that speed may be moderated in areas shared with pedestrians. Appropriate speed limiting treatments as set out in Appendix B of AGRD Part 6A include speed humps, path narrowing, path deflection, warning signs and alternate pavement.

### 3.1.4 Horizontal and Vertical Curvature and Gradients

Per AGRD Part 6A Section 5.3, a path alignment consisting of straights and large radius curves is desirable to provide good sight lines. The desirable minimum ranges of horizontal curvature are presented in Figure 7.

It is noted that exceptions may include locations where the alignment is severely constrained and smaller radii cannot be avoided, in these cases isolated bends with poor lighting should be avoided as warning signage may not be visible with bicycle lights. Given the scope of this project, radii of curves along the route are subject to the existing road and footpath alignment.

**Figure 7 Desirable minimum horizontal curve radii for a given superelevation**

| Speed (km/h) | Superelevation (%) | | | | |
|---|---|---|---|---|---|
| | 2 | 3 | 4 | 5 | 6 |
| | Minimum radius (m) | | | | |
| 20 | 10 | 9 | 9 | 9 | 9 |
| 30 | 24 | 23 | 22 | 21 | 21 |
| 40 | 47 | 45 | 43 | 42 | 41 |
| 50 | 86 | 82 | 79 | 76 | 73 |

Source: AGRD Part 6A 2017 Table 5.7

Gradients are to comply with AS1428:2009 and AS1428.2:1992 which have specific requirements for pedestrians. In general, a 3% grade is considered the desirable maximum gradient on paths with a maximum of 5% over short lengths. Further detail is provided in AGRD Part 6A Section 5.4.2. Vertical curves are to be as shallow as possible.

The proposed shared path will follow the grade of existing facilities, with no modifications expected to change the gradient.

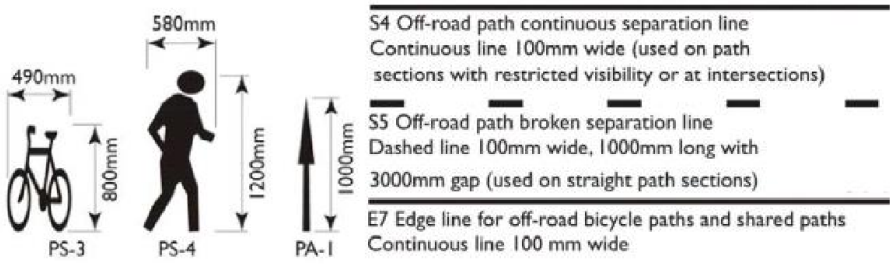
### 3.1.5 Bicycle Signage and Line-marking

All regulatory and warning signs are to be principally in accordance with the 'Australian Standard AS1752 – Manual of Uniform Traffic Control Devices'. The relevant components are 'Part 9, Bicycle Facilities' and 'Part 2, Traffic Control Devices'. All pavement markings relating to cycling should be designed in accordance with the Roads and Maritime Services (Roads and Maritime) Guide to Delineation Section 12.

The NSWBG section 5.2.2 states that shared paths are regulated by the sign R8-2 (supplemented by R7-4 and R7-2). PS-3 and PS-4 pavement symbols and PA-1 pavement arrows are used in an advisory capacity at 75m (200m max) intervals. An S3 separation line is used to separate opposing flows or riders with a solid line used on tight corners of where visibility is reduced. Solid edge lines can be used in areas of high pedestrian/cyclist activity to define the riding area.

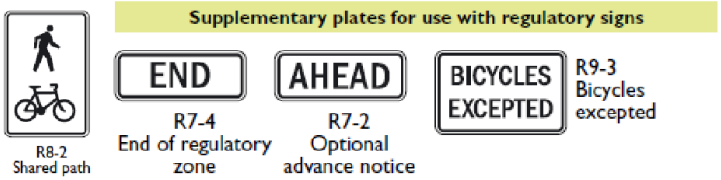
The line marking symbols that will likely be required for this project are shown in Figure 8 while the regulatory signs are shown in Figure 9 and warning signs are included in Figure 10 below.

**Figure 8 Off-road line marking per Delineation Manual Section 12**



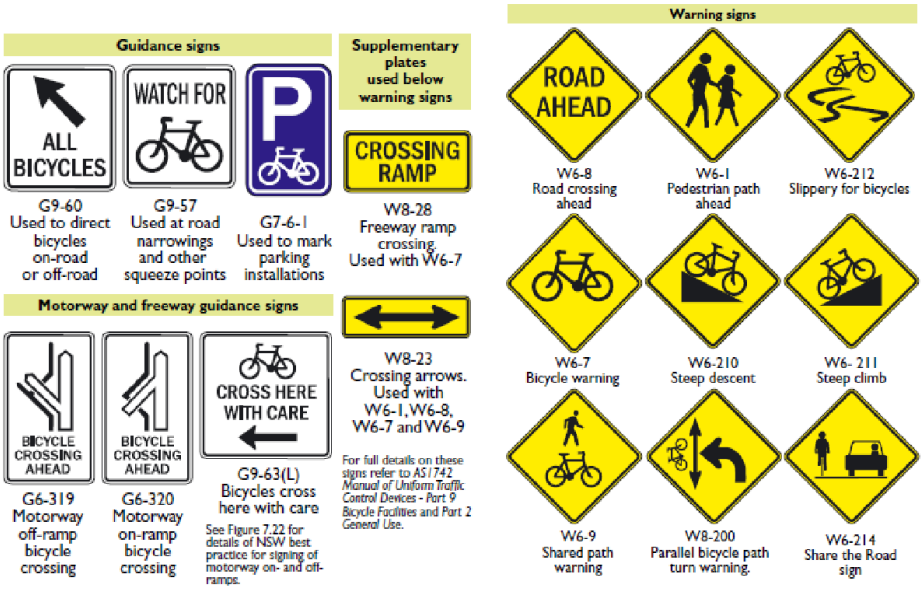

Source: Roads and Maritime Delineation Manual Section 12

**Figure 9 Regulatory signage for bicycle facilities per AS1742.9**




Source: NSWBG 2005 Section 9

**Figure 10 Warning and Guidance Signs per AS1742.9**



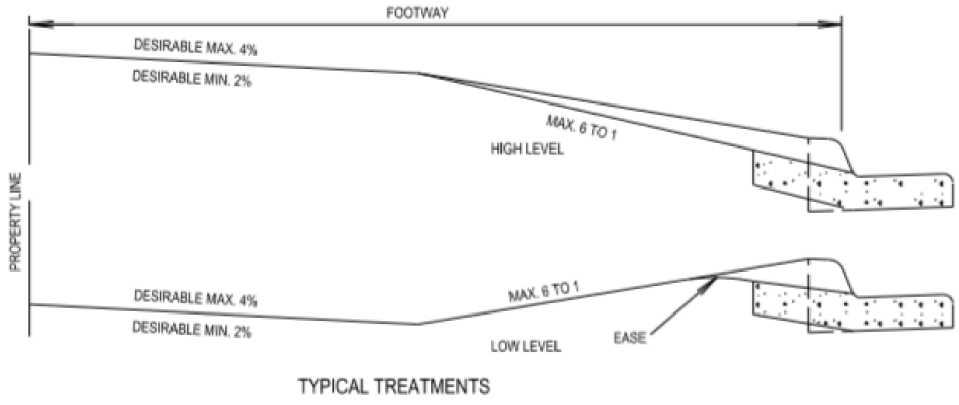

Source: NSWBG 2005 Section 9

### 3.1.6 Driveway considerations

The kerb and channel facilities are to be designed by a suitably qualified practitioner in accordance with the Roads and Maritime 'R0300 Kerb and Channel Series'.

The standard (road) drawings show standard details of components and construction techniques to be used in roadworks on Roads and Maritime funded infrastructure or infrastructure that will become the property of Roads and Maritime in the future. R0300-04 outlines standard details for private and commercial driveways including desirable maximum and minimum grades where the driveway interfaces with a footpath. Excerpts from this drawing are shown below in Figure 11.

**Figure 11 Typical cross-section treatments**




Source: Roads and Maritime R0300-04

It was noted on site that some existing driveways exceed the desirable gradients shown in these standard drawings and described in the Austroads guides. In these cases, remediation work may be required.

Consideration will also need to be given to driveway sight distance. AS/NZS 2890.1-2004 recommends a splay of 2.5m x 2m in new developments which may not be feasible given many existing obstructions to sight distance would fall outside the project area. The designer should exercise diligence in noting cases where changes to pavement layout may bring pedestrians and cyclists closer to the property boundary exacerbating sight distance issues.

## 3.2 Pedestrian Parameters

As the proposed cycle path is a shared path, the design requirements for pedestrians and cyclists overlaps and, in most cases, the geometric requirements for cyclists are more stringent than those for pedestrians. There are a few exceptions highlighted by the AGRD Part 6A.

- There are specific requirements for gradients outlined in AS 1428 which, while developed for access to premises, should be considered by the designer to ensure pedestrian inclusivity. Changes to grades of the existing footpath are not proposed however if opportunities arise where it is considered appropriate to provide compliant path gradients and flat landings, the requirements of AS 1428.1 – 2000 should be incorporated into the path design.
- Tactile ground surface indicators (TGSI) to be installed at pram ramps and crossings in accordance with AS 1428.4.1.

## 3.3 Urban Design and Landscaping

High-level landscaping and urban design will be suggested in consultation with Council and is to consider clearance and visibility requirements outlined in Section 3.1 and Section 3.8 respectively.

Bicycle specific landscaping factors outlined in Section 8.3 of the NSWBG are also to be considered in the subsequent design stages. These include:

- Frangible planting
- Tree root damage
- Public safety
- Functional landscape design
- Landscape maintenance issues Planting

### 3.3.1.1 Existing Trees

There are a range of existing trees of varying levels of maturity and planting density located along site extent of the Pacific Highway. In some cases, these trees act as pinch points on the existing path which will act as constraints on the shared path design.

Further consultation will be required with Willoughby City Council's arborist. There will be a need to confirm the acceptability of removing/relocating affected trees and where acceptable identify the location of replanting and opportunities for new (mitigation) planting

### 3.3.1.2 New and Relocated Trees

TBC

## 3.4 Cut and Fill

No major earthworks are anticipated as part of the project. Preliminary design of sediment and erosion control will be informed by the Roads and Maritime Technical Guideline – Temporary stormwater drainage for road construction (2011).

## 3.5 Pedestrian Access and Crossing facilities

The project area encompasses signalised and unsignalized intersections with numerous property accesses, local roads, collector roads and the M2 motorway. Guidance on the traffic management aspects of and selection of treatments for intersections of cycle paths with roads has been sourced from AGTM Part 6 Section 8. Guidance on the design of crossing facilities for cyclists has been sourced from AGRD Part 4 Section 9 and AGRD Part 6A Section 7.5. The relevant Australian Standard is AS 1742.9-2000 which is complemented by the NSWBG.

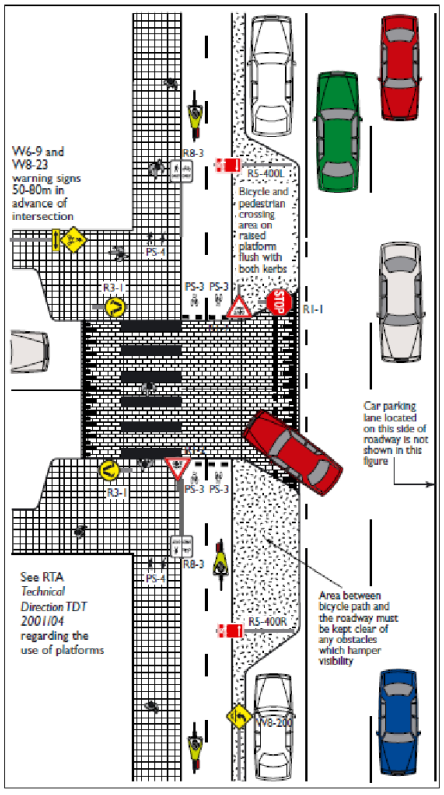
The following sections outline crossing treatment options for different intersection types and priority assignments. Due to the shared path's location on a regional route, providing priority over local intersecting roads is the desirable option subject to the individual constraints and uses of each road.

### 3.5.1 Unsignalised Intersection with Local Roads – Path has priority

AS1742.9-2000 contains no provisions for unsignalized intersection treatments where users of shared path would have priority over road users at the intersection. Clause 3.7.2 relating to providing pedestrian crossings or bicycle crossings (with 'Give Way' signs facing road traffic) for shared paths only applies to scenarios where the path crosses the road at mid-block. NSWBG contains complementary advice for intersection treatments where exclusive off-road bicycle lanes take priority over the adjoining road as shown in Figure 12.

A first principles/best practice approach will be adopted for the design of treatments at unsignalised intersections in the project area.

**Figure 12 Off-road bicycle path intersection straight**




Source: NSWBG Section 7.2

It should be noted that Figure 12 refers to the now superseded TDT 2001/04, which has been replaced by the RMS Supplement to AS1742.10 and TDT 2011/01a. Provision of a pedestrian crossing is subject to the warrants for pedestrian crossings contained in the Roads and Maritime Supplement to Australian Standard 1742 Manual of Uniform Traffic Control Devices parts 1-15.

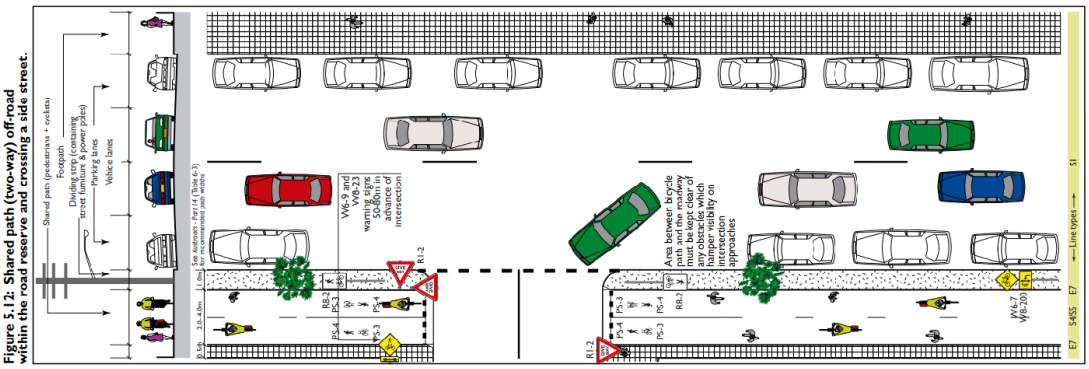
No treatments for off-road bicycle paths or shared paths at unsignalized intersections are provided in the Cycling Aspects of Austroads Guides or AGTM Part 6. AGRD Part 6A specifies that a 'shared environment intersection' may be considered in low speed environments where pedestrian, cyclist and traffic volumes are balanced however these factors are not present in the project area.

### 3.5.2 Unsignalised Intersection with Local Roads – Road has priority

Per AS1742.9-2000 Clause 3.8.1 no special provision is required where a 'joint-use path' (shared path) crosses a side road at an unsignalized intersection. Treatments that may be applied based on the designer's assessment per Clause 3.7.3(a) include refuge islands, kerb extensions and warning signs. Clause 3.7.3(b) may be applied as an alternative to Clause 3.7.3(a) where the interface of shared path and may be treated as an at-grade intersection with corresponding 'Give Way' signs. Per the Cycling Aspects of Austroads Guides Clause 7.6.4 kerb ramps on both sides represent the minimum provision at such intersections.

The NSWBG provides complementary advice regarding the layout of a shared path crossing a minor intersecting side road where Clause 3.7.3(b) is applied, which is shown in Figure 13.

**Figure 13 Shared path at intersection with minor road – road traffic has priority**




Source: NSWBG Figure 5.12

### 3.5.3 Signalised Intersections

The project area encompasses two signalised pedestrian crossings namely the M1 entrance / M2 off-ramp to/from the Pacific Highway and the Lane Cove Tunnel entrance from the Pacific Highway to Epping/Windsor. The former consists of three signalised foot-crossings (two slip lane crossings) while the latter is a single foot-crossing.

Per the Cycling Aspects of Austroads Guides Table 5.3 for shared paths at arterial road signalised approaches, it is desirable for shared paths to continue through the intersection via shared foot/cyclist crossings that are appropriately marked. Austroads also recommends that handrails be provided to assist cyclists in remaining mounted. In this case handrails will not be provided as cyclists remaining mounted at foot-crossings would be in contravention of NSW Road Rules 2014 Rule 248.

AS1742.9-2000 Clauses 3.8.2 and 3.7.4 specify that cyclists are required by law to dismount at a 'joint path' (shared path) crossing and state that consideration should be given to providing physical devices or a Cyclist Dismount (G9-58) sign. Per advice in AGRD Part 6A physical devices to encourage dismounting will be considered only if a safety issue is shown to exist at these crossings.

While provision of bicycle crossing lights allowing cyclists to remain mounted would be desirable regarding compliance and user amenity, bicycle crossing lights are generally provided only in

conjunction with dedicated bicycle paths/crossings on approach to/within the intersection. Geometric constraints at the east footpath at the M1 entrance preclude the provision of a short, dedicated bicycle path. Such provision may be possible at the Lane Cove Tunnel entrance which would enhance cyclist movement and better separate pedestrian and cyclist conflicts.

### 3.5.4 Facilities

Kerb Ramps

Per Roads and Maritime guidance kerb ramp design should comply with AS 1428.1-2009 Clause 10.7 and R0300-11 of Roads and Maritime standard drawings. These standards and drawings do not contain specific recommendations related to cycle paths regarding increased width or altered gradients. The NSWBG and Cycling Aspects of Austroads Guides, AGTM Part 6 and AGRD Part 6A do not make recommendations regarding kerb ramp design. The now superseded Roads and Maritime drawing MD.R173.B01 recommended a 3.6m ramp width. As such the ramp width of kerb ramps for this project will be designed to be at least as wide the connecting section of shared path.

Cyclist Crossing Push Buttons

Per the AGRD Part 6A Section 7.4.1:

> "*push buttons should be placed on existing traffic signal pedestals, to reduce the number of poles on and near the path. Where traffic signal pedestals are not available or appropriately positioned, a separate post should be installed such that the height of the push button is between 1.0 and 1.2 m. This height provides reasonable access for a range of users including pedestrians, wheelchair users and cyclists.*"

Holding Rails

Per the AGRD Part 6A Section 7.4.2 holding rails should be provided where cyclists will have to stop at intersections with roadways, as such they are not recommended at intersections with local roads. Holding rails should be situated 600mm from the kerb line of the intersecting road and for this project would only be provided at a signalised intersection with dedicated bicycle crossing lanterns.

## 3.6 Road Layout, Geometry, Traffic Calming

The project area directly encompasses the Pacific Highway and Mowbray Road and their associated junctions, which include minor roads and the M2.

Under the NSW Roads and Maritime Services 'Schedule of Classified Roads and Unclassified Regional Roads' the Pacific Highway is a state road. It has a posted speed limit of 60km/h within the project area. Mowbray Road is a classified Secondary Road with a 50km/h posted speed limit. The shared path is not anticipated to have an impact on the operational speed of the Pacific Highway or Mowbray Road.

Crossing treatments may have impact on the entry speed of minor road approaches to the Pacific Highway. Note the NSWBG specifies that "where a shared path has the function of a regional route, consideration should be given to providing the route priority over lower volume side streets. The Australian Road Rules (Rule 71) provides for Give Way signage as a means of regulating approaching vehicles on side streets."

Based on the high-level movement and place assessment our proposed route is a regional route therefore the selection of crossing treatments should focus on giving priority to the shared path over minor road movements where such treatments are feasible.

The following carriageway requirements are from the Austroads Guide to Road Design – Part 3 Geometric Design:

- Desirable lane width of 3.5m
- Minimum lane width should be 3.0m for local roads (3.5m minimum for buses at spends less than 80km/h)
- For "local roads" narrower widths may be appropriate for special conditions and designs for these shall be based on actual vehicle and turning dimensions and shall be at the discretion of Council.

Requirements at intersections are detailed in AGRD Part 4: Intersections and Crossings: General (2009).

## 3.7 Design Vehicles and Vehicle Tracking

The proposed project does not include changes to the layout of general traffic / parking lanes on the Pacific Highway or Mowbray Road. Road layout changes are anticipated for local roads at their junctions with the subject arterial and collector roads. As such, this section is limited to discussion regarding access and design requirements for local roads intersecting with the project area. This includes local roads servicing both residential and industrial zoned areas.

Per Austroads 'Design Vehicles and Turning Path Templates Guide' the 'Service Vehicle' (8.8m MRV) is an appropriate design vehicle to be adopted for Arterial / local (residential) intersections. For arterial / local (industrial) intersections no specific guidance is provided however based on the requirements for Collector / Local intersections the design vehicle would be a prime mover and semi-trailer (19m). The prime mover is also suitable as the design vehicle for Arterial/Arterial intersections. The standard design vehicles is presented in Figure 14.

**Figure 14 Standard design vehicles per Austroads Guide**

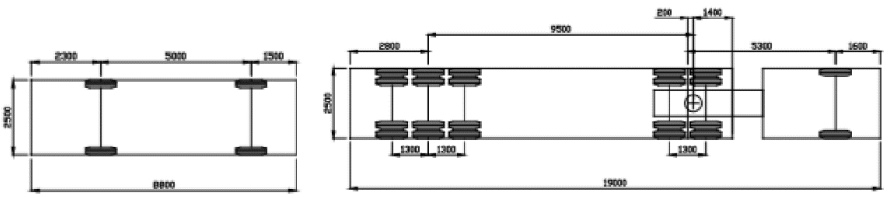



Figure 3.2: Service vehicle (8.8 m)

Figure 3.6: Prime mover and semi-trailer (19 m)

Source: Austroads Design Vehicles and Turning Path Templates Guide (2013).

Turning paths of these design vehicles will be undertaken as part of design and checking of intersections, based on guidance provided in Austroads 'Design Vehicles and Turning Path Templates Guide' 2013.

Note that for infrequent access by vehicles of greater size than the design vehicles, traffic regulations and the Austroads guide permit vehicles to encroach into other traffic lanes when turning. Specific access requirements for larger vehicles are subject to stakeholder consultation.

## 3.8 Visibility

Site distance checks will be carried out for the proposed improvements at intersections and pedestrian crossing points in accordance with Austroads Guide to Road Design Part 4A: Unsignalised and signalised intersections Chapter 3.3. Criteria to be checked are Crossing Sight Distance (CSD) and Approach Site Distance (ASD). Sight distance checks for cyclists are also to be carried out in accordance with Section 5.6.1 of AGRD Part 6A. Where changes have been made that impact sight distance at driveways sight distance checks using the method outlined in AS/NZS 2890.1-2004 are to be carried out as outlined in Section 3.1.6.

The following additional visibility restrictions should be considered by the designer in accordance with Section 5.11 AUSTROADS Part 3 Geometric Design.

- Avenues with trees
- Road safety barriers
- Bus shelters
- Bridge handrails
- Median kerbs

## 3.9 On-Street Parking

The project area north of the M2 is subject to Clearway / No Parking restrictions with intermittent bus zones. Other sections of the project area south of the M2 are subject to morning peak hour clearway restrictions with timed parking. From Mowbray Road in the north and continuing south on Pacific Highway there is approximately 1.8km No Parking / Clearway (with bus zones) within the project area. South of the M2 there is approximately 730m of peak hour clearway / timed ticket parking the majority of which is situated near St Leonards.

The project is not anticipated to negatively impact on-street parking availability along the Pacific Highway, however parking on side streets may be impacted depending on the crossing treatment selected. Furthermore, both temporary and permanent relocation of parking meters will be required. Such relocations will be subject to consultation with Council and state transit authorities.

A detailed assessment of potential construction related parking impacts of the project and requisite mitigation measures will be undertaken during the scheme design stage prior to construction.

## 3.10 Public Transport

The proposed shared path will require permanent relocation of the majority of bus shelters on the eastern side of the Pacific Highway; however no removal or relocation of bus stops themselves is required. Temporary relocation of bus stops and shelters may be required during construction of the shared path however given the nature of the proposed works such relocations would not be required for a significant length of time.

Changes to bus stop locations and amendments to facilities are subject to approval by the Local Traffic Committee. Bus stop removals must be approved by the Director General of Transport for New South Wales.

Bus shelters and all other street furniture are required to be accessible according to the Disability Discrimination Act and new facilities or those undergoing substantial amendment are required to comply with the Disability Standards for Accessible Public Transport. These standards do not provide specific blueprints but rather a guiding set of principles that the designer is required to implement. An interpretation of these standards as they pertain to Bus Shelters by Australia's Disability Discrimination Commissioner Graeme Innes may also provide further guidance to the designer.

Willoughby City Council DCP Clause C.17.5 outlines the following basic locational requirements for bus shelters:

1. Provide a minimum 1.2m wide pedestrian access
2. Comply with Safer by Design principles;
3. Consider impacts of the Bus Shelter location on retail shop fronts and awnings, siting of street furniture and street trees.

The design and siting of bus shelters is to be carried out under consultation with Willoughby City Council and Transport for New South Wales.

## 3.11 Existing Signs, Markings and Traffic Control

There are a number of regulatory, warning and parking signs which may require relocation and/or consolidation to facilitate the provision of the shared path.

All road signage and markings will be in accordance with the following:

- Australian Standard AS1742 – Manual of Uniform Traffic Control Devices
- Roads and Maritime Services 'Delineation Manual'

### 3.11.1 Parking Signs

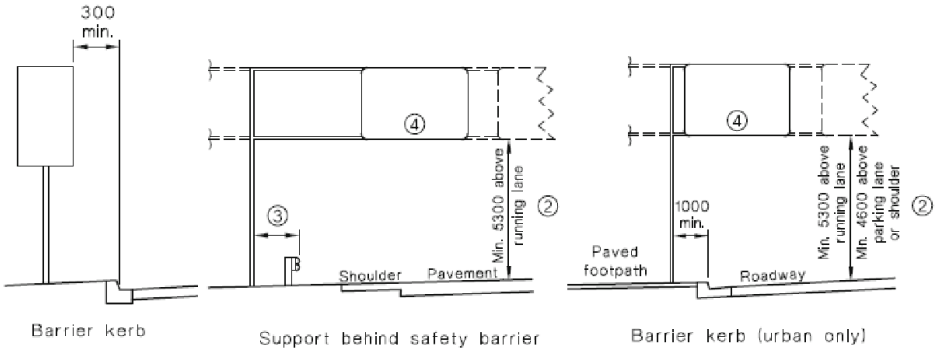
Relocation/ consolidation of parking signs is subject to approval by Willoughby City Council, RMS and other relevant stakeholders.

### 3.11.2 Regulatory Signs, Warning Signs and Guide Signs

Per AS 1742.2-2009 signs overhanging a footway or cycle path shall have a height of 2.5m minimum above the level of the footway or cycle path. There are a number of signs below the 2.5m minimum currently overhanging the project area. Signs mounted overhead roads are to be a minimum of 5.3m above the highest level of the roadway which may be reduced to 4.6m when above a shoulder lane or parking lane.

Figure 15 shows the minimum lateral and vertical clearance requirements of signs found within the project area as per AS 1742.2-2009.

**Figure 15 Clearances for side mount signs on kerbed urban roads (left) and overhead mount signs (centre/right)**




NOTES:

1 At traffic islands additional clearance may be required to allow for overhang of turning vehicles.

2 Minimum clearance applies to lighting brackets or other fixtures when these project below the sign.

3 Clearance behind safety barrier to take account of dynamic deflection of barrier and body roll of high vehicles in a collision, see AS/NZS 3845.

4 For cantilever or butterfly mounted signs, desirably the centre of the sign should be located above the kerb or edge line.

Source: AS 1742.2-2009 – Figure D2

Longitudinal placement requirements of warning signs are shown in Table D1 of AS 1742.2-2009. The location of regulatory and guide signs is based on their individual function.

Signs are to be oriented at approximately right angle to, and facing, the traffic they are intended to serve per AS 1742.2-2009 Clause D3. On curves a 200m nominal chord is to be drawn, to which the sign orientation shall be normal to. Further details are available in Clause D3.

This project will predominantly involve moving signs to the boundary side of the existing footway, with minor ancillary changes to longitudinal placement and orientation.

### 3.11.3 Signal Controllers - Intelligent Transport Systems (ITS) Boxes

ITS boxes at the two signalised intersections within the project area may require removal as part of the proposed shared path. Full details regarding locational requirements are outlined in Roads and Maritime Traffic Signal Design - Section 12.3, however given proposed changes involved in this project primarily revolve around moving the boxes closer to the adjacent property boundary the following relevant requirements have been identified. Boxes should be situated such that:

- There will be an unobstructed view of all approaches to the intersection for timing and maintenance purposes
- It will not be unduly exposed to accidental damage by passing traffic
- Access is available for maintenance personell to park a vehicle

- It is not obstructed by services nor obstruct services
- It is clear of the highest flood level on record

### 3.12 Lighting

AS/NZS 1158 provides standards for the lighting of urban roads and other public thoroughfares including shared paths. This publication specifies that roads which have roadway lighting to the category V standard of AS/NZS 1158.1.1-2005, which is the standard assigned to arterial/distributor/collector roads will provide sufficient lighting for shared paths. As such, no changes to existing lighting are anticipated to be required to accommodate the needs of the proposed shared path.

### 3.13 Utilities

Currently there are a significant number of sign posts on the eastern side of the Pacific Highway which are likely to require relocation and/or consolidation. Power poles are one way in which such consolidation could be facilitated. Should relocation of power poles or consolidation of signage onto power poles be proposed, consultation is to be undertaken with Ausgrid in the subsequent design stages. Relocation of utilities is to be considered in conjunction with Ausgrid's asset relocation policy. Consolidation of signage will be proposed in accordance with NW000-S0054 NS183 Installation of Private Attachments on Ausgrid Poles.

During concept design Dial Before You Dig Surveys will be requested in order to determine potential conflicts between the project and existing utilities.

### 3.14 Drainage

Per AS/NZS 1428.4.1-2009 cross fall shall not exceed 2.5% to cater for people who have a disability. In regard to bicycles the maximum cross fall outlined in the Austroads 'Cycling Aspects of Austroads Guides' is 4% and the minimum is 2%. Specific guidance for cyclist requirements is contained in Section 7.5.6 of this Austroads publication.

In general drainage facilities are to be designed by a suitably qualified practitioner in accordance with the Austroads 'Guide to Road Design Part 5A: Drainage: Road Surface, Network, Basin and Subsurface 2013' and the Roads and Maritime 'R0200 Stormwater Drainage Series'. The Standard (Road) Drawings show standard details of components and construction techniques to be used in roadworks on Roads and Maritime Services funded infrastructure or infrastructure that will become the property of Roads and Maritime Services in the future.

## 4.0 Departures from Standards

Due to the corridor width constraints, departures from the noted standards may be required. The requirement for departures (if any) will be determined as the scheme design is developed.

At present the following departures have been identified as necessary:

- 2.5m minimum width of shared path at constrained locations.

# Appendix B – Movement and Place Framework memo

AECOM Imagine it. Delivered.

AECOM Australia Pty Ltd
Level 21, 420 George Street
Sydney NSW 2000
PO Box Q410
QVB Post Office NSW 1230
Australia
www.aecom.com

+61 2 8934 0000 tel
+61 2 8934 0001 fax
ABN 20 093 846 925

# Memorandum

| | | | |
|---|---|---|---|
| To | Willoughby City Council | Page | 1 |
| CC | Jack Jiang (AECOM)<br>Anoop Sridhar (AECOM) | | |
| Subject | Pacific Highway Shared Path, Artarmon to St Leonards.<br>High-Level Movement & Place Assessment | | |
| From | Ghizlane Chergaoui (AECOM) | | |
| File/Ref No. | Final | Date | 27-Mar-2019 |

## 1.0 Introduction

### 1.1 Background

Willoughby City Council (Client) commissioned AECOM to undertake the route assessment and concept design for a bicycle shared path between Artarmon and St Leonards that will integrate to the Sydney's Principle Bike Network, as well as connecting to the centres and destinations in all directions on lower order bicycle networks.

The project objectives, as agreed with Willoughby Council, are:

- Develop a safe, coherent, direct and comfortable off-road cycling route along the eastern footpath of the Pacific Highway;
- Connect the Artarmon to St Leonards train station with a connection to the Gore Hill Freeway shared path and Lane Cove LGA bike lanes;
- Determine a 'fit for purpose' shared path and adopt an approach to "achieve the best out of existing assets";
- Provide a 3m wide shared path (reduce to 2.5m if required, with proper justification);
- Pedestrians and cyclists will need to receive more priority to ensure road safety is increased.

### 1.2 Purpose of this memo

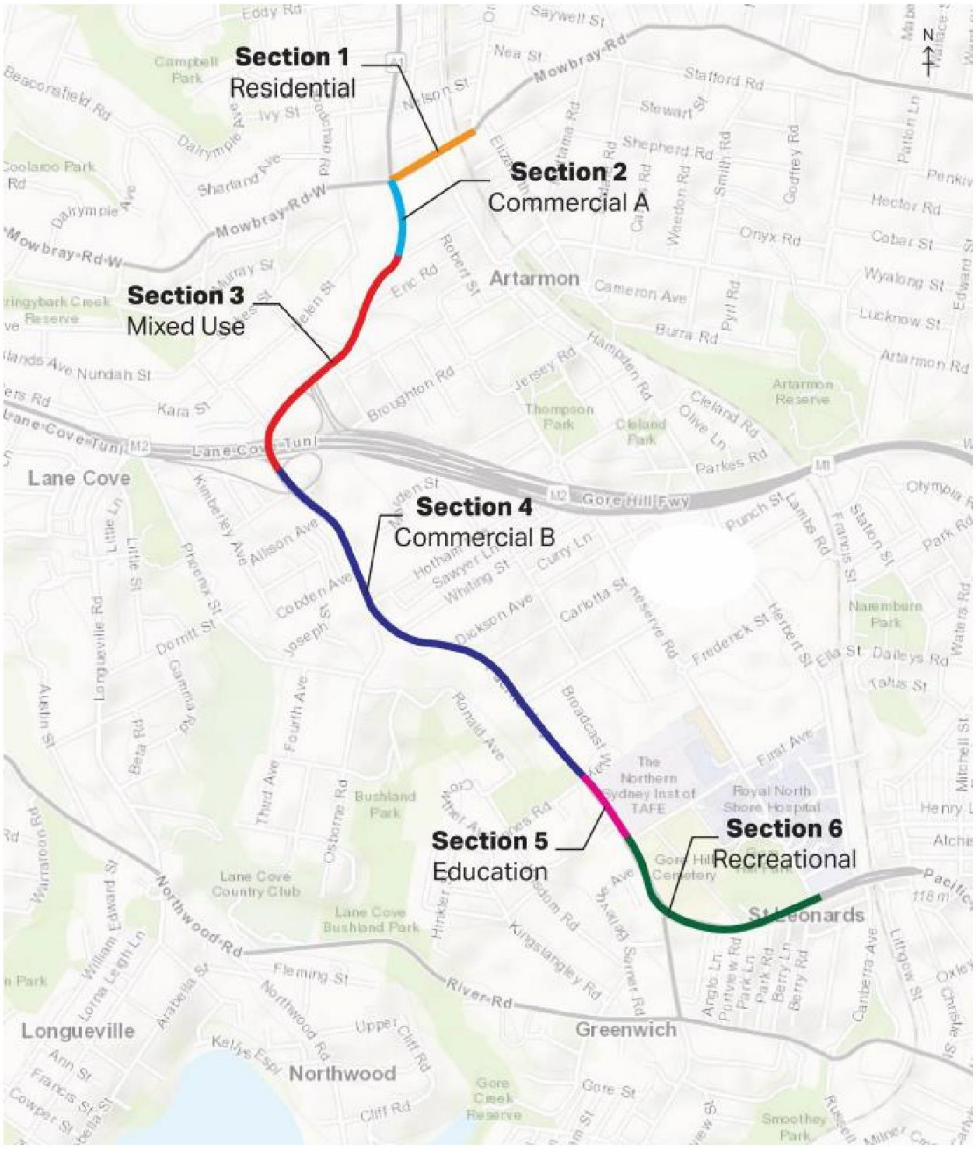
This memo presents a high-level assessment of the proposed shared path based on the Movement and Place Framework. This framework supports the Future Transport Strategy 2056 and aims to allocate road space in a way that improves liveability of spaces and integrates land use and transport planning strategies. The overarching objectives of the Movement and Place Framework are to deliver better focused outcomes for the community.

The guidance used for this assessment is the excerpts in the Future Transport 2056 Strategy document published by Transport for New South Wales; specifically page 17-18 and 83-86 of the document.

## 2.0 The project

The shared path is proposed along the eastern footpath of Pacific Highway, with the primary users of the infrastructure expected to be commuters, users with key destinations along the route or people using the facilities for recreational purposes. The overall route is divided into six sections in function of the frontage land-use characteristics as illustrated in Figure 1.

**Figure 1 The Artarmon to St Leonards route**




Source: AECOM, 2019

## 3.0 Movement and Place Framework

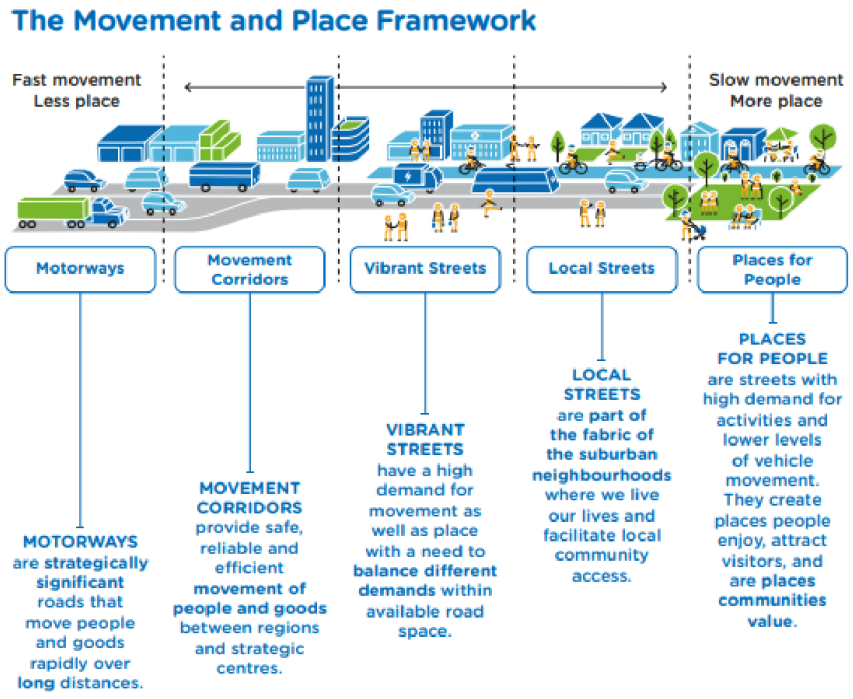
### 3.1 Policy context

The Movement and Place Framework is an integrated land use and transport planning tool that aims to allocate road space in a way that improves the liveability of places. The framework supports the Future Transport Strategy 2056 and aims to become a common platform for road planning that integrates uses of strategic significance, and consists of:

- Roads and streets in their role in moving goods and people
- Land uses adjacent to roads and streets.

The guiding principles within the framework acknowledge that the needs and expectations of transport customers and communities change for different street environments, and the need to prioritise different customer groups based on the street environment as indicated in Figure 2.

**Figure 2 The movement and Place Framework**




Source: Future Transport Strategy 2056, pg85, 2018

The framework distinguishes between four main street environments as follows:

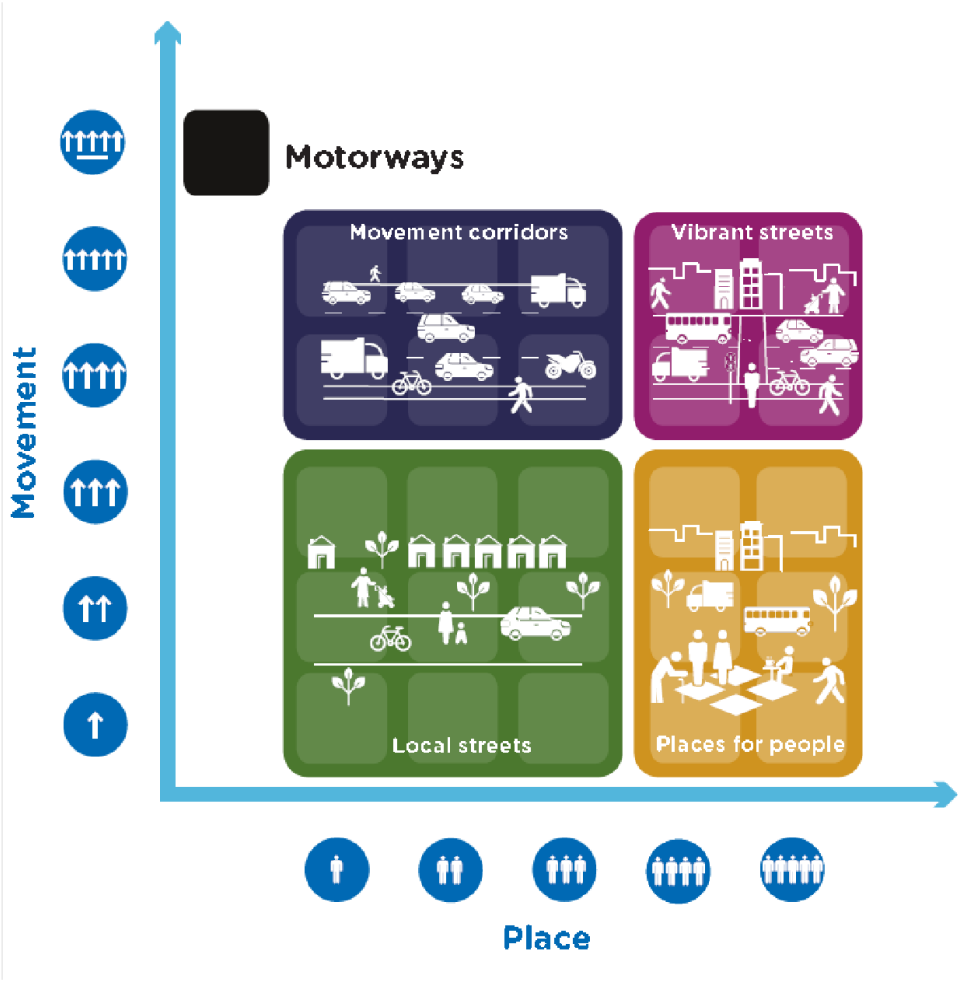
- Places for people are people orientated street environments that aim to better prioritise public transport, pedestrians, cycle and freight access whilst limiting through traffic.
- Local Streets set the frame for communities' local access as a priority. They are safe environments that acknowledge the need to share road space and are supported by lower vehicle speeds that better align with the need to prioritise walking and cycling within local communities.
- Vibrant Streets are some of the most active areas that present the need to balance high pedestrian activity and densities along with the need to move high numbers of people and goods.
- Movement Corridors and Motorways are highly important for the movement of people and goods with little interaction with adjacent land use.

### 3.2 The project in the context of the framework

The proposed shared path route has been assessed in function of the Movement and Place Framework to better understand the street environment along each section of the route, with the aim of identifying the different needs of the community along these sections of the route and help provide better transport outcomes along each section.

The guidance for the classification is outlined in Figure 3

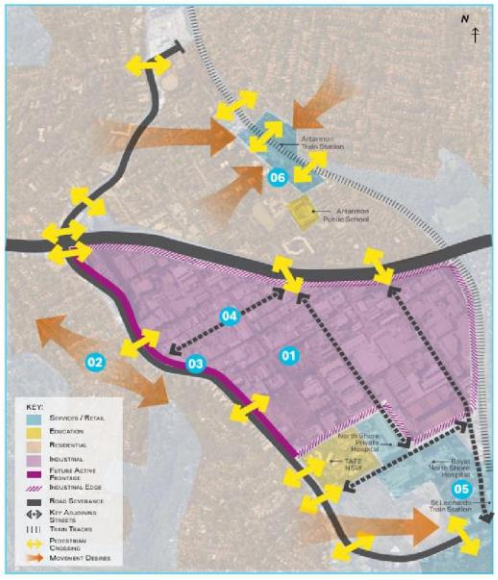
**Figure 3 Movement and Place road classification**




Source: Future Transport Strategy 2056, pg18, 2018

Key places identified along the proposed route have also been identified and shown in Figure 4

**Figure 4 Key places along the proposed shared path**




## Key Places

**01 Industrial Zone**

Parcels are zoned for industrial use, establishing an industrial edge that runs adjacent to Pacific Highway. The dominance of large warehouses, combined with inactive frontage and the frequency of large trucks creates an unattractive pedestrian environment, thus discouraging movement through this zone to access Artarmon or St Leonards Station. This land-use is not planned to change in the near future.

**02 Residential - Western Side**

Primarily residential land use along the western side of Pacific Highway, with potential movement desires being towards Lane Cove town centre (north west) and St Leonards town centre. However, the permeability of the road layout on this side may deter walking and cycling trips towards Pacific Highway.

**03 Future Active Frontage**

Willoughby City Council proposes to activate this frontage with retail and hospitality. This will enhance the attractiveness of the streetscape for people walking and using bikes along Pacific Highway, in contrast to the existing industrial frontage.

**04 Adjoining Side Streets**

There may be a desire for residents from the west (02) to access Artarmon, however limited crossing opportunities (Pacific Highway and M1) combined with poor permeability within industrial zone deters this movement.

**05 St Leonards**

The combination of retail, services, education, recreation areas and train station makes St Leonards a key location to promote and connect to, via Pacific Highway.

**06 Artarmon Station**

Station location, and adjacent retail, is easily accessible for residents directly adjacent to the station (eastern side of Pacific Highway, either side of train tracks).

Source: AECOM, 2019

Figure 3 and Figure 4 along with available information and data collected through engagement with the client was used to determine the movement and place classification for the different sections of the route. The outcomes of this assessment are summarised in Table 1.

**Table 1 Movement and Place Framework assessment of the proposed shared path**

| Section | Description | Street environment |
|---|---|---|
| 1 | This section of the route is characterised by residential frontage on the south side of Mowbray Road with a frontage to the new Sydney Metro site on the north side. The intersection of Pacific Highway and Mowbray Road is a major intersection characterised with high pedestrian and cycling movements, especially during peak hours. | Movement Corridor characterised with moderate demand for place. |
| 2 | Along this section, commercial developments predominantly front the east side of Pacific Highway along with residential developments on the west side of the road.<br>Clearways are in place on Pacific Highway during the morning peak. The existing eastern footpath is characterised by multiple vehicle crossovers. Bus stops are also located on both sides of the road.<br>There are no crossing opportunities along this section of the road, with heavy north-south vehicle movements observed along this section of Pacific Highway. | Movement Corridor characterised with high demand for movement. |
| 3 | This section of the route is characterised by a mixed-use developments on the east side of the road with commercial and retail developments predominantly fronting Pacific Highway. Commercial developments predominantly have frontages to the west side of the road.<br>Midblock crossings are limited along this section of the road, with the nearest crossing provided at the entrance to the Lane Cove Tunnel and at the intersection of Pacific Highway with Gore Hill Freeway, located approximately 800 metres south of Mowbray Road.<br>Pacific Highway has a posted limit of 60 kilometres per hour along this section of the route. | Movement Corridor characterised with high demand for movement. |
| 4 | This section of the route is characterised by commercial buildings on the east side of the road with multiple vehicle crossovers. The same is observed on the west side of the road.<br>Bus shelters are also provided on both sides of the road, with car parking permitted on multiple sections along the east side of the road.<br>Pacific Highway has a posted limit of 60 kilometres per hour along this section of the route, with access provided to/ from multiple side streets with lower posted speed limits. Along this 1.3 kilometre stretch, only three signalised crossings were observed. | Movement Corridor characterised with high demand for movement. |
| 5 | Educational land uses are located on the east side of the road with residential developments predominantly on the west side of the road.<br>Bus stops are provided on both sides of the road along this 200 metres long section of the route, with two crossings provided. | Movement Corridor characterised with high demand for place. |
| 6 | Commercial developments are located on the west side of the road with public recreation use and a cemetery located on the east side of the road. Bus stops are provided along both sides of the road with parking permitted along section on the east side of the road. Midblock crossings are also provided. | Vibrant Streets characterised with high demand for place as well as movement. |

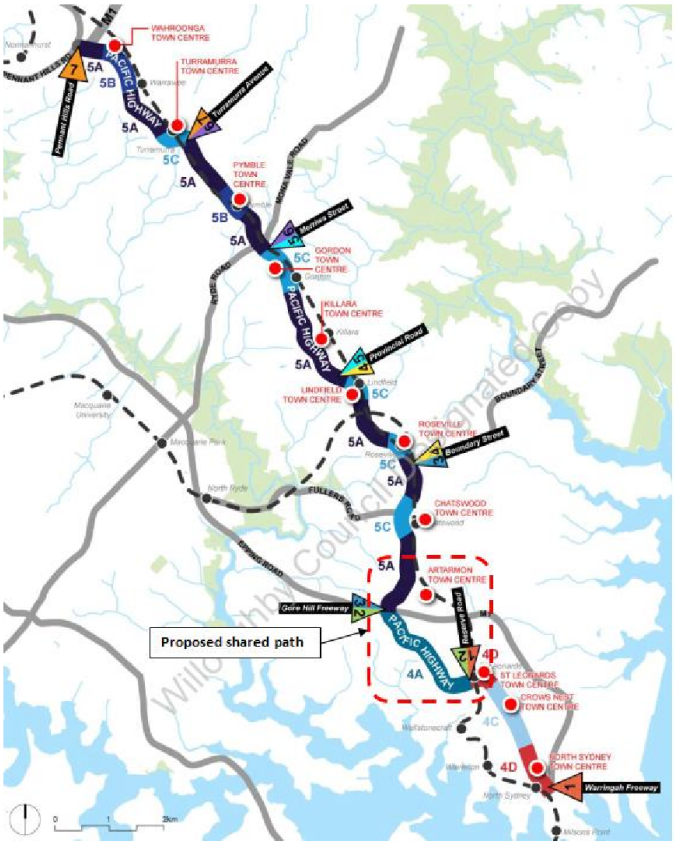
### 3.3 Road Network Plan assessment

Roads and Maritime Services (Roads and Maritime) has prepared a Road Network Plan report for the Pacific Highway between Warringah Freeway and Pennant Hills Road (2018). The Road Network Plan sets out a plan for management, operation and development of the Pacific Highway and forms part of supporting plans that deliver the NSW Government's Future Transport Strategy.

Pacific Highway between Warringah Freeway and Pennant Hills Road currently serves several movement functions which differ along the corridor as shown in Figure 5. As such, the assessment breaks down Pacific Highway into segments and considers each section of the road separately (both sides of the road).

The proposed shared path is located along Segment 1, Segment 2 and Segment 3 of the corridor. Pacific Highway, north of the Lane Cove tunnel/ Gore Hill Freeway (Segment 3) is classified as a Movement Corridor with a high demand for movement and a low place significance. This segment has a moderately high importance for traffic customers and accommodates north-south traffic and connects key east-west routes, with dispersed urban facilities. Between the Lane Cove tunnel/ Gore Hill Freeway and Reserve Road (Segment 2), the corridor is classified as a Movement Corridor and is characterised with a moderately high need for movement and a low place function. East of Reserve Road (Segment 1), Pacific Highway has a Vibrant Streets classification and is characterised with a moderately high need for both movement and place. Segments 1 and 2 both have importance for local traffic with Segment 2 having dispersed urban facilities whilst Segment 1 has the most predominant and closely spaced urban environment.

**Figure 5 Movement and Place requirements of the Pacific Highway corridor**




Source: Roads and Maritime, 2018 modified by AECOM, 2019

## 4.0 Summary

The assessment indicated that the corridor is a mix of a movement corridor environment and a vibrant street environment. Section 2 to Section 4 of the corridor are predominantly a Movement Corridor characterised with high demand for movement and low priority and need for provision for pedestrians and cyclists or access to land use. Sections 1, 5 and 6 of the proposed shared path are classified as a Movement Corridor characterised with moderate to high demand for place and activity and movement throughout hours of the day and an identified need to balance high pedestrian and cyclist activity.

The results from this high-level assessment suggest majority of the route should be prioritised for their movement function while a higher level of finish or spatial experience for people should be considered along Mowbray Street, the future Sydney Metro site, and a portion of Pacific Highway towards St Leonards train station.

This high-level assessment is in line with the findings of the Road Network Plan assessment for Pacific Highway, prepared by Roads and Maritime.

# Appendix C – MCA Criteria

| | Category | MCA criteria | Overall weighting |
|---|---|---|---|
| Stage 1 | Project Objectives | 1: Developing a safe, coherent, direct and comfortable off-road cycling route along the eastern footpath of Pacific Highway. | 33% total |
| | | 2: Connecting the Artarmon to St Leonards train stations, with a connection to the Gore Hill Freeway shared path and the Lane Cove Local Government Area (LGA) cycling lanes. | |
| | | 3: Developing a shared path that fits the requirements and needs determine by Willoughby City Council (Council) and adopting an approach to achieve the best possible outcome given the existing geometric limitations and the location of existing assets. | |
| | | 4: Ensuring road safety is increased for vulnerable road users such as cyclists and pedestrians through prioritising these road users. | |
| | KPI's | 1: 90% of trees will be retained along the route | Pass/Fail/To be determined<br><br>If a scenario fails any sections it will need justification before progressing to Stage 2. |
| | | 2: 80% of the route will have a minimum 3m width | |
| | | 3: Target 20kph turning speeds from the Pacific Highway on to local roads | |





| | Category | MCA criteria for IBC/DBC | MCA guidance considerations | Project considerations, suggested changes or focus areas | Overall weighting |
|---|---|---|---|---|---|
| Stage 2 | Implementability | Technical | How straightforward is it to implement this option, including moving any barriers (e.g. trees, poles, bus stops etc.)<br><br>Are there any technical risks involved in developing or implementing this option? | Focus on level of technical risk | 33% total |
| | | Planning | Is a new designation or alteration required? Will removal of any barriers be prohibited by the Council?<br><br>Could the option include activities prohibited under the policies and rules of the District of Regional Plan? | Focus on the planning risks of tree relocation and designation change but if the Council have any specific limitations known to the area | |
| | | Operation & Maintenance | Are there factors that affect the operation or maintenance of the facility over its lifetime without major additional cost?<br><br>How does the design impact on the general multi-modal operation of the route? | Identify areas where operational & maintenance impacts would occur and put in place management methods. | |
| | | Financial | How much will removing barriers, implementing speed table etc. cost?<br><br>How acceptable is the cheaper alternative? | Consider whole of life costs and ability to reuse/upgrade existing assets | |
| | Assessment of Effects | User Safety | What is the impact on personal safety/security?<br><br>What is the impact on fatal/serious injuries?<br><br>What is the impact on intended user behaviour? | Major focus of the project, to assess and ensure that the route will be safe for all users | 33% total |
| | | Amenity, Urban Design and Streetscape | How does the option impact the local Streetscape/landscape of the area?<br><br>What is amenity value would the project realise? | Comment on the impact of removing any existing barriers on the road and determine if their removal is necessary | |
| | | Land and Transport Relationship | Are there property risks to delivery and can they be effectively managed?<br><br>Are there any links to public spaces and amenities? | This assessment will largely rely on the appropriateness of the option in relation to the Movement and Place assessment | |

aecom.com

AECOM Imagine it. Delivered.

# Appendix 2

AECOM Imagine it. Delivered.

AECOM Australia Pty Ltd
Level 21, 420 George Street
Sydney NSW 2000
PO Box Q410
QVB Post Office NSW 1230
Australia
www.aecom.com

+61 2 8934 0000 tel
+61 2 8934 0001 fax
ABN 20 093 846 925

# Memorandum

| | | | |
|---|---|---|---|
| To | Willoughby City Council | Page | 1 |
| CC | Jack Jiang (AECOM)<br>Anoop Sridhar (AECOM) | | |
| Subject | Pacific Highway Shared Path, Artarmon to St Leonards<br>Preliminary Planning Memo | | |
| From | Ghizlane Chergaoui (AECOM) | | |
| File/Ref No. | Final - Amended with comments from Strategic Planning team | Date | 27-Mar-2019 |

## 1.0 Introduction

### 1.1 Background

A preliminary planning assessment is required for the Pacific Highway Shared Path Project, from Artarmon to St Leonards ('the project').

The project aims to deliver a bicycle shared path between Artarmon and St Leonards that will integrate to the Sydney's Principle Bike Network, as well as connecting to the centres and destinations in all directions on lower order bicycle networks.

The project objectives, as agreed with Willoughby Council, are:

- Develop a safe, coherent, direct and comfortable off-road cycling route along the eastern footpath of the Pacific Highway;
- Connect the Artarmon to St Leonards train station with a connection to the Gore Hill Freeway shared path and Lane Cove LGA bike lanes;
- Determine a 'fit for purpose' shared path and adopt an approach to "achieve the best out of existing assets";
- Provide a 3m wide shared path (reduce to 2.5m if required, with proper justification);
- Pedestrians and cyclists will need to receive more priority to ensure road safety is increased.

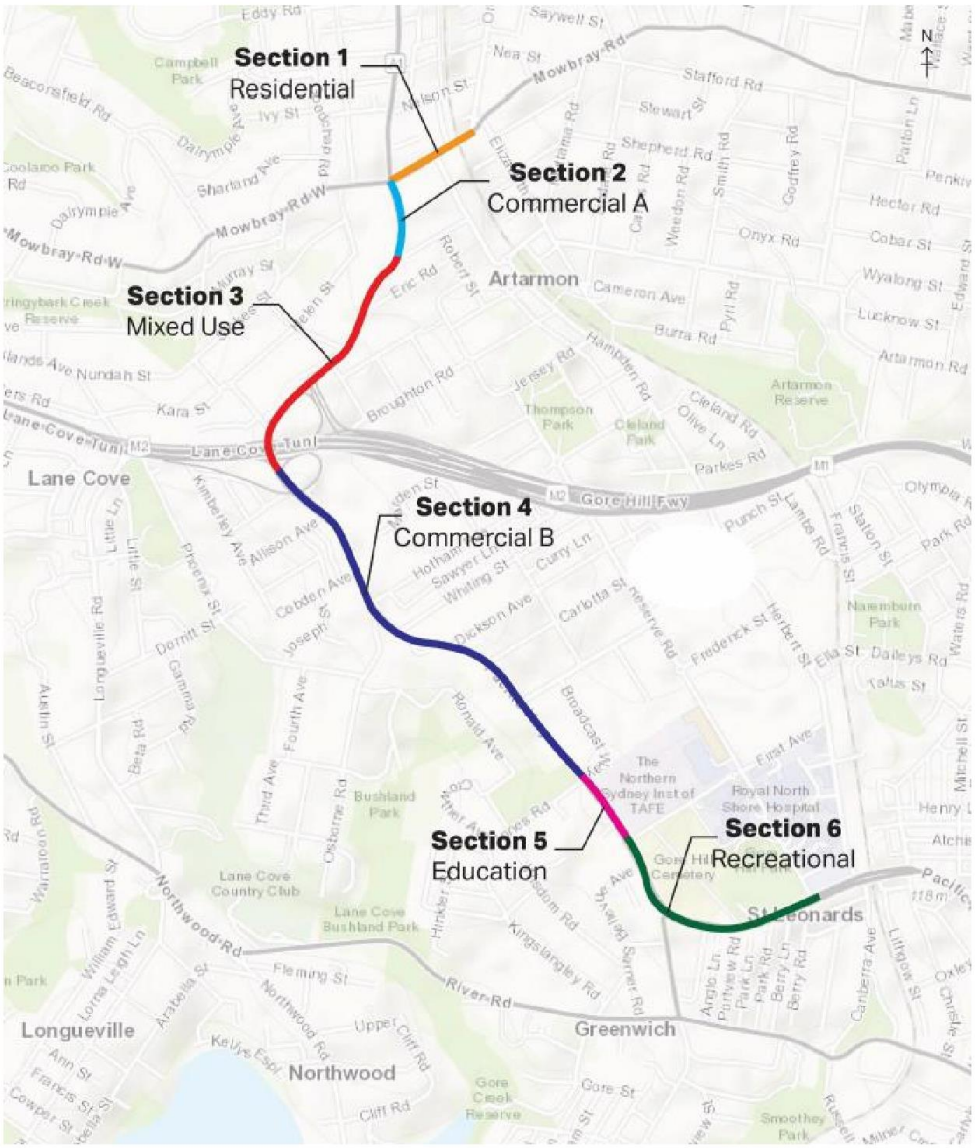
### 1.2 Project description

The shared path is proposed along the eastern footpath of Pacific Highway, with the primary users of the infrastructure expected to be commuters, users with key destinations along the route or people using the facilities for recreational purposes.

The proposed route poses several challenges. Pacific Highway is a State Road and provides the major north-south traffic route through the area. It is characterised by large traffic volumes (approx. 30,000 vehicles per day) and high vehicle speeds (60km/h posted speed) throughout the day. The footpath is further characterised by limited footpath and verge width along majority of the route, existing structure, services and a variety of trees and vegetation.

Based on the above, the overall route is divided into six sections based on the function of the adjacent land-use characteristics illustrated in Figure 1.

**Figure 1 The Artarmon to St Leonards route**




Source: AECOM, 2019

## 1.3 Purpose of this memo

This desktop assessment was prepared on behalf of Willoughby City Council (Council) and aims to outline the regulatory context within the route extent and their interactions with the proposed work.

This assessment further considers planning policies relevant to the assessment of the proposed shared path project as follows:

- Future Transport Strategy
- Sydney's Cycling Future

- Sydney's Walking Future
- Movement and Place Framework
- Council's Bike Plan
- Walking and Cycling Program Guidelines
- Cycling Aspects of Austroads Guides.

### 1.4 Assumptions

This preliminary assessment assumes the following:

- The project will be entirely located within the road reserve.
- Some construction works may require the acquisition of private lands along the route.
- Construction works may require the relocation of street trees located on the existing footpath.
- Construction works may further require the relocation of street furniture, including bins and benches located along the project route.
- The project may require the relocation of existing bus stops located along the proposed route.
- The property boundary assessment is based on the CAD based plans received from Council as well as Council's LEP 2012.
- The assessment of existing infrastructure located along the project route is based on a desktop review of aerial map survey and site observations.
- The proposed shared path may affect scheduled heritage items located along the route.
- The assessment of the proposed shared path in regard to current planning policies released as at 26 February 2019.

## 2.0 Policy context

### 2.1.1 Future Transport Strategy

The Future Transport Strategy 2056 is the New South Wales (NSW) Government framework for planning and improving the NSW transport system and was developed as part of the 5-year update to the 2012 Long Term Transport Master Plan for NSW. The plan enables Sydney to prepare for a period of population growth with a vision for setting a pathway up to 2056. This vision is based on Greater Sydney being a metropolis of three cities (Eastern Harbour City, Central River City and Western Parkland City).

The strategy to accommodate population growth seeks to take advantage of technological enabled mobility that offers opportunities to maximise travel by car-free alternatives within Sydney. This includes the transformation of the mass transit network to align with a 30-minute trip to services and employment. It also recognises the role of automation and how it can help to improve safety, travel choices and mode concepts, service frequency, reliability and travel times for customers when travelling within and around Sydney's transport network.

The Strategy further focuses on integrating walking and cycling networks through enabling assisted mobility devices to be used safely on the network to assist with short journeys within centres and to connect people to public transport. As part of this vision, future directions to investigate consist of:

- Delivering complete cycling networks, pedestrian space and interchanges that safely support a wider range of devices
- Enabling shared use service models in key centres (e.g. E-bike hire)
- Developing and adopting safety standards for new devices entering the market and review existing regulatory frameworks.

Transport for NSW is already delivering initiatives to increase active transport. As part of Sydney's Cycling Future program, secure bike storage is being rolled out across the network providing undercover storage at selected railway stations.

### 2.1.2 Sydney's Cycling Future

Sydney's Cycling Future (Transport for NSW, 2013) provides a framework for the way cycling is planned and prioritised in Sydney. It aims to grow the number of people cycling for transport by investing in safe, connected networks, making better use of existing infrastructure and fostering the formation of partnerships to develop cycling infrastructure.

Key points to emerge from the strategy include:

- A safe and connected bicycle network benefits the wider transport network by improving access to towns and centres, reducing congestion and increasing capacity on the public transport system
- The promotion of safe separation of cyclists from motor vehicles and pedestrians where possible
- Investment in bicycle infrastructure should be prioritised within 5km of public transport interchanges to provide improved connections
- Promoting 'bike-and-ride' at major public transport interchanges including secure parking facilities integrated with public transport access.

### 2.1.3 Sydney's Walking Future

Sydney's Walking Future (Transport for NSW, 2013) provides a framework for the way walking is planned and prioritised in Sydney. Transport for NSW will create a culture of walking as a viable and attractive transport choice, especially for getting to and from school.

The three pillars of Sydney's walking future include promoting benefits of walking and providing information to increase walking trips through programs that encourage more sustainable transport. The framework aims to encourage more people to walk during peak times to ease congestion on roads and free up capacity on public transport, particularly around schools as well as promoting the physical, emotional and social benefits of walking.

### 2.1.4 Movement and Place Framework

The Movement and Place Framework is an integrated land use and transport planning tool that aims to allocate road space in a way that improves the liveability of places. The framework supports the Future Transport Strategy 2056 and aims to become a common platform for road planning that integrates uses of strategic significance.

An assessment of the proposed shared path in accordance to the Movement and Place Framework has been completed and is included in the Movement and Place Framework Memo.

### 2.1.5 Council's Bike Plan

**Bike Plan Review 2012**

Bike Plan Review 2012 provides a comprehensive review of existing cycling behaviour, infrastructure and perceptions of cycling, along with establishing targets, recognising barriers to cycling and developing strategies to encourage and promote cycling as a viable transport mode. The plan further provides a clear and uniform approach in developing the future direction and integration of cycling.

The plan identified a coordinated approach for developing cycle paths as follows:

- Implementing bicycle route facilities based on the identified short, medium and long term actions.
- Lobbying Roads and Maritime Services (RMS) to improve safe bicycle access within Willoughby.
- Improving and complementing the existing bicycle parking facilities.
- Developing a signage and wayfinding strategy to guide pedestrians and cyclists.
- Fostering a safe walking and cycling environment, through separation, integration and behavioural education as appropriate.
- Formulating a comprehensive cycling education, awareness and promotion program to get more people cycling, more often.
- Identifying a formal program to monitor and evaluate the implementation of the Bicycle Strategy.

**Bike Plan Update 2017**

Bike Plan Update 2017 is a review to the 2012 Plan that seeks to provide an audit of existing cycling infrastructure throughout the Willoughby LGA to understand to which extent previously identified cycling infrastructure projects have been implemented.

The audit also identifies additional priority infrastructure projects. Factors that have been considered through this review include:

- connectivity to the existing network and inter-LGA connectivity
- the regional cycling network, namely the Inner Sydney Regional Bicycle Network
- connectivity to the surrounding land uses
- the locally available route between two destinations
- cyclist Safety
- topography.

### 2.1.6 Walking and Cycling Program Guidelines

Walking and Cycling Program Guidelines 2019-2020 are aimed at prioritising key walking and cycling projects within NSW based on a weighting system that will be used to assess walking and cycling proposals submitted to the NSW Government for funding. The focus of these guidelines is to achieve the following key tasks:

- assess the eligibility of projects for NSW Government State funding
- prioritise eligible projects for delivery
- provide guidance to councils and stakeholders on planning cycles and funding
- provide accountability and transparency.

The guiding principles for the prioritisation process are based on the following:

- prioritising cost-effective solutions
- delivering in collaboration with partners
- creating and supporting a walking and cycling culture
- supporting urban renewal
- ensuring initiatives are based on sound evidence

### 2.1.7 Cycling Aspects of Austroads Guides

Cycling Aspects of Austroads Guides 2017 contains information that relates to the planning, design and traffic management of cycling facilities and is sourced from Austroads Guides. It primarily relates to the Guide to Road Design, the Guide to Traffic Management and the Guide to Road Safety. The report provides:

- an overview of planning and traffic management considerations
- a summary of design guidance and criteria relating to on-road and off-road bicycle facilities
- information and cross-references on the provision for cyclists at structures, traffic control devices, construction and maintenance considerations and end-of-trip facilities.

## 2.2 Strategic Planning Context

In consultation with the Strategic Planning team within the council, it was understood that the future land use scenario adjacent to Pacific Highway is unlikely to change drastically other than natural growth.

There is however the encouragement of active frontage through redevelopment along the frontage of Pacific Highway, particularly along the industrial land use. Adjacent to the Pacific Highway, the planning focuses on intensification of the St Leonards CBD area, which put more demand on this route to provide the necessary access.

The strategic planning work is currently under review and rework, therefore more information will develop in 2019. However for the purpose of this project, it is assume to significant change to the land use other than natural growth.

## 3.0 Existing Site Context

### 3.1 Property boundaries

A review of the property boundary map provided by Council and a review of the Council Local Environmental Plan (LEP) 2012 land zoning maps indicate that some property boundaries directly interface with sections of the proposed route along the alignment.

These properties are identified in Table 1 and have a land use classification of SP2 Infrastructure and are controlled by Willoughby City Council.

**Table 1 Property boundaries directly interfacing with the route**

| Section | Location | Land use classification | Ownership |
|---|---|---|---|
| 2 | Corner of Mowbray Road and Pacific Highway | SP2 Infrastructure | Willoughby City Council |
| 3 | South of Eric Road and north of Gore Hill Freeway | SP2 Infrastructure | Willoughby City Council |
| 4 | Between Alto Place and Hotham Parade | SP2 Infrastructure | Willoughby City Council |
| 4 | Between Dickson Avenue and Broadcast Way | SP2 Infrastructure | Willoughby City Council |

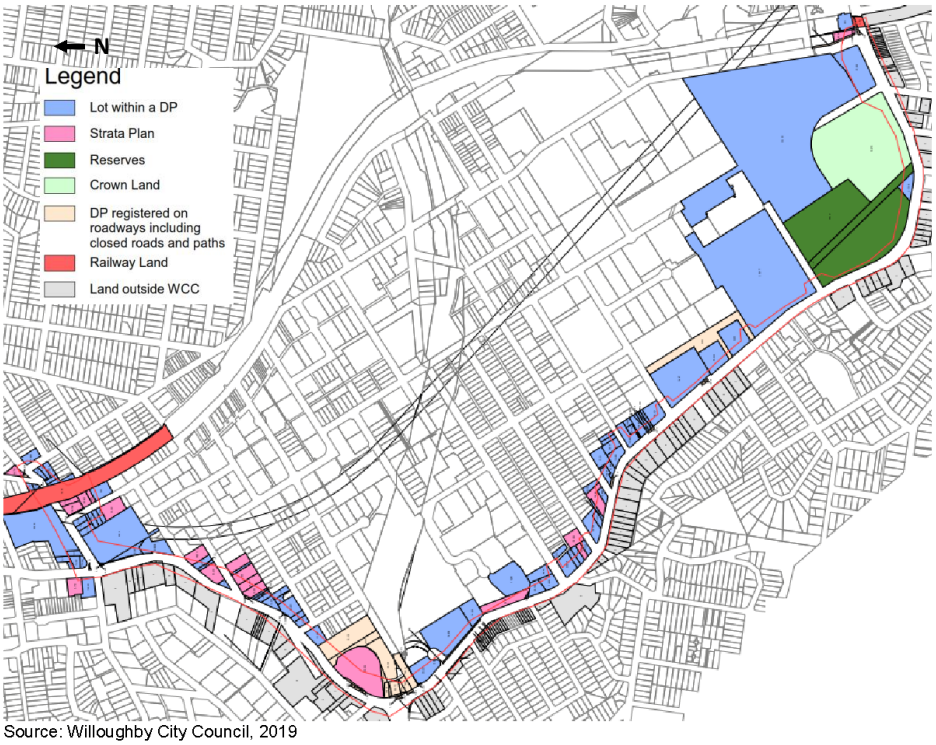
Further to the above, properties fronting Pacific Highway, on the eastern side of the road are presented in Table 2 and shown in Figure 2.

**Table 2 Properties located on the east side of Pacific Highway**

| Section | Location | Land use classification | Ownership |
|---|---|---|---|
| 1 | 348 Mowbray Road West and 332 Pacific Highway, Artarmon | SP2 Electricity Transmission and Distribution and SP2 Water Supply System | NSW Government /Roads and Maritime Services /Sydney Water |
| 2 | 555 Pacific Highway, Artarmon | B5 Business Development | Private |
| | 9 Eric Road, Artarmon to 517 Pacific Highway, Artarmon | R3 Medium Density Residential | Private |
| 3 | 22 Eric Road, Artarmon to 501 Pacific Highway, Artarmon | R3 Medium Density Residential | Private |
| | 481 Pacific Highway, Artarmon to 477 Pacific Highway, Artarmon | R2 Low Density Residential | Private |
| | 421-473 Pacific Highway, Artarmon to 477 Pacific Highway, Artarmon | R4 High Density Residential | Private |
| | 409-419 Pacific Highway, Artarmon | SP2 Classified Road | Roads and Maritime Services |
| 4 | 407 Pacific Highway, Artarmon | B7 Business Park | Private |
| | 405 Pacific Highway, Artarmon | IN2 Light Industrial | Private |
| | 403 Pacific Highway, Artarmon to 401 Pacific Highway, Artarmon | B7 Business Park | Private |
| | 395-397 Pacific Highway, Artarmon to 393 Pacific Highway, Artarmon | B7 Business Park | Private |

| Section | Location | Land use classification | Ownership |
|---|---|---|---|
| | 387 Pacific Highway, Artarmon to 373 Pacific Highway, Artarmon | B7 Business Park | Private |
| | 355 Pacific Highway, Artarmon to 335 Pacific Highway, Artarmon | B7 Business Park | Private |
| | 327 Pacific Highway, Artarmon to 301 Pacific Highway, Artarmon | B7 Business Park | Private |
| | 291 Pacific Highway, Artarmon to 269 Pacific Highway, Artarmon | B7 Business Park | Private |
| | 219-247 Pacific Highway, Artarmon | B7 Business Park | Private |
| | 217 Pacific Highway, Artarmon | SP2 Telecommunications facility | Private |
| | 219 Pacific Highway, Artarmon (4 Broadcast Way) | B7 Business Park | Private |
| 5 | 213 Pacific Highway, St Leonards | SP2 Educational Establishment | Technical and Further Education Commission |
| 6 | Gore Hill Memorial Cemetery | SP1 Cemetery | Gore Hill Memorial Cemetery Trust |
| | 209 Pacific Highway, St Leonards (Gore Hill Park) | RE1 Public Recreation | Crown Land |
| | 207 Pacific Highway, St Leonards | B3 Commercial Core | Private |

**Figure 2 Properties located along the east side of Pacific Highway**




Source: Willoughby City Council, 2019

### 3.2 Existing infrastructure

The shared path route was assessed to identify infrastructure located along the alignment. The initial assessment was based on aerial map survey and site observations and has found significant geometric and physical constraints along the route, which consist of a range of residential and commercial driveways, bus stops, trees, signalised and unsignalized side streets and overhead services. The findings of this assessment are summarised in Table 3.

**Table 3 Existing infrastructure along the route**

| Type of constraint | Section 1 | Section 2 | Section 3 | Section 4 | Section 5 | Section 6 | Total |
|---|---|---|---|---|---|---|---|
| Trees | 6 | 3 | 27 | 11 | 0 | 4 | 51 |
| Residential driveways | 4 | 0 | 3 | 0 | 0 | 0 | 7 |
| Commercial driveways | 4 | 3 | 8 | 17 | 0 | 2 | 34 |
| Bus stops | 0 | 0 | 3 | 4 | 1 | 2 | 10 |
| Signalised side streets | 0 | 0 | 2 | 2 | 0 | 2 | 6 |
| Unsignalised side streets | 1 | 0 | 1 | 6 | 0 | 0 | 8 |
| Overhead services | 3 | 7 | 9 | 38 | 6 | 15 | 78 |
| *Total* | *18* | *13* | *53* | *78* | *7* | *25* | *194* |

Table 3 indicates there are a total of 194 physical constraints or challenges observed along the proposed shared path. Section 4 has the highest number of challenges observed followed by Section 3 and Section 6 respectively.

The assessment further indicates that overhead services constitute the largest number of constraints observed along the proposed route. Other most observed challenges along the shared path are trees, driveways and bus stops.

### 3.3 Heritage listed infrastructure

The LEP 2012 indicates there are several heritage-listed sites located along the proposed share path alignment.

Council's Natural Heritage Register further indicates ecological communities are located at Gore Hill Oval including lands surrounding the oval and within or adjoining car parking areas bounded by Pacific Highway. A south-western boundary group is identified at the southwestern corner of Gore Hill Oval, near Pacific Highway. The lower eastern portion of Reserve Road, including the western gardens to 207 Pacific Highway and adjoining open space are also identified as endangered ecological communities.

A summary of the heritage listed infrastructure and their location is presented in Table 4.

**Table 4 Existing heritage listed infrastructure**

| Section | Location | Type |
|---|---|---|
| 1 | Along Mowbray Road up to its intersection with Pacific Highway | Buildings/ communication tower/ water supply system |
| 4 | Between Campbell Street and Westbourne Street | Buildings/ communication tower |
| 6 | Between Westbourne Street and Gore Hill Oval | Site (cemetery) |
| | At Gore Hill Oval, between The Avenue and Reserve Road | Trees |

### 3.4 Nearby future projects

Key transformation projects and planning proposals are currently proposed in close vicinity of the proposed route. Future development projects near the site are collated in Table 5.

**Table 5 Future developments identified near the shared path**

| Site location | Description of works |
|---|---|
| Gore Hill Technology Park, Artarmon | The proposal seeks to amend the LEP 2012 by rezoning lots 5 and 6 which are part of the Gore Hill Technology Park from Light Industrial IN2 to Business Park B7 and to amend the height and FSR controls relating to the site to allow large floor plate office development in a business park setting. |
| 12 Frederick Street, St Leonards | The planning proposal seeks to amend the LEP 2012 to permit hospital uses and amend the floor space ratio controls for the site. |
| 545-553 Pacific Highway, St Leonards NSW | The proposal seeks to amend North Sydney LEP 2001 in relation to land at 545-553 Pacific Highway, St Leonards, to construct a new mixed-use development. |
| 472-520 Pacific Highway & 95 Nicholson Street, St Leonards | The proposal seeks to amend the Lane Cove LEP 2009 by changing the zoning of the five sites that comprise 472-520 Pacific Highway & 95 Nicholson Street from B3 - Commercial Core to B4 - Mixed Use to facilitate 3930 sqm of retail space, 7800sqm of commercial space and 910 residential units. |
| 1-13 Marshall Avenue, St Leonards | The purpose of this planning proposal is to amend Lane Cove LEP 2009 to increase the maximum height of buildings from 65 metres to 94 metres for a proposed mixed-use development. |
| 75-79 Lithgow Street, and 84-90 Christie Street, St Leonards | Rezone the site from B3 Commercial Core to B4 Mixed Use, to allow the development of two residential towers above retail/commercial, increase the maximum height and increase the floor space ratio via an incentive bonus scheme. |
| St Leonards South Master Plan | The planning proposal seeks to amend zoning, floor space ratio, lot size and height of buildings controls under Lane Cove LEP 2009 for the St Leonards South Precinct, to allow apartment buildings, community facilities and childcare centres. |
| 575-583 Pacific Highway, St Leonards | The planning proposal seeks to increase height and floor space ratio to allow for residential development in mixed use buildings, with commercial and retail uses on the lower levels and residential uses above those levels. |
| 100 Christie Street, St Leonards | The planning proposal seeks to increase height and floor space ratio to allow for additional mixed-use including offices, retail, health, services and housing. |

Table 5 indicates a planning proposal is submitted at Gore Hill Technology Park, which has a frontage to the east side of Pacific Highway. This indicates future on-site construction might have a direct impact on the access to the proposed shared path, thus directly impacting upon the safety of pedestrians and cyclists using the shared path.

Temporary traffic conditions may be in place on the surrounding road network during the construction stages at Gore Hill Technology Park. As such, it is recommended that the Construction Traffic Management Plan (CTMP) prepared for the site be checked in order to understand the proposed access arrangements, including construction trucks approach and departure routes as well as access gates for the site, with the aim to understand the impact upon the shared path.

It is noted that although Table 5 indicates multiple future developments are located away from the shared path, it is however recommended that construction vehicle access and deliveries to these sites be communicated and understood to limit the impact on the users of the shared path.

### 3.5 Approved Vehicle Access

The routes east of the Pacific Highway are approved for B-Double vehicle routes in accordance with Roads and Maritime as indicated in Figure 3. These routes serve the industrial land uses in the area.

**Figure 3 Approved B-Double routes**


Source: https://www.rms.nsw.gov.au/business-industry/heavy-vehicles/maps/restricted-access-vehicles-map/map/index.html accessed 19 March 2019

## 3.6 Project planning requirements

The preliminary assessment of the proposed shared path indicates existing facilities and assets along the shared path may require relocation. These assets include street furniture such as benches, bins, bus stops and bus shelters and street trees. Furthermore, existing buildings and developments along the proposed route may be impacted by The Project. Land acquisition may be required as part of the construction works. Existing heritage items may also be impacted by the construction of the proposed route.

Consultation with relevant authorities and stakeholders such as Transport for NSW and Roads and Maritime Services should be undertaken prior to the commencement of any works.

## 4.0 Conclusions

Based on the analysis and discussions presented within this preliminary planning assessment, the following conclusions are made:

- The proposed shared path works anticipated to be undertaken are within the strategic planning context for the area.
- The shared path works may require the relocation of existing street furniture, street trees, bus stops, light posts and poles and other existing assets along the route which are permitted activities with agreement from the affected stakeholders.
- The planning approach should be agreed with Willoughby City Council. Consultations with relevant stakeholders should further be undertaken prior to the relocation works of identified assets along the route.

AECOM Imagine it. Delivered.

# Appendix 3

AECOM Imagine it. Delivered.

AECOM Australia Pty Ltd
Level 21, 420 George Street
Sydney NSW 2000
PO Box Q410
QVB Post Office NSW 1230
Australia
www.aecom.com

+61 2 8934 0000 tel
+61 2 8934 0001 fax
ABN 20 093 846 925

# Memorandum

| | | | |
|---|---|---|---|
| To | Willoughby City Council | Page | 1 |
| CC | Jack Jiang (AECOM)<br>Anoop Sridhar (AECOM) | | |
| Subject | High level safety audit for Pacific Highway Shared Path, Artarmon to St Leonards | | |
| From | Ghizlane Chergaoui (AECOM) | | |
| File/Ref No. | Final | Date | 27-Mar-2019 |

## 1.0 Introduction

### 1.1 Background

Willoughby City Council commissioned AECOM to undertake a high-level safety audit for a shared path between Artarmon and St Leonards and identify key issues and concerns along the route. The proposed shared path will integrate into the Sydney's Principle Bike Network, as well as connecting to the centres and destinations in all directions on lower order bicycle networks.

The project objectives include:

- developing a safe, coherent, direct and comfortable off-road cycling route along the eastern footpath of Pacific Highway.
- connecting the Artarmon to St Leonards train stations, with a connection to the Gore Hill Freeway shared path and the Lane Cove Local Government Area (LGA) cycling lanes.
- Determine a 'fit for purpose' shared path and adopt an approach to "achieve the best out of existing assets".
- Provide a 3m wide shared path (reduce to 2.5m if required, with proper justification).
- Ensuring road safety is increased for vulnerable road users such as cyclists and pedestrians through prioritising these road users.

### 1.2 Purpose of this memo

This memo conducts a high-level safety audit of the existing foot path along the eastern side of Pacific Highway and aims to document the observed issues and concerns in relation to safety along the route. This will aid the development of the options and concept design for the proposed shared path.

Site visits conducted on Thursday 14 January 2019 and Monday 18 February 2019 form the basis for this audit.

### 1.3 Contents of the memo

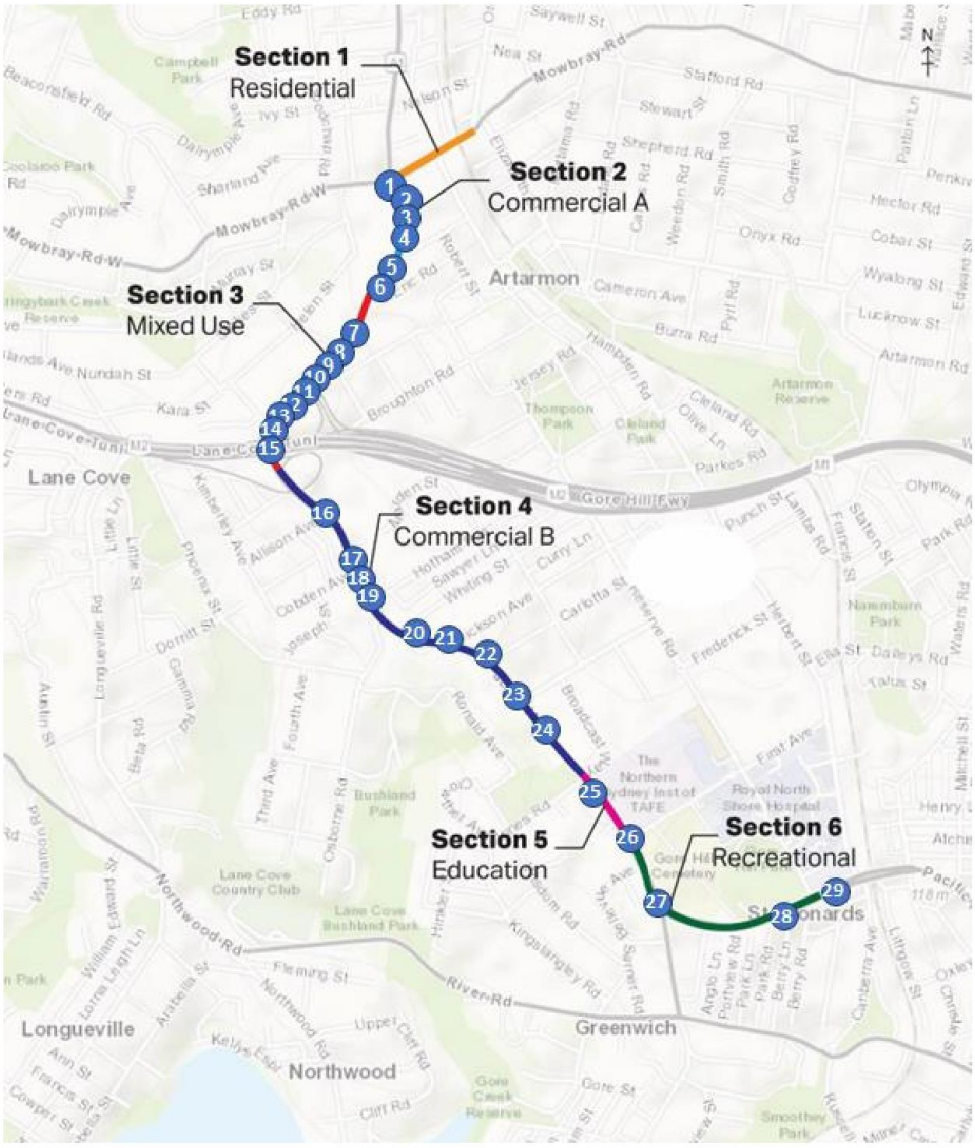
This memo is structured as follows:

- Section 2.0 presents a safety audit addressing the key concerns observed along the route.
- Section 3.0 presents an analyses of crash data along the route.
- Section 4.0 provides a summary of the assessment.

## 2.0 Key observations and safety assessment

Detailed observations from the site visits along with a safety assessment is presented in Table 1. The location reference for each observation presented in Table 1 is illustrated in Figure 1.

**Figure 1 Locations of observed key safety issues along the route**




Source: AECOM, 2019

**Table 1 Safety assessment**

| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| 1 | Intersection of Mowbray Road West and Pacific Highway (Section 2) |  | Light posts and poles are located on the existing footpath. | The location of light posts and poles on the footpath restricts access. The footpath is narrow at these locations and the minimum footpath width required for wheelchair access is not provided. |
| 2 | Pacific Highway near Mowbray Road West (Section 2) |  | Services boxes and traffic signal poles are located on the footpath | The location of the service box and the poles on the footpath restricts both access and visibility to users. The footpath is narrow at these locations and the minimum footpath width or passing width required for wheelchair access is not provided.<br>The footpath surface is uneven and is of different materials which presents tripping hazard to pedestrians. |
| 3 | Pacific Highway, before Palmer Street (Section 2) |  | Uneven surface is observed at multiple locations along the footpath. | Footpath surface is uneven, with broken pavement observed, pits and service covers along the footpath.<br>This presents a tripping hazard for pedestrians and poses a safety concern for users requiring wheelchair access. Consider improvement works or an alternative surface treatment to improve safety. |





| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| 4 | Pacific Highway, before Palmer Street (Section 2) |  | Vehicular crossovers located along the footpath. | This poses a safety concern for pedestrians walking along the footpath. There might be an increased risk of vehicle-pedestrian crashes due to limited visibility for pedestrians and high speeds for vehicles along the Pacific Highway. These access points may need improvement works to improve the sightline and entry speed at these locations to ensure increase safety for pedestrians. |
| 5 | Pacific Highway, between Palmer Street and Eric Road (Section 3) |  | Footpath is narrow in some instances and not located along pedestrian desire lines. | Footpaths are observed to be narrow with sharp angles along the pedestrian desire lines, which restricts access. Opportunities to improve footpath alignment should be investigated. The location of street furniture should further be considered to avoid conflicts with desire line. |
| 6 | Pacific Highway, between Palmer Street and Eric Road (Section 3) |  | Bins are located on the footpath. | The location of bins on the footpath are along observed pedestrian desire lines, restricting access and visibility. |

| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| 7 | Pacific Highway, between Eric Road and Rimmington Street (Section 3) |  | Vegetation extending onto the footpath. | Vegetation was observed extending onto the footpath with debris accumulating, thus limiting the available walking space. The footpath narrows at these locations, restricting access. Opportunities to widen the footpath should be examined. |
| 8 | Pacific Highway, between Eric Road and Rimmington Street (Section 3) |  | Access to commercial and retail car parking facilities is provided at this location. | This driveway provides access to the car parking facilities and is more than 10m wide. This increases vehicle-pedestrian conflicts, especially given the frequent turn-over volumes of vehicles using the carpark and the high posted speed along Pacific Highway. |
| 9 | Intersection of Pacific Highway and Rimmington Street (Section 3) |  | Unmarked crossing at this location. | Rimmington Street has a 13 metre-wide-carriageway at this location, with unmarked pedestrian crossing. This raises safety concerns for pedestrians crossing at this location due to the distance between the pram crossings.<br>Improvement works to decrease the crossing distance and/ or improve line marking should be considered. |





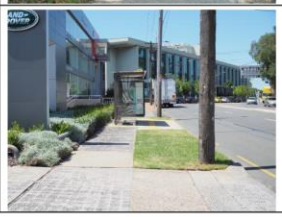
| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| 10 | Intersection of Pacific Highway and the Lane Cove Tunnel (Section 3) |  | Footpaths narrow with vegetation extending onto the footpath and debris accumulating. Pram crossing is also narrow at this location. | These conditions restrict pedestrian access. Overall widening of both the footpath and the pram crossing should be considered. Opportunities to clear vegetation and provide improved sightlines should also be examined. |

| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| 11 | Intersection of Pacific Highway and the Lane Cove Tunnel (Section 3) |   | Staged crossing with service boxes located at the end of the crossing. | The location of service boxes on the footpath restricts visibility. The service boxes are further located on pedestrian desire lines and reduce the footpath width and the available walking space.<br>Removal of service boxes and widening the footpath should be considered to improve visibility and the available space for pedestrians along the footpath. |
| 12 | Pacific Highway, between Lane Cove Tunnel and Gore Hill Freeway (Section 3) |  | Overhanging tree branches. | Overarching tree branches extending onto the footpath limit the spatial clearance and restrict visibility. Pruning of trees is recommended to improve visibility. |





| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| 13 | Pacific Highway, between Lane Cove Tunnel and Gore Hill Freeway (Section 3) |  | Narrow footpath and limited waiting area. | The footpath is narrow and there is limited space available for passengers to board/ alight from the bus. This creates pedestrian-pedestrian conflicts between people using the footpath and people waiting to board or alighting from the bus. Consider widening the footpath to provide adequate waiting space. |
| 14 | Pacific Highway, between Lane Cove Tunnel and Gore Hill Freeway (Section 3) |  | Narrowed footpath due to vegetation, tree and signage extending onto the footpath. | Narrow footpath creates pedestrian-pedestrian conflicts due to limited space available on the footpath. The passing width required for wheelchair access is also not provided. Vegetation and signage location further restrict visibility.<br>Consider widening works, pruning trees and relocation of signage to improve access and visibility at this location. |

| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| 15 | Pacific Highway, before Gore Hill Freeway (Section 3) |  | Uneven pavement. Overarching tree branches and vegetation extending onto the footpath. | The combination of uneven footpath and vegetation extending onto the footpath creates a tripping hazard for pedestrians. Trees also restrict sight lines. Improvement works including pavement works, pruning trees and vegetation management should be considered. |
| 16 | Pacific Highway, between Alto Place and Marden Street (Section 4) |  | Bus shelter with an advertisement panel are located on the footpath and along pedestrian desire lines. | The bus shelter location restricts access to the footpath. The advertisement panel further restricts sight lines and limits visibility. Relocation or removal of the bus shelter from the footpath and/or reducing size of the advertisement panel should be considered. |





| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| 17 | Pacific Highway, before Hotham Parade (Section 4) |  | Light poles and trees located along the footpath. | Light poles, parking payment station and tress located on the footpath reduce the width of the footpath, restricting access to pedestrians. The minimum passing width required for wheelchair access is not provided. Visibility is also limited along the footpath due to overhanging branches. Commercial building access is directly onto the path creating pedestrian-pedestrian conflicts, with building structures impeding sightlines. Potential cause of collision if patronage is increased along the route. Consider widening of the footpath by relocating existing assets and improving visibility by pruning trees. |
| 18 | Pacific Highway, between Marden Street and Whiting Street |  | Trees obstructing movements and visibility. | Sight line is limited along this footpath due to overhanging branches and the location of trees on the footpath. There is an increased risk of collision once the footpath becomes heavily utilised. Available footpath width for pedestrians is also reduced. Consider pruning trees to improve sight lines and reduce risk of collision and improve available space. |

| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| | |  | | |
| 19 | Intersection of Pacific Highway and Hotham Parade (Section 4) |  | Narrow crossing. | Crossing width is narrow and service poles are located within the desire line. This increases risk of collision and restricts available space. Consider widening of the crossing at this intersection and relocation of service poles. |





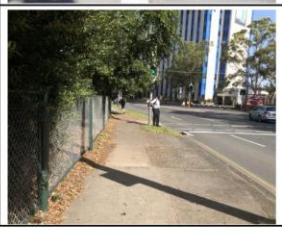
| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| 20 | Pacific Highway, south of Whiting Street (Section 4) |  <br>  | Vehicles parked on the footpath. | Vehicles observed on the footpath restrict access to pedestrian movements and people with mobility devices. Sight lines are also limited as parked vehicles restrict visibility. There are also safety concerns in relation to vehicle-pedestrian collisions occurring. Consider limiting parking along these locations and regularly enforcing this. |
| 21 | Intersection of Pacific Highway and Dickson Avenue (Section 4) |  | Large radius with high vehicle speeds along Pacific Highway. | The combination of a large radius coupled with high turning speeds is likely to result in vehicles turning into Dickson Avenue at a high speed, resulting in high crash probability between vehicles and pedestrians or cyclists crossing at this intersection.<br>The street is at an oblique angle to Pacific Highway. This arrangement can be difficult for people crossing the road to spot oncoming traffic. Potential to square-up the intersection to reduce vehicle entry speed and improve pedestrian crossing safety. |

| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| 22 | Intersection of Pacific Highway and Carlotta Street (Section 4) |  | The shared path is narrow and the distance to the carriageway is also narrow at this location. A service grate is also located along the footpath. A narrow pram crossing is provided at the intersection without a formal crossing provided. | Service grates provided along a narrow footpath restrict access to pedestrians while increasing risk of tripping. The lack of formal crossing at the intersection increases the risk of vehicle-pedestrian collisions especially given vehicle speeds along Pacific Highway are high. Consider widening the footpath as well as the pram crossing. Consider relocation of the service grate and providing a formal crossing at the intersection to improve safety for people at the crossing. |
| 23 | Intersection of Pacific Highway and Campbell Street (Section 4) |  | Vehicles close to the footpath as they are turning at high speeds. Footpath generally wide, however multiple service grates observed. Wide crossing distances on Campbell Street. | There is a large crossing distance at this location given the width of the carriageway. This increases the risk of vehicle-pedestrian crashes especially given the high speed of vehicles along travelling along Pacific Highway and turning at large speeds. |





| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| 24 | Pacific Highway, between Campbell Street and Broadcast Way (Section 4) |  | Footpath narrow due to extensive vegetation. | Visibility reduced due to vegetation. Footpath width also reduced as a result. Debris accumulating on the footpath increase the risk of tripping. |
| 25 | Pacific Highway, between Broadcast Way and Westbourne Street (Section 5) |  | Bin and bus shelters are located within observed pedestrian desire lines. The advertisement panel also restricts sightlines along the footpath. Location of stairs on the footpath. | Bus shelters are located within observed pedestrian desire lines restricting access. The bus shelter and bin locations are within pedestrian desire lines and restrict access to the footpath. The advertisement panel on the bus shelter further restricts sight lines and limits visibility along the footpath. Relocation or removal of the bus shelter from the footpath and/or reduction of the size of advertisement panel should be considered. Furthermore, stairs extend into the footpath restricting direct access to the footpath and increases pedestrian-pedestrian conflicts. |

| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| 26 | Intersection of Pacific Highway and Westbourne Street (Section 6) |  | Broken pavement at intersection crossing. | Broken pavement along the pedestrian crossing increases the risk of tripping for pedestrians crossing the intersection. Consider pavement improvement works. |
| 27 | Pacific Highway, at Greenwich Road (Section 6) |  | Trees obstruct sight lines and vegetation and debris narrow footpath. | Debris accumulating along the fence reduces available space on the footpath. Trees and overhanging branches extending onto the footpath further reduce the available width along the footpath while restricting sightlines. Pedestrian-pedestrian conflict is increased due to reduced sight lines. Consider improving visibility by pruning trees and maintenance works by regularly clearing the footpath from debris. |





| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| | |  | | |
| 28 | Pacific Highway, at Gore Hill Oval (Section 6) |  | Signage located within the footpath and site fencing/ hoarding extending into the footpath. | The location of signage on the footpath is along pedestrian desire lines. This signage restricts access and visibility.<br>Furthermore, extension of the temporary hoarding onto the footpath, reducing the width of the footpath. The hoarding covers provided also restricts visibility.<br>Consider relocation of signage, replacement of the hoarding cover material to improve visibility and moving the hoarding away from the footpath. |

| No. | Location | Site Photo | Description | Commentary |
|---|---|---|---|---|
| 29 | Pacific Highway, after Reserve Road (Section 6) |  | Low hanging branches along the footpath. | Compliance is generally adequate along this section of the footpath. Overhanging branches restrict sightlines. Consider pruning trees to improve sight lines. |

## 3.0 Crash analysis

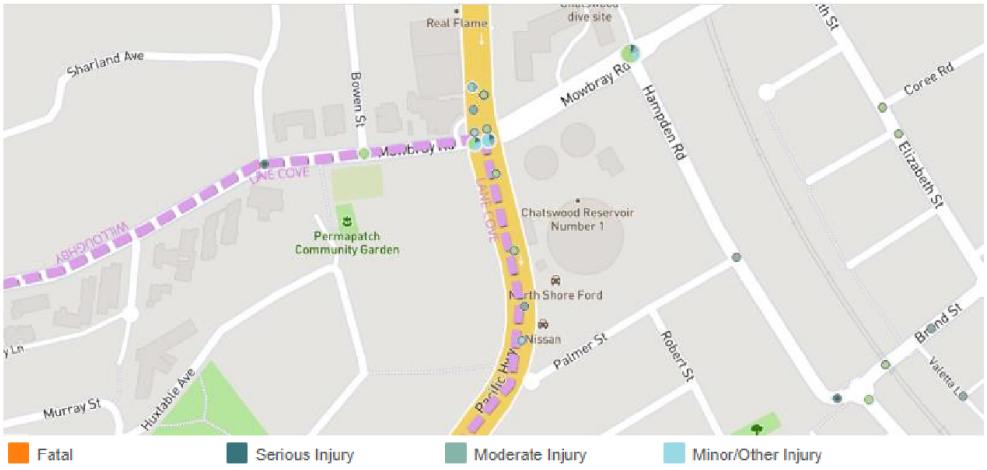
Transport for NSW provides a database of crash and casualty statistics with recorded crash history data on Pacific Highway and the surrounding side roads including. The data provided includes the most recent five-year period of finalised data (January 2013 to December 2017). Provisional data (January 2018 to February 2019) is not available. The data is presented for each section of the route and shown graphically in Figure 2 to Figure 6.

### 3.1 Section 1 and Section 2

There were a high proportion of crashes at the intersection of Mowbray Road with Hampden Road. These crashes were typical intersection crashes including rear end crashes and side impacts.

A cluster of crashes was observed at the intersection of Mowbray Road and Pacific Highway. These crashes were mainly typical intersection crashes and consisted of rear end crashes, side sweeps and right through crashes. Furthermore, four crashes occurred along Section 2 of the route, between Mowbray Road and Palmer Street. These largely consists of rear end crashes.

**Figure 2 Crash data history on Mowbray Road and Pacific Highway before Palmer Street**



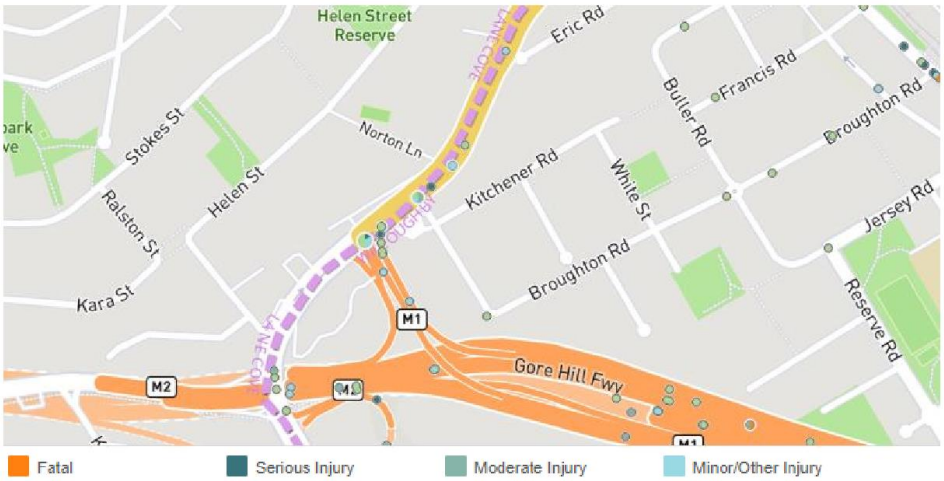

Source: Transport for NSW, 2019

### 3.2 Section 3

Four crashes occurred along Pacific Highway before Kitchener Road. One crash was a result of a vehicle going off the carriageway on the right bend into an object or a parked vehicle, two were rear end crashes and one crash was a lane side sweep, which resulted in a serious injury.

A bunch of crashes occurred at the intersection of Rimmington Street and Pacific Highway. These were crashes occurring in the same direction, such as rear end crashes and crashes due to lane change, which all resulted in minor or moderate injuries. Crashes south of Remmington Street predominantly consist of rear end crashes.

**Figure 3 Crash data history on Pacific Highway between Eric Road and Gore Hill Freeway**




Source: Transport for NSW, 2019

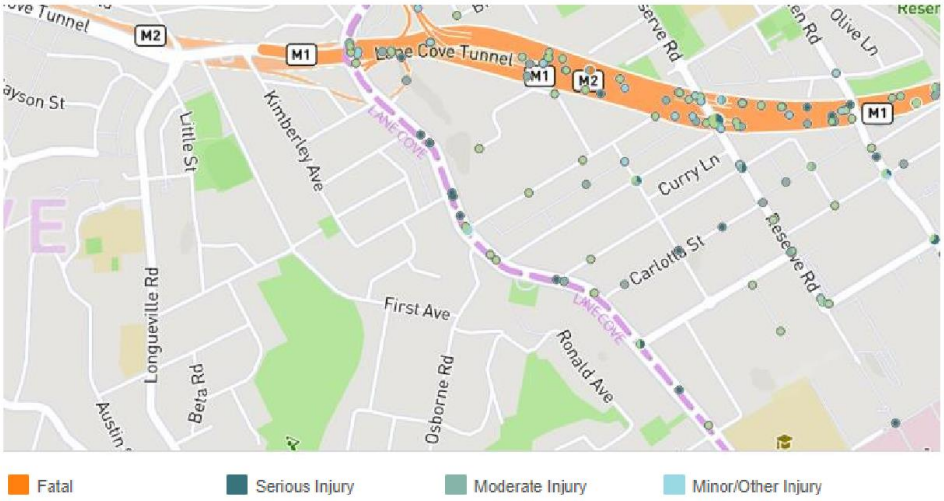
## 3.3 Section 4

Crashes on Pacific Highway, between Gore Hill Freeway and Hotham Parade, all resulted in serious injuries due to rear end crashes and head on collisions. Two pedestrian crashes occurred along this section of the route, as a result of pedestrians crossing either from the far side or the near side of the road and both crashes resulted in a serious injury.

A cluster of crashes occurred at the intersection of Pacific Highway with Hotham Parade. These were mainly rear end crash but include a crash with a vehicle manoeuvring from the footpath. At Whiting Street, a crash occurred due to a vehicle leaving the carriageway into an object or a parked vehicle. A similar type of crash also south of Dickson Avenue and resulted in a moderate injury.

A cluster of crashes also occurred at Campbell Street. These were typical intersection crashes and comprised rear end crashes and lane change crashes. South of Campbell Street, a crash occurred as a result of a vehicle going out of control off the carriageway and resulted in a serious injury.

**Figure 4 Crash data history on Pacific Highway between Gore Hill Freeway and Broadcast Way**

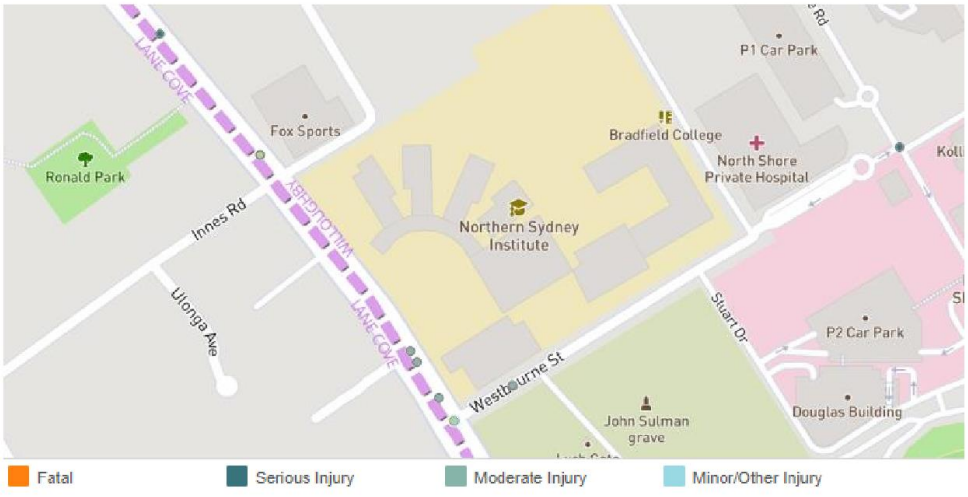



Source: Transport for NSW, 2019

## 3.4 Section 5

Three crashes occurred on Pacific Highway along this section of the route. All resulted in moderate injuries and consist of crashes occurring in the same direction including rear end and parked vehicle crashes and a vehicle leaving the carriageway hitting an object or a parked vehicle.

**Figure 5 Crash data history on Pacific Highway between Broadcast Way and Westbourne Street**



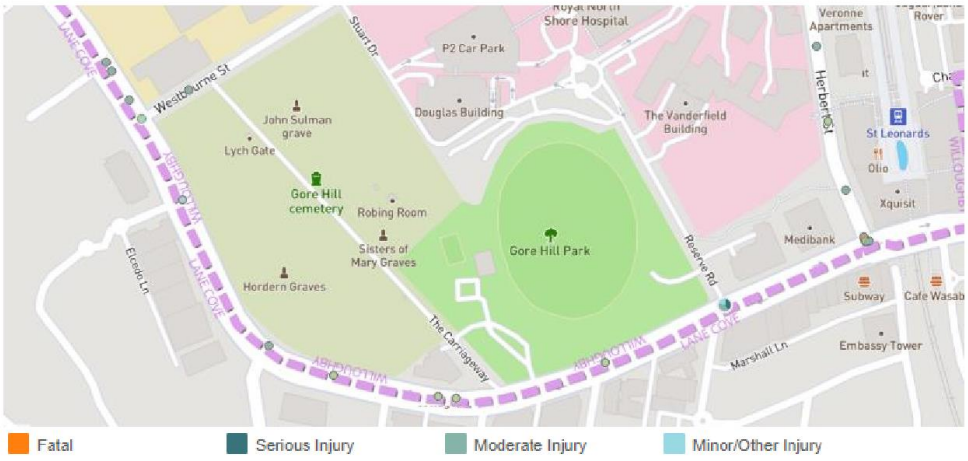

Source: Transport for NSW, 2019

## 3.5 Section 6

At the intersection of Westbourne Street and Pacific Highway, typical T-junction crashes occurred and consist of right through crashes which resulted in minor and moderate injuries. Along this section of the corridor, crashes on Pacific Highway mainly comprised rear end crashes, vehicles going off the carriageway on the left bend into an object or a parked vehicle, into a parked vehicle or into a door.

A cluster of pedestrian crashes occurred at the intersection of Pacific Highway and Herbert Street with pedestrians emerging or crossing from the far side of the road. One crash occurred as a result of a pedestrian crossing from the near side of the road and resulted in a fatality.

**Figure 6 Crash data history on Pacific Highway between Westbourne Street and Herbert Street**



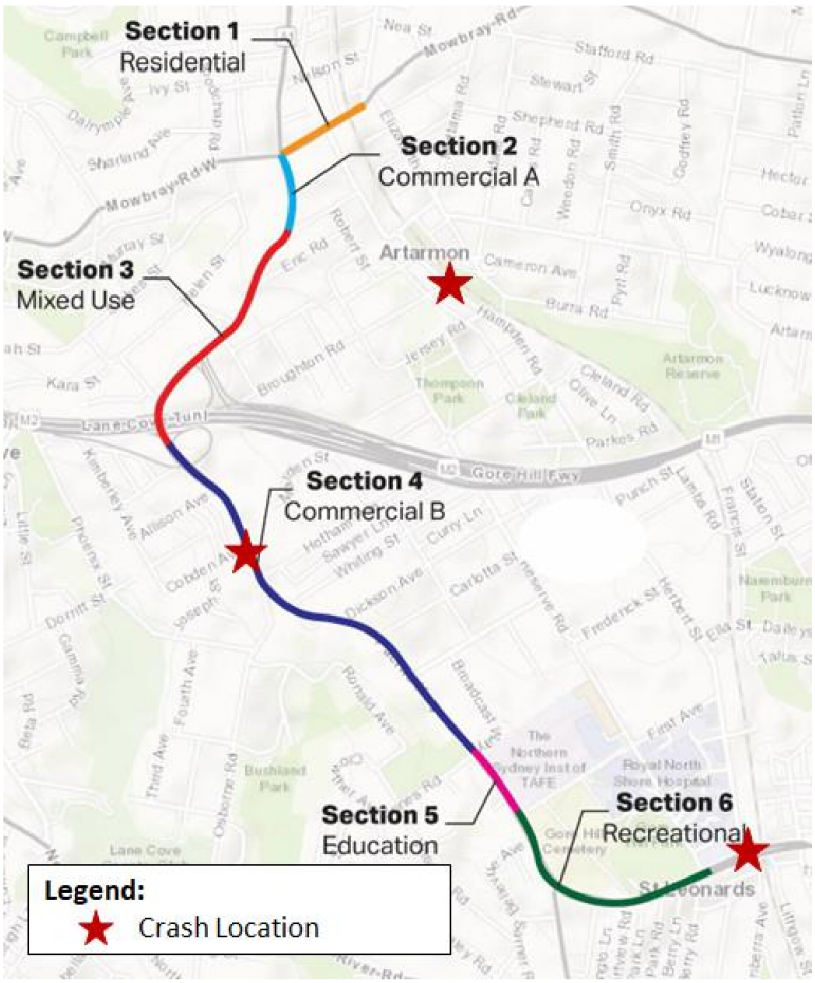

Source: Transport for NSW, 2019

### 3.6 Pedestrian crashes

Along the proposed shared path between Artarmon Station and St Leonard Station, ten pedestrian crashes were recorded at three locations within the study area. These crashes are shown in Figure 7 and are as follows:

- On Hampden Road, north of Artarmon Station, four pedestrian crashes occurred due to pedestrians emerging or pedestrians crossing from the near side of the road. One crash resulted in a minor injury, two resulted in serious injuries and one crash resulted in a fatality.
- Two pedestrian crashes occurred on Pacific Highway, near Cobden Avenue. Both resulted in serious injuries and were due to pedestrians crossing either from the far side or the near side of the road.
- At the intersection of Herbert Street and Pacific Highway, four pedestrian crashes occurred resulting in minor to moderate injuries as a result of a pedestrian emerging or crossing from either side of the road. A crash occurred due to a pedestrian crossing from the near side of the road and resulted in a fatality.

**Figure 7 Crash location along the route**




Source: AECOM, 2019

## 4.0 Conclusions

Based on the analysis and discussions presented within this safety assessment, the following conclusions are made:

- The safety assessment identified a series of safety hazards for the people walking along the eastern footpath of Pacific Highway within the project route extent. These are generally limited to:
    - Narrow footpath width
    - Width side road crossing distance
    - Overgrown vegetation
    - Street furniture such as bus shelters, service boxes or poles in the desired line of travel
    - And uneven footpath surface
- Improvement works along the route were identified to improve pedestrian safety, especially around crossings.
- A series of pedestrian crashes occurred at locations along the route as a result of pedestrians emerging or crossing from the near side or far side of the road, and all resulted in moderate to serious crashes. One pedestrian crash occurred at the intersection of Pacific Highway and Herbert Street which resulted in a fatality. These crashes need to be considered in the development of a concept design for the shared path.
- This safety audit highlighted that there are several constraints along the route that are expected to create complexities to convert the existing facility into a shared path.

AECOM Imagine it. Delivered.

# Appendix 4

# Pacific Highway Shared Path
## Artarmon to St Leonards

### Opportunities and Constraints Report

Revision 1
March 2019

**Reversion history**

| Reversion | Revision Date | Details | Prepared by | Reviewed by | Position |
|---|---|---|---|---|---|
| 1 | March 2019 | Draft for Review | Jack J. Jiang<br>Kaylie Bramley | Anoop Sridhar | Principal Traffic Engineer |

© Legal Name (AECOM). All rights reserved.

AECOM has prepared this document for the sole use of the Client and for a specific purpose, each as expressly stated in the document. No other party should rely on this document without the prior written consent of AECOM. AECOM undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document. This document has been prepared based on the Client's description of its requirements and AECOM's experience, having regard to assumptions that AECOM can reasonably be expected to make in accordance with sound professional principles. AECOM may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified. Subject to the above conditions, this document may be transmitted, reproduced or disseminated only in its entirety.

60598451



# 1 Introduction & The Background

# The Route


## Pacific Highway Shared Path Objectives

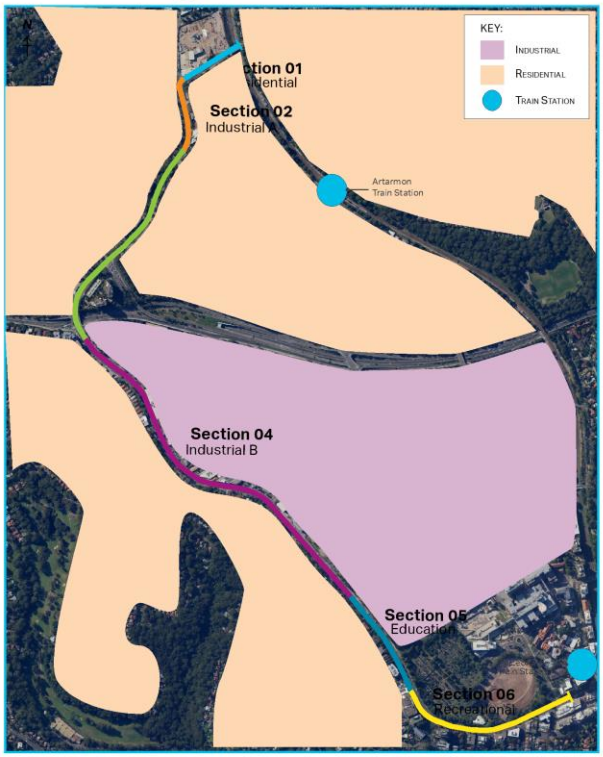
Artarmon - St Leonards

- Developing a safe, coherent, direct and comfortable off-road cycling route along the eastern footpath of Pacific Highway
- Connect the Artarmon to St Leonards train station with a connection to the Gore Hill Freeway shared path and Lane Cove LGA bike lanes
- Determine a 'fit for purpose' shared path and adopt an approach to "achieve the best out of existing assets"
- Provide a 3m wide shared path (reduce to 2.5m if required, with proper justification)
- Pedestrians and cyclists will need to receive more priority to ensure road safety is increased






# Existing Conditions




The proposed route was identified as a **Tier 1 inter-regional connector route** within the Transport for New South Wales (TfNSW) Future Transport Strategy 2056, providing a link between different centres at a regional scale. However the existing conditions lack connected and high qaulity cycling facilities and a number of constraints that presently impedes on generating increase of cycle trips.

The constraints include high volumes and speeds of the traffic, limited footpath / verge widths due to location of bus shelters, services, trees, and busy intersections.

The facility under investigation is a shared path. Therefore the pedestrain design and cycle-pedestrain interactions needs to be designed and provided for. The aspiration is for a high quality cycle link across the region, this shared path can be considered the first step to achieving that outcome.


# Local Attractors

The primary goal is to provide a safe walking and cycling route between Artarmon Station and St Leonards Station, providing a wider regional link as well as connecting the different attractors within the adjacent to Pacific Highway.

The land uses surrounding St Leonards creates key nodes of activity, with additional attractors including Technical and Further Education (TAFE) NSW, retail shops, commercial offices and both public and private hospitals.

However, along the rest of the route, the majority of the adjacent land use is occupied by industrial workshops, car dealerships and small clusters of office buildings. This will influence the type of users along the route and the usage of the facility.

The dominance of this industrial land use, particularly on the eastern side of Pacific Highway, is likely to discourage residents on the western side to cross over. This is exacerbated by East-West pedestrian severance due to the high speed and volume of vehicles along Pacific Highway and the lack of crossing facilities.

There are planned cycle connections in the east-west direction linking Pacific Highway and the inner suburbs. These are mapped on the map to the right. The Pacific Highway shared path will be able to provide the necessary links for connecting to these new connections.






**~30,000**
Volume of Vehicles South Bound

**60km/h**
Posted Speed

**1.4-3.5m**
Footpath Width Range

**29**
Number of Significant Pinch Points (Less than 2.5m)

**1.2m**
Narrowest Pinch Point

**14**
Number of Bus Services along route

**12**
Number of Ped & Cycle Related Crashes in past 5 Years

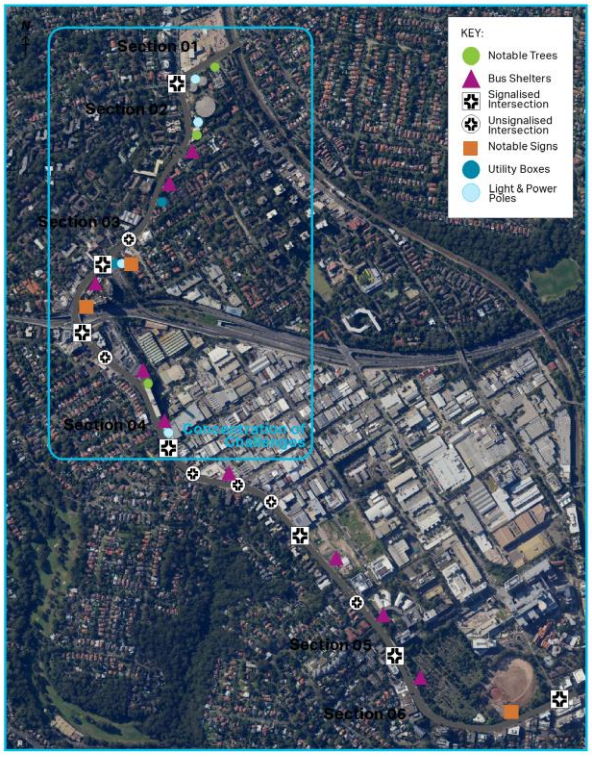
**12.4-22.3m**
Range of Crossing Point Width at Unsignalised Side Streets

**647m**
Longest mid-block length





# **Existing** Key Challenges




| Component | Sections | | | | | | Total | Stakeholders |
|---|---|---|---|---|---|---|---|---|
| | 01 | 02 | 03 | 04 | 05 | 06 | | |
| Trees | 6 | 3 | 27 | 11 | 0 | 4 | **51** | Willoughby City Council |
| Driveways | 8 | 3 | 11 | 17 | 0 | 2 | **41** | Willoughby City Council |
| Bus Shelters | 0 | 0 | 3 | 5 | 1 | 2 | **11** | Willoughby City Council<br>TfNSW |
| Signalised Intersections | 0 | 0 | 2 | 2 | 0 | 2 | **6** | Willoughby City Council<br>RMS |
| Unsignalised Intersections | 1 | 0 | 1 | 6 | 0 | 0 | **8** | Willoughby City Council<br>RMS |
| Power & Lighting Poles | 3 | 7 | 9 | 38 | 6 | 15 | **78** | Willoughby City Council<br>RMS |

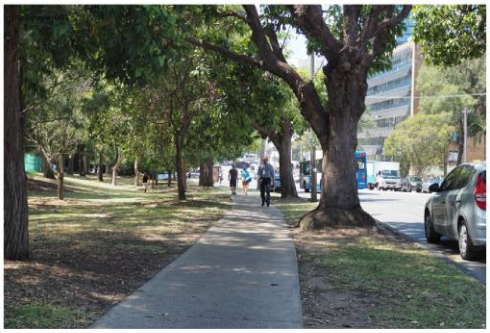
These components have been highlighted as they provide the biggest challenge towards creating a quality and safe shared path facility.

The location of existing bus shelters, trees, signage, and poles provide the biggest width constraints along the route, impacting on the quality of service and safe separation of pedestrians and cyclists.

Addressing these components will be challenging, and likely to incur the greatest cost. However, decisions surrounding the treatment or improvement of these components need to be weighed against the desired level of service of the facility.

The unsignaised intersection layouts for adjoining roads result in safety challenges for people walking and cycling across, primarily due to the extended width between the crossing. The signalised intersections appears to be able to integrate cycling into the signal cycles with minimal modification, this will be explored further with the appropriate stakeholders.

# **Existing** Street Trees



**Street Trees**

There are 51 street trees adjacent to the route. It is understood that existing features, such as trees, will be retained in its present condition where possible. However, the placement of some existing trees creates pinch points along the route.

Careful consideration will be given to any tree removal or relocation and the details will be worked through with the council and its stakeholders.

**Stakeholders**

Willoughby City Council





# **Existing** Bus Shelters

**Bus Shelters**

There are 11 bus shelters along the route. The location of some of these shelters pose a challenge for the shared path improvements due to the limited footpath space remaining and the general lack of grass berm space.

At particularly constrained locations, the advertising panels protrude into the path and block visual and physical permeability. Changes to these will need to be worked through with the appropriate stakeholders

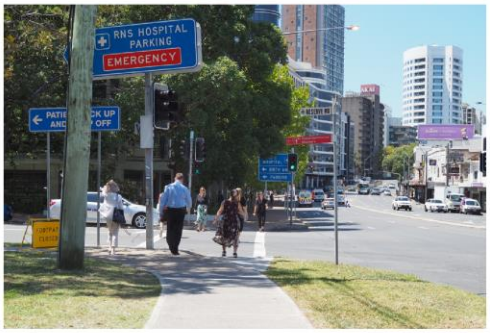
**Stakeholders**

Willoughby City Council

TfNSW

JCDecaux

# **Existing** Signalised Intersections




**Signalised Intersections**

There are 6 signalised intersections along the route, in which cycling needs to be safely integrated into the existing pedestrian crossings.

**Stakeholders**

Willoughby City Council

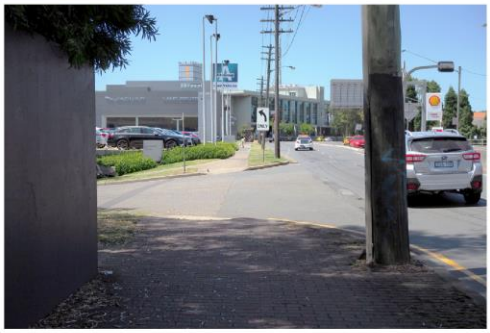
RMS





# **Existing** Unsignalised Intersections





**Unsignalised Intersections**

There are 8 unsignalised side streets that intersect the route. Most result in wide distances between footpaths, which can be a safety hazards for the people walking and cycling.

The wide intersections also promotes faster vehicle entry speed into the side streets. This increases the crossing risk.

The distance plus the fast entry speed means the shared path has the opportunity to improve the user safety for walking and cycling to match the Tier 1 route expectation.

**Stakeholders**

Willoughby City Council

RMS

# **Existing** Signage






**Signage**

Placement of signage further restricts the limited footpath space along the route.

There is a notable pinch point south of the motorway off-ramp intersection, displayed in figure 4, which is exacerbated by the placement of light poles and utility boxes

**Stakeholders**

Willoughby City Council

RMS





# **Existing** Light & Power Poles

**Light & Power Poles**

Placement of light and power poles further restricts the limited footpath space along the route.

The northern power poles appears to be newer compared to the southern portion and that there are three different types of lighting poles along the route.

Also to note is that the location and boundary offset for all these poles varies along the route.

**Stakeholders**

Willoughby City Council

RMS

# **Existing** ITS Boxes




**ITS Boxes**

Placement of selected ITS boxes restricts the limited footpath space along the route.

There is a notable pinch point south of the motorway off-ramp intersection, displayed in figure 1, which is exacerbated by the placement of light poles and signage

These ITS boxes are critical for the operation of the intersection traffic lights, therefore advanced engagement and consultation with RMS is expected.

**Stakeholders**

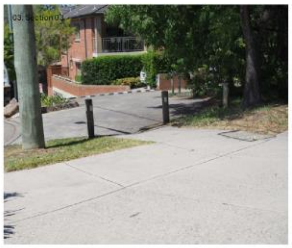
Willoughby City Council

RMS





# **Existing** General




**General Context**

The eastern footpath along the route is in generally good condition.

Other than the specific street furniture, other items such as access grates, parking meter units and parking signs can be found along the route consistently.

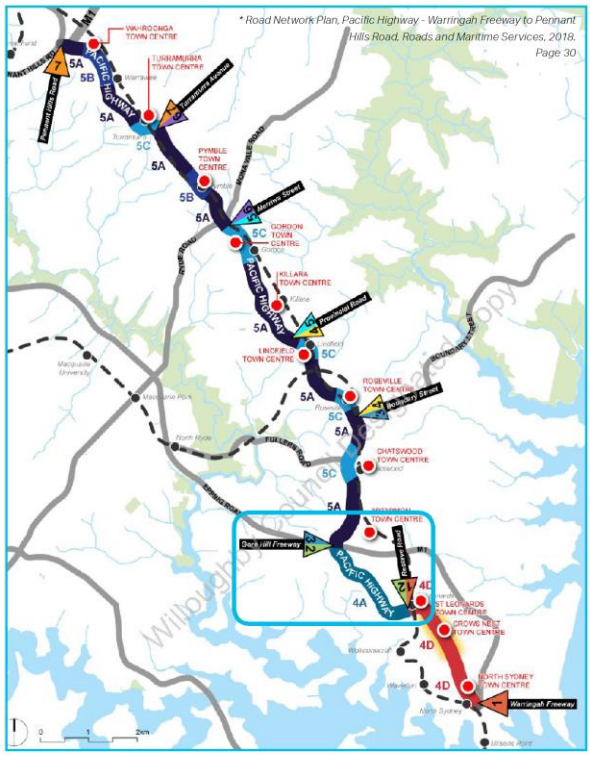
**Stakeholders**

Willoughby City Council






# Movement & Place




** Road Network Plan, Pacific Highway - Warringah Freeway to Pennant Hills Road, Roads and Maritime Services, 2018. Page 30*

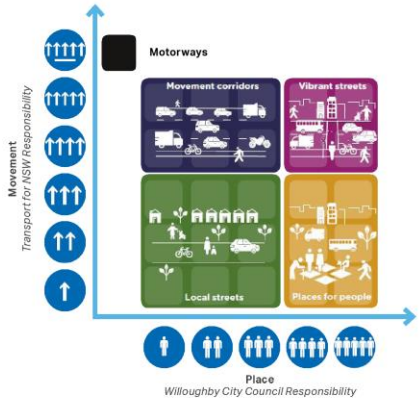
The Movement and Place Framework is an integrated land use and transport planning tool that assesses the functions of the land use and the transport infrastructure that support it with the aim to allocate road space in a way that improves the liveability of places. The framework supports the Future Transport Strategy 2056, with guiding principles within the framework acknowledging that the needs and expectations of transport customers and communities change for different street environments.

Roads and Maritime Services (RMS) prepared a Road Network Plan report for the Pacific Highway between Warringah Freeway and Pennant Hills Road (2018). The Road Network Plan sets out a plan for management, operation and development of the Pacific Highway and forms part of supporting plans that deliver the NSW Government's Future Transport Strategy. Pacific Highway between Warringah Freeway and Pennant Hills Road currently serves several movement functions which differ along the corridor.

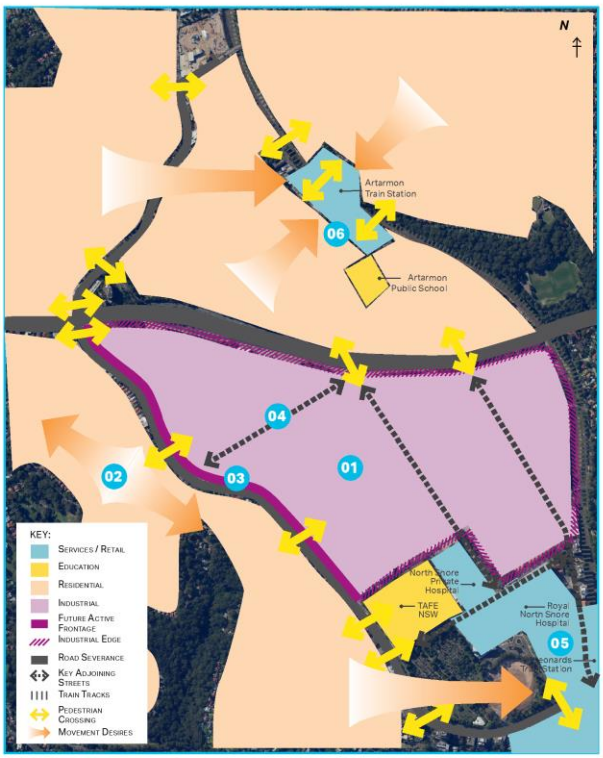
The results from a high-level assessment of Movement and Place for this Pacific Highway section highlighted in the map to the left. Majority of the route should be prioritised for their movement function while a higher level of finish or spatial experience for people should be considered along Mowbray Road, the future Sydney Metro site, and a portion of Pacific Highway towards St Leonards train station. In the context of this project. the development of the shared path must not preclude future land redevelopment opportunities.

## Movement and Place road classification

*Source: Future Transport Strategy 2056, pg18, 2018*



# Movement & Place




## Key Places

**01 Industrial Zone**

Parcels are zoned for industrial use, establishing an industrial edge that runs adjacent to Pacific Highway. The dominance of large warehouses, combined with inactive frontage and the frequency of large trucks creates an unattractive pedestrian environment, thus discouraging movement through this zone to access Artarmon or St Leonards Station. This land-use is not planned to change in the near future.

**02 Residential - Western Side**

Primarily residential land use along the western side of Pacific Highway, with potential movement desires being towards Lane Cove town centre (north west) and St Leonards town centre. However, the permeability of the road layout on this side may deter walking and cycling trips towards Pacific Highway.

**03 Future Active Frontage**

Willoughby City Council proposes to activate this frontage with retail and hospitality. This will enhance the attractiveness of the streetscape for people walking and using bikes along Pacific Highway, in contrast to the existing industrial frontage.

**04 Adjoining Side Streets**

There may be a desire for residents from the west (02) to access Artarmon, however limited crossing opportunities (Pacific Highway and M1) combined with poor permeability within industrial zone deters this movement.

**05 St Leonards**

The combination of retail, services, education, recreation areas and train station makes St Leonards a key location to promote and connect to, via Pacific Highway.

**06 Artarmon Station**

Station location, and adjacent retail, is easily accessible for residents directly adjacent to the station (eastern side of Pacific Highway, either side of train tracks).





# Cost & Quality
## Walking & Cycle Facilities

The compliance requirement for a shared path facility is relatively minimal. The result of these standards are typically facilities that are low in cost, as the quality aspect of the finish can be considered urban design improvements.

In order to generate increased patronage along the shared path, the facility should consider enhanced finish at selected locations than striving for compliance. The outcome from the Movement and Place Framework will provide the necessary urban design guidance.

In order to attract patronage, the shared path needs to achieve a certain level of safety, particularly in addressing conflicting movements between general traffic and the shared path users, and between the walking and cycling uders of the path.

The goal for this project is to provide a facility that separates vulnerable users, such as pedestrians and cyclists, from the busy vehicular movement along Pacific Highway. Additionally, there needs to be design consideration around how to sufficiently separate pedestrians and cyclists where necessary, so both users can share the path safely and avoid conflicts.

The facility should be designed for walking and cycling use, therefore the design should consider elements that will effect how people use and interact with it. Therefore, the conflict-management opportunity lies in the spatial design, as these elements can contribute to the necessary behaviour changes required for users to share the facility in a safe manner.

$$$

High quality material finishing with bespoke design features including additional street furniture, artworks, cultural elements, information signage and feature lighting. Providing generous proportions where possible on route and break out areas for resting, sight seeing and art interpretation. The design most likely to go beyond the minimum standards and provided highest level of service.

**High**

Improved quality of material finishing beyond the regulatory requirement. Includes limited additional design features such as artworks, cultural elements and feature lighting at discreet locations to enhance the spatial arrangement. There may be improvement on the minimum standards to offer higher level of service.

**Medium**

$

Standard material with a design built to the regulations and functional requirements. Minimal additional elements, break out spaces or spatial improvements.

**Low**





# Focus Areas


## Top Three Opportunities

1. **Unsignalised Intersections**

   Currently a safety concern - addressing the width of the crossing area, combined with measures to slow vehicle speeds entering and exiting side roads will provide the greatest safety impact for walking and cycling.

2. **Bus Shelters**

   Location of bus shelters restricts clearance width, creating significant pinch-points along the route, particularly because of narrow footpaths. These are usually areas with more pedestrian movement, creating a safety concern. Therefore, the greatest opportunity lies in the possibility of relocating bus shelters to achieve the greatest separation of conflicting pedestrian and cyclist movements.

3. **Signage**

   Location of numerous signage restricts clearance width, sometimes creating significant pinch-points along the route. This has the potential to provide a quick win if the selected signs are easily relocatable.

## Focus Areas

1. **TAFE NSW**

   A key land use along the route that generates higher pedestrian activities, and is encouraged by a signalised pedestrian crossing, greater tree coverage and bus stops serving key transit routes. Location of the bus shelters and retaining walls currently restricts space for shared path.

2. **St Leonards**

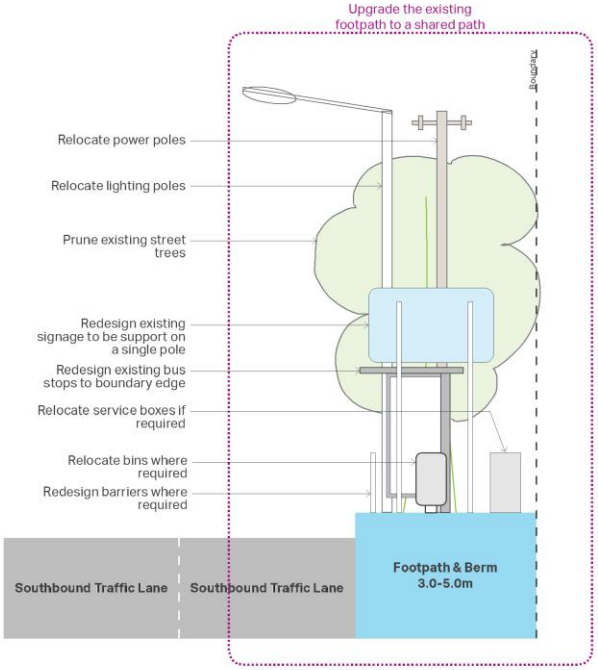
   The combination of retail, services, recreation areas and train station makes St Leonards a key location to promote, connect to, and enhance. Because of these uses, the area is likely to generate the most foot traffic and demand.

# Improvement Strategy
## Mid-Blocks

The locations of existing street furniture can create significant pinch points along the route, impacting on the clearance space available for a safe shared path.

Majority of the route would require a "tidy up" to upgrade the existing footpath to a shared path.

Our strategy is to relocate existing street furniture to gain the clearance required, where practicably possible, see next page for diagrams.

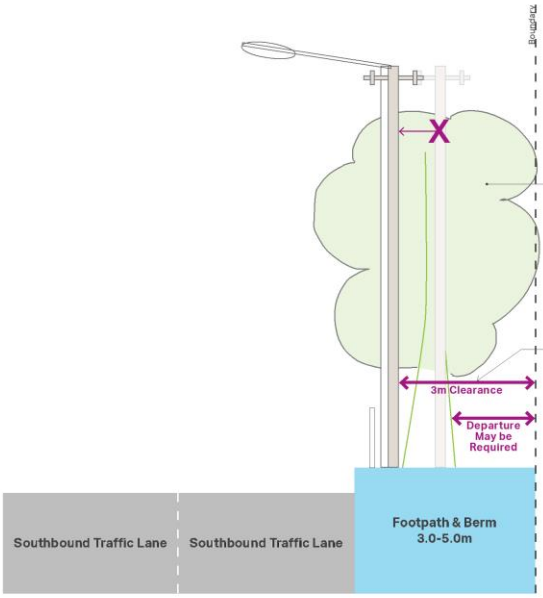



**Typical Cross Section**
NTS

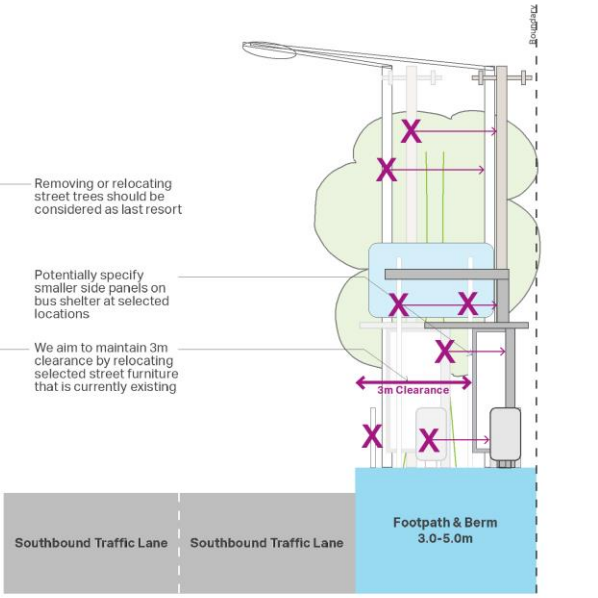




# Improvement Strategy
## Mid-Blocks



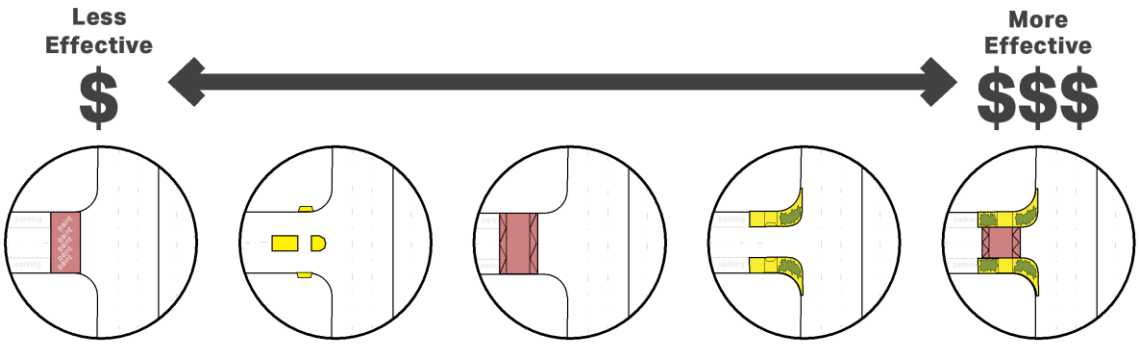

**Typical Cross Section without Bus Shelter**
NTS




**Typical Cross Section with Bus Shelter**
NTS

# Improvement Strategy
## Unsignalised Intersections

The opportunity is focused on providing crossing priority for people walking and cycling along this route. This can be achieved by reducing the vehicle entry speed, crossing distances and ride quality.




### Painted Surface

Painted surface will indicate the intended path of cyclists, to give a visual indication for vehicles to slow speed within conflict areas. Effectiveness depends on the paints visibility and consideration of vehicles

### Traffic Islands

Traffic islands are protected spaces in the centre of the street to facilitate safer crossing, by only having to navigate one direction of traffic at a time, and narrowing roadway to calm traffic. Dependent on size of island, in order to easily accommodate a bike and to sufficiently narrow traffic lanes.

### Speed Table

Raised speed tables at crossings help to calm traffic, improve accessibility, and increase the visibility of cyclists and pedestrians for motorists. This may not work with large vehicles due to vehicle body-roll

### Kerb Built-out

Build outs are an extension of the footpath into the parking lane, with the ability to reduce corner radii to restrict vehicle turn speeds around corners, reducing crossing distances.

### Speed Table & Kerb Built-out

These have the ability to reduce corner radii to restrict vehicle turn speeds around corners, reducing crossing distance, and calm traffic.

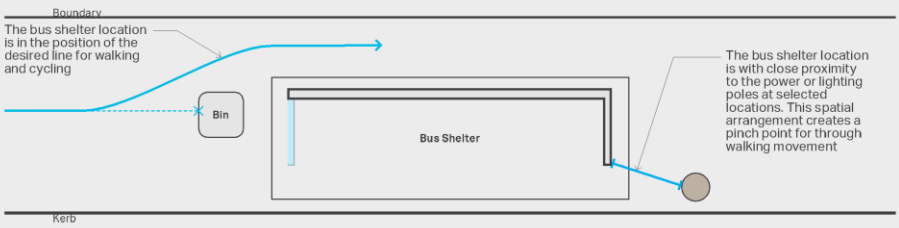




# Improvement Strategy
## Bus Shelters

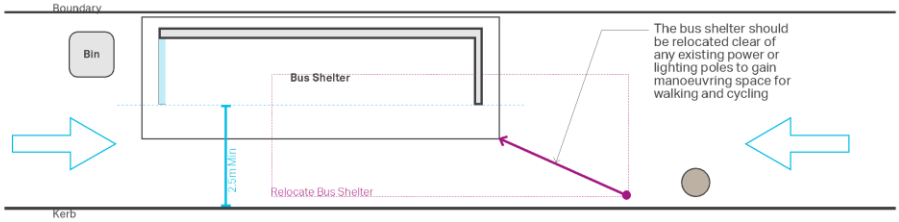
### Existing

Existing bus shelters are located in the desired line of the pedestrian. Its location in relation surrounding street furniture also creates pinch points for the users




### Proposed

Relocating the bus shelter adjacent to the boundary and away from the existing street furniture should gain the clearance required for the people walking and cycling through



# Improvement Strategy
## Bus Shelters

The area around the bus shelter requires particular attention in terms of spatial arrangement and detailing.

The potential conflict of bus patrons getting on and off buses and the people walking and cycling through needs to be managed. Especially in locations with high levels of people activities, such as TAFE.

A variety of methods will be utilised in order to most safely address the movement conflicts of pedestrians waiting at bus shelters and cyclists moving along the shared path.

This can include using colours, patterns, and textures as differentiation and delineation to indicate to user to slow down and take extra care around bus shelters areas. This can be supplemented with advanced warning signage and ITS features encourage the appropriate safe behaviour during high activity periods.

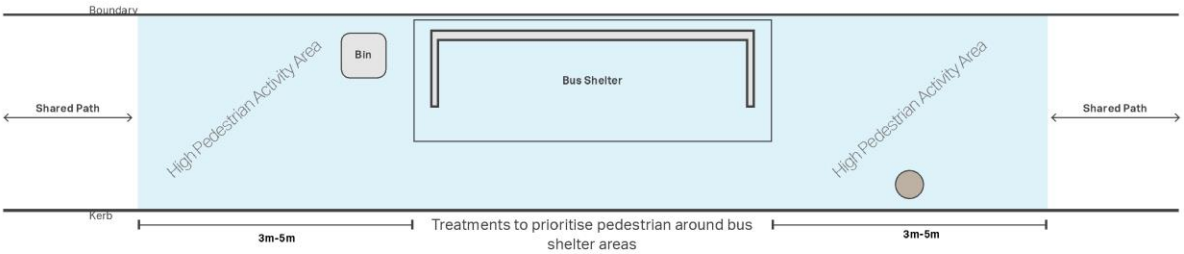
A selection these methods are shown in the adjacent figures. The project will seek opportunities to include a range of these features in a consistent manner along the length of the route.

*Source: Division Transit Project, Trimet, 2017*

*Source: Auckland Transport, 2018*


*Source: Singapore Land Transport Authority, 2018*

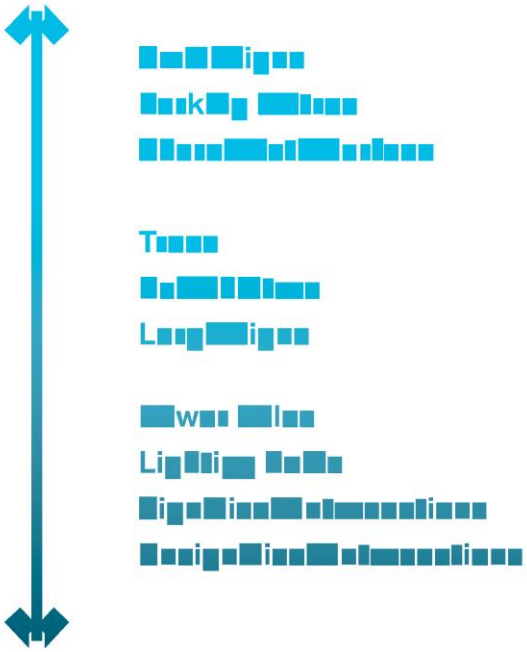
*Source: Phil Champion, New Fosse Way shared path, Geograph, 2011*








# Quick Wins



**Complicated**

The existing conditions along Pacific Highway prove challenging for the implementation of a safe and attractive shared path. The primary challenge is to separate vulnerable users, such as pedestrians and cyclists, from the busy vehicular movement along Pacific Highway. This will be achieved within the space available between boundary lines and vehicle lanes.

Because of this space restriction, the main challenges include pinch points created by the location of existing street furniture and trees, as well as safety concerns around intersections.

Addressing these concerns can be more challenging and costly, but its improvements have the potential to enable increase walking and the inclusion of cycling in a ameaningful way along an otherwise gap in the urban network for walking and cycling.

The top 3 opportunities are:

- Improving safety and accessibility for pedestrians crossing unsignalised side streets
- The relocation and reconfiguration of bus shelters and surrounding street furniture to more safely separate pedestrians waiting for buses and to slow cyclists and make them more conscious of pedestrians in these conflict areas
- Relocation of signage to allow for more width along the shared path in particular pinch points

The project will proceed to work with different affected stakeholder and recommend a way forward.

**About AECOM**
AECOM is a premier, fully integrated professional and technical services firm positioned to design, build, finance and operate infrastructure assets around the world for public- and private-sector clients. The firm's global staff — including architects, engineers, designers, planners, scientists and management and construction services professionals — serves clients in over 150 countries around the world. AECOM is ranked as the #1 engineering design firm by revenue in *Engineering News-Record* magazine's annual industry rankings, and has been recognized by *Fortune* magazine as a World's Most Admired Company. The firm is a leader in all of the key markets that it serves, including transportation, facilities, environmental, energy, oil and gas, water, high-rise buildings and government. AECOM provides a blend of global reach, local knowledge, innovation and technical excellence in delivering customized and creative solutions that meet the needs of clients' projects. A *Fortune 500* firm, AECOM companies, including URS Corporation and Hunt Construction Group, have annual revenue of approximately $19 billion.

More information on AECOM and its services can be found at www.aecom.com.

Follow us on Twitter: @aecom

**Contact**
**Jack J. Jiang**
Urban Designer / Transport Planner
T +64 (9) 967 9110
E Jack.Jiang3@aecom.com

**Anoop Sridhar**
Principal Traffic Engineer
T +61 (2 8934 0187
E Anoop.Sridhar@aecom.com

**aecom.com**

AECOM Imagine it. Delivered.

# Appendix 5

AECOM Imagine it. Delivered.

AECOM Australia Pty Ltd
Level 21, 420 George Street
Sydney NSW 2000
PO Box Q410
QVB Post Office NSW 1230
Australia
www.aecom.com

+61 2 8934 0000 tel
+61 2 8934 0001 fax
ABN 20 093 846 925

# Minutes of Inception Meeting

Pacific Highway Shared Path - Artarmon to St Leonards

| | | | |
|---|---|---|---|
| Subject | Inception Meeting | Page | 1 |
| Venue | Flannel Flower Room, Level 6, Willoughby City Council, Chatswood | Time | 10:00 |
| Participants | Willoughby City Council<br>Gordon Farrelly<br>Heather Gavriel<br><br>Transport for NSW<br>Benny Horn<br>Sara Stace<br><br>RMS<br>Zakaria Ahmad<br><br>AECOM<br>Anoop Sridhar<br>Jack Jiang | | |
| Apologies | Leon Paap | | |
| File/Ref No. | | Date | 18-Feb-2019 |
| Distribution | As above | | |

| No | Item | Action | Date |
|---|---|---|---|
| 1. | **Project background**<br><br>Willoughby City Council introduced the project background and purpose. Requested all stakeholders to provide their inputs so that the project team can try to incorporate the requirements into the study. | Note | |
| 2. | **Project objectives**<br><br>AECOM discussed the project objectives as captured from the request for tender and based on Council's vision for this project. It was noted that the study will assess a shared path along the route and try to achieve the best out of existing assets approach.<br><br>The entire section has been divided into six sections based on frontage land use and each section will be dealt with separately during route assessment to ensure the options are considered based on the requirements for each land use incorporating the TfNSW Movement and Place Strategy. | Note | |

| No | Item | Action | Date |
|---|---|---|---|
| 3. | **Scope and Deliverables**<br><br>The study will be undertaken in three stages as follows:<br>Stage 1: Route Assessment<br>Stage 2: Draft Concept Design<br>Stage 3: Final Concept Design | Note | |
| 4. | **Project Programme/Schedule**<br><br>The project is likely to be completed in 12 weeks as per the current programme of works (including community consultation). | Note | |
| 5. | **Review of Existing Conditions**<br><br>AECOM presented typical constrained locations along the route with street trees, bus stops, utility poles etc. to discuss the potential challenges along the corridor and stated that the top 3 challenges would be bus stops, trees and commercial driveways.<br><br>Transport for NSW noted that the bus stops constrain the shared path, however this may be acceptable as these are short, localised constraints. The cumulative impact of constraints along the route e.g. street trees, side street crossings and driveways would have the effect of lowering cyclist travel speeds along the route and thus the appeal/convenience of the route for cyclists.<br><br>Council stated that their top 3 challenges would be similar to AECOM but with trees and poles as the second key challenge. It was also highlighted that the indicated number of trees or driveways along the route are relatively lower and do not seem to cause significant disruptions to the proposed shared path.<br><br>RMS maintained that their priority would be the signalised and unsignalised side streets and less interruption to traffic.<br><br>AECOM indicated that traffic calming requirements may be required while treating commercial driveways with high vehicle movements (like a petrol station). The Council and Transport for NSW suggested reviewing the current guidelines and precedents for treating similar cases than trying to adopt an approach that hinders traffic flow. The treatment suggested might not be accepted by the property owners or RMS. | Note<br><br>Note | |

| No | Item | Action | Date |
|---|---|---|---|
| 6. | **Design Brief - Proposed Approach**<br><br>AECOM presented the proposed approach that will be followed to evaluate the route options.<br><br>All agreed that the proposed approach is acceptable, and a draft version of the design brief needs to be reviewed by all the relevant stakeholders prior to finalisation.<br><br>Transport for NSW suggested that where possible, consideration should be given for a segregated path for cyclists as this aligns with the strategic objectives of the business case that is currently being prepared by Transport for NSW. Council indicated that the width available along the corridor may not allow development of a separate path and may also necessitate loss of road space, which is a cause of concern due to likely increase in demand around St Leonards. It was also highlighted that the Movement and Place concept needs to be considered during the study.<br><br>It was also highlighted by TfNSW that key challenges/opportunities regarding the frequency that shared path users would be required to interact with are:<br>• motorists entering/exiting driveways (where shared path users would have right of way) and<br>• motorists entering/exiting side streets, where there would be merit in considering continuous footpath/shared environment intersection treatments (on side streets with low traffic volumes) to provide a more connected shared path environment through these intersections.<br><br>AECOM indicated that the design philosophy document will detail the priorities to be maintained while assessing the route options and will include the Movement and Place concept.<br><br>Transport for NSW also suggested that pedestrian movements be considered while developing options, especially sections with high pedestrian demand like TAFE etc. It is suggested to have lower operating speeds for bicycles along such sections for increased pedestrian safety. | AECOM<br><br>Note<br><br>Note | 01 March 2019 |
| 7. | **Data requirements**<br><br>The following data are requested from relevant agencies to proceed with this study.<br><br>• Property boundary information | Council | |

| No | Item | Action | Date |
|---|---|---|---|
| | • Existing road kerb alignment<br>• Existing services information (including signs, electric poles etc.)<br>• Location of street trees<br><br>RMS to check if the road network plan prepared for this section can be passed onto AECOM for review as part of this study. | RMS<br><br>RMS<br>Council<br><br>RMS | 01 March 2019<br><br><br><br>25 March 2019 |
| 8. | **Community Consultation**<br><br>Council indicated that they do not anticipate any major objections from the community for this project. It was also highlighted that the local bicycle user groups are aware of this project and highly supportive of its implementation. | Note | |
| 9. | **Communications**<br>All correspondences will be issued by AECOM through the Council for inputs and feedback from stakeholders. | AECOM | |
| 10. | **Close out**<br>Draft design brief will be prepared, and a route assessment workshop will be scheduled after two weeks to discuss the potential options. | | |

Attachments:

1) Inception presentation

AECOM Imagine it. Delivered.

# Pacific Highway Shared Path, Artarmon to St Leonards

## Shared Path Route Development and Concept Design

Project Inception Meeting

February 18, 2019

# Agenda

- Project purpose and objectives
- Scope of services and project programme
- Existing conditions
- Initial assessment
- Proposed approach
- Stakeholder inputs
- Next steps

# Project Purpose

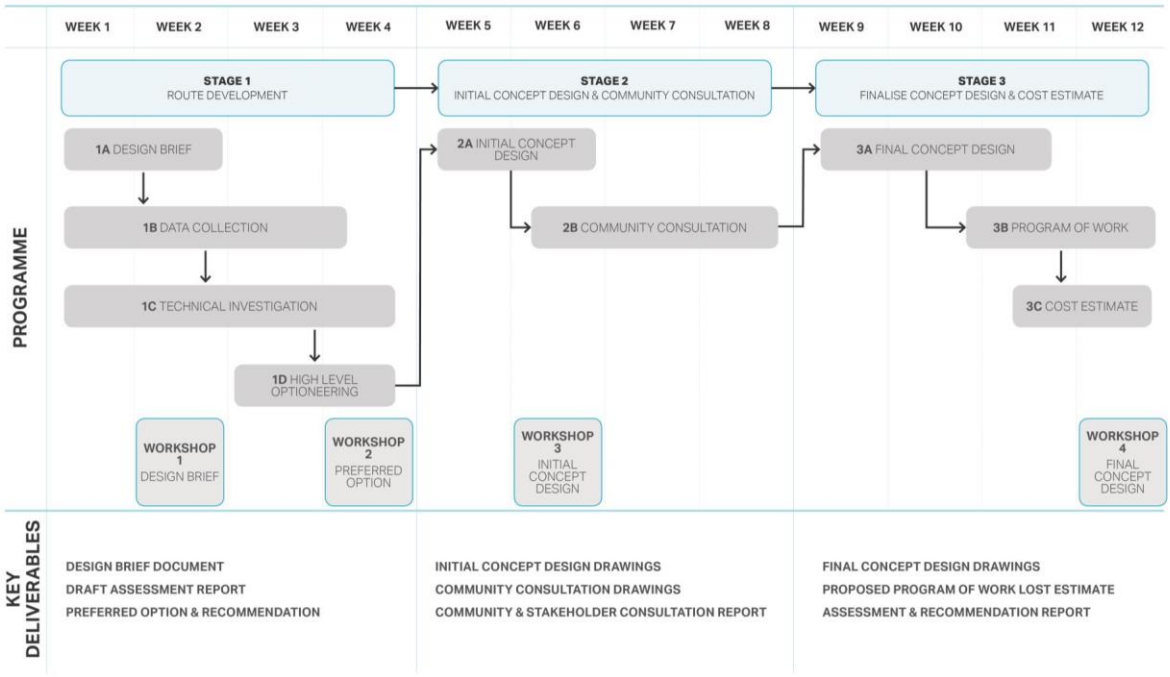
*"The shared path route assessment and concept design seeks to deliver a bicycle shared path between Artarmon and St Leonards that will integrate into Sydney's Principal Bike Network (Tier 2) as well as connecting to the centres/destinations in all directions on lower order bicycle networks (Tiers 1 and 3)."*

*The route – Artarmon to St Leonards*

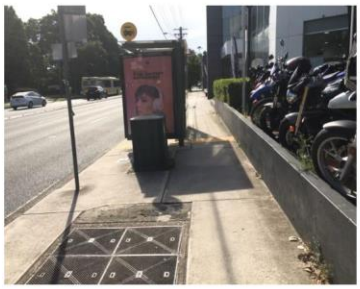
# Project Objectives

- Develop a safe, coherent, direct and comfortable off-road cycling route along the eastern footpath of the Pacific Highway.
- Connect the Artarmon to St Leonards train station with a connection to the Gore Hill Freeway shared path and Lane Cove LGA bike lanes.
- Determine a 'fit for purpose' shared path and adopt an approach to "achieve the best out of existing assets".
- Provide a 3m wide shared path (reduce to 2.5m if required, with proper justification).
- Pedestrians and cyclists will need to receive more priority to ensure road safety is increased.

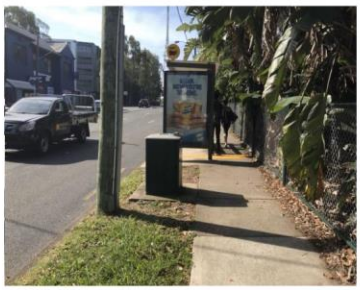
# Scope of Services & Project Programme



# Existing Conditions

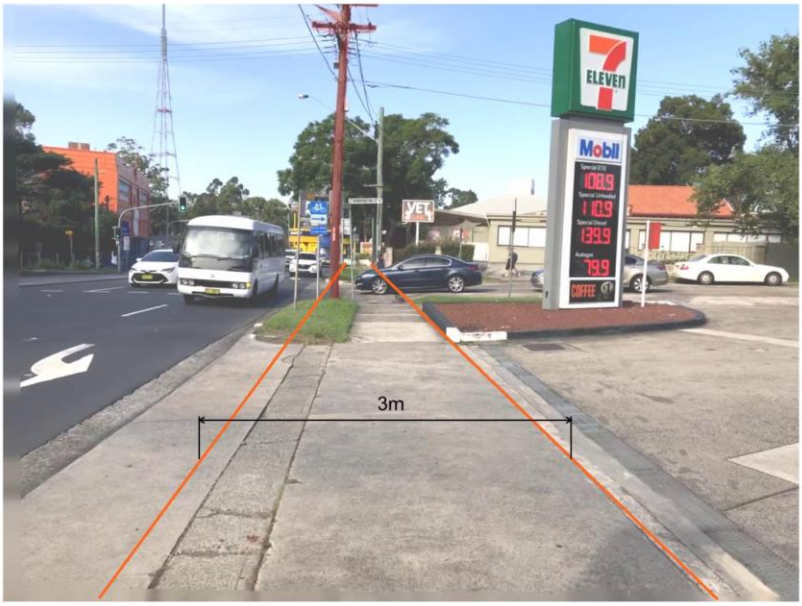


# Existing Conditions




# Existing Conditions

# Existing Conditions



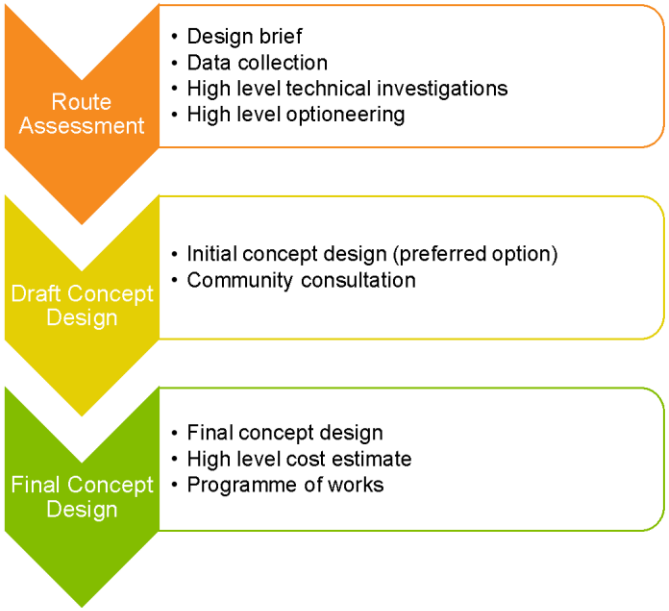
# Initial Assessment

| Frontage land use | Length (m) | Trees | Residential driveways | Commercial driveways | Bus stops | Signalised side streets | Unsignalised side streets | Overhead services |
|---|---|---|---|---|---|---|---|---|
| **Section 1 Residential** | 300 | 6 | 4 | 4 | 0 | 0 | 1 | 3 |
| **Section 2 Commercial A** | 200 | 3 | 0 | 3 | 0 | 0 | 0 | 7 |
| **Section 3 Mixed Use (Residential and Commercial)** | 750 | 27 | 3 | 8 | 3 | 2 | 1 | 9 |
| **Section 4 Commercial B** | 1,300 | 11 | 0 | 17 | 4 | 2 | 6 | 38 |
| **Section 5 Educational** | 200 | 0 | 0 | 0 | 1 | 0 | 0 | 6 |
| **Section 6 Recreation** | 700 | 4 | 0 | 2 | 2 | 2 | 0 | 15 |
| **TOTAL** | 3,450 | 51 | 7 | 34 | 10 | 6 | 8 | 78 |

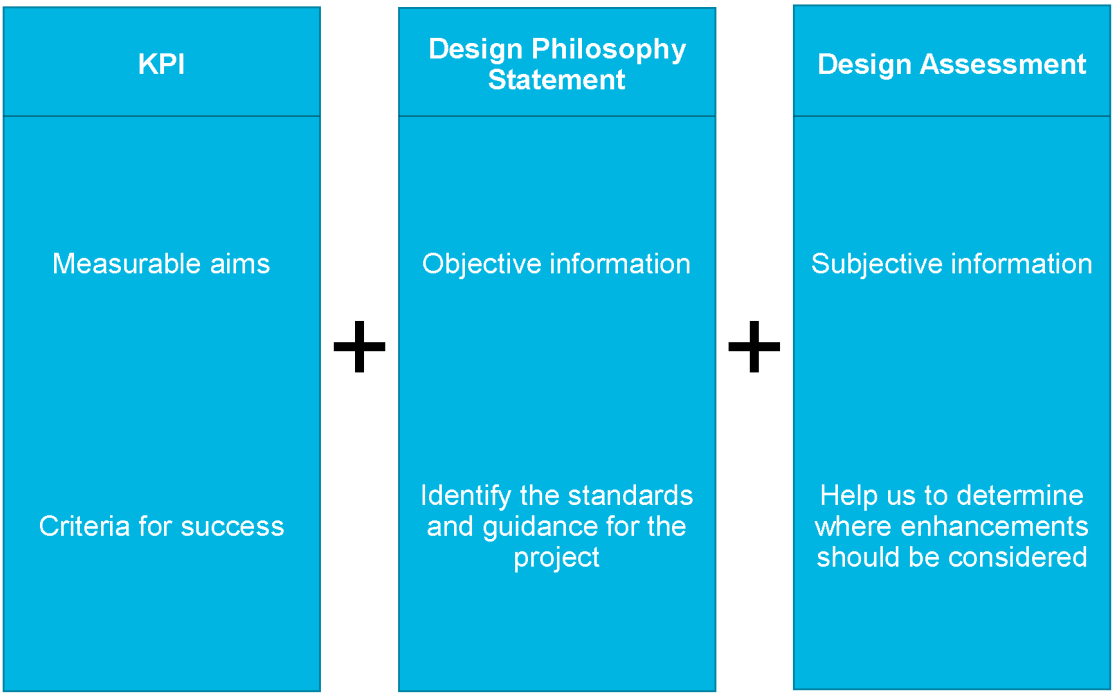

Top 3 Challenges:

1. Bus Stops
2. Trees
3. Commercial Driveways

# Proposed Approach



# Design Brief



# Options Assessment – Multi-Criteria Assessment (MCA)

| MCA Criteria | Weighting |
|---|---|
| Project objectives / KPIs | 33.33% |
| Implementability | 33.33% |
| Assessment of Effects | 33.33% |

| Description | Scoring |
|---|---|
| Significant adverse effect (very difficult to manage/mitigate) | -3 |
| Moderate adverse effect (can be managed/mitigated) | -2 |
| Minor adverse effect (little/no mitigation required) | -1 |
| Neutral / no change | 0 |
| Minor positive effect | +1 |
| Moderate / major positive effect | +2 |
| Significant positive effect | +3 |

# Data Collection

- Site visit to identify constraints and opportunities
- Identify current footpath usage patterns
- Obtain width measurements at critical locations
- Property boundary information – *Council to provide?*
- Aerial imagery – Near Map
- Existing road kerb alignment – *RMS to provide?*
- Existing services information – *RMS to provide?*
- Existing street tree locations – *Council to provide?*

# Stakeholder Inputs

- Past studies and/or relevant data
- Key design considerations for the project team
- Key challenges
- Known opportunities & constraints
- Other proposed projects along route likely to impact design
- Agreement on the KPIs for this project

# Next steps

**Stage 1**

- Collate and review data/reports provided by Council and key stakeholders
- Prepare and finalise Design Brief in consultation with key stakeholders
- Data collection and high level technical investigations
- Route assessment – review available options, identify feasible ones and finalise a preferred option

**Stage 2**

- Draft concept design – prepare draft concept design for the preferred option
- Community consultation (led by Council) and respond to community queries

**Stage 3**

- Finalise concept design and estimate indicative costs and timeframe for implementation


AECOM
Imagine it.
Delivered.

AECOM Imagine it. Delivered.

AECOM Australia Pty Ltd
Level 21, 420 George Street
Sydney NSW 2000
PO Box Q410
QVB Post Office NSW 1230
Australia
www.aecom.com

+61 2 8934 0000 tel
+61 2 8934 0001 fax
ABN 20 093 846 925

# Minutes of Meeting

Pacific Highway Shared Path - Artarmon to St Leonards

| | | | |
|---|---|---|---|
| Subject | Movement and Place Framework - TfNSW | Page | 1 |
| Venue | TfNSW, Franklin Room, 477, Pitt St | Time | 11:30 |
| Participants | Transport for NSW<br>Benny Horn<br>Neill Miller<br><br>Willoughby City Council<br>Gordon Farrelly<br>Heather Gavriel<br>Norma Shankie-Williams<br>Craig O'Brien<br>Dennis Nguyen<br>Daniel Sui<br><br>AECOM<br>Anoop Sridhar<br>Jack Jiang | | |
| Apologies | | | |
| File/Ref No. | | Date | 13-Mar-2019 |
| Distribution | As above | | |

| No | Item | Action | Date |
|---|---|---|---|
| 1. | **Introduction**<br><br>TfNSW informed that this meeting has been arranged based on request from Willoughby City Council to provide guidance regarding the Movement & Place framework and its potential application to the Pacific Highway Shared Path study. | Note | |
| 2. | **Movement and Place Framework**<br><br>TfNSW provided an overview of the movement and place framework. The discussions centred around the definition of different types of movements and classification of places. It was highlighted that the purpose of the framework is to understand the relationship between movement and places and plan according to the needs.<br><br>Council enquired if there are any guidelines to use the framework to specific projects like the shared path study. TfNSW informed that the framework provides a matrix which determines the relative | Info | |

| No | Item | Action | Date |
|---|---|---|---|
| | importance of movement and place. The treatments should then be decided based on the classification of the section as per the matrix included within the framework. Consideration should be given to the future planning of both the movement and place within the section under consideration. | Note | |
| 3. | **Pacific Highway Shared Path**<br><br>Willoughby City Council provided an overview about the project and AECOM presented further details regarding the project objectives, status and the movement and place assessments prepared as part of this project.<br><br>TfNSW gave the following recommendations:<br>• Objectives should ideally be outcome focussed than solution focussed.<br>• Long term vision and planning to be considered while designating "Place" and "Movement".<br>• Qualitative assessment for Place is more suitable than a quantitative assessment.<br>• Colour coding of the movement corridor to be in line with TfNSW guidelines.<br>• Map designating movement and place definitions along the corridor more suitable than the table.<br>• Performance indicators booklet prepared by RMS can be provided for reference.<br><br>Willoughby City Council suggested the following changes:<br>• Section 4 on the map to be changed to Industrial land use.<br>• Movement definition along the corridor to be modified to include anticipated cycle and pedestrian movements in addition to the vehicle movements on Pacific Highway.<br>• Requested TfNSW to provide classifications table for reference.<br><br>TfNSW confirmed that the proposed approach is acceptable for this study. | Note<br><br>TfNSW<br><br>TfNSW | <br><br>22-Mar-19<br><br>22-Mar-19 |
| 4. | **Next Steps**<br><br>AECOM informed that following are the next steps:<br>• Movement and place assessment will be amended based on the discussions. High-level optioneering will be based on the revised assessments.<br>• Based on feedback received from the community and other stakeholders, a preferred option for the shared path will be identified. | | |

Attachments: Nil

AECOM Imagine it. Delivered.

AECOM Australia Pty Ltd
Level 21, 420 George Street
Sydney NSW 2000
PO Box Q410
QVB Post Office NSW 1230
Australia
www.aecom.com

+61 2 8934 0000 tel
+61 2 8934 0001 fax
ABN 20 093 846 925

# Minutes of Meeting

Pacific Highway Shared Path-Artarmon to St Leonards

| | | | |
|---|---|---|---|
| Subject | Stakeholder Consultation Workshop | Page | 1 |
| Venue | Level 6, Banksia Room, Willoughby City Council, Chatswood | Time | 1730 hrs |
| Participants | Councillor Wendy Norton<br>Gordon Farrelly (Council)<br>Heather Gavriel (Council)<br>Carolyn New (Bike North)<br>Russ Webber (North Shore Bicycle Group)<br>Sashika Perera (Lane Cove Council)<br>Anoop Sridhar (AECOM)<br>Jack Jiang (AECOM)<br>Alex Saunders (AECOM) | | |
| Apologies | Councillor Craig Campbell<br>Councillor Stuart Coppock<br>Leon Paap (RMS)<br>Benny Horn (TfNSW)<br>Egwin Herbert (Sydney Buses)<br>Sara Stace (TfNSW)<br>Yaffa Gould (Bike North)<br>Nada Curac<br>Lindsay Menday<br>Cotter Erickson<br>Tony Richards<br>Paul Collings<br>Martin Terescenko (Lane Cove Council) | | |
| File/Ref No. | | Date | 13-Mar-2019 |
| Distribution | As above | | |

| No | Item | Action | Date |
|---|---|---|---|
| 1. | <u>Introduction – Shared Path between St Leonards and Artarmon</u><br><br>Willoughby Council introduced the project, the scope and proposed timeframes. TfNSW has classified the Pacific Highway as a Tier 1 link in the regional bicycle network. | Note | |

| No | Item | Action | Date |
|---|---|---|---|
| 2. | Project objectives<br><br>The rationale for this project was one of providing improvements in the short term to facilitate and encourage cycling on the Pacific Highway beyond the existing demographics, while also taking opportunities to improve the experience for other customer groups. | Note | |
| 3. | Existing context and conditions<br>• AECOM outlined characteristics of the project area including footpath width, number of pinch points etc.<br>• Key challenges include:<br>- Potential conflicts with pedestrians and bus passengers<br>- Width of unsignalised side-streets (also an opportunity to improve pedestrian safety)<br>- Pinch points caused by existing trees, bus shelters, signage, ITS boxes, lighting and power poles,<br>- Pavement surface was found to be inconsistent but generally in good condition. | Note | |
| 4. | Movement & Place assessments<br>• Willoughby Council indicated that TfNSW considers the M+P framework to include locations that link to the project area, e.g. needs of side streets and the general traffic lanes rather than just the Pacific highway, footpath and fronting lots.<br>• This project is one of the pilots for the application of M+P for the Willoughby Council.<br>• Willoughby Council stated that in applying the M+P framework the needs of the Lane Cove Council side should also be considered. For example pedestrian crossing demands at the TAFE. | AECOM | |
| 5. | High level options and improvement strategies<br>• Willoughby Council described that the primary objective of the project is to provide a continuous and safe shared path, one where a base level of functionality and amenity would be achieved that could then be further developed upon.<br>• AECOM outlined potential treatments for unsignalised intersections based on a cost-benefit axis. It was described how the cost axis will play a role in the selection of treatments appropriate for the project.<br>• Treatments for pinch points at bus shelters were outlined and given the geometric constraints, AECOM indicated that moving shelters to property boundary side of the footpath was the preferred option. Stakeholders raised potential safety concerns, the mitigation of which requires further investigation. Safety measures include line marking/signage to create shared zones, channelling cyclists behind the bus shelter and pedestrians in front of bus shelter or priority control such as give way signs.<br>• Slimline bus shelters and clear side panels are also preferred, subject to consultation with Willoughby Council and JC Decaux. | AECOM | |

| No | Item | Action | Date |
|---|---|---|---|
| 6. | <u>Feedback from stakeholders via mapping</u><br>• In terms of the anticipated customer group for the shared path, Council indicated the project is currently targeting more casual riders rather than the most avid commuter cyclists.<br>• Stakeholders noted that experienced riders may also use the path in certain circumstances, e.g. connections to Gore Hill Freeway cycle paths or for steeper uphill sections of Pacific Highway. However, the experienced riders would predominantly use the road.<br>• In terms of pedestrian and cyclist interaction, tactile and visual elements would be used to control speeds of those more experienced riders who choose to use the shared path in order to enhance pedestrian safety. Markings have been found to be more effective than signs. | All | |
| 7. | <u>Key principles</u><br>Bus Shelter Pinch Point<br>• It was noted pending further conversation with appropriate parties there may be an opportunity to widen the footpath near the cemetery.<br>• Was also noted that JC Decaux may require clearance between the back of the bus shelter to walls/fences which may limit the benefit of moving the shelter to the property boundary side.<br>• Options in cases where even 2m width can't be achieved include sight distance/ end-end visibility improvements and warning signs / line marking. Current practice from other Councils such as City of Sydney should be investigated.<br>• AECOM to find examples of shared zones between cyclists and pedestrians at bus stops.<br>• Stakeholders noted that some cycle users may not comply with signs and restrictions, however provision of a shared path is likely to attract more casual riders who would have higher compliance.<br>• In terms of pedestrian and cyclist interaction, tactile and visual elements would be used to control speeds of those more experienced riders who choose to use the shared path in order to minimise impacts to pedestrian safety.<br>• Limited crossing facilities across Pacific Highway to provide access to public transport was also noted as an issue.<br>Mowbray Road Tee Pinch Point<br>• Tactile / pavement marking and reminders to give way to pedestrians should be provided.<br>• Potential planning solution in buying adjacent Sydney Water land.<br>• Council has significant control over potential solutions including waiting for the tree to expire and replacing it with a tree at a slightly different location. However unless a tree is "unsafe" it's unlikely that removals would be considered.<br>• Stakeholders noted that the lack of trees within the project area overall was an issue which should also be considered. | AECOM | |

| No | Item | Action | Date |
|---|---|---|---|
| | Freeway with Signs / Lighting Pinch Point<br>• Financially it's likely that moving the ITS boxes would be preferable to moving the large guide signs. To be checked with RMS.<br>Bus Shelter Near Thomas Street Pinch Point<br>• Clearing part of the nature strip would be a viable solution.<br>Unsignalised Crossings<br>• Options for reducing crossing distances and providing kerb build-outs at industrial side roads are limited due to turning path issues.<br>• Potential for painted marking and traffic islands as solutions. Painted pavement may discourage queuing drivers from blocking the shared path.<br>• It was noted that the industrial precinct is slated for future redevelopment which would increase heavy vehicle demand due to construction and intensification of land use.<br>• One safety issue with the shared path increasing cycling/ped volumes was raised - drivers would be looking right for a gap and won't necessarily be used to looking left for peds / cyclists.<br>• Oblique alignment of Dickson Avenue was highlighted as an issue. To be reviewed during design development.<br>• Improving alignments of intersections, kerb build-outs etc. may have a significant impact on the project's budget.<br>Crossings into Lane Cove LGA<br>• Consider the bicycle schemes and pedestrian networks proposed by Lane Cove Council.<br>Future Provision of Dedicated Cycling Facilities<br>• The traffic and transport team is looking at the Pacific Highway as a whole link and working with Willoughby City Council's Planning team to update the Development control Plans to include provision of a future shared cycleway. This is subject to further conversations internally within Willoughby City Council.<br>Loss of Nature Strips / Grassed Sections<br>• Loss of grass has implications for pedestrian amenity which should be considered.<br>• Refer to River Road West in Lane Cove as an example of how shared paths in the area look. | AECOM | |
| 8. | <u>Next steps</u><br>• AECOM to carry out further site visits and commence draft concept design.<br>• AECOM to continue consultation with Council's internal stakeholders, RMS, TfNSW and JC Decaux.<br>• Community consultation proposed next month.<br>• Concept design to be concluded in FY 2019.<br>• AECOM and Willoughby Council are happy to take emails with | AECOM & Council | |

| No | Item | Action | Date |
|---|---|---|---|
| | further questions. | | |

AECOM Imagine it. Delivered.

AECOM Australia Pty Ltd
Level 21, 420 George Street
Sydney NSW 2000
PO Box Q410
QVB Post Office NSW 1230
Australia
www.aecom.com

+61 2 8934 0000 tel
+61 2 8934 0001 fax
ABN 20 093 846 925

# Minutes of Meeting

Pacific Highway Shared Path - Artarmon to St Leonards

| | | | |
|---|---|---|---|
| Subject | Trees and Parks Discussion | Page | 1 |
| Venue | Flannel Flower Room, Level 6 | Time | 9:00 |
| Participants | Willoughby City Council<br>Heather Gavriel<br>Jean O'Neill<br>Jason Baker<br><br>AECOM<br>Anoop Sridhar<br>Jack Jiang | | |
| Apologies | | | |
| File/Ref No. | | Date | 14-Mar-2019 |
| Distribution | As above | | |

| No | Item | Action | Date |
|---|---|---|---|
| 1. | **Introduction**<br><br>Willoughby City Council informed that this meeting is to understand the Pacific Highway shared path study and discuss potential issues and options to mitigate obstructions due to trees along the proposed route. | Note | |
| 2. | **Pacific Highway Shared Path**<br><br>AECOM presented details regarding the project objectives, proposed route and existing site conditions. Following items were discussed in relation to the project area and existing constraints:<br><br>• AECOM requested Council (parks and open spaces team) to provide inventory of trees along the route. Council informed that inventory has not been completed for this section but can be expedited and provided as soon as it is available.<br>• Pacific Highway is a key focus area as per Council resolution to increase tree cover.<br>• Several trees with roots protruding towards the proposed shared path found along the corridor. Council team suggested using filter pave, an approved product, which is porous and can provide a flat surface over the roots to allow people to travel over it. | Willoughby City Council<br><br>Note<br><br>Note | 27 March 2019 |

| No | Item | Action | Date |
|---|---|---|---|
| | • Trees inside private property with overhanging branches observed. Private owners to be notified to ensure vertical clearance for the shared path. Council's contractor could be provided to private owners to ensure a quick turnaround. Cost to be borne by the project.<br>• AECOM recommends an arboriculture assessment as a part of detailed design.<br>• Overgrown vegetation along on/off ramp leading to the freeway belongs to RMS and they need to be notified to ensure removal. AECOM to confirm with RMS in another meeting<br>• Parks and open spaces team highlighted that due to priorities set forth by the Council, no approval will be provided to remove trees along this corridor.<br>• Nature strips are mowed by the private owners.<br>• Council prefers to plant trees at the kerb built-outs instead of low level planting. AECOM to review if opportunities existing without sight line issues.<br>• Planting trees around bus shelters will inform the bikers a change in environment and warn them about high pedestrian activity. Council's team to review options for planting trees around bus stops after receiving proposed options from AECOM.<br>• Council's team to provide cost of typical tree planting per item.<br>• Council's team acknowledged that pinch points will be present throughout the shared path route due to the presence of trees. This has been accepted by the user groups and stakeholders during the workshop held on 13 March 2019 and will be accepted by the Council considering the Council's resolution to increase tree cover along the Pacific Highway. | Note<br>Note<br>Note<br>AECOM<br>Willoughby City Council<br>Note | 21 March 2019<br>29 March 2019 |
| 3. | **Next Steps**<br>• AECOM to provide proposed treatment options for locations with bus shelters.<br>• Council's team to provide inventory of trees along this corridor and review opportunities for planting trees at locations with bus shelters. | | 21 March 2019<br>27 March 2019 |

Attachments: Nil